

# **INTRODUCTORY INFORMATION**

BLANK PAGE

# TABLE of CONTENTS

## **PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP**

### INTRODUCTORY INFORMATION

#### TABLE OF CONTENTS

### **DIVISION 00: PROCUREMENT AND CONTRACTING REQUIREMENTS**

#### **PROCUREMENT REQUIREMENTS SUBGROUP**

##### **00 1000 SOLICITATION**

###### INVITATION TO BID

##### **00 2000 INSTRUCTIONS FOR PROCUREMENT**

###### INSTRUCTIONS TO BIDDERS

##### **00 4000 PROCUREMENT FORMS AND SUPPLEMENTS**

###### SUBCONTRACTORS AND MAJOR MATERIALS SUPPLIERS LIST EQUAL PRODUCT APPROVAL REQUEST FORM BID FORM AND EMAIL BID MODIFICATION FORM

##### **00 4500 REPRESENTATIONS AND CERTIFICATIONS**

###### CONSTRUCTION MATERIAL ASBESTOS REPRESENTATION

#### **CONTRACTING REQUIREMENTS SUBGROUP**

##### **00 5000 CONTRACTING FORMS AND SUPPLEMENTS**

###### AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR A FIXED SUM (CANADA)

##### **00 7000 CONDITIONS OF THE CONTRACT**

###### GENERAL CONDITIONS FOR A FIXED SUM (CANADA) SUPPLEMENTARY CONDITIONS FIXED SUM (CANADA)

## **SPECIFICATIONS GROUP**

### **GENERAL REQUIREMENTS SUBGROUP**

### **DIVISION 01: GENERAL REQUIREMENTS**

##### **01 1000 SUMMARY**

###### 01 1100 SUMMARY OF WORK 01 1200 MULTIPLE CONTRACT SUMMARY 01 1400 WORK RESTRICTIONS

##### **01 2000 PRICE AND PAYMENT PROCEDURES**

###### 01 2900 PAYMENT PROCEDURES

**01 3000 ADMINISTRATIVE REQUIREMENTS**

01 3100 PROJECT MANAGEMENT AND COORDINATION  
01 3200 CONSTRUCTION PROGRESS DOCUMENTATION  
01 3300 SUBMITTAL PROCEDURES  
01 3500 SPECIAL PROCEDURES

**01 4000 QUALITY REQUIREMENTS**

01 4000 QUALITY REQUIREMENTS  
01 4200 REFERENCES  
01 4301 QUALITY ASSURANCE - QUALIFICATIONS  
01 4523 TESTING AND INSPECTION SERVICES  
01 4546 DUCT TESTING, ADJUSTING, AND BALANCING

**01 5000 TEMPORARY FACILITIES AND CONTROLS**

01 5100 TEMPORARY UTILITIES  
01 5200 CONSTRUCTION FACILITIES  
01 5400 CONSTRUCTION AIDS  
01 5600 TEMPORARY BARRIERS AND ENCLOSURES  
01 5700 TEMPORARY CONTROLS  
01 5800 PROJECT IDENTIFICATION

**01 6000 PRODUCT REQUIREMENTS**

01 6100 COMMON PRODUCT REQUIREMENTS  
01 6200 PRODUCT OPTIONS  
01 6400 OWNER-FURNISHED PRODUCTS  
01 6600 PRODUCT DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

**01 7000 EXECUTION AND CLOSEOUT REQUIREMENTS**

01 7300 EXECUTION  
01 7400 CLEANING AND WASTE MANAGEMENT  
01 7700 CLOSEOUT PROCEDURES  
01 7800 CLOSEOUT SUBMITTALS

**FACILITY CONSTRUCTION SUBGROUP****DIVISION 02: EXISTING CONDITIONS****02 4000 DEMOLITION AND STRUCTURE MOVING**

02 4119 SELECTIVE STRUCTURE DEMOLITION

**DIVISION 03: CONCRETE****03 2000 CONCRETE REINFORCING**

03 2100 REINFORCEMENT BARS

**03 3000 CAST-IN-PLACE CONCRETE**

03 3111 CAST-IN-PLACE STRUCTURAL CONCRETE  
03 3923 MEMBRANE CONCRETE CURING

**DIVISION 04: MASONRY****04 0500 COMMON WORK RESULTS FOR MASONRY**

04 0501 COMMON MASONRY REQUIREMENTS



04 0513 CEMENT AND LIME MASONRY MORTARING  
04 0521 MASONRY VENEER TIES  
04 0523 MASONRY ACCESSORIES

**04 2000 UNIT MASONRY**

04 2113 BRICK VENEER UNIT MASONRY

**DIVISION 05: METALS****05 1000 STRUCTURAL METAL FRAMING**

05 1223 STRUCTURAL STEEL FOR BUILDINGS

**05 5000 METAL FABRICATIONS**

05 5214 GALVANIZED STEEL PIPE AND TUBE RAILINGS  
05 5871 METAL BRACKETS

**DIVISION 06: WOOD, PLASTICS, AND COMPOSITES****06 0500 COMMON WORK RESULTS OF WOOD, PLASTICS, AND COMPOSITES**

06 0573 PRESERVATIVE WOOD TREATMENT

**06 1000 ROUGH CARPENTRY**

06 1011 WOOD FASTENINGS  
06 1100 WOOD FRAMING  
06 1636 WOOD PANEL PRODUCT SHEATHING

**06 2000 FINISH CARPENTRY**

06 2001 COMMON FINISH CARPENTRY REQUIREMENTS  
06 2024 DOOR, FRAME, AND FINISH HARDWARE INSTALLATION  
06 2210 MISCELLANEOUS WOOD TRIM

**06 4000 ARCHITECTURAL WOODWORK**

06 4001 COMMON ARCHITECTURAL WOODWORK REQUIREMENTS  
06 4005 PLASTIC LAMINATE  
06 4114 WOOD-VENEER-FACED ARCHITECTURAL CABINETS  
06 4512 ARCHITECTURAL WOODWORK WOOD TRIM

**06 6000 PLASTIC FABRICATIONS**

06 6001 MISCELLANEOUS PLASTIC FABRICATIONS

**DIVISION 07: THERMAL AND MOISTURE PROTECTION****07 2000 THERMAL PROTECTION**

07 2113 BOARD INSULATION  
07 2116 BLANKET INSULATION  
07 2613 ABOVE-GRADE VAPOR RETARDERS: Canada  
07 2616 BELOW-GRADE VAPOR RETARDERS

**07 8000 SMOKE AND FIRE PROTECTION**

07 8400 FIRESTOPPING

**07 9000 JOINT PROTECTION**

07 9213 ELASTOMERIC JOINT SEALANTS

07 9219 ACOUSTICAL JOINT SEALANTS

**DIVISION 08: OPENINGS****08 0100 OPERATION AND MAINTENANCE OF OPENINGS**

08 0601 HARDWARE GROUP AND KEYING SCHEDULES

**08 1000 DOORS AND FRAMES**

08 1213 HOLLOW METAL FRAMES

08 1429 FLUSH WOOD DOORS: FIELD-FINISHED, CLEAR

**08 3000 SPECIALTY DOORS AND FRAMES**

08 3110 ACCESS DOORS AND PANELS

**08 7000 HARDWARE**

08 7101 COMMON FINISH HARDWARE REQUIREMENTS

08 7102 HANGING DEVICES

08 7103 SECURING DEVICES

08 7106 CLOSING DEVICES

08 7109 ACCESSORIES

**08 8000 GLAZING**

08 8100 GLASS GLAZING

**DIVISION 09: FINISHES****09 2000 PLASTER AND GYPSUM BOARD**

09 2900 GYPSUM BOARD

**09 3000 TILING**

09 3013 CERAMIC TILING

**09 5000 CEILINGS**

09 5113 ACOUSTICAL PANEL CEILINGS

09 5323 METAL ACOUSTICAL SUSPENSION ASSEMBLIES

**09 6000 FLOORING**

09 6816 SHEET CARPET: BACK CUSHION, DIRECT GLUE

**09 7000 WALL FINISHES**

09 7226 SISAL WALL COVERINGS

**09 9000 PAINTS AND COATINGS**

09 9001 COMMON PAINTING AND COATING REQUIREMENTS  
09 9123 INTERIOR PAINTED GYPSUM BOARD, PLASTER  
09 9124 INTERIOR PAINTED METAL  
09 9125 INTERIOR PAINTED WOOD  
09 9324 INTERIOR CLEAR-FINISHED HARDWOOD  
09 9413 INTERIOR TEXTURED FINISHING

**DIVISION 10: SPECIALTIES****10 1000 INFORMATION SPECIALTIES**

10 1495 MISCELLANEOUS INTERIOR SIGNAGE

**10 2000 INTERIOR SPECIALTIES**

10 2113 METAL TOILET COMPARTMENTS  
10 2813 COMMERCIAL TOILET ACCESSORIES

**DIVISION 11: EQUIPMENT: NOT USED****DIVISION 12: FURNISHINGS: NOT USED****DIVISION 13: SPECIAL CONSTRUCTION: NOT USED****DIVISION 14: CONVEYING SYSTEMS: NOT USED****DIVISIONS 15 THROUGH 19: NOT USED****FACILITY SERVICES SUBGROUP****DIVISION 20: NOT USED****DIVISION 21: NOT USED****DIVISION 22: PLUMBING****22 0500 COMMON WORK RESULTS FOR PLUMBING**

22 0501 COMMON PLUMBING REQUIREMENTS  
22 0529 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT  
22 0553 IDENTIFICATION FOR PLUMBING PIPES AND EQUIPMENT  
22 0719 PLUMBING PIPING INSULATION

**22 1000 PLUMBING PIPES AND PUMPS**

22 1116 DOMESTIC WATER PIPING  
22 1119 DOMESTIC WATER PIPING SPECIALTIES  
22 1313 FACILITY SEWERS  
22 1319 FACILITY SANITARY SEWER SPECIALTIES

**22 4000 PLUMBING FIXTURES**

22 4213 COMMERCIAL WATER CLOSETS AND URINALS  
22 4216 COMMERCIAL LAVATORIES AND SINKS

**DIVISION 23: HEATING, VENTILATING, AND AIR-CONDITIONING****23 0500 COMMON WORK RESULTS FOR HVAC**

- 23 0501 COMMON HVAC REQUIREMENTS
- 23 0529 HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 0553 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 0713 DUCT INSULATION

**23 3000 HVAC AIR DISTRIBUTION**

- 23 3001 COMMON DUCT REQUIREMENTS
- 23 3114 LOW-PRESSURE METAL DUCTS
- 23 3123 UNDERGROUND DUCTS
- 23 3300 AIR DUCT ACCESSORIES
- 23 3316 FIRE AND SMOKE DAMPERS
- 23 3346 FLEXIBLE DUCTS
- 23 3401 EXHAUST FANS
- 23 3713 DIFFUSERS, REGISTERS, AND GRILLES
- 23 3714 LOUVERS AND VENTS

**DIVISION 24 & 25: NOT USED****DIVISION 26: ELECTRICAL****26 0500 COMMON WORK RESULTS FOR ELECTRICAL**

- 26 0501 COMMON ELECTRICAL REQUIREMENTS
- 26 0519 LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
- 26 0523 CONTROL-VOLTAGE ELECTRICAL CABLES
- 26 0526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
- 26 0533 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS
- 26 0613 ELECTRICAL EQUIPMENT MOUNTING HEIGHT SCHEDULE

**26 2000 LOW-VOLTAGE ELECTRICAL TRANSMISSION**

- 26 2726 WIRING DEVICES

**26 5000 LIGHTING**

- 26 5100 INTERIOR LIGHTING
- 26 5200 EMERGENCY LIGHTING

**DIVISION 27: NOT USED****DIVISION 28: ELECTRONIC SAFETY AND SECURITY****28 3000 ELECTRONIC DETECTION AND ALARM**

- 28 3101 FIRE DETECTION AND ALARM SYSTEM

**DIVISION 29: NOT USED****SITE AND INFRASTRUCTURE SUBGROUP****DIVISION 30: NOT USED****DIVISION 31: EARTHWORK**

**31 0500 COMMON WORK RESULTS FOR EARTHWORK**

31 0501 COMMON EARTHWORK REQUIREMENTS

**31 1000 SITE CLEARING**

31 1123 AGGREGATE BASE

31 1413 TOPSOIL STRIPPING AND STOCKPILING

**31 2000 EARTH MOVING**

31 2323 FILL

31 2500 EROSION AND SEDIMENTATION CONTROLS

**DIVISION 32: EXTERIOR IMPROVEMENTS**

**32 9000 PLANTING**

32 9001 COMMON PLANTING REQUIREMENTS

32 9120 TOPSOIL AND PLACEMENT

32 9122 TOPSOIL GRADING

32 9223 SODDING

**DIVISION 33: NOT USED**

**DIVISIONS 36 THROUGH 39: NOT USED**

END OF TABLE OF CONTENTS

BLANK PAGE

# **DIVISION 01: GENERAL REQUIREMENTS**

## **01 1000 SUMMARY**

- 01 1100 SUMMARY OF WORK
- 01 1200 MULTIPLE CONTRACT SUMMARY
- 01 1400 WORK RESTRICTIONS

## **01 2000 PRICE AND PAYMENT PROCEDURES**

- 01 2900 PAYMENT PROCEDURES

## **01 3000 ADMINISTRATIVE REQUIREMENTS**

- 01 3100 PROJECT MANAGEMENT AND COORDINATION
- 01 3200 CONSTRUCTION PROGRESS DOCUMENTATION
- 01 3300 SUBMITTAL PROCEDURES
- 01 3500 SPECIAL PROCEDURES

## **01 4000 QUALITY REQUIREMENTS**

- 01 4000 QUALITY REQUIREMENTS
- 01 4200 REFERENCES
- 01 4301 QUALITY ASSURANCE - QUALIFICATIONS
- 01 4523 TESTING AND INSPECTION SERVICES
- 01 4546 DUCT TESTING, ADJUSTING, AND BALANCING

## **01 5000 TEMPORARY FACILITIES AND CONTROLS**

- 01 5100 TEMPORARY UTILITIES
- 01 5200 CONSTRUCTION FACILITIES
- 01 5400 CONSTRUCTION AIDS
- 01 5600 TEMPORARY BARRIERS AND ENCLOSURES
- 01 5700 TEMPORARY CONTROLS
- 01 5800 PROJECT IDENTIFICATION

## **01 6000 PRODUCT REQUIREMENTS**

- 01 6100 COMMON PRODUCT REQUIREMENTS
- 01 6200 PRODUCT OPTIONS
- 01 6400 OWNER-FURNISHED PRODUCTS
- 01 6600 PRODUCT DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

## **01 7000 EXECUTION AND CLOSEOUT REQUIREMENTS**

- 01 7300 EXECUTION
- 01 7400 CLEANING AND WASTE MANAGEMENT
- 01 7700 CLOSEOUT PROCEDURES
- 01 7800 CLOSEOUT SUBMITTALS

END OF TABLE OF CONTENTS

BLANK PAGE



**SECTION 01 1100****SUMMARY OF WORK****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements Summary of Work requirements.

**1.2 WORK COVERED BY CONTRACT DOCUMENTS**

- A. Provisions contained in Division 01 apply to Sections of Divisions 02 through 49 of Specifications. Instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, obligations set forth in Contract Documents are obligations of Contractor.
- B. Contractor shall furnish total labor, materials, equipment, and services necessary to perform The Work in accordance with Contract Documents.

**1.3 WORK BY OWNER**

- A. Owner will furnish and install some portions of The Work with its own forces. Contractor will be provided with schedule of when these items are to be performed.
  - 1. General:
    - a. Complete work necessary to accommodate work to be performed by Owner before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work.
    - b. Store and protect completed work provided by Owner until date of Substantial Completion.
  - 2. Work furnished and installed by Owner include, but are not limited to, following:
    - a. Carpet and Carpet Base.
    - b. Selected commercial toilet accessories.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used****END OF SECTION**

**BLANK PAGE**

**SECTION 01 1200****MULTIPLE CONTRACT SUMMARY****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Multiple Contracts.

**1.2 SUMMARY OF CONTRACTS**

- A. Owner may issue separate contracts for operations scheduled to precede and be substantially completed before beginning of The Work under this Contract.
1. Contractor will be given written notice from such contractors of any revisions to scheduled completion of their work at least 30 days in advance. Owner will reimburse Contractor for expenses incurred by Contractor by failure to be properly notified.
- B. Owner has issued or will issue separate contracts for operations scheduled to be completed between Notice to Proceed and Substantial Completion.
1. General:
    - a. Schedule performance of work covered by such separate contracts in Contractor's Construction Schedule so as to avoid delays in Substantial Completion. Give written notice to such contractors and to Owner of any revisions to scheduled delivery and work dates at least 90 days in advance.
    - b. Complete work necessary to accommodate items provided under such separate contracts before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work including, but not limited to, cost of crews during downtime or for call backs and costs to correct substrate deficiencies.
    - c. Store and protect completed work provided under separate contracts until date of Substantial Completion.
  2. Sheet Carpeting. See Section 09 6816.
  3. Testing and Inspection. See Section 01 4523 "Testing and Inspection" for testing and inspection, and testing laboratory services for materials, products, and construction methods:
    - a. Aggregate Base. See Section 31 1123.
    - b. Air System Testing, Adjusting, and Balance. See Section 01 4546.
    - c. Concrete. See Section 03 3111.
    - d. Fill / Engineering Fill. See Section 31 2323.
    - e. Reinforcement Bars. See Section 03 2100.
- C. Owner has issued or will issue separate contracts for operations normally scheduled to follow Substantial Completion.
1. General:
    - a. Give written notice to such contractors and to Owner of any revisions of scheduled date of Substantial Completion at least 90 days in advance. Contractor will be back charged for actual expenses incurred by Owner for failure to accurately report date of Substantial Completion.
    - b. Complete work necessary to accommodate items provided under such separate contracts before Substantial Completion. Contractor will be back charged for actual expenses incurred by Owner for failure to complete such work before Substantial Completion.
  2. Furnishings.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

**SECTION 01 1400****WORK RESTRICTIONS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Work Restrictions.

**1.2 PROJECT CONDITIONS**

- A. During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and their employees comply with following requirements:
1. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
  2. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project site.
  3. Do not allow use of tobacco in any form on Project Site.
  4. Do not allow pornographic or other indecent materials on site.
  5. Do not allow work on Project site on Sundays except for emergency work.
  6. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
  7. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
  8. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
  9. Do not build fires on Project Site.
  10. Do not allow weapons on Project Site, except those carried by law enforcement officers or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.
  11. Owner will occupy the building during construction.
- B. Do not load or permit any part of the structure to be loaded with a weight that will endanger its safety. Questions of structural loading as part of construction means and methods shall be addressed by a licensed structural engineer engaged by Contractor, subject to the review by Architect.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used****END OF SECTION**

**BLANK PAGE**

**SECTION 01 2900****PAYMENT PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements to prepare and process Applications for Payments.

**1.2 PAYMENT REQUESTS**

- A. Use Payment Request forms provided by Owner.
- B. Each Payment Request will be consistent with previous requests and payments certified by Architect and paid for by Owner.
- C. Request Preparation:
  - 1. Complete every entry on Payment Request form.
  - 2. Entries will match data on approved schedule of values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
  - 3. Submit signed Payment Request to Architect with current Construction Schedule.
- D. Provide following submittals before or with submittal of Initial Payment Request:
  - 1. List of Subcontractors.
  - 2. Initial progress report.
  - 3. Contractor's Construction Schedule.
  - 4. Submittal Schedule.
- E. Provide Affidavit of Contractor and Consent of Surety with Payment Request following Substantial Completion.

**1.3 SCHEDULE OF VALUES**

- A. Submit schedule of values on Owner's standard form to Architect 20 days minimum before submission of Initial Payment Request as a necessary condition before payment will be processed. Coordinate preparation of schedule of values with preparation of Contractor's Construction Schedule. Correlate line items in Schedule of Values with other required administrative schedules and forms, including:
  - 1. Contractor's Construction Schedule.
  - 2. Payment Request form.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used****END OF SECTION**

**BLANK PAGE**



**SECTION 01 3100****PROJECT MANAGEMENT AND COORDINATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Project Management and Coordination on Projects.

**1.2 PROJECT COORDINATION**

- A. Project designation for this Project is **LDS 510-5234-1802-0101 Cranbrook 1, 2, &.**
- B. This Project designation will be included on documents generated for Project by Contractor and Subcontractors or be present on a cover letter accompanying such documents.

**1.3 MULTIPLE CONTRACT COORDINATION**

- A. Contractor shall be responsible for accurately maintaining and reporting schedule of The Work from Notice to Proceed to date of Substantial Completion.
- B. Contractor shall be responsible for providing Temporary Facilities And Controls for those who perform work on Project from Notice to Proceed to date of Substantial Completion.
- C. Contractor shall be responsible for providing Construction Waste Management And Disposal services for those who perform work on Project from Notice to Proceed to date of Substantial Completion.
- D. Contractor shall be responsible for Final Cleaning for entire Project.

**1.4 PROJECT MEETINGS AND CONFERENCES**

- A. Preconstruction Conference:
  - 1. Attend preconstruction conference and organizational meeting scheduled by Architect at Project site or other convenient location.
  - 2. Be prepared to discuss items of significance that could affect progress, including such topics as:
    - a. Construction schedule.
    - b. Critical Work sequencing.
    - c. Current problems.
    - d. Designation of responsible personnel.
    - e. Distribution of Contract Documents.
    - f. Equipment deliveries and priorities.
    - g. General schedule of inspections by Architect and its consultants.
    - h. General inspection of tests.
    - i. Office, work, and storage areas.
    - j. Preparation of record documents and O & M manuals.
    - k. Procedures for processing interpretations and Modifications.
    - l. Procedures for processing Payment Requests.
    - m. Project cleanup.
    - n. Security.
    - o. Status of permits.
    - p. Submittal of Product Data, Shop Drawings, Samples, Quality Assurance / Control submittals.

- q. Use of the premises.
- r. Work restrictions.
- s. Working hours.
- 3. Architect will record minutes of meetings and distribute copies to Owner and Contractor within three (3) working days.

**B. Progress Meetings:**

- 1. Attend progress meetings at Project site at regularly scheduled intervals determined by Architect, at least once a month.
- 2. Progress meetings will be open to Owner, Architect, Subcontractors, and anyone invited by Owner, Architect, and Contractor.
- 3. Be prepared to discuss items of significance that could affect progress, including following:
  - a. Progress since last meeting.
  - b. Whether Contractor is on schedule.
  - c. Activities required to complete Project within Contract Time.
  - d. Labor and materials provided under separate contracts.
  - e. Off-site fabrication problems.
  - f. Access.
  - g. Site use.
  - h. Temporary facilities and services.
  - i. Hours of work.
  - j. Hazards and risks.
  - k. Project cleanup.
  - l. Quality and Work standards.
  - m. Status of pending modifications.
  - n. Documentation of information for Payment Requests.
  - o. Maintenance of Project records.
- 4. Architect will prepare minutes of progress meetings and distribute copies of minutes to Owner and Contractor within three (3) working days.

**C. Pre-Installation Conferences:**

- 1. Attend pre-installation conferences specified in Contract Document.
  - a. If possible, schedule these conferences on same day as regularly scheduled Progress Meetings. If this is not possible, coordinate scheduling with Architect.
  - b. Request input from attendees in preparing agenda.
- 2. Be prepared to discuss following items:
  - a. Requirements of Contract Documents.
  - b. Completed work necessary for installation of items or systems.
  - c. Conditions not in compliance with installation requirements.
  - d. Installation and inspection schedule.
  - e. Coordination between trades.
  - f. Space and access limitations.
  - g. Testing.
- 3. Architect will prepare meeting minutes and distribute minutes to Owner and Contractor within three (3) working days.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

**SECTION 01 3200****CONSTRUCTION PROGRESS DOCUMENTATION****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes But is Not Limited To:**

1. Administrative and procedural requirements for documenting the progress of construction during performance of the Work.

**1.2 SCHEDULING OF WORK****A. Bar Chart Schedule:**

1. Submit horizontal bar chart schedule before Preconstruction Conference. Provide separate time bar for each construction activity listed on Owner's payment request form. Within each time bar, show estimated completion percentage. Provide continuous vertical line to identify first working day of each week. Show each activity in chronological sequence. Show graphically sequences necessary for completion of related portions of The Work. As The Work progresses, place contrasting mark in each bar to indicate actual completion.
2. Provide copies of schedule for Architect and Owner and post copy in field office.
3. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.
4. Project Management Software Programs:
  - a. Any software project management program capable of Bar Chart Scheduling for projects of equal size and complexity is approved by Contractor and approved by Owner's Project Manager.

**B. Daily Construction Reports:**

1. Prepare daily reports of operations at Project including at least following information:
  - a. List of Subcontractors at site.
  - b. Approximate count of personnel at site by trade.
  - c. High and low temperatures, general weather conditions.
  - d. Major items of equipment on site.
  - e. Materials, equipment, or Owner-furnished items arriving at or leaving site.
  - f. Accidents and unusual events.
  - g. Site or structure damage by water, frost, wind, or other causes.
  - h. Meetings, conferences, and significant decisions.
  - i. Visitors to the job including meeting attendees.
  - j. Stoppages, delays, shortages, losses.
  - k. Any tests made and their result if known.
  - l. Meter readings and similar recordings.
  - m. Emergency procedures.
  - n. Orders and requests of governing authorities.
  - o. Modifications received, carried out.
  - p. Services connected, disconnected.
  - q. Equipment or system tests and start-ups.
  - r. Brief summary of work accomplished that day.
  - s. Signature of person preparing report.
2. Submit daily reports to Architect at least weekly.
3. Maintain copies of daily reports at field office.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

**SECTION 01 3300****SUBMITTAL PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Submittal Procedures.
- B. Related Requirements:
  - 1. Section 01 7800: 'Closeout Submittals' for administrative and procedural requirements for closeout submittals.

**1.2 SUBMITTAL SCHEDULE**

- A. Furnish submittal schedule within 20 days after receipt of Notice to Proceed, listing items specified to be furnished for review to Architect including product data, shop drawings, samples, and Informational submittals.
  - 1. Coordinate submittal schedule with Contractor's construction schedule.
  - 2. Enclose the following information for each item:
    - a. Scheduled date for first submittal.
    - b. Related Section number.
    - c. Submittal category.
    - d. Name of Subcontractor.
    - e. Description of part of the Work covered.
    - f. Scheduled date for resubmittal.
    - g. Scheduled date for Architect's final release or approval.
- B. Print and distribute copies to Architect and Owner and post copy in field office. When revisions are made, distribute to same parties and post in same location.
- C. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.

**1.3 SUBMITTAL PROCEDURES**

- A. Coordination:
  - 1. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
    - a. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
    - b. Coordinate transmittal of different types of submittals required for related elements of The Work so processing will not be delayed by need to review submittals concurrently for coordination. Architect reserves right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
  - 2. Processing Time:
    - a. Allow sufficient review time so installation will not be delayed by time required to process submittals, including time for resubmittals.
      - 1) Allow 21 days for initial review. Allow additional time if processing must be delayed allowing coordination with subsequent submittals. Architect will promptly advise Contractor when submittal being processed must be delayed for coordination.
      - 2) If an intermediate submittal is necessary, process same as initial submittal.

- 3) Allow 10 days for reprocessing each submittal.
  - 4) No extension of Contract Time will be authorized because of failure to transmit submittals to Architect in sufficient time before work is to be performed to allow processing.
3. Identification:
- a. Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
    - 1) Provide space approximately 4 by 5 inches on label or beside title block on Shop Drawings to record Contractor's review and approval markings and action taken.
    - 2) Include following information on label for processing and recording action taken:
      - a) Project name.
      - b) Date.
      - c) Name and address of Architect.
      - d) Name and address of Contractor.
      - e) Name and address of Subcontractor.
      - f) Name and address of supplier.
      - g) Name of manufacturer.
      - h) Number and title of appropriate Specification Section.
      - i) Drawing number and detail references, as appropriate.
4. Transmittal:
- a. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using transmittal letter. On transmittal, record relevant information and requests for data. Include Contractor's certification that information complies with Contract Document requirements, or, on form or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations.
  - b. Submittals received from sources other than Contractor or not marked with Contractor's approval will be returned without action.

#### 1.4 ACTION SUBMITTALS

- A. Product Data:
1. Submit Product Data, as required by individual Sections of Specifications.
  2. Mark each copy of each set of submittals to show choices and options used on Project. Where printed Product Data includes information on products that are not required for Project, mark copies to indicate information relating to Project.
  3. Certify that proposed product complies with requirements of Contract Documents. List any deviations from those requirements on form or separate sheet.
  4. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.
  5. Submit electronic files PDF: Architect will return a PDF copy marked with action taken and with corrections or modifications required.
- B. Shop Drawings:
1. Submit newly prepared graphic data to accurate scale. Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least **8-1/2 by 11 inches (215 by 280 mm)** but no larger than **36 by 48 inches (915 by 1 200 mm)**. Highlight, encircle, or otherwise show deviations from Contract Documents. Include following information as a minimum:
    - a. Dimensions.
    - b. Identification of products and materials included.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
  2. Do not reproduce Contract Documents or copy standard information as basis of Shop Drawings. Standard printed information prepared without specific reference to Project is not acceptable as Shop Drawings.
  3. Review and designate (stamp) approval of shop drawings. Unless otherwise specified, submit to Architect six copies of shop drawings required by Contract Documents. Shop drawings not required by Contract Documents, but requested by Contractor or supplied by Subcontractor, need not be submitted to Architect for review.

## C. Samples:

1. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
  - a. Mount, display, or package Samples to ease review of qualities specified. Prepare Samples to match samples provided by Architect, if applicable. Include following:
    - 1) Generic description of Sample.
    - 2) Sample source.
    - 3) Product name or name of manufacturer.
    - 4) Compliance with recognized standards.
    - 5) Availability and delivery time.
2. Submit Samples for review of kind, color, pattern, and texture, for final check of these characteristics with other elements, and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
  - a. Where variations in color, pattern, texture or other characteristics are inherent in material or product represented, submit set of three samples minimum that show approximate limits of variations.
  - b. Refer to other specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
  - c. Refer to other Sections for Samples to be returned to Contractor for incorporation into The Work. Such Samples shall be undamaged at time of use. On transmittal, indicate special requests regarding disposition of Sample submittals.
3. Where Samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit full set of choices for material or product. Preliminary submittals will be reviewed and returned with Architect's mark indicating selection and other action.
4. Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three sets. One will be returned marked with action taken.
5. Samples, as accepted and returned by Architect, will be used for quality comparisons throughout course of construction.
  - a. Unless noncompliance with Contract Documents is observed, submittal may serve as final submittal.
  - b. Sample sets may be used to obtain final acceptance of construction associated with each set.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Informational submittals are design data, test reports, certificates, manufacturer's instructions, manufacturer's field reports, and other documentary data affirming quality of products and installations. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required. [or] Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.
  1. Certificates: Describe certificates intended to document affirmations by Contractor or others that the work is in accordance with the Contract Documents, but do not repeat provisions of Parts 2 or 3.
  2. Delegated Design Submittals / Design Data: Describe submittals intended to demonstrate design work prepared by Contractor's licensed professionals.
  3. Test And Evaluation Reports: Describe submittal of test reports or evaluation service reports intended to document required tests.
  4. Manufacturer Instructions: Describe submittals intended to document manufacturer instructions.
  5. Source Quality Control Submittals: Describe submittal of source quality control documentation.
  6. Field Quality Control Submittals: Describe submittal of field quality control documentation.
  7. Manufacturer Reports: Describe submittal of Manufacturer reports as documentation of manufacturer activities.
  8. Special Procedure Submittals: Describe submittals intended to document special procedures. An example would be construction staging or phasing for remodeling an existing facility while

- keeping it in operation. While the Contractor would normally be responsible for managing this, submittal of his plan as documentation could be specified.
9. Qualification Statements: Describe submittals intended to document qualifications of entities employed by Contractor.

## **1.6 CLOSEOUT SUBMITTALS**

- A. This title groups submittals that occur during project closeout. Coordinate with section 01 7800 Closeout Submittals.
1. As Built Record Drawings as defined in the Agreement.
  2. Project Manual: Complete Project Manual including Addenda and Modifications as defined in General Conditions.
  3. Maintenance Contracts: Describe submittal of the maintenance contract specific to the Section.
  4. Operations & Maintenance Data: Describe submittal of operation and maintenance data necessary for products of the Section.
  5. Warranty Documentation: Describe submittal of final executed warranty document specific to the Section.
  6. Record Documentation: Describe submittal of record documentation specific to the Section.

## **1.7 MAINTENANCE MATERIAL SUBMITTALS**

- A. This title groups maintenance material required submittals specific to the Section. Items may be provided at completion of Work or submitted with section 01 7800 Closeout Submittals:
1. Spare Parts: Describe spare parts necessary for Owner's use in facility operation and maintenance. 'Parts' are generally understood to be items such as filters, hardware, lamps, and other similar manufactured items that require only simple replacement.
  2. Extra Stock Materials: Describe extra stock materials to be provided for Owner's use in facility operation and maintenance. Extra stock materials are generally understood to be items such as ceiling tiles, flooring, paint etc.
  3. Tools:
    - a. Describe tools to be provided for Owner's use in facility operation and maintenance. Tools are generally understood to be wrenches, gauges, circuit setters, etc, required for proper operation or maintenance of a system.

## **PART 2 - PRODUCTS Not Used**

## **PART 3 - EXECUTION Not Used**

## **END OF SECTION**



**SECTION 01 3500****SPECIAL PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Special Procedures.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Acceleration of Work:
1. Complete The Work in accordance with Construction Schedule. If Contractor falls behind schedule, take such actions as are necessary, at no additional expense to Owner, to bring progress of The Work back in accordance with schedule.
  2. Owner may request proposal for completion of The Work at date earlier than expiration of Contract Time:
    - a. Promptly provide requested proposal showing cost of such acceleration of The Work. Consult with Owner and Architect regarding possible options to decrease cost of such acceleration.
    - b. If Owner determines to order acceleration of The Work, change in Contract Sum and Contract Time resulting from acceleration will be included in a Change Order.

**1.3 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
1. Meet current applicable OHAS and Workplace BC regulations, 'Construction Industry Regulations'.
  2. Owner's Safety Requirements:
    - a. Personal Protection:
      - 1) Contractor shall ensure:
        - a) Positive means of fall protection, such as guardrails system, safety net system, personal fall arrest system, etc, is provided to employees whenever exposed to a fall **6 feet (1.80 m)** or more above a lower level.
        - b) Personnel working on Project shall wear hard hats and safety glasses as required by regulation and hazard.
        - c) Personnel working on Project shall wear long or short sleeve shirts, long pants, and hard-toed boots or other sturdy shoes appropriate to type and phase of work being performed.
    - b. Contractor Tools And Equipment:
      - 1) Contractor shall ensure:
        - a) Tools and equipment are in good working condition, well maintained, and have necessary guards in place.
        - b) Ground Fault Circuit Interrupters (GFCI) is utilized on power cords and tools.
        - c) Scaffolding and man lifts are in good working condition, erected and maintained as required by governmental regulations.
        - d) Ladders are in good condition, well maintained, used as specified by Manufacturer, and secured as required.
    - c. Miscellaneous:
      - 1) Contractor shall ensure:
        - a) Protection is provided on protruding rebar and other similar objects.
        - b) General Contractor Superintendent has completed the OHAS construction outreach training course or equivalent.

- c) Implementation and administration of safety program on Project.
  - d) Material Safety Data Sheets (MSDS) are provided for substances or materials for which an MSDS is required by governmental regulations before bringing on site.
  - e) Consistent safety training is provided to employees on Project.
  - f) Implement and coordinate Lockout / Tagout procedures with Owner's Representative as required.
- 2) Report accidents involving injury to employees on Project that require off-site medical treatment to Owner's designated representative.
- d. Hot Work Permit:
    - 1) Permit shall document that fire prevention and protection requirements in 29 CFR 1926.352, 'Fire Prevention' have been implemented prior to beginning hot work operations.
    - 2) Required for doing hot work involving open flames or producing heat or sparks such as:
      - a) Brazing.
      - b) Cutting.
      - c) Grinding.
      - d) Soldering.
      - e) Welding.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used**

**END OF SECTION**

**SECTION 01 4000****QUALITY REQUIREMENTS****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Related Requirements:
  - 1. Section 01 3100: 'Project Management and Coordination' for Pre-Installation Conferences for testing and inspection.
  - 2. Section 01 3200: 'Construction Progress Documentation' for developing a schedule of required tests and inspections.
  - 3. Section 01 3300: 'Submittal Procedures'.
  - 4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
  - 5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
  - 6. Section 01 7300: 'Executions' for cutting and patching for repair and restoration of construction disturbed by testing and inspecting activities.
  - 7. Divisions 01 thru 49 establish responsibility for providing specific testing and inspections.

**1.3 REFERENCES**

- A. Definitions:
  - 1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
  - 2. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with requirements indicated; and having complied with requirements of authorities having jurisdiction.
  - 3. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a construction operation, including installation, erection, application, and similar operations.
    - a. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of corresponding generic name.
  - 4. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish standard by which the Work will be judged.
  - 5. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant

- construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
6. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
  7. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
  8. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
  9. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
  10. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
  11. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

B. Reference Standards:

1. International Code Council (IBC) (2015 or most recent edition adopted by AHJ):
  - a. IBC Chapter 17, 'Structural Tests and Special Inspections'.
2. British Columbia Building Code 2018.

## 1.4 ADMINISTRATIVE REQUIREMENTS

A. Conflicting Requirements:

1. General:
  - a. If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement.
  - b. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
2. Minimum Quantity or Quality Levels:
  - a. Quantity or quality level shown or specified shall be minimum provided or performed.
  - b. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.
  - c. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for context of requirements.
  - d. Refer uncertainties to Architect for decision before proceeding.

B. Coordination:

1. Coordinate sequence of activities to accommodate required quality assurance and quality control services with minimum of delay.

C. Scheduling:

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

## 1.5 QUALITY ASSURANCE

- A. Testing and inspecting services are used to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
1. Specific quality assurance and quality control requirements for individual construction activities are specified in Sections that specify those activities and Section 01 4523. Requirements in those Sections may also cover production of standard products.
  2. Specified tests, inspections, and related actions do not limit Contractor's other quality control procedures that facilitate compliance with Contract Document requirements.
  3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

- B. Quality Assurance Services:
  - 1. Activities, actions, and procedures performed before and during execution of the Work to verify compliance and guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
  - 2. Owner or Owner's designated representative(s) will perform quality assurance to verify compliance with Contract Documents.
- C. Activities performed by Owner's Quality Assurance Testing Agency include, but are not limited to following:
  - 1. Individual Sections in Division 01 through Division 49:
    - a. Pre-Installation Conference agenda review items for:
      - 1) Schedule requirements.
      - 2) Testing and inspection requirements:
      - 3) Requirements and frequency of testing and inspections.
      - 4) Mock-up or sample requirements.
      - 5) Submittals requirements.
    - b. Quality Assurance personal qualifications.
      - 1) Qualification documentation including certificates if required.
    - c. Non-Conforming Work:
      - 1) Prepare non-compliance log to track non-compliant testing or inspections.
  - 2. Weekly Activities:
    - a. Summarize and track any non-compliance issues.
    - b. Provide summary report of previous week's performed Work.
    - c. Visit contractors periodically to find out if they have any concerns with Quality Assurance inspectors and check on any schedule changes.
    - d. Visit Owner's Representatives periodically to find out if they have any concerns with how project is progressing.
- D. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with following requirements, using materials indicated for completed Work:
  - 1. Coordinate with individual section in Division 01 through Division 49 if there are any additional requirements or modification to these requirements:
    - a. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
    - b. Notify Architect seven days in advance of dates and times when mockups will be constructed.
    - c. Demonstrate proposed range of aesthetic effects and workmanship.
    - d. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
      - 1) Allow seven days for initial review and each re-review of each mockup.
    - e. Maintain mockups during construction in undisturbed condition as standard for judging completed Work.
      - 1) Demolish and remove mockups when directed, unless otherwise indicated.

## 1.6 QUALITY CONTROL

- A. Quality Control Services:
  - 1. **Quality Control will be sole responsibility of Contractor.**
    - a. Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements performed by Contractor:
      - 1) They do not include inspections, tests or related actions performed by Architect, Owner, governing authorities or independent agencies hired by Owner or Architect.
      - 2) **Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.**
    - b. Where services are indicated as Contractor's responsibility, engage a qualified Testing Agency to perform these quality control services.
      - 1) Contractor shall not employ same testing entity engaged by Owner, without Owner's written approval.

- B. Manufacturer's Field Services: Where indicated, engage factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300: 'Submittal Procedures'.
- C. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify Testing Agency sufficiently in advance of operations to permit assignment of personnel. Provide following:
  - 1. Access to the Work.
  - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
  - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist Testing Agency in obtaining samples.
  - 4. Facilities for storage and field curing of test samples.
  - 5. Delivery of samples to testing agencies.
  - 6. Preliminary design mix proposed for use for material mixes that require quality control by Testing Agency.
  - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections:
  - 1. Civil And Structural Testing:
    - a. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services'. Quality Control is sole responsibility of Contractor:
      - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
        - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
      - 2) Contractor bears full responsible for compliance with all contract requirements and quality control on project.
    - b. Weekly Activities:
      - 1) Ensure that non-compliance log is current.
      - 2) Provide summary reports of performed Work.

## **PART 2 - PRODUCTS Not Used**

## **PART 3 - EXECUTION**

### **3.1 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
  - 2. Comply with Contract Document requirements for Section 01 7300 'Execution' for cutting and patching.
- B. Protect construction exposed by or for Quality Assurance and Quality Control activities.
- C. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

**END OF SECTION**

**SECTION 01 4200****REFERENCES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Reference standards, definitions, specification format, and industry standards.

**1.2 REFERENCES**

- A. Definitions:
1. Approved: The term "approved," when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
  2. Directed: The term "directed" is a command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," and "permitted" have the same meaning as "directed."
  3. Experienced: The term "experienced," when used with an entity, means having successfully completed a minimum of ten previous projects similar in size and scope to this Project; being familiar with the special requirements indicated, and having complied with requirements of authority having jurisdiction.
  4. Furnish: The term "furnish" means supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
  5. General: Basic Contract definitions are included in the Conditions of the Contract.
  6. Indicated: The term "indicated" refers to requirements expressed by graphic representations, or in written form on Drawings, in Specifications, and in other Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
  7. Install: The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
  8. Installer: An "Installer" is the Contractor or another entity engaged by the Contractor, as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  9. Project Site: The term "Project site" means the space available for performing construction activities. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
  10. Provide: The term "provide" means to furnish and install, complete and ready for the intended use.
  11. Regulations: The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
  12. Submitted: The terms "submitted," "reported," "satisfactory" and similar words and phrases means submitted to Architect, reported to Architect and similar phrases.
  13. Testing Agencies: A "testing agency" is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, or to report on and, if required, to interpret results of those inspections or tests.
  14. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
- B. References Standards:

1. Specification Format: Specifications will follow MasterFormat™ 2004 for organizing numbers and titles. (The Construction Specifications Institute, Project Resource Manual/CSI Manual of Practice, 5<sup>th</sup> Edition. New York, McGraw-Hill, 2005).
  - a. Specification Identifications:
    - 1) The Specifications use section numbers and titles to help cross referencing in the Contract Documents.
    - 2) Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
  - b. Specification Language:
    - 1) Specifications should be prepared, with concern and respect for their legal status. Specifications should be Clear, Concise, Correct and Complete.
    - 2) Streamlining: Streamlining is used to list products, materials, reference standards, and other itemized specifications. This technique places the subject first and provides keywords for quick reference
  - c. Sentence Structure:
    - 1) Specifications to be written in the "Imperative Mood".
      - a) The verb that clearly defines the action becomes the first word in the sentence.
      - b) The imperative sentence is concise and readily understandable.
    - 2) Streamlining is used to list products, materials, reference standards, and other itemized specifications. This technique places the subject first and provides keywords for quick reference.
  - d. Abbreviated Language:
    - 1) Abbreviations should be used only on drawings and schedules where space is limited.
    - 2) Abbreviations with multiple meanings should be avoided, unless used in different disciplines where their meaning is clear from the context in which they are used.
    - 3) Abbreviations should be limited to five or fewer letters
      - a) The verb that clearly defines the action becomes the first word in the sentence.
  - e. Symbols:
    - 1) Caution should apply to symbols substituted for words or terms.
  - f. Numbers:
    - 1) The use of Arabic numerals rather than words for numbers is recommended.
- C. Industry Standards:
  1. Except where Contract Documents specify otherwise, construction industry standards will apply and are made a part of Contract Documents by reference.
  2. Where compliance with two or more standards is specified and standards apparently establish different or conflicting requirements for minimum quantities or quality levels, refer to Architect for decision before proceeding. Quantity or quality level shown or specified will be minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for context of requirements. Refer uncertainties to Architect for decision before proceeding.
  3. Each entity engaged in construction on Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with Contract Documents. Where copies of standards are needed for performance of a required construction activity, Contractor will obtain copies directly from publication source.
  4. Trade Association names and titles of general standards are frequently abbreviated. The acronyms or abbreviations, as referenced in Contract Documents, are defined to mean association names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.
- D. Federal Government Agencies:
  1. Names and titles of federal government standard or specification producing agencies are often abbreviated. The acronyms or abbreviations referenced in Contract Documents represent names of standard or specification producing agencies of federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.
- E. Governing Regulations / Authorities:



1. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
2. Obtain copies of regulations required to be retained at Project Site, available for reference by parties who have a reasonable need for such reference.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used****END OF SECTION**

**BLANK PAGE**

**SECTION 01 4301****QUALITY ASSURANCE - QUALIFICATIONS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Related Documents:
  - 1. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Requirements:
  - 1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
  - 2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
  - 2. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
  - 3. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
  - 4. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM E329-14a, 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.'

**1.3 QUALIFICATIONS**

- A. Qualifications: Qualifications paragraphs in this Article establish minimum qualification levels required; individual Specification Sections specify additional requirements:
  - 1. Fabricator / Supplier / Installer Qualifications: Firm experienced in producing products similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units.
    - a. VMR (Value Managed Relationship):
      - 1) Where heading '*VMR (Value Managed Relationship) / Manufacturers / Suppliers / Installers*' is used to identify list of specified suppliers or installers, Owner has established relationships that extend beyond requirements of this Project.
      - 2) No other *Suppliers / Installers* will be acceptable.
      - 3) Follow specified procedures to preserve relationships between Owner and specified suppliers / installers and advantages that accrue to Owner from those relationships.
      - 4) **Following areas of the Work have restrictions on sub-bids by Contractor:**
        - a) Common Finish Hardware Requirements, Section 08 7101: VMR Supplier, no other Supplier accepted:
          - (1) Accessories, Section 08 7109.

- (3) Closing Devices, Section 08 7106.
    - (4) Hanging Devices, Section 08 7102.
    - (7) Securing Devices, Section 08 7103.
  - b) Flush Wood Doors: Field Finished, Clear, Section 08 1429: VMR Supplier, no other Supplier accepted.
  - c) Hollow Metal Frames, Section 08 1213: VMR Supplier, no other Supplier accepted.
  - d) Sheet Carpeting, Section 09 6816: VMR, no other Manufacturer / Installers accepted.
  - e) Aluminum framed entrances 08 4113.
- b. Approved:
  - 1) Where heading '*Approved Suppliers / Distributors / Installers / Applicators / Fabricators*' is used to identify list of specified suppliers / distributors / installers / applicators / fabricators, use only listed suppliers / installers / fabricators.
  - 2) No substitutions will be allowed.
  - 3) **Following areas of the Work have restrictions on sub-bids by which may be accepted by Contractor:**
    - a) Ceramic Tiling, Section 09 3013: No other Suppliers accepted.
- c. Acceptable Suppliers / Installers:
  - 1) Where heading '*Acceptable Suppliers / Installers / Fabricators*' is used, qualifications as specified in Quality Assurance in Part 1 of individual sections will be used to determine requirements of those that will be acceptable to be used on Project. Lists for acceptable installers can include additional installers that may be approved before bidding or by addendum.
- 2. Factory-Authorized Service Representative Qualifications:
  - a. Authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- 3. Installer Qualifications:
  - a. Firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- 4. Manufacturer Qualifications:
  - a. Firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- 5. Manufacturer's Field Services Qualifications:
  - a. Experienced authorized representative of manufacturer to inspect field-assembled components and equipment installation, including service connections.
- 6. Professional Engineer Qualifications:
  - a. Professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- 7. Specialists:
  - a. Certain sections of Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations.
  - b. Specialists shall satisfy qualification requirements indicated and shall be engaged for activities indicated.
  - c. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- 8. Testing Agency Qualifications:
  - a. Independent Testing Agency with experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
    - 1) Testing Laboratory:
      - a) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
      - b) Cement and Concrete Reference Laboratory (CCRL).

- c) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
- d) National Voluntary Laboratory (NVLAP): Testing Agency accredited according to National Institute of Standards and Technology (NIST) Technology Administration, U. S. Department of Commerce Accreditation Program.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used****END OF SECTION**

**BLANK PAGE**

**SECTION 01 4523****TESTING AND INSPECTING SERVICES****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section

**1.2 SUMMARY**

- A. This Section includes testing, inspections, special testing, special inspections, and testing laboratory services for materials, products, and construction methods as specified hereafter for the Work.
- B. Specified tests, inspections, and related actions do not limit Contractor's quality control procedures to fully comply with Contract Document requirements in all regards.
- C. Costs: Costs of initial services for testing and inspection personnel will be paid by Owner unless otherwise noted.
  - 1. If initial tests indicate non-compliance with contract document requirements, any subsequent testing will be performed by same personnel and paid for by Contractor.
- D. Related Requirements:
  - 1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
  - 2. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
  - 3. Division 01 through Division 49 establish responsibility for providing specific testing and inspections and Field Tests and Inspections.

**1.3 REFERENCES**

- A. Association Publications:
  - 1. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15<sup>th</sup> St., NW, Washington, DC 20005; 202-347-7474; [www.acec.org](http://www.acec.org)).
  - 2. International Code Council (IBC):
    - a. IBC Chapter 17, 'Structural Tests and Special Inspections'.
  - 3. British Columbia Building Code 2018.
- B. Definitions:
  - 1. Accreditation: Process in which [certification](#) of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
  - 2. Approved: To authorize, endorse, validate, confirm, or agree to.
  - 3. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
  - 4. Inspection/Special Inspection:
    - a. Inspection: Not required by code provisions but may be required by Contract Documents.
    - b. Special Inspection: Inspection required of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance

- with approved construction documents and reference standards (required by code provisions and by Contract Documents).
  - c. Special Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
  - d. Special Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
  - 5. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation. They are not samples. Approved mockups establish standard by which the Work will be judged.
  - 6. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
  - 7. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
  - 8. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
  - 9. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
  - 10. Special Inspection: See Inspection.
  - 11. Special Inspector: Certified individual or firm that implements special inspection program for project.
  - 12. Special Test: See Test.
  - 13. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship:
    - a. Test: Not required by code provisions but may be required by Contract Documents.
    - b. Special Test: Required by code provisions and by Contract Documents.
  - 14. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
  - 15. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
  - 16. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.
- C. Reference Standards:
- 1. ASTM International:
    - a. ASTM A898/A898M-17, 'Standard Specification for Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes'.
    - b. ASTM C42/C42M-16, 'Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete'.
    - c. ASTM C138/C138M-17a, 'Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete'.
    - d. ASTM C597-16, 'Standard Test Method for Pulse Velocity Through Concrete'.
    - e. ASTM C803/C803M-17, 'Standard Test Method for Penetration Resistance of Hardened Concrete'.
    - f. ASTM C805/C805M-13a, 'Standard Test Method for Rebound Number of Hardened Concrete'.
    - g. ASTM C1019-16, 'Standard Test Method for Sampling and Testing Grout'.
    - h. ASTM C1021-08(2014), 'Standard Practice for Laboratories Engaged in Testing of Building Sealants'.
    - i. ASTM C1077-16a, 'Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation'.
    - j. ASTM C1093-15a, 'Standard Practice for Accreditation of Testing Agencies for Masonry'.
    - k. ASTM D3666-16, 'Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials'.



- l. ASTM D3740-12a, 'Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction'.
- m. ASTM E114-15, 'Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Examination by the Contact Method'.
- n. ASTM E164-13, 'Standard Practice for Contact Ultrasonic Testing of Weldments'.
- o. ASTM E329-14a: 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
- p. ASTM E488-15, 'Standard Test Methods for Strength of Anchors in Concrete Elements'.
- q. ASTM E543-15, 'Standard Specification for Agencies Performing Nondestructive Testing'.
- r. ASTM E587-15, 'Standard Practice for Ultrasonic Angle-Beam Examination by the Contact Method'.
- s. ASTM E709-15, 'Standard Guide for Magnetic Particle Testing'.
- t. ASTM E1212-17, 'Standard Practice for Quality Management Systems for Nondestructive Testing Agencies'.
- u. ASTM F710-11, 'Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring'.
- v. ASTM F2170-16b, 'Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes'.
- 2. Code of Federal Regulations:
  - a. 29 CFR 1910, Subpart A, Section 1910.7, 'Definition and Requirements for a Nationally Recognized Testing Laboratory'.
- 3. International Code Council (IBC 2015 or latest approved edition):
  - a. IBC Chapter 17, 'Special Inspections And Tests'.
    - 1) Section 1704, 'Special Inspections And Tests, Contractor Responsibility And Structural Observations'.
    - 2) Section 1705, 'Required Special Inspection And Tests'.
      - a) Section 1705.2, 'Steel Construction'.
- 4. British Columbia Building Code 2018.

#### 1.4 SUBMITTALS

- A. Informational Submittals:
  - 1. General: Additional submittal requirements are specified in Individual Sections in Division 01 through Division 50.
  - 2. Certificates:
    - a. Testing Agency will submit certified written report of each inspection, test, or similar service.
  - 3. Tests and Evaluation Reports:
    - a. Testing Agency or Agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections and deliver copies (or electronic record) distributed as follows:
      - 1) 1 copy to Owner's Representative.
      - 2) 1 copy to Architect.
      - 3) 1 copy to Consulting Engineers (Engineer of Record).
      - 4) 1 copy to General Contractor.
      - 5) 1 copy to Authorities Having Jurisdiction (if required).
    - b. Other tests, certificates, and similar documents will be obtained by Contractor and delivered to Owner's Representative and Architect in such time as not to delay progress of the Work or final payment therefore.
    - c. Submittal Format:
      - 1) Schedule of Tests and Inspections: Prepare in tabular form and include following:
        - a) Specification Section number and title.
        - b) Description of test and inspection.
        - c) Identification of applicable standards.
        - d) Identification of test and inspection methods.
        - e) Number of tests and inspections required.
        - f) Time schedule or time span for tests and inspections.
        - g) Entity responsible for performing tests and inspections.
        - h) Requirements for obtaining samples.

- 2) Certified written reports of each inspection, test, or similar service will include, but not be limited:
  - a) Date of issue.
  - b) Project title and number.
  - c) Name, address, and telephone number of Testing Agency.
  - d) Dates and locations of samples and tests or inspections.
  - e) Names of individuals making tests and inspections.
  - f) Description of the Work and test and inspection method.
  - g) Identification of product and Specification Section.
  - h) Complete test or inspection data.
  - i) Test and inspection results and an interpretation of test results.
  - j) Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - k) Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements.
  - l) Name and signature of laboratory inspector.
  - m) Recommendations on retesting and re-inspecting.
4. Source Quality Control Submittals:
  - a. Testing Agency will submit following prior to commencing the Work:
    - 1) Qualifications of Testing Agency management and personnel designated to project.
    - 2) Testing Agency 'Written Practice for Quality Assurance'.
    - 3) Qualification records for Inspector and non-destructive testing technicians designated for project.
    - 4) Testing Agency non-destructive testing procedures, equipment calibration records, and personnel training records.
    - 5) Testing Agency Quality Control Plan for monitoring and control of testing operations.

## 1.5 QUALITY ASSURANCE

- A. **Owner or Owner's designated representative(s) will perform quality assurance.** Owner's quality assurance procedures may include observations, inspections, testing, verification, monitoring and any other procedures deemed necessary by Owner to verify compliance with Contract Documents.
- B. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.
- C. Certification:
  1. Product producers and associations, which have instituted approved systems of quality control and which have been approved by document approval agencies, are not required to have further testing.
  2. Concrete mixing plants, plants producing fabricated concrete and wood or plywood products certified by agency, lumber, plywood grade marked by approved associates, and materials or equipment bearing underwriters' laboratory labels require no further testing and inspection.
- D. Written Practice for Quality Assurance:
  1. Testing Agency will maintain written practice for selection and administration of inspection personnel, describing training, experience, and examination requirements for qualification and certification of inspection personnel.
  2. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.
  3. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

## 1.6 QUALITY CONTROL

- A. **Quality Control will be sole responsibility of Contractor.** Contractor will be responsible for testing and inspections, coordination, start-up, operational checkout, and commissioning of all items of the Work included in Project. All costs for these services will be included in Contractor's cost of the Work.
- B. Contractor will assign one (1) employee to be responsible for Quality Control. This individual may have other responsibilities and may be Contractor's Project superintendent or Contractor's Project Manager.
- C. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and Owner's Representative within twenty four (24) hours of test or inspection having been performed.
  - 1. Testing and Inspection Reports will be distributed as follows:
    - a. 1 copy to Owner's Representative.
    - b. 1 copy to Architect.
    - c. 1 copy to Consulting Engineer(s) (Engineer of Record).
    - d. 1 copy to Authorities Having Jurisdiction (if required).
- D. Contractor's Responsibility:
  - 1. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents.
  - 2. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.
  - 3. Cooperate with Testing Agency(s) performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify Testing Agency before operations to allow assignment of personnel. Auxiliary services required include but are not limited to:
    - a. Providing access to the Work and furnishing incidental labor, equipment, and facilities deemed necessary by Testing Agency to facilitate inspections and tests at no additional cost to Owner.
    - b. Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
    - c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
    - d. Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
  - 4. Contractor will integrate Owner's independent Testing Agency services within Baseline Project Schedule and with other Project activities.
  - 5. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
  - 6. All Work is subject to testing and inspection and verification of correct operation prior to 100% payment to Contractor of line item(s) pertaining to that aspect of the Work.
  - 7. For Mechanical Equipment, inspection and documented approval of individual equipment and/or system(s) must be accomplished prior to requesting Substantial Completion Inspection for any area affected by said equipment and/or system:
    - a. Contractor will perform thorough checkout of operations with manufacturer's representatives prior to requesting formal inspection by Owner.
    - b. Contractor must notify Owner's Representative, in advance, as to when manufacturer's representative is scheduled to arrive at Site.
  - 8. Comply:
    - a. Upon completion of Testing Agency's inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
    - b. Comply with Contract Documents in making such repairs.
  - 9. Data: Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.
  - 10. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements:

- a. Where results of inspections, tests, or similar services show that the Work does not comply with Contract Document requirements, correct deficiencies in the Work promptly to avoid Work delays.
  - b. Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.
  - c. Contractor responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
  - d. Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
  - e. Should test return unacceptable results, Contractor will bear all costs of retesting and re-inspection as well as cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.
11. Protection:
- a. Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.
12. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
- a. Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover Work for testing or inspection.
  - b. Notify Testing Agency and Architect as noted in Sections in Division 01 through Division 50 prior to any time required for such services.
  - c. Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
  - d. Schedule sequence of activities to accommodate required services with minimum of delay.
  - e. Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections
13. Test and Inspection Log:
- a. Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following:
    - 1) Date test or inspection was conducted.
    - 2) Description of the Work tested or inspected.
    - 3) Date test or inspection results were transmitted to Architect.
    - 4) Identification of Testing Agency or inspector conducting test or inspection.
  - b. Maintain log at Project site:
    - 1) Post changes and modifications as they occur.
    - 2) Provide access to test and inspection log for Architect's reference during normal working hours.

## 1.7 TESTING AND INSPECTIONS - GENERAL

- A. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.
- B. Individual Sections in Division 01 through Division 49 indicate if Owner will provide testing and inspection of the Work of that Section.
- C. Tests include but not limited to those described in detail in 'Field Quality Control' in Part 3 of Individual Sections in Divisions 01 through Division 49.
- D. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
  - 1. Activities of any such Owner consultants are in addition to Contractor testing of materials or systems necessary to prove that performance is in compliance with Contract requirements.
  - 2. Contractor must cooperate with persons and firms engaged in these activities.
- E. Taking Specimens:
  - 1. Except as may be specifically otherwise approved by Architect, only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.

- F. Scheduling Testing Agency:
  - 1. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
  - 2. Contractor will notify Testing Agency and Architect to schedule tests and / or inspections.
- G. For 'building-wide' and/or life safety systems, such as emergency lighting, emergency power uninterruptible power supply systems, fire alarm, smoke evacuation systems, capturer exhaust systems, etc. formal start-up inspection will be completed prior to requesting Substantial Completion Inspection for any area of Project:
  - 1. Manufacturer's representatives and installing contractor will demonstrate both operation and compliance to Owner's agents and consultants. If coordinated and scheduled appropriately by Contractor, these equipment and/or systems inspections may also serve to provide required Owner training, if approved in advance by Owner.
  - 2. Contractor responsible for requesting that Architect arrange for inspection of materials, equipment, and work prior to assembly or enclosure that would make materials, equipment, or work inaccessible for inspection and at other times as may be required.

## 1.8 TESTING AGENCY SERVICES AND RESPONSIBILITIES

- A. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located.
  - 1. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.
- B. Testing and Inspection Services:
  - 1. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
  - 2. Testing Agency will not give direction or instruction to Contractor.
  - 3. Testing Agency will have full authority to see that the Work is performed in strict accordance with requirements of Contract Documents and directions of Owner's Representative and/or Architect.
  - 4. Testing Agency will not provide additional testing and inspection services beyond scope of Work without prior approval of Owner's Representative and / or Architect.
- C. Testing Agency Duties:
  - 1. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
  - 2. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
  - 3. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
  - 4. Testing Agency must have experience and capability to conduct testing and inspecting indicated by ASTM standards and that specializes in types of tests and inspections to be performed.
  - 5. Testing Agency will comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D3666, ASTM D3740, and other relevant ASTM standards.
  - 6. Testing Agency must calibrate all testing equipment at reasonable intervals (minimum yearly) with accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
  - 7. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and will verify compliance with all reference standard requirements.
- D. Testing and Inspection Reports:
  - 1. Conduct and interpret tests and inspections and state in each report whether tested and inspected the Work complies with or deviates from requirements.
  - 2. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
    - a. Description of method of test.

- b. Identification of sample and portion of the Work tested.
  - 1) Description of location in the Work of sample.
  - 2) Time and date when sample was obtained.
  - 3) Weather and climatic conditions at time when sample was obtained.
- c. Evaluation of results of tests including recommendations for action.
- 3. Inspection Reports:
  - a. Testing Agency will furnish 'Inspection at Site' reports for each site visit documenting activities, observations, and inspections.
  - b. Include notation of weather and climatic conditions, time and date conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
- 4. Reporting Testing and Inspection (Conforming Work):
  - a. Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
- 5. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
  - a. Testing Agency, upon determination of irregularities, deficiencies observed or test failure(s) observed in the Work during performance of its services of test or inspection having been performed, will:
    - 1) Verbally notify results to Architect, Contractor, and Owner's Representative within one hour of test or inspection having been performed (if Defective Work (Non-Conforming Work) is incorporated into project).
    - 2) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
  - b. Prepare non-compliance log to track non-compliant testing or inspections.
- 6. Final Report:
  - a. Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

## **1.9 ARCHITECT'S RESPONSIBILITIES**

- A. Architect Duties:
  - 1. Notify Owner's Representative before each test and/or inspection.

## **PART 2 - PRODUCTS Not Used**

## **PART 3 - EXECUTION**

### **3.1 FIELD QUALITY CONTROL**

- A. Field Tests And Inspections:
  - 1. Field Tests and Inspections requirements are described in 'Field Quality Control' of individual Sections in Division 01 through Division 49.

**END OF SECTION**

**SECTION 01 4546****DUCT TESTING, ADJUSTING, AND BALANCING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Is Not Limited To:
  - 1. Test, balance, and adjust air duct systems services provided by Owner as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 01 1200: 'Multiple Contracts Summary': Owner will provide test, balance, and adjust air duct systems. PART 3 of this Section establishes requirements for field tests of 'Testing Agency'.
  - 2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
  - 3. Division 23:
    - a. Completing installation and start-up of mechanical systems and dampers as required for correct balance.
    - b. Maintain HVAC system and equipment in full operation each working day of testing, balancing, and adjusting.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Contractor to assist Testing Agency in testing and balancing of mechanical system.
- B. Scheduling:
  - 1. Contractor to schedule this work in cooperation with other Sections involved and to comply with completion date for test, balance, and adjust air duct systems as described in Contract Documents.
  - 2. Contact Testing Agency and coordinate (Owner' Representative to provide 'Testing Agency' contact information):
    - a. One inspection when 60 percent of ductwork is installed.
    - b. One inspection when 90 percent of equipment and ductwork is installed.
  - 3. Contact Testing Agency and coordinate date(s) for test and balance work when following is completed:
    - a. HVAC and exhaust systems including installation of specialties, devices, and new filters.
    - b. Proper function of control system components including electrical interlocks, damper sequences has been verified.
    - c. Automatic temperature controls have been calibrated and set for design operating conditions.
    - d. Verification of proper thermostat calibration and setting of control components such as static pressure controllers and other devices that may need set points changed during process of balancing system.
  - 4. If, in opinion of Testing Agency, systems are not ready for test and balance, reschedule as required.

**1.3 SUBMITTALS**

- A. Informational Submittals:
  - 1. Test and Evaluation Reports:
    - a. Preliminary Report(s):
      - 1) Four copies to be given to Owner's Representative.

- b. Final Report :
  - 1) Four copies to be given to Owner's Representative.
- B. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Testing and Inspection Reports:
        - a) Testing Agency Testing and Evaluation Final Report of testing, balancing, and adjusting air duct systems. Bind approved copy of Testing and Evaluation Report in Operations And Maintenance Manual for Division 23.

## 1.4 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Approved Testing Agency. Section 01 4301 applies, but is not limited to following:
    - a. Testing Agency shall specialize in testing and balancing of heating, ventilating, and cooling systems to balance, adjust, and test air moving equipment, air distribution, and exhaust systems.
    - b. Testing Agency shall provide proof of having successfully completed at least five years of specialized experience in air and hydronic system balancing.
    - c. Testing Agency shall provide testing under direct supervision of qualified heating and ventilating engineer.
    - d. Neither Architect's engineering consultant nor anyone performing work on this Project under other Sections of Division 23 shall be permitted to do this work.

## PART 2 - PRODUCTS: Not Used

## PART 3 - EXECUTION

### 3.1 OWNER-FURNISHED TESTING AND INSPECTION

- A. Owner to provide Testing and Inspection for testing, balancing, and adjusting air duct systems:
  - 1. See Section 01 1200: Multiple contracts for administrative and procedural requirements for Testing and Inspection services.

### 3.2 FIELD QUALITY CONTROL

- A. Field Tests
  - 1. Air System Testing, Adjusting, And Balance:
    - a. Inspections and site visits. (For paragraph a thru c, note deficiencies, if any, that needs to be corrected and report this to Owner's Representative, Architect, and Mechanical Engineer):
      - 1) One inspection when ductwork installation is 60 percent complete.
      - 2) One inspection when ductwork is installation is 90 percent complete.
      - 3) One inspection when potable hot and cold water system is 90 percent complete.
      - 4) Site visit for test and balance. Before commencing test and balance, perform an inspection to verify 100 percent completion of system. Confirm completion of work, correction of previously noted deficiencies, and look for new deficiencies not noted in previous inspections. If the work is complete, then proceed with test and balance. If the work is not complete and ready for test and balance, inform Contractor and submit an invoice to Owner's Representative for compensation for travel time, expenses, and time on site. Report deficiencies or incomplete work to Owner's Representative, Architect, and Mechanical Engineer.
      - 5) Additional site visits (beyond those set forth above) to complete the work after issues are resolved may be needed and will be paid for separately from compensation for



services set forth in this Agreement, pursuant to hourly rates and conditions set forth in Attachment "A".

- b. Checklist for Inspections and site visits:
  - 1) Pre-Startup Inspection – use for inspections and site visits a thru d in paragraph 1 above. All pertinent items shall be checked, including but not limited to following:
    - a) Removal of shipping blocks and stops.
    - b) Vibration isolators' alignment and adjustment.
    - c) Flexible connections properly installed and aligned.
    - d) Safety controls, safety valves and high or low limits in operation.
    - e) All systems properly filled.
    - f) Filters in place and seal provided around edges.
    - g) Filters and strainers are clean.
    - h) Damper access door installations.
    - i) Installation of all gauges on equipment.
    - j) Control system is operating.
    - k) All dampers, valves, and operators are properly installed and operating.
    - l) All ductwork is installed and sealed.
    - m) Voltage to unit matches nameplate voltage.
  - 2) First Run Inspection – use for inspections and site visits d and e in paragraph 1 above. Recheck items in Pre-Startup list, and check for following items:
    - a) Excessive vibration or noise.
    - b) Loose components.
    - c) Initial control settings.
    - d) Motor amperages.
    - e) Heat buildup in motors.
    - f) Control system is calibrated and functioning as required.
  - 3) System Operation Inspection – use for inspections and site visits d and e in paragraph 1 above. Observe mechanical systems under operation for sufficient amount of time to ensure proper operation in all running modes. Check following items periodically.
    - a) Filters and strainers.
    - b) Filters and strainers.
    - c) Check for system leaks at seals and valves.
- c. Performance Requirements:
  - 1) Testing and balancing in complete accordance with Associated Air Balance Council (AABC) Standards for Field Measurement & Instructions, Form P1266, Volume I.
  - 2) Noise level in chapel and / or cultural hall shall not exceed NC 35 with all HVAC equipment operating in full or second stage cooling mode.
- d. Site tests: Air Test and Balancing Procedure:
  - 1) Instruments used by Consultant shall be accurately calibrated and maintained in good working order.
  - 2) All supply air and return air fans in all HVAC zone systems, energy recovery ventilators, and exhaust fans in building shall be operating when final setup of all units is performed.
  - 3) Perform tests at high and low speeds of multi-speed systems and single speed systems.
  - 4) Perform following testing and balancing functions in accordance with Associated Air Balance Council National Standards.
    - a) Fan Speeds - Air handling units (with variable pitch pulleys and sheaves): Test and adjust fan RPM to achieve design CFM requirements.
    - b) Fan Speeds - Furnaces (with direct drive motors): Set fan speed to lowest possible setting that will achieve design CFM requirements. Adjust down from Contractor setting, if necessary. Adjust low voltage fan speed jumpers (provided and installed by installing contractor) as necessary to achieve design cooling air flow at lowest possible setting. An exception to this would be when furnace is variable speed blower for dehumidification applications.
    - c) Current And Voltage: Measure and record motor current and voltage.
    - d) Pitot-Tube Traverse Method:
      - (1) Make measurements in duct where velocity is uniform, 7-1/2 duct diameters downstream and 2 duct diameters minimum upstream from any turbulence, i.e., elbow, damper, take-off, etc.

- (2) Perform pitot-tube traverse of outdoor ventilation air duct serving each piece of air moving equipment.
  - (3) Where single outdoor ventilation air trunk duct serves multiple pieces of equipment, perform pitot-tube traverse of duct branch serving each piece of equipment as well as pitot-tube traverse of total air flow in trunk with all pieces of equipment operating.
- e) Where pitot-tube traverse is not possible or if pitot-tube traverse is unreliable, flow hood measurement over exterior intake louver or grille is acceptable for measuring outdoor ventilation air.
- f) Use proportionate method of air balance leaving fan at lowest possible speed and at least one branch balance damper fully open.
- 5) Static Pressure: Test and record system static pressures, including suction and discharge static pressure of each fan.
- 6) Air Temperature: Take dry bulb air temperatures on entering and leaving side of each cooling coil. Dry bulb temperatures shall be taken on entering and leaving side of each heating unit.
- 7) Zone Ducts: Adjust zone ducts to within design CFM requirements. At least one zone balancing damper shall be completely open.
- 8) Branch Ducts: Adjust branch ducts to within design CFM requirements. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.
- 9) Tolerances: Test and balance all fans, zone ducts, registers, diffusers etc. to + or – 10 percent of design CFM.
- 10) Identification: Identify location and area of each grille, diffuser, register, and terminal box. Record on air outlet data sheets.
- 11) Description: Record size, type, and manufacturer of each diffuser, grille, and register on air outlet data sheets.
- 12) Drafts: Adjust diffusers, grilles, and registers to minimize drafts. For high sidewall supply air diffusers install horizontal blade core to direct air flow upward 15 degree and set adjustable vertical blades to spread air flow horizontally and evenly in fan pattern.
- 13) Permanently mark all outside air, supply air, and return air damper positions after balancing has been completed.
- 14) Smoke testing: Smoke testing, or some other approved means, may be required to determine leak locations if air balance report indicates that any system's CFM total is less than 90 percent of design CFM. Prior to test, verify that system's duct joints have been sealed as specified and that air moving device in question is supplying required design system air flow. Mechanical Engineer will approve test method required. If smoke test is selected, use following procedure. Provide necessary precautions to protect those performing or observing test from being exposed to smoke.
  - a) Use zinc chloride smoke candles, titanium tetrachloride ampules or sticks, or other devices acceptable to Mechanical engineer to generate smoke.
  - b) Close openings in duct except for one opening at farthest end of duct run.
  - c) Circulate smoke at pressurized condition of **1/2 inch (13 mm)** minimum water gauge static pressure.
  - d) Report findings to mechanical engineer in writing.
- e. Air System Test and Evaluation Report:
  - 1) Record test data on AABC standard forms or facsimile.
  - 2) Preliminary Report: Provide and deliver four copies of complete data for evaluation and approval to Owner.
  - 3) Final report: Provide and deliver complete four copies of final report to Owner prior to project Substantial Completion date.
  - 4) Complete with logs, data, and records as required herein. Print logs, data, and records on white bond paper bound together in report form.
  - 5) Certified accurate and complete by Consultant's certified test and balance engineer.
  - 6) Contain following general data in format selected by Consultant:
    - a) Project Number.
    - b) Project Title.
    - c) Project Location.
    - d) Project Architect and Mechanical Engineer.
    - e) Consultant and Certified Engineer.
    - f) Contractor and mechanical sub-contractor.

- g) Dates tests were performed.
- h) Certification Document.
- i) Report Forms similar to AABC Standard format.
- 7) Report shall include following:
  - a) Instrumentation List including type, model, manufacturer, serial number, and calibration dates.
  - b) HVAC zone identification to include reduced ductwork floor plan from project documents with outlets and inlets numbered to match written test and balance report. This page may be oversized but it should fold up neatly within standard 8 1/2 x 11 report paper size.
  - c) Record following for each piece of air handling equipment:
    - (1) Manufacturer, model number, and serial number.
    - (2) Design and manufacture rated data.
    - (3) Actual CFM.
    - (4) Suction and discharge static pressure of each fan.
    - (5) Outdoor-ventilation-air and return-air total CFM.
    - (6) Final RPM of each motor or speed tap.
    - (7) Actual operating current and voltage of each fan motor.
    - (8) Fan and motor sheave manufacturer, model, size, number of grooves and center distance.
    - (9) Belt size and quantity.

### **3.3 PREPARATION**

- A. Heating, ventilating, and cooling systems and equipment shall be in full operation and continue in operation during each working day of testing and balancing.

### **END OF SECTION**

**BLANK PAGE**

**SECTION 01 5100****TEMPORARY UTILITIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Temporary Utilities.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Where necessary, engage appropriate local utility companies to install temporary service or connect to existing service. Where utility company provides only part of service, provide remainder with matching, compatible materials and equipment. Comply with utility company's recommendations.
1. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction.
  2. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.
  3. Arrange with utility company and existing users for time when service can be interrupted, where necessary, to make connections for temporary services.
  4. Provide adequate capacity at each stage of construction. Before temporary utility availability, provide trucked-in services.
  5. Obtain construction easements necessary to bring temporary and/or permanent utilities to site.
  6. Use qualified personnel for installation and maintenance of temporary facilities. Locate temporary utilities where they will serve Project adequately and result in minimum interference with the Work of Owner or other Contractors on Project Site. Relocate and modify temporary utilities as required.
  7. Pay cost and use charges for temporary and permanent utilities until Substantial Completion has been granted by Owner.
- B. Prepare schedule indicating dates for implementation and termination of each temporary utility. At earliest feasible time, change over from use of temporary service to use of permanent service.
- C. Keep temporary utilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload utilities, or allow them to interfere with progress of The Work. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Project site.
- D. Limit availability of temporary utilities to essential and intended uses to reduce waste and abuse.
- E. Maintain temporary utilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
  2. Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- F. Remove each temporary utility and control when need has ended, or when replaced by permanent utility, but not later than Substantial Completion. Complete permanent construction that may have been delayed because of interference with temporary utility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that make up temporary utilities are property of Contractor.

2. By Substantial Completion, clean and renovate permanent utilities used during construction period, including but not limited to:
  - a. Replace air filters and clean inside of ductwork and housings.
  - b. Replace significantly worn parts and parts subjected to unusual operating conditions.
  - c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

### **1.3 TEMPORARY ELECTRIC POWER**

- A. As needed, provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period.

### **1.4 TEMPORARY FIRE PROTECTION**

- A. Install and maintain temporary fire protection facilities of types needed to protect against predictable and controllable fire losses. At a minimum, provide and maintain in working order two Standard ULC Labeled ABC all-purpose 10 lb fire extinguishers. Do not incorporate these extinguishers into final Project.
  1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher.
  2. Store combustible materials in containers in fire-safe locations.
  3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for fighting fires.
  4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
  5. At earliest feasible date in each area of Project, complete installation of permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

### **1.5 HEATING, COOLING, AND VENTILATING:**

- A. As needed, install and operate temporary heating, cooling, and ventilating units including fuel, temporary piping, fittings, wiring, and connections necessary to provide environmental conditions specified for various portions of the Work. Coordinate ventilation requirements to produce ambient conditions required and reduce consumption of energy.
- B. Repair damage to building and contents caused by cold, heat, dampness, and/or heating, cooling, and ventilating equipment. Select equipment that will not have harmful effect on completed installations or on elements being installed.
- C. Maintain safe conditions for use of temporary heating, cooling, and ventilating systems including, but not limited to, following requirements:
  1. Operate equipment according to equipment manufacturer's instructions.
  2. Provide fresh air ventilation required by equipment manufacturer.
  3. Keep temperature of fuel containers stabilized.
  4. Secure fuel containers from overturning.
  5. Operate equipment away from combustible materials.
- D. Permanent mechanical system may be operated subject to following conditions:
  1. Do not operate system when work causing air-borne dust is occurring or when dust caused by such work is present without installation of temporary filtering system approved by Architect.
  2. Operate system at no cost to Owner, including cost of fuel.
  3. Assume all responsibility and risk for operation of system.
  4. Return permanent mechanical equipment to 'like-new' condition for Substantial Completion Inspection.

**1.6 TEMPORARY LIGHTING**

- A. As needed, install and operate temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

**1.7 TEMPORARY TELEPHONES**

- A. As needed, provide temporary telephone service for all personnel engaged in construction activities, throughout construction period.
- B. Contractor will pay for Local calls. Party making call will pay for long-distance and toll calls.
- C. At each telephone, post list of important telephone numbers.

**1.8 TEMPORARY WATER SERVICE**

- A. As needed, install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used**

**END OF SECTION**

**BLANK PAGE**



**SECTION 01 5200****CONSTRUCTION FACILITIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Construction Facilities.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. As needed, prepare schedule indicating dates for implementation and termination of each temporary facility.
- B. Keep temporary facilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or allow them to interfere with progress of The Work. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Project site.
- C. Maintain facilities in good operating condition until removal.
- D. Remove each temporary facility when need has ended, or when replaced by authorized use of permanent facility, or by Substantial Completion. Complete permanent construction that may have been delayed because of interference with temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that make up temporary facilities are property of Contractor.
  - 2. By Substantial Completion, clean and renovate permanent facilities used during construction period.

**1.3 FIELD OFFICES**

- A. Provide and maintain insulated, weather tight temporary office of sufficient size to accommodate Contractor's personnel at Project site and for use by Owner, Architect and Subcontractors.
  - 1. Keep office clean and orderly.
  - 2. Heat and cool office as needed.
  - 3. Furnish office with locking door, light(s), table(s), bench(es), rack(s) for drawings, telephone, and FAX machine / email service.
  - 4. Make office available for progress meetings.
  - 5. Provide an operable fire extinguisher in facility.
  - 6. Provide hardhats for Owner's Representatives for site visits.
- B. If Owner agrees to permit removal of temporary office before Substantial Completion, Contractor may use a room as an office after temporary office is removed. Equip room as specified above and restore to 'like-new' condition before Substantial Completion.

**1.4 SANITARY FACILITIES**

- A. Provide temporary sanitary toilets. Service and maintain temporary toilets in a clean, sanitary condition.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

**SECTION 01 5400**  
**CONSTRUCTION AIDS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Construction Aids.

**1.2 SCAFFOLDING, PLATFORMS, STAIRS, ETC**

- A. Furnish and maintain equipment such as temporary stairs, ladders, ramps, platforms, scaffolds, hoists, runways, derricks, chutes, and bracing as required for proper execution of The Work.
- B. Apparatus, equipment, and construction shall meet requirements of applicable laws and safety regulations.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

**BLANK PAGE**

**SECTION 01 5600****TEMPORARY BARRIERS AND ENCLOSURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Temporary Barriers and Enclosures.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Protection Of Existing Improvements: Protect streets, private roads, and sidewalks, including overhead protection where required. Repair damage to existing improvements caused by construction activities.
- B. Protection Of Adjacent Property: Provide necessary protection for adjacent property and lateral support thereof.
- C. Proprietary Camera Services: In its absolute discretion, and with or without notice to Contractor, Owner may provide from time to time, but is not obligated to provide, one or more cameras on or about Project site and/or signage or notices of the same:
  - 1. If provided by Owner, such camera(s) and/or signage and notices are solely for Owner's benefit and convenience and shall not be for benefit of Contractor, Subcontractor(s) or for any third person.
  - 2. Owner shall have no liability, obligation, or responsibility to Contractor, Subcontractors, or any third person relative to such camera(s), signage, or notices, or absence of camera(s), signage, or notices, including without limitation, installation, maintenance, operation, repair, testing, functionality, capacity, recording, monitoring, posting, etc., of the same (hereafter 'Proprietary Camera Services').
  - 3. Contractor, with Owner's prior consent (which shall not be unreasonably withheld), may relocate such camera(s), signage, or notices as necessary to not unreasonably, materially and physically interfere with work at Project Site.
  - 4. Contractor's obligations under Contract Documents, including but not limited to, Contractor's obligation for security of Project Site, are not modified by Owner's opportunity to provide, actually providing, or not providing Proprietary Camera Services and/or signage or notices regarding the same.
  - 5. This Specification Section does not preclude Contractor from providing its own camera(s), signage, or notices pursuant to terms and conditions of this Agreement. Neither does this Section reduce, expand or modify any other right or obligation of Owner pursuant to terms of this Agreement.

**1.3 TEMPORARY BARRICADES**

- A. Comply with standards and code requirements in erecting barricades, warning signs, and lights.
- B. Take necessary precautions to protect persons, including members of the public, from injury or harm.

**1.4 TEMPORARY FENCING**

- A. Before construction begins, install 6 foot high enclosure fence with lockable entrance gates. If not shown on Drawings, enclose portion sufficient to accommodate construction operations.

**1.5 TEMPORARY SECURITY BARRIERS**

- A. Install temporary enclosures of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and other violations of security.
- B. Secure materials and equipment stored on site.
- C. Secure building at the end of each work day.
- D. Maintain exterior building security until Substantial Completion.

**1.6 TEMPORARY TREE AND PLANT PROTECTION**

- A. Protection:
  - 1. Before commencing site work, build and maintain protective fencing as required around existing trees and shrubs in area of work that are to remain.
  - 2. Keep areas within protective fencing undisturbed and do not use for any purpose.
    - a. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.
    - b. Damage to any tree that has been indicated to remain and be protected, will have a cost associated with it. This includes branches, trunk and root systems:
      - 1) Trees: \$1,500.00.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used**

**END OF SECTION**

**SECTION 01 5700****TEMPORARY CONTROLS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Temporary Controls.

**1.2 TEMPORARY EROSION AND SEDIMENT CONTROL**

- A. Take precautions necessary to prevent erosion and transportation of soil downstream, to adjacent properties, and into on-site or off-site drainage systems.
- B. Develop, install, and maintain an erosion control plan if required by law.
- C. Repair and correct damage caused by erosion.

**1.3 TEMPORARY ENVIRONMENTAL CONTROLS**

- A. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and reduce possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result:
  - 1. Avoid use of tools and equipment that produce harmful noise.
  - 2. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near site.
- B. Provide protection against weather (rain, winds, storms, frost, or heat) to maintain all work, materials, apparatus, and fixtures free from injury or damage.
- C. Protect excavation, trenches, and building from damage from rain water, spring water, ground water, backing up of drains or sewers, and all other water:
  - 1. For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with requirements of applicable local regulations. Where feasible, use permanent facilities.
  - 2. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
- D. Comply with governing ordinances relating to weed control and removal.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used****END OF SECTION**

**BLANK PAGE**



**SECTION 01 5800**

**PROJECT IDENTIFICATION**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Project Identification.

**1.2 TEMPORARY PROJECT SIGNAGE**

- A. Contractor may, at its option, erect a temporary project identification sign.
  - 1. Sign may be free-standing or attached to temporary field office or storage shed.
  - 2. No other signs or advertisements are allowed on building site.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

**BLANK PAGE**

**SECTION 01 6100****COMMON PRODUCT REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Common Product Requirements.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Provide products that comply with Contract Documents, that are undamaged, and, unless otherwise indicated, new and unused at time of installation. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.
- B. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on surfaces of products that will be exposed to view in occupied spaces or on building exterior.
1. Locate required product labels and stamps on concealed surface or, where required for observation after installation, on accessible surface that is not conspicuous.
  2. Provide permanent nameplates on items of service-connected or power-operated equipment. Locate on easily accessible surface that is inconspicuous in occupied spaces. Nameplate will contain following information and other essential operating data:
    - a. Name of product and manufacturer.
    - b. Model and serial number.
    - c. Capacity.
    - d. Speed.
    - e. Ratings.
- C. Where specifications describe a product or assembly by specifying exact characteristics required, with or without use of brand or trade name, provide product or assembly that provides specified characteristics and otherwise complies with Contract requirements.
- D. Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by manufacturer for application described. General overall performance of product is implied where product is specified for specific application. Manufacturer's recommendations may be contained in published product literature, or by manufacturer's certification of performance.
- E. Where specifications only require compliance with an imposed code, standard, or regulation, select product that complies with standards, codes or regulations specified.
- F. Where Specifications require matching an established Sample, Architect's decision will be final on whether proposed product matches satisfactorily. Where no product available within specified category matches satisfactorily nor complies with other specified requirements, refer to Architect.
- G. Where specified product requirements include phrase *' . . . as selected from manufacturer's standard colors, patterns, textures . . . '* or similar phrase, select product and manufacturer that comply with other specified requirements. Architect will select color, pattern, and texture from product line selected.

- H. Remove and replace products and materials not specified in Contract Documents but installed in the Work with specified products and materials at no additional cost to Owner and for no increase in Contract time.
- I. Informational Submittals:
  - 1. Sustainable Design Submittals:
    - a. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.
    - b. Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

**SECTION 01 6200****PRODUCT OPTIONS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Product Options.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Product Selection:
1. When option of selecting between two or more products is given, product selected will be compatible with products previously selected, even if previously selected products were also options.
- B. Non-Conforming Work:
1. Non-conforming work as covered in Article 12.3 of General Conditions applies, but is not limited, to use of non-specified products or manufacturers.
- C. Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include:
1. Substitutions And Equal Products:
    - a. Generally speaking, substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
    - b. Approved Products / Manufacturers / Suppliers / Installers:
      - 1) Category One:
        - a) Owner has established 'Value Managed Relationships' that extend beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
        - b) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.
      - 2) Category Two:
        - a) Owner has established National Contracts that contain provisions extending beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
        - b) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.
      - 3) Category Three:
        - a) Specified products are provided to Church Projects under a National Account Program. Use these products to preserve advantages that accrue to Owner from those programs. No substitutions or equal products will be allowed on this Project.
      - 4) Category Four:
        - a) Provide only specified products available from manufacturers listed. No substitutions, private-labeled, or equal products, or mixing of manufacturers' products is allowed on this Project.
        - b) In Sections where lists recapitulating Manufacturers previously mentioned in Section are included under heading '*Manufacturers*' or '*Approved Manufacturers*', this is intended as a convenience to Contractor as a listing of contact information only. It is not intended that all manufacturers in list may provide products where specific products and manufacturers are listed elsewhere in Section.

- c. Acceptable Products / Manufacturers / Suppliers / Installers:
  - 1) Type One: Use specified products / manufacturers unless approval to use other products / manufacturers has been obtained from Architect by Addendum.
  - 2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect in writing before installing or applying unlisted or private-labeled products.
  - 3) Use 'Equal Product Approval Request Form' to request approval of equal products, manufacturers, or suppliers before bidding or before installation, as noted in individual Sections.
- d. Quality / Performance Standard Products / Manufacturers:
  - 1) Class One: Use specified product / manufacturer or equal product from specified manufacturers only.
  - 2) Class Two: Use specified product / manufacturer or equal product from any manufacturer.
  - 3) Products / manufacturers used shall conform to Contract Document requirements.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used****END OF SECTION**

**SECTION 01 6400****OWNER - FURNISHED PRODUCTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Administrative and procedural requirements for Owner-Furnished Products. Install items furnished by Owner or receive and store in safe condition items purchased directly by Owner according to requirements of Contract Documents:
1. Interior Signage. See Section 10 1495.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. General:
1. Review 'Contractor Notice of Owner Furnished Materials' notice listing Owner-furnished products to be delivered for Project:
    - a. Review due (delivery) dates and vendor lead times for each item and coordinate with construction schedule. Immediately report recommended changes to Owner's Purchasing Coordinator listed in 'Contractor Notice of Owner Furnished Materials'. Contact vendors directly if changes to delivery dates become necessary during construction.
    - b. Report problems in coordinating due (delivery) dates with construction schedule to Architect and Owner's Purchasing Coordinator.
  2. Receive unload, store and protect Owner-furnished materials and products.
    - a. Provide labor and equipment necessary to receive, unload, and store materials and products.
    - b. Count number of pieces received and note any discrepancies on Delivery Receipt before driver leaves:
      - 1) Compare 'Contractor Notice of Owner Furnished Materials' notice' with packing slips.
      - 2) Note discrepancies in number, size, color, model numbers, etc. on Delivery Receipt.
    - c. Include Project Name and Project Number on Delivery Receipt.
    - d. Check for visible evidence of damage such as holes, tears, or crushed portions of cartons and note on Delivery Receipt before driver leaves:
      - 1) Include Project Name and Project Number on Delivery Receipt.
      - 2) If you are unsure if carton is damaged, take photo of cartons and share it with Owner's Purchasing Coordinator.
    - e. Properly store and protect all deliveries of Owner Furnished materials and Products.
  3. Within forty-eight (48) hours of delivery:
    - a. Open and inspect each piece of freight delivered. Take picture of any concealed damage not reported at time of delivery and report it to Owner's Purchasing Coordinator.
    - b. Compare 'Contractor Notice of Owner Furnished Materials' with packing slips. Note discrepancies in number, size, color, model numbers, etc.
    - c. Deliver copy of Delivery Receipt (bill of lading) on which you have noted any loss or damage to Owner's Purchasing Coordinator. Include in your submission any report of concealed damage, discrepancies or photos.
  4. Failure to strictly follow above procedures will result in your assumption of all financial responsibility for this shipment. All replacement and reorders must be made through Owner's Purchasing Coordinator and must allow Owner's vendor sufficient lead time to produce and ship new product.
  5. When above procedures are strictly followed, shortages and damaged items will be replaced by Owner at Owner's cost.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**



**SECTION 01 6600****PRODUCT DELIVERY, STORAGE, AND HANDLING REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Product Delivery, Storage, and Handling Requirements.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

**1.3 DELIVERY AND ACCEPTANCE REQUIREMENTS**

- A. Schedule delivery to reduce long-term storage at site and to prevent overcrowding of construction spaces.
- B. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
- C. Deliver products to site in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- D. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.

**1.4 STORAGE AND HANDLING REQUIREMENTS**

- A. Store products at site in manner that will simplify inspection and measurement of quantity or counting of units.
- B. Store heavy materials away from Project structure so supporting construction will not be endangered.
- C. Store products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used****END OF SECTION**

**BLANK PAGE**

**SECTION 01 7300****EXECUTION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for governing Execution of the Work.

**1.2 COMMON INSTALLATION PROVISIONS**

- A. Manufacturer's Instructions: Comply with Manufacturer's installation instructions and recommendations to extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents. Notify Architect of conflicts between Manufacturer's installation instructions and Contract Document requirements.
- B. Provide attachment and connection devices and methods necessary for securing Work. Secure work true to line and level. Anchor each product securely in place, accurately located, and aligned with other Work. Allow for expansion and building movement.
- C. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain best visual effect. Refer questionable choices to Architect for final decision.
- D. Install each component during weather conditions and Project status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.
- E. Coordinate temporary enclosures with required inspections and tests, to reduce necessity of uncovering completed construction for that purpose.
- F. Mounting Heights: Where mounting heights are not shown, install individual components at standard mounting heights recognized within the industry or local codes for that application. Refer questionable mounting height decisions to Architect for final decision.

**PART 2 - PRODUCTS Not Used****PART 3 - EXECUTION Not Used****END OF SECTION**

**BLANK PAGE**

**SECTION 01 7400****CLEANING AND WASTE MANAGEMENT****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Administrative and procedural requirements for Cleaning and Waste Management as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 01 1200: Coordination of responsibilities for waste management.
  - 2. Section 01 6400: Waste removal of Owner furnished products.
  - 3. In addition to standards described in this section, comply with all requirements for cleaning-up as described in various other Sections of these Specifications.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Brick and Concrete (ABC) Rubble: Rubble that contains only clay bricks and attached mortar normally used in construction, or concrete that may contain rebar. The rubble shall not be mixed with, or contaminated by, another waster or debris.
  - 2. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
  - 3. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
  - 4. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
  - 5. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
  - 6. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

**PART 2 - PRODUCTS: Not Used****PART 3 - EXECUTION****3.1 PROGRESS CLEANING**

- A. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.
- B. Keep premises broom clean during progress of the Work.
- C. Keep site and adjoining streets reasonably clean. If necessary, sprinkle rubbish and debris with water to suppress dust.
- D. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.
- E. Clean and maintain completed construction as frequently as necessary throughout construction. Adjust and lubricate operable components to ensure ability to operate without damaging effects.

- F. Supervise construction activities to ensure that no part of construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction.
- G. Before and during application of painting materials, clear area where such work is in progress of debris, rubbish, and building materials that may cause dust. Sweep floors and vacuum as required and take all possible steps to keep area dust free.
- H. Clean exposed surfaces and protect as necessary to avoid damage and deterioration.
- I. Provide and maintain a dust barrier to area of work.
- J. Place extra materials of value remaining after completion of associated work have become Owner's property as directed by Owner or Architect.
- K. Construction Waste Management And Disposal:
  - 1. Remove waste materials and rubbish caused by employees, Subcontractors, and contractors under separate contract with Owner and dispose of legally. Remove unsuitable or damaged materials and debris from building and from property.
    - a. Provide adequate waste receptacles and dispose of materials when full.
    - b. Properly store volatile waste and remove daily.
    - c. Do not deposit waste into storm drains, sanitary sewers, streams, or waterways. Do not discharge volatile, harmful, or dangerous materials into drainage systems.
  - 2. Do not burn waste materials or build fires on site. Do not bury debris or excess materials on Owner's property.

### **3.2 FINAL CLEANING**

- A. Immediately before Substantial Completion, thoroughly clean building and area where The Work was performed. Remove all rubbish from under and about building, landscaped areas and parking lot and leave building and Project Site ready for occupancy by Owner.
- B. Comply with individual manufacturer's cleaning instructions.
- C. Clean each surface or unit to condition expected in normal, commercial building cleaning and maintenance program, including but not limited to:
  - 1. Interior Cleaning:
    - a. Clean inside glazing, exercising care not to scratch glass.
    - b. Remove marks, stains, fingerprints and dirt.
    - c. Clean and polish woodwork and finish hardware.
    - d. Remove labels that are not permanent labels.
    - e. Clean plumbing fixtures and tile work. Remove spots, soil or paint.
    - f. Clean surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
    - g. Clean other fixtures and equipment and remove stains, paint, dirt, and dust.
    - h. Remove temporary floor protection and clean floors.
  - 2. Exterior Cleaning:
    - a. Clean outside glazing, exercising care not to scratch glass.
    - b. Remove marks, stains, and dirt from exterior surfaces.
    - c. Clean and polish finish hardware.
    - d. Remove temporary protection systems.
    - e. Clean dirt, mud, and other foreign material from paving, sidewalks, and gutters.
    - f. Clean drop inlets, through-curb drains, and other drainage structures.
    - g. Remove trash, debris, and foreign material from landscaped areas.

**END OF SECTION**

**SECTION 01 7700****CLOSEOUT PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Closeout Procedures.

**1.2 GENERAL**

- A. Closeout process consists of three specific project closeout inspections. Contractor shall plan sufficient time in construction schedule to allow for required inspections before expiration of Contract Time.
- B. Contractor shall conduct his own inspections of The Work and shall not request closeout inspections until The Work of the contract is reasonably complete and correction of obvious defects or omissions are complete or imminent.
- C. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect and included on Certificate of Substantial Completion.

**1.3 PRELIMINARY CLOSEOUT REVIEW**

- A. When Architect, Owner and Contractor agree that project is ready for closeout, Pre-Substantial Inspection shall be scheduled. Preparation of floor substrate to receive carpeting and any work which could conceivably damage or stain carpet must be completed, as carpet installation will be scheduled immediately following this inspection.
- B. Prior to this inspection, completed test and evaluation reports for HVAC system where one occurs, are to be provided to Project Manager, Architect, and applicable consultants.
- C. Architect and his appropriate consultants, together with Contractor and mechanical, plumbing, and electrical sub-contractors shall conduct a space by space and exterior inspection to review materials and workmanship and to demonstrate that systems and equipment are operational.
  - 1. Punch list of items requiring completion and correction will be created.
  - 2. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

**1.4 SUBSTANTIAL COMPLETION INSPECTION**

- A. When Architect, Owner and Contractor agree that project is ready for Substantial Completion, an inspection is held. Punch list created at Pre-Substantial Inspection is to be substantially complete.
- B. Prior to this inspection, Contractor shall discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.
- C. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
  - 1. Date of Substantial Completion.
  - 2. Punch List Work not yet completed, including seasonal and long lead items.

3. Amount to be withheld for completion of Punch List Work.
  4. Time period for completion of Punch List Work.
  5. Amount of liquidated damages set forth in Supplementary Conditions to be assessed if Contractor fails to complete Punch List Work within time set forth in Certificate.
- D. Contractor shall present Closeout Submittals to Architect and place tools, spare parts, extra stock, and similar items required by Contract Documents in locations as directed by Facilities Manager.

## **1.5 FINAL ACCEPTANCE MEETING**

- A. When punch list items except for any seasonal items or long lead items which will not prohibit occupancy are completed, Final Acceptance Meeting is held.
- B. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:
1. All seasonal and long lead items not prohibiting occupancy, if any, are identified, with committed to completion date and amount to be withheld until completion.
  2. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
  3. Final cleaning requirements have been completed.
- C. If applicable, once any seasonal and long lead items are completed, Closeout Inspection is held where Owner and Architect verify that The Work has been satisfactorily completed, and Owner, Architect and Contractor execute Closeout portion of the Project Closeout - Final Acceptance form.
- D. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

## **PART 2 - PRODUCTS Not Used**

## **PART 3 - EXECUTION Not Used**

**END OF SECTION**



**SECTION 01 7800****CLOSEOUT SUBMITTALS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Closeout Submittals.
- B. Related Requirements:
  - 1. Section 01 3300: 'Submittal Procedures' for administrative and procedural requirements for submittal procedures.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Project Record Documents:
  - 1. Do not use record documents for construction purposes:
    - a. Protect from deterioration and loss in secure, fire-resistive location.
    - b. Provide access to record documents for Architect's reference during normal working hours.
  - 2. Maintain clean, undamaged set of Drawings:
    - a. Mark set to show actual installation where installation varies from the Work as originally shown.
    - b. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
    - c. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
    - d. Mark new information that is important to Owner, but was not shown on Drawings.
    - e. Note related Change Order numbers where applicable.
- B. As Built Record Drawings:
  - 1. As required in agreement with the Owner:
    - a. Architect will provide two full-size sets of prints of the As Built Record Drawings to the Facilities Management Office, printed from the updated AutoCAD drawing files, as specified by Owner, that have been modified to show actual dimensions and location of equipment, material, utility lines, and other work as actually constructed, based upon information provided by Contractor. Architect will submit updated As Built Record Drawings in PDF (ISO32000 format) to Owner.
    - b. Architect will submit following:
      - 1) Updated AutoCAD as built record drawing files with associated plot style tables as specified by Owner.

**1.3 CLOSEOUT SUBMITTALS**

- A. Operations And Maintenance Manual:
  - 1. General:
    - a. Include closeout submittal documentation as required by Contract Documentation.
    - b. Include workmanship bonds, final certifications, equipment check-out sheets, and similar documents.
    - c. Releases enabling Owner unrestricted use of The Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
    - d. Include Project photographs, damage or settlement survey, and similar record information required by Contract Documents.
    - e. Submittal Format:

- 1) Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.
  - 2) Include only closeout submittals as defined in individual specification section as required in Contract Documents.
2. Project Manual:
  - a. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
    - 1) Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications.
    - 2) Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
3. Operations and Maintenance Data:
  - a. Digital format only:
    - 1) Cleaning instructions.
    - 2) Maintenance instructions.
    - 3) Operations instructions.
    - 4) Equipment list.
    - 5) Parts list.
4. Warranty Documentation:
  - a. Digital format of final, executed warranties.
5. Record Documentation:
  - a. Digital format only.
    - 1) Certifications.
    - 2) Color and pattern selections.
    - 3) Design Data.
    - 4) Manufacture Reports.
    - 5) Manufacturer's literature or cut sheets.
    - 6) Shop Drawings.
    - 7) Testing and Inspection Reports.

#### **1.4 MAINTENANCE MATERIAL SUBMITTALS**

- A. Submit item(s) required by Section 01 3300 'Submittal Procedures' and as defined in individual specification section if required in Contract Documents. Items may be provided at completion of Work or with Closeout Submittals.

#### **1.5 WARRANTIES**

- A. When written guarantees beyond one (1) year after substantial completion are required by Contract Documents, secure such guarantees and warranties properly addressed and signed in favor of Owner. Include these documents in Operations & Maintenance Manual(s) specified above.
- B. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

#### **PART 2 - PRODUCTS Not Used**

#### **PART 3 - EXECUTION Not Used**

**END OF SECTION**

## **DIVISION 02: EXISTING CONDITIONS**

### **02 4000 DEMOLITION AND STRUCTURE MOVING**

02 4119 SELECTIVE STRUCTURE DEMOLITION

END OF TABLE OF CONTENTS

BLANK PAGE

**SECTION 02 4119****SELECTIVE STRUCTURE DEMOLITION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Demolition and removal of selected portions of building or structure.
  - 2. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
  - 1. Section 26 0501: 'Common Electrical Requirements' for salvage of existing electrical items to be reused or recycled removed by Owner.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. National Fire Protection Association / American National Standards Institute:
    - a. NFPA 241, 'Standard for Safeguarding Construction, Alteration, and Demolition Operations', 2013 Edition.
  - 2. American Society of Safety Engineers:
    - a. ASSE A10.6-2006, 'Safety Requirements for Demolition Operations'.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Storage or sale of removed items or materials will not be permitted on-site.
- B. Pre-Installation Conference:
  - 1. Before beginning Selective Demolition work, in addition to requirements of Section 01 3100, meet on site to confirm work to be demolished, items to be salvaged or reused, and coordination with Owner.
- C. Scheduling:
  - 1. Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, on Schedule specified in Section 01 3200.

**1.4 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Comply with governing EPA notification regulations before beginning selective demolition.
  - 2. Comply with hauling and disposal regulations of authorities having jurisdiction.
  - 3. Standards: Comply with ANSI A10.6 and NFPA 241.

**1.5 FIELD CONDITIONS**

- A. Existing Conditions:
  - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

**PART 2 - PRODUCTS: Not Used****PART 3 - EXECUTION****3.1 EXAMINATION****A. Verification Of Conditions:**

1. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
  - a. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

**B. Evaluation And Assessment:**

1. Hazardous Materials:
  - a. It is not expected that hazardous materials will be encountered in the Work. Identified hazardous materials will be removed by Owner before start of the Work.
  - b. If materials suspected of containing hazardous materials are encountered, do not disturb and immediately notify Architect.
2. Inventory and record condition of items to be removed and reinstalled and items to be removed and salvaged.
3. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure nature and extent of conflict. Promptly submit written report to Architect.
4. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
5. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

**3.2 PREPARATION****A. Temporary Facilities:**

1. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
2. Maintain fire-protection facilities in service during selective demolition operations.

**B. Temporary Shoring:**

1. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
2. Strengthen or add new supports when required during progress of selective demolition.

**C. Utility Services:**

1. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
2. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - a. Arrange to shut off indicated utilities with utility companies.
  - b. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

**3.3 SELECTIVE DEMOLITION****A. General:**

1. Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  2. Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
    - a. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
    - b. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
    - c. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
    - d. Maintain adequate ventilation when using cutting torches.
    - e. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
    - f. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
    - g. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
    - h. Dispose of demolished items and materials promptly.
- B. Selective Demolition Procedures For Specific Materials:
1. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
  2. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
  3. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- C. Removed and Salvaged Items:
1. Relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
    - a. Clean salvaged items as directed by Owner.
    - b. Pack or crate items after cleaning. Identify contents of containers.
    - c. Store items in a secure area until delivery to Owner.
    - d. Transport items to Owner's storage area designated by Owner.
    - e. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
  2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain:
1. Protect construction indicated to remain against damage and soiling during selective demolition.
  2. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

### **3.4 CLEANING**

- A. General:
  - 1. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations.
  - 2. Return adjacent areas to condition existing before selective demolition operations began.
- B. Waste Management:
  - 1. Disposal of Demolished Materials:
    - a. Remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. Do not burn demolished materials.
      - 1) Do not allow demolished materials to accumulate on-site.
      - 2) Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
      - 3) Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

**END OF SECTION**



## **DIVISION 03: CONCRETE**

### **03 2000 CONCRETE REINFORCING**

03 2100 REINFORCEMENT BARS

### **03 3000 CAST-IN-PLACE CONCRETE**

03 3111 CAST-IN-PLACE STRUCTURAL CONCRETE

03 3923 MEMBRANE CONCRETE CURING

END OF TABLE OF CONTENTS

BLANK PAGE

**SECTION 03 2100****REINFORCEMENT BARS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install concrete reinforcement bars as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 03 3111: 'Cast-In-Place Structural Concrete' for:
    - a. Reinforcement installed in concrete.
    - b. Pre-installation conference held jointly with other concrete related sections.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. American Concrete Institute:
    - a. ACI 'Detailing Manual' (2004 Edition).
  - 2. Reinforcing Steel Institute of Canada / Institut D'Acier D'Armature Du Canada:
    - a. RSIC/IAAC, 'Placing Reinforcing Bars' (Canadian Version, 1st Edition).
    - b. RSIC/IAAC, 'Reinforcing Steel Manual of Standard Practice' (2004 Edition).
- B. Reference Standards:
  - 1. American Concrete Institute:
    - a. ACI 117M-10: 'Specifications for Tolerances for Concrete Construction and Materials and Commentary (Metric)' (Reapproved 2015).
    - b. ACI 318-14M, 'Metric Building Code Requirements for Structural Concrete and Commentary'.
  - 2. CSA Group (Canadian Standards Association):
    - a. CSA G30.18-09 (R2014), 'Carbon Steel Bars for Concrete Reinforcement'.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 03 3111.
  - 2. In addition to agenda items specified in Section 01 3100, and Section 03 3111, review following:
    - a. Installation scheduling and reinforcing placement.

**1.4 SUBMITTALS**

- A. Action Submittals:
  - 1. Shop Drawings:
    - a. Reinforcing placement drawings.
- B. Informational Submittals:
  - 1. Certificates:
    - a. Mill certificates for mill tests for reinforcing in accordance with ASTM A615/A615M.

## 1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  - 1. Comply with provisions of following codes and standards except where more stringent requirements are shown or specified:
    - a. American Concrete Institute
      - 1) ACI 318-14M, 'Metric Building Code Requirements for Structural Concrete and Commentary'.
    - b. Reinforcing Steel Institute of Canada / Institut D'Acier D'Armature Du Canada:
      - 1) RSIC/IAAC, 'Placing Reinforcing Bars'.
- B. Qualifications:
  - 1. Throughout progress of the work of this section, provide at least one (1) person who shall be thoroughly familiar with Construction Documents and other applicable specified requirements, completely trained and experienced in necessary skills, and who shall be present at site and shall direct all work performed under this Section:
    - a. In actual installation of the work of this Section, use adequate numbers of skilled workmen to ensure installation in strict accordance with approved design.
    - b. In acceptance or rejection of work performed under this Section, no allowance will be made for lack of skill on part of workmen.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  - 1. Deliver bars separated by size and tagged with manufacturer's heat or test identification number.
  - 2. Reinforcement bars shall be free of heavy rust scales and flakes, or other coating at time of delivery and placing.
- B. Storage And Handling Requirements:
  - 1. Properly protect rebar on site after delivery.

## PART 2 - PRODUCTS

### 2.1 MATERIAL

- A. Reinforcement Bars:
  - 1. Bars shall have grade identification marks and conform to ASTM A615/A615M.
  - 2. Meet or Exceed requirements of CSA G30.18:
    - a. 10M Bars for ties and stirrups:
      - 1) 300 MPa yield grade.
      - 2) 400 MPa yield grade.
    - b. 15M Or Larger: 400 MPa yield grade.
    - c. Bars For Welding Or Bending: W400 MPa yield grade special low alloy deformed billet steel.
  - 3. Bars shall be deformed type.
  - 4. Bars shall be free of heavy rust scales and flakes, or other bond-reducing coatings.

### 2.2 ACCESSORIES

- A. Bar Supports:
  - 1. Concrete masonry units or bricks are not acceptable.
  - 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).
  - 3. Type Two Acceptable Products:
    - a. Concrete 'dobies' or blocks wired to reinforcing.

- b. Manufactured chairs with 4 sq inch (25.8 sq cm) bearing surface on sub-grade, or other feature to prevent chair from being pushed into sub-grade or damaging vapor retarder under slabs on grade.
- c. Equals as approved by Architect before installation. See Section 01 6200.

## 2.3 FABRICATION

### A. Fabricate:

- 1. Fabricate reinforcement bars according to the Reinforcing Steel Institute of Ontario RSIO Manual of Standard Practice' and details on Contract Documents.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. General:

- 1. Avoid cutting or puncturing vapor retarder during reinforcement placement and concrete operations.
- 2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
- 3. Blowtorch shall not be used to facilitate field cutting or bending or any other reinforcing work.
- 4. Reinforcement shall not be bent after partially embedded in hardened concrete.

#### B. Placing Reinforcement:

- 1. Comply with RSIC/IAAC, 'Reinforcing Steel Manual of Standard Practice' and RSIC/IAAC, 'Placing Reinforcing Bars' recommended practice for 'Placing Reinforcing Bars' for details and methods of reinforcement placement and supports. and as herein specified
- 2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations:
  - a. Locate and support reinforcing by chairs, runners, bolsters, bar supports, spacers, or hangers, as required as recommended by 'ACI Detailing Manual' or by Section 8, RSIC/IAAC, 'Reinforcing Steel Manual of Standard Practice', except slab on grade work.
  - b. Support bars in slabs on grade and footings with specified bar supports around perimeter and at 1 350 mm on center each way maximum to maintain specified concrete cover.
  - c. Install bar supports at bar intersections.
- 3. Bend bars cold.
- 4. Epoxy dowel reinforcement as detailed in drawings.
- 5. Securely anchor and tie reinforcement bars and dowels before placing concrete. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

#### C. Splices:

- 1. Non-Concrete Structural System:
  - a. Avoid splices of reinforcement bars at points of maximum stress. Lap bars 60 bar diameters minimum unless dimensioned otherwise on Drawings. Run reinforcement bars continuous through cold joints.
- 2. Concrete Structural System:
  - a. In beams, slabs, and walls, avoid splices of reinforcement bars at points of maximum stress.
  - b. Lap bars as follows:
    - 1) Compression Splices: 45 bar diameters minimum.
    - 2) Tension Splices: In accordance with ACI 318M Class B requirements.
    - 3) No splice shall be less than 20 inches (508 mm).
  - c. Run reinforcement bars continuous through cold joints.

#### D. Tolerances:

1. Provide following minimum concrete cover for reinforcement as per ACI 318 or ACI 318M. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations:
  - a. Concrete cast against and permanently exposed to earth:
    - 1) Interior Slabs on Grade: 1 inches (25 mm). clear from top of slab at 4 inches (100 mm) slabs.
  - b. Concrete Exposed to Earth or Weather:
    - 1) 20M and Larger Bars: 2 inches (50 mm).
    - 2) 15M and Smaller Bars: 1-1/2 inches (38 mm).

**END OF SECTION**

**SECTION 03 3111****CAST-IN-PLACE STRUCTURAL CONCRETE****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install concrete work as described in Contract Documents including:
    - a. Quality of concrete used on Project but furnished under other Sections.
    - b. Concrete mix information and use of admixtures.
    - c. Field Quality Control Testing and Inspection requirements for concrete.
    - d. Pre-installation conference held jointly with other concrete related sections.
    - e. Curing compounds used with concrete.
    - f. Compact aggregate base for cast-in-place concrete.
    - g. Cast-in-place concrete and splash pads.
- B. Products Installed But Not Furnished Under This Section:
  - 1. Concrete accessories.
  - 2. Inserts, bolts, templates, and fastening devices for other work, including those for Mechanical and Electrical.
  - 3. Membrane Concrete Curing.
- C. Related Requirements:
  - 1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
  - 2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
  - 3. Section 03 2100: 'Reinforcement Bars'.
  - 4. Section 03 3923: 'Membrane Concrete Curing' for quality of curing materials used.
  - 5. Section 31 0501: 'Common Earthwork Requirements' for:
    - a. General procedures and requirements for earthwork.
    - b. Pre-installation conference held jointly with other common earthwork related sections.
  - 6. Section 31 1123: 'Aggregate Base' for aggregate base under exterior splash pads, and under interior slabs-on-grade concrete.
  - 7. Section 31 2323: 'Fill' for compaction procedures and tolerances.
  - 8. Section 32 9121: 'Topsoil Grading' for grading of subgrade below topsoil.
  - 9. Divisions 22, 23, And 26: Mechanical and electrical devices including boxes, conduits, pipes, hangers, inserts, and other work to be embedded in concrete work before placing.
  - 10. Furnishing of items to be embedded in concrete specified in Section involved.
  - 11. Owner will provide concrete leveling compounds and patching compounds required for carpet installation.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. American Concrete Institute, Farmington Hills, MI [www.concrete.org](http://www.concrete.org). Abstracts of ACI Periodicals and Publications.
    - a. Certifications:
      - 1) ACI CP-1(16), *'Technical Workbook for ACI Certification of Concrete Field Testing Technician-Grade 1'*.
      - 2) ACI CP-10(10), *'Craftsman Workbook for ACI Certification of Concrete Flatwork Technician/Finisher'*.
      - 3) ACI CP-19(16), *'Technical Workbook for ACI Certification of Concrete Strength Testing Technician'*.

2. Cold Weather, as referred to in this Section, is four (4) hours with ambient temperature below **40 deg F (4.4 deg C)** in twenty-four (24) hour period.
3. Floor Flatness ( $F_F$ ): Rate of change in elevation of floor over a **12 inches (305 mm)** section.
4. Floor Levelness ( $F_L$ ): Measures difference in elevation between two points which are **10 feet (3.05 m)** apart.
5. Hot Weather, as referred to in this Section, is ambient air temperature above **100 deg F (38 deg C)** or ambient air temperature above **90 deg F (32 deg C)** with wind velocity **8 mph (12.9 kph)** or greater.

B. Reference Standards:

1. American Concrete Institute:
  - a. ACI 117M-10 (R2015): 'Specifications for Tolerances for Concrete Construction and Materials and Commentary (Metric)'.
  - b. ACI 305.1-14, 'Specification for Hot Weather Concreting'.
  - c. ACI 306.1-90 (R2002), 'Standard Specification for Cold Weather Concreting'.
  - d. ACI 318M-14, 'Building Code Requirements for Structural Concrete (ACI 318M) and Commentary' (ACI 319RM).
2. ASTM International:
  - a. ASTM C31/C31M-15, 'Standard Practice for Making and Curing Concrete Test Specimens in the Field'.
  - b. ASTM C33/C33M-16, 'Standard Specification for Concrete Aggregates'.
  - c. ASTM C39/C39M-15a, 'Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens'.
  - d. ASTM C94/C94M-16, 'Standard Specification for Ready-Mixed Concrete'.
  - e. ASTM C140/C140M-16, 'Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units'.
  - f. ASTM C143/C143M-15, 'Standard Test Method for Slump of Hydraulic-Cement Concrete'.
  - g. ASTM C150/C150M-16, 'Standard Specification for Portland Cement'.
  - h. ASTM C172/C172M-14a, 'Standard Practice for Sampling Freshly Mixed Concrete'.
  - i. ASTM C173/C173M-16, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method'.
  - j. ASTM C192/C192M-16a, 'Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory'.
  - k. ASTM C231/C231M-14, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method'.
  - l. ASTM C260/C260M-10a, 'Standard Specification for Air-Entraining Admixtures for Concrete'.
  - m. ASTM C330/C330M-14, 'Standard Specification for Lightweight Aggregates for Structural Concrete'.
  - n. ASTM C494/C494M-15a, 'Standard Specification for Chemical Admixtures for Concrete'.
  - o. ASTM C496/C496M-11, 'Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens'.
  - p. ASTM C567/C567M-14, 'Standard Test Method for Determining Density of Structural Lightweight Concrete'.
  - q. ASTM C595/C595M-16, 'Standard Specification for Blended Hydraulic Cements'.
  - r. ASTM C618-15, 'Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete'.
  - s. ASTM C1077-16, 'Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation'.
  - t. ASTM C1157/C1157M-11, 'Standard Performance Specification for Hydraulic Cement'.
3. CSA Group (Canadian Standards Association):
  - a. CSA A23.1-14/A23.2-14, 'Concrete Materials and Methods of Concrete Construction / 'Test Methods and Standard Practices for Concrete'.
  - b. CSA A283-06 (R2016), 'Qualification Code for Concrete Testing Laboratories'.
  - c. CSA A3000-13, 'Cementitious Materials Compendium'.
4. International Code Council (IBC) (2015 or latest approved edition):
  - a. IBC Chapter 17, 'Special Inspections And Tests'.
    - 1) Section 1704, 'Special Inspections And Tests, Contractor Responsibility And Structural Observations'.
    - 2) Section 1705, 'Required Special Inspection And Tests'.



- a) Section 1705.2, 'Steel Construction'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 and held jointly with following sections:
    - a. Section 03 2100: 'Reinforcement Bars'.
    - b. Section 26 0526: 'Grounding And Bonding For Electrical Systems'.
  2. Schedule pre-installation conference prior to placing of reinforcing steel, and installation of dowels, inserts, etc. in slabs.
  3. In addition to agenda items specified in Section 01 3100, review following:
    - a. Set up concrete placement pour card system and verify that all relevant trades have signed off prior to concrete placement.
    - b. Obtaining trade sign-offs on each pour card will be responsibility of General Contactor's foreman or whoever is in charge of ordering concrete.
    - c. Pour cards will be turned in to Quality Assurance representative after the work has been completed so that they can be reviewed and filed.
    - d. Review installation scheduling, coordination, placement of building concrete, and placement of items installed in and under concrete.
    - e. Review installation scheduling, coordination and placement of site concrete and of items installed in concrete.
    - f. Review 'Verification of Conditions' requirements.
    - g. Review requirements for preparation of subgrade and aggregate base requirements.
    - h. Review approved mix design requirements, mix designs and use of admixtures.
    - i. Review reinforcing bar submittals.
    - j. Review installation schedule and placement of reinforcing bars.
    - k. Review placement, finishing, and curing of concrete, including cold and hot weather requirements.
    - l. Review concrete slab tolerances and corrective measures if tolerances not met.
    - m. Review safety issues.
    - n. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
      - 1) Review requirements and frequency of testing and inspections.
- B. Scheduling:
1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing concrete.

### 1.4 SUBMITTALS

- A. Informational Submittals:
1. Certificates:
    - a. Installers:
      - 1) Certification for National Ready Mixed Concrete Association (NRMCA).
      - 2) Certification for ACI-certified Flatwork Finishers and Technicians.
  2. Design Data:
    - a. Mix Design:
      - 1) Furnish proposed mix design to Architect for review prior to commencement of Work.
        - a) Include density (unit weight) and void content determined per ASTM C1688/C1688M for fresh mixed properties and per ASTM C140/C140M for hardened concrete properties.
        - b) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use.
    - b. Ready-Mix Supplier:
      - 1) Require mix plant to furnish delivery ticket for each batch of concrete. Keep delivery tickets at job-site for use of Owner or his representatives. Tickets shall show following:
        - a) Name of ready-mix batch plant.

- b) Serial number of ticket.
  - c) Date and truck number.
  - d) Name of Contractor.
  - e) Name and location of Project.
  - f) Specific class or designation of concrete conforming to that used in Contract Documents.
  - g) Amount of concrete.
  - h) Amount and type of cement.
  - i) Total water content allowed by mix design.
  - j) Amount of water added at plant.
  - k) Sizes and weights of sand and aggregate.
  - l) Time loaded.
  - m) Type, name, manufacturer, and amount of admixtures used.
  - n) Design Data.
- 2) Provide certificates with supporting testing reports verifying compliance with Contract Document requirements and that materials provided are from single source for following:
  - a) Cement.
  - b) Aggregate.
  - c) Fly Ash.
- 3. Source Quality Control Submittals:
  - a. **Concrete mix design:** Submit mix designs to meet following requirements:
    - 1) **Mix Type (Interior concrete floor slab not exposed to freezing):**
      - a) **3000 psi (20.68 MPa)** minimum at twenty-eight (28) days.
      - b) Water / Cementitious Material: 0.45 to 0.50 by weight.
    - 2) **Mix Type (Exterior concrete exposed to freezing - splashpads):**
      - a) **4641 psi (32.00 MPa)** minimum at twenty-eight (28) days.
      - b) Water / Cementitious Material: 0.45 maximum by weight.
    - 3) Air Entrainment: Six (6) percent, plus or minus 1-1/2 percent for exterior concrete exposed to freeze/thaw cycles.
    - 4) Do not add water any time during mixing cycle above amount required to meet specified water / cement ratio. No reduction in amount of cementitious material is allowed.
  - b. Slump:
    - 1) **4 inch (100 mm)** slump maximum before addition of high range water reducer.
    - 2) **8 inch (200 mm)** slump maximum with use of high range water reducer.
  - c. Admixtures:
    - 1) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use. Do not use any admixture without Architect's written approval.
    - 2) Fly ash: Amount of specified Class F (or Class C where Class F is not available) fly ash not to exceed twenty-five (25) percent of weight of cementations materials may used.
    - 3) Chemical: Specified accelerator or retarder may be used if necessary to meet environmental conditions.
    - 4) Chemical: Special additives to promote rapid drying concrete may be used in interior concrete slabs on grade if necessary to meet construction schedules.
- B. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Pour Reports:
        - a) Provide report that records following information:
        - b) Date and time of start of pour, Date and time of end of pour, and Date and time of end of finishing procedures.
        - c) Temperature at start of pour, Temperature at end of Pour, and Maximum temperature during performance of finishing procedures.
        - d) Screeding method and equipment used.
        - e) Saw cut method and equipment used.
      - 2) Testing and Inspection Reports:
        - a) Testing Agency Testing and Inspecting Reports of concrete.

## 1.5 QUALITY ASSURANCE

- A. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
  - 1. Installers and Installation Supervisor:
    - a. ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
  - 2. Ready-Mix Supplier:
    - a. Comply with ASTM C94/C94M requirements and be certified according to NRMCA's 'Certification of Ready Mixed Concrete Production Facilities'.
  - 3. Testing Agencies:
    - a. Independent agency qualified according to ASTM C1077 and ASTM E329.
      - 1) Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technicians, Grade I according to ACI CP-1 or equivalent certification program.
      - 2) Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be ACI-certified Concrete Laboratory Testing Technician - Grade II.
- B. Testing And Inspection:
  - 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
  - 2. Owner will provide Testing and Inspection on concrete:
    - a. Owner will employ testing agencies to perform testing and inspection on concrete as specified in Field Quality Control in Part 3 of this specification:
      - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
      - 2) See Section 01 1200: 'Multiple Contract Summary'.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Aridus Admixture by US Concrete, Euless, TX [www.us-concrete.com/aridus/](http://www.us-concrete.com/aridus/).
    - b. BASF (Construction Chemicals Division), Cleveland, OH [www.master-builders-solutions.basf.us/en-us](http://www.master-builders-solutions.basf.us/en-us).
    - c. Bonsal American, Charlotte, NC [www.bonsal.com](http://www.bonsal.com).
    - d. Concure Systems Admixture by Concure Systems, Phoenix, AZ [www.ConcureSystems.com](http://www.ConcureSystems.com).
    - e. Dayton Superior Specialty Chemicals, Kansas City, KS [www.daytonsuperiorchemical.com](http://www.daytonsuperiorchemical.com).
    - f. Euclid Chemical Company, Cleveland, OH [www.euclidchemical.com](http://www.euclidchemical.com).
    - g. Fritz-Pak Concrete Admixtures, Dallas, TX [www.fritzpak.com](http://www.fritzpak.com).
    - h. GCP Applied Technologies, Cambridge, MA [www.gcpat.com/construction/en-us](http://www.gcpat.com/construction/en-us).
    - i. L & M Construction Chemicals, Omaha, NE [www.lmcc.com](http://www.lmcc.com).
    - j. Larsen Weldcrete by Larsen Products Corp, Rockville, MD [www.larsenproducts.com](http://www.larsenproducts.com).
    - k. Sika Corporation, Lyndhurst, NJ [www.sikaconstruction.com](http://www.sikaconstruction.com) and Sika Canada, Pointe Claire, QC [www.sika.ca](http://www.sika.ca).
    - l. Unitex, Kansas City, MO [www.unitex-chemicals.com](http://www.unitex-chemicals.com).
    - m. U S Mix Products Co, Denver, CO [www.usspec.com](http://www.usspec.com).
    - n. W R Meadows, Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).
- B. Performance:
  - 1. Design Criteria: Conform to requirements of ASTM C94/C94M unless specified otherwise:
  - 2. Capacities:
    - a. For testing purposes, following concrete strengths are required:

- 1) At 7 days: 70 percent minimum of 28 day strengths.
- 2) At 28 days: 100 percent minimum of 28 day strengths.

C. Materials:

1. **Hydraulic Cement:** Meet requirements of ASTM / CSA **TYPE 10 GU**.
2. Aggregates:
  - a. Coarse:
    - 1) Meet requirements of ASTM C33/C33M or nonconforming aggregate that by test or actual service produces concrete of required strength and conforms to local governing codes.
    - 2) Aggregate shall be uniformly graded by weight.
  - b. Fine:
    - 1) Meet requirements of ASTM C33/C33M.
    - 2) Aggregate shall be uniformly graded by weight.
3. Water: Clear, apparently clean, and potable.
4. Admixtures And Miscellaneous:
  - a. Fly Ash:
    - 1) Meet requirements of ASTM C618, Class F (or Class C where Class F is not available) and with loss on ignition (LOI) of three (3) percent maximum.
  - b. Chemical:
    - 1) No admixture shall contain calcium chloride nor shall calcium chloride be used as an admixture. All chemical admixtures used shall be from same manufacturer and compatible with each other.
    - 2) Air Entraining Admixture:
      - a) Meet requirements of CSA A23.1/A23.2.
      - b) Type Two Acceptable Products:
        - (1) Equal as approved by Architect before use. See Section 01 6200.
    - 3) Water Reducing Admixture:
      - a) Meet requirements of ASTM C494/C494M, Type A and containing not more than 0.05 percent chloride ions.
      - b) Type Two Acceptable Products:
        - (1) Equal as approved by Architect before use. See Section 01 6200.
    - 4) Water Reducing, Retarding Admixture:
      - a) Meet requirements of ASTM C494/C494M, Type D and contain not more than 0.05 percent chloride ions.
      - b) Type Two Acceptable Products:
        - (1) Equal as approved by Architect before use. See Section 01 6200.
    - 5) High Range Water Reducing Admixture (Superplasticizer):
      - a) Meet requirements of ASTM C494/C494M, Type F or G and containing not more than 0.05 percent chloride ions.
      - b) Type Two Acceptable Products:
        - (1) Equal as approved by Architect before use. See Section 01 6200.
    - 6) Non-Chloride, Non-Corrosive Accelerating Admixture:
      - a) Meet requirements of ASTM C494/C494M, Type C or E and containing not more than 0.05 percent chloride ions.
      - b) Type Two Acceptable Products:
        - (1) Equal as approved by Architect before use. See Section 01 6200.
    - 7) Corrosion Inhibiting Admixture:
      - a) Liquid admixture to inhibit corrosion of steel reinforcement in concrete by introducing proper amount of anodic inhibitor. Admixture shall contain thirty (30) percent calcium nitrite solution and shall be used where called for in specifications or on drawings.
      - b) Type Two Acceptable Products:
        - (1) Eucon CIA by Euclid.
        - (2) DCI or DCI-S by GCP Applied Technologies.
        - (3) Equal as approved by Architect before use. See Section 01 6200.
    - 8) Alkali-Silica Reactivity Inhibiting Admixture:
      - a) Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.

- b) Type Two Acceptable Products:
  - (1) Eucon Integral ARC by Euclid.
  - (2) RASIR by W R Grace.
  - (3) Equal as approved by Architect before use. See Section 01 6200.
- 9) Viscosity Modifying Admixture (VMA):
  - a) Liquid admixture used to optimize viscosity of Self-Consolidating Concrete (SCC). Subject to compliance with requirements, provide following at dosage rates per manufacturer's recommendation.
  - b) Type Two Acceptable Products:
    - (1) Equal as approved by Architect before use. See Section 01 6200.
- 10) Shrinkage Reducing Admixture (SRA):
  - a) Liquid admixture specifically designed to reduce drying shrinkage and potential for cracking.
  - b) Type Two Acceptable Products:
    - (1) Equal as approved by Architect before use. See Section 01 6200.
- 11) Rapid Drying Admixture in Interior Concrete Slabs on Grade:
  - a) Admixture specifically designed to promote rapid drying of concrete.
  - b) Type Two Acceptable Products:
    - (1) Equal as approved by Architect before use. See Section 01 6200.

## 2.2 ACCESSORIES

- A. Bonding Agents:
  - 1. Type Two Acceptable Products:
    - a. Acrylic Additive by Bonsal American.
    - b. Day Chem Ad Bond (J-40) by Dayton Superior.
    - c. Flex-Con by Euclid Chemical Co.
    - d. Larsen Weldcrete by Larsen Products Corp.
    - e. Everbond by L & M Construction Chemicals.
    - f. MasterEmaco A 660 (formally Acryl 60) by BASF.
    - g. U S Spec Multicoat by U S Mix Products.
    - h. Intralok by W R Meadows.
    - i. Equal as approved by Architect before use. See Section 01 6200.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification Of Conditions:
  - 1. Coordinate slab height with sloped drypack above as detailed.

### 3.2 PREPARATION

- A. Concrete Mixing:
  - 1. General:
    - a. All concrete shall be machine mixed.
    - b. Water gauge shall be provided to deliver exact predetermined amount of water for each batch.
    - c. Reliable system must be employed to ensure that no less than predetermined amount of cement goes into each batch.
    - d. Re-tempering partly set concrete will not be permitted.
  - 2. Transit Mix:
    - a. Transit mix concrete may be used provided it conforms to Specifications and tests herein described and ASTM C94/C94M.

- b. Central plant producing concrete and equipment transporting it are suitable for production and transportation of controlled concrete and plant is currently approved by local state DOT.
  - c. Maximum elapsed time between time of introduction of water and placing shall be one (1) hour.
  - d. Minimum time of mixing shall be one (1) minute per cubic yard after all material, including water, has been placed in drum, and drum shall be reversed for an additional two (2) minutes.
  - e. Mixing water shall be added only in presence of Inspecting Engineer or inspector employed by Testing Agency.
  - f. Trucks shall not be overloaded in excess of rated capacity as recommended by manufacturer.
3. Cold Weather Concreting Procedures:
- a. General Requirements:
    - 1) Materials and equipment required for heating and protection of concrete shall be approved and available at Project site before beginning cold weather concreting.
    - 2) Forms, reinforcement, metallic embedments, and fillers shall be free from snow, ice, and frost. Surfaces that will be in contact with newly placed concrete, including sub-grade materials, shall be **35 deg F (2 deg C)** minimum at time of concrete placement.
    - 3) Thaw sub-grade **6 inches (150 mm)** deep minimum before beginning concrete placement. If necessary, re-compact thawed material.
    - 4) Use no frozen materials or materials containing ice.
    - 5) See ACI 306.1 'Standard Specification for Cold Weather Concreting' for additional requirements.
4. Hot Weather Concreting Procedures:
- a. General:
    - 1) Maximum concrete temperature allowed is **90 deg F (32 deg C)** in hot weather.
    - 2) Cool aggregate and subgrades by sprinkling.
    - 3) Avoid cement over **140 deg F (60 deg C)**.
    - 4) Use cold mixing water or ice.
    - 5) Use fog spray or evaporation retardant to lessen rapid evaporation from concrete surface.
    - 6) See ACI 305.1 'Specification for Hot Weather Concreting' for additional requirements.
- B. Surface Preparation:
- 1. Earthwork Preparation:
    - a. Aggregate base and subgrade:
      - 1) Prepare aggregate base as specified in Section 31 1123.
      - 2) Prepare fill subgrade as specified in Section 31 2323.
  - 2. Inserts, boxes, templates, pipes, conduits, sleeves and other accessories required by Divisions 22, 23, and 26 shall be installed and inspected before placing concrete.
  - 3. Install inserts, boxes, templates, pipes, conduits, and other accessories furnished under other Sections to be installed as part of work of this Section.
- C. Removal:
- 1. Remove water and debris from space to be placed:

### 3.3 INSTALLATION

- A. Placing Concrete:
- 1. General:
    - a. Place as soon after mixing as possible.
    - b. Deposit as nearly as possible in final position.
    - c. No concrete shall be deposited in water.
    - d. Placing of concrete shall be continuous until panel or section is complete.
    - e. Compact concrete in forms by vibrating and other means where required.
      - 1) Thoroughly consolidate concrete around reinforcing bars.
      - 2) Use and type of vibrators shall conform to ACI 309.
    - f. Form vertical surfaces full depth. Do not allow concrete to flow out from under forms in any degree into landscaped areas.

- g. Consolidate concrete thoroughly.
- h. Do not embed aluminum in concrete.
- i. Do not use contaminated, deteriorated, or re-tempered concrete.
- j. Avoid accumulation of hardened concrete.
- k. Dusting with cement not permitted.
- 2. Joints:
  - a. Control Joints (Contraction Joints):
    - 1) Form control joints with early-entry, dry-cut saws as soon as final trowel operations are complete and joints can be cut without raveling.
    - 2) Depth of control joints shall be approximately one quarter of concrete slab thickness, but not less than **one inch (25 mm)**.
    - 3) Control joints to be hand tooled in pads.
    - 4) Table One:

Concrete Control Joint On-Center Spacing (+/-)		
Pads	<b>4 feet to 6 feet</b>	<b>1.2 meters to 1.8 meters</b>

- 3. Bonding Fresh And Hardened Concrete:
  - a. Re-tighten forms.
  - b. Roughen surfaces.
  - c. Clean off foreign matter and laitance.
  - d. Wet but do not saturate.
  - e. Slush with neat cement grout or apply bonding agent.
  - f. Proceed with placing new concrete.
- B. Finishing:
  - 1. General:
    - a. Meet requirements of CSA A23.1/A23.2.
  - 2. Interior Concrete Flatwork:
    - a. Screed Concrete.
    - b. Float Finish:
      - 1) Float as soon after screeding as possible.
      - 2) Consolidate surface with power-driven floats with exception of areas inaccessible to power-driven floats, which may be hand-floated.
      - 3) Re-straighten, cutting down high spots and filling low spots.
      - 4) Repeat float passes and re-straightening until surface has uniform, smooth, granular texture.
    - c. Rough:
      - 1) Top of building slab (in areas that are sloped to floor drains) to receive drypack setting bed for ceramic or paver tile.
    - d. Trowel Finish:
      - 1) Steel trowel slab after concrete has set enough to avoid bringing water and fines to surface.
      - 2) Perform troweling with power-driven trowels with exception of areas inaccessible to power-driven trowels, which may be hand-troweled.
      - 3) Continue troweling passes and re-straightening with **10 foot (3 meter)** highway straightedge until surface is free of trowel marks and uniform in texture and appearance.
      - 4) Apply burnished, burned-out trowel finish.
  - 3. Exterior Concrete Flatwork:
    - a. Pads:
      - 1) After completion of final floating, performed immediately after screeding and when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
        - a) Provide fine hair finish where grades are less than 6 percent **1-1/4 inch (32 mm)**.
        - b) Do not remove forms for twenty-four (24) hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed

areas. Remove and replace areas or sections with major defects, as directed by Architect.

- c) Round edges exposed to public view to 3/4 inch (19 mm) radius.
- d) Remove edger marks.

C. Curing:

1. Membrane Concrete Curing:

- a. As specified in Section 09 3923 'Membrane Concrete Curing'.
- b. Follow Manufacturer's written instructions for preparation, application rates, placement, and cleanup:
  - 1) Apply as soon as troweling on interior concrete is complete.
  - 2) Apply as soon as brooming or finishing of exterior concrete is complete.
  - 3) Spraying application is required.
  - 4) Do not dilute or thin product.
  - 5) Do not apply when temperature of concrete is less than 40 deg F (4.4 deg C).
  - 6) Apply uniformly without puddles or ponding.
  - 7) Do not apply before bleed water has dissipated.
  - 8) Do not apply over standing water.

D. Tolerances:

1. General:

- a. Tolerances shall conform to requirements of ACI 117 or CSA A23.1/A23.2, except where specified differently:
  - 1) Floor test surfaces shall be measured and reported within seventy two (72) hours after completion of slab concrete finishing operations and before removal of any supporting shores to eliminate any curling effect F-numbers.
- b. Maximum Variation Tolerances:
  - 1) Table Three:

Maximum Variation Tolerances		
Thickness, standard	plus 3/8 inch, minus 1/4 inch	plus 9.5 mm, minus 3 mm
Plan, 0 - 20 feet	1/2 inch	12.7 mm
Plan, 40 feet or greater	3/4 inch	19 mm
Openings, size	minus 1/4 inch, plus one inch	minus 6 mm, plus 25.4 mm
Openings, location	plus / minus 1/2 inch at center	plus / minus 12.7 mm at center
Plumb	1/2 inch maximum	12.7 mm maximum

2. Local Flatness / Levelness of Interior Slabs:

- a. Carpet and Tile Areas:
  - 1) Specified Overall Value of  $F_F25 / F_L20$  and Minimum Local Value of  $F_F15 / F_L13$  when tested in accordance with ASTM E1155.
  - 2) Specified Overall Value of  $F_F30 / F_L20$  and Minimum Local Value of  $F_F18 / F_L13$  when tested in accordance with ASTM E1155 in ceramic, resilient or vinyl tiled areas.
  - 3) Used on building slabs to be covered by carpet and tile as shown on Contract Drawings. Verify and coordinate with Finish Schedule.
  - 4) Remedy For Out-of-Tolerance Building Slabs:
    - a) Sections of building slabs which do not meet specified tolerances but are within ten (10) percent of specified tolerances, may be corrected by grinding or filling, at Owner's option.
    - b) Remove and replace sections of slabs measuring outside specified correctable tolerances.
    - c) Carpet areas: If floor leveling compounds or concrete patching compounds are required to bring floor into specified tolerances, they will be provided by Owner in conjunction with carpet installation and back-charged to Contractor.

### 3.4 FIELD QUALITY CONTROL

A. Field Tests And Inspections:



1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
    - a. Quality Control is sole responsibility of Contractor:
      - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
        - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
  2. Reinforcement Bars:
    - a. Testing Agency shall provide inspections will include following:
      - 1) Reinforcement Bars:
        - a) Periodic inspection of reinforcement bars and placement prior to concrete placement to verify grade, size, cover, spacing, and position of reinforcing.
        - b) Confirm surface of reinforcing bars is free of form release oil or other deleterious substances.
- B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.

### **3.5 CLEANING**

- A. General:
1. Curing:
    - a. Clean tools, equipment as directed by Manufacturer's instructions.

### **3.6 PROTECTION**

- A. Concrete:
1. Protect concrete that has not received its initial set from precipitation to avoid excess water in mix and unsatisfactory surface finish.
  2. Do not allow materials resulting from construction activities, which will affect concrete or application of finish floor systems adversely, to come in contact with interior concrete slabs.
  3. Protect interior concrete floors from stains, paint, mortar and other construction activities.
- B. Curing:
1. Restrict foot or vehicle traffic as curing membrane dries as recommended by Manufacturer.

**END OF SECTION**

**BLANK PAGE**

**SECTION 03 3923****MEMBRANE CONCRETE CURING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Quality of membrane concrete curing as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 03 3111: 'Cast-In-Place Structural Concrete' for application of membrane concrete curing.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Curing: Process by which hydraulic-cement concrete matures and develops hardened properties, over time, as result of continued hydration of cement in presence of sufficient water and heat. Also used to describe action taken to maintain moisture and temperature conditions in freshly placed concrete.
- B. Reference Standards:
  - 1. American Association of State and Highway Transportation Officials:
    - a. AASHTO M 148-05, 'Standard Specification for Liquid Membrane-Forming Compounds for Curing'.
  - 2. ASTM International:
    - a. ASTM C309-11, 'Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete'.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's product data.
    - b. Material Safety Data Sheets (MSDS).
- B. Informational Submittals:
  - 1. Manufacturer Instructions:
    - a. Printed installation instructions.

**1.4 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Comply with applicable VOC standards and other local requirements.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery And Acceptance Requirements:
  - 1. Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:

1. Follow Manufacturer's written instructions for handling and storage of product:
  - a. Store in unopened containers in clean, dry area between **35 deg F (2 deg C)** and **110 deg F (43 deg C)** (Keep from freezing) or as directed by Manufacturer's instruction.
2. Shelf Life: Do not use curing compound that is over one (1) year from manufacturer date.

## 1.6 FIELD CONDITIONS

### A. Ambient Conditions:

1. Do not apply curing compound when temperature of concrete is less than **40 deg F (4.4 deg C)**.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Membrane Concrete Curing:

1. Description:
  - a. Clear water-based, ready-to use, dissipating membrane curing agent that cures freshly placed concrete, forming effective barrier against moisture loss from concrete surface.
2. Design Criteria:
  - a. VOC-compliant compound.
  - b. Meet requirements of ASTM C309 and AASHTO M 148, Type 1 or 1-D, Class B.
  - c. Interior concrete: containing no mineral spirits, naptha, or other components detrimental to finish flooring installation.
  - d. Maintain ninety-five (95) percent of mix water present in concrete mass after application.
  - e. Gradually dissipate after twenty-eight (28) days without leaving stain or discoloring concrete surface.
3. Horizontal and Vertical Cast-In-Place Structural Concrete:
  - a. Type One Acceptable Products.
    - 1) Exterior and Interior Concrete:
      - a) Clear Cure J7WB by Dayton Superior Corporation, Miamisburg, OH [www.daytonsuperior.com](http://www.daytonsuperior.com).
      - b) Clear Water Resin by Right Point, Dekalb, IL [www.rightpointe.com](http://www.rightpointe.com).
      - c) L&M Cure R by L&M Construction Chemicals, Inc. Omaha, NE [www.lmcc.com](http://www.lmcc.com).
      - d) VOCOMP 20 (exterior concrete only, do not use when a concrete sealer will be applied in areas of freeze/thaw and deicer salts) by W.R. Meadows, Inc. Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).
      - e) 1100-Clear by W. R. Meadows, Inc. Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).
    - 2) Equal product meeting design criteria requirements as approved by Architect/Owner's Representative before BID. See Section 01 6200.

## PART 3 - EXECUTION: Not Used

END OF SECTION

## **DIVISION 04: MASONRY**

### **04 0500 COMMON WORK RESULTS FOR MASONRY**

04 0501 COMMON MASONRY REQUIREMENTS  
04 0513 CEMENT AND LIME MASONRY MORTARING  
04 0521 MASONRY VENEER TIES  
04 0523 MASONRY ACCESSORIES

### **04 2000 UNIT MASONRY**

04 2113 BRICK VENEER UNIT MASONRY

END OF TABLE OF CONTENTS

BLANK PAGE

**SECTION 04 0501****COMMON MASONRY REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Common requirements and procedures for Masonry including:
    - a. References.
    - b. Definitions.
    - c. Pre-Installation Conferences held jointly with masonry sections.
- B. Related Requirements:
  - 1. Sections Under 04 0000 Heading: 'Masonry':
    - a. Pre-installation conference held jointly with other masonry related sections including:
      - 1) Section 04 0513: 'Cement and Lime Masonry Mortaring'.
      - 2) Section 04 2113: 'Brick Veneer Unit Masonry'.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. The Brick Industry Association, Reston VA: 'Technical Notes on Brick Construction' (July 2012), [www.gobrick.com](http://www.gobrick.com).
- B. Definitions:
  - 1. Brick:
    - a. Cavity Wall Masonry: Wall consisting of two wythes of masonry in which space between wythes is not grouted.
    - b. Hollow Brick: Masonry unit of clay or shale whose net cross-sectional area in any plane parallel to bearing surface is not less than 60 percent of its gross cross-sectional area measured in same plane (See ASTM C652).
    - c. Solid Brick: Solid masonry unit of clay or shale, usually formed into rectangular prism while plastic and burned or fired in a kiln. Solid brick can have core holes whose area is no more than twenty-five 25 percent of total bed surface of the brick.
    - d. Running Bond: Same as common bond, with continuous horizontal joints, but vertical joints are offset or in line. Bricks of each course are offset from the previous instead of being right on top of each other. If running bond is being used with modular brick, end of brick will be at mid-point of brick on course below. Running bond only requires minimal cutting at each end and will easily follow a gentle curve. Running bond method most used.
    - e. Unit Masonry: as referred to in this specification is defined as Brick Veneer, Hollow Brick, Architectural Concrete, Composite, and Cavity Wall.
    - f. Warpage: Distortion of surfaces or edges of an individual brick from a plane surface or from straight line.
    - g. Wythe: Continuous vertical section of masonry one (1) unit in thickness.
  - 2. Brick Classifications:
    - a. Brick Color:
      - 1) No color-related tolerances in ASTM standards for brick. Standards are dictated by sample panel, mockups, or project specification.
    - b. Brick Grade (durability and exposure):
      - 1) Brick is subjected to environmental and service conditions that vary. Brick is specified for its specific durability based on severity of weather and exposure and physical properties. Brick grades classifications are based on Weathering Index:
        - a) Grade SW: Severe weathering (stronger and more durable, and require less maintenance.

- b) Grade MW: Moderate weathering (less durable).
    - c) Grade NW: Negligible or no weathering (least durable and should only be used for interior work).
  - c. Brick Types:
    - 1) Type FBX:
      - a) Brick for general use in masonry where higher degree of precision and lower permissible variation in size than permitted for Type FBS.
      - b) Maintains strict requirements on absorption, waste, chipping, cracks, dimensions and distortion (warpage).
      - c) Allows very narrow color range, minimal size variations, and uniform in appearance.
    - 2) Type FBS:
      - a) Brick for general use in masonry:
      - b) Wider range of color and size variations, but lack of production controls results in many odd color lots.
    - 3) Type FBA:
      - a) Brick for general use in masonry selected to produce characteristic architectural effects resulting from non-uniformity in size and texture of individual units:
      - b) Used for aesthetic qualities.
      - c) Has no limits for size and color variations.
- 3. Cold Weather: as referred to in this Section, is four (4) hours with ambient temperature below 40 deg F (4.4 deg C) in twenty-four (24) hour period.
- 4. Efflorescence: Deposit or encrustation of soluble salts, generally white and most commonly consisting of calcium sulfate that may form on surface of stone, brick, concrete, or mortar when moisture moves through and evaporates on masonry. Often caused by free alkalis leached from mortar, grout, adjacent concrete, or in clays. Test for efflorescence is described in ASTM C67 and CAN/CSA A82.
- 5. Flashing:
  - a. Cavity Wall Flashing: Same as flexible flashing.
  - b. Flashing: Thin impervious material placed in mortar joints and through air spaces in masonry to prevent water penetration and/or provide water drainage.
  - c. Flexible Flashing: Water-proof material typically used in cavity wall construction to contain and assist in proper water drainage that may penetrate wall system veneer. Other materials may be required to constitute the system.
  - d. Foundation Flashing: Same as flexible flashing.
  - e. Head And Sill Flashing: Same as flexible flashing.
  - f. Through-Wall Flashing: Generally considered same as flexible flashing.
- 6. Hot Weather: as referred to in this Section, is ambient air temperature above 100 deg F (38 deg C) or ambient air temperature above 90 deg F (32 deg C) with wind velocity 8 mph (13 kph) or greater.
- 7. Vents:
  - a. Weep Hole: Opening placed in mortar joints of facing material at level of flashing, to permit escape of moisture.
  - b. Weep Vent: Inserts placed in Weep Hole to screen insects from entering but allowing escape of moisture.
  - c. Vents (Open Head Joints): Placed at top of drainage air space to help reduce moisture buildup in air space by promoting ventilation. Weep vents may be placed vents to screen insects from entering but allowing movement of air through weep holes.

#### C. Reference Standards:

- 1. ASTM International:
  - a. ASTM D2000-12, 'Standard Classification for Rubber Products in Automotive Applications'.
  - b. ASTM D2240-15, 'Standard Test Method for Rubber Property-Durometer Hardness'.
  - c. ASTM D2287-12, 'Standard Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds'.
- 2. Canadian Standards Association / National Standard of Canada:
  - a. CAN/CSA A82-14, 'Fired Masonry Brick Made from Clay or Shale'.
- 3. CSA Group (Canadian Standards Association):
  - a. CSA A371-14, 'Masonry Construction for Buildings'.



4. Masonry Standards Joint Committee (MSJC) - The Masonry Society (TMS) / American Concrete Institute (ACI) / American Society of Civil Engineers (SEI/ASCE):
  - a. Building Code Requirements and Specification for Masonry Structures:
    - 1) TMS 402-13/ACI 530-13/ASCE 5-13 'Building Code Requirements for Masonry Structures'.
    - 2) TMS 602-13/ACI 530.1-13/ASCE 6-13, 'Specification for Masonry Structures'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  1. Coordinate work with other trades with items to be built into masonry such as anodized flashing and louvers.
- B. Pre-Installation Conference:
  1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 held jointly with other Division 04 'Masonry' specifications in this Project that require pre-installation conferences:
    - a. Conduct conference at Project site.
    - b. Schedule pre-installation conference during construction of mockup panel.
  2. In addition to agenda items specified in Section 01 3100, review following:
    - a. Review storage and handling requirements.
    - b. Review cold and hot weather procedure requirements.

### 1.4 SUBMITTALS

- A. Action Submittals:
  1. Product Data: As specified in each masonry section.
  2. Samples: As specified in each masonry section.

### 1.5 QUALITY ASSURANCE

- A. Mockups:
  1. Masonry Sample Panel:
    - a. Sample panel 4 feet (1.20 m) long by 3 feet (900 mm) high of proposed color range, texture, bond, mortar, and workmanship. Include mock-up framing and sheathing to show wall construction to be used on Project, including:
      - 1) Anchor and tie systems.
      - 2) Any specialty details, such as reveals, soldier courses, window details.
      - 3) Flexible flashing and required components at foundation.
    - b. Sample panel(s) shall be constructed using 'production run' material to be used on Project. Mockup can be placed on building area of work.
    - c. Do not start work until Architect has accepted sample panel(s).

### 1.6 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
  1. Check, carefully unload, and deliver material to site in such manner as to avoid soiling, damaging, or chipping.
  2. Do not use damaged masonry units, damaged components of structure, or damaged packaged materials.
  3. Masonry Accessories: Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
  1. Aggregate:

- a. Store different aggregates separately.
- b. Store on high ground, or ideally, off ground to prevent contamination from dirt, organic materials and ground water, any of which may contribute to efflorescence and may be deleterious to mortar performance.
- c. Store under protective cover to avoid saturation and freezing in cold weather.
- 2. Cementitious material:
  - a. Store in such manner as to prevent deterioration or intrusion of foreign material or moisture.
  - b. Do not use cementitious materials that have become contaminated.
  - c. Protect from precipitation and groundwater.
    - 1) Store materials on elevated platforms, under cover, and in dry location.
    - 2) Do not use cementitious materials that have become damp or has become unsuitable for good construction.
- 3. Masonry accessories:
  - a. Store masonry accessories clear of ground, including metal items, to prevent corrosion and contamination by dirt and ground water which may contain soluble salts and other matter which may contribute to efflorescence and staining.
  - b. Plastic and asphalt coated flashing material should not be stored in areas exposed to sunlight. During installation, flashing must be pliable so that no cracks occur at corners or bends.
  - c. Protect from damage until installation.
- 4. Masonry units:
  - a. Store materials protected from exposure to harmful weather conditions as directed by manufacturer.
  - b. Store material on planks clear of ground which may contain soluble salts and protect from damage, dirt, or disfigurement.
  - c. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof membrane, securely tied. If units become wet, do not install until they are dry.
- 5. Masonry Reinforcement:
  - a. Protect reinforcement, ties, and metal accessories from permanent distortions, elements and store off ground.

## 1.7 FIELD CONDITIONS

### A. Ambient Conditions:

- 1. Mortar:
  - a. Ideal mortar temperature is **70 deg F  $\pm$  10 deg F (21 deg C  $\pm$  6 deg C)**. Mixing temperature should be maintained within **10 deg F (6 deg C)**.
- 2. Cold Weather Requirements. Implement approved cold weather procedures and comply with requirements contained in TMS 602/ACI 530.1/ASCE 6 including but not limited to following:
  - a. Preparation requirements (prior to conducting masonry work):
    - 1) Do not lay masonry units having either temperature below **20 deg F (minus 7 deg C)** or containing frozen moisture, visible ice, or snow on their surface.
    - 2) Do not use frozen materials or materials mixed or coated with ice or frost. Keep materials free of ice and snow. Do not lay masonry on frozen material. Remove and replace unit masonry damaged by frost or by freezing conditions.
    - 3) Remove visible ice and snow from top surface of existing foundations and masonry to receive new construction. Heat these surfaces above freezing, using methods that do not result in damage.
    - 4) Preparation of mortar.
  - b. Construction requirements (work in progress and based on ambient air temperature):
    - 1) Do not heat water or aggregates used in mortar or grout above **140 deg F (60 deg C)**. Comply with cold weather requirements for ambient air temperatures prior to conducting masonry work in accordance with TMS 402/ACI 530/ASCE 5-11 and TMS 602/ACI 530.1/ASCE 6.
- 3. Hot Weather Requirements. Implement approved hot weather procedures and comply with requirements contained in TMS 602/ACI 530.1/ASCE 6 including but limited to following:
  - a. Preparation (prior to conducting masonry work). Comply hot weather procedures when:
    - 1) Ambient air temperature exceeds **100 deg F (37.8 deg C)**, or exceeds **90 deg F (32.2 deg C)** with wind velocity greater than **8 mph (12.9 kph)**.

- 2) Ambient temperature exceeds 115 deg F (46.1 deg C), or exceeds 105 deg F (40.6 deg C) with wind velocity greater than 8 mph (12.9 kph).
- b. Construction requirements (work in progress). Comply hot weather procedures when prior to conducting masonry work in accordance with TMS 402/ACI 530/ASCE 5-11 and TMS 602/ACI 530.1/ASCE 6.

**PART 2 - PRODUCTS – NOT USED****PART 3 - EXECUTION – NOT USED****END OF SECTION**

**BLANK PAGE**

**SECTION 04 0513****CEMENT AND LIME MASONRY MORTARING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Quality of masonry mortar used on Project.
- B. Related Requirements:
  - 1. Sections Under 04 2000 Heading: Furnish and install mortar.

**1.2 REFERENCES**

- A. Definitions:
  - 1. See Section 04 0501: 'Common Masonry Requirements' for common masonry definitions.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C144-11, 'Standard Specification for Aggregate for Masonry Mortar'.
    - b. ASTM C150/C150M-16, 'Standard Specification for Portland Cement'.
    - c. ASTM C207-06(2011), 'Standard Specification for Hydrated Lime for Masonry Purposes'.
    - d. ASTM C270-14a, 'Standard Specification for Mortar for Unit Masonry'.
  - 2. Canadian Standards Association / National Standard of Canada:
    - a. CAN/CSA-A179-14, 'Mortar and Grout for Unit Masonry'.
  - 3. CSA Group (Canadian Standards Association):
    - a. CSA A3000-13, 'Cementitious Materials Compendium'.
      - 1) A3001-13, 'Cementitious Materials for use in Concrete'.
      - 2) A3002-13, 'Masonry and Mortar Cement'.
      - 3) A3003-13, 'Chemical Test methods for Cementitious Materials for use in Concrete and Masonry'.
      - 4) A3004-13, 'Test Methods and Standard Practices for Cementitious Materials for use in Concrete and Masonry'.
      - 5) A3005-13, 'Test equipment and Materials for Cementitious Materials for use in Concrete and Masonry'.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference:
  - 1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 held jointly with other Division 04 'Masonry' specifications in this Project that require pre-installation conference as specified in Section 04 0501: 'Common Masonry Requirements'.

**1.4 SUBMITTALS**

- A. Informational Submittals:
  - 1. Source Quality Control Submittals:
    - a. If pre-mixed wet mortar or pre-blended dry mortar mix are to be used, provide certification from Manufacturer or Supplier verifying that mixes meet specification requirements.
    - b. If site mixed / blended mortar is to be used, provide written description of proposed method of measuring and mixing of materials.

## 1.5 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
  - 1. As specified in Section 04 0501: 'Common Masonry Requirements'.
- B. Storage And Handling Requirements:
  - 1. Cementitious material:
    - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

- A. Design Criteria:
  - 1. Mixing:
    - a. Meet either proportion or property specifications of ASTM C270 for masonry mortar as per Table 3 'Proportion Specifications' and Table 4 'Physical Requirements for Masonry Cement Mortars'.
    - b. Conform with requirements of ASTM C780 and ASTM C1586.
    - c. Machine mixing should be used whenever possible.
  - 2. Mortar Minimum Compressive Strength at twenty-eight (28) days:
    - a. Type N: **750 psi (5 171 kPa)**.
      - 1) Brick Veneer Unit Masonry.
- B. Materials:
  - 1. Portland Cement:
    - a. Meet requirements of ASTM C150/C150M and ASTM C270.
  - 2. Hydrated Lime:
    - a. Meet requirements of ASTM C207 for hydrated lime.
  - 3. Aggregate:
    - a. Meet requirements of ASTM C144 and ASTM C270.
      - 1) Grading requirements for pointing mortar:

Sieve	Sieve	Percent Passing	
		Natural Sand	Manufactured Sand
No. 16	1.191 mm	100	100
No. 30	0.594 mm	40 to 75	40 to 75
No. 50	0.297 mm	10 to 35	20 to 40
No. 100	0.150 mm	2 to 15	10 to 25
No. 200	0.075 mm	none	0 to 10

- 4. Water:
  - a. Clean and free of acids, alkalis, and organic materials.
- 5. Admixtures:
  - a. Use no admixtures without Architect's written permission. Use of any admixture to meet cold weather requirements and admixtures that increase air entrainment are expressly forbidden under all circumstances.
- C. Mixes:
  - 1. General:
    - a. Heat water and sand to **140 deg F (60 deg C)** maximum if temperature is below **40 deg F (4.4 deg C)**.
  - 2. Unit Masonry for mortar as specified in each Masonry specification section:

- a. Proportions of ingredients in compliance with proportion specification of ASTM 270 using Portland cement.

**PART 3 - EXECUTION – NOT USED**

**END OF SECTION**

**BLANK PAGE**



**SECTION 04 0521****MASONRY VENEER TIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Ties for attaching brick veneer to framed walls.
  - 2. Coordinate with existing masonry attachment systems.
- B. Related Requirements:
  - 1. Section 04 0501: 'Common Masonry Requirements' for installation of anchor and tie system.
  - 2. Sections Under 04 2000 Heading: 'Unit Masonry' for installation of masonry units using anchor and tie system.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A153/A153M-16, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
    - b. ASTM A1008/A1008M-15, 'Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable'.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's product literature or cut sheet for each item showing compliance with design criteria requirements as specified.
- B. Informational Submittals:
  - 1. Test And Evaluation Reports:
    - a. Manufacturer's published test results showing performance characteristics.
  - 2. Manufacturer's Instructions:
    - a. Manufacturer's published installation instructions for each item.

**PART 2 - PRODUCTS****2.1 MANUFACTURED UNITS**

- A. Manufacturers:
  - 1. Manufacturer Contact Information:
    - a. Heckman Building Products Inc, Melrose Park, IL [www.heckmannbuildingprods.com](http://www.heckmannbuildingprods.com).
    - b. Hohmann & Barnard, Hauppauge, NY [www.h-b.com](http://www.h-b.com).
    - c. Wire-Bond by Masonry Reinforcing Corporation of America, Charlotte, NC [www.wirebond.com](http://www.wirebond.com).
- B. Brick Veneer Unit Masonry Attached to Framing:
  - 1. Brick Ties:

- a. Design Criteria:
    - 1) Sheet Metal (Carbon Steel):
      - a) Meet requirements of ASTM A1008/A1008M.
      - b) Provide seismic notch to accommodate 9 ga (3.8 mm) or 3/16 inch (4.8 mm) diameter continuous wire.
      - c) Thickness: 14 ga (1.9939 mm).
    - 2) Finish: Hot dipped galvanized (ASTM A153/A153M, Class B-2).
    - 3) Tie Length: Length includes cavity air space and 1-1/2 inches (38 mm) brick overlap as per code.
  - b. Type Two Acceptable Products:
    - 1) 360 L-Type Seismic Anchor by Heckmann.
    - 2) 345 SV Seismic-Notch Veneer Anchor by Hohmann & Barnard.
    - 3) 2522 Seismic Veneer Anchor by Wire-Bond.
    - 4) Equals meeting Design Criteria as approved by Architect before installation. See Section 01 6200.
2. Fasteners:
- a. Class Two Quality Standards. See Section 01 6200:
    - 1) Wood Framing: Non-corrosive wood screws of length, type, and quantity recommended by Manufacturer.

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**

**SECTION 04 0523****MASONRY ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Flexible flashing for brick sills.
  - 2. Flexible flashing for bottom of masonry veneer, and behind masonry wall infill.
  - 3. Mortar guard.
  - 4. Weep vents.
  - 5. Vents (open head joints).
- B. Related Requirements:
  - 1. Section 04 0501: 'Common Masonry Requirements' for installation of masonry accessories.
  - 2. Section 04 0521: 'Masonry Veneer Ties'.
  - 3. Sections Under 04 2000 Heading: 'Unit Masonry' for masonry accessories used in unit masonry.

**1.2 REFERENCES**

- A. Definitions:
  - 1. See Section 04 0501 for common masonry definitions.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A153/A153M-16, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
    - b. ASTM A240/A240M-16, 'Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications'.
    - c. ASTM A580/A580M-15, 'Standard Specification for Stainless Steel Wire'.
    - d. ASTM D903-98(2010), 'Standard Test Method for Peel or Stripping Strength of Adhesive Bonds'.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's product literature or cut sheet for each item showing compliance with design criteria requirements as specified.
- B. Informational Submittals:
  - 1. Test And Evaluation Reports:
    - a. Manufacturer's published test results showing performance characteristics.
  - 2. Manufacturer's Instructions:
    - a. Manufacturer's published installation instructions for each item.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Warranty Documentation:
      - 1) Final, executed copy of Warranty.
    - b. Record Documentation:
      - 1) Manufacturers documentation:
        - a) Manufacturer's product literature for each item.

## 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  - 1. See submittal requirements as specified in Section 04 0501.
- B. Storage And Handling Requirements:
  - 1. See submittal requirements as specified in Section 04 0501.

## 1.5 WARRANTY

- A. Manufacturer's Standard Warranty for products provided.

## PART 2 - PRODUCTS

### 2.1 ACCESSORIES

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Advanced Building Products Inc, Springvale, ME [www.advancedflashing.com](http://www.advancedflashing.com).
    - b. Hohmann & Barnard, Hauppauge, NY [www.h-b.com](http://www.h-b.com).
    - c. Mortar Net USA Ltd, Burns Harbor, IN [www.mortarnet.com](http://www.mortarnet.com).
    - d. Sandell Manufacturing, Schenectady, NY [www.sandellmfg.com](http://www.sandellmfg.com).
    - e. Wire-Bond, Charlotte, NC [www.wirebond.com](http://www.wirebond.com).
    - f. York Manufacturing Inc, Sanford, ME [www.yorkflashings.com](http://www.yorkflashings.com).
- B. Materials:
  - 1. Flexible Flashing:
    - a. Design Criteria:
      - 1) General:
        - a) Compatible with sealants and other building components.
        - b) Do not use as an exposed flashing.
        - c) Drool: Membrane shall not 'drool' when exposed to UV or heat.
      - 2) Required Components:
        - a) Mortar Guard: Install with mortar guard.
        - b) Weep Vents: Requires weep vents.
      - 3) Self-adhering and self-sealing membranes:
        - a) Ambient Conditions: Follow Manufacturer recommendations for storage and application.
        - b) Do not apply to moist or damp surfaces.
        - c) Meet testing requirements of ASTM D903 for peel or stripping strength of adhesive bonds.
    - b. Flexible Flashing:
      - 1) Description:
        - a) Self-adhering and self-sealing composite non-asphaltic waterproof polyethylene membrane.
      - 2) Design Criteria:
        - a) Self-adhering and self-sealing.
        - b) Width: Provide **18 inches (450 mm)** minimum width.
      - 3) Type One Acceptable Products:
        - a) Bakor TWF with primer (for masonry base), Bakor Blueskin with Primer (for behind infill wall).
        - b) Air Shield TWF with primer.
        - c) Equal meeting Design Criteria as approved by Architect before bidding. See Section 01 6200.
  - 2. Components:
    - a. Mortar Guard:

- 1) Description:
  - a) Allows passage of moisture from cavity to building exterior while restricting ingress of insects and other debris.
- 2) Design Criteria:
  - a) Allows moisture to quickly and easily exit the cavity.
  - b) Allows for proper air movement in and out of the cavity.
  - c) Will not oxidize, rot, promote mold or fungus growth, or react with common building materials.
- 3) Dimensions:
  - a) Thickness as recommended by Manufacturer for air space.
- 4) Category Four Approved Products. See Section 01 6200 for definition of Categories.
  - a) Mortar Trap by Hohmann & Barnard.
  - b) Mortar Net by Mortar Net.
- b. Weep Vents:
  - 1) Description:
    - a) Allows passage of moisture from cavity to building exterior while restricting ingress of insects and other debris.
    - b) Dimensions:
      - (1) 3/8 inch (9.5 mm) wide x 2-1/2 inch (64 mm) deep x 3-3/8 inch (86 mm) long.
  - 2) Design Criteria:
    - a) Polypropylene tested to conform to ASTM standards.
    - b) Suitable for top of wall venting.
  - 3) Type One Acceptable Products:
    - a) Cell Vent:
      - (1) QV - Quadro-Vent by Hohmann & Barnard.
      - (2) No. 3601 Cell Vent by Wire-Bond.
    - b) Equal meeting Design Criteria as approved by Architect before bidding. See Section 01 6200.
- c. Vents (Open Head Joints):
  - 1) Description:
    - a) Vent inserted in weep hole at top of drainage air space in masonry veneer walls.
    - b) Vent allows passage of moisture from cavity to building exterior while restricting ingress of insects and other debris.
    - c) Dimensions:
      - (1) 3/8 inch (9.5 mm) wide x 2-1/2 inch (64 mm) deep x 3-3/8 inch (86 mm) long.
  - 2) Design Criteria:
    - a) Polypropylene tested to conform to ASTM standards.
    - b) Suitable for top of wall venting.
  - 3) Type One Acceptable Products:
    - a) Cell Vent:
      - (1) QV - Quadro-Vent by Hohmann & Barnard.
      - (2) No. 3601 Cell Vent by Wire-Bond.
    - b) Equal meeting Design Criteria as approved by Architect before bidding. See Section 01 6200.

### **PART 3 - EXECUTION: Not Used**

### **END OF SECTION**

**BLANK PAGE**

**SECTION 04 2113****BRICK VENEER UNIT MASONRY****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install masonry and precast shaped units as veneer on framing as described in Contract Documents.
  - 2. See detail 8/A-9 for descriptions.
- B. Products Installed But Not Furnished Under This Section:
  - 1. Masonry Accessories:
    - a. Flexible flashing for brick sills.
    - b. Flexible flashing for bottom of masonry veneer and behind masonry wall infill.
    - c. Mortar guard.
    - d. Weep vents.
  - 2. Masonry Veneer Ties.
  - 3. Galvanized Metal Lintels.
- C. Related Requirements:
  - 1. Sections Under 04 0000 Heading: 'Masonry':
    - a. Pre-installation conference held jointly with other masonry related sections.
  - 2. Section 04 0501: 'Common Masonry Requirements' for:
    - a. Common masonry requirements and procedures.
    - b. Pre-installation conference held jointly with other masonry related sections.
  - 3. Section 04 0513: 'Cement and Lime Masonry Mortaring' for quality of mortar.
  - 4. Section 04 0521: 'Masonry Veneer Ties' for quality of masonry veneer ties.
  - 5. Section 04 0523: 'Masonry Accessories' for furnishing flexible flashing, mortar guard, and weep vents.
  - 6. Section 05 1223: 'Structural Steel Buildings' for metal lintels.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Section 04 0501: 'Common Masonry Requirements' for:
    - a. Common Masonry Terms.
    - b. Brick and Brick Classifications.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C67-14, 'Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile'.
    - b. ASTM C216-16, 'Standard Specification for Facing Brick (Solid Masonry Made from Clay or Shale)'.
  - 2. Canadian Standards Association / National Standard of Canada:
    - a. CAN/CSA A82-14, 'Fired Masonry Brick Made from Clay or Shale'.
    - b. CAN/CSA-A82.1-M87 (R2003), 'Burned Clay Brick (Solid Masonry Units made from Clay or Shale)'.
  - 3. CSA Group (Canadian Standards Association):
    - a. CSA A371-14, 'Masonry Construction for Buildings'.
  - 4. Masonry Standards Joint Committee (MSJC) - The Masonry Society (TMS) / American Concrete Institute (ACI) / American Society of Civil Engineers (SEI/ASCE):

- a. TMS 402-13/ACI 530-13/ASCE 5-13 and TMS 602-13/ACI 530.1-13/ASCE 6-13, 'Building Code Requirements and Specification for Masonry Structures'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
  1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 held jointly with other Division 04 'Masonry' specifications in this Project that require pre-installation conference as specified in Section 04 0501.
    - a. Schedule pre-installation conference during construction of mockup panel.

### 1.4 SUBMITTALS

- A. Action Submittals:
  1. Samples:
    - a. One (1) full size brick minimum, one (1) sample of each special shape, and physical samples which demonstrate full range of color and texture.
    - b. Type of veneer tie used.
- B. Closeout Submittals:
  1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Manufacturers Documentation:
        - a) Brick Manufacturer's literature or cut sheet.
        - b) Brick color and type selection.

### 1.5 QUALITY ASSURANCE

- A. Qualifications:
  1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
    - a. Minimum of five (5) years' experience on successfully completed projects of similar nature.
- B. Mockups:
  1. Sample panel **4 feet (1.20 m)** long by **3 feet (900 mm)** high of proposed color range, texture, bond, mortar, and workmanship. Include mock-up framing and sheathing to show wall construction to be used on Project, including:
    - a. Anchor and tie systems.
    - b. Any specialty details, such as reveals, soldier courses, etc.
    - c. Flexible flashing and required components at foundation.
    - d. Mortar Guard
    - e. Ship lapped flexible flashing.
  2. Sample panel(s) shall be constructed using 'production run' material to be used on Project unless otherwise approved in writing by Architect and/or Owner. Mockup can be placed on building area of work.
  3. Do not start work of this Section until Architect has accepted sample panel(s).

### 1.6 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
  1. As specified in Section 04 0501: 'Common Masonry Requirements'.
- B. Storage And Handling Requirements:
  1. Aggregate, Cementitious Material, Masonry Accessories, Masonry Units, and Reinforcement:
    - a. As specified in Section 04 0501: 'Common Masonry Requirements'.



## 1.7 FIELD CONDITIONS

- A. Ambient Conditions:
  - 1. Cold Weather and Hot Weather Limitations:
    - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

- A. Design Criteria:
  - 1. Face Brick: Meet requirements of ASTM C216 or CSA A82.
    - a. Brick Grade SW.
    - b. Brick Type: FBX.
    - c. Efflorescence:
      - 1) Provide brick that has been tested according to ASTM C67 and is rated 'Not Effloresced'.
    - d. Initial rate of absorption: Less than 30 sq. in (30 g) per minute when tested per ASTM C67.
    - e. Brick shall be free of defects, deficiencies, and surface treatments, including coatings that would interfere with proper setting of brick or significantly impair strength or performance of Work.
    - f. Face or faces that will be exposed in place shall be free of chips that exceed limits set in ASTM C216 of five (5) percent for FBX. Aggregate length of chips shall not exceed ten (10) percent.
    - g. Other than chips, face or faces shall be free of cracks or other imperfections detracting from appearance of designated sample when viewed from distance of 15 feet (4.6 meters) away. Number of brick in delivery that are broken or otherwise fail to meet requirements for chippage and tolerances shall not exceed five (5) percent.
- B. Materials:
  - 1. Mortar (as specified in Section 04 0513: 'Cement And Lime Masonry Mortaring'):
    - a. Type 'N' preferred for unit masonry three stories or less.
  - 2. Brick:
    - a. Brick shall be true to size and shape. No warped brick permitted. Brick for Project shall be fired in same run.
    - b. See detail 8/A-9 for sizes.
    - c. Type One Acceptable Manufacturers, Style, And Color:
      - 1) **Interstate Arctic White (For Bid Purposes)**
    - d. Contractor to allow for two (2) possible colour changes based on final site review prior to finalizing the masonry selection.

### 2.2 ACCESSORIES

- A. Cleaning Compounds:
  - 1. Use type of compound recommended by Brick Manufacturer based on minerals present in masonry units.
  - 2. Type Two Acceptable Products:
    - a. 202 or 202V by Diedrich Technologies, Oak Creek, WI [www.diedrichtechnologies.com](http://www.diedrichtechnologies.com).
    - b. Surekleen No. 600 or Vana-Trol by ProSoCo Inc, Kansas City, KS [www.prosoco.com](http://www.prosoco.com).
    - c. Equal as approved by Architect before use. See Section 01 6200.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification Of Conditions:
  - 1. Examine substrate and verify substrate is suitable for installation of masonry.
  - 2. Verify built-in items are in proper location, and ready for roughing into masonry.
  - 3. Notify Architect of unsuitable conditions in writing.
    - a. Do not install masonry over unsuitable conditions.
    - b. Commencement of Work by installer is considered acceptance of substrate.

### 3.2 PREPARATION

- A. Coordinate placement of reinforcement, anchors and accessories, flashings and weep holes and other moisture control products specified in other sections.
- B. Clean:
  - 1. Prior to placing masonry:
    - a. Clean reinforcement and shanks of anchor bolts by removing mud, oil, or other materials that will adversely affect or reduce bond at time mortar or grout is placed.
    - b. Remove laitance, loose aggregate, and anything else that would prevent mortar from bonding to foundation.

### 3.3 INSTALLATION

- A. Interface With Other Work:
  - 1. Masonry Cutting:
    - a. Make cuts proper size to accommodate work of other trades.
    - b. Replace unit masonry in which larger than necessary openings are cut.
    - c. Do not patch openings with mortar or other material.
- B. General:
  - 1. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
  - 2. Step back unfinished work for joining with new work. Use toothing only with Architect's approval.
  - 3. Built-In Work:
    - a. As work progresses, install masonry flashings and weep holes and other built-in work specified in other sections.
- C. Mortar:
  - 1. Use mortar within two (2) hours of initial mixing. Discard mortar that has begun to set. Set masonry units within one (1) minute of spreading mortar.
  - 2. Do not allow mortar build-up in cavity between brick veneer and wall framing.
  - 3. Cold Weather and Hot Weather Limitations:
    - a. Place mortar as specified in Section 04 0501: 'Common Masonry Requirements'.
- D. Tolerances:
  - 1. Masonry shall be laid true to vertical and horizontal planes within **1/8 inch in 10 feet (3 mm in 3 meters)**, non-cumulative. Recess masonry where indicated.
  - 2. Maintain **3/8 inch (9.5 mm)** mortar joints throughout. (Match existing).
- E. Brick Masonry Units:
  - 1. Laying (Intent is to match existing adjacent masonry):
    - a. Layout:
      - 1) Running bond except where noted otherwise. Select brick so there is uniform distribution of hues.

- 2) Use solid brick where brick coursing would otherwise show cores.
- b. Joints:
  - 1) Do not tool until mortar has taken initial set.
  - 2) Tool concave. When tooling joints, squeeze mortar back into joint.
  - 3) Point holes in joints. Fill and tool properly.
- c. Brick:
  - 1) Wet each brick to saturation. Lay brick when surface is dry. Brick absorption when laid should not exceed 0.025 oz/sq inch (457 g/sq mm) maximum.
  - 2) Shove brick into place in full mortar bed, do not lay.
  - 3) Completely fill horizontal and vertical joints. Do not furrow bed joints.
  - 4) Strike back-side joints on brick flush. Do not allow mortar build-up in cavity between masonry veneer and stud wall sheathing.
  - 5) Step back unfinished work for joining with new work. Use toothing only with Architect's approval.
2. Placing Mortar:
  - a. General:
    - 1) Use mortar within two (2) hours of initial mixing. Discard mortar that has begun to set.
    - 2) Set masonry units within one (1) minute of spreading mortar.
    - 3) Clean excess mortar from brick face promptly to ensure residual mortar will not stain the brick face.
  - b. Bed joints at foundations:
    - 1) In starting course on foundations and other supporting members, construct bed joints so that bed joint thickness is at least 1/4 inch (6.4 mm) and not more than:
      - a) 3/4 inch (19 mm) when masonry is ungrouted or partially grouted.
  - c. Bed and head joints:
    - 1) Unless otherwise required, construct 3/8 inch (9.5 mm) thick bed and head joints, except at foundation.
    - 2) Construct joints that also conform to following:
      - a) Fill holes not specified in exposed and below grade masonry with mortar.
      - b) Tool joint with round jointer when mortar is thumbprint hard.
      - c) Remove masonry protrusions extending 1/2 inch (12.7 mm) or more into cells or cavities to be grouted.
  - d. Solid units:
    - 1) Unless otherwise required, place mortar so that bed and head joints are fully mortared and:
      - a) Do not fill head joints by slushing with mortar.
      - b) Construct head joints by shoving mortar tight against adjoining unit.
      - c) Do not deeply furrow bed joints.
  - e. Open end units with beveled ends:
    - 1) Fully grout open-end units with beveled ends.
    - 2) Head joints of open-end units with beveled ends need not be mortared:
      - a) At beveled ends, form grout key that permits grout within 5/8 inch (15.9 mm) of face of unit.
      - b) Tightly butt units to prevent leakage of grout.

#### F. Masonry Veneer Ties:

1. Place corrugated sheet-metal anchors, sheet-metal anchors, and wire anchors as follows:
  - a. Free of material that may destroy bond.
  - b. Install in same course as masonry as brick reinforcement on centerline of brick width.
  - c. Install as detailed by screwing through sheathing into framing:
    - 1) Install as detailed by screwing through sheathing into framing.
    - 2) Begin approximately 8 inches (200 mm) from base of masonry and with maximum spacing of 16 inches (400 mm) vertically and at each vertical stud horizontally.
    - 3) Install final row of ties within 8 inches (200 mm) of top course of brick.
    - 4) Install to meet Tie Manufacturer's recommendations.
  - d. Provide at least one (1) adjustable two-piece anchor, anchor of wire size W 1.7 (MWII), or 22 ga (0.8 mm) corrugated sheet-metal anchor for each 2.67 sq ft (0.25 sq m) of wall area.
    - 1) Provide at least one anchor of other types for each 3.5 sq ft (0.33 sq m) of wall area.

- e. Space anchors at maximum of **32 inches (813 mm)** horizontally and **25 inches (635 mm)** vertically, but not to exceed applicable requirement of as specified in two previous paragraphs.
  - f. Provide additional anchors around openings larger than **16 inch (400 mm)** in either dimension:
    - 1) Space anchors around perimeter of opening at maximum of **3 feet (0.90 m)** on center.
    - 2) Place anchors within **12 inch (300 mm)** of opening.
- G. Flashing:
- 1. General:
    - a. Install embedded flashing, metal drip edges, with weep holes and other components in masonry at lintels, ledges, floors, and other obstructions to downward flow of water in wall, and where indicated.
    - b. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  - 2. Flexible flashing:
    - a. Install flashing in ship lapped application.
    - b. Carry flashing vertically as detailed. See 8/A-9.
    - c. Lap flexible flashing minimum of **6 inch (150 mm)**.
    - d. Seal all flashing laps with compatible lap cement.
    - e. Do not stop flashing behind face of brickwork.
    - f. Place flashing at all points where air space is interrupted.
    - g. Extend head flashings no less than **12 inch (305 mm)** beyond edges of openings and turn up to form watertight pan, seal with mastic.
    - h. Extend sill flashings no less than **12 inch (305 mm)** minimum height to form watertight pan, seal with mastic.
    - i. All discontinuous flashing shall be turned up minimum **1 inch (25 mm)** into head joint a flashing ends to form an end dam.
- H. Weep Holes:
- 1. General:
    - a. Weep holes must be placed at base of cavity and at all other flashing levels providing means of draining away any moisture that may have found its way into cavity.
    - b. Weep holes must provide clear access to cavity and must be placed directly on flashing for proper drainage.
  - 2. Install weep vents in weep holes at **33 inches (875 mm)** on center maximum at bottom masonry course at foundation.
- I. Vents (Open Head Joints):
- 1. Place vents at top of cavity air space of masonry walls.
  - 2. Install weep vents in weep holes at **33 inches (875 mm)** on center maximum and should be centered between weep holes at top of Masonry wall.
- J. Mortar Guard:
- 1. Place mortar guard continuously between brick and sheathing at bottom masonry course at foundation.

### 3.4 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
- 1. Remove and replace defective material at Architect's direction and at no additional cost to Owner.

### 3.5 CLEANING

- A. General:

1. Clean exposed masonry surfaces of stains, efflorescence, mortar and grout droppings, and debris using methods that do not damage masonry
2. After mortar has hardened, wet masonry and clean with specified cleaning compound. Use stiff fibered brush for application. Rinse masonry surfaces with water immediately after cleaning. Leave masonry clean, free of mortar daubs, and with tight mortar joints.
3. Wash adjacent non-masonry surfaces. Use detergent and soft brushes or cloth.
4. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

B. Waste Management:

1. Clean up masonry debris and remove from site.

### 3.6 PROTECTION

A. General:

1. During construction, all walls should be kept dry by covering top of wall with a strong, water-resistant membrane at end of each day or shutdown period. Covering should overhang wall by at least **24 inches (610 mm)** on each side, and should be secured against wind.
2. Covering should remain in place until top of cavity wall is completed or protected by adjacent materials.
3. Protect masonry with covering during rainy weather.

B. Cold Weather Requirements:

1. In cold weather, all materials and walls should be properly protected against freezing including storing of materials, preparation of mortar, heating of masonry units, laying precautions, and protection of Work.
2. Remove all masonry deemed frozen or damaged.

C. Stain prevention: Prevent grout, mortar, and soil from staining face of masonry to be left exposed. Immediately remove mortar and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with pointed and integral finishes, from mortar droppings.
4. Turn scaffold boards near wall on edge at end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

**END OF SECTION**

**BLANKPAGE**

## **DIVISION 05: METALS**

### **05 1000 STRUCTURAL METAL FRAMING**

05 1223 STRUCTURAL STEEL FOR BUILDINGS

### **05 5000 METAL FABRICATIONS**

05 5214 GALVANIZED STEEL PIPE AND TUBE RAILINGS

05 5871 METAL BRACKETS

END OF TABLE OF CONTENTS

BLANK PAGE



**SECTION 05 1223****STRUCTURAL STEEL FOR BUILDINGS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Miscellaneous structural steel including following:
    - a. Galvanized Lintel – see detail 8/A-9 and MA-10.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for installation of miscellaneous structural steel.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. American Society For Testing And Materials:
    - a. ASTM A36/A36M-14, 'Standard Specification for Carbon Structural Steel'.
    - b. ASTM A53/A53M-12, 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'.
    - c. ASTM A500/A500M-13, 'Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes'.
  - 2. Canadian Standards Association:
    - a. CSA G40.20-13/G40.21-13, 'General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel'.
    - b. CSA-S136-07 (R2012), 'North American Specification for the Design of Cold-Formed Steel Structural Members'.
    - c. CSA-S408-11, 'Guidelines for the Development of Limit States Design Standards'.
    - d. CSA-S473-04 (2009), 'Steel Structures'.
    - e. CSA-W59-13, 'Welded Steel Construction (Metal Arc Welding)'.
    - f. CSA-W117.2-12, 'Safety in Welding, Cutting and Allied Processes'.
  - 3. Canadian Standards Association / National Standard of Canada:
    - a. CAN/CSA-G40.23-94 (R2005), 'Steel - Surface Finish of Hot-Rolled Plates and Wide Flats - Delivery Requirements' (Adopted ISO 7788:1985).

**PART 2 - PRODUCTS****2.1 COMPONENTS**

- A. Materials:
  - 1. Miscellaneous Steel (Lintels):
    - a. Meet the following requirements:
      - 1) General requirements: Meet CAN/CSA-G40.20.
      - 2) Shapes And Bars: Conform to CAN/CSA-G40.23, grade 300W.
      - 3) Hollow Structural Sections: Conform to CAN/CSA-G40.20, grade 350W (Class C or H).
- B. Fabrication:
  - 1. Galvanize lintels to be installed in accordance with CAN/CSA G40.23.

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**

**SECTION 05 5214****GALVANIZED STEEL PIPE AND TUBE RAILINGS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install galvanized steel pipe handrails to Corridor 178 stairs as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for blocking for handrail brackets installed on wood-framed walls.
  - 2. Finish painting:
    - a. Section 09 9124: 'Interior Painted Metal'.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Galvanized: To coat iron or steel with zinc for protection from rust and corrosion.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A53/A53M-12, 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'.
    - b. ASTM A501/A501M-14, 'Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing'.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Shop Drawings: Show fabrication and installation of handrails and railings including floor plans, elevations, sections, details of components, and attachments to other elements of The Work.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Storage And Handling Requirements:
  - 1. Store handrails in clean, dry location, away from uncured concrete and masonry, and protected against damage.
  - 2. Cover with waterproof paper, tarpaulin, or polyethylene sheeting. Allow for air circulation inside covering.

**PART 2 - PRODUCTS****2.1 ASSEMBLIES**

- A. Materials:
  - 1. Handrails:
    - a. Galvanized steel pipe meeting requirements of ASTM A53/A53M or galvanized steel tubing meeting requirements of ASTM A501/A501M.

- b. 1-1/2 inch (38 mm) outside diameter.
- 2. Brackets, Flanges, Fittings, And Anchors:
  - a. Provide standard wall brackets, flanges, miscellaneous fittings, and anchors for connection of handrails and railings to other wall construction.

**B. Fabrication:**

- 1. Preassemble railing systems in shop to greatest extent possible to minimize field splicing and assembly.
- 2. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- 3. Grind smooth welded joints and buff welds to same appearance as remainder of railing.
- 4. Form curves by bending pipe in jigs to produce uniform curvature for each configuration required. Maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
- 5. Welded Connections:
  - a. Fabricate railing system and handrail connections by welding.
  - b. Weld corners and seams continuously to comply with following:
    - 1) Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    - 2) At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.
    - 3) At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and so contours of welded surfaces match adjacent surfaces.
- 6. Return pipe ends of wall mounted handrails into wall.
- 7. After fabrication, shop prime metal to be painted.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Touch up field welds to match pre-finished material.

**END OF SECTION**

**SECTION 05 5871****METAL BRACKETS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Supplied But Not Installed Under This Section:
  - 1. Metal Brackets:
    - a. Metal brackets necessary to support counter in Room 176.
- B. Related Requirements:
  - 1. Metal Brackets:
    - a. Section 06 2001: 'Common Finish Carpentry Requirements' for installation of metal brackets.
    - b. Section 09 9124: 'Interior Painted Metal' for finish painting.

**1.2 REFERENCES**

- A. Reference Standards (Metal Brackets):
  - 1. ASTM International:
    - a. ASTM A36/A36M-14, 'Standard Specification for Carbon Structural Steel'.

**PART 2 - PRODUCTS****2.1 FABRICATED UNITS**

- A. Materials:
  - 1. Metal Brackets:
    - a. Steel: Meet requirements of ASTM A36/A36M.
    - b. Fabrication:
      - 1) Fabricate as detailed.
      - 2) Grind exposed welds smooth and polish to match non-welded metal finish.
      - 3) After fabrication and drilling of mounting holes, shop prime.

**PART 3 - EXECUTION: Not Used****END OF SECTION**

**BLANK PAGE**

# **DIVISION 06: WOOD, PLASTICS, AND COMPOSITES**

## **06 0500 COMMON WORK RESULTS OF WOOD, PLASTICS, AND COMPOSITES**

06 0573 PRESERVATIVE WOOD TREATMENT

## **06 1000 ROUGH CARPENTRY**

06 1011 WOOD FASTENINGS  
06 1100 WOOD FRAMING  
06 1636 WOOD PANEL PRODUCT SHEATHING

## **06 2000 FINISH CARPENTRY**

06 2001 COMMON FINISH CARPENTRY REQUIREMENTS  
06 2024 DOOR, FRAME, AND FINISH HARDWARE INSTALLATION  
06 2210 MISCELLANEOUS WOOD TRIM

## **06 4000 ARCHITECTURAL WOODWORK**

06 4001 COMMON ARCHITECTURAL WOODWORK REQUIREMENTS  
06 4005 PLASTIC LAMINATE  
06 4114 WOOD-VENEER-FACED ARCHITECTURAL CABINETS  
06 4512 ARCHITECTURAL WOODWORK WOOD TRIM

## **06 6000 PLASTIC FABRICATIONS**

06 6001 MISCELLANEOUS PLASTIC FABRICATIONS

END OF TABLE OF CONTENTS

BLANK PAGE



**SECTION 06 0573****PRESERVATIVE WOOD TREATMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Quality of wood preservative treatment where specified.
  - 2. Sill plate, any wood in contact with concrete / concrete block.
- B. Related Requirements:
  - 1. Section 06 1100:
    - a. Characteristics of wood to be pressure-treated.
    - b. Furnishing and installing of pressure-treated wood.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Preservative-Treated Wood: Wood exposed to high levels of moisture or heat susceptible to decay by fungus and other organisms, and to insect attack. The damage caused by decay or insects can jeopardize the performance of the wood members so as to reduce the performance below that required. Preservative treatment requires pressure-treatment process to achieve depth of penetration of preservative into wood to verify that the wood will be resistant to decay and insects over time.
  - 2. Treated Wood: Wood impregnated under pressure with compounds that reduce its susceptibility to flame spread or to deterioration caused by fungi, insects, or marine bores.
- B. Reference Standards:
  - 1. Canadian Standards Association:
    - a. CSA-O80 Series-08, 'Wood Preservation' (10th edition).
  - 2. International Building Code (IBC) (2015 or latest approved edition by AHJ):
    - a. Chapter 23, 'Wood':
      - 1) Section 2300, 'Minimum Standards and Quality':
        - a) 2303.1, 'General':
          - (1) 2303.1.8, 'Preservative-Treated Wood'.
      - 2) Section 2400, 'General Construction Requirements':
        - a) 2304.11, 'Protection Against Decay and Termites':
          - (1) 2311.2, 'Wood Used Above Ground'.
          - (2) 2311.4, 'Wood In Contact With The Ground'.

**1.3 SUBMITTALS**

- A. Informational Submittals:
  - 1. Certificate: Certificate of pressure treatment showing compliance with specification requirements and including information required under IBC Section 2303.1.8.1, 'Identification'.

**PART 2 - PRODUCTS****2.1 SYSTEMS**

- A. Manufacturers:

1. Type One Acceptable Manufacturers:
  - a. Arch Wood Protection Inc, Atlanta, GA [www.wolmanizedwood.com](http://www.wolmanizedwood.com).
  - b. Hoover Treated Wood Products, Thomson, GA [www.frtw.com](http://www.frtw.com).
  - c. Osmose Inc, Griffin, GA [www.osmose.com](http://www.osmose.com).
  - d. U S Borax Inc, Valencia, CA [www.borax.com/wood](http://www.borax.com/wood).
  - e. Viance LLC, Charlotte, NC [www.treatedwood.com](http://www.treatedwood.com).
  - f. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Performance:
  1. Framing lumber grade and species shall be as specified in Section 06 1100 for particular use.
  2. Wood Preservatives: Meet requirements of CSA-O80.

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**

**SECTION 06 1011****WOOD FASTENINGS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Quality of wood fastening methods and materials used for Rough Carpentry unless specified otherwise.
- B. Related Requirements:
  - 1. Furnishing and installing of other fasteners are specified in individual Sections where installed.

**1.2 REFERENCES**

- A. Reference Standards;
  - 1. ASTM International:
    - a. ASTM A153/A153M-16a, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
    - b. ASTM D3498-03(2011), 'Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems'.
    - c. ASTM F1667-17, 'Standard Specification for Driven Fasteners: Nails, Spikes, and Staples'.
  - 2. Canadian Standards Association:
    - a. CSA O112 Series-M1977 (R2006), 'CSA Standards for Wood Adhesives':
      - 1) CSA O112.6-1.1, 'Resourcinol and Phenol-Resourcinol Resin Adhesive for Wood (High Temperature Curing)'.
      - 2) CSA O112.7-1.1, 'Resourcinol and Phenol-Resourcinol Resin Adhesive for Wood (Room and Intermediate Temperature Curing)'.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's literature on framing anchors and powder actuated fasteners.
  - 2. Shop Drawings:
    - a. Submit diameter and lengths of fasteners proposed for use on Project. If length or diameter of proposed fasteners differ from specified fasteners, also include technical and engineering data for proposed fasteners including, but not limited to:
      - 1) Adjusted fastener spacing where using proposed fasteners and,
      - 2) Adjusted number of fasteners necessary to provide connection capacity equivalent to specified fasteners.
    - b. Submit on powder-actuated fasteners other than those specified in Contract Documents showing design criteria equivalents at each application.
    - c. Show type, quantity, and installation location of framing anchors. Where necessary, reference Drawing details, etc, for installation locations.

**PART 2 - PRODUCTS****2.1 MANUFACTURED UNITS**

- A. Description:

## 1. Nail Terminology:

- a. When following nail terms are used in relation to this Project, following lengths and diameters will be understood. Refer to nails of other dimensions by actual length and diameter, not by one of listed terms:

Nail Term	Length	Diameter	Length	Diameter
8d Box	2-1/2 inches	0.113 inch	63.5 mm	2.827 mm
8d Common	2-1/2 inches	0.131 inch	63.5 mm	3.389 mm
10d Box	3 inches	0.128 inch	76.2 mm	3.251 mm
10d Common	3 inches	0.148 inch	76.2 mm	3.759 mm
16d Box	3-1/2 inches	0.135 inch	88.9 mm	3.411 mm
16d Sinker	3-1/4 inches	0.148 inch	82.6 mm	3.759 mm
16d Common	3-1/2 inches	0.162 inch	88.9 mm	4.115 mm

## B. Materials:

## 1. Fasteners:

## a. General:

- 1) Fasteners for preservative treated wood shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronzed, or copper. Coating weights for zinc-coated fasteners shall be in accordance with ASTM A153/A153M.

## b. Nails:

- 1) Meet requirements of ASTM F1667.  
 2) Unless noted otherwise, nails listed on Drawings or in Specifications shall be common nail diameter, except 16d nails, which shall be box diameter.

## c. Wood Screws:

## 1) SDS Screws:

- a) Category Four Approved Products. See Section 01 6200 for definitions of categories.

(1) SDS Screws by Simpson Strong Tie Co, Dublin, CA [www.strongtie.com](http://www.strongtie.com).

- 2) All Other: Standard type and make for job requirements.

## d. Powder-Actuated Fasteners:

- 1) Type One Quality Standard: Hilti X-DNI 62P8.

## 2) Manufacturers:

- a) Hilti, Tulsa, OK [www.us.hilti.com](http://www.us.hilti.com).

- b) Redhead Division of ITW, Wood Dale, IL [www.itw-redhead.com](http://www.itw-redhead.com) and Markham, ON [www.itwconstruction.ca](http://www.itwconstruction.ca).

- c) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

## 2. Adhesives:

## a. Construction Mastics:

- 1) Meet requirements of 'APA-The Engineered Wood Association' Specification AFG-01 or ASTM D3498 or CSA O112 standards.  
 2) Use phenol-resorcinol type for use on pressure treated wood products.

## 3. Framing Anchors:

- a. Framing anchors and associated fasteners in contact with preservative hot dipped zinc-coated galvanized steel or stainless steel. Do not use stainless steel items with galvanized items.

## b. Type Two Acceptable Products:

- 1) KC Metals Inc, San Jose, CA [www.kcmetals.com](http://www.kcmetals.com).

- 2) Simpson Strong Tie Co, Dublin, CA [www.strongtie.com](http://www.strongtie.com).

- 3) United Steel Products Co Inc (USP), Montgomery, MN [www.uspconnectors.com](http://www.uspconnectors.com).

- 4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

## **PART 3 - EXECUTION**

### **3.1 ERECTION**

- A. Secure one Manufacturer approved fastener in each hole of framing anchor that bears on framing member unless approved otherwise in writing by Architect.

**END OF SECTION**

**BLANK PAGE**

**SECTION 06 1100****WOOD FRAMING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install wood framing and blocking as described in Contract Documents.
  - 2. Provide blocking to connect full height walls to u/s of existing roof structure at 4'-0" (1200 mm) O.C.
- B. Products Installed But Not Furnished Under This Section:
  - 1. Miscellaneous structural steel elements.
- C. Related Requirements:
  - 1. Section 05 1223: 'Structural Steel For Buildings' for furnishing of miscellaneous structural steel.
  - 2. Section 06 0573: 'Preservative Wood Treatment' for quality of preservative wood treatment.
  - 3. Sections under 06 4000 Heading: 'Architectural Woodwork' for wall blocking requirements.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. Canadian Standards Association (CSA Group):
    - a. CSA-O86-14, 'Engineering Design in Wood'.
    - b. CSA-O141-05 (R2014), 'Softwood Lumber'.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference:
  - 1. Participate in pre-installation conference:
    - a. Schedule pre-installation conference immediately before beginning framing work.
    - b. In addition to agenda items specified in Section 01 3100, review following:
      - 1) Equipment and gypsum board blocking in wood framed walls.
      - 2) Rough opening.
      - 3) Nails and nailing requirements.
      - 4) Connections.

**1.4 SUBMITTALS**

- A. Informational Submittals:
  - 1. Test And Evaluation Reports:
    - a. Technical and engineering data on nails to be set by nailing guns for Architect's approval of types proposed to be used as equivalents to specified hand set nails and adjusted number and spacing of pneumatically-driven nails to provide equivalent connection capacity.

**1.5 QUALITY ASSURANCE**

- A. Qualifications:
  - 1. Suppliers:

- a. Licensed by American or Canadian Institute of Timber Construction, or American Wood Systems.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  1. Protect lumber and sheathing and keep under cover in transit and at job site.
  2. Do not deliver material unduly long before it is required.
- B. Storage And Handling Requirements:
  1. Store lumber and sheathing on level racks and keep free of ground to avoid warping.
  2. Stack to insure proper ventilation and drainage.

## PART 2 - PRODUCTS

### 2.2 MATERIALS

- A. Dimension Lumber:
  1. Design Criteria:
    - a. Grading:
      - 1) Lumber: Dimension lumber shall conform to CSA-O141 Species Group CSA-O86.1 as listed, and to National Lumber Grades Authority Standard Grading Rules, 1980 and Supplement 1 of 1984.
    - b. Identify lumber and sheathing/plywood by grade mark or Certificate of Inspection issued by approved lumber grading or inspection bureau or agency. Graded American lumber may be used, subject to CLSAB approval.
    - c. Lumber **2 inches (50 mm)** or less in nominal thickness shall not exceed 19 percent in moisture content at time of fabrication and installation and be stamped 'S-DRY', 'K-D', or 'MC15'.
    - d. Preservative Treated Plates / Sills:
      - 1) **2x4 (38 mm by 64 mm)**: Standard and better Douglas Fir, Southern Pine, or HemFir, or StrandGuard by iLevel by Weyerhaeuser Boise, ID [www.ilevel.com](http://www.ilevel.com). (LSL 1.3 E)
      - 2) **2x6 (38 mm by 140 mm)** And Wider: No. 2 or or MSR 1650f - 1.5e Douglas Fir, Southern Pine, HemFir, or StrandGuard by iLevel by Weyerhaeuser, Boise, ID [www.ilevel.com](http://www.ilevel.com). (LSL 1.3 E).
- B. See Contract Drawings for additional requirements.

### 2.3 ACCESSORIES

- A. Blocking:
  1. Sound lumber without splits, warps, wane, loose knots, or knots larger than **1/2 inch (13 mm)**.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General:
  1. Use preservative treated wood for wood members in contact with concrete or masonry, including wall, sill, and ledger plates, etc.
- B. Interface With Other Work:



1. Coordinate with other Sections for location of blocking required for installation of equipment and building specialties. Do not allow installation of gypsum board until required blocking is in place.
2. Where manufactured items are to be installed in framing, provide rough openings of dimensions within tolerances required by manufacturers of such items. Confirm dimensions where not shown on Contract Drawings.

C. Tolerances:

1. Walls:

- a. 1/4 inch (6 mm) in 20 feet (6 meters), non-cumulative in length of wall.
- b. 1/8 inch (3 mm) in 10 feet (3 meters) with 1/4 inch (6 mm) maximum in height of wall.
- c. Distances between parallel walls shall be 1/4 inch (6 mm) maximum along length and height of wall.

D. Walls:

1. Openings: Single, bearing stud supporting header and one adjacent (king) stud continuous between top and bottom plates, unless shown otherwise.
2. Corners: Triple studs.
3. Top Plates In Bearing Partitions: Doubled and lapped. Stagger joints at least 48 inches (1 200 mm).
4. Firestops:
  - a. Horizontal or vertical concealed spaces in walls, and other features over 10 feet (3 000 mm) in length or height, and at stairs, ceiling levels, floor levels, and other junctures of horizontal to vertical concealed spaces.
5. Sill Plates:
  - a. Walls: Fasten with powder actuated fasteners.
  - b. In addition to requirements of paragraph 'a' above, set sill plates of interior walls in solid bed of specified construction adhesive.
6. Posts And Columns:
  - a. Unless shown otherwise, nail members of multiple member columns together with 16d at 6 inches (150 mm) on center from each side.
7. Beams And Girders:
  - a. Built-Up Members:
    - 1) Stagger individual members of multiple span beams and girders so, over any one support, no more than half the members will have a joint. In all cases, however, joints shall occur over supports.
    - 2) Unless shown otherwise on Drawings, nail two-ply built-up members with 10d nails 12 inches (300 mm) on center top and bottom, staggered on opposite sides. Nail three-ply built-up members with 16d nails at 12 inches (300 mm) on center, top and bottom, staggered, on opposite sides. Set with crown edge up with full bearing at ends and intermediate supports.
  - b. Wood shims are not acceptable under ends.
  - c. Do not notch framing members unless specifically shown in Drawing detail.
8. Nailing:
  - a. Stud to plate (coordinate with Contract Drawings):

2 by 4 inch nominal	38 by 89 mm	End nail, two 16d OR toe nail, four 8d
2 by 6 inch nominal	38 by 140 mm	End nail, three 16d OR toe nail, four 8d
2 by 8 inch nominal	38 by 184 mm	End nail, four 16d OR toe nail, six 8d
2 by 10 inch nominal	38 by 235 mm	End nail, five 16d OR toe nail, six 8d

- b. Top plates: Spiked together, 16d, 16 inches (400 mm) on center.
- c. Top plates: Laps, lap members 48 inches (1200 mm) minimum and nail with 16d nails 4 inches (100 mm) on center
- d. Top plates: Intersections, three 16d.
- e. Backing And Blocking: Three 8d, each end.
- f. Corner studs and angles: 16d, 16 inches (400 mm) on center.

E. Accessory / Equipment Mounting And Gypsum Board Back Blocking (nailers) for Wood Framing:

1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.

**END OF SECTION**

**SECTION 06 1636****WOOD PANEL PRODUCT SHEATHING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install wood panel product sheathing required for walls, floors, and backing as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for:
    - a. Pre-installation conference held jointly with Section 06 1636.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. CSA Group:
    - a. CSA O121-08 (R2013), 'Douglas Fir Plywood'.
    - b. CSA O151-09 (R2014), 'Canadian Softwood Plywood'.
  - 2. International Code Council (IBC) (2015 or latest AHJ approved edition):
    - a. IBC Chapter 17, 'Special Inspections And Tests'.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference:
  - 1. Participate in pre-installation conference as specified in Section 06 1100.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery And Acceptance Requirements:
  - 1. Do not deliver material unduly long before it is required.
  - 2. Protect sheathing and keep under cover in transit and at job site.
- B. Storage And Handling Requirements:
  - 1. Store sheathing on level racks and keep free of ground.
  - 2. Stack to insure proper ventilation and drainage.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. Performance:
  - 1. Design Criteria:
    - a. Unless specified otherwise, conform to CSA O151, standard grade exterior.
    - b. Sheathing shall be COFI or Canadian Lumbermen's Association standard and grade marked accordingly.
- B. Sheathing:

1. Sheathing shall not exceed 18 percent moisture content when fabricated nor more than 19 percent when installed in Project.
2. Sheathing used for same purpose shall be of same thickness. In all cases, thickness specified is minimum required regardless of span rating.
3. Minimum span ratings for given thicknesses shall be as follows:

Thickness	Span Rating
9.5 mm	24 / 0
11 mm nominal	24 / 16
11.9 mm actual	32 / 16
12.5 mm nominal	32 / 16
15.1 mm actual	40 / 20
15.9 mm nominal	40 / 20
18.3 mm actual	48 / 24
19 mm nominal	48 / 24

## 2.2 ACCESSORIES

- A. Nails:
  1. As indicated on Contract Drawings.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General:
  1. Top of nail heads shall be flush with sheathing surface.
  2. Use of edge clips to provide spacing between sheathing panels is acceptable.
- B. Wall Sheathing:
  1. Spacing:
    - a. Provide 1/8 inch (3 mm) space between sheets at end and edge joints.
  2. Edge Bearing And Blocking:
    - a. Panel edges shall bear on framing members and butt along their center lines.
    - b. Back block panel edges, which do not bear on framing members, with 2 inch nominal (45 mm) framing.
  3. Nail Spacing:
    - a. 4 inches (100 mm) O.C. perimeter and 6 inches (152 mm) O.C. in field.
    - b. Place nails not less than 3/8 inch (9.5 mm) in from edge.
  4. Thickness:
    - a. As indicated on Contract Drawings.
  5. Do not install any piece of wall sheathing with shortest dimension of less than 12 inches (300 mm).
- C. Floor Sheathing:
  1. Subflooring: 2 Layers Subflooring.
    - a. Bottom layer:
      - 1) Glue subflooring layers together along lines of structural supports.
      - 2) Leave 1/32 inch (1 mm) gap at side and end joints.
      - 3) Screw at 8 inches (200 mm) O.C.
      - 4) Thickness:
        - a) 3/4 inch actual (19 mm) minimum thickness.
      - 5) Do not install any piece of single layer floor sheathing with shortest dimension of less than 24 inches (600 mm).
    - b. Top layer:

- 1) Stagger joints of second layer subflooring so they do not line up with joints of first layer subflooring, but do align with intermediate structural member.
- 2) Glue subflooring layers together along lines of structural supports.
- 3) Leave  $\frac{1}{32}$  inch (1 mm) gap at side and end joints.
- 4) Screw at 8 inches (200 mm) O.C.
- 5) Thickness:
  - a)  $\frac{3}{4}$  inch actual (19 mm) minimum thickness.
- 6) Do not install any piece of single layer floor sheathing with shortest dimension of less than 24 inches (600 mm).

**END OF SECTION**

**BLANK PAGE**

**SECTION 06 2001****COMMON FINISH CARPENTRY REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install sealants required for items installed under this Section, as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:
  - 1. Architectural Woodwork
  - 2. Casings, stops, handrails, and jambs.
  - 3. Chair Rails.
  - 4. Factory Manufactured Access Doors.
  - 5. Miscellaneous Wood Trim.
  - 6. Selected Building Specialties.
  - 7. Miscellaneous as specified elsewhere.
- C. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for furring and blocking.
  - 2. Section 06 2210: 'Miscellaneous Wood Trim'.
    - a. Wood Trim.
  - 3. Sections under 06 4000 Heading: Furnishing of Architectural Woodwork.
    - a. Section 06 4001: 'Common Architectural Woodwork Requirements':
      - 1) Quality of wood materials to be used in Finish Carpentry.
    - b. Section 06 4512: 'Architectural Woodwork Wood Trim'.
  - 4. Section 07 9213: 'Elastomeric Joint Sealants' for quality of sealants, submittal and installation requirements.
  - 5. Section 08 3110: 'Access Doors And Panels' for furnishing of Factory Manufactured Access Doors.
  - 6. Sections under 09 9000 heading: Back priming of work to be installed against concrete or masonry or subjected to moisture, and finishing of finish carpentry and architectural woodwork.
  - 7. Sections in Division 10: Furnishing of Specialties.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
  - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
    - a. Economy Grade: The lowest acceptable grade in both material and workmanship requirements, and is for work where price outweighs quality considerations.
    - b. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
    - c. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Manufacturers:

##### 1. Manufacturer Contact List:

- a. Blum Inc, Stanley, NC [www.blum.com](http://www.blum.com).
- b. Bommer Industries, Landrum, SC [www.bommer.com](http://www.bommer.com).
- c. CompX National, Mauldin, SC [www.nclnet.com](http://www.nclnet.com).
- d. Dow Chemical, Midland, MI [www.dow.com](http://www.dow.com).
- e. Flynn & Enslow, San Francisco, CA [www.flynnenslow.com](http://www.flynnenslow.com).
- f. Grass America Inc, Kernersville, NC [www.grassusa.com](http://www.grassusa.com).
- g. Hafele America Co., Archdale, NC [hafele.com](http://hafele.com).
- h. Hillside Wire Cloth Co., Inc., Bloomfield, NJ [www.hillsidewirecloth.com](http://www.hillsidewirecloth.com).
- i. Ives, Indianapolis, IN [www.iveshardware.com](http://www.iveshardware.com).
- j. Knappe & Vogt, Grand Rapids, MI [www.knappeandvogt.com](http://www.knappeandvogt.com) or Knappe & Vogt Canada, Mississauga, ON (905) 676-8972.
- k. Olympus Lock Co, Seattle, WA [www.olympus-lock.com](http://www.olympus-lock.com).
- l. Owens Corning, Toledo, OH [www.owens-corning.com](http://www.owens-corning.com).
- m. Salice America Inc, Charlotte, NC [www.saliceamerica.com](http://www.saliceamerica.com).
- n. SOSS Door Hardware (Division of Universal Industrial Products Company) Pioneer OH [www.soss.com](http://www.soss.com).
- o. Stanley, New Britain, CT [www.stanleyhardware.com](http://www.stanleyhardware.com) or Oakville, ON (800) 441-1759.
- p. TWP Inc., Berkley, CA [www.twpinc.com](http://www.twpinc.com).
- q. Wire Cloth Manufacturers Inc., Mine Hill, NJ [www.wireclothman.com](http://www.wireclothman.com).

#### B. Glue: Waterproof and of best quality.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Verification Of Conditions:

1. Verify walls, ceilings, floors, and openings are plumb, straight, in-line, and square before installing Architectural Woodwork.
2. Report conditions that are not in compliance to Architect before starting installation.

### 3.2 PREPARATION

#### A. Surface Preparation:

1. Install Architectural Woodwork after wall and ceiling painting is completed in areas where Architectural Woodwork is to be installed.

### 3.3 INSTALLATION

#### A. Special Techniques:

1. **AWS Custom Grade is minimum acceptable standard**, except where explicitly specified otherwise, for installation of architectural woodwork.

#### B. General Architectural Woodwork Installation:

1. Fabricate work in accordance with measurements taken on Project site.
2. Scribe, miter, and join accurately and neatly to conform to details.
3. Exposed surfaces shall be machine sanded, ready for finishing.
4. Allow for free movement of panels.



5. Countersink nails. Countersink screws and plug those exposed to view.

**END OF SECTION**

**BLANK PAGE**

**SECTION 06 2024****DOOR, FRAME, AND FINISH HARDWARE INSTALLATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install sealants for caulking door frames as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:
  - 1. Flush wood doors.
  - 2. Hollow metal door frames.
  - 3. Finish hardware.
- C. Related Requirements:
  - 1. Section 07 9213: 'Elastomeric Joint Sealants' for quality of sealants.
  - 2. Sections under 08 1000 heading: Furnishing of doors and metal frames.
  - 3. Sections under 08 7000 heading: Furnishing of finish hardware.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference.
  - 1. Participate in pre-installation conference.
  - 2. In addition to agenda items specified in Section 01 3100, review following:
    - a. Schedule conference after hardware has been delivered to site and organized into hardware groups by door, but before installation of hardware.
    - b. Check for appropriate blocking and for correct hardware models and fasteners for substrates.
    - c. Review submittals and set of Manufacturer's installation, adjustment, and maintenance instructions submitted under Section 08 7101.
    - d. Review use of crowbar or other prying devices are not permitted to be used to set door frame into wall opening.

**1.3 SUBMITTALS**

- A. Informational Submittals:
  - 1. Installer Report:
    - a. Report verifying correct operation and adjustment of installed hardware.
  - 2. Special Procedure Submittals:
    - a. Copy of 'Installation Guide for Doors & Hardware' by Door & Hardware Institute. Guide may be obtained from Door and Hardware Institute (DHI).

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery And Acceptance Requirements:
  - 1. Wood Doors:
    - a. Do not have doors delivered to building site until after plaster, cement, and taping compound are dry.
    - b. If doors are to be stored at job-site for more than one week, seal top and bottom edges if not factory sealed.
  - 2. Metal Frames:
    - a. Examine door frames and note damage upon acceptance.

**B. Storage And Handling Requirements:**

1. Wood Doors:
  - a. Store flat on a level surface in a dry, well ventilated building.
    - 1) Cover to keep clean but allow air circulation
  - b. Handle with clean gloves and do not drag doors across one another or across other surfaces.
  - c. Do not subject doors to abnormal heat, dryness, or humidity or sudden changes therein
    - 1) Condition doors to average prevailing humidity of locality before hanging.
2. Metal Frames:
  - a. Protect metal frames from damage before and during installation.

**PART 2 - PRODUCTS: Not Used****PART 3 - EXECUTION****3.1 INSTALLATION****A. Hollow Metal Frames:**

1. Site Tolerances:
  - a. Squareness: **1/16 inch (1.6 mm)** from top edge to opposite top edge.
  - b. Plumbness: **1/16 inch (1.6 mm)** from top of jamb to bottom of jamb.
  - c. Alignment: **1/16 inch (1.6 mm)** from plane of left side face of jamb to right side face of jamb.
  - d. Twist: **1/16 inch (1.6 mm)** across throat of jamb plane measured across each face to plane of opposite jamb throat.
  - e. Finished Clearance Between Door And Frame:
    - 1) **1/16 inch (1.6 mm)** at head and hinge jamb plus **1/16 inch (1.6 mm)** maximum
    - 2) **1/8 inch (3 mm)** at strike jamb plus or minus **1/16 inch (1.6 mm)** maximum.
    - 3) **1/2 inch (12.7 mm)** to top of finished floor surface or **1/4 inch (6 mm)** to top of threshold, plus or minus **1/16 inch (1.6 mm)** maximum.
2. Set frame in location and level head.
  - a. Use of crowbar or other prying device to set door frame into wall opening will damage door frames and are not permitted to be used.
3. Equalize with adjustable floor anchor.
4. Set spreaders and fasten jambs to floor and wall.
  - a. Wood spreaders shall be square, fabricated from lumber one inch minimum thick, be same length as door opening at header, and same depth as frame.
  - b. Cut notches for frame stops.
  - c. Do not remove spreaders until frames are permanently anchored in wall.
  - d. Use one spreader at base of frame and another at strike level.
  - e. Do not use temporary spreaders welded to base of jambs during installation of frame.
5. Caulking:
  - a. Caulk around both sides of frames of doors with paintable, specified sealant.
6. Adjust existing metal frame 169A/173A as required to accept latch for new hardware.

**B. Doors:**

1. When Project is completed, doors shall not bind, stick, or be mounted so as to cause future hardware difficulties.
2. Do not impair utility or structural strength of door in fitting of door, applying hardware, or cutting and altering door louvers, panels, or other special details.

**C. Hardware:**

1. General:
  - a. Install using set of Manufacturer's installation, adjustment, and maintenance instructions submitted with hardware under Section 08 7101. Follow as closely as possible.
  - b. Mount closers on jamb stop side of door in parallel arm configuration where it is physically possible to do so and not damage or hinder operation of door or closer.

- c. Use supplied thru bolts where ever possible to mount hardware.
- 2. Hardware for Wood Doors:
  - a. If doors are not factory-machined, use hardware templates furnished by Hardware Manufacturer when mounting hardware.
  - b. Set hinges flush with edge surface. Be sure that hinges are set in a straight line to prevent distortion.
  - c. Mount door latches high in strike plate opening so when door later settles, latch will not bind.

### **3.2 FIELD QUALITY CONTROL**

- A. Field Tests:
  - 1. Arrange to have keys brought to Project site and, in meeting attended by local representatives and Architect, test every new key and locking mechanism.
- B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
  - 1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.
  - 2. Door frames:
    - a. Door frames damaged by use of crowbar or other prying devices to set door frames shall be repaired or replaced at no additional cost to Owner.

### **3.3 CLOSEOUT ACTIVITIES**

- A. Key Delivery:
  - 1. Immediately before Final Acceptance Meeting, turn change keys over to Owner properly organized and tagged.

**END OF SECTION**

**BLANK PAGE**

**SECTION 06 2210****MISCELLANEOUS WOOD TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install wood trim not specified elsewhere as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for wall blocking required for Wood Trim.
  - 2. Section 06 2001: 'Common Finish Carpentry Requirements':
    - a. Installation of Wood Trim.
  - 3. Section 06 4001: 'Common Architectural Woodwork Requirements':
    - a. General standards for materials and fabrication of Architectural Woodwork.
  - 4. Section 06 4512: 'Architectural Woodwork Wood Trim'.
  - 5. Section 09 9324: 'Interior Clear-Finished Hardwood'.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
  - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
    - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
  - 2. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Samples:
    - a. Interior Hardwood for Transparent Finish:
      - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
      - 2) Design Criteria:
        - a) Provide **8 inch by 10 inch (200 mm by 255 mm)** sample of Red Oak to match Owner provided stain color selected for Project.
        - b) Control Sample will be used as performance standard for evaluating finish provided.
- B. Informational Submittals:
  - 1. Source Quality Control Submittals:
    - a. Samples:
      - 1) Interior Hardwood for Transparent Finish:
        - a) Owner will provide Control Sample for finish.

**1.4 WARRANTY**

- A. Manufacturer Extended Warranty:
  - 1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. Design Criteria:
  - 1. General:
    - a. Meet requirements of Section 06 4001 for general standards for materials and fabrication of Architectural Woodwork.
  - 2. Clear Finished Hardwood:
    - a. Match materials specified in Section 06 4512.
    - b. Match finish specified in Section 06 4512 and match Owner selected sample as specified in Section 09 9324.

**2.2 SOURCE QUALITY CONTROL**

- A. Inspections:
  - 1. Clear Finished Hardwood:
    - a. Color matches Owner provided sample specified in Section 09 9324.

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**



**SECTION 06 4001****COMMON ARCHITECTURAL WOODWORK REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. General standards for materials and fabrication of Architectural Woodwork and for hardware associated with Architectural Woodwork.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for furring and blocking.
  - 2. Section 06 2001: 'Common Finish Carpentry Requirements' for Installation.
  - 3. Section 06 2210: 'Miscellaneous Wood Trim'.
  - 4. Section 06 4512: 'Architectural Woodwork Wood Trim'.
  - 5. Section 09 9324: 'Interior Clear-Finished Hardwood' for filling of nail holes and finishing.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
  - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
    - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's literature for specialty items and hardware not manufactured by Architectural Woodwork fabricator.

**1.4 QUALITY ASSURANCE**

- A. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
  - 1. Fabricator:
    - a. Fabricators:
      - 1) Fabricator Firm specializing in performing work of this section:
        - a) Minimum five (5) years experience in Woodwork installations.
        - b) Firm experience in supplying products indicated for this Project.
        - c) Sufficient production capacity to produce required units.
        - d) Comply with specifications and Contract Documents.

## 1.5 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
  - 1. Fabricator Responsibility:
    - a. Assemble architectural woodwork at Architectural Woodwork Fabricator's plant and deliver ready for erection insofar as possible.
    - b. Protect architectural woodwork from moisture and damage while in transit to job site.
  - 2. General Contractor Responsibility:
    - a. Report damaged materials received within two (2) days from delivery at project site.
- B. Storage And Handling Requirements:
  - 1. General Contractor Responsibility:
    - a. Unload and store in place where it will be protected from moisture and damage and convenient to use.

## 1.6 WARRANTY

- A. Manufacturer Extended Warranty:
  - 1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

## PART 2 - PRODUCTS

### 2.1 FABRICATORS

- A. Approved Fabricators. See Section 01 4301 for Qualification Requirements.
  - 1. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements.
  - 2. Same Approved Fabricator shall furnish following Specification Sections:
    - a. Section 06 2210: 'Miscellaneous Wood Trim'.
    - b. Section 06 4512: 'Architectural Woodwork Wood Trim'.

### 2.2 ASSEMBLIES

- A. Design Criteria:
  - 1. General:
    - a. **AWS Custom Grade is minimum acceptable standard**, except where explicitly specified otherwise, for materials, construction, and installation of architectural woodwork.
  - 2. Materials:
    - a. Lumber:
      - 1) Grade:
        - a) No defects in boards smaller than **600 sq in (3 871 sq cm)**.
        - b) One defect per additional **150 sq inches (968 sq cm)** in larger boards.
        - c) Select pieces for uniformity of grain and color on exposed faces and edges.
        - d) No mineral grains accepted.
      - 2) Allowable Defects:
        - a) Tight knots not exceeding **1/8 inch (3 mm)** in diameter. No loose knots permitted.
        - b) Patches (dutchmen) not apparent after finishing when viewed beyond **18 inches (450 mm)**.
        - c) Checks or splits not exceeding **1/32 inch by 3 inches (1 mm by 75 mm)** and not visible after finishing when viewed beyond **18 inches (450 mm)**.
        - d) Stains, pitch pockets, streaks, worm holes, and other defects not mentioned are not permitted.
        - e) Normal grain variations, such as cats eye, bird's eye, burl, curl, and cross grain are not considered defects.

- 3) Use maximum lengths possible, but not required to exceed **10 feet (3 meters)** without joints. No joints shall occur closer than **72 inches (1 800 mm)** in straight runs exceeding **18 feet (3 600 mm)**. Runs between **18 feet (3 600 mm)** and **10 feet (3 meters)** may have no more than one joint. No joints shall occur within **72 inches (1 800 mm)** of outside corners nor within **18 inches (450 mm)** of inside corners.
- 4) Moisture content shall be six (6) percent maximum at fabrication. No opening of joints due to shrinkage is acceptable.

B. Fabrication:

1. Follow Architectural Woodwork Standards (AWS) for fabrication of Architectural Woodwork.
2. Tolerances:
  - a. No planer marks (KCPI) allowed. Sand wood members and surfaces with 100 grit or finer.
  - b. Maximum Gap: None allowed.
  - c. Flushness Variation: **0.015 inch (0.4 mm)** maximum.
  - d. Sanding Cross Scratches: **1/4 inch (6 mm)** maximum.
  - e. Plug screw holes. Screw locations not to be visible beyond **18 inches (450 mm)**.
3. Fabricate work in accordance with measurements taken on job site.
4. 'Ease' sharp corners and edges of exposed members to promote finishing and protect users from splinters. Radius of 'easing' shall be uniform throughout Project and between **1/32 and 1/16 of an inch (0.8 and 1.6 of a millimeter)**.
5. Fabricate so veneer grain is vertical.
6. Joints:
  - a. Use lumber pieces with similar grain pattern when joining end to end.
  - b. Compatibility of grain and color from lumber to panel products is required.
7. Install hardware in accordance with Manufacturer's directions. Leave operating hardware operating smoothly and quietly.
8. Remove or repair damaged surface of or defects in exposed finished surfaces of architectural woodwork to match adjacent similar undamaged surface.

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**

**BLANK PAGE**

**SECTION 06 4005****PLASTIC LAMINATE****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Wall-hung counters.
- B. Related Requirements:
  - 1. Section 06 2001: 'Common Finish Carpentry Requirements':
    - a. Installation of wall-hung counters.
  - 2. Section 06 4001: 'Common Architectural Woodwork Requirements':
    - a. General standards for materials and fabrication of Architectural Woodwork.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
  - 1. Flame Spread: The propagation of flame over a surface.
    - a. Flame Spread Index: The numerical value assigned to a material tested in accordance with ASTM E84 or ULC 102.
  - 2. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
    - a. Premium Grade: Highest Grade available in both material and workmanship where highest level of quality, materials, workmanship, and installation is required.
  - 3. High-Pressure Decorative Laminate (HPDL): Laminated thermosetting decorative sheets intended for decorative purposes. Also known as Plastic Laminate.
  - 4. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84 or ULC 102.
- C. Reference Standards:
  - 1. ASTM International:
    - a. ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
    - b. ASTM E162-15a, 'Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source'.
  - 2. Kitchen Cabinet Manufacturers Association:
    - a. ASTM/KCMA A161.1-2012, 'Performance And Construction Standards For Kitchen And Vanity Cabinets'.
  - 3. National Electrical Manufacturer's Association / American National Standards Institute:
    - a. ANSI/NEMA LD-3-2005, 'High Pressure Decorative Laminates'.
  - 4. Underwriters Laboratories of Canada:
    - a. ULC 102: 'Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies' (CAN/ULC S102) (7th Edition).

**1.3 SUBMITTALS**

- A. Action Submittals:

1. Product Data:
  - a. Color selections.
  - b. Manufacturer's technical data sheet.
- B. Informational Submittals:
  1. Certificates:
    - a. Provide Manufacturer's certification of compliance to ANSI/NEMA LD 3.
  2. Test And Evaluation Reports:
    - a. Test reports: Certified test reports showing compliance with specified performance characteristics and physical properties for Quality Assurance if requested by Owner or Architect.
- C. Closeout Submittals:
  1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Manufacturers documentation:
        - a) Manufacturer's literature for plastic laminate.
        - b) Color selections.

## 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  1. Fire-Test-Response Characteristics: Provide plastic laminate with surface burning characteristics as determined by testing identical products by qualified testing agency.
    - a. Surface-Burning Characteristics:
      - 1) Plastic Laminate shall have Class A flame spread rating in accordance with ASTM E84 or ULC 102.
        - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
        - b) Flash point: None.

## 1.5 WARRANTY

- A. Manufacturer Extended Warranty:
  1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Fabricators:
  1. Approved Fabricators. See Section 06 4001 for Approved Fabricators.
- B. Manufacturers:
  1. Type Two Acceptable Manufacturers:
    - a. Formica, Cincinnati, OH [www.formica.com](http://www.formica.com) or Formica Canada Inc, St Jean sur Richelieu, PQ (450) 347-7541, all matte finish.
    - b. Nevamar, Odenton, MD [www.nevamar.com](http://www.nevamar.com).
    - c. Pionite Decorative Surfaces, Auburn, ME [www.pionite.com](http://www.pionite.com).
    - d. WilsonArt, Temple, TX [www.wilsonart.com](http://www.wilsonart.com) or WilsonArt International Inc, Mississauga, ON (905) 565-1255.
    - e. Equal as approved by Architect before bidding. See Section 01 6200.
- C. Plastic Laminates:
  1. Design Criteria:

- a. Countertops:
    - 1) Solid surface front edge with laminate side and backsplash, except where detailed otherwise, with plastic laminate meeting requirements of ANSI/NEMA LD 3: PF 42.
      - a) Vertical Applications: GP 28.
      - b) Horizontal (other than countertops): GP 38.
    - 2) No raised lip on front edge.
  - b. Balancing Material: BK 20.
  - c. AWS Quality Grade: Premium.
- 2. Assemblies:
    - a. Countertops shall meet requirements of KCMA A161.1 and A161.2.
    - b. Adhesives shall be spray grade, high heat resistant, neoprene contact adhesive.
- 3. Category Four Approved Color. Wilsonart "Kalahari Topaz" #4588K-07

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**

**BLANK PAGE**



**SECTION 06 4114****WOOD-VENEER-FACED ARCHITECTURAL CABINETS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Custom casework.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for wall blocking required for Custom Casework.
  - 2. Section 06 2001: 'Common Finish Carpentry Requirements' for installation of Custom casework.
  - 3. Section 06 4001: 'Common Architectural Woodwork Requirements' for:
    - a. General standards for materials and fabrication of Architectural Woodwork and for hardware associated with Architectural Woodwork.
  - 4. Section 09 9324: 'Interior Clear-Finished Hardwood' for wood finishes.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
    - b. HPVA, NWWDA, or APA.
  - 2. Hardwood Plywood & Veneer Association (HPVA), Reston, VA [www.hpva@hpva.org](http://www.hpva@hpva.org).
  - 3. The Engineered Wood Association (APA), Tacoma, WA [www.apawood.org](http://www.apawood.org).
  - 4. Window & Door Manufacturers Association (WDMA) Chicago, IL [www.wdma@wdma.com](http://www.wdma@wdma.com).
- B. Definitions:
  - 1. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are "opened" as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
  - 2. Face Veneer: The outermost exposed wood veneer surface of a veneered wood door, panel, or other component exposed to view when the project is completed.
  - 3. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
    - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
  - 4. High-Pressure Decorative Laminate (HPDL): Laminated thermosetting decorative sheets intended for decorative purposes. Also known as Plastic Laminate.
  - 5. Medium Density Fiberboard (MDF): Generic name for a panel or core manufactured from lignocellulosic fibers combined with synthetic resin or other suitable binder and bonded together under heat and pressure in hot press by process in which added binder creates entire bond.
  - 6. Panel Product: Panels manufactured with differences in core materials, adhesives or binders which affect characteristics of the panels. These include wood veneers and many prefinished wood panels and decorative overlays with aesthetic and performance characteristics.
  - 7. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.
  - 8. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.
  - 9. Veneer: A thin sheet or layer of wood, usually rotary cut, sliced or sawn from a log or flitch. Thickness may vary from 1/100 inch (0.3 mm) to 1/4 inch (6.4 mm).

**C. Reference Standards:**

1. American National Standards Institute / Builders Hardware Manufacturers Association:
  - a. ANSI/BHMA A156.11-2014, 'Cabinet Locks'.
2. American National Standards Institute / Hardwood Plywood & Veneer Association:
  - a. ANSI/HPVA HP-1-2009, 'Standard for Hardwood and Decorative Plywood'.
3. American National Standards Institute / Window & Door Manufacturers Association (WDMA):
  - a. ANSI/WDMA I.S. 6A-13, 'Industry Standard for Architectural Stile and Rails Doors'.

**1.3 ADMINISTRATIVE REQUIREMENTS****A. Coordination:**

1. Coordinate the efforts of the various trades affected by the Work of this Section.
2. Coordinate completion of 2x6 (50mm x 100mm) wall blocking for custom casework.
3. Coordinate completion of custom casework.

**1.4 SUBMITTALS****A. Action Submittals:**

1. Product Data:
  - a. Manufacturer's literature or cut sheets for hardware.
2. Shop Drawings:
  - a. Confirm compliance with Contract Document requirements as to configuration and dimensions of custom casework.
  - b. Include plan and elevation views, materials used, standing and running trim profiles, assembly methods, joint details, fastening methods, accessories, and hardware.
3. Samples:
  - a. Interior Hardwood for Transparent Finish:
    - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
    - 2) Design Criteria:
      - a) Provide 8 inch by 10 inch (200 mm by 255 mm) sample(s) of Red Oak to match Owner provided stain color selected for Project.
      - b) Control Sample will be used as performance standard for evaluating finish provided.

**B. Informational Submittals:**

1. Source Quality Control Submittals:
  - a. Samples:
    - 1) Interior Hardwood for Transparent Finish:
      - a) Owner will provide Control Sample for finish.
2. Special Procedure Submittals:
  - a. Copy of AWS manual with shop drawing submission.

**1.5 WARRANTY****A. Manufacturer Extended Warranty:**

1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for period of five (5) years from date of substantial completion.

## PART 2 - PRODUCTS

### 2.1 ASSEMBLIES

#### A. Components:

##### 1. Design Criteria:

###### a. General:

1) Except as noted otherwise, **fabricate the work of this section according to AWS 'Custom Grade'.**

2) Casework Construction Type:

a) Type B: Face-frame construction where front edge of cabinet body components are overlaid with frame.

###### b. Solid Stock:

1) Exposed: Plain sawn Red Oak.

2) Semi-exposed And Concealed: Species as acceptable for AWS 'Custom Grade'.

###### c. Panel Product:

1) Glues (adhesives) used in manufacture and fabrication of panel products shall be Type I or II.

2) Moisture content shall be same as specified for lumber.

3) Cores:

a) All Other: Industrial grade particle board with minimum density of **45 lbs per cu ft (721 kg per cu meter).**

4) Facings:

a) Hardwood veneer facings shall be plain sliced Red Oak AWS Grade A, or equal by HPVA, WDMA, or APA.

b) All other facings shall be Melamine or Kortron.

5) Edgings:

a) Cabinet Doors And Cabinet Construction:

(1) **3/4 inch by 1/8 to 1/4 inch (19 mm by 3 to 6 mm)** edge-banding of wood species matching hardwood face veneer.

b) Shelves And Exposed Panel Product Edges:

(1) Hot-glued, 3 mm thick, PVC edge-banding. Wood-grain, except color matching Melamine or Kortron surface at shelf edges.

#### B. Fabrication:

##### 1. Cabinet Body:

a. Use AWS Flush Overlay construction on cabinet bodies.

b. If used, install Rail System adjustable shelf supports recessed.

##### 2. Cabinet Component Thickness And Material:

a. Use hardwood veneer facing on panel product.

b. Ends, Divisions, Bottoms, Tops: **3/4 inch (19 mm)** thick panel product.

c. Rails: **3/4 inch (19 mm)** thick panel product.

d. Shelves:

1) Panel product.

2) Thickness:

a) **30 Inch (750 mm)** Span And Less: **3/4 inch (19 mm)** thick.

b) Spans Over **30 Inches (750 mm)** To **42 Inches (1 050 mm)**: **One inch (25 mm)** thick.

e. Backs: **1/4 inch (6 mm)** thick panel product.

3. Install plastic grommets in cable access holes in countertops located as located on Contract Documents. Provide two (2) as indicated. Field verify locations.

#### C. Finishes:

##### 1. Factory Finishing:

###### a. Design Criteria:

1) Applied before leaving factory.

2) Factory-finish to match Owner selected sample as specified in Section 09 9324.

###### b. Color:

1) Similar to LDS 95 (match existing on site stain colour).

## 2.2 ASSESSORIES

### A. Manufacturers:

#### 1. Manufacturer Contact List for Assessories:

- a. Accuride, Santa Fe Springs, CA [www accuride.com](http://www accuride.com).
- b. Anybumper, Amite, LA [www Anybumper.com](http://www Anybumper.com).
- c. Blum Inc, Stanley, NC [www blum.com](http://www blum.com).
- d. Grass America Inc, Kernerville, NC [www grassusa.com](http://www grassusa.com).
- e. Hafele America Co., Archdale, NC [hafele.com](http://hafele.com).
- f. Ives, Indianapolis, IN [www iveshardware.com](http://www iveshardware.com).
- g. Knappe & Vogt, Grand Rapids, MI [www knapeandvogt.com](http://www knapeandvogt.com) or Knappe & Vogt Canada, Mississauga, ON (905) 676-8972.
- h. Salice America Inc, Charlotte, NC [www saliceamerica.com](http://www saliceamerica.com).
- i. Stanley, New Britain, CT [www stanleyhardware.com](http://www stanleyhardware.com).

### B. Cabinet Hardware:

#### 1. Cabinet Adjustable Shelf Supports:

- a. Either of following systems are acceptable, at Fabricator's option:
  - 1) 32mm System: Casework Fabricator's standard.
  - 2) Traditional System:
    - a) Class Two Quality Standards: 255 and 256 by Knappe & Vogt.

## 2.3 SOURCE QUALITY CONTROL

### A. Inspections:

#### 1. Clear Finished Hardwood:

- a. Color matches Owner provided sample specified in Section 09 9324.

## PART 3 - EXECUTION: Not Used

**END OF SECTION**

**SECTION 06 4512****ARCHITECTURAL WOODWORK WOOD TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Casings, stops, handrails, and jambs.
  - 2. Chair rails.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for wall blocking required for Wood Trim.
  - 2. Section 06 2001: 'Common Finish Carpentry Requirements':
    - a. Installation of Wood Trim.
  - 3. Section 06 2210: Remaining Wood Trim.
  - 4. Section 06 4001: 'Common Architectural Woodwork Requirements':
    - a. General standards for materials and fabrication of Architectural Woodwork.
  - 5. Section 08 1429: Interior Flush Wood Doors.
  - 6. Section 09 9324: 'Interior Clear-Finished Hardwood'.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
  - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
    - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
  - 2. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.
  - 3. Running Trim: Generally combined in the term "standing and running trim" and refers to random, longer length trims delivered to the jobsite (e.g., baseboard, chair rail, crown molding).

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Shop Drawings:
    - a. Include materials used, standing and running trim profiles, joint details, and hardware.
  - 2. Samples:
    - a. Interior Hardwood for Transparent Finish:
      - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
      - 2) Design Criteria:
        - a) Provide 8 inch by 10 inch (200 mm by 255 mm) sample of Red Oak to match Owner provided stain color selected for Project.

- b) Control Sample will be used as performance standard for evaluating finish provided.

B. Informational Submittals:

1. Source Quality Control Submittals:

a. Samples:

1) Interior Hardwood for Transparent Finish:

- a) Owner will provide Control Sample for finish.

## 1.4 WARRANTY

A. Manufacturer Extended Warranty:

- 1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Manufacturers:

- 1. Approved Fabricators. See Section 06 4001 for Approved Fabricators.

B. Performance / Design Criteria: Conform to requirements of Section 06 4001 'Common Architectural Woodwork Requirements'.

- 1. Glue: Waterproof and of best quality.
- 2. Factory-finish to match Owner selected sample as specified in Section 09 9324.

C. Architectural Woodwork Wood Trim:

1. Interior Hardwood For Transparent Finish:

a. Design Criteria:

- 1) Solid wood shall be plain sawn Red Oak.
- 2) Paneling shall be panel product with plain sliced Red Oak veneer.
- 3) Finish to match Owner selected sample as specified in Section 09 9324.

b. Color:

- 1) Similar to LDS 95 (match existing on site stain colour).

### 2.2 SOURCE QUALITY CONTROL

A. Inspections:

1. Clear Finished Hardwood:

- a. Color matches Owner provided sample specified in Section 09 9324.

## PART 3 - EXECUTION Not Used

**END OF SECTION**

**SECTION 06 6001****MISCELLANEOUS PLASTIC FABRICATIONS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But not Installed Under This Section:
  - 1. Furnish and install solid surface nosing at counter tops. See 6/A-9.
- B. Related Requirements:
  - 1. Section 06 2001: 'Common Finish Carpentry Requirements'
  - 2. Section 06 4001: 'Common Architectural Woodwork Requirements'

**1.2 REFERENCES**

- A. Definitions:
  - 1. Solid Surface: Solid surface materials are manufactured from polymeric materials. Granules may also be added to enhance the color effects. Solid surface materials are non-porous and homogeneous, with the same composition throughout the thickness of the solid surface material. They are capable of being repaired, renewed to the original finish and fabricated into continuous surfaces with inconspicuous seams.
- B. Reference Standards:
  - 1. American National Standards Institute/International Cast Polymer Alliance:
    - a. ANSI/ICPA SS-1-2001, 'Performance Standard for Solid Surface Materials'.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's literature.
    - b. Color selections.

**1.4 WARRANTY**

- A. Manufacturer Extended Warranty:
  - 1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

**PART 2 - PRODUCTS****2.1 ASSEMBLIES**

- A. Manufacturers:
  - 1. Acrylic Solid Surface:
    - a. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories.
      - 1) Corian by DuPont Co, Wilmington, DE. Contact Steve Finch at (314) 941-5179 or email [stephen.m.finch@dupont.com](mailto:stephen.m.finch@dupont.com).
      - 2) Staron Solid Surfacing by Cheil Industries / Samsung Chemical USA, La Mirada, CA [www.staron.com](http://www.staron.com).

- 3) Hanex Solid Surfaces by Hanwha L&C Surfaces US HQ, Atlanta, GA [www.hanwhasurfaces.com](http://www.hanwhasurfaces.com).
- 4) LG Hi-Macs Solid Surfacing by LG Solid Source LLC, Peoria, AZ [www.lgcreate.com](http://www.lgcreate.com).
- 5) 'Gibraltar Solid Surface' by Wilsonart International Inc, Temple, TX [www.wilsonart.com](http://www.wilsonart.com).

B. Materials:

1. Acrylic Solid Surface Countertop nosing:
  - a. Design Criteria:
    - 1) Meet requirements of ANSI/ICPS SS-1.
  - b. General:
    - 1) **1/2 inch (12.7 mm)** thick 100 percent acrylic polymer.
  - c. Approved Colors: As selected by Architect from Manufacturer's standard colors.
    - 1) Wilsonart D50 TM "Khaki Brown Tempest"

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**



# **DIVISION 07: THERMAL AND MOISTURE PROTECTION**

## **07 2000 THERMAL PROTECTION**

07 2113 BOARD INSULATION  
07 2116 BLANKET INSULATION  
07 2613 ABOVE-GRADE VAPOR RETARDERS: Canada  
07 2616 BELOW-GRADE VAPOR RETARDERS

## **07 8000 SMOKE AND FIRE PROTECTION**

07 8400 FIRESTOPPING

## **07 9000 JOINT PROTECTION**

07 9213 ELASTOMERIC JOINT SEALANTS  
07 9219 ACOUSTICAL JOINT SEALANTS

END OF TABLE OF CONTENTS

BLANK PAGE

**SECTION 07 2113****BOARD INSULATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install board insulation to side of existing foundation and under splash pads as described in Contract Documents.
  - 2. Coordinate with granular base compaction and reinforcing steel placement.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. International Code Council (ICC) [www.icc-es.org](http://www.icc-es.org):
    - a. ICC-ES Evaluation Report, [www.icc-es.org](http://www.icc-es.org).
      - 1) ESR-1061, 'Foamular 150, 250, 400, 600, and 1000 Extruded Polystyrene Insulation Boards' (Issued May 1, 2011).
      - 2) ESR-2142, 'Styrofoam Brand Insulation Boards and DOW Fan-Fold Products' (Issued October 1, 2012).
      - 3) ESR-2912, 'Greenguard and Greenguard RCY extruded polystyrene insulation board' (Issued July 1, 2012).
- B. Definitions:
  - 1. Flame Spread: The propagation of flame over a surface.
  - 2. Flame Spread Index: The numerical value assigned to a material tested in accordance with ULC 102.2.
  - 3. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ULC 102.2.
- C. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C518-10, 'Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus'.
    - b. ASTM C578-15, 'Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation'.
    - c. ASTM C1289-15, 'Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board'.
  - 2. Underwriters Laboratories of Canada:
    - a. ULC 102.2, 'Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies' (CAN/ULC S102.2-10) (7th Edition 2010).
    - b. ULC 701, 'Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering' (CAN/ULC S701-11) (4th Edition).
    - c. ULC 704, 'Thermal Insulation, Polyurethane, Polyisocyanurate, Boards, Faced' (CAN/ULC S704-11) (3rd Edition).

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 01 3100:
    - a. Schedule pre-installation conference prior to commencement of installing insulation with Installer.
    - b. In addition to agenda items specified in Section 01 3100, review following:

- 1) Review installation procedures.
- 2) Review coordination of work with related and adjacent work.

## 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
1. Insulation shall be manufactured and installed in compliance with NBC, British Columbia Building Code 2018, or other applicable building codes.
  2. Fire-Test-Response Characteristics: As determined by test method indicated below by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Surface-Burning Characteristics:
      - 1) Insulation shall have Class A flame spread rating in accordance with ULC 102.2.
        - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
        - b) Flash point: None.
  3. Qualifications:
    - a. Installer: Firm which has at least three (3) years experience in work of type required by this specification.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
1. Materials shall be delivered in original, unopened packages with labels intact. Exercise care to avoid damage during unloading.
  2. Deliver materials in sufficient quantities to allow continuity of work.
- B. Storage And Handling Requirements:
1. Store, protect and handle materials in accordance with Manufacturer's recommendations to prevent damage, contamination and deterioration. Keep material free of dirt and other foreign matter.
  2. Store in cool, dry area away from sources of heat, flame, ignition and strong oxidizing agents.
  3. Following Manufacturer's instructions for protection when handling and cutting insulation.

## 1.6 WARRANTY

- A. Manufacturer Warranty:
1. Manufacturer's Insulation Warranty.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERES

- A. Manufacturer Contact List:
1. OSI Sealants, Mentor, OH [www.osiproseries.com](http://www.osiproseries.com).
  2. Owens Corning, Toledo, OH [www.owens-corning.com](http://www.owens-corning.com).
  3. Dow Chemical, Midland, MI [www.dow.com](http://www.dow.com) or Dow Canada, Sarnia, ON [www.dow.com](http://www.dow.com).

### 2.2 MATERIALS

- A. Board Insulation at side of existing foundation wall:
1. Description:
    - a. Extruded polystyrene XPS foam insulation for use above and below grade.
  2. Design Criteria:
    - a. Meet requirements of ASTM C578, Type IV.

- b. Close-cell foam insulation.
- c. Meet requirements of CAN/ULC S701 Type 4, CCMC 06525-L. Class A Type 2 drainage requirements.
- d. Perimeter Insulation:
  - 1) Butt type, minimum RSI 1.7 (R-10), 50 mm (2 inches) thick by 600 mm (24 inches) by standard length.
- 3. Type One Acceptable Products:
  - a. Foamular 250 by Owens Corning.
  - b. Styrofoam SM by DOW
  - c. Styrofoam Scoreboard Extruded Polystyrene Foam Insulation by Dow Chemical.
  - d. Equal as approved by Architect before bidding. See Section 01 6200.
- 4. Insulation placed horizontally under exterior splash pads to be 2 inches (50mm) Expanded Polystyrene EPS (used as void form).

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verification Of Conditions:
  - 1. Prior to all work of this section, carefully inspect installed work of all other trades and verify that all such work is complete to point where installation may properly commence.
  - 2. Verify insulation may be installed in accordance with original design and manufacturer's recommendations
  - 3. Discrepancies:
    - a. In event of discrepancy, immediately notify Architect.
    - b. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

### **3.2 INSTALLATION**

- A. General: Install insulation in compliance with British Columbia Building Code 2018 and in accordance with Manufacturer's current recommendations.

### **3.3 FIELD QUALITY CONTROL**

- A. Field Tests And Inspections:
  - 1. Upon completion of installation, visually inspect each insulated area and verify that all insulation is complete and properly installed.
- B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
  - 1. Correct any work found not complying with contract document requirements at no additional cost to the Owner.

### **3.4 CLEANING**

- A. Waste Management:
  - 1. Remove from site debris resulting from work of this Section.

**END OF SECTION**

**BLANK PAGE**

**SECTION 07 2116****BLANKET INSULATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install unfaced thermal and acoustic batt insulation as described in Contract Documents.
  - 2. Furnish and Install Roxul in abandoned mechanical duct voids as detailed in Drawings.
- B. Related Requirements:
  - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for furnishing and installing of insulation in hollow metal door frames.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C665-12, 'Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing'.
  - 2. Standards Council of Canada:
    - a. CAN/ULC-S702-14: 'Standard for Thermal Insulation, Mineral Fibre for Buildings',

**1.3 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Insulation shall be manufactured and installed in compliance with NBC, British Columbia Building Code 2018 or other applicable building codes.

**PART 2 - PRODUCTS****2.1 SYSTEMS**

- A. Manufacturers:
  - 1. Insulation:
    - a. Type One Acceptable Manufacturers:
      - 1) Certaineed Corp, Valley Forge, PA [www.certainteed.com](http://www.certainteed.com).
      - 2) Graham Fiberglass Ltd, Erin, ON (519) 833-9645.
      - 3) Johns Manville Canada, North York, ON [www.jm.com](http://www.jm.com).
      - 4) Ottawa Fibre Inc, Gloucester, ON [www.ofigroup.com](http://www.ofigroup.com).
      - 5) Owens-Corning Canada Inc, Willowdale, ON [www.owenscorning.com](http://www.owenscorning.com).
      - 6) Roxull Inc, Milton, ON (800) 265-6878.
      - 7) Thermafiber, Wabash, IL [www.thermafiber.com](http://www.thermafiber.com).
      - 8) Equal as approved by Architect before bidding. See Section 01 6200.
- B. Materials:
  - 1. Thermal And Acoustic Insulation:
    - a. Unfaced Insulation:
      - 1) Friction fit, preformed unfaced mineral fiber insulation meeting requirements of CAN/ULC-S702, Type 1.

- b. Order insulation by 'RSI' factor rather than thickness.
- c. 'RSI' Factor Required: See Drawings.

1) Wood Wall Stud Framing:

R12	3-1/2 inches deep	RSI-2.1	89 mm deep
R-20	5-1/2 inches deep	RSI-3.5	140 mm deep

- 2) Mechanical Duct Alterations:
  - a) See Drawings for Roxul Insulation Notes.
- 3) Metal Door Frames:
  - a) See details A-10.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General:
  - 1. Leave no gaps in insulation envelope.
  - 2. If two layers of insulation are used to attain required 'R' factor, stagger joints.
- B. In Framing:
  - 1. Install insulation behind plumbing and wiring, around duct and vent line penetrations, and in similar places.
  - 2. Fit ends of batts snug against top and bottom plates.
  - 3. Fit batts snug against stud framing at each side.
  - 4. Where insulation is not enclosed by structure or drywall, support in place with wire or other suitable material as approved by Architect before bid.

### END OF SECTION



**SECTION 07 2613****ABOVE-GRADE VAPOR RETARDERS: Polyethylene****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install polyethylene film vapor retarders at patch work into existing building envelope as described in Contract Documents.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM D4397-16, 'Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications'.
  - 2. Canadian General Standards Board:
    - a. CGSB 51-GP-51M, 'Polyethylene Sheet for Use in Building Construction' (1981).
  - 3. National Standards of Canada / Canadian General Standards Board:
    - a. CAN / CGSB 51.34-M86, 'Vapor Barrier, Polyethylene Sheet for use in Building Construction'.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. Polyethylene Film:
  - 1. **6 mil (0.152 mm)** thick polyethylene film meeting requirements of CAN / CGSB 51.34, Type 2.
- B. Vapor Retarder Splice Strips:
  - 1. **6 mil (0.152 mm)** thick polyethylene film meeting requirements of CGSB 51-GP-51M, Type 2.

**2.2 ACCESSORIES**

- A. Lap Sealant:
  - 1. Type Two Acceptable Products:
    - a. Narrow Joint Sealer by Schnee-Morehead Inc, Irving, TX [www.trustsm.com](http://www.trustsm.com).
    - b. Equal as approved by Architect before use. See Section 01 6200.
- B. Tuck Tape

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Install using **1/2 inch (12.7 mm)** long minimum staples through thin cardboard disc or strip reinforcement. Staple every **6 inches (150 mm)** along structural members and blocking and **3 inches (75 mm)** in from sheet edge. Run long edge of sheet along structural members.

- B. Bed all splices and joints in specified sealant and seal with vapor resistant tape of type recommended by Manufacturer for vapor retarder installation.
- C. Seal penetrations through vapor retarder immediately before installation of gypsum board.
- D. Tape edges secure with Tuck Tape.

### **3.2 FIELD QUALITY CONTROL**

- A. Field Inspection:
  - 1. Vapor retarder is to be air tight and free from holes, tears, and punctures.
    - a. Immediately before installation of gypsum board, inspect vapor retarder for holes, tears, and punctures and repair damaged areas.
    - b. Immediately before completion of Project, inspect exposed vapor retarder for holes, tears, and punctures and repair damaged areas.

**END OF SECTION**

**SECTION 07 2616****BELOW-GRADE VAPOR RETARDER****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Vapor retarder, seam tape, and penetration accessories for installation under interior slabs-on-grade at washroom suite renovated areas. Tie into existing under slab membrane to maintain building envelope.
- B. Related Requirements:
  - 1. Section 31 1123: 'Aggregate Base' for installation of vapor retarder.

**1.2 REFERENCE**

- A. Association Publications:
  - 1. American Concrete Institute:
    - a. ACI 302.1R-04, 'Guide for Concrete Floor and Slab Construction'.
      - 1) Section 3.2.3, 'Vapor Retarder'.
    - b. ACI 302.2R-06, 'Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials'.
- B. Definitions:
  - 1. Vapor Barrier: Material that has permeance of 0.1 perm or less. Vapor barrier is a material that is essentially vapor impermeable. Vapor barrier is a Class I vapor control layer. Test procedure for classifying vapor retarders is ASTM E-96 Test Method A—the desiccant or dry cup method.
  - 2. Vapor Retarder: Vapor retarder is a material that has permeance of 1.0 perm or less and greater than 0.1 perm. Vapor retarder is a material that is vapor semi-impermeable. Vapor retarder is a Class II vapor control layer. The test procedure for classifying vapor retarders is ASTM E-96 Test Method A—the desiccant or dry cup method.
  - 3. Vapor Retarder Classes and Permeance Descriptions:
    - a. Classes of Vapor Retarders:
      - 1) Class I Vapor Retarder: 0.1 perm or less.
      - 2) Class II Vapor Retarder: 1.0 perm or less and greater than 0.1 perm.
      - 3) Class III Vapor Retarder: 10 perm or less and greater than 1.0 perm.
    - b. Four general classes based on permeance):
      - 1) Vapor Impermeable: 0.1 perm or less.
      - 2) Vapor semi-impermeable: 1.0 perm or less and greater than 0.1 perm.
      - 3) Vapor semi-permeable: 10 perm or less and greater than 1.0 perm.
      - 4) Vapor permeable: greater than 10 perms.
- C. Reference Standards:
  - 1. ASTM International:
    - a. ASTM D1709-16a, 'Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method'.
    - b. ASTM E96/E96M-16, 'Standard Test Methods for Water Vapor Transmission of Materials'.
    - c. ASTM E1745-11, 'Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs'.

**1.3 SUBMITTALS**

- A. Action Submittals:

1. Product Data:
    - a. Manufacturer's literature or cut-sheets.
  2. Samples:
    - a. Vapor Retarder:
      - 1) Submit sample of specified vapor retarder.
- B. Informational Submittals:
1. Source Quality Control Submittals:
    - a. Vapor Retarder:
      - 1) Installation, seaming, and penetration boot instructions.
- C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Warranty Documentation:
      - 1) Final, executed copy of Warranty:
    - b. Record Documentation:
      - 1) Manufacturers documentation:
        - a) Manufacturer's documentation showing compliance to Contract Documents.

## 1.4 WARRANTY

- A. Manufacturer Warranty:
1. Manufacturer standard warranty to be free of defects and installed without damage.

## PART 2 - PRODUCTS

### 2.1 ASSEMBLIES

- A. Manufacturers:
1. Manufacturer Contact List:
    - a. Fortifiber, Reno, NV [www.fortifiber.com](http://www.fortifiber.com).
    - b. Insulation Solutions, East Peoria, IL [www.insulationsolutions.com](http://www.insulationsolutions.com).
    - c. Inteplast Group, Livingston NJ [www.BarrierBac.com](http://www.BarrierBac.com).
    - d. Raven Industries, Sioux Falls, SD [www.ravenind.com](http://www.ravenind.com).
    - e. Reef Industries, Houston, TX [www.reefindustries.com](http://www.reefindustries.com).
    - f. Stego Industries, San Juan Capistrano, CA [www.stegoindustries.com](http://www.stegoindustries.com).
    - g. W R Meadows, Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).
- B. Materials:
1. Vapor Retarder:
    - a. Design Criteria:
      - 1) Meet requirements of ASTM E1745, Class A rating.
      - 2) Thickness: 15 mil (0.38 mm) minimum.
      - 3) Physical Properties:
        - a) Water Vapor Pemeance      ASTM E96, Method A      Perm 0.01
        - b) Puncture Resistance      ASTM D1709.
    - b. Category Four Approved Products. See Section 01 6200 for definition of Categories.
      - 1) Barrier-Bac VB-350 (16 mil) by Inteplast Group.
      - 2) Griffolyn 15 by Reef Industries.
      - 3) Moistop Ultra 15 Underslab Vapor Retarder by Fortifiber.
      - 4) Perminator (15 mil) by W R Meadows.
      - 5) Stego Wrap by Stego.
      - 6) Vapor Block 15 by Raven Industries.
      - 7) Viper Vaporcheck II (15 mil) by Insulation Solutions.

## **2.2 ACCESSORIES**

- A. Vapor Barrier:
  - 1. Seam Tape: As recommended by Membrane Manufacturer for continuous taping of seams and sealing of penetration boots.
  - 2. Penetration Boots at Utility Penetrations:
    - a. Quality Standard: Factory fabricated pipeboots:
      - 1) Moistop: The Boot.
      - 2) Raven: VaporBoot.
      - 3) Reef Industries: VaporBoot.
      - 4) All Others:
        - a) Other Manufacturer's boot system.
        - b) or
        - c) Field fabricated from same material as vapor retarder membrane.

## **PART 3 - EXECUTION Not Used**

**END OF SECTION**

**BLANK PAGE**

**SECTION 07 8400****FIRESTOPPING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install firestopping not involving penetrations as described in Contract Documents.
  - 2. Quality of firestopping materials and systems used for penetrations on Project, including submittal requirements.
  - 3. See General Note 8/A-1.
- B. Related Requirements:
  - 1. Furnishing and installing of penetration firestopping specified under Section installing work penetrating structure.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. American Society For Testing And Materials:
    - a. ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
    - b. ASTM E119-16a, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.
    - c. ASTM E814-13a, 'Standard Test Method for Fire Tests of Penetration Firestop Systems'.
    - d. ASTM E1996-14a, 'Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes'.
  - 2. Underwriters Laboratories Canada:
    - a. ULC 115, 'Standard Method of Fire Tests of Firestop Systems' (CAN/ULC S115-11) (4th Edition).

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate construction of openings and penetrating items to ensure that firestopping assemblies are installed in compliance with specific requirements.
  - 2. Coordinate sizes of sleeves, openings, core drilled holes, or cut openings to accommodate through-penetration firestop systems.
- B. Sequencing:
  - 1. Perform work of this section in proper sequence to prevent damage to firestop system and to ensure installation will occur prior to enclosing or concealing work. Firestopping shall precede finishing of gypsum board.
    - a. Do not conceal firestopping installations until inspection agency or authorities having jurisdiction, as required, have examined each installation.

**1.4 SUBMITTALS**

- A. Action Submittals:
  - 1. Shop Drawings:
    - a. Show each type of Penetration Firestop System to be used on Project with design approval reference number.

- b. Identify locations where each type of Penetration Firestop System is to be installed.
- B. Informational Submittals:
- 1. Qualification Statement:
    - a. Manufacturer/Installer:
      - 1) Provide Qualification documentation if requested by Architect or Owner.

## 1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
- 1. Conform to applicable building codes for fire resistance ratings.
  - 2. Comply with installation requirements and protocol outlined in Firestop Contractors International Association 'FICIA 'Manual of Practice' handbook.
  - 3. Each Penetration Firestop System shall be UL/ULC listed for that type of penetration occurring on Project.
  - 4. Ratings shall be in accordance with ASTM E814, UL 1479, or ULC 115 as acceptable to local code authority.
    - a. Provide Firestop Systems with F Ratings not less than Fire-Resistance Rating of Constructions penetrated.
    - b. Provide Firestop Systems with T and F Ratings, as determined per ASTM E814.
    - c. Provide Joint Sealants with Fire-Resistance Ratings as determined per ASTM E119.
    - d. Provide Products with Flame-Spread values of less than 25 and smoke developed values of less than 450, as determined per ASTM E84.
    - e. Surface burning characteristics (per ASTM E84): 25 or less. Tested in accordance with UL 115 or ASTM E814.
- B. Qualifications:
- 1. Manufacturer Qualifications:
    - a. Company that specializes in manufacturing the type of products specified, with minimum of five (5) years of documented experience.
  - 2. Upon request, submit documentation.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
- 1. Deliver firestopping materials to Project Site in original, new unopened containers or packages bearing manufacturer's printed labels.
- B. Storage And Handling Requirements:
- 1. Store and handle firestopping materials in compliance with manufacturers written instructions.
  - 2. Protect materials from freezing or overheating and to prevent deterioration or damage due to moisture, temperature changes, contaminants or other causes.
  - 3. Store materials off floor at temperatures between **40 deg F (4.4 deg C)** and **90 deg F (32.2 deg C)** or as required by Manufacturer.

## 1.7 FIELD CONDITIONS

- A. Ambient Conditions:
- 1. Temperature: Do not install firestopping materials when ambient or substrate temperatures are outside limits permitted by manufacturer of firestopping materials.
  - 2. Humidity and Moisture: Do not install the Work of this Section under conditions that are detrimental to the application, curing, and performance of the materials.
  - 3. Ventilation: Provide sufficient ventilation wherever firestopping materials are installed in enclosed spaces. Follow manufacturer's recommendations.



## 1.8 WARRANTY

- A. Manufacturer Warranty:
  - 1. Firestop materials shall be free from cracking, checking, dusting, flaking, spalling, separation, and blistering for period of 10 years from Date of Substantial Completion. Reinstall or repair such defect or failures at no cost to Owner.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

- A. Manufacturers:
  - 1. Type Two Acceptable Manufacturers:
    - a. Members of International Firestop Council [www.firestop.org](http://www.firestop.org) and member in good standing.
    - b. Equal as approved by Architect before installation. See Section 01 6200.
- B. Materials:
  - 1. General:
    - a. Sealant, packing material, or collar system required by Firestop Manufacturer for Firestop Penetration System to comply with listed design.
    - b. Primers, sleeves, forms, insulation, packing, stuffing, and accessories: Type required for tested assembly design.
  - 2. Firestopping Assembly Requirements:
    - a. Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
    - b. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use any system that has been tested according to ASTM E1966 or UL/ULC to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
    - c. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
  - 3. Firestopping System:
    - a. HILTI or Any material meeting requirements.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification Of Conditions:
  - 1. Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
  - 2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.
  - 3. Verify ducts, piping, equipment, and other similar items that would interfere with application of firestopping shall be in place.
  - 4. Do not commence Work until unsatisfactory conditions have been corrected.
    - a. Commencement of installation constitutes acceptance of conditions and responsibility for satisfactory performance.

### 3.2 PREPARATION

- A. Protection Of In-Place Conditions:

1. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
  2. Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work. Remove tape as soon as it is possible to do so without disturbing firestopping seal with substrates.
- B. Surface Preparation:
1. Clean out openings, control, and expansion joints immediately before installation of through-penetration firestopping. Comply with recommendations of firestopping manufacturer and the following requirements:
    - a. Remove foreign materials from surfaces of openings and joint substrates, and from penetrating items that could interfere with adhesion of firestopping.
    - b. Clean opening and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
    - c. Remove laitance and form release agents from concrete.
    - d. Do not apply firestopping materials to surfaces which have been previously painted or treated with sealer, curing compound, water repellent, or other similar coating, unless application has been accepted by manufacturer of firestopping products.
    - e. Install damming materials, as recommended by sealant manufacturer, to hold sealant in place.
  2. Priming:
    - a. Prime substrates where recommended by firestopping manufacturer using manufacturer's recommended products and methods.
    - b. Confine primers to areas of bond. Do not allow spillage and migration onto exposed surfaces.
    - c. Apply prime coat in compliance with manufacturer's instructions.

### **3.3 INSTALLATION**

- A. General:
1. Install firestopping in accordance with Manufacturer's instructions for installation of firestopping products.
  2. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
  3. Do not cover installed firestopping until inspected by authority having jurisdiction.

### **3.4 PROTECTION**

- A. Protect surfaces adjacent to through-penetration firestops with suitable covering to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or that would be caused by cleaning methods used to remove smears from firestopping materials.
- B. Protect firestopping during and after curing period from contact with contaminating substances, or damage resulting from adjacent Work.

### **3.5 CLEANING**

- A. Clean off excess fill materials and sealants adjacent to penetrations by methods and cleaning materials recommended by manufacturers of firestopping products and of products in which penetrations occur.

**END OF SECTION**

**SECTION 07 9213****ELASTOMERIC JOINT SEALANTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install sealants not specified to be furnished and installed under other Sections.
  - 2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.
- B. Related Requirements:
  - 1. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.
- C. Products Furnished But not Installed Under This Section:
  - 1. Interior Ceramic Tile Joint Sealants:
- D. Related Requirements:
  - 1. Section 09 3013: 'Ceramic Tiling'.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Sealant Types and Classifications:
    - a. ASTM Specifications:
      - 1) Type:
        - a) Type S: Single-component sealant.
        - b) Type M: Multi-component sealant.
      - 2) Grade:
        - a) Grade P: Pourable or self-leveling sealant used for horizontal traffic joints.
        - b) Grade NS: Non-sag or gunnable sealant used for vertical and non-traffic joints.
      - 3) Classes: Represent movement capability in percent of joint width.
        - a) Class 100/50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand of at least 100 percent increase and decrease of at least 50 percent of joint width as measured at time of application.
        - b) Class 50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 50 percent of joint width as measured at time of application.
        - c) Class 25: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 25 percent of joint width as measured at time of application.
        - d) Class 12: Sealant that, when tested for adhesion and cohesion under cyclic movement shall withstand increase and decrease of at least 12 percent of joint width as measured at time of application.
      - 4) Use:
        - a) NT (Non-Traffic): Sealant designed for use in joints in non-traffic areas.
        - b) M (Mortar): Sealant that meets bond requirements when tested on mortar specimens.
        - c) G (Glass): Sealant that meets bond requirements when tested on glass specimens.
        - d) A (Aluminum): Sealant that meets bond requirements when tested on aluminum specimens.

- e) O (Other): Sealant that meets bond requirements when tested on substrates other than standard substrates, being glass, aluminum, mortar.
- 2. Silicone: Any member of family of polymeric products whose molecular backbone is made up of alternating silicon and oxygen atoms and which has pendant hydrocarbon groups attached to silicon atoms. Used primarily as a sealant. Offers excellent resistance to water and large variations in temperature (minus 100 deg F to + 600 deg F) (minus 73.3 deg C to + 316 deg C).

B. Reference Standards:

- 1. ASTM International:
  - a. ASTM C920-14a, 'Standard Specification for Elastomeric Joint Sealants'.
  - b. ASTM C1193-16, 'Standard Guide for Use of Joint Sealants'.
  - c. ASTM C1330-02(2013), 'Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:

- 1. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
- 2. Ensure sealants are cured before covering with other materials.

### 1.4 SUBMITTALS

A. Action Submittals:

- 1. Product Data:
  - a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
  - b. Manufacturer's literature for each Product.
  - c. Schedule showing joints requiring sealants. Show also backing and primer to be used.

B. Informational Submittals:

- 1. Certificates:
  - a. Manufacturer's Certificate:
    - 1) Certify products are suitable for intended use and products meet or exceed specified requirements.
    - 2) Certificate from Manufacturer indicating date of manufacture.
- 2. Manufacturers' Instructions:
  - a. Manufacturer's installation recommendations for each Product.
  - b. Manufacturer's installation for completing sealant intersections when different materials are joined.

### 1.5 QUALITY ASSURANCE

A. Qualifications:

- 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
- 2. Applicator Qualifications:
  - a. Company specializing in performing work of this section.
  - b. Provide if requested, reference of projects with minimum three (3) years documented experience, minimum three (3) successfully completed projects of similar scope and complexity, and approved by manufacturer.
  - c. Designate one (1) individual as project foreman who shall be on site at all times during installation.

B. Preconstruction Testing:

1. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.

C. Mockups:

1. Provide mockups including sealant and joint accessories to illustrate installation quality and color if requested by Architect or Project Manager.
  - a. Incorporate accepted mockup as part of Work.

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:

1. Deliver and keep in original containers until ready for use.
2. Inspect for damage or deteriorated materials.

B. Storage and Handling Requirements:

1. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
2. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
3. Store in a cool dry location, but never under 40 deg F (4 deg C) or subjected to sustained temperatures exceeding 90 deg F (32 deg C) or as per Manufacturer's written recommendations.
4. Do not use sealants that have exceeded shelf life of product.

## 1.7 FIELD CONDITIONS

A. Ambient Conditions:

1. Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
2. Follow Manufacturer's temperature recommendations for installing sealants.

## 1.8 WARRANTY

A. Manufacturer Warranty:

1. Signed warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of three (3) years from date of Substantial Completion.
  - a. Manufacturer's standard warranty covering sealant materials.
  - b. Applicator's standard warranty covering workmanship.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

A. Manufacturers:

1. Manufacturer Contact List:
  - a. Dow Corning Corp., Midland, MI [www.dowcorning.com](http://www.dowcorning.com).
  - b. Franklin International, Inc. Columbus, OH [www.titebond.com](http://www.titebond.com).
  - c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).
  - d. Laticrete International Inc., Bethany, CT [www.laticrete.com](http://www.laticrete.com).
  - e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC [www.ge.com/silicones](http://www.ge.com/silicones).
  - f. Sherwin-Williams, Cleveland, OH [www.sherwin-williams.com](http://www.sherwin-williams.com).
  - g. Sika Corporation, Lyndhurst, NJ [www.sikaconstruction.com](http://www.sikaconstruction.com) or Sika Canada Inc, Pointe Claire, QC [www.sika.ca](http://www.sika.ca).

- h. Tremco, Beachwood, OH [www.tremcosealants.com](http://www.tremcosealants.com) or Tremco Ltd, Toronto, ON (800) 363-3213.

**B. Materials:**

**1. Design Criteria:**

- a. Compliance: Meet or exceed requirements of these standards:
  - 1) ASTM C920: Elastomeric joint sealant performance standard.
- b. Comply with Manufacturer's ambient condition requirements.
- c. Sealants must meet Manufacturer's shelf-life requirements.
- d. Sealants must adhere to and be compatible with specified substrates.
- e. Sealants shall be stable when exposed to UV, joint movements, and environment prevailing at project location.
- f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer. Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
  - 1) Adhesion Test:
    - a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
  - 2) If Primer required, shall not stain and shall be compatible with substrates.
  - 3) Allow primer to dry before applying sealant.

**2. Sealants At Exterior Building Elements:**

- a. Description:
  - 1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
    - a) Aluminum framed window infill.
    - b) Connections.
    - c) EIFS to metal joints.
    - d) Louvers.
    - e) Masonry.
    - f) Wall penetrations.
    - g) Other joints necessary to seal off building from outside air and moisture.
- b. Design Criteria:
  - 1) Meet following standards for Sealant:
    - a) ASTM C920: Type S, Grade NS, Class 50 Use NT, M, G, A.
  - 2) Limitations:
    - a) Do not use below-grade applications.
    - b) Do not use on surfaces that are continuously immersed or in contact with water.
    - c) Do not use on wet, damp, frozen or contaminated surfaces.
    - d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
  - 3) Color:
    - a) Architect to select from Manufacturer's standard colors.
    - b) Match building elements (do not use white that shows dirt easily).
- c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - 1) Dow Corning:
    - a) Primer: 1200 Prime Coat.
    - b) Sealant: 791 Silicone Weatherproofing Sealant.
  - 2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
    - a) Primer: SS4044 Primer.
    - b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
  - 3) Tremco:
    - a) Primer:
      - (1) Metal surface: No. 20 primer.
      - (2) Porous surfaces: No. 23 primer.
    - b) Sealant: Spectrum 1 Silicone Sealant.

**3. General Interior Sealants:**

- a. General:

- 1) Inside jambs and heads of exterior door frames.
  - 2) Both sides of interior door frames.
  - 3) Inside perimeters of windows.
  - 4) Miscellaneous gaps between substrates.
  - b. Design Criteria:
    - 1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
    - 2) 100 percent silicone sealant.
  - c. Paintable Sealant:
    - 1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
      - a) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS7000 Paintable Silicone Sealant.
- 4. Sealants For Interior Joints:**
- a. General:
    - 1) Countertops and backsplash to wall. Paintable sealant is required for any sealant that touches a painted surface (gypsumboard, metal door frame, etc...). Non-paintable can be used against a non-painted surface (tile, etc...)
    - 2) Joints between plumbing fixtures and other substrates.
  - b. Interior Ceramic Tile Joints are furnished in Section 07 9213 and installed in Section 09 3013 'Ceramic Tiling' including the following:
    - 1) Ceramic tile inside corners
  - c. Description:
    - 1) One-part acetoxycure silicone sealant with fungicides to resist mold and mildew.
  - d. Design Criteria:
    - 1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
    - 2) 100 percent silicone sealant.
  - e. Color: As selected by Architect from Manufacturer's standard colors.
  - f. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
    - 2) Laticrete: Latasil Tile and Stone Silicone Sealant.
    - 3) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS1700 Sanitary Silicone Sealant.
    - 4) Tremco: Tremsil 200 Silicone Sealant.

## 2.2 ACCESSORIES

- A. Bond Breaker Tape:
  1. Pressure sensitive tape as by Sealant Manufacturer to suit application.
  2. Provide tape to prevent adhesion to joint fillers or joint surfaces at back of joint and allow sealant movement.
- B. Joint Backing:
  1. Comply with ASTM C1330.
  2. Flexible closed cell, non-gassing polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
  3. Oversized 25 to 50 percent larger than joint width.
- C. Joint Cleaner:
  1. Non-corrosive and non-staining type as recommended by Sealant Manufacturer, compatible with joint forming materials.
- D. Masking Tape:
  1. Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verification Of Conditions:
  - 1. Examine substrate surfaces and joint openings are ready to receive Work.
    - a. Verify each sealant is compatible for use with joint substrates.
    - b. Verify joint surfaces are clean and dry.
    - c. Ensure concrete surfaces are fully cured.
  - 2. Sealants provided shall meet Manufacturer's shelf-life requirements.
  - 3. Notify Architect of unsuitable conditions in writing.
    - a. Do not proceed until unsatisfactory conditions are corrected.
  - 4. Commencement of Work by installer is considered acceptance of substrate.

### **3.2 PREPARATION**

- A. Surface Preparation:
  - 1. Surfaces shall be clean, dry, free of dust, oil, grease, dew, frost or incompatible sealers, paints or coatings that may interfere with adhesion. Prepare substrates in accordance with Manufacturer's instructions:
    - a. Porous surfaces: Clean by mechanical methods to expose sound surface free of contamination and laitance followed by blasting with oil-free compressed air.
    - b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193. Allow solvent to evaporate prior to sealant application.
    - c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
    - d. Primers:
      - 1) Primers enhance adhesion ability.
      - 2) Use of primers is not a substitution for poor joint preparation.
      - 3) Primers should be used always in horizontal application where there is ponding water.
  - 2. Field test joints in inconspicuous location.
    - a. Verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
    - b. When test indicates sealant adhesion failure, modify joint preparation primer, or both and retest until joint passes sealant adhesion test.
  - 3. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.
- B. Joints:
  - 1. Prepare joints in accordance with ASTM C1193.
    - a. Clean joint surfaces of contaminants capable of affecting sealant bond to joint surface using Manufacturer's recommended instructions for joint preparation methods.
    - b. Remove dirt, dust, oils, wax, paints, and contamination capable of affecting primer and sealant bond.
    - c. Clean concrete joint surfaces to remove curing agents and form release agents.
- C. Protection:
  - 1. Protect elements surrounding the Work of this section from damage or disfiguration.

### **3.3 APPLICATION**

- A. General:
  - 1. Apply silicone sealant in accordance with Manufacturer's instructions.
  - 2. Do not use damaged or deteriorated materials.
  - 3. Install primer and sealants in accordance with ASTM C1193 and Manufacturer's instructions.
  - 4. Apply primer where required for sealant adhesion.
  - 5. Install sealants immediately after joint preparation.



6. Do not use silicone sealant as per the following:
  - a. Apply caulking/sealant at temperatures below 40 deg F (4 deg C).
  - b. Below-grade applications.
  - c. Brass and copper surfaces.
  - d. Materials bleeding oils, plasticizers, and solvents.
  - e. Structural glazing and adhesive.
  - f. Surfaces to be immersed in water for prolonged time.
- B. Joint Backing:
  1. Install joint backing to maintain sealant joint ratios recommended by Manufacturer.
  2. Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.
  3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.
- C. Bond Breaker:
  1. Install bond breaker where joint backing is not used or where backing is not feasible.
    - a. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.
- D. Sealant:
  1. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.
  2. Fill joint opening to full and proper configuration.
  3. Apply in continuous operation.
  4. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.
  5. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.
- E. Caulk gaps between painted or coated substrates and unfinished or pre-finished substrates.

### 3.4 TOLERANCES

- A. Provide joint tolerances in accordance with Manufacturer's printed instructions.

### 3.5 FIELD QUALITY CONTROL

- A. Adhesion Test (Installer Option to use adhesion test to determine if primer is required).
  1. Perform adhesion tests in accordance with Manufacturer's instructions and ASTM C1193, Method A, Field-Applied Sealant joint Hand-Pull Tab:
    - a. Perform five (5) tests for first 1,000 linear feet (300 meters) of applied silicone sealant.
    - b. For sealants applied between dissimilar materials, test both sides of joints.
  2. Sealants failing adhesion test shall be removed, substrates cleaned, sealants re-installed, and re-testing performed.
  3. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

### 3.6 CLEANING

- A. Remove masking tape and excess sealant.
- B. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.

- C. Waste Management: Dispose of products in accordance with manufacturer's recommendation.

**END OF SECTION**

**SECTION 07 9219****ACOUSTICAL JOINT SEALANTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Quality of sealants to be used at perimeters of and penetrations through acoustically insulated walls and associated ceilings.
  - 2. Apply to wall types noted with acoustic batt insulation (A-2).
- B. Related Requirements:
  - 1. Section 09 2900: Furnishing and installing of acoustical sealants.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Sealant. Sealants are generally used in applications where elastic properties are needed while adhesives are generally used in applications where bonding strength and rigidity are needed. With technology advancements both sealants and adhesives can be used interchangeably depending on the applications performance requirements.
  - 2. Sealant Types and Classes:
    - a. Federal Specifications:
      - 1) Type I: Self-leveling, pour grade.
      - 2) Type II: Non-sag, gun grade.
      - 3) Type NS: Non-sag, gun grade.
      - 4) Class A: +25 percent, -25 percent expansion – contraction.
    - b. ASTM Specifications:
      - 1) Type S: Single-component sealant.
      - 2) Type M: Multi-component sealant.
      - 3) Grade P: Pourable or self-leveling sealant for joints on horizontal surfaces.
      - 4) Grade NS: Non-sag or gunnable sealant for joints in vertical surfaces.
      - 5) Class 25: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 25 percent of joint width as measured at time of application.
      - 6) Class 12: Sealant that, when tested for adhesion and cohesion under cyclic movement shall withstand increase and decrease of at least 12 percent of joint width as measured at time of application.
      - 7) NT: Sealant designed for use in joints in non-traffic areas.
      - 8) M: Sealant will remain adhered to mortar.
      - 9) G: Sealant will remain adhered to glass.
      - 10) A: Sealant will remain adhered to aluminum.
      - 11) O: Sealant will remain adhered to substrates other than glass, aluminum, mortar.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C834-17, 'Standard Specification for Latex Sealants'.
    - b. ASTM C919-12(2017), 'Standard Practice for Use of Sealants in Acoustical Applications'.
    - c. ASTM C1193-16, 'Standard Guide for Use of Joint Sealants'.
    - d. ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
    - e. ASTM E90-09(2016), 'Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements'
  - 2. Underwriters Laboratories of Canada:

- a. CAN/ULC-S102-10: 'Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.'

### 1.3 SUBMITTALS

- A. Action Submittals:
  1. Product Data:
    - a. Manufacturer's literature for each Product.
- B. Informational Submittals:
  1. Certificates:
    - a. Manufacturer's Certificate:
      - 1) Certify products are suitable for intended use and products meet or exceed specified requirements.
      - 2) Certificate from Manufacturer indicating date of manufacture.
  2. Manufacturers' Instructions:
    - a. Manufacturer's installation recommendations for each Product.

### 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  1. Surface-Burning Characteristics:
    - a. Class A flame spread rating in accordance with ULC-S102.2.
      - 1) Class A (Flame spread index 0-25; Smoke-developed index 0-450).

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  1. Deliver and keep in original containers until ready for use.
  2. Inspect for damage or deteriorated materials.
- B. Storage And Handling Requirements:
  1. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
  2. Store in cool, dry location, and at temperatures never under 40 deg F (4 deg C) nor exceeding 80 deg F (26.7 C).

### 1.6 FIELD CONDITIONS

- A. Ambient Conditions:
  1. Do not apply caulking at temperatures below 40 deg F (4 deg C).

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Sealants:
  1. Design Criteria:
    - a. Meet requirements of ASTM C834.
    - b. Meet Class A flame spread rating.
  2. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a. OSI Pro-Series SC-175 Draft & Acoustical Sound Sealant by OSI Sealants Inc, Mentor, OH [www.osisealants.com](http://www.osisealants.com).
    - b. QuietZone Acoustic Caulk by Owens Corning, Toledo, OH [www.owenscorning.com](http://www.owenscorning.com).

- c. Acoustical Sealant by Tremco, Beachwood, OH [www.tremcosealants.com](http://www.tremcosealants.com) or Toronto, ON (800) 363-3213.
- d. Acoustical Sound Sealant by Titebond.
- e. Acoustical Sealant by U S Gypsum, Chicago, IL [www.usg.com](http://www.usg.com).

## 2.2 ACCESSORIES

- A. Bond Breaker: Pressure sensitive tape recommended by Sealant Manufacturer to suit application.
- B. Joint Backing:
  - 1. Flexible closed cell polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
  - 2. Oversized 25 to 50 percent larger than joint width.
- C. Joint Cleaner: Non-corrosive and non-staining type, recommended by Sealant Manufacturer, compatible with joint forming materials.
- D. Masking Tape: Pressure sensitive tape recommended by Sealant Manufacturer to suit application.
- E. Primer: Non-staining type, type, recommended by Sealant Manufacturer to suit application.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification Of Conditions:
  - 1. Examine substrate surfaces and joint openings are ready to receive Work.
  - 2. Sealants provided shall meet Manufacturer's shelf-life requirements.
  - 3. Notify Architect of unsuitable conditions in writing.
    - a. Do not proceed until unsatisfactory conditions are corrected.
  - 4. Commencement of Work by installer is considered acceptance of substrate.

### 3.2 PREPARATION

- A. Surface Preparation:
  - 1. Prepare joints in accordance with ASTM C1193 and Manufacturer's instructions.
  - 2. Clean joint surfaces to remove dirt, dust, oils, wax, paints, and other contamination capable of affecting primer and sealant bond.
  - 3. Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.
- B. Surface Preparation:
  - 1. Clean joint surfaces of residual sealant and other contaminants capable of affecting sealant bond to joint surface.
  - 2. Surfaces shall be clean, dry, and free of dust, oil, grease, dew, or frost.

### 3.3 INSTALLATION

- A. General:
  - 1. Do not use damaged or deteriorated materials.
  - 2. Install primer and sealants in accordance with ASTM C1193 and Manufacturer's instructions where required for sealant adhesion.
  - 3. Install sealants immediately after joint preparation.

4. Do not apply caulking/sealant at temperatures below 40 deg F (4 deg C).
- B. Joint Backing:
  1. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.
  2. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.
- C. Install at perimeter joints and mechanical and electrical penetrations in sound insulated rooms. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint.
- D. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface.
- E. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.

### 3.4 FIELD QUALITY CONTROL

- A. Inspection:
  1. Examine sealant joints to verify compliance with Contract Document requirements.
- B. Non-Conforming Work. Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
  1. Sealant material found to be contaminated or damaged or inadequate preparation of substrate results in deficiencies in joint sealant adhesion is considered defective or not complying with Contract Document requirements.
  2. Correct any work found defective or not-complying with Contract Document requirements at no additional cost to Owner.

### 3.5 CLEANING

- A. General:
  1. Remove sealant from adjacent surfaces in accordance with Sealant Manufacturer and Substrate Manufacturer recommendations as work progresses.
  2. Remove masking tape and any other foreign material.
  3. Clean adjacent materials that have been soiled immediately (before setting) as recommended by Manufacturer.
- B. Waste Management: Dispose of products in accordance with Sealant Manufacturer's recommendation.

**END OF SECTION**

# **DIVISION 08: OPENINGS**

## **08 0100 OPERATION AND MAINTENANCE OF OPENINGS**

08 0601 HARDWARE GROUP AND KEYING SCHEDULES

## **08 1000 DOORS AND FRAMES**

08 1213 HOLLOW METAL FRAMES  
08 1429 FLUSH WOOD DOORS: FIELD-FINISHED, CLEAR

## **08 3000 SPECIALTY DOORS AND FRAMES**

08 3110 ACCESS DOORS AND PANELS

## **08 4000 ENTRANCES, STOREFRONTS, AND CURTAIN WALLS**

08 4113 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

## **08 7000 HARDWARE**

08 7101 COMMON FINISH HARDWARE REQUIREMENTS  
08 7102 HANGING DEVICES  
08 7103 SECURING DEVICES  
08 7106 CLOSING DEVICES  
08 7109 ACCESSORIES

## **08 8000 GLAZING**

08 8100 GLASS GLAZING

END OF TABLE OF CONTENTS

BLANK PAGE



**SECTION 08 0601****HARDWARE GROUP AND KEYING SCHEDULES****PART 1 - GENERAL****1.1 SUMMARY**

## A. Includes But Not Limited To:

1. Furnish and install door hardware and keying as described in Contract Documents.

**1.2 REFERENCES**

## A. Definitions:

1. Builders Hardware Manufacturer's Association (BHMA) Hardware Functions:
  - a. F76 Privacy Lock: Latch bolt operated by lever from either side. Outside lever locked by push button inside and unlocked by emergency key from outside or rotating lever from inside.
  - b. F81 Office Door Lock: Dead locking latch bolt operated by lever from either side, except when outside lever is locked by turn button in inside lever. When outside lever is locked, latch bolt is operated by key in outside lever or by rotating inside lever. Turn button must be manually rotated to unlock outside lever.
  - c. F75 Passage Latch: Latch bolt operated by lever from either side at all times.

**1.3 DELIVERY, STORAGE, AND HANDLING**

## A. Delivery And Acceptance Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact.

**PART 2 - HARDWARE GROUPS****2.1 INTERIOR DOORS**

## A. Single Interior Doors:

1. **Group 20: (169A/173A)**
  - a. 1 set: Smoke Gaskets.
  - b. 3 each: Hinges.
  - c. 1 each: Passage Function F75.
  - d. 1 each: Closer.
  - e. Contractor to review existing frame and adjust as needed for proper latch with new hardware.
2. **Group 21: (170A)**
  - a. 1 set: Smoke Gaskets.
  - b. 3 each: Hinges.
  - c. 1 each: Privacy Function F76.
  - d. 1 each: Closer.
3. **Group 22: (174A/191B)**
  - a. 1 set: Smoke Gaskets.
  - b. 3 each: Hinges.

- c. 1 each: Passage Function F75.
  - d. 1 each: Acoustic Seal.
  - e. 1 each: Closer.
  - f. 1 each: Threshold.
4. **Group 23: (176A/178A)**
- a. 1 set: Smoke Gaskets.
  - b. 3 each: Hinges.
  - c. 1 each: Lockset Function F81.
  - d. 1 each: Closer

### PART 3 - KEYING SCHEDULE for FINISH HARDWARE

#### 3.1 KEYING SCHEDULE

A. Stake Center Meetinghouse Keying Schedule:

1. Room 176:

Key	Stamped	Amount	Door Numbers of Doors Operated by Key
4AB34	AUX 24	0	Re-use existing cylinder. Key 4AB34 will also open X4AB1.

2. Corridor 178:

Key	Stamped	Amount	
4XAB42	STK2	0	Key 4XAB42 will also open X4AB1

B. Provide interior keying system that includes Masterkey and Changekey levels. Pin locks so pins in masterkeys are two numbers minimum different between masterkeys and associated change keys.

1. Keys and cores to be visual keyed. Stamp "keycode" on face of core (ie X4AB1). Stamp "key stamp" on key (ie GEN).

C. This is an existing Stake designation and is already in use. Grandmaster keys and Great Grandmaster keys are existing and in use.

D. Securing System –

1. All locking devices to be controlled by Schlage QUAD key way system. Great Grandmaster keying has been pre-established by Schlage Canada for the LDS Church. This is not a high security system but is a restricted key way registered to the LDS Church in Western Canada.
- a. Church & Factory Authorized Agents in Western Canada.
    - 1) Allegion (Ingersoll-Rand)
      - #103, 2915 – 21 Street NE, Calgary AB T2E 7T1
      - Contact: Sandra Slavik
      - Phone (403) 287-1190
      - Schlage Factory Master Key Department in Canada (File #169271)
  - b. Information required to identify Master Key System –
    - Cranbrook BC FM Group (4)**
    - Cranbrook British Columbia Stake (A)** - as noted on individual door schedules.
    - Property #510-5234 (B)** - as noted on individual door schedules.
  - c. Confirm keying schedule with Architect and/or owner prior to ordering hardware.
  - d. Keys and cylinders to be visually keyed following previously established system.
    - 1) Stamp face of cylinder core with key code (ie: X4AB1)
    - 2) Stamp key with key name (ie: GEN)
  - e. Provide bitting list for future reference.
2. Bitting schedule must be determined by Ingersoll-Rand to match pre-established Great Grand Master system.

- E. Purchase #50-123 Key Transcript and provide bitting list to owner for inclusion in maintenance manual at end of project.

**END OF SECTION**

**BLANK PAGE**

**SECTION 08 1213****HOLLOW METAL FRAMES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Hollow metal frames for wood stud wall installations.
- B. Related Requirements:
  - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. American Architectural Manufacturers Association / Window & Door Manufacturers Association / Canadian Standards Association:
    - a. AAMA/WDMA/CSA 101/I.S.2/A440-11, 'North American Fenestration Standard/Specification for windows, doors, and skylights'.
  - 2. ASTM International:
    - a. ASTM A568/A568M-13a, 'Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
    - b. ASTM A653/A653M-13, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
  - 3. Steel Door Institute:
    - a. SDI A250.8-2003(R2008), 'Standard Steel Doors and Frames'.
    - b. SDI A250.11-2012, 'Recommended Erection Instructions for Steel Frames'.

**PART 2 - PRODUCTS****2.1 MANUFACTURED UNITS**

- A. Category One VMR Approved Suppliers. See Section 01 6200 for definitions of Categories:
  - 1. Spalding, Calgary, AB - attention: Kelly Aldridge, Phone (403) 244-5531, e-mail, [kaldridge@spaldingssd.com](mailto:kaldridge@spaldingssd.com).
  - 2. Allmar Inc. Calgary, AB - attention: Earl Blakie, Phone (403) 236-2604 or (877) 505-5675, FAX (403) 236-2119, e-mail, [earl@allmar.com](mailto:earl@allmar.com).
  - 3. Northern Hardware Limited, Calgary, AB - attention: Rob Shearer, Phone (403) 243-5401 FAX (403) 243-7792, email [rshearer@northernhardware.com](mailto:rshearer@northernhardware.com).
- B. Manufacturers:
  - 1. Type One Acceptable Manufacturers:
    - a. Any current member of Steel Door Institute.
    - b. Ambico Limited, Ottawa, ON.
    - c. Apex Machine Works Limited, Moncton, NB.
    - d. Daybar Industries Ltd, Mississauga, ON.
    - e. SW Fleming, Ajax, ON.
    - f. Macotta Manufacturing, Mississauga, ON.
    - g. Steelcraft, Cincinnati, OH.
    - h. Equal as approved by Architect before bidding. See Section 01 6200.
- C. Frames:

1. Cold rolled furniture steel.
    - a. Interior Frames: 16 ga. (1.6 mm).
  2. Provide labeled frame to match fire rating of door.
  3. Finish:
    - a. Use one of following systems:
      - 1) Prime surfaces with rust inhibiting primer.
      - 2) Galvanize.
  4. Anchors: 16 US ga (1.6 mm) minimum meeting ULC or other code acceptable requirements for door rating involved.
- D. Fabrication:
1. General Requirements:
    - a. Frames shall be welded units. Provide temporary spreader on each welded frame.
    - b. Provide Manufacturer's gauge label for each item.
    - c. Make breaks, arrises, and angles uniform, straight, and true. Accurately fit corners.
  2. Frame width dimension:
    - a. Fabricate frame 1/8 inch (3 mm) wider than finished wall thickness as described in Contract Documents.
  3. Provide mortar guards at strikes and hinges.
  4. Anchors:
    - a. Provide three jamb anchors minimum for each jamb. On hinge side, install one anchor at each hinge location. On strike side, install one anchor at strike level and anchors at same level as top and bottom hinges. Tack weld anchors on frames intended for installation in framed walls.
    - b. Frames installed before walls are constructed shall be provided with extended base anchors in addition to other specified anchors.
    - c. Anchor types and configurations shall meet wall conditions.

### **PART 3 - EXECUTION: Not Used**

### **END OF SECTION**

**SECTION 08 1429****FLUSH WOOD DOORS: Field-Finished, Clear****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Field-finished flush wood doors.
  - 2. Doors will be field finished by Millworker to match existing building finishes as specified in Section 09 9324.
- B. Related Requirements:
  - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation.
  - 2. Section 09 9324: 'Interior Clear-Finished Hardwood'.

**1.2 REFERENCES**

- A. Abbreviations And Acronyms:
  - 1. AWS: Architectural Woodwork Standards (formerly AWI).
  - 2. FD: Fire-resistant core, fire-resistant materials assembled to stiles and rails according to methods prescribed by the testing agency to meet rigorous smoke, flame, and pressure tests.
  - 3. FD-5: Core with 2 layers on each side.
  - 4. ME: Matching edges, i.e., vertical edges same as decorative faces.
  - 5. PC: Particleboard core, solid core door with stiles and rails bonded to the core and abrasive planed flat prior to the application of the faces.
  - 6. PC-5: Core with 2 layers on each side.
- B. Association Publications:
  - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- C. Definitions:
  - 1. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are "opened" as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
  - 2. Fire-rated: Fire-retardant particleboard with an Underwriters' Laboratory (UL) stamp for Class 1 fire rating (Flame Spread 20, Smoke Developed 25). Fire-rated doors are available with particleboard and mineral cores for ratings up to 1-1/2 hours.
  - 3. Fire-rated Door: A door made of fire-resistant material that can be closed to prevent the spread of fire and can be rated as resisting fire for 20 minutes (1/3 hour), 30 minutes (1/2 hour), 45 minutes (3/4 hour) (C), 1 hour (B), or 1-1/2 hours (B). The door must be tested and carry an identifying label from a qualified testing and inspection agency.
  - 4. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
    - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
    - b. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.
  - 5. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.

**D. Reference Standards:**

1. American Architectural Manufacturers Association / Window & Door Manufacturers Association / Canadian Standards Association:
  - a. AAMA/WDMA/CSA 101/I.S.2/A440-11, 'North American Fenestration Standard/Specification for windows, doors, and skylights'.
2. ASTM International:
  - a. ASTM C1036-16, 'Standard Specification for Flat Glass'.
  - b. ASTM C1048-12, 'Standard Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass'.
3. Consumer Products Safety Commission (CPSC):
  - a. CPSC 16 CFR 1201 Consumer Product Safety Commission Part 1201 – 'Safety Standard for Architectural Glazing Materials'.
4. Hardwood, Plywood, and Veneer Association:
  - a. HPVA HP-1-2009 'Standard for Hardwood and Decorative Plywood'.
5. International Building Code (IBC):
  - a. 715.4, 'Fire Door and Shutter Assemblies'. (2012).
6. National Fire Protection Association:
  - a. NFPA 80, 'Standard for Fire Doors and Other Opening Protectives' (2016 Edition).
  - b. NFPA 101: 'Life Safety Code' (2015 Edition).
  - c. NFPA 252: 'Fire Tests of Door Assemblies' (2012 Edition).
7. National Particleboard Association / Composite Panel Association:
  - a. NPA A208.1-2009, 'Particleboard'.
8. Underwriters Laboratories of Canada:
  - a. ULC 104: 'Standard Method for Fire Tests of Door Assemblies' (CAN/ULC-S104-15) (4th Edition).

**1.3 SUBMITTALS****A. Action Submittals:**

1. Shop Drawings:
  - a. Schedule showing type of door at each location. Included shall be size, veneer, core type, fire rating, hardware prep, openings, blocking, etc.

**B. Closeout Submittals:**

1. Include following information in Operations And Maintenance Manuals specified in Section 01 7800:
  - a. Record Documentation:
    - 1) Manufacturers Documentation:
      - a) Manufacturer's product literature on doors.
      - b) Maintenance and repair instructions.

**1.4 DELIVERY, STORAGE, AND HANDLING****A. Delivery And Acceptance Requirements:**

1. Deliver in clean truck and, in wet weather, under cover.
2. Deliver to building site only after plaster, cement, and taping compound are completed and dry and after interior painting operations have been completed.
3. Individually wrap in polyethylene bags for shipment and storage.

**B. Storage And Handling Requirements:**

1. Store doors in a space having controlled temperature and humidity range between 25 and 55 percent.
2. Store flat on level surface in dry, well ventilated space.
3. Cover to keep clean but allow air circulation.
4. Do not subject doors to direct sunlight, abnormal heat, dryness, or humidity.
5. Handle with clean gloves and do not drag doors across one another or across other surfaces.



6. Doors have been acclimated to the field conditions for a minimum of 72 hours before installation is commenced.

## 1.5 WARRANTY

### A. Manufacturer Warranty:

1. Manufacturer's standard full door warranty for lifetime of original installation.
  - a. Warranty shall include finishing, hanging, and installing hardware if manufacturing defect was discovered after door was finished and installed.
  - b. Warranty to include defects in materials including following:
    - 1) Delaminating in any degree.
    - 2) Warp or twist of **1/4 inch (6 mm)** or more in door panel at time of one-year warranty inspection.
    - 3) Telegraphing of core assembly: Variation of **1/100 inch (0.25 mm)** or more in **3 inch (75 mm)** span.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

#### A. Category One VMR Approved Suppliers. See Section 01 6200 for definitions of Categories:

1. Spalding, Calgary, AB - attention: Kelly Aldridge, Phone (403) 244-5531, e-mail, [kaldridge@spaldingssd.com](mailto:kaldridge@spaldingssd.com).
2. Allmar Inc. Calgary, AB - attention: Earl Blakie, Phone (403) 236-2604 or (877) 505-5675, FAX (403) 236-2119, e-mail, [earl@allmar.com](mailto:earl@allmar.com).
3. Northern Hardware Limited, Calgary, AB - attention: Rob Shearer, Phone (403) 243-5401 FAX (403) 243-7792, email [rshearer@northernhardware.com](mailto:rshearer@northernhardware.com).

#### B. Manufacturers:

1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories.
  - a. Graham Wood Doors, Mason City, IA.
  - b. Marshfield Door Systems Inc, Marshfield, WI.
  - c. VT Industries, Holstein, IA.
  - d. Billargeon, St Ephrem, QC

#### C. Wood Doors for transparent field finish:

1. Type: AWS PC-5ME or FD-5ME.
2. Grade: AWS Premium, except face veneer.
3. Fully Type I Construction: Adhere all glue lines with Type I adhesive, including veneer lay-up.
4. Face Veneer:
  - a. Plain sliced Red Oak meeting requirements of AWS Grade A, **1/50 inch (0.5 mm)** thick minimum immediately before finishing.
  - b. Face veneers shall be running book matched.
5. Core:
  - a. Fully bonded to stiles and rails and sanded as a unit before applying veneers.
  - b. Fire-rated, AWS FD 1/3:
    - 1) 32 lb density meeting requirements of ANSI A208.1 Mat Formed Wood Particle Board, Grade 1-L-1 minimum.
    - 2) Stiles:
      - a) **1-3/8 inches (35 mm)** deep minimum before fitting.
      - b) Stile face to be hardwood matching face veneer material, thickness manufacturer's standard.
    - 3) Rails:
      - a) **1-1/8 inches (28 mm)**.
      - b) Manufacturer's option

- D. Fabrication:
  - 1. Doors shall be factory-machined. Coordinate with Section 08 1213 and Sections under 08 7000.
- E. Finishes:
  - 1. Field Finishing:
    - a. Door Manufacturer to ship doors for field-finishing by Millworker.
    - b. Performance / Design Criteria:
      - 1) Field finish to match Owner selected sample as specified in Section 09 9324.
      - 2) Color:
        - a) Similar to LDS 95 (confirm match to existing doors on site).
    - c. Finish: AWS Finish System TR-6 Catalyzed Polyurethane Premium Grade for unfilled, open-grain woods.

## 2.2 SOURCE QUALITY CONTROL

- A. Inspections:
  - 1. Verification of Performance:
    - a. Doors shall have following information permanently affixed on top of door:
      - 1) Manufacturer:
      - 2) Door designation or model.
      - 3) Veneer species.
  - 2. Clear Field-finished Hardwood:
    - a. Color matches Owner provided sample specified in Section 09 9324.
    - b. Conform to National Fire Protection Standards, NFPA 80, for fire-rated doors.
      - 1) Required fire-rated doors shall bear approved labels of UL/ULC, Warnock Hersey International, or other code acceptable agency.
      - 2) Machining for hardware shall be complete before application of label.

## PART 3 - EXECUTION: Not Used

## END OF SECTION

**SECTION 08 3110****ACCESS DOORS AND PANELS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Manufactured access doors in walls for equipment access.
- B. Related Requirements:
  - 1. Section 06 2001: 'Common Finish Carpentry Requirements' for Installation.

**PART 2 - PRODUCTS****2.1 MANUFACTURED UNITS**

- A. Acceptable Manufacturers:
  - 1. Babcock-Davis, Minneapolis, MN [www.babcock-davis.com](http://www.babcock-davis.com).
  - 2. The Bilco Company, New Haven, CT [www.bilco.com](http://www.bilco.com) or Bilco Canada, London, ON (519) 659-7331.
  - 3. Dur-Red Products, Cudahy, CA [www.dur-red.com](http://www.dur-red.com).
  - 4. Elmdor Stoneman, City of Industry, CA [www.elmdorstoneman.com](http://www.elmdorstoneman.com).
  - 5. Jensen Industries, Los Angeles, CA [www.jensen-ind.com](http://www.jensen-ind.com).
  - 6. Karp Associates Inc, Maspeth, NY [www.karpinc.com](http://www.karpinc.com).
  - 7. Larsen's Manufacturing Co, Minneapolis, MN [www.larsensmfg.com](http://www.larsensmfg.com).
  - 8. Mifab Manufacturing Co, Minneapolis, MN [www.mifab.com](http://www.mifab.com).
  - 9. Milcor, Bensenville, IL [www.milcorinc.com](http://www.milcorinc.com).
  - 10. Nystrom Inc, Brooklyn Park, MN [www.nystrom.com](http://www.nystrom.com).
  - 11. Williams Brothers Corporation of America, Reno, NV [www.wbdoors.com](http://www.wbdoors.com).
  - 12. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Standard Wall Access Doors:
  - 1. Manually operated with single key operated lock, interior latch release, and continuous piano hinge hardware.
  - 2. Factory powder-coated prime finish, field painted to match metal painting.
  - 3. Provide flange over wall finish.
  - 4. 12x12 Minimum size.
  - 5. 1 hour fire rating minimum at rated walls.

**PART 3 - EXECUTION: Not Used****END OF SECTION**

**BLANK PAGE**

**SECTION 08 4113****ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install aluminum storefront window systems, including glazing, and caulking, as described in Contract Documents.
  - 2. Contractor to review existing conditions on site (See 8/A-9) and remove existing storefront entry door/frame and provide new storefront window infill c/w glazing, framing, and seals.
  - 3. Match existing model number and finish on site.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing':
    - a. Pre-installation conference held jointly with Section 08 4113.
  - 2. Section 07 9213: 'Elastomeric Joint Sealant' for quality of sealants.
  - 3. Section 08 8100: 'Glass Glazing' for quality of glass glazing.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. American Architectural Manufacturers Association (AAMA):
    - a. AAMA SFM 1-14, 'Aluminum Store Front and Entrance Manual'.
    - b. AAMA 501-15, 'Methods of Test for Exterior Walls'.
    - c. AAMA 609 & 610-15, 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined documents).
    - d. AAMA 2605-17, 'Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels'.
- B. Definitions:
  - 1. Glass Surface:
    - a. Insulated glass unit:
      - 1) Surface 1: Exterior surface of outer lite.
      - 2) Surface 2: Interspace-facing surface of outer lite.
      - 3) Surface 3: Interspace-facing surface of inner lite.
      - 4) Surface 4: Interior surface of inner lite.
- C. Reference Standards:
  - 1. ASTM International:
    - a. ASTM B221-14, 'Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes'.
    - b. ASTM B456-17, 'Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium'.
    - c. ASTM B633-15, 'Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel'.
    - d. ASTM C920-14a, 'Standard Specification for Elastomeric Joint Sealants'.
    - e. ASTM C1184-14, 'Standard Specification for Structural Silicone Sealants'.
    - f. ASTM E283-04(2012), 'Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen'.
    - g. ASTM E330/E330M-14, 'Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference'.

- h. ASTM E331-00(2016), 'Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference'.
- 2. Standards Council of Canada:
  - a. CAN/CGSB 12.1-2017, 'Tempered or Laminated Safety Glass'.
  - b. CAN/CGSB 12.8-2017, 'Insulated Glass Units'.
- 3. International Building Code (IBC) (2015 or most recent edition adopted by AHJ):
  - a. Chapter 10, 'Means of Egress'.
  - b. Chapter 16, 'Structural Design'.
    - 1) Section 1609 'Wind Loads'.
- 4. International Code Council / American National Standards Institute:
  - a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.
- 5. National Fenestration Rating Council (NFRC):
  - a. NFRC 100-2014, 'Procedure for Determining Fenestration Product U-factors'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
  - 1. Participate in MANDATORY pre-installation conference as specified in Section 06 1100.
    - a. Schedule pre-installation conference one (1) week before scheduled installation of storefront system.
    - b. In addition to requirements of Section 01 3100, review following:
      - 1) Review rough opening requirements:
        - a) Make certain rough openings are within tolerances required for installation of factory-fabricated frames.
        - b) These dimensions have been agreed upon between Owner and Manufacturer and are shown on Standard Plan Drawings.
      - 2) Review installation scheduling, coordination, placement of window infill.
      - 3) Review delivery, storage, and handling requirements.
      - 4) Review 'Protection' responsibilities.
      - 5) Review 'Cleaning' responsibilities.

### 1.4 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's literature.
      - 1) Storefront entry system.
    - b. Color and finish.
  - 2. Shop Drawings:
    - a. Clearly mark components to identify their location in Project.
    - b. Show exact dimensions of factory-fabricated frames and required tolerances for rough openings. Submit shop drawings in time for Pre-Installation Conference specified in Section 06 1100.
- B. Informational Submittals:
  - 1. Qualification Statement:
    - a. Installer:
      - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operations and Maintenance Data:
      - 1) Maintenance, adjustment, and repair instructions.
    - b. Warranty Documentation:
      - 1) Final, executed copy of Warranty.
        - a) Storefront warranty.
    - c. Record Documentation:

- 1) Manufacturers documentation:
  - a) Manufacturer's literature or cut sheets for storefront system.
  - b) Color and finish selections.
  - c) Parts lists.

## **1.5 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  1. Provide wind load and impact testing by testing laboratory when required by local codes and jurisdictions:
- B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
  1. Manufacturer Qualifications:
    - a. Provide aluminum storefront systems produced by firm experienced in manufacturing systems that are similar to those indicated for this project and have record of successful in-service performance.
  2. Fabricator Qualifications:
    - a. Provide aluminum storefront systems fabricated by a firm experienced in producing systems that are similar to those indicated for this Project, and have record of successful in-service performance.
    - b. Fabricator shall have sufficient production capacity to produce components required without causing delay in progress of the Work.
  3. Installer Qualifications:
    - a. Minimum three (3) years experience in storefront installations.
    - b. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
    - c. Upon request, submit documentation.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery And Acceptance Requirements:
  1. Deliver all parts of storefront window infill in original, unopened packages with labels intact to Project at same time.
- B. Storage And Handling Requirements:
  1. Store in clean, dry location, indoors in Manufacturer's unopened packaging until ready for installation and in accordance with Manufacturer's instructions.
  2. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.
  3. Protect materials and finish from damage during storage, handling and installation.

## **1.7 WARRANTY**

- A. Manufacturer Warranty:
  1. Storefront window infill:
    - a. Manufacturer's Warranty to be free of defects in material and workmanship.
    - b. Manufacturer's Warranty against deterioration or fading.

## **PART 2 - PRODUCTS**

### **2.1 ASSEMBLIES**

- A. Manufacturers:

1. Category One VMR Approved Manufacturers. See Section 01 6200 for definitions of Categories:
  - a. Kawneer North America, Norcross, GA, [www.kawneer.com/kawneer/north\\_america](http://www.kawneer.com/kawneer/north_america).
    - 1) Contact Information: Paul Cannon, West Valley City, UT (801) 201-1080, FAX 801-768-4588 [paul.cannon@kawneer.com](mailto:paul.cannon@kawneer.com).
  - b. Kawneer Company of Canada Ltd.
- B. Materials (verify on site – intent is to match existing):
  1. Frames:
    - a. Aluminum:
      - 1) 6063-T6 aluminum alloy or meet requirements of ASTM B221, alloy GS 10A-T6 or T6.
    - b. Mullion:
      - 1) Steel reinforced or heavy duty as necessary to prevent lateral flexing of mullion.
    - c. Sills:
      - 1) Match height of existing adjacent windows.
    - d. Sealer Tape:
      - 1) 3M.
    - e. Fasteners:
      - 1) Aluminum or non-magnetic stainless steel.
      - 2) Concealed fastenings shall be cadmium or zinc-plated steel.
    - f. Finish:
      - 1) Match existing anodized (adjacent).
    - g. Glazing Gasket:
      - 1) Compression-type design with replaceable extruded EPDM rubber.
    - h. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) Double Glazed: Exterior
        - a) Trifab II '451T' by Kawneer (match existing on site)
        - b) 1602 2" Curtainwall by Kawneer (match existing on site).
  2. Glazing:
    - a. Glazing as specified in Section 08 8100: 'Glass Glazing'.
    - b. Glazing Gaskets:
      - 1) Compression-type design with replaceable extruded EPDM rubber.
    - c. Spacers and Setting Blocks: Elastomeric.
    - d. Bond-Breaker (Sealer) Tape: Standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
    - e. Glazing Sealant:
      - 1) Structural Sealant meeting requirements of ASTM C1184:
        - a) Permanently elastic, non-shrinking, and non-migrating type for joint size and movement.
        - b) Single component neutral-curing silicone formulation compatible with system components specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in aluminum-framed systems indicated.
        - c) Color: Black.
      - 2) Weather Sealant:
        - a) ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weather seal sealant, and aluminum-framed-system manufacturers for this use.
        - b) Color: Match structural sealant.
  - C. Fabrication:
    1. Construction shall meet Manufacturer's recommendations.
    2. Fabricate components that, when assembled, have following characteristics:
      - a. Profiles sharp, straight, and free of defects or deformations.
      - b. Accurately fit joints; make joints flush, hairline and weatherproof.
      - c. Means to drain water passing joints, condensation within framing members, and moisture migrating within system to exterior.
      - d. Physical and thermal isolation of glazing from framing members.



## PART 3 - EXECUTION

### 3.1 INSTALLERS

- A. Performance Standard Installers: See Section 01 6200 for definitions of Categories. See Section 01 4301 and 'Quality Assurance' in Part 1 'General' for Installer Qualifications of this specification:
1. General Contractor responsible for Installer(s), verification of qualifications, and performance. Contact VMR Approved Manufacturer's Representative specified in Part 2 'Products' of this specification for potential installers if desired.
  2. Kawneer Factory Authorized Dealer approved by Architect prior to bidding.
  3. Submit Documentation.
  4. City Glass and Windshield Shop Ltd., Cranbrook, BC, (250) 489-2513, Steve Robertson.

### 3.2 EXAMINATION

- A. Verification Of Conditions:
1. Verify that framed openings will accommodate factory-fabricated storefront window frames of dimensions agreed upon by Owner and Manufacturer and shown on Standard Plan documents.
  2. Verify floor is level across entire width of opening.
  3. Verify sill conditions are level and/or sloped away from openings as specified.
  4. Verify wall framing is dry, clean, sound, and free of voids and offsets, construction debris, sharp edges or anything that will prevent a successful installation of storefront system.
  5. Notify Architect and Owner in writing if framed openings are not as agreed upon.
    - a. Do not install storefront window frames until deficiencies in framed openings have been corrected to allow installation of standard windows.
    - b. Commencement of Work by installer is considered acceptance of substrate.
  6. Review existing conditions and storefront framing as part of demolition/new work and coordinate new work to match existing storefront system.

### 3.3 INSTALLATION

- A. General:
1. Installation shall meet or exceed all applicable federal, provincial and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
  2. All installation shall be in accordance with manufacturer's published recommendations and in accordance with approved shop drawings.
  3. Do not install damaged components. Fit frame joints tight, free of burrs and distortion. Rigidly secure non-movement joints.
  4. Isolate metal surfaces in contact with incompatible metal or corrosive substrates, including wood, by applying sealer tape to prevent electrolytic action.
- B. Set plumb, square, level, and in correct alignment and securely anchor to following tolerances:
1. Variation from plane: Limit to **1/8 inch (3 mm)** in **12 feet (3.6 meters)**; **1/4 inch (6 mm)** over total length.
  2. Offset from Alignment: For surfaces abutting in line, limit offset to **1/16 inch (1.6 mm)**.
  3. Offset at Corners: For surfaces meeting at corner, limit offset to **1/32 inch (0.8 mm)**.
  4. Diagonal measurements: Limit difference between diagonal measurements to **1/8 inch (3 mm)**.
  5. Sidelites: Line up horizontal rail in sidelight with new work.
- C. Install exterior window units with through wall anodized metal sill flashing as noted and detailed.
- D. Sealants:
1. Apply in accordance with Section 07 9213 'Elastomeric Joint Sealant' requirements.
  2. Caulk joints between frames and walls, both interior and exterior to provide weather tight installation.

- E. Glazing Characteristics:
  - 1. Exterior Storefront Window Infill:
    - a. Obscure interior pane with pattern on surface 3 and Clear exterior pane with Low E treatment on surface 2.
    - b. GWG.
    - c. Glazing to be tempered.

### **3.4 FIELD QUALITY CONTROL**

- A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
  - 1. Correct any work found defective or not complying with contract document requirements including removal and replacement of glass that has been broken, chipped, cracked, abraded, or damaged during construction period at no additional cost to the Owner.

### **3.5 PROTECTION**

- A. During Installation:
  - 1. Installer's Responsibility:
    - a. During installation, all adjacent work shall be protected from damage.
- B. After Installation:
  - 1. General Contractor's Responsibility:
    - a. Institute protective measures required throughout remainder of construction period to ensure that aluminum storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

### **3.6 CLEANING**

- A. General:
  - 1. Installer's Responsibility:
    - a. Follow Manufacturer's written recommendations for cleaning and maintenance or guidelines of AAMA 609 & 610 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined documents). Avoid damaging protective coatings and finishes.
    - b. Clean glass and aluminum surfaces, inside and out, promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Exercise care to avoid damage to coatings.
    - c. Remove nonpermanent labels, protective films, and clean surfaces following recommended procedures.
      - 1) Do NOT remove permanent AAMA/CSA or NFRC labels.
- B. Waste Management:
  - 1. Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**SECTION 08 7101****COMMON FINISH HARDWARE REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. General requirements for finish hardware related to architectural wood doors.
- B. Related Requirements:
  - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation of hardware.
  - 2. Section 08 0601: 'Hardware Group and Keying Schedules'.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. Builders Hardware Manufacturers Association (BHMA), 355 Lexington Avenue, 15th Floor, New York, NY 10017-6603, Tel: 212-297-2122 Fax: 212-370-9047, [www.buildershardware.com](http://www.buildershardware.com).
- B. Reference Standards:
  - 1. International Code Council / American National Standards Institute:
    - a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.
  - 2. Underwriters Laboratories (UL):
    - a. UL 10B, 'Fire Tests of Door Assemblies'.
    - b. UL 10C, 'Positive Pressure Fire Tests of Door Assemblies'.
  - 3. ULC

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Hardware Templates:
    - a. Provide hardware templates to Sections 08 1213 and 08 1429 within fourteen (14) days after Architect approves hardware schedule.
    - b. Supply necessary hardware installation templates to Section 06 2024 before pre-installation conference.

**1.4 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's cut sheets.
    - b. Two (2) copies of Manufacturer's installation, adjustment, and maintenance instructions for each piece of hardware. Include one (1) set in 'Operations And Maintenance Manual' and send one (1) set with hardware when delivered.
    - c. Copy of hardware schedule.
  - 2. Shop Drawings:
    - a. Submit hardware schedule indicating hardware to be supplied.
    - b. Schedule shall indicate details such as proper type of strikeplates, spindle lengths, hand, backset, and bevel of locks, hand and degree opening of closer, length of kickplates, length of rods and flushbolts, type of door stop, and other necessary information necessary to determine exact hardware requirements.

**B. Closeout Submittals:**

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Operations and Maintenance Data:
    - 1) Manufacturer's installation, adjustment, and maintenance instructions for each piece of hardware.
  - b. Record Documentation:
    - 1) Manufacturers documentation:
      - a) Manufacturer's literature and/or cut sheets.
      - b) Include keying plan and bitting schedule.

**1.5 DELIVERY, STORAGE, AND HANDLING****A. Storage And Handling Requirements:**

1. Neatly and securely package hardware items by hardware group and identify for individual door with specified group number and set number used on Supplier's hardware schedule.
2. Include fasteners and accessories necessary for installation and operation of finish hardware in same package.

**PART 2 - PRODUCTS****2.1 SUPPLIERS****A. Category One VMR Approved Suppliers. See Section 01 6200 for definitions of Categories:**

1. Spalding, Calgary, AB - attention: Kelly Aldridge, Phone (403) 244-5531, e-mail, [kaldridge@spaldingssd.com](mailto:kaldridge@spaldingssd.com).
2. Allmar Inc. Calgary, AB - attention: Earl Blakie, Phone (403) 236-2604 or (877) 505-5675, FAX (403) 236-2119, e-mail, [earl@allmar.com](mailto:earl@allmar.com).
3. Northern Hardware Limited, Calgary, AB - attention: Rob Shearer, Phone (403) 243-5401 FAX (403) 243-7792, email [rshearer@northernhardware.com](mailto:rshearer@northernhardware.com).

**2.2 FINISHES****A. Hardware Finishes:**

1. Finishes for brass or bronze hardware items shall be:
  - a. ANSI / BHMA Finish Code 626 / C26D.
    - 1) Description: Satin Chromium Plated.
    - 2) Base Metal: Brass. Bronze.
2. Finishes for flat goods items may be:
  - a. ANSI / BHMA Finish Code 630 C32D.
    - 1) Description: Satin Stainless Steel.
    - 2) Base Metal: Stainless Steel (300 Series).
3. Materials other than steel, brass, or bronze shall be finished to match appearance satin chromium plated, except flat goods which shall be satin stainless steel C26D / C32D.

**2.3 FASTENERS**

- A. Fasteners shall be of suitable types, sizes and quantities to properly secure hardware. Fasteners shall be of same material and finish as hardware unless otherwise specified. Fasteners exposed to weather shall be non-ferrous or corrosion resisting steel.

**PART 3 - EXECUTION****3.1 PREPARATION**

- A. Before ordering materials, examine Contract Documents to be assured that material to be ordered is appropriate for thickness and substrate to which it is to be secured and will function as intended.

**END OF SECTION**

**BLANK PAGE**

**SECTION 08 7102****HANGING DEVICES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Hinges for flush wood doors.
- B. Related Requirements:
  - 1. Section 08 7101: 'Common Hardware Requirements'.

**PART 2 - PRODUCTS****2.1 MANUFACTURED UNITS**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Hager Companies, St Louis, MO [www.hagerhinge.com](http://www.hagerhinge.com).
    - b. Stanley, New Britain, CT [www.stanleyworks.com](http://www.stanleyworks.com).
- B. Hinges:
  - 1. Doors:
    - a. Sizes:
      - 1) Doors:
        - a) 1-3/4 inch (45 mm) doors and fire-rated doors in metal frames:
          - (1) Standard: 4-1/2 inches by 4-1/2 inches (115 mm by 115 mm).
          - (2) Wide Throw: 4-1/2 inches (115 mm) by width required.
  - 2. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a. Interior:
      - 1) Hager: AB 700
      - 2) Stanley: CB 179

**PART 3 - EXECUTION: Not Used****END OF SECTION**

**BLANK PAGE**



**SECTION 08 7103**  
**SECURING DEVICES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Items for architectural wood doors:
    - a. Locksets and latchsets.
    - b. Cylinders.
- B. Related Requirements:
  - 1. Section 08 7101: Common Hardware Requirements.

**1.2 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery And Acceptance Requirements:
  - 1. Standard Key Delivery:
    - a. Include change keys with hardware.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
  - 1. Manufacturer List:
    - a. Schlage, Colorado Springs, CO [www.schlage.com](http://www.schlage.com).
- B. General:
  - 1. Backsets shall be 2-3/4 inches (70 mm).
  - 2. Furnish lead shields where required.
- C. Locksets And Latchsets:
  - 1. Lever Operated:
    - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) AL Series by Schlage – Saturn 626.
- D. Standard Cylinders:
  - 1. Provide cylinders for interior locksets.
  - 2. Category Four Approved Products. See Section 01 6000 for definitions of Categories.
    - a. Match manufacturer of locksets.
  - 3. See schedule A-7.

**PART 3 - EXECUTION – NOT USED**

**END OF SECTION**

**BLANK PAGE**

**SECTION 08 7106****CLOSING DEVICES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Closers for flush wood doors.
- B. Related Requirements:
  - 1. Section 08 7101: 'Common Finish Hardware Requirements'.

**1.2 SUBMITTALS**

- A. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Warranty Documentation:
      - 1) Manufacturer's final, executed copy of warranty.

**1.3 WARRANTY**

- A. Manufacturer Warranty:
  - 1. Manufacturer's Standard Warranty, five (5) years minimum.

**PART 2 - PRODUCTS****2.1 MANUFACTURED UNITS**

- A. Manufacturers:
  - 1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
    - a. 4041 Series by LCN Closers, Princeton, IL [www.lcnclosers.com](http://www.lcnclosers.com).
- B. Surface-Mounted Overhead Door Closers:
  - 1. Closers provided under this Section shall be from same Manufacturer.
  - 2. Provide parallel arms on closers unless door position in relation to adjacent wall requires otherwise. Provide covers.
  - 3. Door Closers on doors that swing 180 degree as shown on Contract Documents:
    - a. Closers shall allow for 180 degree opening and not be used as a stop. Wall stops are salvaged existing.
    - b. Closers shall have following features:
      - 1) Adjustable sweep speed.
      - 2) Adjustable backcheck.
      - 3) Non-handed, non-sized.
  - 4. Door Closers on doors that swing 90 degree as shown on Contract Documents:
    - a. Closers shall allow for 100 degree opening and not be used as a stop. Wall stops are salvaged existing.
    - b. Closers shall have following features:
      - 1) Adjustable sweep speed.
      - 2) Adjustable backcheck.
      - 3) Non-handed, non-sized.

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Mount closers on stop side of door wherever conditions permit (parallel arm).
- B. Install with through-bolt hardware-to-door connections.

**3.2 ADJUSTING**

- A. Adjust closers to provide maximum opening force as required by governing code authority and proper backcheck and sweep speed.

**END OF SECTION**

**SECTION 08 7109****ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Acoustical seals.
  - 2. Smoke Gaskets.
  - 3. Thresholds (metal) where required for wood doors.
  - 4. Door bottoms/door sweeps.
- B. Related Requirements:
  - 1. Section 08 7101: 'Common Finish Hardware Requirements' for general finish hardware requirements and Approved Suppliers.
  - 2. Section 09 3013: 'Ceramic Tiling' for thresholds.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. American Architectural Manufacturers Association (AAMA):
    - a. AAMA 609 & 609-09, 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined document).
    - b. AAMA 611-12, 'Voluntary Standards for Anodized Architectural Aluminum'.
    - c. AAMA 701/702-11, 'Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals'.
  - 2. National Association of Architectural Metal Manufacturers (NAAMM):
    - a. AMP 500-06, 'Metal Finishes Manual' for Architectural and Metal Products.
- B. Reference Standards:
  - 1. American National Standards Institute / Builders Hardware Manufacturers Association:
    - a. ANSI / BHMA A156.18-2012, 'Materials and Finishes'.
    - b. ANSI / BHMA A156.21-2014, 'American National Standard for Thresholds'.
  - 2. International Code Council / American National Standards Institute:
    - a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.

**PART 2 - PRODUCTS****2.1 MANUFACTURED UNITS**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Hager, St Louis, MO [www.hagerhinge.com](http://www.hagerhinge.com).
    - b. NGP - National Guard Products, Memphis, TN [www.ngpinc.com](http://www.ngpinc.com).
    - c. Pemko Manufacturing, Ventura, CA [www.pemko.com](http://www.pemko.com).
- B. Acoustical Seals:
  - 1. Color as selected by Architect.
  - 2. Type One Acceptable Products:
    - a. Door Bottom Shoe for Wood Door:
      - 1) 13VDkB by NGP.
      - 2) 211DV by Pemko.

- b. Equal as approved by Architect before bidding. See Section 01 6200.
- C. Smoke Gaskets:
  - 1. Color as selected by Architect.
  - 2. Type One Acceptable Products:
    - a. 726 by Hager.
    - b. 5050 by NGP.
    - c. PK 55 by Pemko.
    - d. Equal as approved by Architect before bidding. See Section 01 6200.
- D. Thresholds:
  - 1. Type One Acceptable Products:
    - a. Design Criteria:
      - 1) Meet handicap accessibility requirements (ADA):
    - b. Interior Doors at Acoustic Seals, Approved Products:
      - 1) Carpet threshold (carpet to carpet):
        - a) 505S DBA by Hager.
        - b) 414 DKB by NGP.
        - c) 236 D by Pemko.
    - c. Equals as approved by Architect before bidding. See Section 01 6200.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install smoke gaskets and acoustical seals in manner to give continuous air-tight fit.
  - 1. Install smoke gaskets as per detail A/A-10:
    - a. Hinge Jamb: Install smoke gaskets on jamb face of door frame so door will compress smoke gasket.
    - b. Header and Strike Jamb: Install smoke gaskets on face of stop of door frame so door will compress smoke gasket.
  - 2. Install acoustical seal with seal under door.

**END OF SECTION**

**SECTION 08 8100****GLASS GLAZING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Quality of glazing used in window infill.
  - 2. Intent is to match existing adjacent glazing on site.
- B. Related Requirements:
  - 1. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts' for furnishing and installing of glazing in aluminum-framed storefront.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Glass Surface:
    - a. Insulated glass unit:
      - 1) Surface 1: Exterior surface of outer lite.
      - 2) Surface 2: Interspace-facing surface of outer lite.
      - 3) Surface 3: Interspace-facing surface of inner lite.
      - 4) Surface 4: Interior surface of inner lite.
  - 2. Insulated Glass: Two pieces of glass spaced apart and hermetically sealed to form single-glazed unit with air space between. Heat transmission through this type of glass may be as low as half that without air space. Also called double glazing, double pane, insulated unit, and thermal pane.
  - 3. Laminated Glass: Two or more sheets with inner layer of transparent plastic to which glass adheres if broken. Used for overhead, safety glazing, and sound reduction.
  - 4. Low-Emissivity Glass (Low-E): Reduces wintertime heat loss from interior with thin, almost colorless metallic coating that reflects heat back inside structure. Allows moderate solar heat gain while reducing harmful ultraviolet light in any season. Minimizes summertime air conditioning loss by reflecting radiated heat to outside. May be tempered for where safety glass is required. Available in single strength clear, gray and bronze (brown) color.
  - 5. Obscure Glass: Adds privacy where window coverings are impractical or undesirable. Various colors and texture patterns provide translucent or semi-opaque effect. May be tempered for use where safety glass is required.
  - 6. Shading Coefficient: Ratio of solar heat gain passing through a glazing system to solar heat gain that occurs under the same conditions if the window was made of clear, unshaded double strength glass. Lower SC number, the better solar control efficiency of glazing system.
  - 7. Solar Heat Gain Coefficient (SHGC): Ratio of total solar heat passing through a given window relative to the solar heat incident on the projected window surface at normal solar incidence. (Percentage of solar energy directly transmitted or absorbed and re-radiated into a building). Lower SHGC, the better it is able to reduce heat.
  - 8. Solar Reflectance (R): Percent of incident solar radiation that is reflected by window film/glass system. Lower the number, the less solar radiation reflected.
  - 9. Tempered Glass: Glass strengthened through process of heating, creating tensile strength that causes glass to resist breakage, yet disintegrate into small pieces if break occurs. Tempered glass is type of safety glass.
  - 10. U-Value: Measurement of heat transfer through film due to outdoor/indoor temperature differences. Lower U-value, less heat transfers. When using performance data, the lower U-value, better insulating qualities of window film/glass system.
  - 11. Visible Light Transmitted (VLT): Percent of total visible light (380-780 nanometers) that passes through glass. Lower the number, the less visible light transmitted.

**B. Reference Standards:**

1. American National Standards Institute:
  - a. ANSI Z97.1-2009, 'Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test'.
2. ASTM International:
  - a. ASTM C1036-16, 'Standard Specification for Flat Glass'.
  - b. ASTM C1048-12, 'Standard Specification for Heat-Treated Flat Glass - Kind H, Kind FT Coated and Uncoated Glass'.
  - c. ASTM C1172-14, 'Standard Specification for Laminated Architectural Flat Glass'.
  - d. ASTM C1281-16, 'Standard Specification for Preformed Tape Sealants for Glazing Applications'.
  - e. ASTM E2190-10, 'Standard Specification for Insulating Glass Unit Performance and Evaluation'.
3. Consumer Products Safety Commission (CPSC):
  - a. 16 CFR, Part 1201 CAT 1 and 11, 'Safety Standard for Architectural Glazing Materials'.

**1.3 SUBMITTALS****A. Action Submittals:**

1. Product Data:
  - a. Manufacturer's data sheets for each glass product and glazing material.

**B. Informational Submittals:**

1. Qualification Statement:
  - a. Installer:
    - 1) Provide Qualification documentation if requested by Architect or Owner.

**C. Closeout Submittals:**

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Warranty Documentation:
    - 1) Final, executed copy of Warranty.

**1.4 QUALITY ASSURANCE****A. Regulatory Agency Sustainability Approvals:**

1. Glazing shall meet applicable requirements of Federal Consumer Product Safety Standard 16 CFR 1201.
2. Comply with published recommendations of glass product Manufacturers and organizations, except where more stringent requirements are indicated.

**B. Qualifications:**

1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
  - a. Satisfactorily completed at least three (3) installations of similar size, scope, and complexity in each of past two (2) years and be approved by glass product Manufacturer before bidding.
  - b. Upon request, submit documentation.

**C. Certifications:**

1. Labels showing strength, grade, thickness, type, and quality are required on each piece of glass.
2. Manufacturers/Fabricators certifying products furnished comply with project requirements.
3. Insulating-Glass Certification Program: Indicate compliance with requirements of Insulating Glass Certification Council on applicable glazing products.

**1.5 DELIVERY, STORAGE, AND HANDLING****A. Delivery And Acceptance Requirements:**



1. Follow Manufacturer's instruction for receiving, handling, and protecting glass & glazing materials to prevent breakage scratching, damage to seals, or other visible damage.
2. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage And Handling Requirements:

1. Follow Manufacturer's instruction for storing and protecting glass & glazing materials.
2. Store materials protected from exposure to harmful environmental conditions and at temperatures and humidity conditions recommended by Manufacturer.
3. Protect edge damage to glass, and damage/deterioration to coating on glass.

## 1.6 FIELD CONDITIONS

A. Ambient Conditions:

1. Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

## 1.7 WARRANTY

A. Manufacturer Warranty:

1. Insulating Glass Warranty:
  - a. Manufacturer's standard form, signed by insulating-glass product Manufacturer/Fabricator, agreeing to replace insulating-glass units that exhibit failure of hermetic seal under normal use evidenced by obstruction of vision by dust, moisture, or film on interior surfaces of glass, for ten [10] years of date of installation.
2. Installer's Warranty:
  - a. Form acceptable to Owner, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or deterioration of glass or glazing products due to faulty installation, for two (2) years from date of installation.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Manufacturers:

1. Manufacturer Contact List for Low E Glazing:
  - a. AGC Flat glass North America, Kingsport, TN [www.us.agc.com](http://www.us.agc.com).
  - b. Carlex (subsidiary of Central Glass Co., Ltd., Nashville, TN [www.carlex.com](http://www.carlex.com).
  - c. Guardian Industries Corp., Auburn Hills, MI [www.guardian.com](http://www.guardian.com).
  - d. Oldcastle BuildingEnvelope, Santa Monica, CA [www.oldcastlebe.com](http://www.oldcastlebe.com).
  - e. Pilkington North America Inc., Toledo, OH [www.pilkington.com](http://www.pilkington.com).
  - f. PPG Industries, Pittsburgh, PA [www.ppgglass.com](http://www.ppgglass.com) or PPG Canada Ltd, Glass Division, Toronto, ON (416) 789-3331.

B. Storefront Window Infill Glazing:

1. Thickness: **1/4 inch (6 mm)** minimum, Double Strength (Insulated Glass).
2. Glazing shall have following characteristics:
  - a. Low-Emissivity (or Low E):
    - 1) Design Criteria:
      - a) Clear:
      - b) Meet requirements of ASTM C1036, Type I, Class I, Quality Q3.
      - c) Insulated Glass: 1 inch (25 mm) units with 1/2 inch (12.7 mm) airspace and two (2) 1/4 inch (6 mm) lites.
      - d) Location: Surface 2.

- 2) Type Two Low-Emissivity (or Low E) Acceptable Product:
  - a) Performance Standard:
    - (1) 70 percent Visible Light Transmission (VLT).
    - (2) 0.29 U-value winter.
    - (3) 0.27 U-value summer.
    - (4) 0.38 Solar Heat Gain Coefficient (SHGC).
    - (5) 0.44 Shading Coefficient.
    - (6) 11 percent Visible Light Reflectance.
  - b) Quality Standard:
    - (1) Cardinal LoE<sup>3</sup>-366.
    - (2) Solarban 70 XL.
    - (3) Other low E glazing system standard with window manufacturer that meets or exceeds performance characteristics of specified glazing is acceptable as approved by Architect before bidding. See Section 01 6200.
- 3) Acceptable Manufacturers:
  - a) AGC.
  - b) Guardian.
  - c) PPG Industries.
  - d) Equal as approved by Architect before bidding. See Section 01 6200.
- b. Obscure:
  - 1) Design Criteria:
    - a) Meet requirements of ASTM C1036, Type II, Class I, Form 3, Quality Q8, Pattern - #62.
    - b) Location: Surface 3.
    - c) Site verify to match existing adjacent pattern.
- c. GWG:
  - 1) Design Criteria:
    - a) Tempered.
    - b) Site verify Georgian Wire Glass to match existing adjacent pattern.
    - c) Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.
- C. Fabrication:
  - 1. Except where glass exceeds **66 inches (1 675 mm)** in width, cut clear glass so any wave will run horizontally when glazed.
  - 2. Sealed, Insulating Glazing Units:
    - a. Double pane, sealed insulating glass units. Install at exterior aluminum-framed window infill.
    - b. Insulated obscure units shall consist of one pane of specified obscure glass and one pane of standard glass.
    - c. Type Seal:
      - 1) Metal-to-glass bond and separated by **1/2 inch (12.7 mm)** dehydrated air space.
      - 2) Use non-hardening sealants.
    - d. Category Four Approved Fabricators. See Section 01 6200 for definitions of Categories.
      - 1) Members of Sealed Insulating Glass Manufacturer's Association.

## 2.2 ACCESSORIES

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Glazing Tape: Butyl-based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation, complying with ASTM C1281 and AAMA 800 for application.

## PART 3 - EXECUTION: Not Used

## END OF SECTION

## **DIVISION 09: FINISHES**

### **09 2000 PLASTER AND GYPSUM BOARD**

09 2900 GYPSUM BOARD

### **09 3000 TILING**

09 3013 CERAMIC TILING

### **09 5000 CEILINGS**

09 5113 ACOUSTICAL PANEL CEILINGS

09 5323 METAL ACOUSTICAL SUSPENSION ASSEMBLIES

### **09 6000 FLOORING**

09 6816 SHEET CARPET: BACK CUSHION, DIRECT GLUE

### **09 7000 WALL FINISHES**

09 7226 SISAL WALL COVERINGS

### **09 9000 PAINTS AND COATINGS**

09 9001 COMMON PAINTING AND COATING REQUIREMENTS

09 9123 INTERIOR PAINTED GYPSUM BOARD, PLASTER

09 9124 INTERIOR PAINTED METAL

09 9125 INTERIOR PAINTED WOOD

09 9324 INTERIOR CLEAR-FINISHED HARDWOOD

09 9413 INTERIOR TEXTURED FINISHING

END OF TABLE OF CONTENTS

BLANK PAGE

**SECTION 09 2900****GYPSUM BOARD****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install gypsum board as described in Contract Documents, except behind ceramic tile.
- B. Related Requirements:
  - 1. Section 09 3013: 'Ceramic Tile' for installation of backerboard joint reinforcing.
  - 2. Section 09 9413: 'Interior Textured Finishing'.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Accessories: Metal or plastic beads, trim, or moulding used to protect or conceal corners, edges, or abutments of the gypsum board construction.
  - 2. Drywall Primer: Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads, and accessories and over skim coatings.
  - 3. Skim Coat: Either a thin coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, over the entire surface.
  - 4. Texturing: Regular or irregular patterns typically produced by applying a mixture of joint compound and water, or proprietary texture materials including latex base texture paint, to a gypsum board surface previously coated with drywall primer.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C11-16, 'Standard Terminology Relating to Gypsum and Related Building Materials and Systems'.
    - b. ASTM C475/C475M-15, 'Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board'.
    - c. ASTM C840-17, 'Standard Specification for Application and Finishing of Gypsum Board'.
    - d. ASTM C1002-16, 'Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs'.
    - e. ASTM C1047-14a, 'Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base'.
    - f. ASTM C1178/C1178M-13, 'Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel'.
    - g. ASTM C1396/C1396M-14a, 'Standard Specification for Gypsum Board'.
    - h. ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
    - i. ASTM E119-16a, 'Standard Test Method for Fire Tests of Building Construction and Materials'.
  - 2. Gypsum Association:
    - a. GA-214-15, 'Recommended Levels of Gypsum Board Finish'.
    - b. GA-216-16: 'Application and Finishing of Gypsum Panel Products'.
    - c. GA-600-15, 'Fire Reference Design Manual'.

- d. GA-801-07, 'Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors'.
- 3. International Building Code (IBC) (2015 or latest approved version):
  - a. Chapter 25, 'Gypsum Board And Plaster'.
- 4. National Building Code of Canada / Underwriters Laboratories of Canada:
  - a. CAN/ULC-S102: 'Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies' (7th Edition).
- 5. Underwriters Laboratories, Inc.
  - a. UL 263: 'Test Method for Fire Tests of Building Construction and Materials' (14th Edition).
  - b. UL 723: 'Test for Surface Burning Characteristics of Building Materials; (10th Edition).

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
  - 1. Schedule MANDATORY pre-installation conference immediately before installation of gypsum wallboard.
  - 2. In addition to agenda items specified in Section 01 3100, review following:
    - a. Finish requirements necessary for installation of finish materials over gypsum wallboard, and location and installation of ceramic tile backerboard.

### 1.4 SUBMITTALS

- A. Informational Submittals:
  - 1. Test And Evaluation Reports:
    - a. Fire test results or assembly diagrams and numbers confirming products used will provide required fire ratings with installation configurations used.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. General:
  - 1. Following recommendations of GA-801 Guide for Handling and Storage of Gypsum Panel Products unless local, provincial or federal laws or agency rules differing from the recommendations shall take precedence.
- B. Delivery And Acceptance Requirements:
  - 1. Deliver materials in original packages, containers, or bundles bearing brand name, applicable standard designation, and Manufacturer's name.
- C. Storage And Handling Requirements:
  - 1. Store material under roof and keep dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack gypsum board flat to prevent sagging.

### 1.6 FIELD CONDITIONS

- A. Ambient Conditions:
  - 1. Comply with ASTM C840 or GA-216 requirements, whichever are more stringent:
    - a. Do not install interior products until installation areas are enclosed and conditioned.
      - 1) Temperature shall be 50 deg F (10 deg C) and 95 deg F (35 deg C) maximum day and night during entire joint operation and until execution of Certificate of Substantial Completion.
      - 2) Provide ventilation to eliminate excessive moisture.
      - 3) Avoid hot air drafts that will cause too rapid drying.

- b. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Manufacturers:

##### 1. Manufacturer Contact List:

- a. American Gypsum, Dallas, TX [www.americangypsum.com](http://www.americangypsum.com).
- b. CertainTeed Gypsum, Inc; Tampa, FL [www.certainteed.com](http://www.certainteed.com).
- c. Georgia Pacific, Atlanta, GA [www.gp.com](http://www.gp.com).
- d. National Gypsum, Charlotte, NC [www.nationalgypsum.com](http://www.nationalgypsum.com).
- e. Pabco Gypsum, Newark, CA [www.pabcogypsum.com](http://www.pabcogypsum.com).
- f. United States Gypsum Co, Chicago, IL [www.usg.com](http://www.usg.com).

#### B. Materials:

##### 1. Interior Gypsum Board:

###### a. General:

###### 1) Size:

- a) Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

###### 2) Class Two Quality Standard:

- a) Core: Fire-resistant rated gypsum core.
- b) Complies with Type X requirements of ASTM C1396/C1396M (Section 5).
- c) Surface paper: Face paper suitable for painting.
- d) Long edges: Tapered edge.
- e) Overall thickness: **5/8 inch (15.9 mm)**, and ½ inch (12.7 mm).

##### 2. Glass Mat Gypsum Tile Backer:

- a. Product meeting requirements of ASTM C1178/C1178M.
- b. **5/8 inch (15.9 mm)**.
- c. Square edges.
- d. Category Four Approved Manufacturer. See Section 01 6200 for definitions of Categories:
  - 1) DensShield Tile Backer by Georgia Pacific.
  - 2) GlasRoc Tilebacker by CertainTeed.

### 2.2 ACCESSORIES

#### A. Manufacturers:

##### 1. Manufacturer Contact List:

- a. Kinetics Noise Control, Dublin, OH [www.kineticsnoise.com](http://www.kineticsnoise.com).
- b. Magnum Products, Lenaxa, KS [www.levelcoat.com](http://www.levelcoat.com).
- c. National Gypsum, Charlotte, NC [www.nationalgypsum.com](http://www.nationalgypsum.com).
- d. Soundproofing Co, San Marcos, CA [www.soundproofing.org](http://www.soundproofing.org).
- e. United States Gypsum Co, Chicago, IL [www.usg.com](http://www.usg.com).
- f. Westpac Materials Inc, Orange, CA [www.westpacmaterials.com](http://www.westpacmaterials.com).
- g. Wm. Zinsser & Co, Somerset, NJ [www.zinsser.com](http://www.zinsser.com).

##### 2. Gypsum Board Mounting Accessories:

###### a. Corner And Edge Trim:

- 1) Metal, paper-faced metal, paper-faced plastic, or solid vinyl meeting requirements of ASTM C1047. Surfaces to receive bedding cement treated for maximum bonding.

##### 3. Joint Compound:

- a. Best grade or type recommended by Board Manufacturer and meeting requirements of ASTM C475/C475M.
  - 1) Use Taping Compound for first coat to embed tape and accessories.

- 2) Use Taping Compound or All-Purpose Compound for subsequent coats except final coat.
    - 3) Use Finishing Compound for final coat and for skim coat.
  4. Joint Reinforcing:
    - a. Paper reinforcing tape acceptable to Gypsum Board Manufacturer.
  5. Fasteners:
    - a. Bugle head screws meeting requirements of ASTM C1002:
      - 1) Gypsum Board:
        - a) Type W: For fastening gypsum board to wood members, of length to penetrate wood framing **5/8 inch (15.9 mm)** minimum.
      - 2) Glass Mat Gypsum Tile Backer:
        - a) Wood Framing: **11 ga (0.1233 in) (3.1318 mm)**, galvanized with **7/16 inch (11 mm)** head, hot dipped. Screws: Type W or Type S Hi-Lo, bugle head, rust resistant.
- B. Primer / Surfer On Surfaces To Receive Texturing:
  1. Type Two Acceptable Products:
    - a. Sheetrock First Coat by USG.
    - b. Prep Coat by Westpac Materials.
    - c. Level Coat by Magnum Products.
    - d. Equal as approved by Architect before bidding. See Section 01 6200.
- C. Primer On Surfaces To Receive Wallcovering:
  1. White, self-sizing, water based, all purpose wallcovering primer.
  2. Type Two Acceptable Products:
    - a. Shieldz Universal Pre-Wallcovering Primer by Wm. Zinsser and Company.
    - b. Equal as approved by Architect before application. See Section 01 6200.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification Of Conditions:
  1. Examine substrate and verify framing is suitable for installation of gypsum board.
  2. Examine gypsum board before installation. Reject panels that are wet, moisture damaged, and mold damaged.
  3. Notify Architect of unsuitable conditions in writing.
    - a. Do not install board over unsuitable conditions.
  4. Commencement of Work by installer is considered acceptance of substrate.

### 3.2 INSTALLATION

- A. Interface With Other Work:
  1. Coordinate with Division 06 for location of backblocking for edges and ends of gypsum board and for blocking required for installation of equipment and building specialties.
  2. Do not install gypsum board until required blocking is in place.
- B. General: Install and finish as recommended in ASTM C840 or GA-216 unless specified otherwise in this Section.
- C. Interior Gypsum Board:
  1. General:
    - a. Install so trim and reinforcing tape are fully backed by gypsum board. No hollow spaces between pieces of gypsum board over **1/8 inch (3 mm)** wide before taping are acceptable.



- b. Rout out backside of gypsum board to accommodate items that extend beyond face of framing, but do not penetrate face of gypsum board, such as metal door frame mounting brackets, etc.
  - c. On walls over **108 inches (2 700 mm)** high, apply board perpendicular to support
  - d. Butt edges in moderate contact. Do not force in place. Shim to level.
  - e. Leave facings true with joint, finishing flush. Vertical work shall be plumb and ceiling surfaces level.
  - f. Scribe work closely:
    - 1) Keep joints as far from openings as possible.
    - 2) If joints occur near an opening, apply board so vertical joints are centered over openings.
    - 3) No vertical joints shall occur within **8 inches (200 mm)** of external corners or openings.
  - g. Install board tight against support with joints even and true. Tighten loose screws.
2. Ceilings:
  - a. Apply ceilings first using minimum of two (2) men.
  - b. Use board of length to give minimum number of joints.
  - c. Apply board perpendicular to support.
  - d. Ceilings:
    - 1) Double Layer Application:
      - a) Apply base layer:
        - (1) End and edge joints of board applied on ceilings do not need to be back blocked in field area of ceiling.
        - (2) Edge joints of board vertically applied on walls shall occur over framing members.
        - (3) **2 inches by 4 inches (38 mm by 89 mm)** blocking is required at wall to ceiling transitions and at top of ceiling vault transitions.
      - b) Apply face layer with joints staggered in relationship to base and occurring over supports:
        - (1) Use combination of adhesive and screws if required to meet Manufacturer's specifications for fire-rated assembly.
        - (2) Apply screws attaching face layer through base layer into support for specified penetration.
3. Fastening:
  - a. Apply from center of board towards ends and edges.
  - b. Apply screws **3/8 inch (9.5 mm)** minimum from ends and edges, **one inch (25 mm)** maximum from edges, and **1/2 inch (13 mm)** maximum from ends.
  - c. Spacing:
    - 1) Ends: Screws not over **7 inches (175 mm)** on center at edges where blocking or framing occurs.
    - 2) Wood Framed Walls And Ceilings: Screws **7 inches (175 mm)** on center in panel field.
  - d. Set screw heads **1/32 inch (0.8 mm)** below plane of board, but do not break face paper. If face is accidentally broken, apply additional screw **2 inches (50 mm)** away.
  - e. Screws on adjacent ends or edges shall be opposite each other.
  - f. Drive screws with shank perpendicular to face of board
4. Trim:
  - a. Corner Beads:
    - 1) Attach corner beads to outside corners.
      - a) Attach metal corner bead with staples spaced **4 inches (100 mm)** on center maximum and flat taped over edges of corner bead. Also, apply screw through edge of corner bead where wood trim will overlay corner bead.
      - b) Set paper-faced trim in solid bed of taping compound.
5. Finishing:
  - a. General:
    - 1) Tape and finish joints and corners throughout building as specified below to correspond with final finish material to be applied to gypsum board. When sanding, do not raise nap of gypsum board face paper or paper-faced trim.
    - 2) First Coat:

- a) Apply tape over center of joint in complete, uniform bed of specified taping compound and wipe with a joint knife leaving a thin coating of joint compound. If metal corner bead is used, apply reinforcing tape over flange of metal corner bead and trim so half of tape width is on flange and half is on gypsum board.
- b) Completely fill gouges, dents, and fastener dimples.
- c) Allow to dry and sand lightly if necessary to eliminate high spots or excessive compound.
- 3) Second Coat:
  - a) Apply coat of specified joint compound over embedded tape extending **3-1/2 inches (88 mm)** on both sides of joint center. Use finishing compound only if applied coat is intended as final coat.
  - b) Re-coat gouges, dents, and fastener dimples.
  - c) Allow to dry and sand lightly to eliminate high spots or excessive compound.
- 4) Third Coat: Apply same as second coat except extend application **6 inches (150 mm)** on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
- 5) Fourth Coat: Apply same as second coat except extend application **9 inches (425 mm)** on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
- a. Finishing Levels: Finish panels to levels indicated below and according to ASTM C840, GA-214 and GA-216:
  - 1) **Gypsum Board Surfaces not painted or finished:**
    - a) GA-214 Level 1: 'All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable'.
  - 2) **Gypsum Board Surfaces to Receive: Wall Covering Type A - Section 09 7226: 'Sisal Wall Covering':**
    - a) GA-214 Level 3: 'All joints and interior angles shall have tape embedded in joint compound and one additional coat of joint compound applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified wall covering primer'.
  - 3) **Gypsum Board Surfaces to Receive: Smooth Gypsum Board Surfaces all other areas:**
    - a) GA-214-96 Level 5: 'All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. A thin skim coat of finishing compound shall be applied over the entire surface. Surface shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.
- D. Glass Mat Gypsum Tile Backer:
  - 1. Apply glass mat gypsum tile backer to framing. Attach using specified fasteners spaced **6 inches (150 mm)** on center on edges and into all framing members. Drive screws flush with surface of board.
  - 2. Shim board to be plumb and flat or level and flat, depending on location.
  - 3. Apply reinforcing at joints.
  - 4. See detail D/A-7 in Drawings to transition from gypsum board to glass mat tile backer at tile base.

### 3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
  - 1. Remove and replace panels that are wet, moisture damaged, and mold damaged.
    - a. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
    - b. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

### **3.4 CLEANING**

- A. Remove from site debris resulting from work of this Section including taping compound spills.

**END OF SECTION**

**BLANK PAGE**

**SECTION 09 3013****CERAMIC TILING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install ceramic tile and tile setting materials and accessories as described in Contract Documents.
  - 2. See Sheet A-7.
- B. Related Requirements:
  - 1. Section 09 2900: 'Gypsum Board' for installation of backerboard behind ceramic tile, except for joint reinforcing.
  - 2. Section 22 1319: 'Facility Sanitary Sewer Specialties' for floor drains installed in ceramic tile floors.
- C. Products Installed But not Furnished Under This Section:
  - 1. Interior Ceramic Tile Joint Sealants:
- D. Related Requirements:
  - 1. Section 07 9213: 'Elastomeric Joint Sealants'.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. American National Standard Specification (ANSI) for the Installation of Ceramic Tile.
  - 2. International Standards Organization (ISO) 13007, 'Classification for Adhesives and Grout'.
  - 3. Tile Council of North America:
    - a. TCNA Handbook, 'Handbook for Ceramic, Glass, and Stone Tile Installation, 2015'.
- B. Definitions:
  - 1. Crack Isolation: Prevention of transfer of cracks from substrate through tile or stone when substrate is subjected to horizontal movement of cracks.
  - 2. Dynamic Coefficient of Friction (DCOF): Measures ratio of forces necessary to keep two surfaces sliding.
  - 3. Epoxy Grout: Mortar system employing epoxy resin and epoxy hardener portions.
  - 4. Grout: Rich or strong cementitious or chemically setting mix used for filling tile joints.
  - 5. ISO 13007 Standards Product Classifications:
    - a. Adhesives:

Types	Classes	Special Characteristics
C = Cementitious (Thin-Set Mortars)	1 = Normal 2 = Improved	F = Fast-Setting T = Slip-Resistant E = Extended Open Time S1 = Deformable S2 = Highly Deformable P1 = Plywood Adhesion P2 = Improved Plywood Adhesion
D = Dispersion (Mastics)	1 = Normal 2 = Improved	F = Fast-Setting T = Slip-Resistant

		E = Extended Open Time
R = Reaction Resin (Epoxy)	1 = Normal 2 = Improved	T = Slip-Resistant

- 1) Cementitious Adhesive (C): Mixture of hydraulic binding agents (e.g. portland cement), aggregates, and organic additives (e.g. latex polymers, moisture retention additive, etc...) to be mixed with water or latex admix before mixing.
- 2) Dispersion Adhesive (D): Ready-to-use mixture of organic binding agents in the form of an aqueous polymer dispersion, organic additives and mineral fillers - mastic type products.
- 3) Reaction Resin Adhesive (R): Single or multi-component mixture of synthetic resin, mineral fillers and organic additives in which curing occurs by chemical reaction – epoxy or urethane based products.
- 4) Class 1 (1): Adhesive has passed minimum pass level tests that are mandatory for that adhesive type.
- 5) Class 2 (2): Adhesive has passed same tests as Class 1 and/or other applicable tests, but at higher pass levels.
- 6) Fast-Setting (F): Adhesive with accelerated cure time that must achieve minimum strength requirements of fast setting adhesive. This designation does not apply to reaction resin adhesives (R).
- 7) Slip-Resistance (T): Downward movement of a tile applied to combed adhesive layer on vertical surface must be  $\leq 0.5\text{mm}$  for a C or D adhesive, and  $\leq 5\text{mm}$  for a type R adhesive.
- 8) Extended Open Time (E): Maximum time interval after application at which tiles can be embedded in applied adhesive and meet tensile adhesion strength requirement must be  $\geq 30$  minutes. This designation does not apply to reaction resin adhesives (R).
- 9) Deformability (S): Capacity of hardened adhesive to be deformed by stresses between tile and substrate without damage to installed surface – to pass S1 requirements an adhesive must be able to deform  $\geq 2.5\text{mm}$  but  $< 5\text{mm}$ ; to pass S2 requirements an adhesive must be able to deform  $\geq 5\text{mm}$ . This designation does not apply to reaction resin adhesives (R).

b. Grouts:

Types	Classes	Special Characteristics
CG = Cementitious Grout	1 = Normal 2 = Improved	F = Fast-Setting A = High Abrasion Resistance W = Reduced Water Absorption
RG = Reaction Resin Grouts	1 = Normal 2 = Improved	Higher performance characteristics than improved cementitious grouts

- 1) Cementitious Grout (CG): Mixture of hydraulic binding agents (e.g. portland cement), aggregates, inorganic and organic additives (e.g. latex polymers, moisture retention additive, etc...).
- 2) Reaction Resin Grout (RG): Single or multi-component mixture of synthetic resin, mineral fillers and organic additives in which curing occurs by chemical reaction – epoxy or urethane based products.
- 3) Class 1 (1): Grout has passed minimum pass level tests that are mandatory for cementitious grouts.
- 4) Class 2 (2): Cementitious grout has passed same tests as Class 1 and/or other applicable tests, but at higher pass levels.
- 5) Fast-Setting (F): Grout with accelerated cure time that must achieve minimum compressive strength requirements under normal conditions within twenty four (24) hours. This designation applies only to cementitious grouts (CG).
- 6) High Abrasion Resistance (A): Capability of grout to resist wear. This designation applies only to cementitious grouts (CG).

- 7) Reduced Water Absorption (W): Grout has lower water absorption rate than standard cementitious grout. This designation applies only to cementitious grouts (CG).
6. Latex/Polymer Modified Portland Cement Mortar: Latex/Polymer modified portland cement mortar is a mixture of portland cement, sand, and special latex/polymer additive that is used as a bond coat for setting tile.
7. Pavers: Unglazed porcelain or natural clay tile formed by dust-pressed method and similar to ceramic mosaics in composition and physical properties but relatively thicker with 6 inch - or more of facial area. (ASTM C242).
8. Sanded Cement Grout: Factory prepared mixture of cement, graded sand, and other ingredients to produce water-resistant, dense, uniformly colored material. Used for joints of 1/8 inch (3 mm) width or greater.
9. Unsanded Cement Grout: Factory prepared mixture of cement and additives that provide water retentivity. Used for joints of 1/8 inch (3 mm) or less.

C. Reference Standard:

1. American National Standards Institute:
  - a. ANSI A108/A118/A136.1, 'American National Standards Specifications for the Installation of Ceramic Tile', Version 2013.1 (compilation of standards):
    - 1) Installation Standards:
      - a) A108.01, 'General Requirements: Subsurfaces and Preparation by Other Trades'.
      - b) A108.02, 'General Requirements: Materials, Environmental, and Workmanship'.
      - c) A108.05, 'Installation of Ceramic Tile with Dry-Set Portland Cement Mortar of Latex-Portland Cement Mortar'.
      - d) A108.6, 'Installation of Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy'.
      - e) A108.10, 'Installation of Grout in Tilework'.
      - f) A108.17, 'Installation of Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone'.
    - 2) Material Specifications:
      - a) A118.1, 'Dry-Set Portland Cement Mortar'.
      - b) A118.3, 'Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive'.
      - c) A118.4, 'Latex Portland Cement Mortar'.
      - d) A118.6, 'Cement Grouts for Tile Installation'.
      - e) A118.7, 'High-Performance Polymer Modified Latex/Portland Cement Grouts for Tile Installation'.
      - f) A118.10, 'Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installations'.
      - g) A118.12, 'Crack Isolation Membranes for Thin-set Ceramic Tile and Dimension Stone Installations'.
  - b. ANSI A137.1, 'National Standard Specifications for Ceramic Tile'.
2. ASTM International:
  - a. ASTM C144-11, 'Standard Specification for Aggregate for Masonry Mortar'.
  - b. ASTM C150/C150M-17, 'Standard Specification for Portland Cement'.
  - c. ASTM C206-14, 'Standard Specification for Finishing Hydrated Lime'.
  - d. ASTM C207-06(2011), 'Standard Specification for Hydrated Lime for Masonry Purposes'.
  - e. ASTM C242-15, 'Standard Terminology of Ceramic Whitewares and Related Products'.
  - f. ASTM C373-16, 'Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products'.
  - g. ASTM C482--02(2014), 'Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste'.
  - h. ASTM C501-84(2015), 'Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser'.
  - i. ASTM C648-04(2014), 'Standard Test Method for Breaking Strength of Ceramic Tile'.
3. International Organization for Standardization:
  - a. ISO 13007-1-2013, 'Ceramic tiles - Grouts and adhesives - Part 1: Terms, definitions and specifications for adhesives'.
  - b. ISO 13007-2-2013, 'Ceramic tiles - Grouts and adhesives - Part 2: Test methods for adhesives'.

- c. ISO 13007-3-2013, ' Ceramic tiles - Grouts and adhesives - Part 3: Terms, definitions and specifications for grouts'.
- d. ISO 13007-4-2013, ' Ceramic tiles - Grouts and adhesives - Part 4: Test methods for grouts'.
- 4. Tile Council of North America:
  - a. TCNA B415-15, 'Wood or Metal Studs, Mortar Bed Walls, Mortar Bed Floor, Ceramic Tile'.
  - b. TCNA F111-15, 'On-Ground or Above-Ground Concrete, Unbonded Mortar Bed, Ceramic Tile'.
  - c. TCNA F115-15, 'On-Ground Concrete, Ceramic Tile, Epoxy or Furan Grout'.
  - d. TCNA W245-15, 'Wood or Metal Studs, Coated Glass Mat Water-Resistant Gypsum Backer Board, Ceramic Tile'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
  - 1. In addition to agenda items specified in Section 01 3100, review following:
    - a. Review installation scheduling, coordination with related work, and placement of tile.
    - b. Review Manufacturer's installation requirements, submittals, and Installers requirements to assure issuance of Manufacturer's system warranty.
    - c. Review surface preparation.
    - d. Review crack isolation membrane requirements.
    - e. Review tile base installation requirements.
    - f. Review floor tile grout thickness requirements.

### 1.4 SUBMITTALS

- A. Action Submittals:
  - 1. Samples:
    - a. **24 inch (600 mm)** square sample on specified tile backer showing all types of tile, grout, and colors specified in this Section. 1/2 of sample board shall show floor tile, and 1/2 shall show wall tile.
    - b. One sample of each type of base tile and trim piece to be used on Project.
- B. Informational Submittals:
  - 1. Certificates:
    - a. Master grade certificate.
      - 1) Conform to ANSI A137.1.
  - 2. Manufacturer's Instructions:
    - a. Provide instructions for installation of tile-setting materials.
  - 3. Source Quality Control Submittals:
    - a. Provide Manufacturer documentation indicating proposed materials will satisfy requirements for Manufacturer's Warranty.
  - 4. Qualification Statement. See Section 01 4301 for qualifications:
    - a. Installer:
      - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operations and Maintenance Data:
      - 1) Cleaning and maintenance instructions.
    - b. Warranty Documentation:
      - 1) Include copy of final, executed warranty.
    - c. Record Documentation:
      - 1) Manufacturers Documentation:
        - a) Source Quality Control Submittal documentation showing materials will satisfy requirements for Manufacturer's Warranty.
        - b) Manufacturer's cut sheets of materials used in installed system.
        - c) Tile color and pattern selections.



## 1.5 QUALITY ASSURANCE

- A. Source Of Materials:
  - 1. Provide materials obtained from one (1) source for each type and color of tile, grout, and setting materials for Manufacturer's system warranty.
- B. Qualifications:
  - 1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
    - a. Minimum three (3) years' experience installing specified tile installations.
    - b. Minimum five (5) satisfactorily completed installations of comparable quality, scope, similar size, and complexity in past two (2) years before bidding.
    - c. Upon request, submit documentation.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  - 1. Deliver and store packaged materials in their original unopened containers with labels intact until time of use.
- B. Storage and Handling Requirements:
  - 1. Store and handle materials in a manner to prevent damage or contamination by water, freezing, or foreign matter.
  - 2. Keep grade seals intact and cartons dry until tile are used.

## 1.7 FIELD CONDITIONS

- A. Ambient Conditions:
  - 1. Do not apply tile setting materials to surfaces that contain frost.
  - 2. Keep ambient temperatures of area to receive tile work and surface temperatures of substrates at **50 deg F (10 deg C)** minimum during preparation of mortar bed, laying of tile, and for seventy-two (72) hours after completion of tile work. Use electric heat to prevent discoloration of grout.
  - 3. Temperature of substrate shall be **60 deg F (15.6 deg C)** and rising for application of epoxy and furan unless otherwise specifically authorized by Manufacturer.
  - 4. Maintain epoxy at stable temperature between **60 deg F (15.6 deg C)** and **90 deg F (32 deg C)** during curing period.

## 1.8 WARRANTY

- A. Manufacturer Warranty:
  - 1. Mortar Manufacturer's twenty-five (25) year minimum system warranty on tile-setting materials for surface preparation, setting materials and grouting materials; includes replacement of defective materials and deterioration, including replacement of tile and labor and materials when products purchased are used within their shelf life and installed in accordance to Manufacturers written instructions and industry standard guidelines.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

- A. Manufacturers:
  - 1. Manufacturer's Contact List:
    - a. Ardex Engineered Cements, Aliquippa, PA [www.ArdexAmericas.com](http://www.ArdexAmericas.com).
      - 1) Contact Information: Don Richards (206) 979-0401  
[www.Don.richards@ArdexAmericas.com](mailto:www.Don.richards@ArdexAmericas.com).

- b. Custom Building Products, Seal Beach, CA [www.custombuildingproducts.com](http://www.custombuildingproducts.com).
    - 1) Contact Information: John Gallup (206) 718-6024 [johng@cbpmail.net](mailto:johng@cbpmail.net).
  - c. Dal-Tile Corp., Div. of Mohawk Industries, Dallas, TX [www.daltile.com](http://www.daltile.com).
  - d. Interceramic Inc., Garland, TX [www.interceramic.com](http://www.interceramic.com).
  - e. Laticrete International Inc., Bethany, CT [www.laticrete.com](http://www.laticrete.com).
  - f. Mapei Americas Headquarters, Deerfield Beach, FL [www.mapei.com](http://www.mapei.com).
    - 1) Contact Information: Bart A. Wilde (801) 467-2060 [bwilde@mapei.com](mailto:bwilde@mapei.com).
  - g. Merkrete, by Parex USA, Inc., Anaheim, CA [www.merkrete.com](http://www.merkrete.com).
    - 1) Contact Information: Andy Townes (505) 873-1181 [andy.townes@parexusa.com](mailto:andy.townes@parexusa.com).
  - h. Schuler Systems L.P., Plattsburgh, NY [www.schluter.com](http://www.schluter.com).
- B. Category Two National Contract Suppliers. See Section 01 6200 for definitions of Categories:
  - 1. Contact following suppliers to procure components of tile assembly:
    - a. Daltile And Stone, Salt Lake City, UT:
      - 1) LDS Project Coordinators:
        - a) Russ Green and Larry McCleary, (801) 487-9901, cell (801) 301 1461, fax (801) 487-0345 [larry.mccleary@daltile.com](mailto:larry.mccleary@daltile.com) - [www.daltileproducts.com](http://www.daltileproducts.com) or [www.daltilegreenworks.com](http://www.daltilegreenworks.com).
- C. Design Criteria:
  - 1. General:
    - a. Paver Tile: Standard grade porcelain tile, solid color throughout, graded in accordance with ANSI A137.1:
      - 1) Cove Base with external and internal corner pieces shall be standard grade.
    - b. Ceramic Tile:
      - 1) Tile shall be standard quality, white or off-white body, square or cushion edge, graded in accordance with ANSI A137.1.
      - 2) Square edge, white body, lug type wall tile. Field wall tile shall have two lugs on each edge to assure uniform joint, approximately 0.040 inch (one mm).
      - 3) External and internal corner pieces shall be standard grade.
  - 2. Capabilities:
    - a. Paver Tile:
      - 1) Water Absorption when tested in accordance with ASTM C373: 0.1 to 0.5 percent.
      - 2) Abrasive Wear Resistance when tested in accordance with ASTM C501: 275 minimum.
      - 3) Breaking Strength when tested in accordance with ASTM C648: 300 lbs minimum.
      - 4) Bond Strength when tested in accordance with ASTM C482: 200 psi minimum.
      - 5) Coefficient of Friction: 0.42 minimum as measured by DCOF (Dynamic Coefficient of Friction) AcuTest method and requirements as per ANSI A137.1.
      - 6) Unpolished.
- D. Description:
  - 1. Paver Tile:
    - a. Tile Sizes:
      - 1) Finished floor with slope shown on Contract Documents: 8 inches (200 mm) square:
        - a) Cove Base: Use wall tile coved base.
        - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
          - (1) Daltile.
    - b. Category Four Approved Colors. See Section 01 6200 for definitions of Categories:
      - 1) CD05 Bianco Alpi by Daltile.
  - 2. Ceramic Tile:
    - a. Wall tile:
      - 1) Walls: 4 inch by 4 inch (100 mm by 100 mm).
      - 2) Ceramic Tile Base:
        - a) 4 inch (100 mm) high, coved base.
        - b) Where tile terminates to painted wall finish, install coved base with bullnose tile above for (2) tile base typical – See Drawings.
        - c) Provide coved base trim with leg for interior and exterior corners to suit layout.
      - 3) Category Four Approved colors. See Section 01 6200 for definitions of Categories:
        - a) Room Walls:

- (1) Semi-gloss 0135 Almond by Daltile.
- b) Accent Color:
  - (1) Matte X735 Almond by Daltile.
- c) See 3/A-8 for typical tile layout.

E. Materials:

1. Paver Tile:
  - a. Category Four Approved Products. See Section 01 6200 for definition of Categories:
    - 1) Porcelato Graniti by Daltile.
2. Wall Tile:
  - a. Category Four Approved Products. See Section 01 6200 for definition of Categories:
    - 1) Semi-Gloss or matte by Dal-Tile.
3. Mortar Bed:
  - a. Portland Cement: Meet requirements of ASTM C150/C150M, Type 1, designation shall appear on bag.
  - b. Hydrated Lime:
    - 1) Meet Requirements of one of following:
      - a) ASTM C206.
      - b) ASTM C207, Type S (designation shall appear on bag).
  - c. Sand: Clean, washed, well-graded, meeting requirements of ASTM C144 with gradation of 100 percent passing No. 8 sieve with not over five (5) percent passing No. 100 sieve.
  - d. Latex Additive; in lieu of all water:
    - 1) Design Criteria:
      - a) Meet material specification requirements of ANSI A118.4 or ANSI 118.11.
      - b) Meet ANSI installation specification requirements of ANSI A108.5.
      - c) Expansion joints complies with TCA method EJ171.
    - 2) Type Two Acceptable Products:
      - a) ARDEX: Ardex E 90 Mortar Admix.
      - b) CUSTOM: Thin-Set Mortar Admix.
      - c) LATICRETE: 4237 Latex Additive with 211 Powder.
      - d) MAPEI: Planicrete AC.
      - e) MERKRETE: 150 Latex Admixture.
4. Metal Trim:
  - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Tile / Carpet Junction: Schluter-RENO-AETK.
5. Backer Board Joint Reinforcing: 2 inch (50 mm) wide glass fiber mesh tape.
6. Tile Setting Products:
  - a. Use only products of same Manufacturer to validate warranty, unless otherwise acceptable to Ceramic Tile Supplier.
  - b. Use only products that meet Mortar Manufacturer's twenty five (25) year system warranty requirements.
  - c. Latex-Portland Cement Mortar For Floors:
    - 1) Design Criteria:
      - a) Meet ANSI material specification requirements of ANSI 118.4, ANSI 118.11, or ANSI A118.15.
      - b) Meet ANSI installation specification requirements of ANSI A108.4 or ISO material specification ISO13007 installation material specification and . C2ES1P2 performance requirements for adhesive.
    - 2) Category Four Approved Products. See Section 01 62 00 for definitions of Categories:
      - a) ARDEX: Ardex X77.
      - b) CUSTOM: Megalite Crack Prevention Mortar or FlexBond Premium Crack Prevention Thin-set Mortar (no additives needed).
      - c) LATICRETE: 254 Platinum Thinset.
      - d) MAPEI: Ultraflex 3.
      - e) MERKRETE: 735 Premium Flex.
  - d. Latex/Polymer Modified Portland Cement Mortar For Walls:
    - 1) Design Criteria:
      - a) Meet ANSI material specification requirements of ANSI 118.4, ANSI 118.11, or ANSI A118.15.

- b) Meet ANSI installation specification requirements of ANSI A108.4 or ISO material specification ISO13007 installation material specification and C2ES1P2 performance requirements for adhesive.
  - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a) ARDEX: Ardex X77.
    - b) CUSTOM: Megalite Thin-Set Mortar or FlexBond Fortified Thin-Set Mortar.
    - c) LATICRETE: 254 Platinum Thinset.
    - d) MAPEI: Ultraflex 3.
    - e) MERKRETE: 735 Premium Flex.
- e. Floor Grout (Epoxy):
  - 1) Design Criteria:
    - a) Meet ANSI material specification requirements of ANSI 118.3.
    - b) Meet ANSI installation specification requirements of ANSI A108.6 and ISO material specification ISO13007 RG.
  - 2) Approved Color:
    - a) ARDEX: 25 Stormy Mist.
    - b) CUSTOM: No. 145 Light Smoke.
    - c) LATICRETE: No. 24 Natural Grey.
    - d) MAPEI: No. 11 Sahara Beige.
    - e) MERKRETE: Pro Epoxy D-153 Buckskin.
  - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a) ARDEX: Ardex WA.
    - b) CUSTOM: CEG-Lite 100% Solids Commercial Epoxy Grout.
    - c) LATICRETE: SpectraLOCK PRO.
    - d) MAPEI: Kerapoxy (sanded).
    - e) MERKRETE: Pro Epoxy.
- f. Wall Grout (Modified Polymer):
  - 1) Design Criteria:
    - a) Meet ANSI material specification requirements of ANSI A118.6 or ANSI A118.7.
    - b) Meet ANSI installation specification requirements of ANSI 108.10 or ISO material specification ISO13007 C2ES1P2.
  - 2) Color:
    - a) ARDEX: to be selected from standard colours.
    - b) CUSTOM:
    - c) LATICRETE: 18 Sauterne
    - d) MAPEI:
    - e) MERKRETE:
  - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a) ARDEX: Ardex FH.
    - b) CUSTOM: PolyBlend Non-Sanded Grout or Prism Color Consistent Grout.
    - c) LATICRETE: 1600 Series Unsanded Dry Set Wall Grout with 1776 Grout Admix Plus additive.
    - d) MAPEI: Keracolor-U Unsanded Polymer-Modified Grout.
    - e) MERKRETE: Non-Sanded ColorGrout, latex modified.
- g. Crack Isolation Membrane:
  - 1) Design Criteria:
    - a) Meet ANSI installation specification requirements of ANSI 118.12.
    - b) ANSI installation specification requirements not required.
  - 2) Category Four Approved Products. See Section 01 6200 for definitions for Categories:
    - a) Flexible, thin, load-bearing, fabric-reinforced:
      - (1) ARDEX: Ardex 8+9 with SK Mesh Tape.
      - (2) CUSTOM: Crack Buster Pro Crack Prevention Mat Underlayment, with Peel & Stick Primer.
      - (3) LATICRETE: Blue 92 Anti-Fracture Membrane.
      - (4) MAPEI: Mapeguard 2, and Primer SM.
      - (5) MERKRETE: Hydro-Guard SP-1.
    - b) Liquid applied, latex based:
      - (1) CUSTOM: RedGard Waterproofing and Crack Prevention Membrane or FractureFree Crack Prevention Membrane.
      - (2) LATICRETE: Hydro Ban.

- (3) MAPEI: Mapelastic AquaDefense.
- (4) MERKRETE: Fracture Guard 5000.

F. Mixes:

1. Mortar Beds:

	Portland Cement	Dry Sand	Damp Sand	Hydrated Lime*
Floor Mix	One Part	5 Parts	4 Part	1/10 Part
Wall Mix	One Part	- -	5-1/2 to 7 Parts	1/2 Part

\* Optional

## PART 3 - EXECUTION:

### 3.1 INSTALLERS

A. Acceptable Installers:

- 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

### 3.2 EXAMINATION

A. Verification Of Conditions:

- 1. Examine substrates where tile will be installed for compliance with requirements for installation tolerances and other conditions effecting performance of installed tile.
- 2. Verify tile substrate is well cured, dry, clean, and free from oil or waxy films, and curing compounds.
- 3. Notify Architect in writing if surfaces are not acceptable to install tile:
  - a. Do not lay tile over unsuitable surface.
  - b. Commencing installation constitutes acceptance of surfaces and approval of existing conditions.

### 3.3 PREPARATION

A. Surface Preparation:

- 1. Allow concrete to cure for twenty-eight (28) days minimum before application of mortar bed.
- 2. Repair and clean substrate in accordance with installation standards and manufacturer's instructions.

### 3.4 INSTALLATION

A. Interface With Other Work:

- 1. Grounds, anchors, plugs, hangers, door frames, electrical, mechanical, and other work in or behind tile shall be installed before tile work is started.

B. Special Techniques:

- 1. Install in accordance with following latest TCNA installation methods:
  - a. Flush Concrete Slabs with crack isolation membrane: TCNA F115.
  - b. Mortar Bed on Concrete Slab: TCNA F111 with reinforcing.
  - c. Framed Walls: TCNA W245 with waterproof membrane.
  - d. Tile Cove Base: TCNA Flush style.

C. Tolerances:

- 1. Plane of Vertical Surfaces:
  - a. **1/8 inch in 8 feet (3 mm in 2.450 meters)** from required plane shall be plumb and true with square corners.

## 2. Variation In Slab Grade:

- a. Plus or minus **1/8 inch (3 mm)** in any **10 feet (3.050 m)** of floor slab and distance between high point and low point of slab of **1/2 inch (12.7 mm)**.
- b. Slab Testing Procedure:
  - 1) Place ends of straightedge on **3/8 inch (10 mm)** high shims.
  - 2) Floor is satisfactory if **1/4 inch (6 mm)** diameter steel rod rolled under straightedge will not touch anywhere along **10 foot (3.050 m)** length and **1/2 inch (12.7 mm)** diameter steel rod will not fit under straightedge anywhere along **10 foot (3.050 m)** length.

## D. General:

1. Install tile in pattern indicated:
  - a. Align joints when adjoining tiles on floor, base, walls, and trim are same size.
  - b. Adjust to minimize tile cutting and to avoid tile less than half size.
  - c. Center and balance areas of tile if possible.
2. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruption:
3. Maintain heights of tilework in full courses to nearest obtainable dimension where heights are given in **feet and inches (meters and millimeters)** and are not required to fill vertical spaces exactly.
4. Install cut tile with cuts on outer edges of field:
  - a. Provide straight cuts that align with adjacent materials.
  - b. When possible, smooth cut edges of tile or use appropriate cutter or wet saw to produce smooth cuts.
  - c. Do not install tile with jagged or flaked edges.
5. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment:
  - a. Fit tile closely where edges are to be covered by trim, escutcheons, or similar devices.
6. Provide straight tile joints of uniform width, subject to variance in tolerance allowed in tile size:
  - a. Make joints smooth and even, without voids, cracks, or excess mortar or grout.
7. Use a beating block and hammer or rubber mallet so faces and edges of individual tiles are flush and level with faces and edges of adjacent tiles, and to reduce lippage.
8. Accessories in tilework shall be evenly spaced, properly centered with tile joints, and level, plumb, and true to correct projection.
9. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

## E. Application On Concrete Floor:

1. On Mortar Bed:
  - a. Apply mortar bed to depth equal to depression in slab minus **1/2 inch (12.7 mm)**.
  - b. Properly cure before installing tile.
2. Clean substrate surface thoroughly.
  - a. Dampen if very dry, but do not saturate.
3. Install tile with 100 percent contact with mortar bed.
  - a. Obtaining 100 percent contact may require troweling mortar layer on back of each tile before placing on mortar bed.
4. Install base by flush method (square or thin-lip method is not acceptable)

## F. Application Of Mortar:

1. Do not spread more mortar than can be covered within ten (10) to fifteen (15) minutes:
  - a. If 'skinning' occurs, remove mortar and spread fresh material.
  - b. Spread mortar with notches running in one (1) direction, perpendicular to pressing, pushing and pulling of tile during placement.
2. Install tile before mortar has started initial cure:
  - a. For thin set mortar application, use notch trowel that will achieve the recommended coverage of mortar after tiles have been installed.
3. Place tile in fresh mortar, press, push and pull tile slightly to achieve as near 100 percent coverage and contact of tile with setting material and substrate as possible:
  - a. Average contact area shall be not less than eighty (80) percent. The eighty (80) percent shall be sufficiently distributed to give full support of the tile.
  - b. Support corners and edges with mortar leaving no hollow corners or edges.

4. Install so there is **1/8 inch (3 mm)** of mortar between tile and substrate after proper bedding:
  - a. Periodically remove sheets or individual tiles to assure proper bond coverage consistent with industry specifications.
  - b. If coverage is found to be insufficient, use a larger size notch trowel.
- G. Application Of Grout:
  1. Firmly set tile before applying grout:
    - a. This requires forty-eight (48) hours minimum.
  2. Before grouting:
    - a. Remove all paper and glue from face of mounted tile.
    - b. Remove spacers or ropes before applying grouting:
  3. Mixing Grout:
    - a. Use clean buckets and mixing tools:
      - 1) Use sufficient pressure and flow grout in progressively to avoid air pockets and voids.
    - b. Machine mixing of grout is preferred to assure uniform blend. To prevent trapping air bubbles into prepared grout, use slow speed mixer.
    - c. Slake for fifteen (15) minutes.
    - d. Water or latex additives used for mixing with dry grout shall be measured accurately.
  4. Before grouting entire area, do a test area to assure there will be no permanent staining or discoloration of tile and to verify that excess grout can be easily removed from tile surface:
    - a. If necessary, pre-coat exposed surfaces of tile with a grout release recommended by Grout Manufacturer to facilitate removal of excess grout.
  5. Installing Grout:
    - a. Use caution, when grouting glazed ceramic tiles to prevent scratching or damaging surface of tile.
    - b. Dampen dry joints prior to grouting with sand-portland cement grout, standard sanded cement grout, standard unsanded cement grout, polymer modified sanded tile grout, and polymer modified unsanded tile grout. Do not leave puddles of water in joints before grouting.
    - c. Keep an adequate joint depth open for grouting. Force maximum amount of grout into joints.
    - d. Apply grout to produce full, smooth grout joints of uniform width, and free of voids and gaps:
      - 1) Fill joints of cushion edge tile to depth of cushion.
      - 2) Fill joints of square edge tile flush with surface.
      - 3) Fill joint between coved wall tile and paver tile with floor grout.
    - e. Install floor tile with grout thickness of **3/16 inch (4.76 mm)** maximum.
    - f. Remove excess grout from surface of tile before it loses its plasticity or begins to set.
    - g. Finished grout shall be uniform in color, smooth, and without voids, pin holes, or low spots.
- H. Curing:
  1. Keep installation at **65 to 85 deg F (18 to 30 deg C)** during first eight (8) hours of cure. Shade area completely from sun during this period.
- I. Application of Joint Sealants:
  1. Apply joint sealants after grout has cured:
    - a. This requires forty-eight (48) hours minimum.
  2. Before applying sealant:
    - a. Remove spacers or ropes before applying joint sealants.
    - b. Apply backer rod and joint sealants at expansion joints.

### 3.5 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
  1. Correct any work found cracked, chipped, broken, unbounded and otherwise defective or not complying with contract document requirements at no additional cost to the Owner.

### 3.6 CLEANING

- A. If one has been used, remove grout release and clean tile surfaces so they are free of grout residue and foreign matter:
  - 1. If a grout haze or residue remains, use a suitable grout haze remover or cleaner.
  - 2. Flush surface with clean water before and after cleaning.

### 3.7 PROTECTION

- A. Close to traffic areas where tile is being set and other tile work being done:
  - 1. Keep closed until tile is firmly set.
  - 2. Before, during, and after grouting, keep area clean, dry, and free from foreign materials and airflow that will interfere with setting and curing of grout.
- B. Newly tiled floors shall not be walked on nor worked on without using kneeling boards or equivalent protection of tiled surface.
- C. After cleaning, provide protective covering and maintain conditions protecting tile work from damage and deterioration:
  - 1. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, cover protective covering with 1/4 inch (6 mm) hardboard, plywood, or similar material.

**END OF SECTION**



**SECTION 09 5113****ACOUSTICAL PANEL CEILINGS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install acoustical ceiling panels for suspended acoustical ceilings as described in Contract Documents.
  - 2. Salvage existing for re-use in Corridor 166, and remainder to owner as maintenance supply.
- B. Related Requirements:
  - 1. Section 09 5323: 'Metal Acoustical Suspension Assemblies'.
  - 2. Section 26 5100: 'Interior Lighting' for light fixtures.
  - 3. Division 23: Related sections for HVAC installed in ceiling.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. The Ceilings & Interior Systems Construction Association (CISCA), *Ceiling Systems Handbook*. 405 Illinois Avenue, 2B, St Charles IL. [www.cisca.org](http://www.cisca.org).
    - a. Recommendations for direct hung acoustical tile and lay-in panel ceilings.
- B. Definitions:
  - 1. Acoustical Panel: Form of a prefabricated sound absorbing ceiling element used with exposed suspension systems.
  - 2. Absorption: Materials that have capacity to absorb sound. Absorption is the opposite of reflection.
  - 3. Ceiling Attenuation Class (CAC): Rates ceiling's efficiency as barrier to airborne sound transmission between adjacent closed offices. Shown as minimum value, previously expressed as CSTC (Ceiling Sound Transmission Class). Single-figure rating derived from normalized ceiling attenuation values in accordance with classification ASTM E413, except that resultant rating shall be designated ceiling attenuation class. (Defined in ASTM E1414.) Acoustical unit with high CAC may have low NRC.
  - 4. Center Line: Line indicating midpoint of surface in either direction. Used as guide in starting ceiling.
  - 5. Class A: Fire classification for product with flame spread rating of no more than 25 and smoke developed rating not exceeding 50, when tested in accordance with ULC 102.2.
  - 6. Flame Spread: The propagation of flame over a surface.
  - 7. Flame Spread Index: The numerical value assigned to a material tested in accordance with ULC 102.2.
  - 8. Interior Finish: Interior finish includes interior wall and ceiling finish and interior floor finish.
  - 9. Mineral Base: Ceilings composed principally of mineral materials such as fibers manufactured from rock or slab, with or without binders.
  - 10. Noise Reduction Coefficient (NRC): Average sound absorption coefficient measured at four frequencies: 250, 500, 1,000 and 2,000 Hertz expressed to the nearest integral multiple of 0.05. Rates ability of ceiling or wall panel or other construction to absorb sound. NRC is fraction of sound energy, averaged over all angles of direction and from low to high sound frequencies that is absorbed and not reflected.
  - 11. Reflection Factor: Percentage of light a surface reflects.
  - 12. Reveal Edge: Acoustical lay-in panels with step-down edge are intended for use in direct hung exposed suspension systems.

13. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ULC 102.2.
14. Sound Absorption: Property possessed by materials and objects, including air, of converting sound energy into heat energy. Sound wave reflected by surface always loses part of its energy. Fraction of energy that is not reflected is called sound absorption coefficient of reflecting surface. For instance, if material reflects 80 percent of sound energy, then sound absorption coefficient would be 20 percent (0.20).
15. Surface Burning Characteristic: Rating of interior and surface finish material providing indexes for flame spread and smoke developed, based on testing conducted according to ULC 102.2.
16. Textured Pattern: Granular or raised (fine, coarse, or a blend), felted or matted surface as an integral part of the basic product or superimposed on the product surface.

C. Reference Standards:

1. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE):
  - a. ASHRAE Standard 62.1-2016, 'Ventilation for Acceptable Indoor Air Quality'.
2. ASTM International:
  - a. ASTM C423-17, 'Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method'.
  - b. ASTM D3273-16, 'Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber'.
  - c. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
  - d. ASTM E119-18c, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.
  - e. ASTM E1111/E1111M-14, 'Standard Test Method for Measuring the Interzone Attenuation of Open Office Components'.
  - f. ASTM E1264-14, 'Standard Classification for Acoustical Ceiling Products'.
  - g. ASTM E1414/E1414M-16, 'Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum'.
  - h. ASTM E1477 - 98a(2017), 'Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers'.
3. International Building Code (IBC) (2018 or most recent edition adopted by AHJ):
  - a. Chapter 8, 'Interior Finishes':
    - 1) Section 803, 'Wall And Ceiling Finishes':
      - a) 803.1.1, 'Interior Wall and Ceiling Finish Materials'.
      - b) 803.1.2, 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
4. National Fire Protection Association:
  - a. NFPA 101: 'Life Safety Code' (2018 or most recent edition adopted by AHJ).
  - b. NFPA 265: 'Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls', (2015 or most recent edition adopted by AHJ).
5. Underwriters Laboratories of Canada:
  - a. ULC 102-18: 'Method of Test for Surface Burning Characteristics of Building Materials and Assemblies' (ULC S102).
  - b. ULC 102.2-18: 'Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies' (ULC S102.2).
6. British Columbia Building Code 2018.

### 1.3 SUBMITTALS

A. Action Submittals:

1. Produce Data: Technical data for each type of acoustical ceiling unit required.
2. Sample: Minimum 6 inch (150 mm) x 6 inch (150 mm) samples of specified acoustical panel.

B. Informational Submittals:

1. Certificates:
  - a. Manufacturer's certifications that products comply with specified requirements including laboratory reports showing compliance with specified tests and standards. For acoustical

- performance, each carton of material must carry approved independent laboratory classification of NRC, CAC, and AC.
2. Test And Evaluation Reports:
    - a. If requested by Owner, provide copies of Quality Assurance requirements for 'Class A' flame spread rating and 'Room-Corner Test'.
  - C. Closeout Submittals:
    1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      - a. Warranty Documentation:
        - 1) Final, executed copy of Warranty.
      - b. Record Documentation:
        - 1) Manufacturers Documentation:
          - a) Manufacturer's literature.
          - b) Color and pattern selection.
  - D. Maintenance Material Submittals:
    1. Extra Stock Materials:
      - a. Provide Owner with one (1) carton of each type of tile for future use.
        - 1) Packaged with protective covering for storage and identified with appropriate labels.

#### 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  1. Fire-Test-Response Characteristics: As determined by testing identical ceiling tile applied with identical adhesives to substrates according to test method indicated below by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Surface-Burning Characteristics:
      - 1) Ceiling tile shall have Class A flame spread rating in accordance with ULC 102.2.
        - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
        - b) Flash point: None.
  2. Passage of 'Room-Corner Test' as recognized by AHJ, is required for system. Adhesive cited in test literature is required for installation of ceiling tile on Project.
    - a. Room Corner Tests:
      - 1) ULC 102.2, 'Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies'.
      - 2) IBC 803.2.1, 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
      - 3) ISO 9705, 'Room/Corner Test: Simulations, Correlations and Heat Flux Measurements'.
      - 4) NFPA 265: 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements:
  1. Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
  1. Store materials where protected from moisture, direct sunlight, surface contamination, and damage.
  2. Store in cool, dry location, out of direct sunlight and weather, and at temperatures between 32 deg F (0 deg C) and 86 deg F (30 deg C).
  3. Handle acoustical ceiling panels carefully to avoid chipping edges or damage. Use no soiled, scratched, or broken material in the Work.

#### 1.6 FIELD CONDITIONS

- A. Ambient Conditions:

1. Building shall be enclosed, mechanical system operating with proper filters in place, and temperature and humidity conditions stabilized within limits under which Project will operate before, during, and after installation until Substantial Completion.
2. Installation shall be at temperatures between 32 deg F (0 deg C) and 86 deg F (30 deg C) or as per Manufacturer recommendations.

## 1.7 WARRANTY

- A. Manufacturer's Warranty:
1. Acoustical ceiling panels:
    - a. Manufacturer's warranty to be free from defects in materials and factory workmanship.
    - b. Manufacturer's warranty against sagging and warping.
    - c. Manufacturer's warranty against mold/mildew, and bacterial growth.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers Contact List:
1. Armstrong World Industries, Lancaster, PA [www.ceiling.com](http://www.ceiling.com).
    - a. Contact Information:
      - 1) For pricing and ordering of tile, contact Sherry Brunt / Phyllis Miller at (800) 442-4212, FAX 800-233-5598, or [bpo\\_strategic\\_accounts@armstrong.com](mailto:bpo_strategic_accounts@armstrong.com).
      - 2) For Strategic Account information, contact Randy Lay at (303) 775-1409 [ralay@armstrong.com](mailto:ralay@armstrong.com).
  2. USG Interiors Inc, Chicago, IL [www.usg.com](http://www.usg.com).

### 2.2 MATERIALS

- A. Acoustic Ceiling Panels:
1. Description:
    - a. Color: White (surface factory-applied).
    - b. Composition: Wet-formed mineral fiber, water-felted mineral or cast mineral.
  2. Design Criteria:
    - a. Acoustics:
      - 1) Noise Reduction Coefficient (NRC): ASTM C423; 0.70 minimum.
      - 2) Ceiling Attenuation Class (CAC): ASTM E1414/E1414M; 35 minimum.
    - b. Antimicrobial Protection: Resistance against growth of mold/mildew.
    - c. Classification:
      - 1) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 1 (nodular) or Form 4 (cast or molded), Pattern E1 (lightly textured).
    - d. Fire Performance: As specified in Quality Assurance in Part 1 of this specification.
    - e. Light Reflectance (LR): ASTM E1477; 0.83 minimum.
    - f. Sag Resistance: Resistance to sagging in high humidity conditions.
    - g. VOC: Low.
  3. Wide Face Design:
    - a. Design Criteria:
      - 1) Grid Face: 15/16 inch (24 mm).
      - 2) Size: 24 inch x 48 inch x 3/4" (610 mm x 1220 mm x 19 mm).
      - 3) Edge profile: Angled Tegral:
    - b. Type One Acceptable Product:
      - 1) Quality Standard:
        - a) Cirrus, Item number 535 by Armstrong.
      - 2) Equal as approved by Architect before bidding. See Section 01 6200.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Verification Of Conditions:
  - 1. Inspect for defects in support that are not acceptable.
    - a. All wet work (concrete, painting, and etc.) must be completed and dry.
    - b. Temperature conditions within Manufacturer's written recommendation.
  - 2. Notify Architect of unsuitable conditions in writing.
    - a. Do not install acoustical ceiling panels until defects in support or environmental conditions are corrected.

**3.2 PREPARATION**

- A. Materials shall be dry and clean at time of application.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

**3.3 INSTALLATION**

- A. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.
- B. Special Techniques:
  - 1. If recommended by Manufacturer, use tile one at a time from at least four (4) open boxes to avoid creating any pattern due to slight variations from box to box. Use tile from same color run in individual rooms to assure color match.
  - 2. Leave tile in true plane with straight, even joints.

**3.4 FIELD QUALITY CONTROL**

- A. Non-Conforming Work:
  - 1. Remove and replace defective materials at no additional cost to Owner including, but not limited to following:
    - a. Remove and replace damaged or broken acoustical ceiling panels.
    - b. Remove and replace discolored acoustical ceiling panels to match adjacent.
    - c. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

**3.5 CLEANING**

- A. Clean exposed surfaces of acoustical ceiling panels, including trim, edge moldings, and suspension members.
  - 1. Comply with Manufacturer's written instructions for cleaning and touch up of minor finish damage.
- B. Waste Management:
  - 1. Remove from site all debris connected with work of this Section.

**END OF SECTION**

**BLANK PAGE**

**SECTION 09 5323****METAL ACOUSTICAL SUSPENSION ASSEMBLIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install metal acoustical suspension system as described in Contract Documents including:
    - a. Suspension system framing.
    - b. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.
    - c. See Drawing A-4
- B. Related Requirements:
  - 1. Section 09 5113: 'Acoustical Panel Ceiling'.
  - 2. Section 26 5100: 'Interior Lighting' for electrical fixtures installed in ceiling.
  - 3. Division 23: 'Mechanical' for related sections for HVAC installed in ceiling.
  - 4. Division 26: 'Electrical' for related electrical work.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. The Ceilings & Interior Systems Construction Association (CISCA), 405 Illinois Avenue, 2B, St Charles IL. [www.cisca.org](http://www.cisca.org).
    - a. *'Ceiling Systems Handbook'*: Recommendations for direct hung acoustical tile and lay-in panel ceiling installation.
    - b. CISCA 0-2, *'Guidelines for Seismic Restraint for Direct-hung Suspended Ceiling Assemblies (zones 0-2)'* Covers Seismic Design Category C.
    - c. *'Production Guide'*: Practical reference for ceiling systems and estimating costs.
- B. Definitions:
  - 1. Ceiling Suspension System: System of metal members, designed to support a suspended ceiling, typically acoustical ceiling. My also be designed to accommodate lighting fixtures or air diffusers.
  - 2. Clips: Several clip designs are available to suit applications such as fire resistance, wind uplift and impact. Fire-resistance rated designs have exact requirements, including mandatory use of hold down clips for acoustical panels or tiles weighing less than **1 lb per sq ft (4.9 kg per sq m)**. For rooms with significant air pressure differential from adjacent spaces, retention clips may be necessary to retain panels in place. Maintaining air pressure values may also require perimeter panel seals, typically closed cell foam gasket with adhesive on one side.
  - 3. Compression Post (Vertical Strut, Seismic Struts): Rigid member used to provide lateral force bracing of suspension system.
  - 4. Cross Runner, Cross Tee: Cross runner is secondary or cross beams of mechanical ceiling suspension system, usually supporting only acoustical tile. Cross tee is inserted into main runner to form different module sizes. In some suspension systems, however, cross runners also provide support for lighting fixtures, air diffusers and other cross runners.
  - 5. Exposed Grid System: Structural suspension system for lay-in ceiling panels. Factory-painted supporting members are exposed to view. Exposed tee surfaces may be continuous or have integral reveal. Reveals are typically formed as channel or rail profiles extending down from tee leg.
  - 6. Flange: Horizontal surface on face of tee, visible from below ceiling. Part of grid to which color cap is applied. Most grid system flanges are either **15/16 inch (24 mm)** or **9/16 inch (14 mm)**.

7. Hanger Wires: Wire employed to suspend acoustical ceiling from existing structure. Standard material is **12 gauge (0.105 inch - 2.70 mm)** galvanized, soft annealed steel wire, conforming to ASTM A641/A641M. Heavier gauge wire is available for higher load carrying installations, or situations where hanger wire spacing exceeds **4 feet (1.20 m)** on center. Seismic designs or exterior installations subject to wind uplift may require supplemental bracing or substantial hanger devices such as metal straps, rods or structural angles.
8. Heavy-Duty Systems: Primarily used for installations in which the quantities and weights of ceiling fixtures (lights, air diffusers, etc.) are greater than those for ordinary commercial structure.
9. Hold Down Clip: Mechanical fastener that snaps over bulb of grid system to hold ceiling panels in place.
10. Main Beam, Main Runner, Main Tee: Primary or main beams of type of ceiling suspension system in which structural members are mechanically locked together. Provide direct support for cross runners and may support lighting fixtures and air diffusers, as well as acoustical tile. Supported by hanger wires attached directly to existing structure; or installed perpendicular to carrying channels and supported by specially designed sheet metal or wire clips attached to carrying channels.
11. Splay Wires: Wires installed at angle rather than perpendicular to grid.
12. Stiffening Brace: Used to prevent uplift of grid caused by wind pressure in exterior applications.
13. Suspension System: Metal grid suspended from hanger rods or wires, consisting of main beams and cross tees, clips, splines and other hardware which supports lay-in acoustical panels or tiles. Completed ceiling forms barrier to sound, heat and fire. It also absorbs in-room sound and hides ductwork and wiring in plenum.
14. T-Bar: Any metal member of "T" cross section used in ceiling suspension systems.

C. Reference Standards:

1. American Society of Civil Engineers/Structural Engineering Institute:
  - a. ASCE/SEI 7-16, 'Minimum Design Loads for Buildings and Other Structures' (Section 9, 'Earthquake Loads').
2. ASTM International:
  - a. ASTM A568/A568M-17a, 'Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for'.
  - b. ASTM A641/A641M-09a(2014), 'Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire'.
  - c. ASTM B117-18, 'Standard Practice for Operating Salt Spray (Fog) Apparatus'.
  - d. ASTM C635/C635M-15, 'Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings'.
  - e. ASTM C636/C636M-13, 'Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels'.
  - f. ASTM D610-08(2019), 'Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces'.
  - g. ASTM E580/E580M-17, 'Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions'.
3. International Building Code (IBC) ((2018 or most recent edition adopted by AHJ):
  - a. IBC 808.1.1.1, 'Suspended Acoustical Ceilings'.
4. Underwriters Laboratories / American National Standards Institute:
  - a. UL 263: 'Standard for Fire Test of Building Construction and Materials' (14th Edition).
  - b. UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials' (11th Edition).
5. Underwriters Laboratories of Canada:
  - a. ULC 102-18: 'Method of Test for Surface Burning Characteristics of Building Materials and Assemblies' (ULC S102).
  - b. ULC 102.2-18: 'Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies' (ULC S102.2).
6. British Columbia Building Code 2018.

### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:



1. Coordinate layout of suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures and HVAC equipment.
2. All work above ceiling should be completed prior to installing suspended system. There should be no materials resting against or wrapped around suspension system, hanger wires or ties.

#### 1.4 SUBMITTALS

- A. Action Submittals:
  1. Product Data:
    - a. Provide Manufacturer's technical literature on suspension system including listing dimensions, load carrying capacity and standard compliance.
  2. Samples:
    - a. Minimum 8 inch (200 mm) long samples of exposed wall molding and suspension system, including main runner/tee and cross runner/tee with couplings.
- B. Informational Submittals:
  1. Certificates:
    - a. Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
    - b. Installer's certificates of training.

#### 1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  1. All system components conform to ASTM standards.
  2. Fire-Resistance Rating: ULC approved metal suspension system.
  3. Meet seismic bracing requirements of British Columbia Building Code 2018 or equivalent governing standard for project site.
  4. Seismic Standard: Acoustical ceilings shall be designed and installed to withstand the effects of earthquake motions according to the following:
    - a. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E580/E580M.
    - b. Cisca's Recommendations for Acoustical Ceilings: Comply with Cisca's *'Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings-Seismic Zones 0-2'* (Apply to Seismic Categories A & B).
    - c. British Columbia Building Code 2018.
- B. Qualifications. Requirements of Section 01 4301 applies, but not limited to following:
  1. Installer:
    - a. Installer training (Ceiling Masters training course or equivalent).
  2. Manufacturer:
    - a. Manufacturer in good standing of Cisca (Ceiling and Interior Systems Construction Association).

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  1. Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
  1. Materials shall be delivered in original, unopened packages with labels intact.
  2. Store material in fully enclosed space protected against damage from moisture, direct sunlight, surface contamination, and general damage.

## 1.7 WARRANTY

### A. Manufacturer Warranty:

1. Suspension system: Manufacturer warranty including repair or replacement of rusting as defined by ASTM D610 and defects in material or factory workmanship.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

#### A. Manufacturers:

1. Category Four Acceptable Manufacturers. See Section 01 6200.
  - a. Grid Face: **15/16 inch**:
    - 1) Armstrong World Industries Co, Lancaster, PA [www.armstrong.com](http://www.armstrong.com).
    - 2) USG Interiors Inc, Chicago, IL [www.usg.com](http://www.usg.com).

#### B. Materials:

1. Grid:
  - a. Systems shall meet requirements of ASTM C635/C635M, Intermediate Duty suspension system required for Seismic Design Categories A, B, or C.
  - b. Exposed surfaces shall be finished with factory-applied white baked enamel.
  - c. Meet requirements of ASTM D610 for red rust.
  - d. Main runners and cross tees:
    - 1) All main beams and cross tees shall be commercial quality hot-dipped galvanized (galvanized steel, aluminum, or stainless steel) as per ASTM A653/A653M. Main beams and cross tees are double-web steel construction with type exposed flange design.
    - 2) Wide-face design - main runners and cross tees shall have **one inch (25 mm)** exposed face.
2. Performance Standards:
  - a. DX Systems by USG Interiors required for Seismic Design Categories A, B, or C.
3. Wire Hangers, Braces, and Ties:
  - a. Zinc-Coated, carbon-steel wire meeting requirements of ASTM A641/A641M, Class 1 zinc coating, soft temper.
  - b. Size:
    - 1) Standard size: **12 gauge (0.105 inch) (2.70 mm)** galvanized, soft annealed steel wire.
    - 2) Select wire diameter so its stress is less than yield when loaded at three (3) times hanger design load (ASTM C635/C635M), Table 1, 'Direct Hung') will be less than yield stress of wire but provide not less than **12 gauge (0.105 inch) (2.70 mm)**.
  - c. Protect with rust inhibitive paint.
4. Wall Molding: Channel section of cold-rolled electro-galvanized steel.
5. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of same width as exposed runner.
6. Hold-down Clips: As required by ULC to prevent lifting of panels under unusual draft conditions.
7. Seismic Suspension System:
  - a. Required for Seismic Design Categories A, B, C, D, E, or F:
  - b. Design Criteria:
    - 1) Installation of ceiling system must be as prescribed by ICC-ES Evaluation Reports ESR-1222 or ESR-1308 and applicable code.
    - 2) Meet requirements of ASTM A568/A568M for hot-dipped galvanized, cold-rolled steel.
    - 3) Attach cross runners to wall with seismic clips.
  - c. Wall Molding Size: **7/8 inch (22 mm)** for all seismic design categories (code approved).
  - d. Category Four Acceptable Products. See Section 01 6200 for definition of Categories.
    - 1) ACM7 Clip by USG Inc, Chicago, IL [www.usg.com](http://www.usg.com).
    - 2) BERC-2 Clip by Armstrong World Industries, Lancaster, PA [www.ceilings.com](http://www.ceilings.com).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification Of Conditions:
  - 1. Inspect area receiving suspension system to identify conditions which will adversely affect installation.
    - a. Work trades work to be thoroughly dry and complete prior to installation.
    - b. Verify weather tightness of area to receive suspension system prior to installation.
  - 2. Notify Architect of unsuitable conditions in writing.
    - a. Do not install ceiling panels until adverse conditions have been remedied.

### 3.2 INSTALLATION

- A. Interface With Other Work:
  - 1. All work above ceiling should be completed prior to installing suspended ceiling system including related work including drywall furring work, acoustical tile, light fixtures, mechanical systems, and electrical systems.
- B. General:
  - 1. Install suspension system and panels in accordance with Manufacturer's written instructions, and in compliance with ASTM C636/C636M, and with authorities having jurisdiction (AHJ).
- C. Lay out suspension system symmetrically about center lines of room unless shown otherwise by Contract Drawings. Lay out system so use of tiles less than 1/2 size is minimized.
- D. Suspend main runner/tee from overhead construction with hanger wires spaced **4 feet (1.20 m)** on center along length of main runner/tee. Install hanger wires plumb and straight. Hanger wires shall not be installed in convenience holes.
- E. Maintain suspension system in true plane with straight, even joints.
- F. Suspension system joints shall be straight and in alignment, and exposed surface flush and level. Wherever system abuts walls, columns, and other vertical surfaces, furnish and install appropriate molding.
- G. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.
- H. Support edges with wall moldings.
- I. Locate light fixtures, speakers, and mechanical diffusers and grilles symmetrically in room insofar as possible (unless shown otherwise). Locate fixtures, speakers, diffusers, and grilles within suspension grid spaces and centered at least one (1) direction within grid. Installed fixtures shall not compromise ceiling performance.
- J. Pay attention to required hanger wire placement and fixture protection. Individual component deflection not to exceed 1/360 of span.
- K. Nails installed vertically into bottom of structural members, which are subject to pullout, shall not be used to support metal acoustical suspended assemblies:
  - 1. Nails may be used when installed horizontally into sides of structural members.
  - 2. Embedment must be at least **5/8 inch (15.9 mm)**.
- L. Screws, eyebolts or lag bolts used to support metal acoustical suspended assemblies must have minimum embedment of **5/8 inch (15.9 mm)** when installed into structural members.

### **3.3 FIELD QUALITY CONTROL**

- A. Field Inspections:
  - 1. Inspect:
    - a. Suspended ceiling system.
    - b. Hangers, anchors and fasteners.
- B. Non-Conforming Work:
  - 1. Correct any work found defective or not complying with contract document requirements at no additional cost to Owner.

**END OF SECTION**

**SECTION 09 6816****SHEET CARPETING: Back Cushion, Direct Glue****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But Is Not Limited To:
  - 1. Coordination, sequencing, and scheduling installation of Owner-Furnished carpet, carpet base, carpet accessories, leveling compounds as described in Contract Documents and including following:
    - a. Maintain Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.
    - b. Protection of carpet after installation of carpeting as required.
- B. Related Requirements:
  - 1. Section 01 1200: 'Multiple Contract Summary' for carpet and carpet base excluded from Contract and furnished and installed by Owner. This Section establishes quality of materials and installation for information of Contractor, Architect, and Owner's Representatives.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. The Carpet and Rug Institute (CRI), Dalton, GA [www.carpet-rug.org](http://www.carpet-rug.org). Standard for Installation Specification of Commercial Carpet:
    - a. CRI Indoor Air Quality (IAQ):
      - 1) CRI Green Label Plus Certification.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate completion of carpet installation with other trades.
- B. Pre-Installation Conference:
  - 1. Schedule pre-installation conference before installation of flooring system.
  - 2. In addition to agenda items specified Section 01 3100 review following:
    - a. Review Owner's Representative schedule for furnishing and installation carpet.
    - b. Review Flooring Manufacturer's installation conditions verification procedure and requirements.
    - c. Review Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.
    - d. Review cleaning and disposal requirements.
    - e. Review protection requirements of carpet after installation of carpeting.
- C. Scheduling:
  - 1. Notify Flooring Installer when Building Ambient Conditions requirements are met before installation of flooring system.
  - 2. Notify Owner's Representative to coordinate installation of carpet.

**1.4 SUBMITTALS**

- A. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:

- a. Warranty Documentation:
  - 1) Copy of Warranty.
- b. Record Documentation:
  - 1) Owner will provide Project Carpet Request Documentation forms in both hard copy and digital format:
    - a) Carpet Request Information Sheet.
    - b) Carpet Vendor Quotation.
    - c) Carpet Preinstallation Meeting Agenda.
    - d) Carpet Installation Notice to Proceed or Cancel.
    - e) Carpet Inspection and Completion.
    - f) Carpet Overage Report and Completion.
    - g) Carpet Quotation Change Request.
- B. Maintenance Material Submittals:
  - 1. Extra Stock Materials:
    - a. Leave excess pieces of carpet, **6 feet square (1 800 sq mm)** or larger and **25 lineal feet (7.620 m)** minimum of carpet cove base.
    - b. Roll up and tie securely.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. General:
  - 1. Comply with instructions and recommendations of Manufacturer for special delivery, storage, and handling requirements.
- B. Delivery And Acceptance Requirements:
  - 1. Deliver materials and accessories necessary for completion of carpet installation to site before beginning installation of carpet.
  - 2. Do not deliver materials before date scheduled for installation.
  - 3. Transport carpet in manner that prevents damage and distortion. Bending or folding individual carpet rolls or cuts from rolls is not recommended. When bending or folding is unavoidable for delivery purposes, carpet is required to be unrolled and allowed to lie flat immediately upon arrival at installation site.
- C. Storage And Handling Requirements:
  - 1. Store carpet and related materials in a climate-controlled, dry space.
  - 2. Protect carpet from soil, dust, moisture and other contaminants and store on a flat surface.
  - 3. Stacking heavy objects on top of carpet rolls or stacking more than three rolls is prohibited.

## 1.6 FIELD CONDITIONS

- A. Ambient Conditions:
  - 1. Building Conditions:
    - a. Conditions inside building shall be brought to levels to be normal at occupancy of building. Conditions include normal levels of humidity, lighting, heating, and air conditioning. (HVAC must be in operation thru out carpet installation):
      - 1) Carpet installation is not to begin until HVAC system is operational and following conditions are maintained for at least forty-eight (48) hours before, during and seventy-two (72) hours after completion:
        - a) Carpet is to be installed when indoor temperature is between **65° - 95° F (18° - 35° C)** with maximum relative humidity of 65%.
        - b) Substrate surface temperature should not be less than **65° F (18° C)** at time of installation.
        - c) Do not allow temperature of indoor carpeted areas to fall below **50° F (10° C)**, regardless of age of installation.
      - 2) Maintain fresh air ventilation after installation for seventy-two (72) hours minimum or until lingering odors are gone.

2. Concrete Slab:
  - a. General:
    - 1) Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive.
  - b. Alkalinity:
    - 1) Do not install sheet carpeting if alkalinity of concrete surface exceeds pH level 9. Corrective procedures are required.

## 1.7 WARRANTY

- A. Manufacturer Warranty:
  1. Provide Carpet Manufacturer's standard Warranty which includes following:
    - a. Warranty shall cover defects in installation, workmanship, and installation materials.
    - b. Warranty includes specific workmanship warranties for delamination, edge raveling, fuzzing, pilling, and other textural changes which can be controlled through proper manufacturing (no fraying, zippering, delamination, edge raveling, fuzzing, pilling in carpet is acceptable for any reason).
    - c. Warranty terms will include inspection of defective area within fifteen (15) days of receipt of written notice from Owner and completion of corrective work within forty-five (45) days, unless other arrangements are made in writing with Owner on case-by-case basis.
    - d. Carpet defect or installation defect:
      - 1) Carpet Manufacturer may use any reasonable means to cure first three (3) breaches of warranty affecting an area of carpeting bounded by natural breaks such as doorways, stairs, rostrum and platform ('affected carpet area'). Such cure must preserve as uniform a blended appearance, acceptable to Carpet Manufacturer and Owner, as exists throughout Installation Site at time of breach.
      - 2) If carpet defect or installation defect continues to appear after three (3) separate notices for correction from Owner, replace carpet where defects have occurred.
  2. Special Warranty:
    - a. Sheet Carpeting:
      - 1) General:
        - a) Appearance Retention to be provided with Special Warranty requirements if not already included in Standard Warranty.
      - 2) Meetinghouse, Mission Office, and O&M / R&I:
        - a) Owner Carpet Program Product: Provide twenty (20) year minimum or Carpet Manufacturer's better Warranty on carpet system.

## PART 2 - PRODUCTS

### 2.1 OWNER-FURNISHED PRODUCTS

- A. Category One VMR Manufacturers. See Section 01 6200 for definitions of Categories:
  1. Materials supplied for carpet installation shall be complete package from specified Carpet Manufacturer:
    - a. Mannington Commercial Carpets, Calhoun, GA:
      - 1) Contact Information: Help Line Voice Mail (800) 241-2262, ext 8045 or Mannington Installation Services, email lds@mannington.com or (855) 466-2664.
    - b. Lees, Division of Mohawk Carpets, Glasgow, VA:
      - 1) Contact Information: Help Line (800) 523-5555 or (801) 397-5626.
- B. Materials:
  1. Carpet:
    - a. Carpet:
      - 1) Category Four Approved Manufacturer and Color / Patterns. See Section 01 6200 for definitions of Categories:
        - a) Existing building colour scheme (Owner to site verify):

- (1) Mannington.
  - (2) Lees:
- 2. Carpet Base:
  - a. 4-1/2 inch (115 mm) wide base made of same carpet from Manufacturer as used in each room, but without cushion backing. Top edge of base serged with 1-1/4 inch (32 mm) polyester binding fabric to coordinate with Owner's color scheme. Roll edges of binding fabric under and sew along top edge of carpet cove base.

## 2.2 ACCESSORIES

- A. Floor Leveling Compound, Floor Patching Compound, And Latex Underlayment: As recommended and approved by Carpet Manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification of Conditions:
  - 1. Carpet Areas:
    - a. Verify concrete surfaces are sufficiently cured and moisture content is within acceptable levels before beginning installation:
      - 1) Notify Owner's Representative in writing if floor surface is not acceptable to install carpet:
        - a) Do not lay carpeting over unsuitable surface. Commencing installation constitutes acceptance of floor and approval of existing conditions.
- B. Evaluation And Assessment:
  - 1. Carpet Areas:
    - a. Variation In Grade:
      - 1) Plus or minus 1/8 inch (3 mm) in any 10 foot (3 meter) of floor slab and distance between high point and low point of slab of 1/2 inch (13 mm).
    - b. Testing Procedure:
      - 1) Place ends of straightedge on 3/8 inch (10 mm) high shims.
      - 2) Floor is satisfactory if 1/4 inch (6 mm) diameter steel rod rolled under straightedge will not touch anywhere along 10 foot (3 meter) length and 1/2 inch (13 mm) diameter steel rod will not fit under straightedge anywhere along 10 foot (3 meter) length.
    - c. Notify Owner's Representative in writing if floor surface is not acceptable to install carpet:
      - 1) Do not lay carpet over unsuitable surface. Commencing installation constitutes acceptance of floor and approval of existing conditions.

### 3.2 PREPARATION

- A. Carpet Areas:
  - 1. Flooring Preparation:
    - a. Owner-Furnished Product Supplier's Responsibility:
      - 1) Prepare floor substrate in accordance with 'CRI Carpet Installation Standard' best practices to receive carpet installation and to provide installation that meets warranty requirements.
      - 2) Verify concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or installation.
    - b. Concrete floor slab patching:
      - 1) Cracks, chips and joints must be properly patched or repaired.
    - c. Concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or other flooring installations:
      - 1) Removal of curing compounds.



- 2) Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
  - 3) Removal of overspray from painted walls (essential so glue will stick).
- d. Vacuum and damp mop floor areas to receive flooring before flooring installation.
- 2. Relaxing / Conditioning Carpet:
  - a. Highly recommended that carpet be unrolled and allowed to relax in installation area for time period that conforms to requirements of manufacturer of product being installed:
  - b. Protect carpet adequately from soil, dust, moisture and other contaminants.
  - c. Sundry items, such as adhesives, should also be conditioned.
- 3. Carpet Accessories:
  - a. Owner-Furnished Product's Responsibility:
    - 1) Sundry items, such as adhesives, shall be conditioned to building ambient conditions before use.

### 3.3 INSTALLATION

- A. Carpet:
  - 1. General:
    - a. Install carpet and carpet base in accordance with 'CRI Carpet Installation Standard' and Manufacturer's written instructions supplied with product.
    - b. Adhesion of carpet cushion (or secondary backing) to floor substrate and adhesion of carpet primary and secondary backings shall be continuous on floor surface so there are no bubble, ridges, or any separation of carpet from backings or backing from floor substrate caused by failure of carpet, backings or cushion, and adhesives as a system.
    - c. Install carpet under edge of metal thresholds where possible. Use specified carpet accessories at exposed edges.
  - 2. Seaming Requirements:
    - a. Seal seams in accordance with Carpet Manufacturer's instructions and according to CRI Carpet Installation Standard (2009) as applicable. Seam carpet base only at inside corners.
    - b. No seam separation in carpet and no more observable seams from any standing position than that which is unavoidable using best seaming materials and practices available at time of installation.
    - c. Lay rooms parallel to respective Corridors. Seam to permit best use of available carpet.
    - d. Quarter turning allowed only at cross-Corridors longer than **24 feet (7.315 m)**.
    - e. Use single or double seams at doorways (single seams preferred). Run nap of pieced carpet in same direction.
    - f. Carpet over Stairs must be laid in Manufactured roll sequence to coordinate with surrounding carpet on floors. Double fill and end seams should be avoided whenever possible.
- B. Carpet Base:
  - 1. Precut base so seams occur only at inside corners.
  - 2. Scribe base to floor.
  - 3. Spread adhesive over back side of base up to bottom of serging on edge or apply three **3/16 inch (4.76 mm)** minimum diameter beads of adhesive placed one inch apart on back of base with top bead placed **2 inch (50 mm)** down from serged edge of base and spread adhesive over back surface of base up to bottom edge of serging.
    - a. Bird's mouth finish should only be required when door frame is flush with wall.
    - b. If bird's mouth is required, terminate at door frames or vertical trim with 45 degree angle, bird mouth cut so serged edge turns down to contact frame or trim.
  - 4. Do not allow adhesive beyond edge of base. Remove excess adhesive.
  - 5. Do not use staples, nails, screws or other mechanical fasteners.

### 3.4 FIELD QUALITY CONTROL

- A. Field Inspections:
  - 1. Carpeting:

- a. Unacceptable carpet after installation shall include but not be limited to:
    - 1) Delaminating carpet from backings.
    - 2) Fiber loss less than specified.
    - 3) Edge raveling.
    - 4) Fuzzing of carpet fibers.
    - 5) Pilling of carpet fibers.
    - 6) Appearance retention less than control samples attached to Agreement.
    - 7) Dye bleeding.
    - 8) Zippering fibers in carpet.
    - 9) Color streaking.
    - 10) Irregular tufts of fiber.
  - b. Unacceptable workmanship shall include but not be limited to:
    - 1) Improper floor preparation before installation.
    - 2) Failure of adhesive to completely adhere carpet to floor resulting in bubbles, ridges, or ripples where carpet has separated from floor.
    - 3) Seams that do not comply with specified requirements:
      - a) Raveled or untrimmed seams.
      - b) Seams not sealed, level, straight, or even.
      - c) Open seams.
      - d) Seams visibly open when viewed by Project Manager from standing position.
    - 4) Sequence rolls, commercial match issues created by rolls being installed out of sequence will require correction or replacement.
    - 5) Failure to properly install carpet next to walls and door frames to eliminate gaps or puckering of carpet.
    - 6) Use of unspecified carpet.
    - 7) Carpet base ends not finished to terminate at door frames or vertical trim shall have 45 degree angle 'birdsmouth' finish.
    - 8) Adhesive exposed on carpet, on carpet base, beyond edges of carpet base, and on other surfaces of building.
    - 9) Carpet base that is not scribed to fit against floor with no gaps.
    - 10) Carpet base attached by means other than acceptable carpet base adhesive.
- B. Non-Conforming Work:
- 1. Carpeting:
    - a. Basis of Acceptable Carpeting: Source Quality Control Testing:
      - 1) Carpet products not meeting Design Criteria and Source Quality Control Testing of this specification will be considered unacceptable carpeting.
    - b. Unacceptable Carpeting:
      - 1) Unacceptable carpeting will be rejected and shall be repaired or replaced at no additional cost to Owner. Owner's Representative will determine reasonable location of acceptable transition points for removal of unacceptable carpet. Minimum replacement size shall be:
        - a) Between nearest existing seams.
        - b) Between natural transition points or 12 feet (3.6 meters) of running length.

### 3.5 CLEANING

- A. General:
  - 1. Carpeting:
    - a. Carpet Installer's Responsibility:
      - 1) Remove any soiling and/or staining from carpet.
      - 2) Remove excessive adhesive with manufacturer recommended adhesive removers.
      - 3) Clean all exposed surfaces of stair treads of adhesive spatter before it sets in accordance with Manufacturer's cleaning instructions.
- B. Damage to building:
  - 1. Carpeting:
    - a. Carpet Installer's Responsibility:

- 1) Carpet Installer responsible for cleaning and repair of all damaged surfaces to their original condition from carpet installation.

C. Waste Management:

1. Contractor's Responsibility:
  - a. Provide adequate waste receptacles (dumpsters) and dispose of Owner Furnished materials from building and property as specified in Section 01 7400.
2. Carpet Installer's Responsibility:
  - a. All work areas are to be kept clean, clear and free of debris at all times.
  - b. Disposal of rubbish, wrapping paper, scraps, and trimmings in provided dumpster(s).

### 3.6 PROTECTION

A. Protection of Carpeting:

1. Contractor's Responsibility:
  - a. No traffic of any kind on newly installed carpet for minimum of twenty-four (24) hours after installation is completed.
  - b. No wheeled traffic of any kind placement of furniture or equipment on carpet for minimum of forty-eight (48) hours after completion of carpet installation.
  - c. Protect carpet adequately from soil, dust, moisture and other contaminants after carpet installation.
  - d. Protect carpet from abuse, vandalism, or damage occurring after installation is complete.

**END OF SECTION**

**BLANK PAGE**

**SECTION 09 7226****SISAL WALL COVERING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnishing and installing wall covering 'Type A' (Sisal) as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 06 4512: 'Architectural Woodwork Wood Trim' for wood trim for sisal wall covering.
  - 2. Section 09 2900: 'Gypsum Board' for priming of gypsum board.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Class A: Fire classification for product with flame spread rating of no more than 25 and smoke developed rating not exceeding 50, when tested in accordance with ASTM E84 or ULC-S 102.2.
    - a. Class A: Fire classification for product with flame spread rating of no more than 25 and smoke developed rating not exceeding 50, when tested in accordance with ULC-S102.2.
    - b. Flame Spread: The propagation of flame over a surface.
    - c. Flame Spread Index: The numerical value assigned to a material tested in accordance with CAN/ULC-S102.2.
    - d. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with CAN/ULC-S102.2.
    - e. Surface Burning Characteristic: Rating of interior and surface finish material providing indexes for flame spread and smoke developed, based on testing conducted according to ULC-S102.2.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
  - 2. International Building Code (IBC) (2015 or latest approved edition):
    - a. Chapter 8, 'Interior Finishes':
      - 1) Section 803, 'Wall And Ceiling Finishes':
        - a) 803.1.3, 'Room Corner Test for Textile Wall Coverings and Expanded Vinyl Wall Coverings'.
        - b) 803.1.4, 'Acceptance Criteria for Textile and Expanded Vinyl Wall Coverings Tested to ASTM E84 or CAN/ULC-S102'.
  - 3. International Organization for Standardization:
    - a. ISO 9705-1:2016, 'Reaction to fire tests - Room corner test for wall and ceiling lining products - Part 1: Test method for a small room configuration'.
  - 4. National Fire Protection Association:
    - a. NFPA 101: 'Life Safety Code' (2015 Edition).
    - b. NFPA 265: 'Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls', (2015 Edition).
  - 5. National Research Council Canada:
    - a. National Fire Code of Canada (2015).
  - 6. Underwriters Laboratories of Canada:
    - a. CAN/ULC-S102-10: 'Method of Test for Surface Burning Characteristics of Building Materials and Assemblies'.

### 1.3 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's literature or cut sheet.
    - b. Maintenance instructions.
    - c. Color and pattern selection.
- B. Informational Submittals:
  - 1. Test And Evaluation Reports:
    - a. Copies of Quality Assurance requirements for 'Class A' flame spread rating and 'Room-Corner Test'.
  - 2. Qualification Statement:
    - a. Installer:
      - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operations and Maintenance Data:
      - 1) Cleaning and maintenance instructions.
    - b. Record Documentation:
      - 1) Manufacturers Documentation:
        - a) Manufacturer's literature or cut sheets.
        - b) Color and pattern selections.

### 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  - 1. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Surface-Burning Characteristics:
      - 1) Wall covering shall have Class A flame spread rating in accordance with ULC-S102.2.
        - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
        - b) Flash point: None.
  - 2. Passage of 'Room-Corner Test' as recognized by AHJ, is required for system. Adhesive cited in test literature is required for installation of wall covering on Project.
    - a. Room Corner Tests:
      - 1) CAN/ULC-S102.2, 'Standard Method of Test For Surface Burning Characteristics of Building Materials and Assemblies.
      - 2) IBC 803.1.3, 'Room Corner Test for Textile Wall Coverings and Expanded Vinyl Wall Coverings'.
      - 3) IBC 803.1.4, 'Acceptance Criteria for Textile and Expanded Vinyl Wall Coverings Tested to ASTM E84 or CAN/ULC-S102.2.
      - 4) ISO 9705-1, 'Reaction to fire tests - Room corner test for wall and ceiling lining products - Part 1: Test method for a small room configuration'.
      - 5) NFPA 265, 'Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls'.
- B. Qualifications:
  - 1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
    - a. Minimum three (3) years experience in wall covering installations.
    - b. Minimum five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
    - c. Agree to view 'No-Flame Sisal Wall Covering Recommended Installation Procedures' provided by Owner found on internet in AEC Webpage under Training in Menu tab. Contact Architect for access to video. This requirement may be waived by Owner, if Installer has

- viewed video before or can document at least two (2) satisfactorily completed projects of comparable size using sisal wall coverings in past three (3) years before bidding.
- d. Upon request, submit documentation and video verification.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
1. Deliver materials in sealed containers with Manufacturer's labels intact.
- B. Storage And Handling Requirements:
1. Store materials in protected area at temperatures below 90 deg F (32 deg C) and above 50 deg F (10 deg C). Keep from freezing.
  2. Keep container tightly closed in a well ventilated area, and store upright when not in use.
  3. Shelf life: One (1) year minimum - Unopened containers.

## 1.6 FIELD CONDITIONS

- A. Ambient Conditions:
1. Apply when the temperature is between 50 deg F (10 deg C) minimum and 100 deg F (38 deg C) maximum and relative humidity is less than seventy five (75) percent.
  2. Provide good ventilation.

## 1.7 WARRANTY

- A. Manufacturer Warranty:
1. Provide five (5) year warranty against manufacturing defects.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturer Contact List:
1. Design Materials Inc, Kansas City, KS [www.dmikc.com](http://www.dmikc.com).
  2. Fibreworks, Louisville, KY [www.fibreworks.com](http://www.fibreworks.com).

### 2.2 DESCRIPTION

- A. Colors:
1. Category Four Approved Colors. See Section 01 6200 for definitions of Categories.

SCHEME	Design Materials	Fibreworks
	0270 TOPAZ	335 TOPAZ

2. Confirm colour on site. Intent is to match existing.

### 2.3 MATERIALS

- A. Sisal Wall Covering:
1. 100 percent fire-treated sisal yarn.
  2. 1/4 inch (6 mm) pile height, 48 oz/sq yd (1 627 grams/sq meter) minimum. Sisal to be installed full height on walls shall be furnished in 9 or 13 foot (2.75 or 3.96 meters) wide goods.
  3. Reversible weave type, without backing.

## 2.4 ACCESSORIES

- A. Wall Covering Adhesive:
  - 1. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
    - a. 257 Sisal Adhesive by Fibreworks.
    - b. Sisal Adhesive No. 1-422 by Design Materials.
- B. Seam Cement:
  - 1. Type Two Acceptable Products:
    - a. 8415 Glue-Down Carpet Seam Adhesive by Roberts Consolidated Industries, Div QEP, Henderson, NV [www.robertsconsolidated.com](http://www.robertsconsolidated.com).
    - b. Equal as recommended by Wall Covering Manufacturer with approval of Architect before installation. See Section 01 6200.

## PART 3 - EXECUTION

### 3.1 INSTALLERS

- A. Acceptable Installers:
  - 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

### 3.2 EXAMINATION

- A. Verification Of Conditions:
  - 1. Examine substrate and verify that it is suitable for installation of sisal wall covering.
  - 2. Notify Architect of unsuitable conditions in writing.
    - a. Do not install over unsuitable conditions.
  - 3. Commencement of Work by installer is considered acceptance of substrate.

### 3.3 INSTALLATION

- A. Apply wall covering in accordance with Manufacturer's instructions, available on DVD from Owner through Architect. See Quality Assurance Installer Qualifications as specified in Part 1 of this specification.
- B. Using specified adhesive, glue continuously to surface to be covered with wall covering. Apply adhesive in accordance with Manufacturer's recommendations.
- C. Run 'ribs' in weaving vertically (railroad style – no seams) when installing wall covering as wainscoting. Install wall covering so it extends to within **1/8 inch (3 mm)** of floor slab.
- D. Carry sisal around corners approximately **6 inch (152 mm)** making no outside corner cuts.

**END OF SECTION**



**SECTION 09 9001****COMMON PAINTING AND COATING REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Common procedures and requirements for field-applied painting and coating.
- B. Related Requirements:
1. Section 07 9213: 'Elastomeric Joint Sealants' for quality of Elastomeric Joint Sealants.
  2. Sections under 09 9000 heading 'Paints and Coatings'.
    - a. Pre-Installation conferences held jointly with Section 09 9001.
  3. Divisions 22 and 23: Painting of plumbing and HVAC identification, and duct interiors.

**1.2 REFERENCES**

- A. Definitions:
1. Damage Caused By Others: Damage caused by individuals other than those under direct control of Painting Applicator (MPI(a), PDCA P1.92).
  2. Gloss Levels:
    - a. Specified paint gloss level shall be defined as sheen rating of applied paint, in accordance with following terms and values, unless specified otherwise for a specific paint system.

Gloss Level '1'	Traditional matte finish - flat	0 to 5 units at 60 degrees to 10 units maximum at 85 degrees.
Gloss Level '2'	High side sheen flat - 'velvet-like' finish	10 units maximum at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level '3'	Traditional 'eggshell-like' finish	10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level '4'	'Satin-like' finish	20 to 35 units at 60 degrees and 35 units minimum at 85 degrees.
Gloss Level '5'	Traditional semi-gloss	35 to 70 units at 60 degrees.
Gloss Level '6'	Traditional gloss	70 to 85 units at 60 degrees.
Gloss Level '7'	High gloss	More than 85 units at 60 degrees.

3. Properly Painted Surface:
  - a. Surface that is uniform in appearance, color, and sheen and free of foreign material, lumps, skins, runs, sags, holidays, misses, strike-through, and insufficient coverage. Surface free of drips, spatters, spills, and overspray caused by Paint Applicator. Compliance will be determined when viewed without magnification at a distance of 5 feet (1.50 m) minimum under normal lighting conditions and from normal viewing position (MPI(a), PDCA P1.92).
4. Latent Damage: Damage or conditions beyond control of Painting Applicator caused by conditions not apparent at time of initial painting or coating work.

**B. Reference Standards:**

1. The latest edition of the following reference standard shall govern all painting work:
  - a. MPI(a), 'Architectural Painting Specification Manual' by Master Painters Institute (MPI), as issued by local MPI Accredited Quality Assurance Association having jurisdiction.
  - b. MPI(r), 'Maintenance Repainting Manual' by Master Painters Institute (MPI), as issued by local MPI Accredited Quality Assurance Association having jurisdiction.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
  - 1. Schedule painting pre-installation conference after delivery of paint or coatings and before or at same time as application of field samples.
    - a. Coordinate pre-installation conferences of all related painting and coating Sections under 09 9000 heading 'Paints and Coatings'.
    - b. Schedule conference before preparation of control samples as specified in Sections under 09 9000 heading 'Paints and Coatings'.
    - c. Conference to be held at same time as Section 09 2900 to review gypsum board finish preparation.
  - 2. In addition to agenda items specified in Section 01 3100, review following:
    - a. Review Quality Assurance for Approval requirements.
    - b. Review Quality Assurance Field Sample requirements.
    - c. Review Submittal requirements for compliance for MPI Approved Products.
    - d. Review Design Criteria requirements.
    - e. Review Cleaning requirements.
    - f. Review painting schedule.
    - g. Review safety issues.
  - 3. Review additional agenda items from Sections under 09 9000 heading 'Paints and Coatings'.

### 1.4 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Include following information for each painting product, arranged in same order as in Project Manual.
      - 1) Manufacturer's cut sheet for each product indicating ingredients and percentages by weight and by volume, environmental restrictions for application, and film thicknesses and spread rates.
      - 2) Provide one (1) copy of 'MPI Approved Products List' showing compliance for each MPI product specified.
        - a) MPI Information is available from MPI Approved Products List using the following link: <http://www.paintinfo.com/mpi/approved/index.shtml>.
      - 3) Confirmation of colors selected and that each area to be painted or coated has color selected for it.
  - 2. Samples: Provide two 4 inch by 6 inch (100 mm by 150 mm) minimum draw-down cards for each paint or coating color selected for this Project.
- B. Informational Submittals:
  - 1. Manufacturer Instructions:
    - a. Manufacturer's substrate preparation instructions and application instruction for each painting system used on Project.
  - 2. Qualification Statement:
    - a. Applicator:
      - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Manufacturer's documentation:
        - a) Manufacturer's cut sheet for each component of each system.
        - b) Schedule showing rooms and surfaces where each system was used.
- D. Maintenance Materials Submittals:
  - 1. Extra Stock Materials:

- a. Provide painting materials in Manufacturer's original containers and with original labels in each color used. Label each can with color name, mixture instructions, date, and anticipated shelf life.
- b. Provide one (1) quart of each finish coat and one (1) pint of each primer and of each undercoat in each color used.

## 1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approval:
  1. Conform to work place safety regulations and requirements of those authorities having jurisdiction for storage, mixing, application and disposal of all paint and related hazardous materials.
  2. Paint and painting materials shall be free of lead and mercury, and have VOC levels acceptable to local jurisdiction.
  3. Master Painters Institute (MPI) Standards:
    - a. Products: Comply with MPI standards indicated and listed in 'MPI Approved Products List'.
    - b. Preparation and Workmanship: Comply with requirements in 'MPI Architectural Painting Specification Manual' for products and coatings indicated.
- B. Qualifications:
  1. Applicator: Requirements of Section 01 4301 applies, but not limited to following:
    - a. Minimum five (5) years' experience in painting installations.
    - b. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
    - c. Maintain qualified crew of painters throughout duration of the Work.
    - d. Upon request, submit documentation.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  1. Deliver specified products in sealed, original containers with Manufacturer's original labels intact on each container.
  2. Deliver amount of materials necessary to meet Project requirements in single shipment.
  3. Notify Architect two working days before delivery of coatings.
- B. Storage And Handling Requirements:
  1. Store materials in single place.
  2. Keep storage area clean and rectify any damage to area at completion of work of this Section.
  3. Maintain storage area at 55 deg F (13 deg C) minimum.

## 1.7 FIELD CONDITIONS

- A. Ambient Conditions:
  1. Perform painting operations at temperature and humidity conditions recommended by Manufacturer for each operation and for each product for both interior and exterior work.
  2. Apply painting systems at lighting level of 540 Lux (50 foot candles) minimum on surfaces to be painted.
    - a. Inspection of painting work shall take place under same lighting conditions as application.
    - b. If painting and coating work is applied under temporary lighting, deficiencies discovered upon installation of permanent lighting will be considered latent damage as defined in MPI Manual, PDCA P1-92.

## **PART 2 - PRODUCTS**

### **2.1 SYSTEMS**

#### **A. Performance:**

##### **1. Design Criteria:**

- a. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- b. All materials, preparation and workmanship shall conform to requirements of 'Architectural Painting Specification Manual' by Master Painters Institute (MPI).
- c. All paint manufacturers and products used shall be as listed under Approved Product List section of MPI Painting Manual.
- d. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.
- e. Where specified paint system does not have Premium Grade, provide Budget Grade.
- f. Provide products of same manufacturer for each coat in coating system.
- g. Color Levels:
  - 1) Color Level II:
    - a) Number and placement of interior and exterior paint colors and gloss levels shall be as defined by Color Level II from MPI Manual, PDCA P3-93 as modified in following paragraph.
    - b) No more than one paint color or gloss level will be selected for same substrate within designated interior rooms or exterior areas.
  - 2) Color Level III:
    - a) Number and placement of interior and exterior paint colors and gloss levels shall be Color Level III from MPI Manual, PDCA P3-93 as modified in following paragraph.
    - b) Several paint colors or gloss levels will be selected for same substrate within designated interior rooms or exterior areas.

#### **B. Materials:**

1. Materials used for any painting system shall be from single manufacturer unless approved otherwise in writing by painting system manufacturers and by Architect. Include manufacturer approvals in Product Data submittal.
2. Linseed oil, shellac, turpentine, and other painting materials shall be pure, be compatible with other coating materials, bear identifying labels on containers, and be of highest quality of an approved manufacturer listed in MPI manuals. Tinting color shall be best grade of type recommended by Manufacturer of paint or stain used on Project.

## **PART 3 - EXECUTION**

### **3.1 APPLICATORS**

#### **A. Approved Applicators:**

1. Meet Quality Assurance Applicator Qualifications as specified in Part 1 of this specification.

### **3.2 EXAMINATION**

#### **A. Verification Of Conditions:**

1. Directing applicator to begin painting and coating work will indicate that substrates to receive painting and coating materials have been previously inspected as part of work of other Sections and are complete and ready for application of painting and coating systems as specified in those Sections.

- B. Pre-Installation Testing:
  - 1. Before beginning work of this Section, examine, and test surfaces to be painted or coated for adhesion of painting and coating systems.
  - 2. Report in writing to Architect of conditions that will adversely affect adhesion of painting and coating work.
  - 3. Do not apply painting and coating systems until party responsible for adverse condition has corrected adverse condition.
- C. Evaluation And Assessment:
  - 1. Report defects in substrates that become apparent after application of primer or first finish coat to Architect in writing and do not proceed with further work on defective substrate until such defects are corrected by party responsible for defect.

### 3.3 PREPARATION

- A. Protection Of In-Place Conditions:
  - 1. Protect other finish work and adjacent materials during painting. Do not splatter, drip, or paint surfaces not intended to be painted. These items will not be spelled out in detail but pay special attention to the following:
    - a. Do not paint finish copper, bronze, chromium plate, nickel, stainless steel, anodized aluminum, or monel metal except as explicitly specified.
    - b. Keep cones of ceiling speakers completely free of paint. In all cases where painting of metal speaker grilles is required, paint without grilles mounted to speakers and without grilles on ceiling.
    - c. On existing work where ceiling is to be painted, remove, clean, and reinstall speakers, fixtures, and grilles as necessary.
- B. Surface Preparation:
  - 1. Prepare surfaces in accordance with MPI requirements and requirements of Manufacturer for each painting system specified, unless instructed differently in Contract Documents. Bring conflicts to attention of Architect in writing.
  - 2. Fill minor holes and cracks in wood surfaces to receive paint or stain.
  - 3. Surfaces to be painted shall be clean and free of loose dirt. Clean and dust surfaces before painting or finishing.
  - 4. Do no exterior painting while surface is damp, unless recommended by Manufacturer, nor during rainy or frosty weather. Interior surfaces shall be dry before painting. Moisture content of materials to be painted shall be within tolerances acceptable to Paint Manufacturer.
  - 5. Sand woodwork smooth in direction of grain leaving no sanding marks. Clean surfaces before proceeding with stain or first coat application.

### 3.4 APPLICATION

- A. Interface With Other Work:
  - 1. Coordinate with other trades for materials and systems that require painting before installation.
  - 2. Schedule painting and coating work to begin when work upon which painting and coating work is dependent has been completed. Schedule installation of pre-finished and non-painted items, which are to be installed on painted surfaces, after application of final finishes.
- B. Paint or finish complete all surfaces to be painted or coated as described in Contract Documents, including but not limited to following items.
  - 1. Back prime wood elements to be installed against concrete or masonry or that may be subjected to moisture.
  - 2. Paint mechanical items that require field painting as indicated in Contract Documents.
- C. Apply paintable sealant in gaps between two substrates that are both to be painted or coated. Sealants in other gaps furnished and installed under Section 07 9213.

- D. On wood to receive a transparent finish, putty nail holes in wood after application of stain using natural colored type to match wood stain color. Bring putty flush with adjoining surfaces.
- E. In multiple coat paint work, tint each succeeding coat with slightly lighter color, but approximating shade of final coat, so it is possible to check application of specified number of coats. Tint final coat to required color.
- F. Spread materials smoothly and evenly. Apply coats to not less than wet and dry film thicknesses and at spreading rates for specified products as recommended by Manufacturer.
- G. Touch up suction spots after application of first finish coat.
- H. Paint shall be thoroughly dry and surfaces clean before applying succeeding coats.
- I. Use fine sandpaper between coats as necessary to produce even, smooth surfaces.
- J. Make edges of paint adjoining other materials or colors clean, sharp, and without overlapping.
- K. Finished work shall be a 'Properly Painted Surface' as defined in this Section.

### **3.5 FIELD QUALITY CONTROL**

- A. Non-Conforming Work:
  - 1. Correct deficiencies in workmanship as required to leave surfaces in conformance with 'Properly Painted Surface,' as defined in this Section.
  - 2. Correction of 'Latent Damage' and 'Damage Caused By Others,' as defined in this Section, is not included in work of this Section.

### **3.6 CLEANING**

- A. General:
  - 1. As work proceeds and upon completion of work of any painting Section, remove paint spots from floors, walls, glass, or other surfaces and leave work clean, orderly, and in acceptable condition.
- B. Waste Management:
  - 1. Remove rags and waste used in painting operations from building each night. Take every precaution to avoid danger of fire.
  - 2. Paint, stain and wood preservative finishes and related materials (thinners, solvents, caulking, empty paint cans, cleaning rags, etc.) shall be disposed of subject to regulations of applicable authorities having jurisdiction.
  - 3. Remove debris caused by work of paint Sections from premises and properly dispose.
  - 4. Retain cleaning water and filter out and properly dispose of sediments.

**END OF SECTION**

**SECTION 09 9123****INTERIOR PAINTED GYPSUM BOARD, PLASTER****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Preparing, priming, and finish painting new interior gypsum board and plaster surfaces as described in Contract Documents.
  - 2. See Plans and Drawings A-2, A-4, A-7, A-8, and A-9.
  - 3. Preparing and painting following existing interior gypsum board and plaster surfaces as described in Contract Documents:
    - a. Refer to scope of work A-2.
  - 4. Intent is to match existing colour and sheen on site.
- B. Related Requirements:
  - 1. Section 09 2900: 'Gypsum Board' for:
    - a. Priming new interior gypsum board surfaces to receive sheet wall covering system or texturing.
    - b. Pre-installation conference.
  - 2. Section 09 9001: 'Common Painting And Coating Requirements':
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
  - 3. Section 09 9413: 'Interior Textured Finishing' for textured finishes.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 09 2900.
    - a. In addition to agenda items specified in Section 01 3100 and Section 09 2900, review following:
      - 1) Review finish level requirements of gypsum wallboard as specified in Section 09 2900.
  - 2. Participate in pre-installation conference as specified in Section 09 9001.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Manufacturers:
  - 1. Category Four Approved Manufacturers and Products. See Section 01 6200 for definitions of Categories.
    - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
  - 1. All Other:
    - a. New Surfaces: Use MPI(a) INT 9.2B Latex Finish system.
    - b. Previously Finished Work: Use MPI(r) RIN 9.2B Latex Finish system.
- C. Performance:
  - 1. Design Criteria:

- a. New Surfaces: MPI Premium Grade finish requirements.
  - b. Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
  - c. Sound Existing Surfaces: MPI Custom Grade requirements.
  - d. Gloss / Sheen Required:
    - 1) Ceiling: Gloss Level 1 or 2.
    - 2) Remaining Painted Surfaces: Gloss Level 5.
- D. Materials:
- 1. Primers:
    - a. MPI Product 50, 'Primer Sealer, Latex, Interior'.
  - 2. Finish Coats:
    - a. Ceiling:
      - 1) MPI Product 53, 'Latex, Interior, Flat (MPI Gloss Level 1)'.
    - b. Remaining Painted Surfaces:
      - 1) MPI Product 141, 'Latex, Interior, High Performance Architectural, Semi-Gloss (MPI Gloss Level 5)'.

## **PART 3 - EXECUTION**

### **3.1 APPLICATION**

- A. General: See appropriate paragraphs of Section 09 9001.
- B. New Surfaces:
  - 1. Primer: Apply primer to be covered with other paint coats with roller only, or with spray gun and back-rolled.
- C. Existing Painted Surfaces:
  - 1. Remove deteriorated existing paint down to sound substrate by scraping or sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces.
  - 2. Clean surface with mild soap and water, or with tri-sodium phosphate (TSP). Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
  - 3. Spackle and tape cracks. Sand to smooth finish and spot prime.
  - 4. Sand or chemically etch existing painted surface as required to prepare surface to accept new paint.
  - 5. Re-clean surface.
  - 6. Apply primer coat.
  - 7. Apply finish coats.

**END OF SECTION**



**SECTION 09 9124****INTERIOR PAINTED METAL****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Preparing and painting new interior metal surfaces as described in Contract Documents.
  - 2. Preparing and painting following existing interior metal surfaces as described in Contract Documents:
    - a. Metal door frames
    - b. Metal brackets.
    - c. Metal handrail.
  - 3. Intent is to match existing colour and sheen on site.
- B. Related Requirements:
  - 1. Section 09 9001: 'Common Painting And Coating Requirements':
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
  - 2. Section 23 0553: 'I. D. For HVAC Piping And Equipment' for field painting requirements of HVAC equipment.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 09 9001.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Manufacturers:
  - 1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories.
    - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
  - 1. Ferrous Metal:
    - a. New Surfaces: Use MPI(a) INT 5.1B Waterborne Light Industrial Finish system.
    - b. Previously Finished Surfaces: Use MPI(r) RIN 5.1B Waterborne Light Industrial Finish system.
  - 2. Galvanized Metal:
    - a. New Surfaces: Use MPI(a) INT 5.3J Latex Finish system
    - b. Previously Finished Surfaces: Use MPI(r) RIN 5.3AH Latex Finish system.
- C. Performance:
  - 1. Design Requirements:
    - a. New Surfaces: MPI Premium Grade finish requirements.
    - b. Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
    - c. Sound Existing Surfaces: MPI Custom Grade finish requirements.
    - d. Gloss / Sheen Level Required: Gloss Level 5.

- D. Materials:
  - 1. Primers:
    - a. Ferrous Metal: MPI Product 107, 'Primer, Rust-Inhibitive, Water Based'.
    - b. Galvanized Metal: MPI Product 134: 'Primer, Galvanized, Water Based'.
  - 2. Finish Coats: MPI Product 153: 'Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)'.

## **PART 3 - EXECUTION**

### **3.1 APPLICATION**

- A. General:
  - 1. See appropriate paragraphs of Section 09 9001.
  - 2. Systems specified are in addition to prime coats furnished under other Sections.
- B. New Surfaces: Remove rust spots by sanding and immediately spot prime. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying full primer coat.
- C. Existing Painted Surfaces:
  - 1. Remove deteriorated existing paint down to sound substrate by scraping and sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces. Spot prime bare metal surfaces immediately.
  - 2. Remove rust spots by sanding and immediately spot prime. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying full primer coat.
  - 3. Clean existing sound painted surfaces as well as scraped and sanded existing painted surfaces as recommended by Paint Manufacturer.
  - 4. Apply prime coat over entire surface to be painted.
  - 5. Lightly sand entire surface.
  - 6. Clean surface as recommended by Paint Manufacturer.
  - 7. Apply finish coats.

**END OF SECTION**

**SECTION 09 9125****INTERIOR PAINTED WOOD****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Preparing and painting new woodwork not requiring transparent finish, as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 09 9001: 'Common Painting And Coating Requirements':
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 09 9001.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Manufacturers:
  - 1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories:
    - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
  - 1. Systems:
    - a. All Other:
      - 1) New Surfaces: Use MPI(a) INT 6.3T or U Latex Finish system.
- C. Performance:
  - 1. Design Criteria:
    - a. New Surfaces: MPI Premium Grade finish requirements.
    - b. Gloss / Sheen Level Required: Gloss Level 5.
- D. Materials:
  - 1. Woodwork:
    - a. Primer Coat: MPI Product 39, 'Primer, Latex, for Interior Wood' or MPI Product 45, 'Primer Sealer, Alkyd, Interior'.
    - b. Finish Coats: MPI Product 153, 'Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)'.

**PART 3 - EXECUTION****3.1 APPLICATION**

- A. General: See appropriate paragraphs of Section 09 9001.
- B. Interface With Other Work:
  - 1. Where back-priming is required, apply one (1) coat of primer.
- C. New Surfaces:
  - 1. Spot prime nail holes, cracks, and blemishes before and after puttying.
  - 2. Apply stain blocker or other product recommended by Paint Manufacturer to knots before applying primer coat.

**END OF SECTION**

**SECTION 09 9324****INTERIOR CLEAR-FINISHED HARDWOOD****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Preparing and finishing of new interior clear finished hardwood as described in Contract Documents. Intent is to match existing stain colour and sheen on site – see Drawing A-2, A-9, and A-10.
- B. Related Requirements:
  - 1. Section 06 2210: 'Miscellaneous Wood Trim'.
  - 2. Section 06 4512: 'Architectural Woodwork Wood Trim'.
  - 3. Section 08 1429: 'Interior Flush Wood Doors'.
  - 4. Section 09 9001: 'Common Painting And Coating Requirements':
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. Kitchen Cabinet Manufacturers Association / American National Standards Institute:
    - a. ANSI/KCMA A161.1-2000 (R2005) 23-Jan-2001 'Recommended Performance and Construction Standards for Kitchen and Vanity Cabinets.'

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 09 9001.
  - 2. In addition to agenda items specified in Section 01 3100 and Section 09 9001, review following:
    - a. Review control sample(s).

**1.4 SUBMITTALS**

- A. Action Submittals:
  - 1. Samples:
    - a. Interior Hardwood for Transparent Finish:
      - 1) Requirements for samples are specified in Related Requirement Sections listed above.
    - b. Design Criteria:
      - 1) Sample will be used as performance standard for evaluating finish provided.
- B. Informational Submittals:
  - 1. Test And Evaluation Reports:
    - a. Before beginning finish work, submit Finish Manufacturer's literature or certification that finish material meets requirements of ANSI / KCMA A161.1.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

- A. Materials:
  - 1. Design Criteria:
    - a. See appropriate paragraphs of Section 09 9001.
  - 2. Stain: MPI 90, 'Stain, Semi-Transparent, for Interior Wood'.
  - 3. Clear Finish Coats:
    - a. Field Finished:
      - 1) Chemcraft International Inc:
        - a) First, Second, And Third Coats: 20 Sheen Opticlear Pre-Catalyzed Lacquer.
      - 2) ICI Dulux / Trinity:
        - a) First Coat: ICE Vinyl Sanding Sealer.
        - b) Second And Third Coats: ICI Pre-Catalyzed Lacquer.
      - 3) Lilly / Valspar:
        - a) First, Second, And Third Coats: 20 Sheen Pre-Catalyzed Lacquer 587E208.
      - 4) Sherwin-Williams:
        - a) First Coat: T67F3 Vinyl Sealer.
        - b) Second And Third Coats: T77F38 Sherwood Pre-Catalyzed Lacquer DRE.
    - b. Mill Finished: Architectural Woodwork finished in a mill may use one (1) coat of Vinyl Sealer and two (2) coats of Conversion Varnish or three (3) coats of Conversion Varnish from one (1) of the approved Finish Manufacturers, as recommended by Finish Manufacturer.
    - c. Products meeting testing requirements for finishes of ANSI / KCMA A161.1 may be used upon approval of submission by Architect before use. See Section 01 6200.
  - 4. Color:
    - a. Design Criteria:
      - 1) Finish to match existing stain colour on site.
    - b. LDS 95:
      - 1) Similar to LDS 95 wood stain.
        - a) Provide a custom stain to match existing current colour.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. General:
  - 1. See appropriate paragraphs of Section 09 9001.
  - 2. Sand entire exposed surface of item to be finished lightly with 120 to 150 non-stearated sandpaper and clean before applying dye or stain.
  - 3. Apply stain in accordance with Manufacturer's recommendations and as necessary to attain correct color.
  - 4. Scuff sand with 220 non-stearated sandpaper between application of application stain and first finish coat.
  - 5. If wood is finished before installation, finish cut ends and other unfinished, exposed surfaces same as previously finished surfaces after installation of wood.
- B. Provide back-priming against block wall installations – apply one coat of finish material.
- C. Interior Flush Wood Doors:
  - 1. Finish tops, bottoms, and edges before faces.
  - 2. Finish doors with no hardware applied to doors.

**END OF SECTION**

**SECTION 09 9413****INTERIOR TEXTURED FINISHING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and apply smooth texturing on walls and popcorn texturing on ceilings as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 09 2900: 'Gypsum Board' for priming.
  - 2. Section 09 9001: 'Common Painting And Coating Requirements' for:
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
  - 3. Section 09 9123: 'Interior Painted Gypsum Board, Plaster' for finish painting.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Drywall Texture: Compound rolled, sprayed, or troweled onto sheetrock after taping and floating of joints is complete. Uses same material as joint compound, but thinned down with water and applied to wall surface:
    - a. Smooth - Smooth application of texture over sheetrock wall that feathers out sheetrock joints, and creates even, non-textured wall.
    - b. Popcorn – match existing on site. See Drawing A-4.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 09 9001.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. National Gypsum, Charlotte, NC [www.nationalgypsum.com](http://www.nationalgypsum.com).
    - b. U S Gypsum Co, Chicago, IL [www.usg.com](http://www.usg.com).
- B. Materials:
  - 1. Class Two Quality Standards: See Section 01 6200.
    - a. ProForm Perfect Spray EM/HF by National Gypsum.
    - b. Sheetrock Wall & Ceiling Texture by U S Gypsum.

**PART 3 - EXECUTION****3.1 APPLICATION**

- A. Location:
  - 1. Walls:
    - a. Smooth:
      - 1) See Drawings.
  - 2. Ceilings:
    - a. Popcorn texture to be applied to the following ceilings:
      - 1) See Drawings.
- B. Finishing:
  - 1. Smooth:
    - a. No applied texture is required. Apply priming and paint as specified in Section 09 9123.

**END OF SECTION**



## **DIVISION 10: SPECIALTIES**

### **10 1000 INFORMATION SPECIALTIES**

10 1495 MISCELLANEOUS INTERIOR SIGNAGE

### **10 2000 INTERIOR SPECIALTIES**

10 2113 METAL TOILET COMPARTMENTS

10 2813 COMMERCIAL TOILET ACCESSORIES

END OF TABLE OF CONTENTS

BLANK PAGE

**SECTION 10 1495****MISCELLANEOUS INTERIOR SIGNAGE****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Installed But Not Furnished Under This Section:
  - 1. Owner-furnished interior signs.
- B. Related Requirements:
  - 1. Section 01 6400: Owner will furnish designated interior signs. This Section establishes quality of materials and installation for information of Contractor, Architect, and Owner's Representatives.

**PART 2 - PRODUCTS****2.1 OWNER FURNISHED PRODUCTS**

- A. Category Four Approved Standard Interior Signs. See Section 01 6200 for definitions of Categories:
  - 1. Visual Identity Office:
    - a. Contact Information:
      - 1) 50 E. North Temple St. Rm. 2350, Salt Lake City, UT 84150-3232.
      - 2) Phone: 1-801-240-1302.
      - 3) Fax: 1-801-240-5997.
      - 4) [vidoffice@ldschurch.org](mailto:vidoffice@ldschurch.org).
  - 2. Room Signs: Molded clear acrylic sub-surface graphics sign with set-screw to attach to included mounting bracket.
  - 3. Color:
    - a. Background: Brown – match existing building standard.
    - b. Lettering: Gold – match existing building standard.
  - 4. See Drawing A-7.

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Install interior signs square and plumb:
  - 1. Room Signs:
    - a. Install bracket using two screws. Use proper anchor for substrate.
    - b. Attach sign to bracket using set-screw.
    - c. Mount signs as described in Contract Drawings.
    - d. Match existing building standard.

**END OF SECTION**

**BLANK PAGE**

**SECTION 10 2113**  
**METAL TOILET COMPARTMENTS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install metal toilet compartments as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for blocking in wood framing for compartment installation and door bumper.
  - 2. Section 10 2813: 'Commercial Toilet Accessories'.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A484/A484M-18a, 'Standard Specification for General Requirements for Stainless Steel Bars, Billets, and Forgings'.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Color selection.
- B. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Warranty Documentation:
      - 1) Final, executed copy of Warranty.
    - b. Record Documentation:
      - 1) Manufacturers documentation:
        - a) Manufacturer's literature or cut sheet.
        - b) Color selection.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery And Acceptance Requirements:
  - 1. Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
  - 1. Store and handle in compliance with Manufacturer's instructions and recommendations.

**1.5 WARRANTY**

- A. Manufacturer Warranty:
  - 1. Manufacturer's standard warranty.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Type One Acceptable Manufacturers:
1. Accurate Partitions Inc, Lyons, IL [www.accuratepartitions.com](http://www.accuratepartitions.com).
  2. AMPCO Products Inc, Miami, FL [www.ampco.com](http://www.ampco.com).
  3. Columbia Partitions, Columbia, SC [www.psisc.com](http://www.psisc.com).
  4. Flush-Metal Partition Corp, Maspeth, NY [www.flushmetal.com](http://www.flushmetal.com).
  5. Global Steel Products Corp, Eastanollee, GA [www.globalpartitions.com](http://www.globalpartitions.com).
  6. Hadrian Inc, Mentor, OH [www.hadrian-inc.com](http://www.hadrian-inc.com).
  7. Knickerbocker Partitions Corp, Freeport, NY [www.knickerbockerpartition.com](http://www.knickerbockerpartition.com).
  8. Metpar, Westbury, NY [www.metpar.com](http://www.metpar.com).
  9. Equal as Approved by Architect before bidding. See Section 01 6200.

### 2.2 MANUFACTURED UNITS

- A. Toilet And Miscellaneous Partitions:
1. Floor-mounted, overhead-braced.
  2. Panels:
    - a. Galvanized bonderized steel sheets (minimum 0.00015 inch (0.004 mm) zinc coating).
    - b. Edges bound interlocked with drawn molding welded on corners.
    - c. Corners welded and ground smooth.
    - d. Sound deadening honeycomb core.
    - e. Provide wood blocking on all panels that have grab bars.
    - f. Gauge:
      - 1) Doors: 22 ga (0.08 mm) minimum.
      - 2) Panels: 22 ga (0.08 mm) minimum.
      - 3) Pilasters: 22 ga (0.08 mm) minimum.
      - 4) Screens: 22 ga (0.08 mm) minimum.
  3. Posts:
    - a. 20 ga (one mm) minimum of same construction and finish as panels.
  4. Headrails:
    - a. Aluminum.
    - b. 20 ga (one mm) minimum of same construction and finish as panels.
    - c. Anti-grip design.
  5. Plinths:
    - a. 20 ga (one mm) Type 304 stainless steel, Number 4 finish.
    - b. 3 inch (76 mm) minimum high, secured with concealed clips.
    - c. All fasteners used to attach Plinths, Posts and Pilasters to the floor shall be Type 304 stainless steel.
  6. Anchorages and fasteners:
    - a. Concealed: Non-corrosive, protective finish.
    - b. Tamper resistant Torx Head with pin screws.
  7. Hardware:
    - a. Each door:
      - 1) Gravity type hinges with double handed, nylon bottom cam, adjustable for partial door closing position, bottom hinge finished flush with door bottom.
      - 2) Sliding or concealed door bolt with emergency access.
      - 3) Door strike and keeper with rubber bumper.
      - 4) Coat hook / door bumper.
    - b. Finish: Chrome plated.
    - c. Meet requirements of ASTM B86, Alloy AG 40A.
- B. Urinal Partition:
1. Basic construction same as panels above, floor mounted.
  2. Width to be 16 inches (400 mm) minimum.

- a. Partition maximum width shall not encroach into required accessibility clear floor space.

## 2.3 FINISHES

- A. Finish And Color:
  - 1. Powder-coated paint finish.
  - 2. Class One Color Quality Standards. See Section 01 6200.

	<b>Almond</b>
a. Accurate:	920 Almond
b. Ampco:	466PC Porcelain
c. Columbia:	Tan
d. Global:	Almond 2103
e. Flush-Metal:	35 Beige or 70 Vanilla
f. Hadrian:	Almond 603
g. Knickerbocker:	Almond 1111
h. Metpar:	Almond 300

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification Of Conditions:
  - 1. Field verify dimensions.
  - 2. Verify that necessary blocking has been installed in framed walls for partition installation and for place where coat hook / door bumper will strike wall.

### 3.2 INSTALLATION

- A. Install pilasters rigid, plumb, and level. Maintain proper door openings. Anchor pilaster to floor with Type 304 stainless steel fasteners embedded **2 inches (50 mm)** into concrete slab below setting bed.
- B. Secure panels to walls with two stirrup brackets minimum attached near top and bottom of each panel. Use fasteners of length to provide **one-inch (25 mm)** embedment into blocking or masonry.
- C. Secure overhead brace to face sheets with two fasteners minimum per face. Set door tops parallel with brace. Set door bottom **12 inches (300 mm)** above floor.
- D. Plinth to be level with and snug to floor.

### 3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
  - 1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.
  - 2. Replace damaged or severely scratched materials with new materials at no additional cost to the Owner.

### 3.4 ADJUSTING

- A. Lubricate hardware as recommended by Manufacturer.

- B. Set hinges on out-swinging doors to return to nearly closed position.
- C. Perform final adjustments to pilaster leveling devices, door hardware, and other operating parts of partition assembly just before Substantial Completion.

### **3.5 CLEANING**

- A. Remove protective masking. Clean exposed surfaces of partitions, hardware, fittings, and accessories.
- B. Touch-up minor scratches and other finish imperfections using materials and methods recommended by Manufacturer.

**END OF SECTION**



**SECTION 10 2813****COMMERCIAL TOILET ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Included But Is Not Limited To:
  - 1. Selected accessories for Rest Rooms, and Universal Room:
    - a. Grab Bars.
    - b. Mirrors.
    - c. Sanitary Napkin Disposal Container.
    - d. Shelf.
    - e. Single Robe Hook.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for blocking.
  - 2. Section 06 2001: 'Common Finish Carpentry Requirements' for installation.
- C. Related Requirements:
  - 1. Section 01 1200: 'Multiple Contract Summary' soap dispensers, paper towel dispensers, and toilet tissue dispensers furnished and installed by Owner (FM Group).

**1.2 REFERENCES**

- A. Association Publications:
  - 1. United States Access Board:
    - a. Americans with Disabilities Act (ADA):
      - 1) ADA Standards:
        - a) ADA Accessibility Guidelines (ADAAG) (2004 or latest version).
  - 2. British Columbia Building Code 2018.
- B. Reference Standards:
  - 1. ASTM International:
    - a. A153/A153M-16a, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
    - b. ASTM A653/A653M-17, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
    - c. ASTM A666-15, 'Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar'.
    - d. ASTM C1036-18, 'Standard Specification for Flat Glass'.
    - e. ASTM F446-85(2009), 'Standard Consumer Safety Specification for Grab Bars and Accessories Installed in the Bathing Area'.
  - 2. International Code Council / American National Standards Institute:
    - a. ICC/ANSI A117.1-2017, 'Accessible and Usable Buildings and Facilities'.
  - 3. International Standard Organization:
    - a. ISO 25537:2008, 'Glass in Building - Silvered Flat Glass Mirror'.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:

- a. Manufacturer's product data sheets indicating operating characteristics, materials and finishes.
  - b. Mounting requirements and rough-in dimensions.
- 2. Shop Drawings:
  - a. Schedule showing items used, location where installed, and proper attaching devices for substrate.
- B. Informational Submittals:
  - 1. Manufacturers' Instructions:
    - a. Provide operation, care and cleaning instructions.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Warranty Documentation:
      - 1) Final, executed copy of Warranty for each product.
    - b. Record Documentation:
      - 1) Manufacturers documentation:
        - a) Manufacturer's literature or cut sheets.

## 1.4 QUALITY ASSURANCE

- A. Source Limitations:
  - 1. For products listed together in same Part 2 articles, obtain products from single source from single manufacturer.

## 1.5 WARRANTY

- A. Manufacturer Warranty:
  - 1. Manufacturer's standard warranty.
- B. Special Mirror Warranty:
  - 1. Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage or frame corrosion defects within specified warranty period:
    - a. Warranty Period: fifteen (15) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 OWNER FINISHED PRODUCTS

- A. Category One Approved Products (Furnished and Installed by Owner):
  - 1. Automatic Touchless Towel Dispensers:
  - 2. Soap dispensers.
  - 3. Toilet tissue dispensers.

### 2.2 MANUFACTURED UNITS

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. AJW Architectural Products, A&J Washroom Accessories, Inc., New Windsor, NY [www.ajwwashroom.com](http://www.ajwwashroom.com).
    - b. American Specialties Inc (ASI), Yonkers, NY [www.americanspecialties.com](http://www.americanspecialties.com).
    - c. Bobrick Washroom Equipment Inc, North Hollywood, CA [www.bobrick.com](http://www.bobrick.com) or Bobrick Washroom Equipment of Canada Ltd, Scarborough, ON (416) 298-1611.
    - d. Bradley Corp, Menomonee Falls, WI [www.bradleycorp.com](http://www.bradleycorp.com).

- e. General Accessory Manufacturing Co (GAMCO), Durant, OK [www.gamcousa.com](http://www.gamcousa.com).

B. Materials:

1. Design Criteria:
  - a. Stainless Steel: ASTM A666 Type 304 (18-8); satin finish exposed surfaces unless otherwise indicated.
  - b. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
  - c. Fasteners:
    - 1) Exposed: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant.
    - 2) Concealed: Galvanized Steel.
2. Rest Rooms:
  - a. Mirrors:
    - 1) Channel-Frame Mirror:
      - a) Frame: Type 304 or Type 430, 20 gauge stainless steel channel frame.
      - b) Roll-formed one piece construction.
      - c) Exposed surfaces have #4 satin finish.
      - d) Edges and corners are burr free.
      - e) Glass: 1/4 inch (6.4 mm) silver coated and hermetically sealed. Guaranteed for 15 years against silver spoilage. Mirrors meet ASTM C1036 requirements.
      - f) Concealed surface mounted wall hanger.
    - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) AJW Architectural Products: Model U711.
      - b) American Specialties (ASI): Model 0620.
      - c) Bobrick: Model B-165.
      - d) Bradley: Model 781.
      - e) General Accessory (GAMCO): Model C Series.
  - b. Sanitary Napkin Disposal Container:
    - 1) Design Criteria:
      - a) Surface mounted type 304, 22 gauge stainless steel with #4 satin finish. Seamless construction with radius and hemmed edges.
      - b) Stainless steel piano hinge.
    - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) AJW Architectural Products: Model U590.
      - b) American Specialties (ASI): Model 0852.
      - c) Bobrick: Model B-270.
      - d) Bradley: Model 4781-15.
      - e) General Accessory (GAMCO): Model ND-1.
  - c. Single Robe Hook:
    - 1) Surface mounted type 304, 22 gauge stainless steel with #4 satin finish.
    - 2) Concealed mounting bracket.
    - 3) Stainless steel locking setscrew on bottom.
    - 4) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) AJW Architectural Products: Model UX110SF.
      - b) American Specialties (ASI): Model 7340-S.
      - c) Bobrick: Model B6717.
      - d) Bradley: Model 9114.
      - e) General Accessory (GAMCO): Model 76717.
  - d. Grab Bars:
    - 1) Configuration shown on Contract Drawings. Include center support for longer lengths when required:
    - 2) Design Criteria:
      - a) Comply with ADA guidelines and ADAAG accessible design for structural strength and local codes and British Columbia Building Code 2018.
      - b) Concealed mount.
      - c) 18 ga (1.27 mm), type 304 stainless steel tubing.
      - d) 1-1/2 inch (38 mm) diameter.
      - e) Provide center support when required.
      - f) Snap-on flange covers.

- g) Peened (non-slip) finish.
- h) Sustain loads in excess of 900 lbs (408 kg).
- 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - a) AJW Architectural Products: Model UG3 Series.
  - b) American Specialties (ASI): Model 3800 Series.
  - c) Bobrick: Model B-6806 Series.
  - d) Bradley: Model 812 Series.
  - e) General Accessory (GAMCO): Model 150 Series.
- e. Shelf:
  - 1) Design Criteria:
    - a) 18 ga (1.27 mm), stainless steel with No. 4 Satin finish.
    - b) 8 inches (200 mm) wide.
  - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a) AJW Architectural Products:
    - b) American Specialties (ASI):
    - c) Bobrick: Model B-298.
    - d) Bradley:
    - e) General Accessory (GAMCO):

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Comply with ADA Accessibility Guidelines, British Columbia Building Code 2018, and installation heights as shown on Contract Drawings (7/A-8).
- B. Assemble fixtures and associated fittings and trim in accordance with manufacturer's instructions.
- C. Install using mounting devices proper for base structure.
- D. Install equipment level, plumb, and firmly in place in accordance with manufacturer's rough-in drawings.
- E. Where possible, mount like items in adjoining compartments back-to-back on same partition.
- F. Grab Bars:
  - 1. Install as per Manufacturers written installation instructions.
  - 2. Install grab bars to withstand downward force of not less than 250 lbf (1112 N) per ASTM F446.
- G. Locate as follows:
  - 1. Sanitary Napkin Disposal Containers: One at each water closet in Women's Rest Room and unisex handicapped Rest Room (5 total).
  - 2. Robe Hook:
    - a. One on partition panel within 12 inches (300 mm) of compartment hinge side door jamb and at same height as compartment latch in handicap stalls or as compartment latch in handicap stalls, or as directed on site (2 total).
    - b. One on building wall within 12 inches (300 mm) of door jamb and at same height as door lockset in unisex handicap Rest Room (1 total).
  - 3. Shelf:
    - a. Provide two 18 inch (450 mm) shelves (back to back) in each washroom (4 total). Provide single 18 inch (450 mm) shelf at unisex handicap Rest Room (1 total). Locations to be determined on site or as detailed.
  - 4. Grab bars:
    - a. Provide 1 each bent side at 3 toilet locations.
    - b. Provide 1 each straight back at 3 toilet locations.
    - c. Provide 2 each straight vertical at 1 urinal location.
  - 5. Mirrors:

- a. Provide (1) 24x36 inch mirror at each lavatory location (5 total) and (1) full length 24x60 inch mirror on the wall in each washroom (2 total).

### **3.2 REPAIR**

- A. Repair or replace defective work, including damaged equipment and components.
- B. Repair or replace malfunctioning equipment, or equipment with parts that bind or are misaligned.

### **3.3 CLEANING**

- A. Clean unit surfaces, and leave in ready-to-use condition.

### **3.4 ADJUSTING**

- A. Test each piece of equipment provided with moving parts to assure proper operation, freedom of movement, and alignment. Install new batteries in battery-powered items.

### **3.5 CLOSEOUT ACTIVITIES**

- A. Turn over keys, tools, maintenance instructions, and maintenance stock to Owner.

**END OF SECTION**

**BLANK PAGE**

## **DIVISION 22: PLUMBING**

### **22 0500 COMMON WORK RESULTS FOR PLUMBING**

22 0501 COMMON PLUMBING REQUIREMENTS  
22 0529 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT  
22 0553 IDENTIFICATION FOR PLUMBING PIPES AND EQUIPMENT  
22 0719 PLUMBING PIPING INSULATION

### **22 1000 PLUMBING PIPES AND PUMPS**

22 1116 DOMESTIC WATER PIPING  
22 1119 DOMESTIC WATER PIPING SPECIALTIES  
22 1313 FACILITY SEWERS  
22 1319 FACILITY SANITARY SEWER SPECIALTIES

### **22 4000 PLUMBING FIXTURES**

22 4213 COMMERCIAL WATER CLOSETS AND URINALS  
22 4216 COMMERCIAL LAVATORIES AND SINKS

END OF TABLE OF CONTENTS

BLANK PAGE



**SECTION 22 0501****COMMON PLUMBING REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Common requirements and procedures for plumbing systems.
  - 2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
  - 3. Furnish and install sealants relating to installation of systems installed under this Division.
  - 4. Furnish and install Firestop Penetration Systems for plumbing systems penetrations as described in Contract Documents.
  - 5. Refer to Drawings for seismic requirements.
- B. Products Furnished But Not Installed Under This Section:
  - 1. Sleeves, inserts, supports, and equipment for plumbing systems installed under other Sections.
- C. Related Requirements:
  - 1. Section 07 8400: 'Firestopping' for quality of penetration firestop systems to be used on Project and submittal requirements.
  - 2. Section 07 9213: 'Elastomeric Joint Sealant' for quality at building exterior.
  - 3. Sections Under 09 9000 Heading: 'Paints And Coatings' for painting of plumbing items requiring field painting.
  - 4. Division 26: 'Electrical' for raceway and conduit, unless specified otherwise, and line voltage wiring.
  - 5. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.

**1.2 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's catalog data for each manufactured item.
      - 1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
      - 2) Include name, address, and phone number of each supplier.
- B. Informational Submittals:
  - 1. Qualification Statement:
    - a. Plumbing Subcontractor:
      - 1) Provide Qualification documentation if requested by Architect or Owner.
    - b. Installer:
      - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):
      - 1) At beginning of PLUMBING section of Operations And Maintenance Manual, provide master index showing items included:

- a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and Plumbing subcontractor.
- b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
  - (1) List of plumbing equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
  - (2) Manufacturer's maintenance instructions for each piece of plumbing equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance instructions.
- b. Warranty Documentation:
  - 1) Include copies of warranties required in individual Sections of Division 22.

### 1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  - 1. Perform work in accordance with applicable provisions of Plumbing Codes applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
  - 2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.
  - 3. Identification:
    - a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.
- B. Qualifications. Requirements of Section 01 4301 applies, but not limited to following:
  - 1. Plumbing Subcontractor:
    - a. Company specializing in performing work of this section.
      - 1) Minimum five (5) years experience in plumbing installations.
      - 2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
    - b. Upon request, submit documentation.
  - 2. Installer:
    - a. Licensed for area of Project.
    - b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
    - c. Upon request, submit documentation.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  - 1. Accept valves on site in shipping containers with labeling in place.
  - 2. Provide temporary protective coating on cast iron and steel valves.
  - 3. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Storage And Handling Requirements:
  - 1. In addition to requirements specified in Division 01, stored material shall be readily accessible for inspection by Architect until installed.
  - 2. Store items subject to moisture damage in dry, heated spaces.

### 1.5 WARRANTY

- A. Manufacturer Warranty:
  - 1. Provide certificates of warranty for each piece of equipment made out in favor of Owner.

- B. Special Warranty:
  - 1. Guarantee plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
  - 2. If plumbing sub-contractor with offices located more than 150 miles (240 km) from Project site is used, provide service / warranty work agreement for warranty period with local plumbing sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

## PART 2 - PRODUCTS

### 2.1 COMPONENTS

- A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.
- B. Pipe And Pipe Fittings:
  - 1. Weld-O-Let and Screw-O-Let fittings are acceptable.
- C. Sleeves:
  - 1. General:
    - a. Two sizes larger than bare pipe or insulation on insulated pipe.
  - 2. In Framing And Suspended Floor Slabs:
    - a. Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga (2 mm) galvanized sheet metal.
- D. Valves:
  - 1. Valves of same type shall be of same manufacturer.

## PART 3 - EXECUTION

### 3.1 INSTALLERS

- A. Acceptable Installers:
  - 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

### 3.2 EXAMINATION

- A. Drawings:
  - 1. Plumbing Drawings show general arrangement of piping, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
  - 2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing Drawings.
  - 3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- B. Verification Of Conditions:
  - 1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which plumbing work is dependent for efficiency and report work that requires correction.

2. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.
3. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.
4. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

### 3.3 PREPARATION

#### A. Demolition Requirements:

1. See Demolition Floor Plan A-1, and Demolition Plumbing Supply and Sanitary Plan A-5.

#### B. Changes Due To Equipment Selection:

1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings showing proposed installations.
2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
3. Provide additional motors, valves, controllers, fittings, and other equipment required for proper operation of systems resulting from selection of equipment.
4. Be responsible for proper location of rough-in and connections provided under other Divisions.

### 3.4 INSTALLATION

#### A. Interface With Other Work:

1. Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
2. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and confirm that they are properly installed.

#### B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.

#### C. Locating Equipment:

1. Arrange pipes and equipment to permit ready access to valves, cocks, unions, traps, and to clear openings of doors and access panels.
2. Adjust locations of pipes, equipment, and fixtures to accommodate work to interferences anticipated and encountered.
3. Install plumbing work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
4. Determine exact route and location of each pipe before fabrication.
  - a. Right-Of-Way:
    - 1) Lines that pitch shall have right-of-way over those that do not pitch. For example, plumbing drains shall normally have right-of-way.
    - 2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
  - b. Offsets, Transitions, and Changes in Direction:
    - 1) Make offsets, transitions, and changes in direction in pipes as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.

- 2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.
- D. Penetration Firestops:
1. Install Penetration Firestop System appropriate for penetration at plumbing systems penetrations through walls, ceilings, roofs, and top plates of walls.
- E. Sealants:
1. Seal openings through building exterior caused by penetrations of elements of plumbing systems.
- F. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus:
1. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper installation of plumbing systems.
  2. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings:
    - a. Arrange so as to facilitate removal of tube bundles.
    - b. Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
      - 1) Make connections of dissimilar metals with di-electric unions.
      - 2) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
    - c. Do not use reducing bushings, bull head tees, close nipples, or running couplings. Street elbows are allowed only on potable water pipe **3/4 inch (19 mm)** in diameter and smaller.
    - d. Install piping systems so they may be easily drained
    - e. Install piping to insure noiseless circulation.
    - f. Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.
  3. Do not install piping in shear walls.
  4. Cut piping accurately to measurements established at site. Remove burr and cutting slag from pipes.
  5. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
  6. Make changes in direction with proper fittings.
  7. Expansion of Thermoplastic Pipe:
    - a. Provide for expansion in every **30 feet (9 meters)** of straight run.
    - b. Provide **12 inch (300 mm)** offset below roof line in each vent line penetrating roof.
  8. Expansion of PEX Pipe: Allow for expansion and contraction of PEX pipe as recommended by Pipe Manufacturer.
- G. Sleeves:
1. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete slabs on grade.
  2. Follow Pipe Manufacturer's recommendations for PEX pipe penetrations through studs.
- H. Escutcheons:
1. Provide spring clamp plates where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.

### 3.5 REPAIR / RESTORATION

- A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it:
1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.

2. Surface finishes shall exactly match existing finishes of same materials.

### **3.6 FIELD QUALITY CONTROL**

- A. Field Tests:
  1. Perform tests on plumbing piping systems. Furnish devices required for testing purposes.
- B. Non-Conforming Work:
  1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.
  2. Repeat tests on new material, if requested.

### **3.7 CLEANING**

- A. Remove dirt, grease, and other foreign matter from each length of piping before installation:
  1. After each section of piping used for movement of water is installed, flush with clean water, except where specified otherwise.
  2. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
  3. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.
- B. Clean exposed piping, equipment, and fixtures. Remove stickers from fixtures and adjust flush valves.

### **3.8 CLOSEOUT ACTIVITIES**

- A. Instruction of Owner:
  1. Instruct building maintenance personnel and Stake Physical Facilities Representative in operation and maintenance of plumbing systems utilizing Operation And Maintenance Manual when so doing.
  2. Conduct instruction period after Substantial Completion inspection when systems are properly working and before final payment is made.

### **3.9 PROTECTION**

- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

**END OF SECTION**

**SECTION 22 0529****HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Common hanger and support requirements and procedures for plumbing systems.
- B. Related Requirements:
  - 1. Section 07 8400: 'Firestopping' for quality of Penetration Firestop Systems to be used on Project and submittal requirements.
  - 2. Sections Under 09 9000 Heading: Painting of mechanical items requiring field painting.
  - 3. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.

**1.2 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's catalog data for each manufactured item.

**PART 2 - PRODUCTS****2.1 ASSEMBLIES**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Anvil International, Portsmouth, NH [www.anvilintl.com](http://www.anvilintl.com).
    - b. Cooper B-Line, Highland, IL [www.b-line.com](http://www.b-line.com).
    - c. Unistrut, Wayne, MI [www.tyco-unistrut.com](http://www.tyco-unistrut.com).
- B. Materials:
  - 1. Hangers, Rods, And Inserts
    - a. Galvanized and ULC approved for service intended.
    - b. Support horizontal piping from hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
      - 1) Support insulated pipes **2 inches (50 mm)** in diameter and smaller with adjustable swivel ring hanger with insulation protection shield. Gauge and length of shield shall be in accordance with Anvil design data.
        - a) Type Two Acceptable Products:
          - (1) Swivel Ring Hanger: Anvil Fig. 69.
          - (2) Insulation Protection Shield: Anvil Fig. 167.
          - (3) Equals by Cooper B-Line.
      - 2) Support insulated pipes **2-1/2 inches (64 mm)** in diameter and larger with clevis hanger or roller assembly with an insulation protection shield. Gauge and length of shield shall be according to Anvil design data.
        - a) Type Two Acceptable Products:
          - (1) Clevis Hanger: Anvil Fig. 260.
          - (2) Roller Assembly: Anvil Fig. 171.
          - (3) Insulation Protection Shield: Anvil Fig. 167.

- (4) Equals by Cooper B-Line.
- 3) Support uninsulated copper pipe **2 inches (50 mm)** in diameter and smaller from swivel ring hanger, copper plated and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from swivel ring hanger.
- a) Type Two Acceptable Products:
- (1) Swivel Ring Hanger For Copper Pipe: Anvil Fig. CT-69.
  - (2) Swivel Ring Hanger For Other Pipe: Anvil Fig. 69.
  - (3) Equals by Cooper B-Line.
- 4) Support uninsulated copper pipe **2-1/2 inches (64 mm)** in diameter and larger from clevis hanger, copper plated hangers and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from clevis hanger.
- a) Type Two Acceptable Products:
- (1) Clevis Hanger For Copper Pipe: Anvil Fig. CT-65.
  - (2) Clevis Hanger For Other Pipe: Anvil Fig. 260.
  - (3) Equals by Cooper B-Line.
- c. Support rods for single pipe shall be in accordance with following table:

Rod Diameter	Pipe Size	Rod Diameter	Pipe Size
3/8 inch	2 inches and smaller	10 mm	50 mm and smaller
1/2 inch	2-1/2 to 3-1/2 inches	13 mm	64 mm to 88 mm
5/8 inch	4 to 5 inches	16 mm	100 mm to 125 mm
3/4 inch	6 inches	19 mm	150 mm
7/8 inch	8 to 12 inches	22 mm	200 mm to 300 mm

- d. Support rods for multiple pipe supported on steel angle trapeze hangers shall be in accordance with following table:

Rods		Number of Pipes per Hanger for Each Pipe Size						
Number	Diameter	2 Inch	2.5 Inch	3 Inch	4 Inch	5 Inch	6 Inch	8 Inch
2	3/8 Inch	Two	0	0	0	0	0	0
2	1/2 Inch	Three	Three	Two	0	0	0	0
2	5/8 Inch	Six	Four	Three	Two	0	0	0
2	5/8 Inch	Nine	Seven	Five	Three	Two	Two	0
2	5/8 Inch	Twelve	Nine	Seven	Five	Three	Two	Two

Rods		Number of Pipes per Hanger for Each Pipe Size						
Number	Diameter	50mm	64mm	75mm	100mm	125mm	150mm	200mm
2	10 mm	Two	0	0	0	0	0	0
2	13 mm	Three	Three	Two	0	0	0	0
2	16 mm	Six	Four	Three	Two	0	0	0
2	19 mm	Nine	Seven	Five	Three	Two	Two	0
2	22 mm	Twelve	Nine	Seven	Five	Three	Two	Two

- 1) Size trapeze angles so bending stress is less than **10,000 psi (69 MPa)**.
- e. Riser Clamps For Vertical Piping:
- 1) Type Two Acceptable Products:
- a) Anvil Fig. 261.
  - b) Equals by Cooper B-Line.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. Piping:

1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.



- a. Except for underground pipe, suspend piping from upper ceiling or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.
- b. Supports For Horizontal Piping:
  - 1) Support metal piping at **96 inches (2 400 mm)** on center maximum for pipe **1-1/4 inches (32 mm)** or larger and **72 inches (1 800 mm)** on center maximum for pipe **1-1/8 inch (29 mm)** or less.
  - 2) Support thermoplastic pipe at **48 inches (1 200 mm)** on center maximum.
  - 3) Support PEX pipe at **32 inches (800 mm)** minimum on center.
  - 4) Provide support at each elbow. Install additional support as required.
- c. Supports for Vertical Piping:
  - 1) Place riser clamps at each floor or ceiling level.
  - 2) Securely support clamps by structural members, which in turn are supported directly from building structure.
  - 3) Provide clamps as necessary to brace pipe to wall.
- d. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.

### END OF SECTION

**BLANK PAGE**

**SECTION 22 0553****IDENTIFICATION FOR PLUMBING PIPES AND EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install identification of plumbing piping and equipment as described in Contract Documents.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Materials:
  - 1. Paint:
    - a. One Coat Primer:
      - 1) 6-2 Quick Drying Latex Primer Sealer over fabric covers.
      - 2) 6-205 Metal Primer under dark color paint.
      - 3) 6-6 Metal Primer under light color paint.
    - b. Finish Coats: Two coats 53 Line Acrylic Enamel.
    - c. Performance Standard: Paints specified are from Pittsburgh Paint & Glass (PPG), Pittsburgh, PA [www.pittsburghpaints.com](http://www.pittsburghpaints.com) or PPG Canada Inc, Mississauga, ON (800) 263-4350 or (905) 238-6441.
    - d. Type Two Acceptable Products. See Section 01 6200.
      - 1) Paint of equal quality from following Manufacturers may be submitted for Architect's approval before use. Maintain specified colors, shades, and contrasts.
        - a) Benjamin Moore, Montvale, NJ [www.benjaminmoore.com](http://www.benjaminmoore.com) or Toronto, ON (800) 304-0304 or (416) 766-1176.
        - b) ICI Dulux, Cleveland, OH or ICI Paints Canada Inc, Concord, ON [www.dulux.com](http://www.dulux.com).
        - c) Sherwin Williams, Cleveland, OH [www.sherwin-williams.com](http://www.sherwin-williams.com).




**PART 3 - EXECUTION****3.1 APPLICATION**

- A. Painting:
  - 1. Only painted legends, directional arrows, and color bands are acceptable.
  - 2. Locate identifying legends, directional arrows, and color bands at following points on exposed piping of each piping system:
    - a. Adjacent to each item of equipment.
    - b. At point of entry and exit where piping goes through wall.
    - c. On each riser and junction.
    - d. Every **25 feet (7.6 m)** on long continuous lines.
    - e. Stenciled symbols shall be one inch high and black.

**3.2 ATTACHMENTS**

- A. Schedules:
  - 1. Pipe Identification Schedule:

- a. Apply stenciled symbols as follows:

Pipe Use	Abbreviation	Direction of Flow
Domestic Cold Water	CW	
Domestic Hot Water	HW	
Domestic Recirc Water	HW Recirc	

**END OF SECTION**

**SECTION 22 0719****PLUMBING PIPING INSULATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Furnish and install insulation on hot and cold water lines, fittings, valves, and accessories as described in Contract Documents.
- B. Related Requirements:
1. Section 22 1116: 'Domestic Water Piping'.

**PART 2 - PRODUCTS****2.1 COMPONENTS**

- A. Manufacturers:
1. Manufacturer Contact List:
    - a. Armacell, Mebane, NC [www.armacell.com](http://www.armacell.com).
    - b. Childers Products Co, Eastlake, OH [www.fosterproducts.com](http://www.fosterproducts.com).
    - c. IMCOA, Youngsville, NC [www.nomacokflex.com](http://www.nomacokflex.com).
    - d. Johns-Manville, Denver, CO [www.jm.com](http://www.jm.com).
    - e. Knauf, Shelbyville, IN [www.knauffiberglass.com](http://www.knauffiberglass.com).
    - f. Manson, Brossard, PQ, Canada [www.isolationmanson.com](http://www.isolationmanson.com).
    - g. Nomaco Inc, Yopungsville, NC [www.nomacokflex.com](http://www.nomacokflex.com).
    - h. Owens-Corning, Toledo, OH [www.owenscorning.com](http://www.owenscorning.com).
    - i. Speedline Corp, Solon, OH [www.speedlinepvc.com](http://www.speedlinepvc.com).
- B. Materials:
1. Above Grade Metal Piping:
    - a. Insulation For Piping:
      - 1) Snap-on glass fiber or melamine foam pipe insulation, or heavy density pipe insulation with factory vapor jacket.
      - 2) Insulation Thickness:

Service Water Temperature	Pipe Sizes		
	Up to 1-1/4 In	1-1/2 to 2 In	Over 2 In
170 - 180 Deg F	One In	1-1/2 In	2 In
140 - 160 Deg F	1/2 In	One In	1-1/2 In
45 - 130 Deg F	1/2 In	1/2 In	One In

Service Water Temperature	Pipe Sizes		
	Up to 32 mm	38 to 50 mm	Over 50 mm
77 - 82 Deg C	25 mm	38 mm	50 mm
60 - 71 Deg C	13 mm	25 mm	38 mm
7 - 54 Deg C	13 mm	13 mm	25 mm

- 3) Performance Standards: Fiberglas ASJ by Owens-Corning.
- 4) Type One Acceptable Manufacturers:
  - a) Childers Products.
  - b) Knauf.

- c) Manson.
  - d) Owens-Corning.
  - e) Johns-Manville.
  - f) Equal as approved by Architect before bidding. See Section 01 6200.
- b. Fitting, Valve, And Accessory Covers:
  - 1) PVC.
  - 2) Performance Standard: Zeston by Johns-Manville.
  - 3) Type One Acceptable Manufacturers:
    - a) Knauf.
    - b) Speedline.
    - c) Johns-Manville.
    - d) Equal as approved by Architect before bidding. See Section 01 6200.
- 2. Pex Piping, Above Grade:
  - a. Insulation:
    - 1) 1/2 inch (13 mm) thick.
    - 2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
      - a) SS Tubolit by Armacell.
      - b) ImcoLock by Imcoa.
      - c) Nomalock or Therma-Cel by Nomaco.
  - b. Joint Sealant:
    - 1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
      - a) Armacell 520.
      - b) Nomaco K-Flex R-373.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. Above Grade Piping:
  - 1. Apply insulation to clean, dry piping with joints tightly butted.
  - 2. Install insulation in manner to facilitate removal for repairs. Place sections or blocks so least possible damage to insulation will result from inspection or repairs of piping or equipment.
  - 3. Piping up to 1-1/4 inch (32 mm) Diameter:
    - a. Adhere 'factory applied vapor barrier jacket lap' smoothly and securely at longitudinal laps with white vapor barrier adhesive.
    - b. Adhere 3 inch (76 mm) wide self-sealing butt joint strips over end joints.
  - 4. Piping 1-1/2 inches (38 mm) Diameter And Larger:
    - a. Use broken-joint construction in application of two-layer covering.
    - b. Fill cracks and depressions with insulating cement mixed to thick plastic paste.
      - 1) Apply by hand in several layers to make up total specified thickness.
      - 2) Final layer shall have smooth uniform finish before application of covering.
  - 5. Fittings, Valves, And Accessories:
    - a. Do not apply insulation over flanged joints or victaulic couplings until piping has been brought up to operating temperature and flange bolts have been fully tightened. Insulate valves so wheel, stem, and packing nut are exposed.
    - b. Insulate with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in.
    - c. Piping Up To 1-1/4 Inch (32 mm) Diameter:
      - 1) Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
      - 2) Alternate Method:
        - a) Insulate fittings, valves, and accessories with one inch of insulating cement and vapor seal with two 1/8 inch (3 mm) wet coats of vapor barrier mastic reinforced with glass fabric extending 2 inches (50 mm) onto adjacent insulation.
    - d. Piping 1-1/2 inches (38 mm) To 2 Inches (50 mm):
      - 1) Insulate with hydraulic setting insulating cement or equal, to thickness equal to adjoining pipe insulation.
      - 2) Apply final coat of fitting mastic over insulating cement.

- e. Piping **2-1/2 inch (64 mm)** And Larger:
  - 1) Insulate with segments of molded insulation securely wired in place and coated with skim coat of insulating cement.
  - 2) Apply fitting mastic, fitting tape and finish with final coat of fitting mastic.
- 6. Pipe Hangers:
  - a. Do not allow pipes to come in contact with hangers.
  - b. Pipe Shield:
    - 1) Provide schedule 40 PVC by **6 inch (150 mm)** long at each clevis and/or unistrut type hanger.
    - 2) Provide **16 ga (1.64 mm)** by **6 inch (150 mm)** long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.
    - 3) Provide **22 ga (0.85 mm)** by **6 inch (150 mm)** long galvanized shield at each pipe hanger to protect insulation from crushing by Unistrut type hanger.
  - c. At Pipe Hangers:
    - 1) Provide rigid calcium silicate insulation (**100 psi (690 kPA)** compressive strength) at least **2 inches (50 mm)** beyond shield.
- 7. Protect insulation wherever leak from valve stem or other source might drip on insulated surface, with aluminum cover or shield rolled up at edges and sufficiently large in area and of shape that dripping will not splash on surrounding insulation.

**END OF SECTION**

**BLANK PAGE**



**SECTION 22 1116****DOMESTIC WATER PIPING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Perform excavating and backfilling required by work of this Section.
  - 2. Furnish and install potable water piping complete with necessary valves, connections, and accessories inside building as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 22 0501: 'Common Piping Requirements'.
  - 2. Section 22 0719: 'Plumbing Piping Insulation'.
  - 3. Section 31 2323: 'Fill' for criteria for performance of backfill.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. American National Standards Institute / American Society of Sanitary Engineers:
    - a. ANSI/ASSE 1003-2009, 'Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems'.
    - b. ANSI/ASSE 1017-2009, 'Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems'.
    - c. ANSI/ASSE 1070-2015, 'Performance Requirements for Water Temperature Limiting Devices'.
  - 2. American Water Works Association:
    - a. AWWA C904-16, 'Cross-Linked Polyethylene (PEX) Pressure Pipe, 1/2 inch (12 mm) Through 3 inch (76 mm) for Water Service'.
  - 3. ASTM International:
    - a. ASTM B88-16, 'Standard Specification for Seamless Copper Water Tube'.
    - b. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
    - c. ASTM F876-17, 'Standard Specification for Crosslinked Polyethylene (PEX) Tubing'.
    - d. ASTM F877-18a, 'Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems'.
    - e. ASTM F1807-18a, 'Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing'.
    - f. ASTM F2023-15, "Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water'.
    - g. ASTM F2389-17a, 'Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems'.
  - 4. CSA Group (Canadian Standards Association):
    - a. CSA B137 Series-17, 'Thermoplastic Pressure Piping Compendium':
      - 1) B137.5, 'Crosslinked Polyethylene (PEX) tubing Systems for Pressure Applications'.
    - b. CSA B356-10 (R2015), 'Water pressure reducing valves for domestic water supply systems'.
  - 5. NSF International Standard:
    - a. NSF P171, 'Protocol for Chlorine Resistance of Plastic Piping Materials' (1999).
  - 6. NSF International Standard / American National Standards Institute:
    - a. NSF/ANSI 14-2018, 'Plastic Piping System Components and Related Materials'.
    - b. NSF/ANSI 61-2017, 'Drinking Water System Components - Health Effects'.

- c. NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.

### 1.3 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's Literature:
      - 1) PEX pipe and PEX pipe fittings.
  - 2. Samples:
    - a. PEX pipe fitting.
- B. Informational Submittals:
  - 1. Test And Evaluation Reports:
    - a. Written report of sterilization test.

### 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  - 1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.
  - 2. British Columbia Building Code 2018.

### 1.5 WARRANTY

- A. Manufacturer Warranty:
  - 1. Manufacturer's Standard Warranty for piping.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Aquatherm, Inc., Lindon, UT [www.aquathermpipe.com](http://www.aquathermpipe.com).
    - b. Acorn Controls, City of Industry, CA [www.acorneng.com](http://www.acorneng.com)
    - c. Cash Acme, Cullman, AL [www.cashacme.com](http://www.cashacme.com)
    - d. Chicago Faucets, Des Plaines, IL, [www.chicagofaucets.com](http://www.chicagofaucets.com).
    - e. Cla-Val Company, Costa Mesa, CA or Cla-Val Canada Ltd, Beamsville, ON [www.cla-val.com](http://www.cla-val.com).
    - f. Conbraco Industries Inc, Matthews, NC [www.conbraco.com](http://www.conbraco.com) or Conbraco (Honeywell Ltd), Scarborough, ON (416) 293-8111.
    - g. Hammond Valve, New Berlin, WI [www.hammondvalve.com](http://www.hammondvalve.com).
    - h. Handy & Harmon Products Div, Fairfield, CT [www.handyharmon.com](http://www.handyharmon.com) or Handy and Harmon of Canada Ltd, Rexdale, ON (800) 463-1465 or (416) 675-1860.
    - i. Harris Products Group, Cincinnati, OH [www.harrisproductsgroup.com](http://www.harrisproductsgroup.com).
    - j. Honeywell Inc, Minneapolis, MN [www.honeywell.com](http://www.honeywell.com).
    - k. Leonard Valve Co, Cranston, RI [www.leonardvalve.com](http://www.leonardvalve.com).
    - l. Milwaukee Valve Co, New Berlin, WI [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
    - m. Nibco Inc, Elkhart, IN [www.nibco.com](http://www.nibco.com).
    - n. Nupi Americas, Early Branch, SC [www.nupiamericas.com](http://www.nupiamericas.com).
    - o. Rehau, Leesburg, VA [www.rehau-na.com](http://www.rehau-na.com).
    - p. Sloan Valve Co, Franklin Park, IL [www.sloanvalve.com](http://www.sloanvalve.com).

- q. Spence Engineering Co, Walden, NY [www.spenceengineering.com](http://www.spenceengineering.com).
- r. Symmons Industries, Braintree, MA [www.symmons.com](http://www.symmons.com).
- s. Uponor Inc, Apple Valley, MN [www.uponor-usa.com](http://www.uponor-usa.com).
- t. Viega ProPress, Wichita, KS [www.viega-na.com](http://www.viega-na.com).
- u. Watts Regulator Co, Andover, MA [www.wattsreg.com](http://www.wattsreg.com).
- v. Wilkins (Zurn Wilkins), Paso Robles, CA [www.zurn.com](http://www.zurn.com).
- w. Zurn PEX, Inc., Commerce, TX [www.zurnpex.com](http://www.zurnpex.com).

B. Materials:

1. Design Criteria:
  - a. All drinking water products, components, and materials above and below grade used in drinking water systems must meet NSF International Standards for Lead Free.
  - b. No CPVC allowed.
2. Pipe:
  - a. Copper:
    - 1) Above-Grade:
      - a) Meet requirements of ASTM B88, Type L.
  - b. Cross-Linked Polyethylene (PEX):
    - 1) Certified with NSF International against NSF Standards NSF/ANSI 14, NSF/ANSI 61, NSF/ANSI 372, and NSF P171 Protocol.
    - 2) Copper tube size (CTS) outside dimensions and Standard Dimension Ratio (SDR) of 9.
    - 3) Pressure rated for **160 psi (1.10 MPa)** at **73 deg F (22.8 deg C)**, **100 psi (0.69 MPa)** at **180 deg F (82 deg C)**, and **80 psi (0.552 MPa)** at **200 deg F (93 deg C)**.
    - 4) Marked with Manufacturer's name, design pressure and temperature ratings, and third party certification stamp for NSF-PW.
    - 5) Manufactured by Engel or peroxide method (PEX-A) or by silane method (PEX-B).
    - 6) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) `RaupeX by Rehau.
      - b) Wirsbo Aquapex by Uponor.
      - c) ViegaPEX by Viega.
      - d) Zurn PEX by Zurn PEX.
3. Fittings:
  - a. For Copper Pipe: Wrought copper.
  - b. For PEX Pipe:
    - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) Everloc by Rehau.
      - b) Viega PEX Press Zero Lead Fittings with attached stainless steel sleeves or Viega PEX Press Radel-R Polymer with attached stainless steel sleeves by Viega.
      - c) ProPEX fittings by Uponor including EP flow-through multiport tees.
      - d) Zurn PEX XL, DZR and CR fittings.
4. Connections For Copper Pipe:
  - a. Above-Grade:
    - 1) Sweat copper type with 95/5 or 96/4 Tin-Antimony solder, Bridgit solder, or Silvabrite 100 solder. Use only lead-free solder.
    - 2) Viega ProPress System
5. Ball Valves:
  - a. Use ball valves exclusively unless otherwise specified. Ball valves shall be by single manufacturer from approved list below.
  - b. Valves shall be two-piece, full port for **150 psi (1.03 MPa)** SWP.
    - 1) Operate with flow in either direction, suitable for throttling and tight shut-off.
    - 2) Body: Bronze, **150 psig (1.03 MPa)** wsp at **350 deg F (177 deg C)** and **400 psig (2.76 MPa)** wog.
    - 3) Seat: Bubble tight at **100 psig (0.69 MPa)** under water.
  - c. Class One Quality Standard: Nibco T585 or S585.
    - 1) Equal by Conbraco 'Apollo,' Hammond, Milwaukee, or Watts.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Locate cold water lines a minimum of 6 inches (150 mm) from hot water line.

### **3.2 FIELD QUALITY CONTROL**

- A. Field Tests:
  - 1. Before pipes are covered, test systems in presence of Architect/Engineer at 125 psig (0.86 MPa) hydrostatic pressure for four (4) hours and show no leaks.
  - 2. Disconnect equipment not suitable for 125 psig (0.86 MPa) pressure from piping system during test period.

### **3.3 CLEANING**

- A. Sterilize potable water system with solution containing 200 parts per million minimum of available chlorine and maintaining pH of 7.5 minimum. Introduce chlorinating materials into system in manner approved by Architect/Engineer. Allow sterilization solution to remain for twenty-four (24) hours and open and close valves and faucets several times during that time.
- B. After sterilization, flush solution from system with clean water until residual chlorine content is less than 0.2 parts per million.
- C. Water system will not be accepted until negative bacteriological test is made on water taken from system. Repeat dosing as necessary until such negative test is accomplished.

**END OF SECTION**

**SECTION 22 1119****DOMESTIC WATER PIPING SPECIALTIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install miscellaneous potable water piping specialties as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 22 0501: 'Common Plumbing Requirements'.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. NSF International Standard / American National Standards Institute:
    - a. NSF/ANSI 61-2014a, 'Drinking Water System Components - Health Effects'.
    - b. NSF/ANSI 372-2011, 'Drinking Water System Components - Lead Content'.

**1.3 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.
  - 2. British Columbia Building Code 2018.

**PART 2 - PRODUCTS****2.1 ACCESSORIES**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Ashcroft, Stratford, CT [www.ashcroftinc.com](http://www.ashcroftinc.com).
    - b. H O Trerice, Oak Park, MI [www.hotco.com](http://www.hotco.com).
    - c. IPS Corporation, Compton, CA [www.ipscorp.com](http://www.ipscorp.com).
    - d. Josam Co, Michigan City, IN [www.josam.com](http://www.josam.com).
    - e. Jay R. Smith Manufacturing Co, Montgomery, AL [www.jrsmith.com](http://www.jrsmith.com).
    - f. Prier Products, Inc., Grandview, MD [www.prier.com](http://www.prier.com).
    - g. Proset Systems Inc., Lawrenceville, GA [www.prosetsystems.com](http://www.prosetsystems.com).
    - h. Sioux Chief Manufacturing Co, Peculiar, MO [www.siouxchief.com](http://www.siouxchief.com).
    - i. Sure Seal, Tacoma, WA [www.thesureseal.com](http://www.thesureseal.com).
    - j. Wade (Division of Tyler Pipe), Tyler, TX [www.wadedrains.com](http://www.wadedrains.com).
    - k. Watts Drainage, Spindale, NC [www.watts.com](http://www.watts.com) or Watts Industries, Burlington, ON, Canada [www.wattscda.com](http://www.wattscda.com).
    - l. Weiss Instruments, Inc., Holtsville, NY [www.weissinstruments.com](http://www.weissinstruments.com).
    - m. Woodford Manufacturing, Colorado Springs, CO [www.woodfordmfg.com](http://www.woodfordmfg.com).
    - n. Zurn Cast Metals, Erie, PA or Zurn Industries Limited, Mississauga, ON [www.zurn.com](http://www.zurn.com).

- B. Materials:
  - 1. Trap Guard Trap Seal:
    - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) MIFAB MI-GARD – See Sheet A-6.
      - a) Install per Manufacturer's recommendations.
  - 2. Water Hammer Arrestors:
    - a. Design Criteria:
      - 1) Meet NSF International Standards for Lead Free.
      - 2) Nesting type, air pre-charged bellows with casing.
      - 3) Bellows constructed of stabilized 18-8 stainless steel.
    - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) Josam: 75003.
      - 2) Jay R. Smith: 5020.
      - 3) Sioux Chief: 650 Series.
      - 4) Wade: 20.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Gauges: Connect to pipe with 1/4 inch (6 mm) connections utilizing gauge cocks.
- B. Locate Water Hammer Arrestors in piping route to meet Code.

**END OF SECTION**

**SECTION 22 1313****FACILITY SANITARY SEWERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install soil, waste, and vent piping systems within building and connect with existing outside utility lines from building where applicable.
  - 2. Perform excavation and backfill required by work of this Section.
- B. Related Requirements:
  - 1. Section 07 8400: 'Firestopping' for quality of firestopping material.
  - 2. Section 22 0501: 'Common Plumbing Requirements'.
  - 3. Section 22 1319: 'Facility Sanitary Sewer Specialties' for furnishing of sewer specialties.
  - 4. Section 31 2323: 'Fill' for criteria for performance of backfill and compaction.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference: Participate in pre-installation conference specified in Section 03 3111.

**1.3 REFERENCES**

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM D2235-04(2016), 'Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings'.
    - b. ASTM D2321-18, 'Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications'.
    - c. ASTM F628-12, 'Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core'.
  - 2. CSA Group (Canadian Standards Association):
    - a. CSA B602-16, 'Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe'.
    - b. CSA B1800-18, 'Thermoplastic Nonpressure Pipe Compendium':
      - 1) CSA-B182.1, 'Plastic Drain and Sewer Pipe and Pipe Fittings'.
      - 2) CSA B182.2, 'PSM Type Polyvinylchloride (PVC) Sewer Pipe Fittings'.
  - 3. British Columbia Building Code 2018.

**PART 2 - PRODUCTS****2.1 SYSTEMS**

- A. Materials:
  - 1. Piping And Fittings: ABS Schedule 40 cellular core plastic pipe and pipe fittings meeting requirements of ASTM F628, joined with pipe cement meeting requirements of ASTM D2235.
    - a. Furnish wall cleanouts with chrome wall cover and screw.
  - 2. Cleanouts:
    - a. Furnish wall cleanouts with chrome wall cover and screw.
    - b. Type Two Acceptable Products:
      - 1) Finish Floors:
        - a) Josam: 56010.

- b) J. R. Smith: 4023.
- c) Mifab: C1100C-R-1.
- d) Wade: W-6000.
- e) Watts: CO-200-R.
- f) Zurn: Z-1402.
- 2) Finished Wall:
  - a) Josam: 58790.
  - b) J. R. Smith: 4530.
  - c) Mifab: C1460RD.
  - d) Wade: W8560E.
  - e) Watts: CO-460-RD.
  - f) Zurn: Z-1446.
- 3) Exposed Drain Lines:
  - a) Josam: 58910.
  - b) J. R. Smith: 4510.
  - c) Mifab: C1460.
  - d) Wade: W8560B.
  - e) Watts: CO-460.
  - f) Zurn: Z-1440.
- 4) General Purpose:
  - a) Josam: 58900.
  - b) J. R. Smith: 4400.
  - c) Mifab: C1300-MF
  - d) Wade: W8550E.
  - e) Watts: CO-380.
  - f) Zurn: Z-1440.
- 5) Equal as approved by Architect before installation. See Section 01 6200.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Excavate and backfill as specified in Section 31 2323 with following additional requirements:
  - 1. Runs shall be as close as possible to those shown on Drawings.
  - 2. Excavate to required depth and grade to obtain fall required. Grade soil and waste lines within building perimeter **1/4 inch (6 mm)** fall in **one foot (300 mm)** in direction of flow.
  - 3. Bottom of trenches shall be hard. Tamp as required.
  - 4. Remove debris from trench before laying of pipe.
  - 5. Do not cut trenches near footings without consulting Architect.
- B. Thermoplastic Pipe And Fittings:
  - 1. General: Piping and joints shall be clean and installed according to Manufacturer's recommendations. Break down contaminated joints, clean seats and gaskets and reinstall.
  - 2. Above Grade: Locate pipe hangers every **4 feet (1.2 m)** on center maximum and at elbows.
  - 3. Below Grade:
    - a. Install in accordance with Manufacturer's recommendations and ASTM D2321.
    - b. Stabilize unstable trench bottoms.
    - c. Bed pipe true to line and grade with continuous support from firm base.
      - 1) Bedding depth: **4 to 6 inches (100 to 150 mm)**.
      - 2) Material and compaction to meet ASTM standard noted above.
    - d. Excavate bell holes into bedding material so pipe is uniformly supported along its entire length. Blocking to grade pipe is forbidden.
    - e. Trench width at top of pipe:
      - 1) Minimum: **18 inches (450 mm)** or diameter of pipe plus **12 inches (300 mm)**, whichever is greater.
      - 2) Maximum: Outside diameter of pipe plus **24 inches (600 mm)**.
    - f. Do not use backhoe or power equipment to assemble pipe.



- g. Initial backfill shall be **12 inches (300 mm)** above top of pipe with material specified in referenced ASTM standard.
- C. Install piping so cleanouts may be installed as follows:
  - 1. Where shown on Drawings and near bottom of each stack and riser.
  - 2. At every 135 degrees of accumulative change in direction for horizontal lines.
  - 3. Every **100 feet (30 meters)** of horizontal run.
  - 4. Extend piping to accessible surface. Do not install piping so cleanouts must be installed in carpeted floors. In such locations, configure piping so wall type cleanouts may be used.
- D. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system so gasses pass freely to atmosphere with no pressure or siphon condition on water seal.
- E. Vent entire waste system to atmosphere. Join lines together in fewest practicable numbers before connecting to existing vent through roof.
- F. Furnish and install firestopping at penetrations of fire-rated structures as required under Sections 07 8400 and 22 0501.
- G. If test Tees are used for testing, plug Tees so wall finish can be installed. Do not leave as exposed cleanouts.
- H. Provide insulation wrap over vent lines extending 10 feet (3M) into warm space.

### 3.2 FIELD QUALITY CONTROL

- A. Field Tests:
  - 1. Conduct tests for leaks and defective work. Notify Architect before testing.
  - 2. Thermoplastic Pipe System:
    - a. Before backfilling and compacting of trenches, Fill waste and vent system with water to roof level or **10 feet (3 meters)** minimum, and show no leaks for two hours. Correct leaks and defective work.
    - b. After backfilling and compacting of trenches is complete but before placing floor slab, re-test as specified above. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.

**END OF SECTION**

**BLANK PAGE**

**SECTION 22 1319****FACILITY SANITARY SEWER SPECIALTIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under this Section as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 09 3013: 'Ceramic Tile' for floor drains in ceramic tile floors.
  - 2. Section 22 0501: 'Common Plumbing Requirements'.
  - 3. Section 22 1119: 'Domestic Water Piping Specialties'.
  - 4. Section 22 1313: 'Facility Sanitary Sewers' for installation of miscellaneous sanitary sewer specialties.

**PART 2 - PRODUCTS****2.1 SYSTEMS**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Josam Co, Michigan City, IN [www.josam.com](http://www.josam.com).
    - b. Jay R. Smith Manufacturing Co, Montgomery, AL [www.jrsmith.com](http://www.jrsmith.com).
    - c. Mifab Manufacturing Inc, Chicago, IL [www.mifab.com](http://www.mifab.com).
    - d. Proset Systems, Lawrenceville, GA [www.prosetsystems.com](http://www.prosetsystems.com).
    - e. Sioux Chief Manufacturing Co, Peculiar, MO [www.siouxchief.com](http://www.siouxchief.com).
    - f. Sureseal Manufacturing, Tacoma WA [www.thesureseal.com](http://www.thesureseal.com).
    - g. Wade Div Tyler Pipe, Tyler, TX [www.wadedrains.com](http://www.wadedrains.com).
    - h. Watts Drainage, Spindale, NC [www.watts.com](http://www.watts.com) or Watts Industries, Burlington, ON, Canada [www.wattscda.com](http://www.wattscda.com).
    - i. Zurn Industries, LLC, Erie PA [www.zurn.com](http://www.zurn.com). or Zurn Industries Ltd, Mississauga, ON (905) 795-8844.
- B. Performance:
  - 1. Design Criteria:
    - a. All materials NOT required to be low lead compliant.
- C. Components:
  - 1. Drains And Drain Accessories (See Drawing A-6):
    - a. Floor Drain FD-1:
      - 1) Approved types with deep seal trap and chrome plated strainer.
      - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
        - a) Josam: 30000-50-Z-5A.
        - b) J. R. Smith: 2010-A.
        - c) Mifab: F-1100-C.
        - d) Sioux Chief: 832.
        - e) Wade: 1100.
        - f) Watts: FD-200-A.
        - g) Zurn: Z-415.
- D. Accessories:
  - 1. Drain Accessories:
    - a. Floor Drains:

- 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - a) MIFAB – MIGARD (2/A-6).

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**

**SECTION 22 4213****COMMERCIAL WATER CLOSETS AND URINALS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install plumbing fixtures as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 07 9213: 'Elastomeric Joint Sealants' for sealants used between fixtures and other substrates.
  - 2. Section 22 0501: 'Common Plumbing Requirements'.
  - 3. Section 22 1116: 'Domestic Water Piping'.

**1.2 REFERENCES**

- A. Definitions:
  - 1. High-Efficiency Toilet (HET): Toilets with effective flush volume of 1.28 gallons (4.8 liters) or less.
  - 2. Maximum Performance (MaP): Toilet testing that rates toilet efficiency and flush performance by measuring number of grams of solid waste (soybean paste and toilet paper) that a toilet can flush and remove completely from fixture in single flush represented as a scale or score. 1000 grams is highest score possible ([www.map-testing.com](http://www.map-testing.com)).
- B. Reference Standards:
  - 1. American Society of Mechanical Engineers / CSA Group (Canadian Standards Association):
    - a. ASME A112.19.2-2018/CSA B45.1-18, 'Ceramic Plumbing Fixtures'.

**1.3 SUBMITTALS**

- A. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operation and Maintenance Data:
      - 1) Sensor Operated operation and maintenance manuals.

**PART 2 - PRODUCTS****2.1 ASSEMBLIES**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. American Standard Brands, Piscataway, NJ [www.americanstandard-us.com](http://www.americanstandard-us.com) or American Standard Canada, Mississauga, ON [www.americanstandard.ca](http://www.americanstandard.ca).
    - b. AMTC - Advanced Modern Technologies Corp, Woodland Hills, CA [www.amtccorporation.com](http://www.amtccorporation.com).
    - c. Bemis Manufacturing Co, Sheboygan Falls, WI [www.bemismfg.com](http://www.bemismfg.com).
    - d. Beneke by Sanderson Plumbing Products, Columbus, MS [www.sppl.com](http://www.sppl.com).
    - e. Church Seat Co, Sheboygan Falls WI [www.churchseats.com](http://www.churchseats.com).
    - f. Delany Flush Valves, Charlottesville, VA [www.delanyproduct.com](http://www.delanyproduct.com).

- g. Delta Faucet Co, Indianapolis, IN [www.deltafaucet.com](http://www.deltafaucet.com) or Delta Faucet Canada, London, ON (519) 659-3626.
- h. Dearborn Brass, Cleveland, OH [www.dearbornbrass.com](http://www.dearbornbrass.com).
- i. Gerber Plumbing Fixtures LLC, Woodridge, IL [www.gerberonline.com](http://www.gerberonline.com).
- j. Josam Co, Michigan City, IN [www.josam.com](http://www.josam.com).
- k. Jay R. Smith Mfg. Co, Montgomery, AL [www.jrsmith.com](http://www.jrsmith.com).
- l. Kohler Co Plumbing Div, Kohler, WI [www.us.kohler.com](http://www.us.kohler.com).
- m. McGuire Manufacturing Co, Cheshire, CT [www.mcguiremfg.com](http://www.mcguiremfg.com).
- n. Mifab Manufacturing Inc, Amherst, NY [www.mifab.com](http://www.mifab.com).
- o. Moen Incorporated, North Olmsted, OH, or Moen Canada, Oakville, ON [www.moen.com](http://www.moen.com).
- p. Olsonite Corp, Newnan, GA [www.olsonite.net](http://www.olsonite.net) or Olsonite Co Ltd, Tilbury, ON (519) 682-1240.
- q. Sloan Valve Co, Franklin Park, IL [www.sloanvalve.com](http://www.sloanvalve.com).
- r. South Fork Manufacturing, Coalville, UT (801) 953-3001 [www.dirt-grabber.com](http://www.dirt-grabber.com).
- s. Toto U.S.A., Inc., Morrow, GA [www.totousa.com](http://www.totousa.com)
- t. Wade Div Tyler Pipe, Tyler, TX [www.wadedrains.com](http://www.wadedrains.com).
- u. Watts Drainage, Spindale, NC [www.wattsdrainage.com](http://www.wattsdrainage.com) or Watts Industries, Burlington, ON, Canada [www.wattscda.com](http://www.wattscda.com).
- v. Zurn Industries, LLC, Erie PA [www.zurn.com](http://www.zurn.com). or Zurn Industries Ltd, Mississauga, ON (905) 795-8844.

B. Performance:

1. Design Criteria:

- a. Meet or exceed ASME A112.19.2/CSA B45.1 for Vitreous China Plumbing Fixtures.
- b. All materials NOT required to be low lead compliant.
- c. Do not use toilets with effective flush volume of less than **1.28 gallons (4.8 liters)**.

C. Materials:

1. Water Closets:

a. Floor Mounted With Tank:

- 1) HET (High-Efficiency Toilet) - Standard Fixture (WC-1):
  - a) Water usage of **1.28 gallons (4.8 liters)** per flush.
  - b) MaP Score of 1000 grams.
  - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - (1) American Standard: Cadet 3 Elongated 215CA.004.
    - (2) Kohler: Wellworth K-3948.
    - (3) Toto: 'ECO Drake' CST744E.or CST744EG.
- 2) HET (High-Efficiency Toilet) - Handicap Accessible Fixture (WC-2):
  - a) Water usage of **1.28 gallons (4.8 liters)** per flush.
  - b) **18 inch (450 mm)** maximum rim height.
  - c) MaP Score of 1000 grams.
  - d) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - (1) American Standard: Cadet Pro Right Height Elongated 215AA.104.
    - (2) Kohler: Highline K-3949.
    - (3) Toto: 'ADA Drake' CST744EL.

2. Water Closet Accessories:

a. Seats:

- 1) Provide split front type with check hinge. Provide lid at barrier free.
- 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - a) Standard And Handicap Accessible Fixtures:
    - (1) American Standard: 5905.100SS.
    - (2) Bemis: 1655SSC.
    - (3) Beneke: 527 SS.
    - (4) Church: 9500SSC.
    - (5) Kohler: K-4731-C.
    - (6) Olsonite: 95SSC.
    - (7) Toto SC534.

b. Supply Pipe And Stop:

- 1) Provide chrome plated quarter-turn brass ball valve, 12 inch (300 mm) braided stainless steel riser, and chrome-plated steel flange.
- 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - a) McGuire: BV2166CC.
  - b) Zurn: Z8804.
3. Urinals:
  - a. HEU (High-Efficiency Urinal) - Standard Fixture (U-1):
    - 1) Water usage of 0.5 gallons (1.9 liters) per flush.
    - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) American Standard: Washbrook FloWise 6590.001.
      - b) Kohler: Bardon K-4904-ET.
      - c) Sloan SU-1009.
      - d) Toto: UT447E.
4. Urinal Accessories:
  - a. Carrier / Support:
    - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) Josam.
      - b) Jay R. Smith.
      - c) Mifab.
      - d) Wade.
      - e) Zurn.
  - b. Flush Valve:
    - 1) HEU (High-Efficiency Urinal) - Standard:
      - a) Proximity sensor type with battery.
      - b) Low flow, 0.5 gallon (1.9 liters) per flush maximum.
      - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
        - (1) American Standard 6063.051.
        - (2) Delany: PL 1451-0.5.
        - (3) Delta: 81T231BTA factory set to 0.5 gallons per flush.
        - (4) Moen: 8315.
        - (5) Sloan: 8186-0.5.
        - (6) Zurn: ZER6003AV-EWS with maintenance override button.
  - c. Flush Valve Filter:
    - 1) Required in following flush valves:
      - a) Sloan.
      - b) Zurn.
    - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) SFDG1 'Dirt Grabber' by South Fork Manufacturing.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install each fixture with separate vent line. Do not circuit vent.
- B. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.
  1. Seal wall-mounted fixtures around edges to wall with sealant specified in Section 07 9213 'Elastomeric Joint Sealants'.
  2. Attach wall-hung fixtures to carriers.
  3. Support fixture hanger or arm free of finished wall.
- C. Adjust flush valves for proper flow.
- D. Provide each individual fixture supply with accessible chrome-plated stop valve with hand wheel.

- E. Urinals: Install with accessible stop or control valve in each branch supply line.
- F. Mounting (See 7/A-8):
  - 1. Urinals:
    - a. Standard: 24 inches (610 mm) from floor to bottom lip.
    - b. Handicap Accessible: 16 1/2 inches (419 mm) maximum from floor to bottom lip.
- G. Water Closets:
  - 1. Floor Fixtures:
    - a. Make fixture connections with approved brand of flange, soldered or caulked securely to waste pipe. Make joints between fixtures and flanges tight with approved fixture setting compound or gaskets. Caulk between fixtures with sealant specified in Section 07 9213. Point edges.
- H. Flush Valve Filters:
  - 1. Install in Sloan and Zurn only flush valves.
  - 2. Install after water lines have been flushed out, but before turning water into flush valve.

### 3.2 CLEANING

- A. Polish chrome finish at completion of Project.

**END OF SECTION**



**SECTION 22 4216****COMMERCIAL LAVATORIES AND SINKS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install plumbing fixtures as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 07 9213: 'Elastomeric Joint Sealants' for sealants used between fixtures and other substrates.
  - 2. Section 22 0501: 'Common Plumbing Requirements'.
  - 3. Section 22 1116: 'Domestic Water Piping'.

**1.2 REFERENCES**

- A. Reference Standard:
  - 1. American National Standards Institute / International Code Council:
    - a. ANSI/ICC A117.1-2017, 'Standard for Accessible and Usable Buildings and Facilities'.
  - 2. American Society of Mechanical Engineers / Canadian Standards Association (CSA Group):
    - a. ASME A112.18.1-2018/CSA B125.1-18, 'Plumbing Supply Fittings'.
    - b. ASME A112.19.1-2018/CSA B45.2-18, 'Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures'.
    - c. ASME A112.19.3-2017/CSA B45.4-17, 'Stainless steel plumbing fixtures'.
  - 3. CSA Group (Canadian Standards Association):
    - a. CSA B125.1-18/ASME A112.18.1-2018, 'Plumbing Supply Fittings'.
    - b. CSA B45.2-18/ASME A112.19.1-2018, 'Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures'.
    - c. CSA B45.4-17/ASME A112.19.3-2017, 'Stainless Steel Plumbing Fixtures'.
  - 4. NSF International Standard / American National Standards Institute:
    - a. NSF/ANSI 61-2017, 'Drinking Water System Components - Health Effects'.
    - b. NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.

**1.3 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

**1.4 SUBMITTALS**

- A. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Warranty Documentation:
      - 1) Final, executed copy of Warranty.

## 1.5 WARRANTY

### A. Manufacturer Warranty:

1. Manufacturer's standard Warranty against material or Manufacturing defects.

## PART 2 - PRODUCTS

### 2.1 ASSEMBLIES

#### A. Manufacturers:

1. Manufacturer Contact List:
  - a. American Standard Brands, Piscataway, NJ [www.americanstandard-us.com](http://www.americanstandard-us.com) or American Standard Canada, Mississauga, ON [www.americanstandard.ca](http://www.americanstandard.ca).
  - b. Brocar Products Inc, Cincinnati, OH [www.brocar.com](http://www.brocar.com).
  - c. CECO, Huntington Park, CA [www.cecocosinks.com](http://www.cecocosinks.com).
  - d. Chicago Faucet Co, Des Plaines, IL [www.chicagofaucets.com](http://www.chicagofaucets.com).
  - e. Dearborn Brass, Tyler, TX [www.dearbornbrass.com](http://www.dearbornbrass.com).
  - f. Delta Faucet Co, Indianapolis, IN [www.deltafaucet.com](http://www.deltafaucet.com) or Delta Faucet Canada, London, ON (519) 659-3626.
  - g. Engineered Brass Co. (EBC) (Just Manufacturing Co.), Franklin Park, IL [www.justmfg.com](http://www.justmfg.com).
  - h. Elkay Manufacturing Co, Oak Brook, IL [www.elkay.com](http://www.elkay.com).
  - i. Gerber Plumbing Fixtures LLC, Woodridge, IL [www.gerberonline.com](http://www.gerberonline.com).
  - j. Josam Co, Michigan City, IN [www.josam.com](http://www.josam.com).
  - k. Jay R. Smith Manufacturing Co, Montgomery, AL [www.jrsmith.com](http://www.jrsmith.com).
  - l. Just Manufacturing Co, Franklin Park, IL [www.justsinks.com](http://www.justsinks.com).
  - m. Keeney Manufacturing Co, Newington, CT [www.keeneymfg.com](http://www.keeneymfg.com).
  - n. Kindred USA, Midland, ON [www.kindred-sinkware.com](http://www.kindred-sinkware.com).
  - o. Kohler Co Plumbing Div, Kohler, WI [www.us.kohler.com](http://www.us.kohler.com).
  - p. McGuire Manufacturing Co, Cheshire, CT [www.mcguiremfg.com](http://www.mcguiremfg.com).
  - q. Mifab Manufacturing Inc, Amherst, NY [www.mifab.com](http://www.mifab.com).
  - r. Moen Incorporated, North Olmsted, OH, or Moen Canada, Oakville, ON [www.moen.com](http://www.moen.com).
  - s. Omni Flow Controls, Harbor City, CA [www.chronomite.com](http://www.chronomite.com) or [www.omniflowcontrols.com](http://www.omniflowcontrols.com).
  - t. Plumberex Specialty Products, Palm Springs, CA [www.plumberex.com](http://www.plumberex.com).
  - u. Sloan Valve Co, Franklin Park, IL [www.sloanvalve.com](http://www.sloanvalve.com).
  - v. Speakman Company, New Castle, DE [www.speakmancompany.com](http://www.speakmancompany.com).
  - w. Symmons, Braintree, MA [www.symmons.com](http://www.symmons.com).
  - x. T & S Brass & Bronze Works Inc, Travelers Rest, SC [www.tsbrass.com](http://www.tsbrass.com).
  - y. TrueBro Inc, Collierville, TN [www.truebro.com](http://www.truebro.com).
  - z. Wade Div Tyler Pipe, Tyler, TX [www.wadedrains.com](http://www.wadedrains.com).
  - aa. Watts Drainage, Spindale, NC [www.wattsdrainage.com](http://www.wattsdrainage.com) or Watts Industries, Burlington, ON, Canada [www.wattscda.com](http://www.wattscda.com).
  - bb. Zurn Commercial Brass, Sanford, NC [www.zurn.com](http://www.zurn.com) or Zurn Industries Ltd, Mississauga, ON (905) 795-8844.
  - cc. Zurn Cast Metal, Erie, PA [www.zurn.com](http://www.zurn.com).

#### B. Performance:

1. Design Criteria:
  - a. Faucets and other fixture fittings shall conform to requirements of ASME A112.18.1/CSA B125.1.
  - b. Lavatories shall conform to requirements of:
    - 1) Enamelled cast iron and enamelled steel fixtures.
      - a) ASME A112.19.1/CSA B45.2.
      - b) CSA B45.2/ASME A112.19.1.
    - 2) Stainless steel plumbing fixtures:
      - a) ASME A112.19.3/CSA B45.4.
      - b) CSA B45.4/ASME A112.19.3.

## C. Components:

## 1. Lavatories And Fittings:

## a. Standard and Handicap Accessible Self Supporting Lavatories (L-1):

- 1) Size: 20 by 18 inches (500 by 450 mm) nominal.
- 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - a) American Standard: Lucern 0355.012.
  - b) Kohler: Greenwich K-2032.
- 3) Carrier / Support:
  - a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - (1) Josam: 17100.
    - (2) Jay R. Smith: 0700.
    - (3) Mifab: MC-41.
    - (4) Wade: 520-M36.

## b. Lavatory Fittings:

## 1) Faucet and Grid Strainer For Handicap Accessible Sinks (All L-1):

- a) Design Criteria:
  - (1) Meet NSF International Standards for Lead Free.
- b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - (1) American Standard: Monterrey Two-Handle Centerset Lavatory Faucet with Vandal-Resistant Wrist Blade handles and grid strainer drain 5502.170.
  - (2) Chicago: 802-317CP with K7715 strainer.
  - (3) Delta: 2529HDF.
  - (4) Kohler: K-7404-5A with K-13885 strainer.
  - (5) Moen: 8215 with 14750 grid strainer.
  - (6) Speakman: SC 3074.
  - (7) T & S: B-0890 with B-0899 Grid Strainer.
  - (8) Zurn: Z-81104 with McGuire 155A grid strainer.

## 2) Flow Control Fitting:

- a) Design Criteria:
  - (1) Meet NSF International Standards for Lead Free.
- b) Accessories:
  - (1) Provide vandal-proof type in place of aerator. Flow shall be 0.5 gpm.
- c) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
  - (1) Omni L-200 Series by Chronomite Laboratories.

## 3) Supply pipes with stops:

- a) Design Criteria:
  - (1) Meet NSF International Standards for Lead Free.
- b) Accessories:
  - (1) Provide chrome plated quarter-turn brass ball valve, 12 inches (305 mm) long braided stainless steel riser, and chrome-plated steel flange.
- c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - (1) McGuire: BV2165CC.
  - (2) Zurn: Z8804 LRQ-PC.

## 4) Trap:

- a) Description:
  - (1) Standard Accessible 'P Trap' covered with insulation jacket.

## 5) Safety Covers for Handicap Accessible Lavatories (All L-1):

- a) Description:
  - (1) Provide protection on both water supply pipes and on trap.
  - (2) Install covers neat to pipe route / fittings.
- b) Design Criteria:
  - (1) Not required to meet NSF International Standards for Lead Free.
- c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - (1) Trapwrap by Brocar Products Inc.
  - (2) Pro Wrap by McGuire Products.

- (3) Lav Guard 2 by TrueBro.
- (4) Pro Extreme by Plumberex.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install each fixture with separate vent line. Do not circuit vent.
- B. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.
- C. Seal wall-mounted fixtures around edges to wall with sealant specified in Section 07 9213.
- D. Unless otherwise noted, provide each individual fixture supply with chrome-plated stop valve with hand wheel.
- E. Install fixtures with accessible stop or control valve in each hot and cold water branch supply line.
- F. Self-Supporting Lavatories: Install using carriers. Support carrier free of finished wall.
- G. Install Safety Covers on all under sink / lavatories with exposed water supply pipes and traps.
- H. Install Handicap Accessible Lavatories as per ADA height mounting requirements. See 7/A-8.

#### **3.2 CLEANING**

- A. Polish chrome finish at completion of Project.

**END OF SECTION**

# **DIVISION 23: HEATING, VENTILATING, AND AIR-CONDITIONING**

## **23 0500 COMMON WORK RESULTS FOR HVAC**

23 0501 COMMON HVAC REQUIREMENTS  
23 0529 HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT  
23 0553 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT  
23 0713 DUCT INSULATION

## **23 3000 HVAC AIR DISTRIBUTION**

23 3001 COMMON DUCT REQUIREMENTS  
23 3114 LOW-PRESSURE METAL DUCTS  
23 3123 UNDERGROUND DUCTS  
23 3300 AIR DUCT ACCESSORIES  
23 3316 FIRE AND SMOKE DAMPERS  
23 3346 FLEXIBLE DUCTS  
23 3401 EXHAUST FANS  
23 3713 DIFFUSERS, REGISTERS, AND GRILLES  
23 3714 LOUVERS AND VENTS

END OF TABLE OF CONTENTS

BLANK PAGE

**SECTION 23 0501****COMMON HVAC REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Common requirements and procedures for HVAC systems.
  - 2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
  - 3. Interface with Testing And Balancing Agency.
  - 4. Furnish and install sealants relating to installation of systems installed under this Division.
  - 5. Furnish and install Firestop Penetration Systems for HVAC system penetrations as described in Contract Documents.
  - 6. Furnish and install sound, vibration, and seismic control elements. See Drawings.
- B. Products Furnished But Not Installed Under This Section:
  - 1. Sleeves, inserts, and equipment for mechanical systems installed under other Sections.
- C. Related Requirements:
  - 1. Section 07 8400: 'Firestopping' for quality of Penetration Firestop Systems to be used on Project and submittal requirements.
  - 2. Section 07 9213: 'Elastometric Joint Sealant' for quality of sealants used at building exterior.
  - 3. Sections Under 09 9000 Heading: Painting of mechanical items requiring field painting.
  - 4. Division 26: Raceway and conduit, unless specified otherwise, line voltage wiring, outlets, and disconnect switches.
  - 5. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.

**1.2 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's catalog data for each manufactured item.
      - 1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
      - 2) Include name, address, and phone number of each supplier.
  - 2. Shop Drawings:
    - a. Product Data required by Division 23, Louver, and exhaust fan equipment.
- B. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):
      - 1) At beginning of HVAC section of Operations And Maintenance Manual, provide master index showing items included.
        - a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and HVAC, Sheet Metal subcontractors.
        - b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:

- (1) List of HVAC equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
  - (2) Manufacturer's maintenance instructions for each piece of HVAC equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.
- b. Warranty Documentation:
  - 1) Include copies of warranties required in individual Sections of Division 23.
- c. Record Documentation:
  - 1) Manufacturers documentation:
    - a) Copies of approved shop drawings.

### 1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  - 1. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern.
  - 2. Notify Architect in writing of such differences before performing work affected by such differences.
  - 3. Identification:
    - a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.
- B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
  - 1. Company:
    - a. Company specializing in performing work of this section.
      - 1) Minimum five (5) years experience in HVAC installations.
      - 2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
    - b. Upon request, submit documentation.
  - 2. Installer:
    - a. Licensed for area of Project.
    - b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
    - c. Upon request, submit documentation.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Storage And Handling Requirements:
  - 1. In addition to requirements specified in Division 01:
    - a. Stored material shall be readily accessible for inspection by Architect until installed.
    - b. Store items subject to moisture damage, such as controls, in dry, heated spaces.

### 1.5 WARRANTY

- A. Manufacturer Warranty:
  - 1. Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record 'start-up' date of each piece of equipment on certificate.
- B. Special Warranty:
  - 1. Guarantee HVAC systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
  - 2. If HVAC sub-contractor with offices located more than 150 miles (240 km) from Project site is used, provide service / warranty work agreement for warranty period with local HVAC sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.



## **PART 2 - PRODUCTS**

### **2.1 COMPONENTS**

- A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.

## **PART 3 - EXECUTION**

### **3.1 INSTALLERS**

- A. Acceptable Installers:
  - 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

### **3.2 EXAMINATION**

- A. Drawings:
  - 1. HVAC Drawings show general arrangement of ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
  - 2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over HVAC Drawings.
  - 3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, and accessories required to meet conditions.
- B. Verification Of Conditions:
  - 1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which mechanical work is dependent for efficiency and report work that requires correction.
  - 2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
  - 3. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.
  - 4. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.

### **3.3 PREPARATION**

- A. Changes Due To Equipment Selection:
  - 1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings, if requested by Architect, showing proposed installations.
  - 2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in ductwork, supports, installation, and as otherwise necessary.

3. Provide any additional motors, controllers, fittings, and other additional equipment required for proper operation of system resulting from selection of equipment.
4. Be responsible for the proper location of roughing-in and connections provided under other Divisions.

### 3.4 INSTALLATION

- A. Interface With Other Work:
  1. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and see they are properly installed.
  2. Electrical: Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
  3. Testing And Balancing:
    - a. Put HVAC systems into full operation and continue their operation during each working day of testing and balancing.
    - b. Make changes in fan speeds, and dampers or add dampers as required for correct balance as recommended by Testing And Balancing Agency and at no additional cost to Owner.
- B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.
- C. Locating Equipment:
  1. Arrange ducts, and equipment to permit ready access to filters, starters, motors, control components, and to clear openings of doors and access panels.
  2. Adjust locations of ducts, switches, panels, and equipment to accommodate work to interferences anticipated and encountered.
  3. Install HVAC work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
  4. Determine exact route and location of each pipe and duct before fabrication.
    - a. Right-Of-Way:
      - 1) Lines that pitch shall have right-of-way over those that do not pitch.
      - 2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
    - b. Offsets, Transitions, and Changes in Direction:
      - 1) Make offsets, transitions, and changes in direction in ducts as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
      - 2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.
- D. Penetration Firestops: Install Penetration Firestop System appropriate for penetration at HVAC system penetrations through walls, ceilings, roofs, and top plates of walls.
- E. Sealants:
  1. Seal openings through building exterior caused by penetrations of elements of HVAC systems.

### 3.5 REPAIR / RESTORATION

- A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
  1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
  2. Surface finishes shall exactly match existing finishes of same materials.

**3.6 SYSTEM START-UP**

- A. Start-up:
  - 1. Provide start-up of new exhaust fans complete with motorized damper function.
  - 2. At end of start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.

**3.7 CLEANING**

- A. Clean exposed ductwork, and equipment in area of work.
- B. Replace filters in equipment for moving air with new filters of specified type no more than one week before Final Inspection.

**3.8 CLOSEOUT ACTIVITIES**

- A. Instruction Of Owner:
  - 1. Instruct building maintenance personnel and Stake Physical Facilities Representative in operation and maintenance of mechanical systems utilizing Operation And Maintenance Manual when so doing:
    - a. Minimum Instruction Periods:
      - 1) HVAC and Refrigeration: Two (2) hours.
    - b. Conduct instruction periods after Substantial Completion inspection when systems are properly working and before final payment is made. None of these instructional periods shall overlap another.

**3.9 PROTECTION**

- A. Do not operate pieces of equipment used for moving supply air without proper air filters installed properly in system.

**END OF SECTION**

**BLANK PAGE**

**SECTION 23 0529****HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Common hanger and support requirements and procedures for HVAC systems.
- B. Related Requirements:
  - 1. Section 07 8400: 'Firestopping' for quality of Penetration Firestop Systems to be used on Project and submittal requirements.
  - 2. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.
- C. Related Requirements:
  - 1. Section 23 0553: 'Identification For HVAC Piping And Equipment' for HVAC piping and equipment identification signage requirements.
  - 2. Sections Under 09 9000 Heading: Painting of mechanical items requiring field painting.

**1.2 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's catalog data for each manufactured item.

**PART 2 - PRODUCTS****2.1 ASSEMBLIES**

- A. Manufacturers:
  - 1. Class Two Quality Standard Approved Manufacturers. See Section 01 6200:
    - a. Anvil International, Portsmouth, NH [www.anvilintl.com](http://www.anvilintl.com).
    - b. Cooper B-Line, Highland, IL [www.cooperblinc.com](http://www.cooperblinc.com).
    - c. Erico International, Solon, OH [www.erico.com](http://www.erico.com).
    - d. Hilti Inc, Tulsa, OK [www.hilti.com](http://www.hilti.com).
    - e. Minerallac, Hampshire, IL [www.minerallac.com](http://www.minerallac.com).
    - f. Thomas & Betts, Memphis, TN [www.superstrut.com](http://www.superstrut.com).
    - g. Unistrut, Wayne, MI [www.unistrut.com](http://www.unistrut.com).
- B. Materials:
  - 1. Hangers, Rods, Channels, Attachments, And Inserts:
    - a. Galvanized and ULC approved for service intended.
    - b. Fan Support Channel:
      - 1) Class One Quality Standard: Unistrut P1000.
      - 2) Acceptable Manufacturers: Hilti, Thomas & Betts.
      - 3) Equal as approved by Architect before installation. See Section 01 6200.
    - c. Swivel Attachment:
      - 1) Class One Quality Standard: Unistrut EM3127.
      - 2) Acceptable Manufacturers: Hilti, Thomas & Betts.
      - 3) Equal as approved by Architect before installation. See Section 01 6200.

**EXECUTION****2.2 INSTALLATION**

- A. Exhaust Fan:
  - 1. Properly support fan and make adequate provisions for seismic anchorage.
    - a. Suspend fan from upper ceiling using support channels and clamps. Do not hang fan from other pipe, equipment, or ductwork.

**END OF SECTION**

**SECTION 23 0553****IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But not Installed Under This Section:
  - 1. Identification of HVAC equipment as described in Contract Documents.

**PART 2 - PRODUCTS****2.1 SYSTEMS**

- A. Materials:
  - 1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories.
  - 2. Labels:
    - a. Equipment Identification:
      - 1) Black formica, with white reveal when engraved.
      - 2) Lettering to be 3/16 inch (5 mm) high minimum.

**PART 3 - EXECUTION****3.1 APPLICATION**

- A. Labels:
  - 1. Identify following items with specified labels fastened to equipment with screws (unless noted otherwise):
    - a. Accessible exhaust fans.
  - 2. Engrave following data from Equipment Schedules on Drawings onto labels:
    - a. Equipment mark.
    - b. Area served.
    - c. Panel and breaker from which unit is powered.

**END OF SECTION**

**BLANK PAGE**



**SECTION 23 0713****DUCT INSULATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install thermal wrap duct insulation as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 23 3114: 'Low-Pressure Metal Ducts'.
  - 2. Section 23 3300: 'Acoustic Duct Accessories' for duct liner.

**PART 2 - PRODUCTS****2.1 MANUFACTURERS**

- A. Manufacturer Contact List:
  - 1. Certainteed St Gobain, Valley Forge, PA [www.certainteed.com](http://www.certainteed.com).
  - 2. Johns-Manville, Denver, CO [www.jm.com](http://www.jm.com).
  - 3. Knauf Fiber Glass, Shelbyville, IN [www.knauffiberglass.com](http://www.knauffiberglass.com) or Toronto, ON (416) 593-4322.
  - 4. Manson Insulation Inc, Brossard, QB [www.isolationmanson.com](http://www.isolationmanson.com).
  - 5. Owens-Corning, Toledo, OH or Owens-Corning Canada Inc, Willowdale, ON [www.owenscorning.com](http://www.owenscorning.com).

**2.2 MATERIALS**

- A. Thermal Wrap Duct Insulation:
  - 1. 1-1/2 inch (38 mm) or 3 inch (76 mm) thick fiberglass with factory-laminated, reinforced aluminum foil scrim kraft facing and density of 0.75 lb / per cu ft (12 kg / per cu m).
  - 2. Thermal Conductivity: 0.27 BTU in/HR SF deg F at 75 deg F (24 deg C) maximum.
  - 3. Type One Acceptable Products:
    - a. Type 75 standard duct insulation by Certainteed St Gobain.
    - b. Microlite FSK by Johns-Manville.
    - c. Duct Wrap FSK by Knauf Fiber Glass.
    - d. Alley Wrap FSK by Manson Insulation Inc.
    - e. FRK by Owens-Corning.
    - f. Equal as approved by Architect before bidding. See Section 01 6200.

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Thermal Wrap Duct Insulation:
  - 1. Install insulation as follows:
    - a. Within Building Insulation Envelope:
      - 1) 1-1/2 inches (38 mm) thick on rectangular outside air ducts, combustion air ducts, and exhaust air ducts.
      - 2) 1-1/2 inches (38 mm) thick on all round ducts.
    - b. Outside Building Insulation Envelope:

- 1) 3 inch (76 mm) thick on round supply and return air ducts.
  - 2) 1-1/2 inch (38 mm) thick on rectangular, acoustically lined, supply, return air ducts, and exhaust ducts.
2. Wrap insulation tightly on ductwork with circumferential joints butted and longitudinal joints overlapped minimum 2 inches (50 mm).
  - a. Do not compress insulation except in areas of structural interference. Minimum thickness at corners shall be one inch (25 mm) thick.
  - b. Remove insulation from lap before stapling.
  - c. Staple seams at approximately 16 inches (400 mm) on center with outward clenching staples.
  - d. Seal seams with foil vapor barrier tape or vapor barrier mastic. Seal penetrations of facing to provide vapor tight system.
  - e. Wire wrap joints to secure insulation in place.
- B. Insulate outside of ceiling diffusers, diffuser drops, and duct silencers same as ductwork.

**END OF SECTION**

**SECTION 23 3001****COMMON DUCT REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. General procedures and requirements for ductwork.
  - 2. Repair leaks in ductwork, as identified by duct testing, at no additional cost to Owner.
- B. Related Requirements:
  - 1. Section 01 4546: 'Duct Testing, Adjusting, and Balancing' for ductwork.
  - 2. Section 23 0501: 'Common HVAC Requirements'.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. Sheet Metal And Air Conditioning Contractors' National Association / American National Standards Institute:
    - a. SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible' (4th Edition).

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference: Schedule conference immediately before installation of ductwork.

**1.4 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data: Specification data on sealer and gauze proposed for sealing ductwork.
  - 2. Samples: Sealer and gauze proposed for sealing ductwork.
- B. Informational Submittals:
  - 1. Manufacturer Instructions:
    - a. Installation manuals providing detailed instructions on assembly, joint sealing, and system pressure testing for leaks.

**PART 2 - PRODUCTS****2.1 ASSEMBLIES**

- A. Performance:
  - 1. Design Criteria:
    - a. Standard Ducts: Construction details not specifically called out in Contract Documents shall conform to applicable requirements of SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible'.
- B. Materials:
  - 1. Duct Hangers:
    - a. One inch (25 mm) by 18 ga (1.27 mm) galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 96 inches (2 400 mm) apart. Do not use wire hangers.

- b. Attaching screws at trusses shall be 2 inches (50 mm) No. 10 round head wood screws. Nails not allowed.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. During installation, protect open ends of ducts by covering with plastic sheet tied in place to prevent entrance of debris and dirt.
- B. Make necessary allowances and provisions in installation of sheet metal ducts for structural conditions of building. Revisions in layout and configuration may be allowed, with prior written approval of Architect. Maintain required airflows in suggesting revisions.
- C. Hangers And Supports:
  - 1. Install pair of hangers as required by spacing indicated in table on Drawings.
  - 2. Install upper ends of hanger securely to roof construction above by method shown on Drawings.
  - 3. Attach strap hangers to ducts with cadmium-plated screws. Use of pop rivets or other means will not be accepted.
  - 4. Where hangers are secured to forms before concrete slabs are poured, cut off flush all nails, strap ends, and other projections after forms are removed.
  - 5. Support vertical ducts, which do not pass through floors, by using bands bolted to walls, columns, etc. Size, spacing, and method of attachment to vertical ducts shall be same as specified for hanger bands on horizontal ducts.

### **3.2 CLEANING**

- A. Clean interior of duct systems before final completion.

**END OF SECTION**

**SECTION 23 3114****LOW-PRESSURE METAL DUCTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install above-grade low-pressure steel ducts and related items as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 01 4546: 'Duct Testing, Adjusting, And Balancing' for duct test, balance, and adjust air duct systems services provided by Owner.
  - 2. Section 23 0713: 'Duct Insulation' for thermal Insulation for ducts, plenum chambers, and casings.
  - 3. Section 23 3001: 'Common Duct Requirements'.

**1.2 REFERENCES**

- A. Association Publications:
  - 1. Sheet Metal And Air Conditioning Contractors' National Association / American National Standards Institute:
  - 2. SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible' (4th edition).
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
    - b. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
  - 2. Underwriters Laboratories of Canada:
    - a. ULC 102-18: 'Method of Test for Surface Burning Characteristics of Building Materials and Assemblies' (ULC S102).

**1.3 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Duct Sealer:
    - a. Meet Class A flame spread rating in accordance with ULC-S102.2.
    - b. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Storage and Handling Requirements:
  - 1. Duct Sealer:
    - a. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
    - b. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
    - c. Store in a cool dry location, but never under 35 deg F (1.7 deg C) or subjected to sustained temperatures exceeding 110 deg F (43 deg C) or as per Manufacturer's written recommendations.

- d. Do use sealants that have exceeded shelf life of product.

## 1.5 FIELD CONDITIONS

### A. Ambient Conditions:

- 1. Duct Sealer:
  - a. Do not apply under 35 deg F (1.7 deg C) or subjected to sustained temperatures exceeding 110 deg F (43 deg C) or as per Manufacturer's written recommendations.
  - b. Do not apply when rain or freezing temperatures will occur within seventy two (72) hours.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

#### A. Materials:

- 1. Sheet Metal:
  - a. Fabricate ducts, plenum chambers and casings of zinc-coated, lock-forming quality steel sheets meeting requirements A653/A653M, with G 60 coating.
- 2. Duct Sealer For Interior Ducts:
  - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Duct Butter or ButterTak by Cain Manufacturing Co Inc, Pelham, AL [www.cainmfg.com](http://www.cainmfg.com).
    - 2) DP 1010, DP 1030 or DP 1015 by Design Polymerics, Fountain Valley, CA [www.designpoly.com](http://www.designpoly.com).
    - 3) PROseal, FIBERseal, EVERseal, or EZ-seal by Ductmate Industries, Inc., Charleroi, PA [www.ductmate.com](http://www.ductmate.com).
    - 4) SAS by Duro Dyne, Bay Shore, NY or Duro Dyne Canada, Lachine, QB [www.durodyne.com](http://www.durodyne.com).
    - 5) Iron Grip 601 by Hardcast Inc, Wylie, TX [www.hardcast.com](http://www.hardcast.com).
    - 6) MTS100 or MTS 200 by Hercules Mighty Tough, Denver CO, [www.herculesindustries.com](http://www.herculesindustries.com).
    - 7) 15-325 by Miracle / Kingco, Div ITW TACC, Rockland, MA [www.taccint.com](http://www.taccint.com).
    - 8) 44-39 by Mon-Eco Industries Inc, East Brunswick, NJ [www.mon-ecoindustries.com](http://www.mon-ecoindustries.com).
    - 9) Airseal Zero by Polymer Adhesive Sealant Systems Inc, Weatherford, TX [www.polymeradhesives.com](http://www.polymeradhesives.com).
    - 10) Airseal #22 Water Base Duct Sealer by Polymer Adhesive Sealant Systems Inc, Weatherford, TX [www.polymeradhesives.com](http://www.polymeradhesives.com).

#### B. Fabrication:

- 1. General:
  - a. Straight and smooth on inside with joints neatly finished.
  - b. Duct drops to diffusers shall be round, square, or rectangular to accommodate diffuser neck. Drops shall be same gauge as branch duct. Seal joints air tight.
- 2. Standard Ducts:
  - a. General:
    - 1) Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.
  - b. Rectangular Duct:
    - 1) Duct panels through 48 inch (1 200 mm) dimension having acoustic duct liner need not be cross-broken or beaded. Cross-break unlined ducts, duct panels larger than 48 inch (1 200 mm) vertical and horizontal sheet metal barriers, duct offsets, and elbows, or bead 12 inches (300 mm) on center.
      - a) Apply cross-breaking to sheet metal between standing seams or reinforcing angles.
      - b) Center of cross-break shall be of required height to assure surfaces being rigid.
      - c) Internally line square and rectangular drops. Externally insulate round drops.

- 2) Duct with height or width over 36 inches (900 mm) shall be fabricated using SMACNA T-24 flange joints or of pre-fabricated systems as follows:
  - a) Ducts with sides over 36 inches (900 mm) up to 48 inches (1 200 mm): Transverse duct joint system by Ductmate / 25, Elgen, Ward, or WDCI (SMACNA Class 'F' joint).
  - b) Ducts 48 inch (1 200 mm) And Larger: Ductmate / 35, Elgen, or WDCI (SMACNA Class 'J' transverse joint).
  - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - (1) Ductmate Industries Inc, Charleroi, PA [www.ductmate.com](http://www.ductmate.com) or Ductmate Canada Ltd, Burlington, ON (905) 332-7678.
    - (2) Ward Industries Inc, Bensonville, IL [www.wardind.com](http://www.wardind.com).
    - (3) Elgen Manufacturing Company, Inc., East Rutherford, NJ [www.elgenmfg.com](http://www.elgenmfg.com).
- c. Round Duct:
  - 1) Spiral Seam:
    - a) 28 ga (0.38 mm) minimum for ducts up to and including 14 inches (355 mm) in diameter.
    - b) 26 ga (0.46 mm) minimum for ducts over 14 inches (355 mm) and up to and including 26 inches (660 mm) in diameter.
  - 2) Longitudinal Seam:
    - a) 28 ga (0.38 mm) minimum for ducts up to and including 8 inches (200 mm) in diameter.
    - b) 26 ga (0.46 mm) minimum for ducts over 8 inches (200 mm) and up to 14 inches (355 mm) in diameter.
    - c) 24 ga (0.61 mm) minimum for ducts over 14 inches (355 mm) up to and including 26 inches (660 mm) in diameter.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Metal duct surface must be clean and free of moisture, contamination and foreign matter before applying duct sealer for interior and exterior ducts.

### 3.2 INSTALLATION

- A. Install internal ends of slip joints in direction of flow. Seal transverse and longitudinal joints air tight using specified duct sealer as per Manufacturer's written instructions. Cover horizontal and longitudinal joints on exterior ducts with two layers of specified tape installed with specified adhesive.
- B. Securely anchor ducts and plenums to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger. Brace and install ducts so they shall be free of vibration under all conditions of operation.
- C. Ducts shall not bear on top of structural members.
- D. Paint ductwork visible through registers, grilles, and diffusers flat black.
- E. Properly flash where ducts protrude above roof.
- F. Under no conditions will pipes, rods, or wires be allowed to penetrate ducts.
- G. Where ducts are shown connecting to concrete or masonry openings and along edges of plenums at floors and walls, provide continuous 2 by 2 by 1/4 inches (50 by 50 by 6 mm) galvanized angle iron.
  1. Bolt angle iron to structure and make airtight by applying sealant between angle and structure.
  2. Bolt or weld sheet metal at these locations to angle and caulk airtight.

3. Apply two coats of aluminum paint to angles after installation.

### **3.3 FIELD QUALITY CONTROL**

- A. Field Tests:
  1. Air Test and Balance Testing as specified in Section 01 4546: 'Duct Testing, Adjusting, and Balancing'.
- B. Non-Conforming Work:
  1. Reseal transverse joint duct leaks and seal longitudinal duct joint leaks discovered during air test and balance procedures at no additional cost to Owner.

**END OF SECTION**



**SECTION 23 3123****UNDERGROUND DUCTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install underground ducts as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 23 3001: Common Duct Requirements.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.'

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference: Participate in conference specified in Section 03 3111.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Materials:
  - 1. Ductwork:
    - a. Fiberglass-reinforced plastic duct system.
      - 1) Category Four Approved Manufacturer. See Section 01 6200 for definitions of Categories.
        - a) Spunstrand Inc, Post Falls, ID [www.spunstrand.com](http://www.spunstrand.com).
      - 2) Gauges shall be as follows and be marked on each duct section. Corrugate ducts 350 mm in diameter and larger.
 

	Duct Size	Gauge	Thickness
a)	100 to 200 mm	26	0.551 mm
b)	225 to 300 mm	24	0.701 mm
c)	350 to 550 mm	22	0.853 mm
d)	600 to 700 mm	20	1.001 mm
e)	750 to 1 000 mm	18	1.311 mm
  - 2. Accessories:
    - a. Joint Sleeves: Galvanized sheet metal, galvanizing meeting requirements of ASTM A653/A653M, G 60.
 

	Duct Size	Thickness	Width
1)	100 to 300 mm	0.551 mm	100 mm
2)	350 to 600 mm	0.701 mm	100 mm
3)	650 to 900 mm	0.853 mm	150 mm
    - b. Metal Boots: 20 ga (0.0396 in) (1.0058 mm) galvanized steel, galvanizing meeting requirements of ASTM A653, G 60.

- c. Connection Tape:
  - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
    - a) Spunstrand: Sealtite PS401 sealing tape by Spunstrand Inc.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Spunstrand (See K/A-10):
  - 1. Join duct sections with galvanized sheet metal sleeve inside of duct secured with sheet metal screws.
  - 2. Wipe joint area clean and apply one layer of tape. Tape shall cover all screw heads.
  - 3. Construct sheet metal boot with 1-1/2 inch (38 mm) flange to fit against duct. Attach boot with self-tapping sheet metal screws, pulling boot flange snug to duct surface and tape joints. Tape shall cover screw heads.
  - 4. Encase boot completely in concrete, covering well around and below taped joint.

**END OF SECTION**

**SECTION 23 3300****AIR DUCT ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install duct accessories in specified ductwork as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 23 3001: 'Common Duct Requirements'.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
    - b. ASTM C1071-16, 'Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)'.
    - c. ASTM C1338-14, 'Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings'.

**PART 2 - PRODUCTS****2.1 ACCESSORIES**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. AGM Industries, Brockton, MA [www.agmind.com](http://www.agmind.com).
    - b. Air Balance Inc, Holland, OH [www.airbalance.com](http://www.airbalance.com).
    - c. Air Filters Inc, Baltimore, MD [www.afinc.com](http://www.afinc.com).
    - d. Air-Rite Manufacturing, Bountiful, UT (801) 295-2529.
    - e. American Warming & Ventilating, Holland, OH [www.american-warming.com](http://www.american-warming.com).
    - f. Arrow United Industries, Wyalusing, PA [www.arrowunited.com](http://www.arrowunited.com).
    - g. Cain Manufacturing Company Inc, Pelham, AL [www.cainmfg.com](http://www.cainmfg.com).
    - h. C & S Air Products, Fort Worth, TX [www.csairproducts.com](http://www.csairproducts.com).
    - i. CertainTeed Corp, Valley Forge, PA [www.certainteed.com](http://www.certainteed.com).
    - j. Cesco Products, Florence, KY [www.cescoproducts.com](http://www.cescoproducts.com).
    - k. Daniel Manufacturing, Ogden, UT (801) 622-5924.
    - l. Design Polymerics, Fountain Valley, CA [www.designpoly.com](http://www.designpoly.com).
    - m. Ductmate Industries Inc, East Charleroi, PA [www.ductmate.com](http://www.ductmate.com).
    - n. Duro Dyne, Bay Shore, NY [www.durodyne.com](http://www.durodyne.com).
    - o. Dyn Air Inc. Lachine, QB [www.dynair.ca](http://www.dynair.ca)
    - p. Elgen Manufacturing Company, Inc. East Rutherford, NJ [www.elgenmfg.com](http://www.elgenmfg.com)
    - q. Flexmaster USA Inc, Houston, TX [www.flexmasterusa.com](http://www.flexmasterusa.com).
    - r. Greenheck Corp, Schofield, WI [www.greenheck.com](http://www.greenheck.com).
    - s. Gripnail Corp, East Providence, RI [www.gripnail.com](http://www.gripnail.com).
    - t. Hardcast Inc, Wylie, TX [www.hardcast.com](http://www.hardcast.com).
    - u. Hercules Industries, Denver, CO, [www.herculesindustries.com](http://www.herculesindustries.com).
    - v. Honeywell Inc, Minneapolis, MN [www.honeywell.com](http://www.honeywell.com).
    - w. Industrial Acoustics Co, Bronx, NY [www.industrialacoustics.com](http://www.industrialacoustics.com).

- x. Johns-Manville, Denver, CO [www.jm.com](http://www.jm.com).
- y. Kees Inc, Elkhart Lake, WI [www.kees.com](http://www.kees.com).
- z. Knauf Fiber Glass, Shelbyville, IN [www.knauffiberglass.com](http://www.knauffiberglass.com).
- aa. Manson Insulation Inc, Brossard, QB [www.isolationmanson.com](http://www.isolationmanson.com).
- bb. Metco Inc, Salt Lake City, UT (801) 467-1572 [www.metcospiral.com](http://www.metcospiral.com).
- cc. Miracle / Kingco, Rockland, MA [www.taccint.com](http://www.taccint.com).
- dd. Mon-Eco Industries Inc, East Brunswick, NJ [www.mon-ecoindustries.com](http://www.mon-ecoindustries.com).
- ee. Nailor Industries Inc, Houston, TX [www.nailor.com](http://www.nailor.com).
- ff. Owens Corning, Toledo, OH [www.owenscorning.com](http://www.owenscorning.com).
- gg. Polymer Adhesive Sealant Systems Inc, Irving, TX [www.polymeradhesives.com](http://www.polymeradhesives.com).
- hh. Pottorff Company, Fort Worth, TX [www.pottorff.com](http://www.pottorff.com).
- ii. Ruskin Manufacturing, Kansas City, MO [www.ruskin.com](http://www.ruskin.com).
- jj. Sheet Metal Connectors Inc, Minneapolis, MN [www.smconnectors.com](http://www.smconnectors.com).
- kk. Tamco, Stittsville, ON [www.tamco.ca](http://www.tamco.ca).
- ll. Techno Adhesive, Cincinnati, OH [www.technoadhesives.com](http://www.technoadhesives.com).
- mm. Titus, Richardson, TX (972) 699-1030. [www.titus-hvac.com](http://www.titus-hvac.com)
- nn. McGill AirSeal, Columbus, OH [www.mcgillairseal.com](http://www.mcgillairseal.com).
- oo. United Enertech Corp, Chattanooga, TN [www.unitedenertech.com](http://www.unitedenertech.com).
- pp. Utemp Inc, Salt Lake City, UT (801) 978-9265.
- qq. Ventfabrics Inc, Chicago, IL [www.ventfabrics.com](http://www.ventfabrics.com).
- rr. Ward Industries, Grand Rapids MI [www.wardind.com](http://www.wardind.com).
- ss. Young Regulator Co, Cleveland, OH [www.youngregulator.com](http://www.youngregulator.com).

**B. Materials:**

**1. Acoustical Liner System:**

**a. Duct Liner:**

- 1) One inch (25 mm) thick, 1-1/2 lb (0.68 kg) density fiberglass conforming to requirements of ASTM C1071. Liner will not support microbial growth when tested in accordance with ASTM C1338.
- 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - a) ToughGard by CertainTeed.
  - b) Duct Liner E-M by Knauf Fiber Glass.
  - c) Akousti-Liner by Manson Insulation.
  - d) Quiet R by Owens Corning.
  - e) Linacoustic RC by Johns-Manville.

**b. Adhesive:**

- 1) Category Four Approved Water-Based Products. See Section 01 6200 for definitions of Categories:
  - a) Cain: Hydrotak.
  - b) Design Polymerics: DP2501 or DP2502 (CMCL-2501).
  - c) Duro Dyne: WSA.
  - d) Elgen: A-410-WB.
  - e) Hardcast: Coil-Tack.
  - f) Hercules: Mighty Tough Adhesives MTA500 or MTA600.
  - g) Miracle / Kingco: PF-101.
  - h) Mon-Eco: 22-67 or 22-76.
  - i) Polymer Adhesive: Glasstack #35.
  - j) Techno Adhesive: 133.
  - k) McGill AirSeal: Uni-tack.
- 2) Category Four Approved Solvent-Based (non-flammable) Products. See Section 01 6200 for definitions of Categories:
  - a) Cain: Safetak.
  - b) Duro Dyne: FPG.
  - c) Hardcast: Glas-Grip 648-NFSE.
  - d) Miracle / Kingco: PF-91.
  - e) Mon-Eco: 22-24.
  - f) Polymer Adhesive: Q-Tack.
  - g) Techno Adhesive: 'Non-Flam' 106.

**c. Fasteners:**

- 1) Adhesively secured fasteners not allowed.

- 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - a) AGM Industries: 'DynaPoint' Series RP-9 pin.
  - b) Cain.
  - c) Duro Dyne.
  - d) Gripnail: May be used if each nail is installed by 'Grip Nail Air Hammer' or by 'Automatic Fastener Equipment' in accordance with Manufacturer's recommendations.
2. Duct Access Doors:
  - a. General:
    - 1) Factory built insulated access door with hinges and sash locks, as necessary. Construction shall be galvanized sheet metal, 24 ga (0.635 mm) minimum.
    - 2) Fire and smoke damper access doors shall have minimum clear opening of 12 inches (300 mm) square or larger as shown on Drawings.
  - b. Rectangular Ducts:
    - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) Air Balance: Fire/Seal FSA 100.
      - b) Air-Rite: Model HAD-2.
      - c) Cesco: HDD.
      - d) Elgen: TAB Type / Hinge and Cam.
      - e) Flexmaster: Spin Door.
      - f) Kees: ADH-D.
      - g) Nailor: 08SH.
      - h) Pottorff: 60-HAD.
      - i) Ruskin: ADH-24.
      - j) United Enertech: L-95.
  - c. Round Ducts:
    - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) Ductmate: 'Sandwich' Access Door.
      - b) Elgen: Sandwich Access Door.
      - c) Kees: ADL-R.
      - d) Nailor: 0809.
      - e) Pottorff: RAD.
      - f) Ruskin: ADR.
      - g) Ward: DSA.
3. Dampers And Damper Accessories:
  - a. Locking Quadrant Damper Regulators:
    - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) Duro Dyne: KS-385.
      - b) Dyn Air: QPS-385.
      - c) Elgen: EQR-4.
      - d) Ventfabrics: Ventline 555.
      - e) Young: No. 1.
  - b. Volume Dampers:
    - 1) Rectangular Duct:
      - a) Factory-manufactured 16 ga (1.6 mm) galvanized steel, single blade and opposed blade type with 3/8 inch (9.5 mm) axles and end bearings. Blade width 8 inches (200 mm) maximum. Blades shall have 1/8 inch (3 mm) clearance all around.
      - b) Damper shall operate within acoustical duct liner.
      - c) Provide channel spacer equal to thickness of duct liner.
      - d) Dampers above removable ceiling and in Mechanical Rooms shall have locking quadrant on bottom or side of duct.
      - e) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
        - (1) Air-Rite: Model CD-2.
        - (2) American Warming: VC-2-AA.
        - (3) Arrow: OBDAF-207.
        - (4) C & S: AC40.
        - (5) Cesco: AGO.
        - (6) Daniel: CD-OB.
        - (7) Greenheck: VCD-20.

- (8) Nailor: 1810 or 1820.
- (9) Pottorff: CD-42.
- (10) Ruskin: MD-35.
- (11) United Enertech: MD-115.
- (12) Utemp: CD-OB.
- 2) Round Duct:
  - a) Factory-manufactured 20 ga (1.0 mm) galvanized steel, single blade with 3/8 inch (9.5 mm) axles and end bearings.
  - b) For use in outside air ducts.
  - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - (1) Air Balance: Model AC-22.
    - (2) Air-Rite: Model CD-8.
    - (3) American Warming: V-22.
    - (4) Arrow: Type-70.
    - (5) C & S: AC21R.
    - (6) Cesco: MGG.
    - (7) Nailor: 1890.
    - (8) Pottorff: CD-21R.
    - (9) Ruskin: MDRS-25.
    - (10) United Enertech: RD.
- c. Motorized Outside Air Dampers:
  - 1) General:
    - a) Low leakage type. AMCA certified.
    - b) Make provision for damper actuators and actuator linkages to be mounted external of air flow.
  - 2) Rectangular Ducts:
    - a) Damper Blades:
      - (1) Steel or aluminum airfoil type with mechanically locked blade seals, 8 inch (200 mm) blade width maximum measured perpendicular to axis of damper.
      - (2) Jamb seals shall be flexible metal compression type.
      - (3) Opposed or single blade type.
    - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - (1) Air Balance: AC 526.
      - (2) American Warming: AC526.
      - (3) Arrow: AFD-20.
      - (4) C & S: AC50.
      - (5) Cesco: AGO3.
      - (6) Nailor: 2020.
      - (7) Pottorff: CD-52.
      - (8) Ruskin: CD-60.
      - (9) Tamco: Series 1000.
      - (10) United Enertech: CD-150 or CD-160.
  - 3) Round Ducts:
    - a) Damper Blades:
      - (1) Steel with mechanically locked blade seals.
      - (2) Blade seals shall be neoprene or polyethylene.
      - (3) Single blade type.
    - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - (1) Air Balance: AC 25.
      - (2) American Warming: VC25.
      - (3) Arrow: Type 70 or 75.
      - (4) C & S: AC25R.
      - (5) Cesco: AGG.
      - (6) Nailor: 1090.
      - (7) Pottorff: CD-25R.
      - (8) Ruskin: CD25.
      - (9) Tamco: Square-to-Round Series 1000.

- (10) United Enertech: RI.
- d. Backdraft Dampers:
    - 1) Backdraft blades shall be nonmetallic neoprene coated fiberglass type.
    - 2) Stop shall be galvanized steel screen or expanded metal, 1/2 inch (13 mm) mesh.
    - 3) Frame shall be galvanized steel or extruded aluminum alloy.
    - 4) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) Air-Rite: Model BDD-3.
      - b) American Warming: BD-15.
      - c) C & S: BD30.
      - d) Pottorff: BD-51.
      - e) Ruskin: NMS2.
      - f) Utemp: BFEA.
  4. Duct Silencers:
    - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) Air Filters: AIRSAN.
      - 2) Industrial Acoustic.
      - 3) Titus.
      - 4) McGill AirSeal.
  5. Air Turns:
    - a. Single thickness vanes. Double thickness vanes not acceptable.
    - b. 4-1/2 inch (115 mm) wide vane rail. Junior vane rail not acceptable.
  6. Branch Tap for Flexible Ductwork:
    - a. Factory-manufactured rectangular-to-round 45 degree leading tap fabricated of 24 ga (0.635 mm) zinc-coated lock-forming quality steel sheets meeting requirements of ASTM A653, with G-90 coating.
    - b. One inch wide mounting flange with die formed corner clips, pre-punched mounting holes, and adhesive coated gasket.
    - c. Manual Volume Damper:
      - 1) Single blade, 22 ga (0.79 mm) minimum
      - 2) 3/8 inch (9.5 mm) minimum square rod with brass damper bearings at each end.
      - 3) Heavy-duty locking quadrant on 1-1/2 inch (38 mm) high stand-off mounting bracket attached to side of round duct.
    - d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) ST-1HD by Air-Rite:
        - a) Nylon damper bearings approved for Air-Rite.
      - 2) STO by Flexmaster.
      - 3) HET by Sheet Metal Connectors.
- C. Fabrication:
1. Duct Liner:
    - a. Install mat finish surface on airstream side. Secure insulation to cleaned sheet metal duct with continuous 100 percent coat of adhesive and with 3/4 inch (19 mm) long mechanical fasteners 12 inches (300 mm) on center maximum unless detailed otherwise on Drawings. Pin all duct liner.
    - b. Accurately cut liner and thoroughly coat ends with adhesive. Butt joints tightly. Top and bottom sections of insulation shall overlap sides. If liner is all one piece, folded corners shall be tight against metal. Ends shall butt tightly together.
    - c. Coat longitudinal and transverse edges of liner with adhesive.
  2. Air Turns:
    - a. Permanently install vanes arranged to permit air to make abrupt turn without appreciable turbulence, in 90 degree elbows of above ground supply and return ductwork.
    - b. Quiet and free from vibration when system is in operation.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. Duct Liner:

1. Furnish and install acoustic lining in following types of rectangular ducts unless noted otherwise on Contract Documents:
    - a. Supply air.
    - b. Return air.
    - c. Transfer air.
  2. Do not install acoustic lining in round ducts.
- B. Access Doors In Ducts:
1. Install at each manual outside air damper and at each motorized damper. Locate doors within 6 inches (150 mm) of installed dampers.
  2. Install within 6 inches (150 mm) of fire dampers and in Mechanical Room if possible. Install on side of duct that allows easiest access to damper.
- C. Dampers And Damper Accessories:
1. Provide each take-off with an adjustable volume damper to balance that branch.
    - a. Anchor dampers securely to duct.
    - b. Install dampers in main ducts within insulation.
    - c. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
  2. Install motorized dampers.

**END OF SECTION**



**SECTION 23 3316****FIRE AND SMOKE DAMPERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install fire and smoke dampers described in Contract Documents.
- B. Related Requirements:
  - 1. Section 23 3001: 'Common Duct Requirements'.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. Underwriters Laboratories (UL):
    - a. UL 555: 'Fire Dampers' (7th Edition).
    - b. UL 555C, 'Ceiling Dampers' (3rd Edition).
    - c. UL 555S, 'Smoke Dampers' (4th Edition).
  - 2. Standards Council of Canada:
    - a. CAN/ULC S112-10(R2016), 'Standard Methods of Test of Fire-Damper Assemblies'.
    - b. CAN/ULC S112.1-10(R2016), 'Standard for Leakage Rated Dampers for Use in Smoke Control Systems'.
    - c. CAN/ULC S112.2-07(R2016), 'Standard of Fire Test of Ceiling Firestop Flap Assemblies'.

**1.3 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Dampers shall conform to NFPA and SMACNA requirements and bear ULC label.
  - 2. Dampers shall be approved by fire authorities having jurisdiction where so required.
  - 3. Wall fire dampers shall conform to CAN/ULC 112.

**1.4 SUBMITTALS**

- A. Maintenance Material Submittals:
  - 1. Extra Stock Materials:
    - a. Leave six (6) fusible links of each rating type used on Project with Owner.

**PART 2 - PRODUCTS****2.1 ASSEMBLIES**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Air Balance Inc, Holland, OH [www.airbalance.com](http://www.airbalance.com).
    - b. Cesco Products, Florence, KY [www.cescoproducts.com](http://www.cescoproducts.com).
    - c. Greenheck Corp, Schofield, WI [www.greenheck.com](http://www.greenheck.com) or Greenheck Corp/ E H Price Ltd, Winnipeg, MB (204) 669-4220.
    - d. Honeywell Inc, Minneapolis, MN [www.honeywell.com](http://www.honeywell.com).

- e. Nailor Industries, Houston, TX [www.nailor.com](http://www.nailor.com).
  - f. Pottorff, Fort Worth, TN [www.pottorff-hvac.com](http://www.pottorff-hvac.com).
  - g. Prefco Products Inc, Buckingham, PA [www.prefco-hvac.com](http://www.prefco-hvac.com).
  - h. Ruskin Manufacturing, Kansas City, MO [www.ruskin.com](http://www.ruskin.com).
  - i. Safe-Air / Dowco, Cicero, IL [www.safeair-dowco.com](http://www.safeair-dowco.com).
  - j. United Enertech Corp, Chattanooga, TN [www.unitedenertech.com](http://www.unitedenertech.com).
- B. Manufactured Units:
- 1. Fire Dampers:
    - a. Walls (Type 1):
      - 1) Type 'B.'
      - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
        - a) Air Balance: Model 119B.
        - b) Cesco: Model 15SB.
        - c) Greenheck: Model FD150XB.
        - d) Nailor: Model 0120H.
        - e) Pottorff: Model VFD-10.
        - f) Ruskin: Model DIBD20.
        - g) Safe-Air: Model 150B Sleeved.
        - h) United Enertech: FDD-SB.
- C. Fabrication:
- 1. General:
    - a. 16 ga frames.
    - b. Integral sleeves.
  - 2. Type 1 Dampers: Fabricate with blades out of airstream.
- D. Operation Sequences:
- 1. Type 1: Dampers shall close when temperatures at damper exceed 165 deg F (74 deg C) link unless indicated otherwise on Drawings.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Placement:
- 1. Fire Dampers (Type 1): Install in ducts where ducts penetrate fire-rated walls.

**END OF SECTION**

**SECTION 23 3346****FLEXIBLE DUCTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install supply air branch duct runouts to diffusers as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 23 3001: Common Duct Requirements.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. National Fire Protection Association / American National Standards Institute:
    - a. NFPA 90A: 'Installation of Air-Conditioning and Ventilating Systems' (2018 or most recent edition adopted by AHJ).
  - 2. Underwriters Laboratories:
    - a. UL 181, 'Factory-Made Ducts and Air Connectors' (11th Edition).
    - b. UL 181B, 'Closure Systems for Use With Flexible Air Ducts and Air Connectors' (3rd Edition).
  - 3. ULC.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. JP Lamborn Co., Fresno CA [www.jpflex.com](http://www.jpflex.com).
    - b. Flexmaster USA Inc, Houston, TX [www.flexmasterusa.com](http://www.flexmasterusa.com) or Flexmaster Canada Ltd, Richmond Hill, ON (905) 731-9411.
    - c. Thermaflex by Flexible Technologies, Abbeville, SC or Mississauga, ON [www.thermaflex.net](http://www.thermaflex.net).
- B. Materials:
  - 1. Ducts:
    - a. Formable, flexible, circular duct which shall retain its cross-section, shape, rigidity, and shall not restrict airflow after bending.
    - b. Insulation:
      - 1) Nominal 1-1/2 inches (38 mm), 3/4 lb per cu ft (12 kg per cu m) density fiberglass insulation with air-tight, polyethylene or polyester core, sheathed in seamless vapor barrier jacket factory installed over flexible assembly.
    - c. Assembly, including insulation and vapor barrier, shall meet Class I requirement of NFPA 90A and be UL 181 rated, with flame spread of 25 or less and smoke developed rating of 50 or under.
    - d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) PR-25 by JP Lambornes.
      - 2) Flex-Vent KP by Thermaflex by Flexible Technologies.

- 3) Type 1B Insulated by Flexmaster.
2. Cinch Bands: Nylon, 3/8 inch (9.5 mm) removable and reusable type.
  - a. Listed and labeled in accordance with Standard UL 181B and labeled 'UL 181 B-C'.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install duct in fully extended condition free of sags and kinks, using 72 inch (1 800 mm) maximum lengths.
- B. Make duct connections by coating exterior of duct collar for 3 inches (75 mm) with duct sealer and securing duct in place over sheet metal collar with specified cinch bands.

#### **END OF SECTION**

**SECTION 23 3401****EXHAUST FANS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install exhaust fans as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 23 3001: 'Common Duct Requirements'.
  - 2. Division 26: Control device and electrical connection.

**1.2 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Bear AMCA seal and ULC label.

**PART 2 - PRODUCTS****2.1 MANUFACTURERS**

- A. Manufacturer Contact List:
  - 1. Acme Engineering & Manufacturing Corp, Muskogee, OK [www.acmefan.com](http://www.acmefan.com).
  - 2. Broan-Nu Tone LLC, Harford, WI [www.broan.com](http://www.broan.com).
  - 3. Carnes Co., Verona, MI [www.carnes.com](http://www.carnes.com).
  - 4. Loren Cook Co., Springfield, MO [www.lorencook.com](http://www.lorencook.com).
  - 5. Soler & Palau (S&P USA Ventilation Systems, LLC), Jacksonville FL [www.solerpalau-usa.com](http://www.solerpalau-usa.com).
  - 6. Greenheck.

**2.2 MANUFACTURED UNITS**

- A. Ceiling Mounted Exhaust Fans:
  - 1. Acoustically insulated housings. Sound level rating of 5.0 sones maximum for CFM and static pressure listed on Contract Drawings. See Schedule A-4.
  - 2. Include chatterproof integral back-draft damper with no metal-to-metal contact.
  - 3. True centrifugal wheels.
  - 4. Entire fan, motor, and wheel assembly shall be easily removable without disturbing housing.
  - 5. Suitably ground motors and mount on rubber-in shear vibration isolators.
  - 6. Provide louver as detailed.
  - 7. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a. Acme: VQ.
    - b. Broan: LoSone.
    - c. Carnes: VCD.
    - d. Cook: Gemini.
    - e. Soler & Palau: FF.
    - f. Greenheck: SP (See A-4).

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Anchor fan units securely to structure.

**END OF SECTION**

**SECTION 23 3713****DIFFUSERS, REGISTERS, AND GRILLES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install diffusers and grilles connected to ductwork as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 23 3001: 'General Duct Requirements'.

**1.2 SUBMITTALS**

- A. Maintenance Material Submittals:
  - 1. Tools: Leave tool for removing core of each different type of grille for building custodian.

**PART 2 - PRODUCTS****2.1 MANUFACTURERS**

- A. Manufacturer Contact List:
  - 1. Carnes Co, Verona, MI [www.carnes.com](http://www.carnes.com).
  - 2. J & J Register, Grand Rapids, MI [www.jandjreg.com](http://www.jandjreg.com).
  - 3. Krueger Air System Components, Richardson, TX [www.krueger-hvac.com](http://www.krueger-hvac.com).
  - 4. Metal\*Aire by Metal Industries Inc, Clearwater, FL [www.metalaire.com](http://www.metalaire.com).
  - 5. Nailor Industries Inc, Houston, TX or Weston, ON [www.nailor.com](http://www.nailor.com).
  - 6. Price Industries Inc, Suwanee, GA [www.price-hvac.com](http://www.price-hvac.com) or E H Price Ltd, Winnipeg, MB (204) 669-4220.
  - 7. Titus, Richardson, TX [www.titus-hvac.com](http://www.titus-hvac.com).
  - 8. Tuttle & Bailey, Richardson, TX [www.tuttleandbailey.com](http://www.tuttleandbailey.com).

**2.2 MANUFACTURED UNITS**

- A. Ceiling Diffusers:
  - 1. Finish: Off-white baked enamel.
  - 2. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a. Carnes: SKSA.
    - b. Krueger: SH.
    - c. Metal\*Aire: 5500S.
    - d. Price: SMD-6.
    - e. Titus: TDC Border Type 6.
    - f. Tuttle & Bailey: M.
- B. Transfer Grilles:
  - 1. Finish: Off-white baked enamel.
  - 2. 1/2 inch (12.7 mm) spacing. Egg crate type.
  - 3. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a. Carnes:
    - b. J & J:

- c. Krueger:
- d. Metal\*Aire:
- e. Nailor:
- f. Price:
- g. Titus:
- h. Tuttle & Bailey:

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Anchor securely into openings. Secure frames to ductwork by using four sheet metal screws, one per side.

**END OF SECTION**



**SECTION 23 3714****LOUVERS AND VENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install exhaust louvers connected to ductwork as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 23 3001: 'General Duct Requirements'.

**PART 2 - PRODUCTS****2.1 MANUFACTURERS**

- A. Manufacturer Contact List:
  - 1. Airolite Co, Marietta, OH [www.airolite.com](http://www.airolite.com).
  - 2. Air-Rite Manufacturing, Bountiful, UT [www.air-ritemfg.com](http://www.air-ritemfg.com).
  - 3. American Warming & Ventilating, Holland, OH [www.awv.com](http://www.awv.com).
  - 4. Arrow United Industries, Wyalusing, PA [www.arrowunited.com](http://www.arrowunited.com).
  - 5. Carnes Co, Verona, WI [www.carnes.com](http://www.carnes.com) or Energy Technology Products LTD, Edmonton, AB (780) 468-1110.
  - 6. Industrial Louvers Inc, Delano, MN [www.industriallouvers.com](http://www.industriallouvers.com) or DKG Construction, LTD., Waterdown, ON 289-895-9729.
  - 7. Pottorff, Fort Worth, TX [www.pottorff.com](http://www.pottorff.com).
  - 8. Ruskin Manufacturing, Kansas City, MO [www.ruskin.com](http://www.ruskin.com).
  - 9. United Enertech Corporation, Chattanooga, TN [www.unitedenertech.com](http://www.unitedenertech.com).
  - 10. Vent Products Co Inc, Chicago, IL [www.ventprod.com](http://www.ventprod.com).
  - 11. SF435 by Western Ventilation Products Ltd, Calgary, AB [www.westvent.com](http://www.westvent.com).
  - 12. Wonder Metals Corp, Redding, CA [www.wondermetals.com](http://www.wondermetals.com).
  - 13. Price.

**2.2 MANUFACTURED UNITS**

- A. Louvers:
  - 1. General:
    - a. Extruded aluminum, with blades welded or screwed into frames.
    - b. Frames shall have mitered corners.
    - c. Louvers shall be recessed, flanged, stationary, or removable as noted on Contract Documents.
    - d. Finish:
      - 1) Polyvinylidene Fluoride (PVF<sub>2</sub>) Resin-base finish (Kynar 500 or Hylar 5000) containing 70 percent minimum PVF<sub>2</sub> in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
      - 2) Color as selected by Architect from Manufacturer's standard colors.
- 2. Louvers Connected To Ductwork:
  - a. 1/2 inch (13 mm) mesh 16 ga (1.59 mm) aluminum bird screen.
  - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Airolite.
    - 2) Air-Rite Manufacturing.

- 3) American Warming & Ventilating.
- 4) Arrow United Industries.
- 5) Carnes.
- 6) Industrial Louvers.
- 7) Pottorff.
- 8) Ruskin.
- 9) United Enertech.
- 10) Vent Products.
- 11) Wonder Metals.
- 12) DE 439 by Price.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Anchor securely into openings. See Detail M/A-10.
- B. Where louvers touch masonry or dissimilar metals, protect with heavy coat of asphaltum paint.

**END OF SECTION**

## **DIVISION 26: ELECTRICAL**

### **26 0500 COMMON WORK RESULTS FOR ELECTRICAL**

26 0501 COMMON ELECTRICAL REQUIREMENTS  
26 0519 LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES  
26 0523 CONTROL-VOLTAGE ELECTRICAL CABLES  
26 0526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS  
26 0533 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS  
26 0613 ELECTRICAL EQUIPMENT MOUNTING HEIGHT SCHEDULE

### **26 2000 LOW-VOLTAGE ELECTRICAL TRANSMISSION**

26 2726 WIRING DEVICES

### **26 5000 LIGHTING**

26 5100 INTERIOR LIGHTING  
26 5200 EMERGENCY LIGHTING

END OF TABLE OF CONTENTS

BLANK PAGE

**SECTION 26 0501****COMMON ELECTRICAL REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. General electrical system requirements and procedures.
  - 2. Make electrical connections to equipment provided under other Sections.
  - 3. Furnish and install Penetration Firestop Systems at electrical system penetrations as described in Contract Documents.
  - 4. Refer to Drawings for Seismic requirements.
- B. Related Requirements:
  - 1. Section 02 4119: 'Selective Structure Demolition' for salvage of existing electrical items to be reused or recycled.
  - 2. Section 07 8400: 'Firestopping' for quality of Penetration Firestop Systems to be used on Project and submittal requirements.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. National Fire Protection Association / American National Standards Institute:
    - a. NFPA 70, Canadian Electric Code (CEC).
  - 2. National Electrical Manufacturing Association Standards (NEMA):
    - a. NEMA 250, 'Enclosure for Electrical Equipment (1000 Volts Maximum)'.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Product Data:
    - a. Provide following information for each item of equipment:
      - 1) Catalog Sheets.
      - 2) Assembly details or dimension drawings.
      - 3) Installation instructions.
      - 4) Manufacturer's name and catalog number.
      - 5) Name of local supplier.
    - b. Furnish such information for following equipment:
      - 1) Section 26 2726: 'Wiring Devices' for lighting control and dimmer equipment.
      - 2) Section 26 5100: 'Interior Lighting Fixtures'.
      - 3) Section 26 5200: 'Emergency Lighting' for battery units.
    - c. Do not purchase equipment before approval of product data.
  - 2. Shop Drawings:
    - a. Submit on following equipment:
      - 1) Light fixtures.
      - 2) Fire alarm devices.
      - 3) Wiring devices.
    - b. Indicate precise equipment to be used, including all options specified. Indicate wording and format of nameplates where applicable.
- B. Informational Submittals:
  - 1. Test And Evaluation Reports:
    - a. Report of site tests, before Substantial Completion.

2. Qualification Statement:
  - a. Electrical Subcontractor:
    - 1) Provide Qualification documentation if requested by Architect or Owner.
  - b. Installer:
    - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
  1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operations and Maintenance Data:
      - 1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
    - b. Record Documentation:
      - 1) Manufacturers documentation:
        - a) Manufacturer's literature.
        - b) Include copy of approved shop drawings.

## 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  1. CEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
  2. Material and equipment provided shall meet standards of NEMA or UL, or ULC, CSA, or EEMAC and bear their label wherever standards have been established and label service is available.
- B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
  1. Electrical Subcontractor:
    - a. Company specializing in performing work of this section.
      - 1) Minimum five (5) years experience in electrical installations.
      - 2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
    - b. Upon request, submit documentation.
  2. Installer:
    - a. Licensed for area of Project.
    - b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
    - c. Upon request, submit documentation.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS – NOT USED

## PART 3 - EXECUTION

### 3.1 INSTALLERS

- A. Acceptable Installers:
  1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

### 3.2 EXAMINATION

- A. Verification Of Conditions:
  1. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

**B. Evaluation And Assessment:**

1. All relocations, reconnections, and removals are not necessarily indicated on Drawings. Include such work without additional cost to Owner.

**3.3 PREPARATION**

- A. Disconnect equipment that is to be removed or relocated. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work.
- B. Where affected by demolition or new construction, relocate, extend, or repair raceways, conductors, outlets, and apparatus to allow continued use of electrical system. Use methods and materials as specified for new construction.
- C. Perform drilling, cutting, block-offs, and demolition work required for removal of necessary portions of electrical system. Do not cut joists, beams, girders, trusses, or columns without prior written permission from Architect.
- D. Remove concealed wiring abandoned due to demolition or new construction. Remove circuits, conduits, and conductors that are not to be re-used back to next active fixture, device, or junction box.
- E. Patch, repair, and finish surfaces affected by electrical demolition work, unless work is specifically specified to be performed under other Sections of the specifications.

**3.4 INSTALLATION**

- A. General:
  1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
  2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough in.
    - a. Notify Architect of conflicts before beginning work.
    - b. Coordinate locations of power and lighting outlets in mechanical rooms and other areas with mechanical equipment, piping, ductwork, cabinets, etc, so they will be readily accessible and functional.
  3. Work related to other trades which is required under this Division, such as cutting and patching, trenching, and backfilling, shall be performed according to standards specified in applicable Sections.
- B. Install Penetration Firestop System appropriate for penetration at electrical system penetrations through walls, ceilings, and top plates of walls.

**3.5 FIELD QUALITY CONTROL**

- A. Field Tests:
  1. Test systems and demonstrate equipment as working and operating properly. Notify Architect before test. Rectify defects at no additional cost to Owner.

**3.6 CLEANING**

- A. Remove obsolete raceways, conductors, apparatus, and lighting fixtures promptly from site and dispose of legally.

**3.7 CLOSEOUT ACTIVITIES****A. Training:**

1. Provide competent instructor to train Owner's maintenance personnel in operation and maintenance of electrical equipment and systems. Schedule instruction period at time of final inspection.

**END OF SECTION**



**SECTION 26 0519****LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Quality of conductors used on Project except as excluded below.
- B. Related Requirements:
  - 1. Section 26 0501: Common Electrical Requirements.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Line Voltage: Over 70 Volts.

**PART 2 - PRODUCTS****2.1 SYSTEMS**

- A. Line Voltage Conductors:
  - 1. Copper with AWG sizes as shown:
    - a. Minimum size shall be No. 12 except where specified otherwise.
    - b. Conductor size No. 8 and larger shall be stranded.
  - 2. Insulation:
    - a. Standard Conductor Size No. 10 And Smaller: 600V type THWN or XHHW (75 deg C).
    - b. Standard Conductor Size No. 8 And Larger: 600V Type THW, THWN, or XHHW (75 deg C).
    - c. Higher temperature insulation as required by CEC or local codes.
  - 3. Colors:
    - a. 208Y / 120 V System:
      - 1) Black: Phase A.
      - 2) Red: Phase B.
      - 3) Blue: Phase C.
      - 4) Green: Ground.
      - 5) White: Neutral.
    - b. 480Y / 277 Volt System:
      - 1) Brown: Phase A.
      - 2) Orange: Phase B.
      - 3) Yellow: Phase C.
      - 4) Gray: Neutral.
      - 5) Green: Ground.
    - c. Conductors size No. 10 and smaller shall be colored full length. Tagging or other methods for coding of conductors size No. 10 and smaller not allowed.
    - d. For feeder conductors larger than No. 10 at pull boxes, gutters, and panels, use painted or taped band or color tag color-coded as specified above.
- B. Line Voltage Cables:
  - 1. Metal Clad Cable (MC) may be used as restricted below:
    - a. Copper conductors.
    - b. Sizes #12 through #8.
    - c. Use only in indoor dry locations where:

- 1) Not subject to damage.
- 2) Not in contact with earth.
- 3) Not in concrete.

C. Standard Connectors:

1. Conductors No. 8 And Smaller: Steel spring wire connectors.
2. Conductors Larger Than No. 8: Pressure type terminal lugs.
3. Connections Outside Building: Watertight steel spring wire connections with waterproof, non-hardening sealant.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

A. General:

1. Conductors and cables shall be continuous from outlet to outlet.
2. Do not use direct burial cable.

B. Line Voltage Conductors:

1. Install conductors in raceway where indicated on Drawings. Run conductors of different voltage systems in separate conduits.
2. Route circuits at own discretion, however, circuiting shall be as shown in Panel Schedules. Group circuit homeruns to panels as shown on Drawings.
3. Neutrals:
  - a. On three-phase, 4-wire systems, do not use common neutral for more than three circuits.
  - b. On single-phase, 3-wire systems, do not use common neutral for more than two circuits.
  - c. Run separate neutrals for each circuit where specifically noted on Drawings.
  - d. Where common neutral is run for two or three home run circuits, connect phase conductors to breakers in panel which are attached to separate phase legs so neutral conductors will carry only unbalanced current. Neutral conductors shall be of same size as phase conductors unless specifically noted otherwise.
4. Pulling Conductors:
  - a. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
  - b. Do not use heavy mechanical means for pulling conductors.
  - c. Use only listed wire pulling lubricants.

C. Line Voltage Cables:

1. Route circuits at own discretion, however, circuiting and numbering shall be as shown in Panel Schedules.
2. Support cables using approved staples, cable ties, straps, hangers, or similar fittings, spaced as required.
3. Where installing in framing, do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches (600 mm) of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width. Holes shall be one inch diameter maximum.
4. Conceal cables within ceilings and walls of finished areas.
5. Install exposed cables parallel to or at right angles to building structure lines.
6. Keep cables 6 inches (150 mm) minimum from hot water pipes.
7. Do not support cables from mechanical ducts or duct supports without Architect's written approval.
8. Prohibited procedures:
  - a. Boring holes for installation of cables in vertical truss members.
  - b. Notching of structural members for installation of cables.

### **END OF SECTION**

**SECTION 26 0523****CONTROL-VOLTAGE ELECTRICAL CABLES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Alter and relocate existing control-voltage electrical cables as required to suit new layout as described in Contract Documents.
  - 2. New data connection / cables to Room 176.
  - 3. Intent is to match existing cables on site.
  - 4. Free air installations (dressed down) secured to structure is acceptable above ceilings to match building standards.
- B. Related Requirements:
  - 1. Section 26 0501: 'Common Electrical Requirements'.
  - 2. Section 28 3101: 'Fire Detection And Alarm System' for cables.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Control Voltage: 70 Volts and under.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Manufacturers:
  - 1. Category Four Approved Cable Manufacturers. See Section 01 6200 for definitions:
    - a. Alpha Wire Co, Elizabeth, NJ [www.alphawire.com](http://www.alphawire.com).
    - b. Belden Wire & Cable Co, Richmond, IN [www.belden.com](http://www.belden.com).
    - c. Liberty Wire & Cable, Colorado Springs, CO [www.libertycable.com](http://www.libertycable.com).
    - d. West Penn Wire Corp, Washington, PA [www.westpenn-cdt.com](http://www.westpenn-cdt.com).
- B. Components:
  - 1. Building Telephone / Data System Cables: CAT 6 with FT4 rating and Northern Telecom Cable.
  - 2. Sheath Colors:
    - a. Telephone: Yellow
    - b. Data: Blue
    - c. Existing to remain
  - 3. Meet requirements of EIZ/TIA 568 Standard.
  - 4. Terminal Block – existing to remain
  - 5. Telephone Board – existing to remain
  - 6. Sound cables – existing to remain

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. General:

1. Cables shall be continuous and without splices from source to outlet. Contractor to site investigate to determine existing route from source to outlet.
2. Dress down cables with similar free air wiring above ceilings.
3. Conceal cables within ceilings and walls of finished areas in conduit. Cables may be exposed in unfinished areas but not run on floors of mechanical equipment spaces or in such a way that they obstruct access to, operation of, or servicing of equipment.
4. Run exposed cables parallel to or at right angles to building structure lines.
5. Keep cables 6 inch (150 mm) minimum from hot water pipes.
6. Support cables using approved staples, cable ties, straps, hangers, or similar fittings spaced every 3 feet (900 mm).
7. Where installing in framing, do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches (600 mm) of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width. Holes shall be 1/2 inch (13 mm) diameter maximum.
8. Bundle only cables of same systems together.
9. Do not run cables within 10 inches (255 mm) of line voltage conductors/raceways.
10. Extend cables 18 inches (450 mm) from wall or ceiling at all outlet locations. Extend cables to twice vertical length of cabinet at each cabinet location.
11. Pulling cables into conduit:
  - a. Do not pull cables until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
  - b. Do not use heavy mechanical means for pulling cables.
  - c. Use only listed wire pulling lubricants.
12. Prohibited procedures:
  - a. Boring holes for installation of cables in vertical truss members.
  - b. Notching of structural members for installation of cables.

#### **END OF SECTION**

**SECTION 26 0526****GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install grounding for electrical installation as described in Contract Documents except as excluded below.
- B. Related Requirements:
  - 1. Section 26 0501: 'Common Electrical Requirements'.

**1.2 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Cable assemblies shall be ULC / CEC Listed and CSA Certified. Cables shall be a distinctive green or green/yellow in color, and all jackets shall be ULC, VW-1 flame rated.
  - 2. Grounding shall conform to all required Commercial Building Grounding and Bonding Requirements for Telecommunications, Electrical Codes, and Manufacturer's grounding requirements.
- B. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
  - 1. Installers Qualifications:
    - a. Grounding and Bonding:
      - 1) Licensed electrical contractor shall perform installation and termination of main bonding conductor to building service entrance ground.
      - 2) Licensed in area that Work is to be performed.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Manufacturers:
  - 1. Type One Acceptable Products:
    - a. 'Cadweld' by Erico International, Solon, OH [www.erico.com](http://www.erico.com).
    - b. 'ThermOweld' by Continental Industries, Tulsa, NE [www.conind.com](http://www.conind.com).
    - c. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Performance:
  - 1. Design Criteria:
    - a. Size materials as shown on Drawings and in accordance with applicable codes.
- C. Materials:
  - 1. Grounding And Bonding Jumper Conductors: Bare copper or with green insulation.
  - 2. Make grounding conductor connections to ground rods and water pipes using approved bolted clamps listed for such use.
  - 3. Service Grounding Connections And Cable Splices: Make by exothermic process.

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Interface With Other Work: Coordinate with existing grounded system of building.
- B. Grounding conductors and bonding jumper conductors shall be continuous from terminal to terminal without splice. Provide grounding for following.
  - 1. Electrical service, its equipment and enclosures.
  - 2. Conduits and other conductor enclosures.
  - 3. Neutral or identified conductor of interior wiring system.
  - 4. Main panelboard, power and lighting panelboards.
  - 5. Non-current-carrying metal parts of fixed equipment such as motors, starter and controller cabinets, instrument cases, and lighting fixtures.
- C. Grounding connection to main water supply is existing.
- D. Ground identified common conductor of electrical system at secondary side of main transformer supplying building is existing. Ground identified grounded (neutral) conductor of electrical system on supply side of main service disconnect is existing.
- E. Pull grounding conductors in non-metallic raceways, in flexible steel conduit exceeding 72 inches (1 800 mm) in length, and in flexible conduit connecting to mechanical equipment.
- F. Provide grounding bushings on all feeder conduit entrances into panelboards and equipment enclosures.
- G. Bond conduit grounding bushings to enclosures with minimum #10 AWG conductor.
- H. Connect equipment grounds to building system ground.
  - 1. Use same size equipment grounding conductors as Phased conductors up through #10 AWG.
  - 2. Use CEC for others unless noted otherwise in Drawings.
- I. Run separate insulated grounding cable from each equipment cabinet to electrical panel. Do not use intermediate connections or splices. Affix directly to cabinet.
- J. On motors, connect ground conductors to conduit with approved grounding bushing and to metal frame with bolted solderless lug.
- K. Existing transformer is grounded.

**END OF SECTION**

**SECTION 26 0533****RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Quality of material and installation procedures for raceway, boxes, and fittings used on Project but furnished under other Divisions.
  - 2. Furnish and install raceway, conduit, and boxes used on Project not specified to be installed under other Divisions.
  - 3. Furnish and install air-vapor barrier boxes at thermal envelope as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 26 0501: 'General Electrical Requirements'.
  - 2. Section 28 3101: 'Fire Detection And Alarm System' for clarification of raceway and conduit requirements for detection and alarm system.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Cooper B-Line, Highland, IL [www.b-line.com](http://www.b-line.com).
    - b. Hubbell Incorporated, Milford, CT [www.hubbell-wiring.com](http://www.hubbell-wiring.com) or Hubbell Canada Inc, Pickering, ON (905) 839-4332.
    - c. Square D, Palatine, IL [www.squared.com](http://www.squared.com).
    - d. Thomas & Betts, Memphis, TN [www.tnb.com](http://www.tnb.com) or Thomas & Betts Ltd, Iberville, PQ (450) 347-5318.
    - e. Walker Systems Inc, Williamstown, WV (800) 240-2601 or Walker Systems Inc / Wiremold Canada Inc, Fergus, ON (519) 843-4332.
    - f. Wiremold Co, West Hartford, CT [www.wiremold.com](http://www.wiremold.com).
- B. Materials:
  - 1. Raceway And Conduit:
    - a. Sizes:
      - 1) 3/4 inch (19 mm) for exterior use, unless indicated otherwise.
      - 2) 1/2 inch (13 mm) for interior use, unless indicated otherwise.
    - b. Types: Usage of each type is restricted as specified below by product.
      - 1) Galvanized rigid steel or galvanized intermediate metal conduit (IMC) is allowed for use in all areas. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with vinyl tape.
      - 2) Galvanized Electrical Metallic Tubing (EMT), Flexible Steel Conduit, and Metal Clad Cable (MC):
        - a) Allowed for use only in indoor dry locations where it is:
          - (1) Not subject to damage.
          - (2) Not in contact with earth.
          - (3) Not in concrete.
        - b) For metal conduit systems, flexible steel conduit is required for final connections to indoor mechanical equipment.
      - 3) Schedule 40 Polyvinyl Chloride (PVC) Conduit:

- a) Allowed for use only underground or below concrete with galvanized rigid steel or IMC elbows and risers.
- 4) Pre-wired 3/8 Inch (9.5 mm) Flexible Fixture Whips: Allowed only for connection to recessed lighting fixtures, lengths not to exceed 72 inches (1 800 mm).
- c. Prohibited Raceway Materials:
  - 1) Aluminum conduit.
  - 2) Armored cable type AC (BX) cable.
- 2. Raceway And Conduit Fittings:
  - a. Rigid Steel Conduit And IMC: Threaded and designed for conduit use.
  - b. EMT:
    - 1) Compression type.
    - 2) Steel set screw housing type.
  - c. PVC Conduit:
    - 1) PVC type. Use PVC adapters at all boxes.
    - 2) PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
  - d. Flexible Steel Conduit: Screw-in type.
  - e. Liquid-tight Flexible Metal Conduit: Sealtite type.
  - f. Expansion fittings shall be equal to OZ Type AX sized to raceway and including bonding jumper.
  - g. Prohibited Fitting Materials:
    - 1) Crimp-on, tap-on, indenter type fittings.
    - 2) Cast set-screw fittings for EMT.
    - 3) Spray (aerosol) PVC cement.
- 3. Air-Vapor Barrier Boxes:
  - a. Pre-molded polyethylene box installed in all exterior framing walls (thermal envelope) around recessed outlet boxes.
  - b. Class Two Quality Standard:
    - 1) Approved Manufacturer. See Section 01 6200 for definitions of Classes.
      - a) Lessco Low Energy Systems Supply Company, Inc., Campbellsport, WI  
[www.lessco-airtight.com](http://www.lessco-airtight.com).

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verification Of Conditions:
  - 1. Confirm dimensions, ratings, and specifications of materials to be installed and coordinate these with site dimensions and with other Sections.

### **3.2 INSTALLATION**

- A. Interface With Other Work:
  - 1. Coordinate with Divisions 22 and 23 for installation of raceway for control of plumbing and HVAC equipment.
  - 2. Before rough-in, verify locations of boxes with work of other trades to ensure that they are properly located for purpose intended.
  - 3. Install pull wires in raceways installed under this Section where conductors or cables are to be installed under other Divisions.
- B. Conduit And Raceway:
  - 1. Conceal raceways within ceilings, walls, and floors, except at Contractor's option, conduit may be exposed on walls or ceilings of mechanical equipment areas. Install exposed raceway runs parallel to or at right angles to building structure lines.
  - 2. Keep raceway runs 6 inches (150 mm) minimum from hot water pipes.
  - 3. Make no more than four quarter bends, 360 degrees total, in any conduit run between outlet and outlet, fitting and fitting, or outlet and fitting.



- a. Make bends and offsets so conduit is not injured and internal diameter of conduit is not effectively reduced.
  - b. Radius of curve shall be at least minimum indicated by CEC.
4. Cut conduit smooth and square with run and ream to remove rough edges. Cap raceway ends during construction. Clean or replace raceway in which water or foreign matter have accumulated.
5. Installation In Framing:
  - a. Do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches (600 mm) of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width.
  - b. Holes shall be one inch (25 mm) diameter maximum.
6. Underground Raceway:
  - 1) Not used.
7. Prohibited Procedures:
  - a. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.
  - b. Installation of raceway that has been crushed or deformed.
  - c. Use of torches for bending PVC.
  - d. Spray applied PVC cement.
  - e. Boring holes in truss members.
  - f. Notching of structural members.
  - g. Supporting raceway from ceiling system support wires.
  - h. Nail drive straps or tie wire for supporting raceway.
- C. Boxes:
  1. Boxes shall be accessible and installed with approved cover.
  2. Do not locate device boxes that are on opposite sides of framed walls in the same stud space. In other wall construction, do not install boxes back to back.
  3. Locate boxes so pipes, ducts, or other items do not obstruct outlets.
  4. Install outlets flush with finished surface and level and plumb.
  5. Support switch boxes larger than two-gang with side brackets and steel bar hangers in framed walls.
  6. At time of substantial completion, install blank plates on uncovered outlet boxes that are for future use.
  7. Install air-vapor barrier boxes.
    - a. Follow Manufacturer's installation instructions.
    - b. Care should be taken to cut above grade vapor barrier and seal around recessed outlet boxes to minimize air infiltration.
  8. Location:
    - a. Install boxes at door locations on latch side of door, unless explicitly shown otherwise on Contract Drawings. Verify door swings shown on electrical drawings with architectural drawings, and report discrepancies to Architect before rough-in. Distance of box from jamb shall be 6 inches (150 mm) from door jamb.
    - b. Properly center boxes located in walls with respect to doors, panels, furring, trim and consistent with architectural details. Where two or more outlets occur, space them uniformly and in straight lines with each other, if possible.

#### END OF SECTION

**BLANK PAGE**

**SECTION 26 0613****ELECTRICAL EQUIPMENT MOUNTING HEIGHT SCHEDULE****PART 1 - GENERAL: Not Used****PART 2 - PRODUCTS: Not Used****PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Unless otherwise indicated, mount center of outlets or boxes at following heights above finish floor. Intent is to match existing conditions on site.
- B. Mounting Heights:
  - 1. Electrical:
    - a. Receptacles: 18 inches (450 mm).
    - b. Wall Switches: 42 inches (1 065 mm).
    - c. Emergency Lighting Units: 90 inches (2 285 mm).
  - 2. Communications
    - a. Telephones (desk type): 18 inches (450 mm).
    - b. Telephone / Data (desk type): 18 inches (450 mm).
    - c. Data (desk type) 18 inches (450 mm).

**END OF SECTION**

**BLANK PAGE**

**SECTION 26 2726****WIRING DEVICES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install wiring devices complete with plates as described in Contract Documents.
  - 2. Intent is to match existing colour and type of devices on site.
- B. Related Requirements:
  - 1. Section 26 0501: 'Common Electrical Requirements'.

**PART 2 - PRODUCTS****2.1 COMPONENTS**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Cooper Wiring Devices, Peachtree City, GA [www.cooperwiringdevices.com](http://www.cooperwiringdevices.com).
    - b. General Electric Industrial Systems, Charlotte, NC [www.geindustrial.com](http://www.geindustrial.com).
    - c. Hubbell Building Automation, Austin, TX [www.hubbell-automation.com](http://www.hubbell-automation.com).
    - d. Hubbell Inc, Milford, CT [www.hubbell-wiring.com](http://www.hubbell-wiring.com) or Hubbell Canada Inc, Pickering, ON (800) 263-4622 or (905) 839-4332.
    - e. Hunt Control Systems Inc, Fort Collins, CO [www.huntdimming.com](http://www.huntdimming.com).
    - f. Intermatic Inc, Spring Grove, IL [www.intermatic.com](http://www.intermatic.com).
    - g. IR-TEC America, Inc., Brea, CA [www.irtec.com/en-ira/](http://www.irtec.com/en-ira/).
    - h. Leviton Manufacturing Co, Little Neck, NY [www.leviton.com](http://www.leviton.com) or Leviton Manufacturing of Canada Ltd, Pointe-Claire, QB (800) 461-2002 or (514) 954-1840.
    - i. Legrand, West Hartford, CT [www.legrand.us.com](http://www.legrand.us.com) or Vaughan, ON [www.legrand.ca.com](http://www.legrand.ca.com).
    - j. Lutron Electronics Co Inc, Coopersburg, PA [www.lutron.com](http://www.lutron.com).
    - k. Ortronics, New London, CT [www.ortronics.com](http://www.ortronics.com).
    - l. Paragon Electric Co Inc, Carol Stream, IL [www.icca.invensys.com/paragon](http://www.icca.invensys.com/paragon) or Paragon Electric, Mississauga, ON (800) 951-5526 or (905) 890-5956.
    - m. Pass & Seymour, Syracuse, NY [www.passandseymour.com](http://www.passandseymour.com) or Pass & Seymour Canada Inc, Concord, ON (905) 738-9195.
    - n. Philips Lighting Co, Somerset, NJ [www.lighting.philips.com/nam](http://www.lighting.philips.com/nam) or Philips Lighting Canada, Scarborough, ON (416) 292-3000.
    - o. Red Dot div of Thomas & Betts, Memphis, TN [www.tnbcom](http://www.tnbcom).
    - p. Schneider Electric North America, Palatine, IL [www.schneider-electric.com](http://www.schneider-electric.com) (847) 397-2600.
    - q. Sensorswitch, Wallingford, CT [www.sensorswitch.com](http://www.sensorswitch.com).
    - r. Siemon Company, Watertown, CT [www.siemon.com](http://www.siemon.com).
    - s. Square D Co, Palatine, IL [www.squared.com](http://www.squared.com).
    - t. Suttle, Hector, MN [www.suttleonline.com](http://www.suttleonline.com).
    - u. Tork Inc, Mount Vernon, NY [www.tork.com](http://www.tork.com).
    - v. Watt Stopper Inc, Santa Clara, CA [www.wattstopper.com](http://www.wattstopper.com).
  - 2. Product Options:
    - a. Faces shall be nylon where available.
    - b. Devices of single type shall be from same Manufacturer.
    - c. Devices are listed as white. Use white devices on light colored walls, brown on dark colored walls, and black on black walls.
- B. Switches:

1. Match Existing.
2. Standard Style:
  - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) 15 AMP, single pole:
      - a) Cooper: 2221V.
      - b) Hubbell: HBL1221-I.
      - c) Pass & Seymour: 20AC1-I.
      - d) Leviton: 1221-2I.
    - 2) Three Way:
      - a) Cooper: 2223V.
      - b) Hubbell: HBL1223-I.
      - c) Pass & Seymour: 20AC3-I.
      - d) Leviton: 1223-2I
- C. Receptacles:
  1. Match Existing.
  2. Rectangular face Designer Style:
    - a. 15 AMP, specification grade, back and side wired, self grounding.
    - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) Cooper: 6262W.
      - 2) Hubbell: HBL2152WA.
      - 3) Leviton: 16252-W.
      - 4) Pass & Seymour: 26252-W.
  3. Standard Style:
    - a. 15 AMP, specification grade, back and side wired, self grounding, tamper resistant.
    - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) Cooper: TR5262.
      - 2) Hubbell: BR20.
      - 3) Leviton: TBR20.
      - 4) Pass & Seymour: TR20.
  4. Ground Fault Circuit Interrupter (GFCI):
    - a. 15 AMP, specification grade.
    - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) Cooper: GF15W.
      - 2) Hubbell: GF5252WA.
      - 3) Leviton: 8599-W.
      - 4) Pass & Seymour: 1594-W.
- D. Telephone and Data Jacks:
  1. Match Existing.
- E. Plates:
  1. Match Existing.
  2. Standard Cover Plates:
    - a. Office / Occupied Areas:
      - 1) Nylon or high impact resistant thermoplastic.
      - 2) Color shall match wiring device.
    - b. All Other: Steel.
    - c. Ganged switches shall have gang plates.
    - d. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
      - 1) Cooper.
      - 2) Hubbell.
      - 3) Leviton.
      - 4) Pass & Seymour.
- F. Occupancy Sensors:
  1. Wall switch, passive infrared type.
    - a. Features include sensitivity and time delay adjustments.
    - b. Manual ON / auto OFF capability.
    - c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:

- 1) Cooper Controls: OSW-P-1001-MV-W.
  - 2) IR-TEC America: LbS-700NW.
  - 3) Leviton: ODS10-IDW.
  - 4) Sensorswitch: WSD-V-WH.
  - 5) Watt Stopper: PW-100-W.
2. Ceiling, ultrasonic type.
    - a. Complete with sensor and combined relay/control transformer.
    - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) Cooper Controls:
        - a) Sensor: OAC-U-0501-R.
        - b) Relay / Transformer: SP20-MV.
      - 2) IR-TEC America:
        - a) Sensor: OS-361DT.
        - b) Relay / Transformer: PPU-300.
      - 3) Leviton:
        - a) Sensor: OSC05-RUW.
        - b) Relay / Transformer: OPP20-D2.
      - 4) Sensorswitch:
        - a) Sensor: CMPDT9.
        - b) Relay / Transformer: MP-20-SP0DM.
      - 5) Watt Stopper:
        - a) Sensor: W-500A.
        - b) Relay / Transformer: BZ-150.
    - c. Provide manual ON and OFF momentary override switches. Refer to Contract Drawings for number of switches.
  3. Ceiling, dual technology type.
    - a. Complete with sensor and relay / transformer.
    - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) Cooper Controls:
        - a) Sensor: OCA-DT-0501-R.
        - b) Relay / Transformer: SP20-MV.
      - 2) IR-TEC America:
        - a) Sensor: OS-361DT.
        - b) Relay / Transformer: PPU-300.
      - 3) Leviton:
        - a) Sensor: OSC05-RMW.
        - b) Relay / Transformer: OPP20-D2.
      - 4) Sensorswitch:
        - a) Sensor: CMPDT9.
        - b) Relay / Transformer: MP-20-SP0DM.
      - 5) Watt Stopper:
        - a) Sensor: DT-305.
        - b) Relay / Transformer: BZ-150.
    - c. Provide manual ON and OFF momentary override switches. Refer to Contract Drawings for number of switches.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install devices flush with walls, straight, and solid to box.

**END OF SECTION**

**BLANK PAGE**



**SECTION 26 5100****INTERIOR LIGHTING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install lighting system as described in Contract Documents, complete with lamps.
- B. Related Requirements:
  - 1. Section 26 0501: 'Common Electrical Requirements'.
- C. Reference Standards:
  - 1. American National Standards Institute (ANSI):
    - a. ANSI C78.377-2015, 'American National Standard for Electric Lamps: Specification for the Chromaticity of Solid State Lighting Products'.
  - 2. Federal Communications Commission (FCC):
    - a. Code of Federal Regulations (CFR):
      - 1) FCC 47 CFR Part 18, 'Industrial, Scientific, and Medical Equipment'.
  - 3. Institute of Electrical and Electronics Engineers (IEEE):
    - a. IEEE C62.41.1-2002, 'Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits'.

**PART 2 - PRODUCTS****2.1 ASSEMBLIES**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Advance Transformer Co, Rosemont, IL [www.advancetransformer.com](http://www.advancetransformer.com).
    - b. Cooper Wiring Devices by Eaton, Peachtree City, GA [www.cooperindustries.com](http://www.cooperindustries.com).
    - c. General Electric Lighting, Hendersonville, NC or General Electric Lighting Canada Inc, Mississauga, ON [www.gelighting.com/na](http://www.gelighting.com/na).
    - d. Howard Lighting Products, Laurel, MS [www.howard-ind.com](http://www.howard-ind.com).
    - e. Novitas Inc, Peachtree City, GA [www.novitas.com](http://www.novitas.com).
    - f. Osram Sylvania, Danvers, MA [www.sylvania.com](http://www.sylvania.com) or Osram Sylvania Ltd, Mississauga, ON (905) 673-6171.
    - g. Philips Lighting Co, Somerset, NJ [www.lighting.philips.com/nam](http://www.lighting.philips.com/nam) or Philips Lighting Canada, Scarborough, ON (416) 292-3000.
    - h. Universal Lighting Technologies, Nashville, TN [www.universalballast.com](http://www.universalballast.com).
    - i. Venture Lighting International, Solon, OH [www.venturelighting.com](http://www.venturelighting.com).
    - j. Watt Stopper Inc, Santa Clara, CA [www.wattstopper.com](http://www.wattstopper.com).
    - k. Westinghouse Lighting Corp, Philadelphia, PA [www.westinghouselightbulbs.com](http://www.westinghouselightbulbs.com).
  - 2. Product Options: When several lighting fixtures are specified by name for one use on Drawings, select any one of those specified. Do not mix fixtures from different manufacturers specified for one use.
- B. Materials
  - 1. Lighting Fixtures:
    - a. Type One Acceptable Products:
      - 1) See Fixture Schedule on Drawings A-4 for acceptable manufacturers and models.
      - 2) Equals as approved by Architect before bidding. See Section 01 6200.
  - 2. Fluorescent Ballasts:

- a. Energy saving electronic for T8 lamps:
  - 1) Program rapid start type.
  - 2) Parallel circuit type.
  - 3) Minimum power factor of 95 percent.
  - 4) Maximum total harmonic distortion of 10 percent.
  - 5) Operation of lamps in compliance with Lamp Manufacturer's recommendations.
  - 6) Minimum starting temperature 0 deg F (minus 17.8 deg C) for T8 lamps.
  - 7) Class A sound rating.
  - 8) Transient protection in accordance with IEEE / ANSI C62.41.1, Category A.
  - 9) Comply with FCC 47 CFR Part 18.
  - 10) Ballast factor of 0.78.
  - 11) Maximum crest factor of 1.7.
  - 12) Five year full replacement warranty including labor allowance for replacement.
  - 13) Input voltage to match system voltage.
  - 14) Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories:
    - a) IOP2PSP32LWSC by Advance.
    - b) GE32-MVPS-L by General Electric.
    - c) QHE-UNV-PSX-SC by Osram / Sylvania.
- 3. Lamps:
  - a. T8 Fluorescent Lamps:
    - 1) Minimum initial output of 3100 Lumens.
    - 2) Rated life of 40,000 hrs at 3 hrs per start for lamps operated on instant start ballasts.
    - 3) Minimum CRI 85.
    - 4) Meet Federal TCLP criteria.
    - 5) Category Four approved Manufacturers. See Section 01 6200 for definitions of Categories:
      - a) General Electric.
      - b) Howard.
      - c) North American Philips.
      - d) Osram / Sylvania.
    - 6) Correlated Color Temperature: 3000k.
- C. Factory Assembly:
  - 1. Fixtures shall be fully assembled complete with necessary wiring, sockets, lamps, reflectors, ballasts, auxiliaries, plaster frames, recessing boxes, hangers, supports, lenses, diffusers, and other accessories essential for complete working installation.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Interface With Other Work:
  - 1. Coordinate with Plans to obtain symmetrical arrangement of fixtures in ceiling as shown on Reflected Ceiling Plan in Contract.
- B. Securely mount fixtures. Support fixtures weighing 50 lbs (23 kg) or more from building framing or structural members.
- C. Where fluorescent fixtures are shown installed end to end, provide suitable connectors or collars to connect adjoining units to appear as a continuous unit.
- D. Do not locate incandescent fixtures in closet or storage areas within 18 inches (450 mm) and fluorescent fixtures within 6 inches (150 mm) of shelves.

**3.2 ADJUSTMENT**

- A. Repair scratches or nicks on exposed surfaces of fixtures to match original undamaged conditions.

**END OF SECTION**

**BLANK PAGE**

**SECTION 26 5200****EMERGENCY LIGHTING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install emergency battery units "EM" as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 26 0501: Common Electrical Requirements.

**PART 2 - PRODUCTS****2.1 SYSTEMS**

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Bodine Emergency Lighting, Collierville, TN [www.bodine.com](http://www.bodine.com)
    - b. Dual-Lite, Cheshire, CT [www.dual-lite.com](http://www.dual-lite.com).
    - c. Iota Engineering Co, Tucson, AZ [www.iotaengineering.com](http://www.iotaengineering.com)
    - d. Lightolier, Fall River, MA [www.lightolier.com](http://www.lightolier.com).
    - e. Lithonia Lighting, Conyers, GA [www.lithonia.com](http://www.lithonia.com).
    - f. McPhilben / Day-Brite Lighting, Tupelo, MS [www.mcphilben.com](http://www.mcphilben.com).
    - g. Sure-Lites / Cooper Lighting, Elk Grove, IL [www.cooperlighting.com](http://www.cooperlighting.com).
- B. Materials:
  - 1. Fluorescent Battery Packs:
    - a. Design Criteria:
      - 1) Batteries shall be long life nickel cadmium type.
      - 2) Complete with charging indicator light and test switch.
      - 3) Components shall be fully concealed and easily accessible for maintenance or replacement.
      - 4) Factory installed in lighting fixture, or field installed to same standards.
    - b. Linear Fluorescent Lighting Fixtures:
      - 1) Battery pack shall operate one (1) lamp at approximately 600 lumens initially and 60 percent minimum of initial lumens after ninety (90) minutes.
      - 2) Charger shall be capable of full recharge in twenty four (24) hours.
    - c. Class Two Quality Products: See Section 01 4301 for Manufacturer Qualifications and Section 01 6200:
      - 1) Any Manufacturer that conforms to Contract Documents requirements.
      - 2) See Light Fixture Schedule A-4.

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Emergency Ballast:
  - 1. General:
    - a. Wire so unit can be tested with lights on.

- b. Wire so lamps in normal mode are switched off with other lighting in area. Connect unit to unswitched conductor of normal lighting circuit.
- 2. Linear Fluorescent Lighting Fixtures:
  - a. Install in ballast channel of fixture with charging indicator light and test switch mounted on fixture end, or visible and accessible through lens.

**END OF SECTION**

# **DIVISION 28: ELECTRONIC SAFETY AND SECURITY**

## **28 3000 ELECTRONIC DETECTION AND ALARM**

28 3101 FIRE DETECTION AND ALARM SYSTEM

END OF TABLE OF CONTENTS

BLANK PAGE



**SECTION 28 3101****FIRE DETECTION AND ALARM SYSTEM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install fire alarm and detection system as described in Contract Documents.
  - 2. Furnish and install raceway, cable and conductors, boxes, and miscellaneous items necessary for complete system.
- B. Related Requirements:
  - 1. Division 26: Quality of and installation standards for wiring, raceway, conduit, and boxes.

**1.2 REFERENCES**

- A. National Fire Protection Association:
  - 1. NFPA 72, 'National Fire Alarm and Signaling Code.' (2016 Edition).
- B. British Columbia Building Code/British Columbia Fire Code / Underwriters Laboratories of Canada:
  - 1. CAN/ULC-S524, 'Standard for the Installation of Fire Alarm Systems
- C. Underwriters Laboratories:
  - 1. UL 1481, 'Power Supplies for Fire-Protective Signaling Systems' (12-12-2006).
  - 2. UL 268, 'Smoke Detectors for Fire Alarm Systems' (8-14-2009).
  - 3. UL 464, 'Audible Signal Appliances' (8-4-2009).
  - 4. UL 521, 'Heat Detectors for Fire Protective Signaling Systems' (10-4-2009).
  - 5. UL 864, 'Control Units and Accessories for Fire Alarm Systems' (10-20-2009).
  - 6. UL 1480, 'Speakers for Fire Alarm, Emergency, and Commercial and Professional' (12-12-2006).
  - 7. UL 1971, 'Standard for Signaling Devices for the Hearing Impaired' (10-15-2008).
  - 8. CAN/ULC-S524 – "Standard for the Installation of Fire Alarm Systems".

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Shop Drawings:
    - a. Prepared by authorized factory representative and including:
      - 1) Manufacturer's original catalog data and descriptive information on each piece of equipment to be used.
- B. Informational Submittals:
  - 1. Certificates:
    - a. Certificate of completion, from Manufacturer's Representative, in accordance with NFPA 72 requirements.
- C. Closeout Submittals:
  - 1. Include following information in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operations and Maintenance Data:
      - 1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
      - 2) Provide copy of Verification Report – see 3.2.

- 3) Provide instruction manual from Manufacturer that explains what is to be done in event of various indications.
- b. Record Documentation:
  - 1) Include copy of approved shop drawings.

## 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  1. System shall meet approval of authority having jurisdiction (AHJ). CEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
  2. Equipment, devices, and cable shall be ULC or Factory Mutual listed for use in fire alarm systems.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

- A. Manufacturers:
  - a. Existing fire alarm system to remain. Contractor to site verify Manufacturer and Model #. New equipment must match existing system. Refer to general notes 22, 23, and 24/A-1 for existing information.
- B. Performance:
  1. Design Criteria:
    - a. Automatic fire alarm system consisting of control panel, power supplies, alarm initiating devices, notification appliances, and off-site communicating devices. System shall be non-coded, zoned or addressable, and monitored for integrity of conductors.
    - b. Class B (Style B) initiating device circuits and Class B (Style W) notification appliance circuits including end-of-line devices.
    - c. Equipment and accessories furnished under this Specification shall be standard products of single manufacturer, or include written statement by Control Panel Manufacturer confirming compatibility of components and inclusion of these components under system warranty.
- C. Operation:
  1. Operation Sequences:
    - a. Operation of manual station or automatic activation of any smoke detector or heat detector shall:
      - 1) Cause system notification appliances to operate.
      - 2) Indicate zone in alarm on control panel.
      - 3) Initiate off-site alarm notification system.
    - b. System shall return to normal when operated device is returned to normal and control panel is manually reset, except alarms may be silenced as specified below.
    - c. Alarm may be silenced by switch in control panel.
      - 1) Ring Back Feature: When silenced, this shall not prevent the resounding of subsequent alarms if another zone should alarm.
    - d. When alarms are silenced, zone indicating red LEDs on control panel and remote annunciator shall remain indicated until operated device is returned to normal and control panel is manually reset.
    - e. Green pilot LED, or other visual annunciation, shall normally be on indicating that system is receiving normal power. In addition, failure of normal power be annunciated.
    - f. Trouble alarm and annunciation, operating together, shall signal trouble condition.
      - 1) Following conditions shall signal trouble condition:
        - 2) Failure of normal power.
        - 3) Opens or short circuits on indicating circuits.
        - 4) Disarrangements in system wiring.
        - 5) Control panel circuit board removal.

- 6) Ground faults.
  - 7) Trouble silencing switch shall silence trouble alarm, but visual annunciation shall remain on until system is restored to normal. As ring-back feature, trouble alarm shall resound as reminder to return silencing switch to normal position.
  - g. Supervisory LED, separate from trouble LED, and alarm, operating together, shall signal operation of supervisory device, such as control valve tamper, low air pressure, and low temperature switches. Alarm silence switch shall operate in same manner as trouble alarm.
- D. Components:
- 1. Control Panel and Remote Annunciator:
    - 1) Existing panel and remote annunciator to remain.
  - 2. Off-Site Alarm Notification System
    - a. Existing condition to remain.
  - 3. Alarm Initiating Devices:
    - a. Smoke Detectors:
      - 1) Photoelectric type.
      - 2) Listed under ULC Standard 268.
      - 3) Provide visual indication of alarm on unit.
    - b. Existing remaining devices to remain.
  - 4. Notification Appliances:
    - a. Color: White.
    - b. Combination Horn / Strobe:
      - 1) Wall mounted flush or semi-flush.
      - 2) Non-coded audible output of 90 dB minimum at 10 feet (3 meters).
      - 3) Integrally mounted flashing light unit with block letters 'FIRE.' Minimum light intensity of 15 candela and flash rate between one and three Hertz.
      - 4) Listed under ULC Standard 464 and ULC Standard 1971.
    - c. Existing remaining devices to remain.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install fire alarm and detection systems as indicated, in accordance with Equipment Manufacturer's written instructions, and complying with applicable portions of CEC, NFPA, and CAN/ULC S524 'Standard of Installation.'
- B. Identification:
  - 1. Update existing zone directory to suit new smoke, and strobe detector w/ matching indicators.
  - 2. Post copy of wire identification list inside fire alarm panel door or other area accessible to fire alarm service personnel.
  - 3. Print location of circuit disconnecting means inside panel.
- C. Conductors:
  - 1. Install conductors in conduit per CEC requirements.
  - 2. Fire alarm system conductors from different zones may be combined in common conduit. Make certain that raceway size and wire quantity, size, and type is suitable for equipment supplied and is within CEC standards. Label pull and junction boxes 'FIRE ALARM.'
  - 3. Loop wires through each device on zone for proper supervision. Tee-taps not permitted.
  - 4. Minimum conductor size shall be 14 AWG unless otherwise specified.
- D. Do not install ceiling mounted detectors within 36 inches (900 mm) of air discharge grilles. Coordinate with other trades as required.

### 3.2 FIELD QUALITY CONTROL

- A. Testing and Verification:
  - 1. Arrange to have and pay for components and system operation re-verification by professional engineer registered in the Province of British Columbia.
  - 2. Submit verification certificate signed by the Professional Engineer registered in the Province of British Columbia.

### **3.3 CLOSEOUT ACTIVITIES**

- A. Instruction Of Owner:
  - 1. Instruct Owner's Representative in proper operation and maintenance procedures.

### **3.4 PROTECTION**

- A. Provide dust protection for existing smoke detectors until finish work is completed and building is ready for occupancy.
- B. Protect conductors from cuts, abrasion and other damage during construction.

**END OF SECTION**

# **DIVISION 31: EARTHWORK**

## **31 0500 COMMON WORK RESULTS FOR EARTHWORK**

31 0501 COMMON EARTHWORK REQUIREMENTS

## **31 1000 SITE CLEARING**

31 1123 AGGREGATE BASE

31 1413 TOPSOIL STRIPPING AND STOCKPILING

## **31 2000 EARTH MOVING**

31 2323 FILL

31 2500 EROSION AND SEDIMENTATION CONTROLS

END OF TABLE OF CONTENTS

BLANK PAGE

**SECTION 31 0501****COMMON EARTHWORK REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited to:
  - 1. General procedures and requirements for earthwork.
- B. Related Requirements:
  - 1. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
  - 2. Pre-Installation conferences held jointly with Section 31 0501 as described in Administrative Requirements on Part 1 of this specification section.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Aggregate Base: Layer of granular material immediately below concrete or miscellaneous site concrete (sidewalks, curbs, etc) and below interior concrete slabs on grade.
  - 2. Base: See aggregate base.
  - 3. Building Grading: sloping of grounds immediately adjacent to building. Proper grading causes water to flow away from a structure. Grading can be accomplished either with machinery or by hand.
  - 4. Compacted Fill: Placement of soils on building site placed and compacted per Contract Documents. Used to replace soils removed during excavation or to fill in low spot on building site.
  - 5. Excavation: Removal of soil from project site or cavity formed by cutting, digging or scooping on project site.
  - 6. Fine Grading (FG): Preparation of subgrade preceding placement of surfacing materials (aggregate base, asphalt or concrete paving, and topsoil) for contour of building site required. Fine Grading is conducted to ensure that earth forms and surfaces have been properly shaped and subgrade has been brought to correct elevations. It is performed after rough grading and placement of compacted fill but before placement of aggregate base or topsoil.
  - 7. Finish Grading: Completed surface elevation of landscaping areas for seeding, sodding, and planting on building site.
  - 8. Natural Grade: Undisturbed natural surface of ground.
  - 9. Rough Grading (RG): Grading, leveling, moving, removal and placement of existing or imported soil to its generally required location and elevation. Cut and fill is part of rough grading.
  - 10. Subgrade (definition varies depending upon stage of construction and context of work being performed):
    - a. Prepared natural soils on which fill, aggregate base, or topsoil is placed.
    - or
    - b. Prepared soils immediately beneath paving or topsoil.
  - 11. Topsoil Placement and Grading: Topsoil placement and finish grading work required to prepare site for installation of landscaping.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference:
  - 1. Participate in MANDATORY pre-installation conference for common earthwork sections:
    - a. Schedule conference after completion of site clearing but before beginning grading work.
    - b. Participate in pre-installation conference held jointly with following sections:
      - 1) Section 03 3111: 'Cast-In-Place Structural Concrete'.
      - 2) Section 31 1123: 'Aggregate Base'.

- 3) Section 31 2323: 'Fill'.
- c. In addition to agenda items specified in Section 01 3100, review following:
  - 1) Review common earthwork schedule.
  - 2) Review protection requirements.
  - 3) Review cleaning requirements.
  - 4) Review safety issues.
  - 5) Review field tests and inspections requirements.
- d. In addition to agenda items specified above, review following. These are items that will occur before pre-installation conference for landscape sections:
  - 1) Review landscape grading requirements.
  - 2) Review landscape finish grade tolerance requirements.
  - 3) Review landscape tolerances.
  - 4) Review surface preparation of landscape areas.
  - 5) Review additional agenda items as specified in related sections listed above.
- 2. Participate in pre-installation conference for landscape sections:
  - a. Schedule pre-installation conference after completion of Fine Grading, but one (1) week minimum before beginning landscape work and held jointly with following sections:
    - 1) Section 32 9120: 'Topsoil And Placement'.
    - 2) Section 32 9122: 'Topsoil Grading'.
    - 3) Section 32 9223: 'Sodding'.
  - b. In addition to agenda items specified in Section 01 3100, review following that these items have been installed correctly:
    - 1) Review topsoil placement requirements.
    - 2) Review topsoil surface preparation requirements.
    - 3) Review topsoil depth requirements.
    - 4) Review landscape finish grade tolerance requirements.
    - 5) Review surface preparation of landscape areas.
- B. Sequencing:
  - 1. General Earthwork:
    - a. Excavation.
    - b. Rough Grading.
    - c. Fill.
    - d. Fine Grading.
    - e. Aggregate Base or Topsoil Grading.

#### 1.4 QUALITY ASSURANCE

- A. Testing And Inspection:
  - 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
    - a. Owner will employ testing agencies to perform testing and inspection as specified in Field Quality Control in Part 3 of this specification:
      - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
      - 2) See Section 01 1200: 'Multiple Contract Summary'.
  - 2. Contractor is responsible for Quality Control (QC) Testing.



**PART 2 - PRODUCTS: Not Used****PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Verification Of Conditions:
  - 1. Forty-eight (48) hours minimum before performing any work on site, contact BC One Call to arrange for utility location services.
  - 2. Perform minor, investigative excavations to verify location of various existing underground facilities at sufficient locations to assure that no conflict with the proposed work exists and sufficient clearance is available to avoid damage to existing facilities.
  - 3. Perform investigative excavating ten (10) days minimum in advance of performing any excavation or underground work.
  - 4. Upon discovery of conflicts or problems with existing facilities, notify Architect by phone within twenty-four (24) hours. Follow telephone notification with letter and diagrams indicating conflict or problem and sufficient measurements and details to evaluate problem.

**3.2 PREPARATION**

- A. Protection:
  - 1. Spillage:
    - a. Avoid spillage by covering and securing loads when hauling on or adjacent to public streets or highways.
    - b. Remove spillage and sweep, wash, or otherwise clean project, streets, and highways.
  - 2. Dust Control:
    - a. Take precautions necessary to prevent dust nuisance, both on-site and adjacent to public and private properties.
    - b. Correct or repair damage caused by dust.
  - 3. Existing Trees:
    - a. Do not damage tops, trunks, and roots of existing trees adjacent to the site.
    - b. Do not use heavy equipment within branch spread.

**3.3 REPAIR / RESTORATION**

- A. Adjust existing covers, irrigation valve boxes, and vaults to grade to suit new landscaping – see Site Plan – Existing and New SD-1.
- B. Replace broken or damaged covers, boxes, and vaults.
- C. Independently confirm size, location, and number of covers, boxes, and vaults that require adjustment.

**3.4 FIELD QUALITY CONTROL**

- A. Field Tests And Inspections:
  - 1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
    - a. Quality Control is sole responsibility of Contractor. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform The Work or Contractors own Testing and Inspection services.
  - 2. Testing and inspection of earthwork operations is required.
  - 3. Field Tests and Laboratory Tests:
    - a. Owner reserves right to require additional testing to re-affirm suitability of completed work including compacted soils that have been exposed to adverse weather conditions.

4. Field Inspections:
  - a. Notify Architect forty-eight (48) hours before performing excavation or fill work.
  - b. If weather, scheduling, or any other circumstance has interrupted work, notify Architect twenty-four (24) hours minimum before intended resumption of grading or compacting.
- B. Non-Conforming Work:
  1. If specified protection precautions are not taken or corrections and repairs not made promptly, Owner may take such steps as may be deemed necessary and deduct costs of such from monies due to Contractor. Such action or lack of action on Owner's part does not relieve Contractor from responsibility for proper protection of The Work.

**END OF SECTION**

**SECTION 31 1123****AGGREGATE BASE****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install the following as described in Contract Documents:
    - a. Aggregate Base:
      - 1) Interior concrete slab-on-grade (area of work).
      - 2) Miscellaneous exterior concrete (splash pads).
- B. Related Requirements:
  - 1. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
  - 2.
  - 3. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
  - 4.
  - 5. Section 03 3111: 'Cast-In-Place Structural Concrete'.
  - 6. Section 31 0501: 'Common Earthwork Requirements':
    - a. General procedures and requirements for earthwork.
    - b. Pre-installation conference held jointly with other common earthwork related sections.
  - 7. Section 31 2323: 'Fill' for compaction procedures and tolerances.
- C. Products Installed But Not Furnished Under This Section:
  - 1. Vapor Retarder:
    - a. Interior slabs on grade:
      - 1) Under-slab vapor retarder and seam tape.
- D. Related Requirements:
  - 1. Section 07 2616: 'Below-Grade Vapor Retarders' for:
    - a. Furnishing of vapor retarder and seam tape.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Aggregate:
    - a. Aggregate: A hard inert mineral material, such as gravel, crushed rock, slag, or sand.
    - b. Coarse Aggregate: Aggregate retained on No. 8 (2.36 mm) sieve.
    - c. Dense-Graded Aggregate: Aggregate that is graded from maximum size down through filler with object of obtaining an asphalt mix with controlled void content and high stability.
    - d. Fine Aggregate: Aggregate passing No. 8 (2.36 mm) sieve.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C131/C131M-14, 'Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine'.
    - b. ASTM D1556/D1556M-15, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method'.
    - c. ASTM D1557-12, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>))'.
    - d. ASTM D1883-16, 'Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils.

- e. ASTM D2167-15, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method'.
- f. ASTM D2419-14, 'Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate'.
- g. ASTM D4318-10, 'Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils'.
- h. ASTM D6938-17, 'Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)'.
- i. ASTM E1643-11(2017), 'Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
  - 1. Participate in MANADORY pre-installation conference as specified in Section 31 0501.
  - 2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
    - a. Review requirements and frequency of testing and inspections.
    - b. Review aggregate base installation requirements.
    - c. Review vapor retarder installation requirements.
    - d. Review proposed miscellaneous exterior concrete schedule.
    - e. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
      - 1) Review frequency of testing and inspections.
- B. Sequencing:
  - 1. Compaction as described in Section 31 2323 'Fill'.
  - 2. Under slab plumbing / HVAC completed.
  - 3. Vapor Retarder below interior concrete slabs on grade:
    - a. Install below-grade vapor retarder on top of granular base and under slab as per manufacturer's details.
    - b. See Drawing A-10.
  - 4. Aggregate Base:
    - a. Install aggregate base at location shown in Contract Drawings.
  - 5. Concrete Slab and reinforcing steel is installed.
- C. Scheduling:
  - 1. Interior slab-on-grade concrete:
    - a. Notify Architect twenty-four (24) hours minimum before installation of concrete to allow inspection of vapor retarder installation.
    - b. Notify Testing Agency and Architect twenty-four (24) hours minimum before installation of interior concrete slabs to allow inspection of aggregate base.
  - 2. Miscellaneous exterior concrete:
    - a. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing concrete for exterior site work concrete (splash pads), to allow inspection of aggregate base.

### 1.4 SUBMITTALS

- A. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Testing and Inspection Reports:
        - a) Testing Agency Testing and Inspecting Reports of aggregate base.

### 1.5 QUALITY ASSURANCE

- A. Testing And Inspection:

1. Owner will provide Testing and Inspection for aggregate base:
  - a. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
  - b. Owner will employ testing agencies to perform testing and inspection for aggregate base as specified in Field Quality Control in Part 3 of this specification.
    - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
    - 2) See Section 01 1200: 'Multiple Contract Summary'.
2. Contractor is responsible for Quality Control (QC) Testing.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
1. Materials shall be delivered in original, unopened packages with labels intact.

## 1.7 FIELD CONDITIONS

- A. Ambient Conditions:
1. Do not perform work during unfavorable conditions as specified below:
    - a. Aggregate Base:
      - 1) Presence of free surface water.
      - 2) Over-saturated sub base materials.
    - b. Vapor Retarder:
      - 1) Unacceptable conditions for installation include presence of high winds which would tear or damage vapor retarder.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Aggregate Base:
1. Under Interior Slab-On-Grade Concrete:
    - a. New Aggregate Base:
      - 1) Gravel: 3/4 inch 18mm minimum to one inch 25 mm maximum well-graded, clean gravel or crushed rock.
      - 2) Base type gravel or crushed rock, graded by weight as follows (three-quarter to one-inch clean gap-graded gravel):
        - a) Road Base type gravel or crushed stone (slag not allowed), graded as follows:
 

(1) Sieve		Percent of Weight Passing
(a) 1 inch	(25.4 mm)	100
(b) 3/4 inch	(19.0 mm)	90 - 80
(c) 1/2 inch	(12.7 mm)	20 - 40
(d) 3/8 inch	(9.5 mm)	5 - 10
(e) No. 4	(4.750 mm)	0 - 12
  2. Under Miscellaneous exterior concrete:
    - a. New Aggregate Base:
      - 1) Road Base type gravel or crushed stone, graded as follows:
 

a) Sieve		Percent of Weight Passing
(1) 1 inch	(25.4 mm)	100
(2) 3/4 inch	(19.0 mm)	85 - 100
(3) No. 4	(4.750 mm)	45 - 60
(4) No. 10	(2.000 mm)	30 - 50
(5) No. 200	(0.05 mm)	5 - 10 (non-plastic)

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Stockpiles:
  - 1. Provide area for each stockpile of adequate size, reasonably uniform in cross-section, well drained, and cleared of foreign materials.
  - 2. Locate piles so that there is no contamination by foreign material and no intermingling of aggregates from adjacent piles. Do not use steel-tracked equipment on stockpiles.
  - 3. Do not store aggregates from different sources, geological classifications, or of different gradings in stockpiles near each other unless bulkhead is placed between different materials.
  - 4. Do not use washed aggregates sooner than twenty-four (24) hours after washing or until surplus water has drained out and material has uniform moisture content.
  - 5. Do not stockpile higher than 15 feet (4.57 m). Cover or otherwise protect stockpiles for use in HMA to prevent buildup of moisture.
- B. Surface Preparation (Miscellaneous Exterior Concrete):
  - 1. Subgrade:
    - a. Finish grade to grades required by Contract Documents.
    - b. Compact subgrade as specified in Section 31 2323.
- C. Surface Preparation (Interior Slab-On-Grade Concrete):
  - 1. Vapor Retarder:
    - a. Install vapor retarder in accordance with ASTM E1643 except where Contract Documents indicate otherwise and following instructions:
      - 1) Install vapor retarder over aggregate base so entire area under slab is covered.
      - 2) Install vapor retarder in accordance with ASTM E1643 at interior stem walls.
      - 3) Lap joints 6 inches (150 mm) minimum and seal with specified seam tape.
      - 4) Seal vapor retarder around pipes, conduits, and other utility items that penetrate vapor retarder using factory-fabricated boot installed as recommended by Manufacturer.
      - 5) Seal tears and punctures.
      - 6) See Drawing A-10.

### 3.2 INSTALLATION

- A. Aggregate Base:
  - 1. General:
    - a. Do not place aggregate base material when subgrade is frozen or unstable.
    - b. Spread aggregate base material with equipment except in limited or restricted areas where use of hand spreading is allowed.
    - c. Spread aggregate base material in manner that does not break down material and eliminates segregation, ruts, and ridges.
    - d. Correct damage to aggregate base caused by construction activities, and maintain corrected aggregate base until subsequent course is placed.
    - e. Do not allow traffic on aggregate base.
    - f. Remove all standing storm water.
  - 2. Under interior concrete slab-on-grade (area of work) aggregate base:
    - a. Place 6 inches (152 mm) minimum of granular base, level, and compact with vibratory plate compactor. Place vapour retarder under concrete slab.
  - 3. Under miscellaneous exterior concrete aggregate base:
    - a. Place 8 inches (200 mm) minimum of aggregate base, level, and compact as specified in Section 31 2323.
    - b. See details on A-10 for aggregate base depths.

### 3.3 FIELD QUALITY CONTROL

#### A. Field Tests And Inspections:

1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
  - a. Quality Control is sole responsibility of Contractor.
    - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
    - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
2. Aggregate Base:
  - a. Interior slab-on-grade concrete areas:
    - 1) Testing Agency shall provide testing and inspection for interior aggregate base.
    - 2) Number of tests may vary at discretion of Architect.
    - 3) Testing Agency will test compaction of base in place according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938, as applicable.
  - b. Miscellaneous exterior concrete areas:
    - 1) Testing Agency shall provide testing and inspection for exterior aggregate base.
    - 2) Number of tests may vary at discretion of Architect.
    - 3) Testing Agency will test compaction of base in place according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938, as applicable.
3. Contractor to provide Quality Control (QC) Testing.

### 3.4 PROTECTION

#### A. Interior Slab-On-Grade Concrete:

1. Vapor Retarder:
  - a. Do not allow water onto vapor retarder or aggregate base before placing concrete.
  - b. Protect membrane from possible punctures caused by reinforcing bar supports before placing concrete.

**END OF SECTION**

**BLANK PAGE**



**SECTION 31 1413****TOPSOIL STRIPPING AND STOCKPILING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Strip existing sod landscape in area of work, including existing topsoil and organic layer and remove from site as described in Contract Documents.
  - 2. There is no re-useable topsoil on site. Provide imported topsoil to meet project specifications.
- B. Related Requirements:
  - 1. Section 31 0501: 'Common Earthwork Requirements':
    - a. General procedures and requirements for earthwork.
    - b. Pre-installation conference held jointly with other common earthwork related sections.
    - c. Pre-installation conference held jointly with other landscape related sections.
  - 2. Section 32 9001: 'Common Planting Requirements'.
  - 3. Section 32 9120: 'Topsoil And Placement' for topsoil evaluation and placement required for topsoil grading.
  - 4. Section 32 9122: 'Topsoil Grading' for preparation of topsoil and addition of amendments prior to landscaping.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Existing topsoil: Defined as total amount of soil stripped and stored for reuse, less vegetation layer stripped and disposed of as specified in Paragraphs below.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference:
  - 1. Participate in pre-installation conferences as specified in Section 31 0501.

**PART 2 - PRODUCTS: Not Used****PART 3 - EXECUTION****3.1 PERFORMANCE**

- A. Strip existing organic layer and remove from site.

**END OF SECTION**

**BLANK PAGE**

**SECTION 31 2323****FILL****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Perform Project backfilling and compacting as described in Contract Documents, except as specified below.
  - 2. Procedure and quality for backfilling and compacting performed on Project under other Sections unless specifically specified otherwise.
- B. Related Requirements:
  - 1. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
  - 2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
  - 3. Section 31 0501: 'Common Earthwork Requirements' for:
    - a. General procedures and requirements for earthwork.
    - b. Pre-installation conference held jointly with other common earthwork related sections.
  - 4. Section 31 1123: 'Aggregate Base' for aggregate base requirements.
  - 5. Section 31 1413: 'Topsoil Stripping And Stockpiling' for stripping existing topsoil.
  - 6. Section 32 9120: 'Topsoil And Placement' for topsoil evaluation and placement required for topsoil grading.
  - 7. Section 32 9122: 'Topsoil Grading' for preparation of topsoil and addition of amendments prior to landscaping.
  - 8. Performance of backfilling and compacting inside and outside of building required for electrical and mechanical work is responsibility of respective Section doing work unless arranged differently by Contractor.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. ASTM International (Following are specifically referenced for fill and aggregate base testing):
    - a. ASTM D698-12, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))'.
    - b. ASTM D1556/D1556M-15, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method'.
    - c. ASTM D1557-12, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>))'.
    - d. ASTM D2167-15, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method'.
    - e. ASTM D2487-11, 'Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)'.
    - f. ASTM D6938-15, 'Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)'.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conferences:
  - 1. Participate in MANDATORY pre-installation conference as specified in Section 31 0501.
  - 2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
    - a. Review backfill requirements.

- b. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
          - 1) Review requirements and frequency of testing and inspections.
- B. Sequencing:
  - 1. Before backfilling, show utility and service lines being covered on record set of Drawings. Do not backfill until utilities involved have been tested and approved by Architect and until instructed by Architect.
  - 2. Compact evenly around all new under slab services.
- C. Scheduling:
  - 1. Notify Testing Agency and Architect seventy-two (72) hours minimum before installation of fill / engineered fill to perform proctor and plasticity index tests on proposed fill or subgrade.
  - 2. Notify Testing Agency and Architect twenty-four (24) hours minimum before installation of fill / engineered fill to allow inspection.
  - 3. Allow inspection and testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after inspections and test results for previously compacted work comply with requirements.

#### 1.4 SUBMITTALS

- A. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Testing and Inspection Reports:
        - a) Testing Agency Testing and Inspecting Reports of fill / engineered fill.

#### 1.5 QUALITY ASSURANCE

- A. Testing and Inspection:
  - 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
  - 2. Owner will provide Testing and Inspection for fill / engineering fill:
    - a. Owner will employ testing agencies to perform testing and inspection for fill / engineering fill as specified in Field Quality Control in Part 3 of this specification.
      - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
      - 2) See Section 01 1200: 'Multiple Contract Summary'.
  - 3. Contractor is responsible for Quality Control (QC) testing.

#### 1.6 FIELD CONDITIONS

- A. Ambient Conditions:
  - 1. Do not perform work during unfavorable conditions as specified below:
    - a. Aggregate Base:
      - 1) Presence of free surface water.
      - 2) Over-saturated sub base materials.

#### 1.7 EXCAVATION AND BACKFILL SYSTEM DESIGNS

- A. The following descriptions summarize procedures for subgrade preparation and depths for design requirements.
  - 1. Fill under interior concrete slabs on grade (area of work): see Drawing A-2 and A-10.

- a. Excavate as required to remove existing granular and clay material to area of work. Coordinate excavation depth with existing and new under slab services / routes.
- b. Following new services construction, fill excavation with engineered clay fill. Place in 6 inches (152 mm) maximum lifts, moisture condition to 2% of optimum moisture content, and mechanically tamp to 98% Standard Proctor, up to 24 inches (610 mm) below finished floor level. Place 12 inches (305 mm) of pit run material (to match existing) compacted to 100% standard proctor in 6 inches (152 mm) maximum lifts. The top 6 inches (152 mm) shall be granular base specified in 31 1123 compacted to 100% Standard Proctor.
- c. Laminated vapour barrier specified in 07 2616.
- d. 4 inches (100 mm) concrete slab (with 2 inches (50 mm) Drypack sloped topping) specified in Division 03.
2. Fill under exterior concrete:
  - a. Excavate as specified in 31 1413 and as detailed on A-10 to a minimum of 19 inches (483 mm) below finish grade.
  - b. Minimum 8 inch (200 mm) granular base specified in 31 1123. Compact to 100% of Standard Proctor maximum density.
  - c. Place 2 inches (50 mm) expanded insulation.
  - d. Place 9 inches (228 mm) tapered concrete specified in Division 03 (as detailed see P/A-10).
3. Fill in utility trenches:
  - a. Excavate as required for services – see A-1.
  - b. Existing clay material can be re-used as trench backfill provided it is approved for use by geo-technical inspection and moisture conditioned to 2% of optimum moisture content. Re-compact in 6 inches (152 mm) lifts to 98% of Standard Proctor maximum density. Alternatively imported engineered clay fill material as specified in this section can be used in compacted lifts not exceeding 6 inches (152mm), moisture condition to 2% of optimum moisture content, and compacted to not less than 98% Standard Proctor.
4. Structure and Services Protection:
  - a. During compaction, careful observation of the services should be carried out continuously.
  - b. Only hand held compaction equipment shall be used in the compaction of fill within 24 inches (600mm) of foundations or grade beams.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Site Material:

1. Existing excavated clay material on site may be suitable for use as trench backfill to meet Project requirements only if previously approved by geo-technical inspection. Excavated clay material must be scarified and moisture conditioned to 2% of optimum moisture content prior to being re-used and re-compacted. If existing clay consists of course material, then material should be moisture conditioned to plus / minus 1% of optimum moisture content.

#### B. Imported Fill / Backfill:

1. Well graded material conforming to ASTM D2487 free from debris, organic material, frozen materials, brick, lime, concrete, and other material which would prevent adequate performance of backfill.
  - a. Under Building Footprint: Fill shall comply with soil classification groups GW, CL, GP, or GM. Fill may not contain stones over 6 inches (150 mm) diameter and ninety-five (95) percent minimum of fill shall be smaller than 1-1/2 inch (38 mm) in any direction.
  - b. Under Landscaped Areas:
    - 1) Fill more than 36 inches (900 mm) below finish grade shall comply with soil classification groups GW, CL, GP, GM, SW, SP, or SM. Fill may not contain stones over 6 inches (150 mm) diameter and ninety (90) percent minimum of fill shall be smaller than 1-1/2 inch (38 mm) in any direction.
    - 2) Fill less than 36 inches (900 mm) below finish grade shall comply with soil classification groups SW, SP, SM, or SC. Fill may not contain stones larger than 1-1/2 inches (38 mm) in any direction and ninety (90) percent minimum of fill shall be smaller than 3/8 inch (4.7 mm) in any direction.

- C. Pit Run:
  - 1. Select pit run gravel having a maximum particle size of 3 inch (75 mm) minus, free of any form of coating. Any gravel or sand containing clay, loam, or other deleterious materials will be rejected.
  - 2. Granular fills and gravels should be clean (the % of material passing through the 80 um sieve should not exceed 2/3 of the material passing the 315 nm sieve).
- D. Engineered Fill:
  - 1. Fill must be free of any organic materials, contamination, deleterious construction debris, and stones greater than 3 inches (75 mm) diameter.
  - 2. Must be of cohesive materials, with low to medium plastic range.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Before placing sub grade fill, aggregate base / sub base, or finish work, prepare existing subgrade as follows:
  - 1. Do not place fill or aggregate base over frozen subgrade.

### **3.2 PERFORMANCE**

- A. See 1.7 for excavation, scarification, moisture conditioning, backfill systems, and compaction requirements.
- B. Fill / Backfill:
  - 1. General:
    - a. Around Buildings And Structures: Slope grade away from building as detailed in Drawings. Hand backfill when close to building or where damage to building might result.
    - b. Do not use puddling or jetting to consolidate fill areas.
  - 2. Compacting: See 1.7
    - a. Fill Materials:
      - 1) General Engineered Fill – To be used as sub grade fill. Place in 6 inches (152 mm) maximum lifts, moisture condition to 2% of optimum moisture content, and compact to 98% Standard Proctor.
      - 2) Pit Run – to be used as subbase. Place in 6 inches (152 mm) maximum lifts, moisture condition to 2% of optimum moisture content, and compact to 100% Standard Proctor.
      - 3) Granular Base – to be used as base course. Place in 6 inches (152mm) maximum lifts, moisture condition to 2% of optimum moisture content, and compact to 100% Standard Proctor.
      - 4) Fill Slopes: Compact by rolling or using sheepfoot roller.
      - 5) Backfill Under Footings not allowed.
      - 6) Landscape Areas:
        - a) Compact fill to ninety-five (95) percent minimum relative compaction.
      - 7) Loose material from compacted subgrade surface shall be immediately removed before placing compacted fill or aggregate base course.

### **3.3 REPAIR / RESTORATION**

- A. Repair damage to other portions of the Work resulting from work of this Section at no additional cost to Owner. On new work, arrange for damage to be repaired by original installer.

### **3.4 FIELD QUALITY CONTROL**

- A. Field Tests and Inspections:

1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
  - a. Quality Control is sole responsibility of Contractor:
    - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
      - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
2. Fill / Engineered Fill:
  - a. Testing Agency shall provide testing and inspection for fill.
  - b. Number of tests may vary at discretion of Architect.
  - c. Testing Agency is to provide one (1) moisture-maximum density relationship test for each type of fill material.
  - d. Testing Agency will test compaction of soils according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following locations and frequencies:
    - 1) Building Slab Areas: At each compacted fill and backfill layer, not less three (3) tests.
    - 2) Trench Backfill: At each 6 inch (152 mm) compacted lift for each 100 linear feet (30.5 linear m) or less of trench length but no fewer than two (2) tests.
    - 3) Exterior Concrete: no fewer than three (3) tests.
  - e. Required verification and inspection of soils as referenced in 2015 IBC (or latest approved edition) Table 1704.7 'Required Verification And Inspection Of Soils'. Periodic and continuous inspections include:
    - 1) Verify excavations are extended to proper depth and have reached proper material (periodic).
    - 2) Perform classification and testing of compacted fill materials (periodic).
    - 3) Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill (continuous).
    - 4) Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly (periodic).

### 3.5 CLEANING

- A. Debris and material not necessary for Project are property of Contractor and are to be removed before completion of Project. However, if material necessary for Project is hauled away, replace with specified fill / backfill material.

### END OF SECTION

**BLANK PAGE**



**SECTION 31 2500****EROSION AND SEDIMENTATION CONTROLS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Provide temporary and permanent erosion and sedimentation controls as described in Contract Documents.
  - 2. Conform to City of Cranbrook current standard details.
- B. Related Requirements:
  - 1. Section 01 5700: Temporary Erosion and Sedimentation Control.
  - 2. Section 31 0501: Common Earthwork Requirements.
  - 3. Section 31 1413: Topsoil Stripping And Stockpiling.

**1.2 REFERENCES**

- A. References:
  - 1. The City of Cranbrook Erosion and Sediment Control Best Practices, Schedule "B" – current edition.

**1.3 SUBMITTALS**

- A. Informational Submittals:
  - 1. Delegated Design Submittals:
    - a. Sediment and erosion control plan, specific to site, meeting following objectives:
      - 1) Prevent loss of soil, including soil stockpiled for reuse, by storm water runoff and wind erosion.
      - 2) Prevent sedimentation of storm ditches and receiving streams.
      - 3) Prevent air pollution by dust and particulate matter.

**1.4 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Sediment and erosion control shall conform to local erosion and sedimentation control standards.
- B. Qualifications:
  - 1. Supervisor of erosion control operations shall be thoroughly familiar with types of erosion control materials being installed and best methods for their installation. Supervisor shall be present when work of this Section is being performed and shall direct work performed under this Section.

**PART 2 - PRODUCTS****2.1 SYSTEM**

- A. Design Criteria:
  - 1. Protect and maintain areas disturbed by the Work, so erosion is adequately controlled and silt and sediments are not allowed to flow into any watercourse, onto adjacent properties, or into storm systems.

- B. Materials:
  - 1. As required to meet local erosion and sedimentation control details.
  - 2. As required by City of Cranbrook Erosion and Sediment Control Best Practices – Schedule “B” – Current edition.
  - 3. Silt Fences:
    - a. Type Two Acceptable Products
      - 1) 'Geofab Silt Fence' by Mercantile Development Inc.
      - 2) 'Mirafi 100X by Celanese Fibers Marketing Co.
      - 3) Equal as approved by Architect before use. See Section 01 6200.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General:
  - 1. Take every reasonable precaution to avoid erosion and to prevent silting of rivers, streams, lakes, reservoirs, impoundments, and drainage ditches and swales.
  - 2. Keep exposure of uncompleted cut slopes, embankments, trench excavations, and site graded areas as short as possible. Initiate seeding and other erosion control measures on each segment as soon as reasonably possible.
  - 3. Should it become necessary to suspend construction for any length of time, shape excavated and graded areas so runoff will be intercepted and diverted to points where minimal erosion will occur. Provide and maintain temporary erosion and sediment control measures, such as berms, dikes, slope drains, silt stops, and sedimentation basins, until permanent drainage facilities or erosion control features have been completed and are operative.
  - 4. Handle and treat fine material placed or exposed during The Work so as to minimize possibility of it reaching surface waters. Use diversion channels, dikes, sediment traps, or other effective control measures.
  - 5. Provide silt stops wherever erosion control measures may not be totally capable of controlling erosion, such as in drainage channels and where steep slopes may exist.
  - 6. Before water is allowed to flow in any ditch, swale, or channel, install permanent erosion control measures in waterway so waterway will be safe against erosion.
  - 7. Take precautions in using construction equipment to minimize erosion. Do not leave wheel tracks where erosion might begin.
  - 8. Continue erosion control measures until permanent measures have been sufficiently established and are capable of controlling erosion on their own.

### **3.2 REPAIR / RESTORATION**

- A. If any temporary erosion and sediment control measures are disturbed, repair them immediately.
- B. Maintain erosion and sediment controls until permanent control measures are established and no further erosion is likely.

## **END OF SECTION**

## **DIVISION 32: EXTERIOR IMPROVEMENTS**

### **32 9000 PLANTING**

32 9001 COMMON PLANTING REQUIREMENTS  
32 9120 TOPSOIL AND PLACEMENT  
32 9122 TOPSOIL GRADING  
32 9223 SODDING

END OF TABLE OF CONTENTS

BLANK PAGE

**SECTION 32 9001****COMMON PLANTING REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Common procedures and requirements for landscaping work.
  - 2. Provide maintenance for new landscaping as described in Contract Documents.
- B. Related Requirements:
  - 1. Pre-Installation conferences held jointly with Section 32 9001 as described in Administrative Requirements on Part 1 of this specification section:
  - 2. Section 01 4301: 'Quality Assurance – Qualifications'.
  - 3. Section 31 0501: 'Common Earthwork Requirements'.
  - 4. Section 31 1413: 'Topsoil Stripping And Stockpiling'.
  - 5. Section 31 2323: 'Fill'.
  - 6. Section 32 9120: 'Topsoil And Placement'.
  - 7. Section 32 9122: 'Topsoil Grading'.
  - 8. Section 32 9223: 'Sodding'.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Plant Establishment Period: Time required for plants to successfully develop root systems into surrounding soil. Following this period, irrigation run times are typically modified. For purposes of this contract, the plant establishment period is assumed to be one (1) year from date of Substantial Completion.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference:
  - 1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 and held jointly with following sections:
    - a. Section 32 9120: 'Topsoil And Placement'.
    - b. Section 32 9122: 'Topsoil Grading'.
    - c. Section 32 9223: 'Sodding'.
  - 2. In addition to agenda items specified in Section 01 3100, review the following:
    - a. Landscape Maintenance:
      - 1) Establish responsibility for maintenance of new landscaping during all phases of construction period.

**1.4 SUBMITTALS**

- A. Informational Submittals:
  - 1. Special Procedure Submittals:
    - a. Installer to provide two (2) copies of following recommendations to be included in Closeout Submittals:
      - 1) Landscape maintenance recommendations.
      - 2) Individual landscape maintenance recommendations.
      - 3) Plant establishment maintenance recommendations.
      - 4) Post-plant establishment maintenance recommendations.

- B. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Submit one (1) copy of recommendations specified in Special Procedure Submittals.

## **1.5 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  - 1. Post-Emergent Weed Control:
    - a. Products shall be recognized for intended use by AHJ.
- B. Qualifications:
  - 1. Landscape Subcontractor. Requirements of Section 01 4301 applies, but not limited to following:
    - a. Company specializing in performing work of this section.
    - b. Minimum five (5) years experience in landscaping installations.
    - c. Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
    - d. Upon request, submit documentation.
  - 2. Installer:
    - a. Planting shall be performed under direction of foreman or supervisor with minimum three (3) years experience in landscape installations similar in size, scope, and complexity.
    - b. Foreman or supervisor required to attend pre-installation conference.
    - c. Use trained personnel familiar with required planting procedures and with Contract Documents.
    - d. Upon request, submit documentation.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Storage And Handling Requirements:
  - 1. Deliver packaged materials in containers showing weight, analysis, and name of Manufacturer.
  - 2. Deliver sod in healthy and vigorous condition.
  - 3. Protect materials from deterioration during delivery.
- B. Storage And Handling Requirements:
  - 1. Store in location on site where they will not be endangered and where they can be adequately watered and kept in healthy and vigorous condition.
  - 2. Protect materials from deterioration while stored at site.

## **PART 2 - PRODUCTS**

### **2.1 POST-EMERGENT WEED CONTROL**

- A. Type Two Acceptable Products:
  - 1. Enide by Upjohn.
  - 2. Dymid by Elanco.
  - 3. Treflan or Surflan by Dow Agrosiences.
  - 4. Eptan by Syngenta.
  - 5. Equal as approved by Architect before use. See Section 01 6200.

## **PART 3 - EXECUTION**

### **3.1 INSTALLERS**

- A. Acceptable Installers:

1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

### **3.2 EXAMINATION**

- A. Verification Of Conditions:
  1. Inspect site and Contract Documents to become thoroughly acquainted with locations of irrigation and utilities.

### **3.3 PREPARATION**

- A. Before proceeding with work, verify dimensions and quantities. Report variations between Drawings and site to Architect before proceeding with landscape work.
  1. All planting indicated on Contract Documents is required unless indicated otherwise.
- B. Protection:
  1. Take care in performing landscaping work to avoid conditions that will create hazards. Post signs or barriers as required.
  2. Provide adequate means for protection from damage through excessive erosion, flooding, heavy rains, etc. Repair or replace damaged areas.
  3. Keep site well drained and landscape excavations dry.
  4. Coordinate with existing irrigation in area of work.

### **3.4 INSTALLATION**

- A. Interface with Other Work:
  1. Do not place new topsoil until re-grading and clay cap installation has been completed. See sheet A-10.
- B. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.
- C. Hand excavate as required.
- D. Maintain grade stakes until parties concerned mutually agree upon removal.
- E. When conditions detrimental to plant growth are encountered, such as rubble fill or adverse drainage conditions, notify Architect before planting.
- F. Adjust existing irrigation heads and lines in area of work to new finished grade and ensure proper coverage and no spray occurs on existing building.

### **3.5 FIELD QUALITY CONTROL**

- A. Field Inspection:
  1. Landscape Architect will inspect landscaping installation at Substantial Completion.
- B. Non-Conforming Work. Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
  1. Replace landscaping that is dead or appears dead as directed by Landscape Architect within ten (10) days of notification and before Substantial Completion at no additional cost to Owner.
  2. Replace damaged plantings at no additional cost to Owner.
  3. Repair damage to irrigation, utilities, and other items adjacent to landscaping caused by work of this Section or replace at no additional cost to Owner.

### 3.6 CLEANING

- A. Waste Management:
  - 1. Immediately clean up soil or debris spilled onto pavement and dispose of deleterious materials.

### 3.7 CLOSEOUT ACTIVITIES

- A. Instruction Of Owner:
  - 1. Include following training:
    - a. Review Maintenance as specified at the end of this specification.

### 3.8 PROTECTION

- A. Protect planted areas against traffic or other use immediately after planting is completed by placing adequate warning signs and barricades.
- B. Provide adequate protection of planted areas against trespassing, erosion, and damage of any kind. Remove this protection after Architect has accepted planted areas.

### 3.9 MAINTENANCE

- A. General:
  - 1. Before beginning maintenance period, sod shall be in at least as sound, healthy, vigorous, and in approved condition as when delivered to site, unless accepted by Architect in writing at final landscape inspection.
  - 2. Maintain landscaping from completion of landscape installation to thirty (30) days after Substantial Completion Meeting. Areas sodded after November 1st will accepted following spring approximately one (1) month after start of growing season, May 1st or as determined by Architect, if specified conditions have been met.
  - 3. Replace landscaping that is dead or appears unhealthy or non-vigorous as directed by Architect before end of maintenance period. Make replacements within ten (10) days of notification. Lawn that does not live and has to be replaced shall be guaranteed and maintained an additional thirty (30) days from date of replacement.
- B. Sodded Lawn:
  - 1. Maintain sodded lawn areas until lawn complies with specified requirements and throughout maintenance period.
  - 2. Water sodded areas in sufficient quantities and at required frequency to maintain sub-soil immediately under sod continuously moist 3 to 4 inches (75 to 100 mm) deep.
  - 3. Cut grass first time when it reaches 3 inches (75 mm) high. Continue to mow at least once each week throughout maintenance period. Remove clippings.
  - 4. Apply weed killer as necessary to maintain weed-free lawn. Apply weed killer in accordance with manufacturer's instructions during calm weather when air temperature is between 50 and 80 deg F (10 and 27 deg C).
  - 5. At end of thirty (30) day maintenance period, fertilize lawns as recommended.

**END OF SECTION**



**SECTION 32 9120****TOPSOIL AND PLACEMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Perform topsoil evaluation and placement required prior to topsoil grading as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 31 0501: 'Common Earthwork Requirements':
  - 2. Section 31 1413: 'Topsoil Stripping And Stockpiling' for stripping and storing of existing topsoil.
  - 3. Section 32 9001: 'Common Planting Requirements':
    - a. Pre-installation conference held jointly with other common planting related sections.
  - 4. Section 32 9122: 'Topsoil Grading' for preparation of topsoil and addition of amendments prior to landscaping.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM D1557-12, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>))'.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference:
  - 1. Participate in MANDATORY pre-installation conference as specified in Section 32 9001.
  - 2. In addition to agenda items specified in Section 01 3100 and Section 32 9001, review following:
    - a. Review finish grade elevation and tolerance requirements.
    - b. Review surface preparation requirements including disking, tilling, ripping, or aerating.
    - c. Review Attachment 'Topsoil Testing Report' including:
      - 1) Landscape Architect, Contractor, Testing, and Soil Testing Laboratory Instructions.
    - d. Review Field Quality Control testing requirements for 'Topsoil Testing Report' including:
      - 1) Corrections required for topsoil not meeting requirements of this specification.
      - 2) Approval requirement of 'Topsoil Testing Report' by Landscape Architect.
      - 3) Submittals required as identified in Closeout Submittals.

**1.4 SUBMITTALS**

- A. Informational Submittals:
  - 1. Testing And Evaluation Reports:
    - a. Use 'Topsoil Testing Report' attachment to this specification for Topsoil Testing as specified in 'Field Quality Control' in Part 3 of this specification for imported topsoil and account of recent use:
      - 1) Contractor will pay for one (1) test.
      - 2) Submit two (2) copies of Final 'Topsoil Testing Report' approved by Landscape Architect to be included with Closeout Submittals.
  - 2. Field Quality Control Submittals:
    - a. Submit report stating location of source of imported topsoil and account of recent use.
    - b. Submit delivery slips indicating amount of physical amendments delivered to Project site.

**B. Closeout Submittals:**

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Record Documentation:
    - 1) Submit one (1) copy Final approved 'Topsoil Testing Report'.
    - 2) Provide report stating location of source of imported topsoil and account of recent use.

**PART 2 - PRODUCTS****2.1 MATERIALS****A. Topsoil:**

1. Design Criteria:
  - a. Imported topsoil used in landscaped areas shall be weed free, fertile, loose, friable soil meeting following criteria:
    - 1) Chemical Characteristics:
      - a) pH 5.5 to 8.0.
      - b) Soluble Salts: less than 3.0 mmhos/cm.
      - c) Sodium Absorption Ratio (SAR): less than 6.0.
      - d) Organic Matter: greater than one percent.
    - 2) Physical Characteristics:
      - a) Gradation as defined by USDA triangle of physical characteristics as measured by hydrometer.
        - (1) Sand: 15 to 60 percent.
        - (2) Silt: 10 to 60 percent.
        - (3) Clay: 5 to 30 percent.
      - b) Clean and free from toxic minerals and chemicals, noxious weeds, rocks, and other objectionable materials.
      - c) Soil
        - (1) Soil shall not contain more than five (5) percent by volume of rocks measuring over 1/4 inch (6 mm) in largest size.
        - (2) Soil shall be topsoil in nature.
        - (3) Soil resembling road base or other like materials are not acceptable.
2. Project Topsoil Requirements:
  - a. It is anticipated that all of the topsoil material required for the area of work will be imported.
  - b. At Contractor's option, the existing topsoil on site can be re-used only if it is screened and tested to meet project specifications for imported topsoil prior to use. Quantity of useable topsoil is unknown.

**PART 3 - EXECUTION****3.1 EXAMINATION****A. Verification Of Conditions:**

1. Do not commence work of this Section until grading design as noted in drawings are met.
2. Do not commence work of this Section until coordination with Section 32 9122 'Topsoil Grading' if required prior to placement.
3. Receive approval from Landscape Architect of subgrade elevations prior to commencement of this Work.

**3.2 PREPARATION****A. Protection Of In-Place Conditions:**

1. Protect utilities, irrigation, and site elements from damage.

## B. Surface Preparation:

1. Surfaces to receive Imported and Stockpiled Topsoil:
  - a. Disk, till, rip, or aerate with approved agricultural aerator to depth of 6 inches (150 mm).
  - b. Place specified and approved topsoil on prepared surface.
  - c. See details on SD-1 and A-10.

**3.3 PERFORMANCE**

## A. General:

1. After Surface Preparation requirements are completed, limit use of heavy equipment to areas no closer than 6 feet (1.80 meter) from building or other permanent structures. Use hand held tillers for preparation of subsoil in areas closer than 6 feet (1.80 m).
2. Do not expose or damage existing shrub or tree roots.

## B. Topsoil Depth/Quantity:

1. Total topsoil depth of 5 inches (125 mm) minimum in lawn and groundcover planting areas.
2. Provide no less than quantity required to achieve tolerance described in Section 32 9122 'Topsoil Grading'. Installer of this section responsible for providing sufficient topsoil material.

## C. Imported Topsoil:

1. Place tested and approved topsoil:
  - a. Before placing topsoil, remove organic material, rocks and clods, and other objectionable materials.
  - b. Do not place topsoil whose moisture content makes it prone to compaction during placement process.
  - c. Do not place topsoil when subgrade is either wet or frozen enough to cause clodding.

## D. Stockpiled Topsoil:

1. It is assumed that any existing topsoil on site will be removed and is not to be re-used on site.

## E. Grading:

1. Slope grade away from building as detailed on SD-1 and A-10.
  - a. High point of finish grade at building foundation shall be 6 inches (150 mm) minimum below finish floor level. See details A-10.
  - b. Direct surface drainage in manner indicated on Contract Documents by molding surface to facilitate natural run-off of water.
  - c. Fill low spots and pockets with topsoil and grade to drain properly.
  - d. Refer to Site Plan – Existing and New SD-1 for design slopes.

**3.4 FIELD QUALITY CONTROL**

## A. Testing And Inspections:

1. Topsoil Testing:
  - a. Test topsoil for project suitability using Owner supplied 'Topsoil Testing Report,' attachment to this specification:
    - 1) Testing requirements:
      - a) If testing report shows topsoil does not meet topsoil Design Criteria and 'Topsoil Testing Report: Soil Test Data' requirements, topsoil is non-conforming. Corrections and re-testing are required until topsoil meets requirements.
      - b) Use new 'Topsoil Testing Report', each time topsoil is tested.
      - c) After topsoil testing is approved by Landscape Architect, submit two (2) copies of Final 'Topsoil Testing Report' as specified in Part 1 'Submittals' of this specification.

## B. Non-Conforming Work:

1. If topsoil does not meet topsoil Design Criteria and 'Topsoil Testing Report: Soil Test Data' requirements topsoil will be re-tested at no cost to Owner.
  - a. Correction procedures:

- 1) Topsoil not meeting specified physical characteristics of sand, silt, and clay shall be removed from site.
  - 2) Topsoil not meeting specified organic or fertility specifications may be amended in place with materials recommended in Topsoil Testing Report.
  - 3) If amendments are necessary, submit proposed amendments and application rates required to bring topsoil up to minimum specified requirements.
  - 4) Re-test topsoil and remove and amend as required until it meets minimum specified requirements.
- b. Submit report to Landscape Architect for approval.
  - c. Receive approval from Landscape Architect prior to planting.

#### **END OF SECTION**

#### **ATTACHMENTS**

# Topsoil Testing Report

Project	Name		Property Number
	Site Street Address, City, State/Province		
Person Submitting Test	Name		Date Requested
	Address, City, State/Province		Phone
Soil Testing Laboratory	Name		Date Submitted
	Address, City, State/Province		Phone

## General

- Contractor will pay for (1) imported topsoil test.

## Landscape Architect Instructions

- Landscape Architect shall determine by investigation quality and quantity of topsoil on site before landscape design. Add physical and fertility recommendations from laboratory recommendations to relevant Church specifications.

## Contractor Instructions

- Test installed topsoil. Installed topsoil shall comply with Project Specifications.
- If installed topsoil does not comply, Contractor will enhance and test at no cost to Owner until installed topsoil complies with Project Specifications.

## Testing Instructions

- Collect at least two (2) samples of on-site topsoil and each anticipated topsoil source. If site soil profile or borrow pit are not uniform, additional samples shall be taken. Uniform composite samples may also be used if properly acquired and documented.
- Submit required soil samples to soil testing laboratory along with all required (for this report and laboratory) information.

## Soil Testing Laboratory Instructions

- This report must be completely filled out and provide soil interpretation and amendment, fertilizer, and soil conditioner recommendations for use by Landscape Architect. These recommendations should consider lawn areas, tree and shrub areas, and native plant areas.
- Provide appropriate times for fertilizing.
- Return completed Topsoil Testing Report to person submitting the test.

SOIL SAMPLE LOG		
Soil Sample No.	Description of location where sample was taken	History of use of the soil

## Existing Conditions Test Report (“Acceptable Levels” refers to the allowable soil specifications prior to being amended)

SOIL TEST DATA												
Sample No.	pH <sup>(1)</sup>	EC <sup>(1)</sup> Mmhos/cm	SAR <sup>(1)</sup>	% Sand	% Silt	% Clay	Text <sup>(2)</sup> Class	% <sup>(3)</sup> OM	NO <sub>3</sub> -N <sup>(4)</sup> ppm	P <sup>(5)</sup> ppm	K <sup>(5)</sup> ppm	Fe <sup>(5)</sup> Ppm
Acceptable Level(s)	5.5 - 8.4	<3.0	<6.0	15-60	10-60	5-30	(2)	>1.0	>20	>11	>130	>10

<sup>(1)</sup> Saturated soil paste 1:1 soil:water method (please Indicate)

<sup>(2)</sup> Hydrometer method (Acceptable soil- sand:15-60 percent, silt:10-60 percent, clay-5-30 percent)

<sup>(3)</sup> Potassium dichromate method (Walkey-Black) or loss of ignition

<sup>(4)</sup> Chromotropic acid method

<sup>(5)</sup> AB-DTPA method

If other methods are used for NO<sub>3</sub>-N, P, K, and Fe, then note.

ROCKS (Coarse Fragments)		
Sample No.	Percent > 1/4 inch (6.4 mm)	Rocks Present $\geq$ 1.5 inch (38 mm) Indicate as present or not present
	percent	
	percent	
Acceptable Level	$\leq$ 5.0 percent	< 1.5 inch (38 mm)

### Landscape Area Description

Lawn Areas: Receive 5 inch (125 mm) topsoil plus recommended amendments and fertilizers.

Shrub/Tree Areas: Unless otherwise indicated, plant pits are to be backfilled with three (3) parts native soil and one part compost or other recommended amendments. Additionally, contractor will add recommended fertilizer.

Native Grass/Shrub/Tree Areas: Planting to receive minimum recommended amendments and fertilizers for establishment.

INFILTRATION RATE	
Documented Infiltration rate of test sample(s) based on texture at 90 percent relative density (to nearest 1/10th of an inch)	
Sample No.	Rate
	Inches/Hour
	Inches/Hour

### Interpretation Summary of Test Results:

### Soil Amendments, Fertilizer and Soil Conditioner – Recommendations:

Lawn Areas

Shrub/Tree Areas

Native Grass/Shrub/Tree Areas

### Long Term (5 Year) Fertilizer and Soil Conditioner – Recommendations:

Lawn Areas

Shrub/Tree Areas

Native Grass/Shrub/Tree Areas

**SECTION 32 9122****TOPSOIL GRADING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Perform topsoil grading required to prepare area of work for installation of landscaping as described in Contract Documents.
  - 2. Perform topsoil placement and finish grading work required to prepare site for installation of landscaping as described in Contract Documents.
  - 3. Furnish and apply soil amendments as described in Contract Documents.
  - 4. See details on SD-1 and A-10.
- B. Related Requirements:
  - 1. Section 31 0501: 'Common Earthwork Requirements':
  - 2. Section 31 1413: 'Topsoil Stripping And Stockpiling' for stripping and storing of existing topsoil.
  - 3. Section 32 9001: 'Common Planting Requirements':
    - a. Pre-installation conference held jointly with other common planting related sections.
  - 4. Section 32 9120: 'Topsoil And Placement' for topsoil evaluation and placement required for topsoil grading.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference:
  - 1. Participate in MANDATORY pre-installation conference as specified in Section 32 9001.
  - 2. In addition to agenda items specified in Section 01 3100, review the following:
    - a. Review compost requirements to be within acceptable range as per Attachment 'Compost Quality Guidelines For Landscaping' and 'Compost Verification Report' in this specification.
    - b. Review soil fertility amendments and fertilizer requirements as per Attachment 'Topsoil Testing Report' in Section 32 9120.

**1.3 SUBMITTALS**

- A. Action Submittals:
  - 1. Material Data:
    - a. Soil Amendments and Fertilizer:
      - 1) Product literature and chemical / nutrient analysis of soil amendments and fertilizers.
      - 2) Proposed application rates necessary to bring topsoil up to specified requirements.
      - 3) Source location of products.
      - 4) Submit to Landscape Architect for approval prior to installation.
  - 2. Samples:
    - a. Soil Fertility Amendments and Fertilizer:
      - 1) Soil conditioner sample for approval before delivery to site.
      - 2) Product analysis.
- B. Informational Submittals:
  - 1. Testing And Evaluation Reports:
    - a. 'Compost Verification Report':
      - 1) Provide signed copy certifying that compost meets requirements of this specification.
  - 2. Field Quality Control Submittals:
    - a. Soil Fertility Amendments and Fertilizer:

- 1) Delivery slips indicating amount of soil amendments, compost, conditioner, and fertilizer delivered to Project site.
- C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Submit 'Compost Verification Report'.
      - 2) Submit delivery slips indicating amount of physical amendments delivered to Project site.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Soil Amendments:
1. Incorporate the soil amendments into imported topsoil used for Project:
    - a. Acceptable Soil Amendments, Soil Conditioners, And Application Rates:
      - 1) As prescribed by the Imported Top Soil Test Results

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verification Of Conditions:
1. Do not commence work of this Section until imported topsoil is placed as specified in Section 32 9120 'Topsoil And Placement'.

### **3.2 PREPARATION**

- A. Protection Of In-Place Conditions:
1. Protect utilities, irrigation, and site elements from damage.
- B. Surface Preparation:
1. Surfaces that meet specified topsoil elevations.
    - a. Seven (7) days maximum before beginning planting:
      - 1) Loosen topsoil 6 inch (150 mm) deep, dampen thoroughly, and cultivate to properly break up clods and lumps.
      - 2) Rake area to remove clods, rocks, weeds, roots, debris or other objectionable material.
      - 3) Grade and shape landscape area to bring surface to true uniform planes free from irregularities and to provide drainage and proper slope away from foundation.
  2. Addition of Soil Amendments:
    - a. Add specified soil amendments at specified rates to topsoil as directed by Topsoil Testing Report found in Section 32 9120 'Topsoil And Placement'.
    - b. Add specified fertilizers at specified rates into topsoil as directed by Soil Testing Laboratory.
    - c. Roto-till or otherwise mix soil amendments evenly into topsoil.

### **3.3 PERFORMANCE**

- A. General:
1. Limit use of heavy equipment to areas no closer than 6 feet (1.80 meter) from building or other permanent structures. Use hand held tillers for preparation of subsoil in areas closer than 6 feet (1.80 m).
  2. Do not expose or damage existing shrub or tree roots.



- B. Placed Topsoil:
  - 1. At locations where topsoil has been placed as per Section 32 9120 'Topsoil And Placement', perform the following:
    - a. Remove existing vegetation as required in preparation for new landscaping.
    - b. Remove organic material, rocks and clods and other objectionable materials.
- C. Grading:
  - 1. Coordinate grading as described in Section 32 9120 'Topsoil And Placement'.
- D. Immediately before planting lawn and with topsoil in semi-dry condition, roll areas that are to receive lawn in two directions at approximately right angles with water ballast roller weighing 100 to 300 lbs (45 to 135 kg), depending on soil type.
- E. Rake or scarify and cut or fill irregularities that develop as required until area is true and uniform, free from lumps, depressions, and irregularities.

### **3.4 PROTECTION**

- A. After landscape areas have been prepared, take no heavy objects over them except lawn rollers.

**END OF SECTION**

**BLANK PAGE**

**SECTION 32 9223****SODDING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
  - 1. Furnish and install sodded lawn as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 32 9001: Common Planting Requirements:
    - a. Pre-installation conference held jointly with other common planting related sections.
  - 2. Section 32 9120: 'Topsoil And Placement'.
  - 3. Section 32 9122: 'Topsoil Grading'.

**1.2 REFERENCES**

- A. Definitions:
  - 1. Crop Coefficients and Hydro-Zones: Crop coefficients (Kc) are used with ETo to estimate specific plant evapotranspiration rates. The crop coefficient is a dimensionless number (between 0 and 1.2) that is multiplied by the ETo value to arrive at a plant ET (ETc) estimate. Plants grouped by water needs, organized into one irrigation zone.
  - 2. Eco-Region Irrigation Design: A bio-regional approach to irrigation and planting design that is relevant to the geographic area for which the planting plan and irrigation system is designed. These geographic areas are defined by the Environmental Protection Agency and have been modified by the LDS church into 15 geographical areas throughout North America, and the Hawaiian Islands.
  - 3. Hardiness Zone: A hardiness zone is a more precisely geographically-defined zone within an Eco-Region in which a specific category of plant life is capable of growing, as defined by temperature hardiness, or ability to withstand the minimum temperatures of the zone. Hardiness Zones may be defined by one of two sources:
    - a. Sunset Western Garden Book Maps.
    - b. USDA Hardiness Zone Map.Plant Hardiness zone sources shall be listed by the architect through the planting and irrigation design process.
  - 4. Hydro-Zone: Plants grouped by water needs (similar Crop Coefficients (Kc), organized into one irrigation zone.
  - 5. Reference Evapotranspiration (ETo): The total water lost from the soil (evaporation) and from the plant surface (transpiration) over some period.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference:
  - 1. Participate in pre-installation conference as specified in Section 32 9001.

**1.4 SUBMITTALS**

- A. Informational Submittals:
  - 1. Certificates:
    - a. Written certification confirming sod seed mix and quality:
      - 1) Include all species used.
      - 2) Include name and contact information of supplier.

- B. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Submit one (1) copy certificate for sod seed quality and mix.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery And Acceptance Requirements:
  - 1. Harvest, deliver, store, and handle sod in accordance with requirements of Turfgrass Producers International (TPI) (formally American Sod Producers Association) Specifications for Turfgrass Sod Materials and Transplanting / Installing.
  - 2. Schedule deliveries to coincide with topsoil operations and laying. Keep storage at job site to minimum without causing delays.
    - a. Deliver, unload, and store sod on pallets within 24 hours of being lifted.
    - b. Do not deliver small, irregular, or broken pieces of sod.
- B. Storage And Handling Requirements:
  - 1. Cut sod in pieces approximately 3/4 to one inch (19 to 25 mm) thick. Roll or fold sod so it may be lifted and handled without breaking or tearing and without loss of soil.
  - 2. During wet weather, allow sod to dry sufficiently to prevent tearing during lifting and handling.
  - 3. During dry weather, protect sod from drying before installation. Water as necessary to insure vitality and to prevent excess loss of soil in handling. Sod that dries out before installation will be rejected.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Description:
  - 1. Superior sod grown from certified, high quality, seed of known origin or from plantings of certified grass seedlings or stolons:
    - a. Assure satisfactory genetic identity and purity.
    - b. Assure over-all high quality and freedom from noxious weeds or an excessive amount of other crop and weedy plants at time of harvest.
  - 2. Sod shall be composed of three varieties minimum of 40% Kentucky Bluegrass, 30% Perennial Ryegrass, and 30% Creeping Red Fescue.
  - 3. Intent is to match locally produced sod for Cranbrook area.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Interface With Other Work:
  - 1. Do not commence work of this Section until work of Section 32 9122 has been completed and approved.
- B. Tolerances:
  - 1. Final grade of soil after sodding of lawn areas is complete shall be one inch (25 mm) below top of adjacent concrete / pavement of any kind.
- C. Laying of Sod:
  - 1. Lay sod during growing season and within 48 hours of being lifted.
  - 2. Lay sod while top 6 inches (150 mm) of soil is damp, but not muddy. Sodding during freezing temperatures or over frozen soil is not acceptable.

3. Lay sod in rows perpendicular to slope with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with a sharp knife.
  4. Lay sod flush with adjoining existing sodded surfaces.
  5. Do not sod slopes steeper than 3:1. Consult with Architect for alternate treatment.
- D. After Laying of Sod Is Complete:
1. Roll horizontal surface areas in two directions perpendicular to each other.
  2. Repair and re-roll areas with depressions, lumps, or other irregularities. Heavy rolling to correct irregularities in grade will not be permitted.
  3. Water sodded areas immediately after laying sod to obtain moisture penetration through sod into top 6 inches (150 mm) of topsoil.

### **3.2 FIELD QUALITY CONTROL**

- A. Field Inspection:
1. Sodded areas will be accepted at Project closeout if:
    - a. Sodded areas are properly established.
    - b. Sod is free of bare and dead spots and is without weeds.
    - c. No surface soil is visible when grass has been cut to height of 2 inches (50 mm).
  2. Sodded areas have been mowed a minimum of twice.

**END OF SECTION**

**BLANK PAGE**

**BIDDING REQUIREMENTS,**  
**SAMPLE FORMS, ETC**  
**FIXED SUM PROJECTS**  
**(CANADA)**

**B L A N K   P A G E**



# INVITATION TO BID

---

**1. GENERAL CONTRACTORS INVITED TO BID THE PROJECT:**

To be announced and issued on Separate list.

**2. PROJECT:**

**Cranbrook 1, 2, &**

Project Identification Number: 510-5234-1802-0101

Cranbrook British Columbia Stake

**3. LOCATION:**

2210 2<sup>nd</sup> Street North

Cranbrook, BC

**4. OWNER**

The Church of Jesus Christ of Latter-day Saints in Canada, an Alberta special act corporation

c/o Jim Kyle, Project Manager

Phone: (403) 869-1521

Canada Calgary Project Management Office

Email: kylejr@churchofjesuschrist.org

7040 Farrell Road Southeast, Room 109

Calgary, Alberta, Canada T2H 0T2

**5. CONSULTANT:**

Ed Zukowski Architect

Phone: (403) 229-3233

1919 – 10<sup>th</sup> Avenue S.W.

Calgary, Alberta T3C 0K3

Attention: Ed Zukowski

**6. DESCRIPTION OF PROJECT:**

A. Products provided under Value Managed Relationships (VMRs) are specified for the following products or systems:

1. Standard Steel Frames
2. Finish Hardware
3. Field finished Wood doors
4. Aluminum framed window infill
5. See Specifications for further detail

B. Description of Project and Major Components

1. Interior renovation to remove existing and create a barrier free washroom suite
2. Associated interior finishes and construction / demolition
3. Sanitary, supply and vent service connections related to Washrooms
4. HVAC and Electrical alterations related to Washrooms
5. Minor exterior re-grading / splashpads / landscape
6. Minor exterior masonry, aluminum framed window infill

**7. TYPE OF BID:** Bids will be on a lump-sum basis. Segregated bids will not be accepted.

**8. TIME OF SUBSTANTIAL PERFORMANCE:** The time limit for substantial performance of this Work will be **120 calendar days** as noted in the Agreement.

9. **PRE-BID CONFERENCE:** A pre-bid conference will be held 1:00pm, Tuesday, April 30, 2019 at:  
Cranbrook 1, 2, & - Relief Society Room  
2210 2<sup>nd</sup> Street North  
Cranbrook, BC

**Attendance by representative authorized to speak for Bidder (General Contractor) is mandatory.**

10. **BID OPENING:**

- A. Sealed Bids will be received and publicly opened at 2:00 pm, Tuesday, May 14, 2019 at:  
The office of the Owner:  
c/o Jim Kyle, Project Manager Phone: (403) 869-1521  
Canada Calgary Project Management Office Email: [kylejr@churchofjesuschrist.org](mailto:kylejr@churchofjesuschrist.org)  
7040 Farrell Road Southeast, Room 109  
Calgary, Alberta, Canada T2H 0T2
- B. **Original signed bid forms with bid security will be received in advance at the Office of the Owner and modifications to the bid amount will be accepted by email up to 5 minutes prior to the appointed bid opening time. Email: [kylejr@churchofjesuschrist.org](mailto:kylejr@churchofjesuschrist.org). The bidder shall use the form provided and acknowledge all addenda received on the email modification form.**

11. **BIDDING DOCUMENTS:**

- A. Bidding Documents may be examined at the following plan room locations:
1. The Office of the Consultant Phone: (403) 229-3233  
Ed Zukowski Architect  
1919 – 10<sup>th</sup> Avenue S.W.  
Calgary, Alberta T3C 0K3  
Attn: Mr. Ed Zukowski
- B. Bidding Documents may be obtained by invited General Contractors only at the Office of the Consultant.
1. Return all Tendering Documents in good condition within five days after Bid Date.  
Any person of firm who retains these Documents longer than this stipulated time shall not be invited to bid future projects.
  2. **Bid Documents will also be available for pick up by invited General Contractors at the pre-bid conference.**

12. **BID BOND:** Bid security in the amount of five percent (5%) of the bid will accompany each bid in accordance with the Instruction to Bidders.

13. **BIDDER'S QUALIFICATIONS:** Bidding by the General Contractors will be by invitation only.

14. **OWNER'S RIGHT TO REJECT BIDS:** The Owner reserves the right to reject any or all bids and to waive any irregularity therein.

15. **SITE ACCESS FOR VIEWING:**

- A. The site and building are accessible and available for public viewing by contacting Troy Gibb or Shainne Harker at the Welling AB FM Office (403) 327-0481. 24 hours minimum advance notice required for access arrangements.

**END OF DOCUMENT**

# INSTRUCTIONS TO BIDDERS

---

## 1. DEFINITIONS:

- A. The definitions set forth in Section 1 of the General Conditions are applicable to the documents included under Bidding Requirements.
- B. Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The proposed Contract Documents consist of the documents identified as Contract Documents in the Form of Agreement, except for Modifications. The Bidding Requirements are those documents identified as such in the proposed Project Manual.
- C. Addenda are written or graphic documents issued by the Consultant prior to execution of the Contract which modify or interpret the Bidding Documents. They become part of the Contract Documents as noted in the Form of Agreement upon execution of the Contract.

## 2. BIDDER'S REPRESENTATIONS:

- A. By submitting a bid, the bidder represents that
  - 1. Bidder has carefully studied and compared the Bidding Documents with each other. Bidder understands the Bidding Documents and the bid is fully in accordance with the requirements of those documents,
  - 2. Bidder has thoroughly examined the site and any building located thereon, has become familiar with local conditions which might directly or indirectly affect the contract work, and has correlated its personal observations with the requirements of the proposed Contract Documents, and
  - 3. Bid is based on the materials, equipment, and systems required by the Bidding Documents without exception.

## 3. BIDDING DOCUMENTS:

- A. Copies
  - 1. Bidding Documents may be obtained as set forth in the Invitation to Bid.
  - 2. Partial sets of Bidding Documents will not be issued.
  - 3. Bidders will use complete sets of Bidding Documents in preparing bids and make certain that those submitting sub-bids to them have access to all portions of the documents that pertain to the work covered by sub-bid, including General Conditions, Supplementary Conditions, and Division 01. Bidder assumes full responsibility for errors or misinterpretations resulting from use of partial sets of Bidding Documents by itself or any sub-bidder.
- B. Interpretation or Correction of Bidding Documents
  - 1. Bidders will request interpretation or correction of any apparent errors, discrepancies and omissions in the Bidding Documents.
  - 2. Corrections or changes to Bidding Documents will be made by written addenda.
- C. Substitutions and Equal Products
  - 1. Generally speaking, substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
  - 2. The terms '*Acceptable Manufacturers*', '*Approved Manufacturers*', '*Suppliers*', '*Installers*', and '*VMR (Value Managed Relationship) Manufacturers*', '*Suppliers*', '*Installers*' are used throughout the Project Manual to differentiate among the options available to Contractor regarding specified products, manufacturers, and suppliers. See Section 01 6200 for options available regarding acceptance of equal products.
  - 3. Base bid only on materials, equipment, systems, suppliers or performance qualities specified in the Bidding Documents.

4. Consultant is only authorized to consider requests for approval of equal products to replace specified products in Sections where the heading '*Acceptable Manufacturers*' is used and statement, '*Equal as approved by Consultant before bidding. See Section 01 6200*' or '*Equal as approved by Consultant before installation. See Section 01 6200*,' appears. In Sections where the afore-mentioned statements do not appear and a different heading is used, Consultant is authorized as Owner's representative to decline consideration of requests for approval of equal products. Approvals of equal products in such Sections must be made by Owner and will generally be for subsequent Projects.
- D. Addenda - Addenda will be sent to bidders and to locations where Bidding Documents are on file no later than one week prior to bid opening or by fax no later than 48 hours prior to bid opening.

#### 4. BIDDING PROCEDURES:

- A. Form and Style Of Bids
  1. Use Owner's Bid Form.
  2. Fill in all blanks on Bid Form. Signatures will be in longhand and executed by representative of bidder duly authorized to make contracts.
  3. Bids will bear no information other than that requested on bid form. Do not delete from or add to the information requested on the bid form.
- B. Bid Security
  1. Each bid will be accompanied by a bid bond naming Owner, as listed in the Agreement, as obligee. If Bidder refuses to enter into a Contract or fails to provide bonds and insurance required by the General Conditions, amount of bid security will be forfeited to Owner as liquidated damages, not as a penalty.
  2. Bid bond will be issued by a surety company meeting requirements of the General Conditions for surety companies providing bonds and will be submitted on a CCDC 220 form, or authorized equivalent provided by surety company. The attorney-in-fact who executes the bond on behalf of the surety will affix to the bond a certified and current copy of the power of attorney.
  3. Owner may retain bid security of bidders to whom an award is being considered until -
    - a. Contract has been executed and bonds have been furnished,
    - b. Specified time has elapsed so bids may be withdrawn, or
    - c. All bids have been rejected.
- C. Submission of Bids
  1. Submit bid in sealed opaque envelope containing only bid form and bid security. Envelopes will be sealed, bear bidder's name, and include the following:

#### BID FOR

#### Cranbrook 1, 2, & - Cranbrook British Columbia Stake

#### 510-5234-1802-0101

- If bid is sent by mail, enclose sealed envelope in separate mailing envelope with notation 'SEALED BID ENCLOSED' on face.
2. It is bidder's sole responsibility to see that its bid is received at specified time. Bids received after specified bid opening time will be returned to bidders unopened.
  3. No oral, facsimile, or telephonic bids, modifications, or cancellations will be considered. **Email (scanned) modifications will be accepted.**
  - D. Modification or Withdrawal Of Bid
    1. Bidder guarantees there will be no revisions or withdrawal of bid amount for 45 days after bid opening.
    2. Prior to bid opening, bidders may withdraw bid by written request or by reclaiming bid

envelope.

3. Prior to bid opening, bidder may mark and sign on the sealed envelope that bidder acknowledges any or all Addenda.
4. **Email (scanned) transmitted modifications will be accepted as noted in the Invitation to Bid using the form provided, if the original bid form and bid security has been previously submitted to the bid closing location. Email: [kylejr@churchofjesuschrist.org](mailto:kylejr@churchofjesuschrist.org)**

**5. CONSIDERATION OF BIDS:**

- A. Opening Of Bids - See Invitation to Bid.
- B. Rejection of Bids - Owner reserves right to reject any or all bids and to waive any irregularity therein.
- C. Acceptance Of Bid
  1. No bidder will consider itself under contract after opening and reading of bids until Agreement between Owner and Contractor is fully executed.
  2. Bidder's past performance, organization, subcontractor selection, equipment, and ability to perform and complete its contract in manner and within time specified, together with amount of bid, will be elements considered in award of contract.

**6. POST-BID INFORMATION:**

- A. The conditionally accepted bidder submitting a bid involving subcontractors will submit its list of proposed subcontractors in a meeting to be held immediately after bid opening.

**7. PERFORMANCE BOND AND PAYMENT BOND:**

- A. Bond Requirements - Performance Bond and Labour and Material Payment bond will be required for this Project as specified in the General Conditions.
- B. Time Of Delivery Of Bonds - Bonds will be delivered to Owner with Agreement signed by bidder.

**8. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:**

- A. Agreement form will be "Agreement Between Owner and Contractor for a Fixed Sum (Canada)" provided by Owner.

**9. MISCELLANEOUS:**

- A. Pre-Bid Conference
  1. A pre-bid conference will be held at a time and place to be announced.
- B. Liquidated Damages - Conditions governing liquidated damages are specified in the General Conditions and in the Supplementary Conditions.
- C. Examination Schedule for Existing Site
  1. The site is open and available for public viewing at any time with prior arrangements.
- D. Exemption from local taxes - See Supplementary Conditions

**END OF DOCUMENT**

**BLANK PAGE**

**SUBCONTRACTORS AND MAJOR MATERIALS SUPPLIERS LIST**

Project Name: \_\_Cranbrook 1, 2, &amp;\_\_ Date:\_\_\_\_\_

Stake: \_\_\_\_Cranbrook British Columbia Stake\_\_\_\_\_ Project No: \_\_510-5234-1802-0101\_\_

General Contractor: \_\_\_\_\_

General Contractor is to provide the names of the following subcontractors and suppliers to the Owner's Project Manager immediately following the bid opening:

**VMR SUBCONTRACTORS**

Doors, Frames &amp; Hardware \_\_\_\_\_

Aluminum Framed Window Infill\_\_\_\_\_

Other \_\_\_\_\_

Other \_\_\_\_\_

Other \_\_\_\_\_

**SUBCONTRACTORS AND SUPPLIERS**

Site work / Landscape\_\_\_\_\_

Site / Building Concrete\_\_\_\_\_

Framing \_\_\_\_\_

Insulation \_\_\_\_\_

Millwork \_\_\_\_\_

Drywall \_\_\_\_\_

Ceramic Tile \_\_\_\_\_

Demolition\_\_\_\_\_

Painting \_\_\_\_\_

Wall Coverings \_\_\_\_\_

Plumbing \_\_\_\_\_

HVAC \_\_\_\_\_

Electrical \_\_\_\_\_

Masonry \_\_\_\_\_

Ceilings \_\_\_\_\_

Other \_\_\_\_\_



## **EQUAL PRODUCT APPROVAL REQUEST FORM (Canada)**

Project Name: Cranbrook 1, 2, & Request Number: \_\_\_\_\_

TO: \_\_\_\_\_

FROM: \_\_\_\_\_

BID DATE: \_\_\_\_\_

A proposed product is not legally approved and cannot legally be included in a bid or used in the Work until it appears in an Addendum or other Contract Modification as defined in the General Conditions. See Instructions To Bidders Paragraph 3,C, General Conditions, and Section 01 6200.

### **PROPOSED EQUAL PRODUCT:**

Specification Section: \_\_\_\_\_

Specified Products: \_\_\_\_\_

Proposed Product: \_\_\_\_\_

The Undersigned certifies:

1. Proposed equal product has been fully investigated and determined to be equal or superior in all respects to specified products.
2. Same warranty will be furnished for proposed equal product as for specified products.
3. Same maintenance service and source of replacement parts, as applicable, is available.
4. Proposed equal product will have no adverse effect on other trades and will not affect or delay progress schedule.
5. Proposed equal product does not affect dimensions and functional clearances.

### **ATTACHMENTS:**

Include the following attachments -

1. Copy of the Project Manual Section where the proposed equal product would be specified, rewritten or red-lined to include any changes necessary to correctly specify the proposed equal product. Identify completely changes necessary to the original Project Manual Section.
2. Copies of details, elevations, cross-sections, and other elements of the Project Drawings redone as necessary to show changes necessary to accommodate proposed equal product. Identify completely the changes from the original Drawings.
3. Complete product literature and technical data, installation and maintenance instructions, test results, and other information required to show complete conformance with requirements of the Contract Documents.

**SIGNED:** \_\_\_\_\_

Printed Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City, Province, Postal Code \_\_\_\_\_

Telephone \_\_\_\_\_ Fax \_\_\_\_\_

**REVIEW COMMENTS:**

\_\_\_\_\_ Accepted. See Addenda Number \_\_\_\_\_.

\_\_\_\_\_ Submission Not In Compliance With Instructions. Respond to attached comments and resubmit.

\_\_\_\_\_ Proposed Equal Product Not Acceptable. Use specified products.

\_\_\_\_\_ Not Reviewed. Submission received too late. Use specified products.

---

**ADDITIONAL COMMENTS:**

---

**BY:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

# B I D F O R M

FOR GENERAL CONTRACT WORK (Canada)

## PROJECT IDENTIFICATION:

Cranbrook 1, 2, & - LDS #510-5234-1802-0101, Cranbrook British Columbia Stake

## OWNER:

The Church of Jesus Christ of Latter-day Saints in Canada, an Alberta special act corporation ("Owner")

## CONSULTANT:

Ed Zukowski Architect

## B I D

1. In submitting this Bid, Bidder represents that:
  - a. If this Bid is accepted, Bidder will enter into an agreement with Owner to perform and furnish the Work described in the Bidding Documents for the Bid Price and within the Time of Substantial Performance indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
  - b. Bidder has carefully examined Set(s) Number \_\_\_\_\_ of the Bidding Documents consisting of the Project Manual containing the Bidding Requirements, the Conditions of the Contract, and the Specifications, entitled \_\_Cranbrook 1, 2, &\_\_, the Drawings entitled \_\_Cranbrook 1, 2, &\_\_ and dated \_\_March 2019\_\_, and including sheets numbered \_\_All sheet titles noted in Drawing List on cover sheet ACS\_\_, and addenda numbers \_\_\_\_\_.
  - c. Bidder has examined the site of the work, existing conditions, and all other conditions affecting the work on the above-named Project.
  - d. Bidder has carefully correlated the information known to Bidder and information and observations obtained from visits to the site with the Bidding Documents.
  - e. Bidder is familiar with federal, Province, and local laws and regulations applicable to Project.
  - f. Bidder guarantees there will be no revisions or withdrawal of bid amount for forty-five (45) days after the bid opening.
2. Bidder hereby proposes to furnish all materials, labor, equipment, tools, transportations, services, licenses, fees, permits, etc., required by said documents to complete the Work described by the Contract Documents for the lump-sum of: \_\_\_\_\_ Canadian Dollars (CAD\$ \_\_\_\_\_) plus GST or HST where applicable.
3. Bidder agrees to achieve substantial performance of the Work within the number of days indicated in the Invitation to Bid.
4. Enclosed is a Bid Bond for not less than five percent (5%) of the bid.

RESPECTFULLY SUBMITTED:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Company name

\_\_\_\_\_  
Business Address

\_\_\_\_\_  
Date

\_\_\_\_\_  
City, Province, and Postal Code

\_\_\_\_\_  
License No.

\_\_\_\_\_  
Telephone

\_\_\_\_\_  
Fax

\_\_\_\_\_  
Contact Email Address

BLANK PAGE

**CONSTRUCTION MATERIAL ASBESTOS STATEMENT**  
**(Canada)**

Building Name: Cranbrook 1, 2, &

Building Plan Type: \_\_\_\_\_

Building Address: 2210 2<sup>nd</sup> Street North, Cranbrook, BC

Building Owner: The Church of Jesus Christ of Latter-day Saints in Canada, an Alberta  
special act corporation

Project Number: 510-5234-1802-0101

Completion Date: \_\_\_\_\_

As PROJECT CONSULTANT and principal in charge; based on my best knowledge, information, inspection, and belief; I certify that on the above referenced Project, no asbestos-containing building materials were specified in the construction documents or given approval in shop drawings or submittals.

\_\_\_\_\_  
Project Consultant and Principal in Charge (signature)      Date

Ed Zukowski Architect  
\_\_\_\_\_  
Company Name

As GENERAL CONTRACTOR in charge of construction; based on my best knowledge, information, inspection, and belief; I affirm that on the above-referenced Project, no asbestos-containing building materials were used in the construction.

\_\_\_\_\_  
General Contractor (signature)      Date

\_\_\_\_\_  
Company Name

BLANK PAGE

## Email Bid Modification

Project Name: Cranbrook 1, 2, &  
Project Number: 510-5234-1802-0101  
Bid Opening Date: Tuesday, May 14, 2019 (unless changed by addendum)  
Bid Opening Time: 2:00 pm  
Bid Opening Location: Office of the Owner – c/o Jim Kyle, Project Manager, Canada Calgary Project Management Office, 7040 Farrell Road Southeast, Room 109  
Email Address: [kylejr@churchofjesuschrist.org](mailto:kylejr@churchofjesuschrist.org)

This document is equivalent to the Sealed Bid Envelope and as such becomes part of the submitted Sealed Bid when emailed to the bidding location before the time of the Bid Opening as noted below. It is the Contractor's Responsibility to scan and email the document in sufficient time to be received before the bid time is closed for the Bid Opening. When using this form to make any alterations, the bidder shall acknowledge the number of addenda on the form where indicated.

Contractor's Name: \_\_\_\_\_

Contractor's Address: \_\_\_\_\_

Acknowledgement of Addenda Numbers: \_\_\_\_\_

Add: \_\_\_\_\_ (\$ \_\_\_\_\_ )

Subtract: \_\_\_\_\_ (\$ \_\_\_\_\_ )

**This change modifies the sum printed and written on the Bid Form in Sealed Envelope.**

Person signing is authorized agent of the Company:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
(print signors name)

\_\_\_\_\_  
Title or Position

- Date and time will be as printed on the email receipt. Email submission must be received 5 minutes before the Bid Opening or this document will be non-responsive.
- This form shall be used for bid modifications only. Indication on this form of the total bid value will invalidate the bid.
- Bidders in attendance for the Bid Opening may modify their bids by writing the above information on the sealed envelope and resubmitting the envelope prior to the appointed time for Bid Opening, as noted in the Instructions to Bidders or as discussed at the Pre-bid Conference.

**END OF DOCUMENT**

**BLANK PAGE**



**CONDITIONS**  
**Of The**  
**CONTRACT**

**BLANK PAGE**

# GENERAL CONDITIONS For a Fixed Sum (Canada)

---

## TABLE OF CONTENTS

SECTION 1 GENERAL PROVISIONS	SECTION 9 PAYMENTS AND COMPLETION
SECTION 2 OWNER	SECTION 10 PROTECTION OF PERSONS AND PROPERTY
SECTION 3 CONTRACTOR	SECTION 11 INSURANCE AND BONDS
SECTION 4 ADMINISTRATION OF THE CONTRACT	SECTION 12 UNCOVERING AND CORRECTION OF WORK
SECTION 5 SUBCONTRACTORS	SECTION 13 RESOLUTION OF DISPUTES
SECTION 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS	SECTION 14 TERMINATION
SECTION 7 CHANGES IN THE WORK	SECTION 15 MISCELLANEOUS PROVISIONS
SECTION 8 TIME	

### SECTION 1 - GENERAL PROVISIONS

#### 1.1 DEFINITIONS

- A. Adverse Weather: weather conditions that are seasonally abnormal and could not have been reasonably anticipated.
- B. Agreement: the document entitled "Agreement Between Owner and Contractor for a Fixed Sum (Canada)" executed by Owner and Contractor for performance of the Work.
- C. Change In The Work: a modification to the requirements of the Contract Documents or a delay in Substantial Performance resulting from an instruction from Owner or Consultant to Contractor or from another event or circumstance.
- D. Change Order: a written instrument prepared by Consultant and signed by Owner, Contractor, and Consultant stating their agreement upon the following: (1) the occurrence of a Change in the Work; (2) the amount of the adjustment, if any, in the Contract Sum as a result of the Change in the Work; and (3) the extent of the adjustment, if any, in the Contract Time as a result of the Change in the Work.
- E. Construction Change Directive: a written order prepared by Consultant and signed by Consultant and Owner which: (1) orders a Change in the Work if the terms of a Change Order cannot be agreed upon prior to performance of a Change in the Work described in Section 7.1 or after occurrence of an event or circumstance described in Section 7.2; and (2) states a proposed basis for adjustment, if any, in the Contract Sum, the Contract Time, or both, resulting from the Change in the Work.
- F. Consultant: the entity identified as such in the Agreement.
- G. Contract Documents: the documents identified as such in the Agreement.
- H. Contract Sum: the total amount set forth in the Agreement payable by Owner to Contractor for performance of the Work.
- I. Contract Time: the period of time set forth in the Agreement for the Substantial Performance of the Work.
- J. Contractor: the entity identified as such in the Agreement.
- K. Day: calendar day unless otherwise specifically defined.
- L. Direct Costs: actual costs for labour, materials, equipment, insurance, bonds, subcontract costs and onsite supervision relating to the Project. They do not include labour costs for project managers or other off-site administration.
- M. Drawings: the documents identified as such in the Agreement.
- N. Field Change: a written order prepared by Consultant and signed by Consultant and Contractor for a minor Change in the Work consistent with the general intent of the Contract Documents costing CAD\$1,000 or less, resulting in no time extension, and which is necessary to avoid delaying the Work.
- O. Modification: a written amendment to the Contract Documents in the form of a:
  - 1. Change Order;
  - 2. Construction Change Directive; or
  - 3. Field Change.
- P. Owner: the entity identified as such in the Agreement.

- Q. Project: the total construction designed by Consultant of which the Work performed under the Contract Documents may be the whole or a part.
- R. Product Data: standard illustrations, schedules, performance charts, instructions, brochures, diagrams, and other information furnished by Contractor to illustrate details regarding materials or equipment to be used in the Work, or the manner of installation, operation, or maintenance of such materials or equipment.
- S. Project Manual: the document identified as such in the Agreement.
- T. Samples And Mock-ups: physical examples that illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.
- U. Shop Drawings: drawings, diagrams, illustrations, schedules, performance charts, fabrication and installation drawings, setting diagrams, patterns, templates, and other data which illustrate some portion of the Work and confirm dimensions and conformance to the Contract Documents specially prepared by Contractor or any Subcontractor, manufacturer, supplier, or distributor.
- V. Specifications: the documents identified as such in the Agreement.
- W. Subcontractor: any entity supplying labour, materials, equipment, construction or services for the Work under separate contract with Contractor or any other Subcontractor.
- X. Submittals: Shop Drawings, Product Data, Samples and Mock-ups and any other documents or items furnished by Contractor or its Subcontractors to Owner or Consultant to demonstrate how any portion of the Work will be accomplished or the type of materials or products that will be used in the Work.
- Y. Substantial Performance: Completion of the Work to a point where Owner can use the Work for its intended purposes. The date of Substantial Performance is the date certified as such by Consultant in accordance with the Contract Documents..
- Z. Work: all labour, materials, equipment, construction, and services required by the Contract Documents.
- AA. Written Notice: notice in writing given from one party to the other at the addresses or facsimile numbers listed in the Agreement, or at such other addresses or facsimile numbers as the parties will designate from time to time by Written Notice, and will be effective at the earliest of:
  1. The date of personal delivery to the other party with signed acknowledgment of receipt; or
  2. The date sent by facsimile transmission to the other party provided receipt of the facsimile is verified by an electronic confirmation report by the party sending the facsimile transmission and further provided that a confirmation copy is sent to the other party by courier or by registered or certified mail within twenty-four (24) hours after the time and date of the facsimile transmission; or
  3. The date of receipt by the other party as stated on the return receipt if sent by registered or certified mail, or by courier.

## 1.2 CORRELATION AND INTENT OF CONTRACT DOCUMENTS

- A. The intent of the Contract Documents is to require Contractor to provide all labour, materials, equipment, construction, and services necessary for the proper execution and completion of the Work. The Contract Documents are complementary and what is required by any one will be as binding as if required by all. Contractor will perform the Work in accordance with the requirements expressly set forth in or reasonably inferable from the Contract Documents.
- B. The organization of the Contract Documents is not intended to control Contractor in dividing the Work among Subcontractors or to establish the extent of the Work to be performed by any trade.
- C. Words used in the Contract Documents that have well known technical or trade meanings are used therein in accordance with such recognized meanings.
- D. In the interest of brevity, the Contract Documents may omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.
- E. When any of the Contract Documents are prepared in both the English and French languages, it is agreed that in the event of any apparent discrepancy between the English and French versions, the English language version will prevail. The Contract Documents are drawn in English, by agreement and at the request of the parties. . (Cette entente est rédigée en anglais à la demande de toutes les parties.)

## 1.3 OWNERSHIP AND USE OF CONTRACT DOCUMENTS

The Drawings, the Project Manual, and copies thereof are the property of Owner. Contractor will not use these documents on any other project. Contractor may retain one copy of the Drawings and the Project Manual as a contract record set and will return or destroy all remaining copies following final completion of the Work.

## 1.4 PUBLIC STATEMENTS REGARDING PROJECT

Contractor will not make any statements or provide any information to the media about the Project without the prior written consent of Owner. If Contractor receives any requests for information from media, Contractor will refer such requests to Owner.

## **1.5 OWNERSHIP AND USE OF RENDERINGS AND PHOTOGRAPHS**

Renderings representing the Work are the property of Owner. All photographs of the Work, whether taken during performance of the Work or at completion, are the property of the Owner. The Owner reserves all rights including copyrights to renderings and photographs of the Work. No renderings or photographs shall be used or distributed without written consent of the Owner

## **1.6 NO COMMERCIAL USE OF TRANSACTION OR RELATIONSHIP**

Without the prior written consent of Owner, which Owner may grant or withhold in its sole discretion, neither Contractor nor Contractor's affiliates, officers, directors, agents, representatives, shareholders, members, Subcontractors, Sub-subcontractors or employees shall make any private commercial use of their relationship to Owner or the Project, including, without limitation:

- A. By referring to this Agreement, Owner, or the Project verbally or in any sales, marketing or other literature, letters, client lists, press releases, brochures or other written materials except as may be necessary for Contractor to perform Contractor's obligations under the terms of this Agreement;
- B. By using or allowing the use of any photographs of the Project or any part thereof, or of any service marks, trademarks or trade names or other intellectual property now or which may hereafter be associated with, owned by or licensed by Owner in connection with any service or product; or
- C. By contracting with or receiving money or anything of value from any person or commercial entity to facilitate such person or entity obtaining any type of commercial identification, advertising or visibility in connection with the Project.

Notwithstanding the foregoing, Contractor may include a reference to Owner and the services and equipment provided under this Agreement in a professional résumé or other similar listing of Contractor's references without seeking Owner's written consent in each instance; provided, that such reference to Owner, the services and equipment is included with at least several other similar references and is given no more prominence than such other references.

## **1.7 CONFIDENTIALITY / PROPERTY RIGHTS**

- A. Owner will retain ownership and intellectual property rights in all plans, designs, drawings, documents, concepts, and materials provided by or on behalf of Owner to Contractor and to all work products of Contractor for or relative to Work performed under this Agreement, such products, services, and Work of Contractor constituting works made for hire. Contractor will not reuse any portions of such items provided by Owner or developed by Contractor for Owner pursuant to this Agreement, or disclose any such items to any third party without the prior written consent of Owner. Owner may withhold its consent in its' absolute discretion.
- B. In addition, Contractor shall ensure that Contractor, Subcontractors, and the employees, agents and representatives of Contractor and its Subcontractors maintain in strict confidence, and shall use and disclose only as authorized by Owner all Confidential Information of Owner that Contractor receives in connection with the performance of this Agreement. Notwithstanding the foregoing, Contractor may use and disclose any information to the extent required by an order of any court or governmental authority, but only after it has notified Owner and Owner has had an opportunity to obtain reasonable protection for such information in connection with such disclosure. For purposes of this Agreement, "Confidential Information" means:
  - 1. The name or address of any affiliate, customer or contractor of Owner or any information concerning the transactions of any such person with Owner;
  - 2. Any information relating to contracts, agreements, business plans, budgets or other financial information of Owner to the extent such information has not been made available to the public by the Owner; and
  - 3. Any other information that is marked or noted as confidential by the Owner at the time of its disclosure.

## **1.8 COMPLY WITH INTELLECTUAL PROPERTY RIGHTS OF OTHERS**

Contractor represents and warrants that no Work (with its means, methods, goods, and services attendant thereto), provided to Owner will infringe or violate any right of any third party and that Owner may use and exploit such Work, means, methods, goods, and services without liability or obligation to any person or entity (specifically and without limitation, such Work, means, methods, goods, and services will not violate rights under any patent, copyright, trademark, or other intellectual property right or application for the same).

## **SECTION 2 - OWNER**

### **2.1 OWNER'S DESIGNATED REPRESENTATIVE**

Owner will designate in writing a representative who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.

### **2.2 INFORMATION AND SERVICES REQUIRED OF OWNER**

- A. Owner will be responsible for establishment of property lines and benchmarks for grading.
- B. Owner will furnish to Contractor any information or services it is required to furnish under the Contract Documents with reasonable promptness to avoid delay in the orderly progress of the Work.
- C. Owner will furnish to Contractor a reasonable number of copies of the Drawings, the Project Manual, and the Addenda.

### **2.3 OWNER'S RIGHT TO INSPECT THE WORK**

Owner and its representatives will have the right to inspect any portion of the Work wherever located at any time.

## 2.4 OWNER'S RIGHT TO STOP THE WORK

If Contractor fails to carry out the Work in accordance with the Contract Documents or fails to correct Work which is not in accordance with the Contract Documents in a timely manner, Owner may order Contractor in writing to stop the Work, or any portion thereof, until the cause for that order has been eliminated.

## SECTION 3 - CONTRACTOR

### 3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

- A. By executing the Agreement, Contractor represents that it has visited the Project site, familiarized itself with the local conditions under which the Work is to be performed, and correlated its own observations with the requirements of the Contract Documents.
- B. Contractor will carefully review and compare the Contract Documents and any other available information relating to the Project prior to commencing and during performance of each portion of the Work and will immediately report to Consultant any errors, inconsistencies, and omissions it discovers.
- C. Should Contractor or any of its Subcontractors become aware of any question regarding the meaning or intent of any part of the Contract Documents prior to commencing that portion of the Work about which there is a question, Contractor will request an interpretation or clarification from Consultant before proceeding. Contractor proceeds at its own risk if it proceeds with the Work without first making such a request and receiving an interpretation or clarification from Consultant. If neither Contractor nor its Subcontractors become aware of the question until after work on the relevant portion of the Work has commenced, then the following precedence will govern for purposes of determining whether resolution of the question constitutes a Change in the Work:
  - 1. The Agreement takes precedence over all other Contract Documents.
  - 2. The Supplementary Conditions take precedence over the General Conditions.
  - 3. The General Conditions and Supplementary Conditions take precedence over the Drawings and the Specifications.
  - 4. An Addendum or a Modification takes precedence over the document(s) modified by the Addendum or Modification.
  - 5. The Specifications take precedence over the Drawings.
  - 6. Within the Drawings, larger scale drawings take precedence over smaller scale drawings, figured dimensions over scaled dimensions, and noted materials over graphic indications.
- D. Contractor will give Consultant notice of any additional drawings, specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work, sufficiently in advance of the need for information so as not to delay the Work.
- E. It is not Contractor's responsibility to ascertain that the Contract Documents are in accordance with requirements of applicable laws, statutes, ordinances, building codes, rules and regulations. However, if Contractor observes that portions of the Contract Documents are at variance with those requirements, Contractor will immediately notify Consultant in writing. Contractor will not proceed unless Owner and/or Consultant effects Modifications to the Contract Documents required for compliance with such requirements. Contractor will be fully responsible for any work knowingly performed contrary to such requirements and will fully indemnify Owner against loss and bear all costs and penalties arising therefrom.
- F. Contractor will take field measurements and verify field conditions and will compare such field measurements and conditions and other information known to Contractor with the Contract Documents before ordering any materials or commencing construction activities. Contractor will immediately report errors, inconsistencies, and omissions which it discovers to Consultant. If Contractor orders materials or commences construction activities before taking field measurements and verifying field conditions, Contractor will not be entitled to any compensation for additional costs to Contractor resulting from field measurements or conditions different from those anticipated by Contractor which would have been avoided had Contractor taken field measurements and verified field conditions prior to ordering the materials or commencing construction activities.
- G. If site conditions indicated in the Contract Documents or other information provided by Owner or Consultant to Contractor differ materially from those Contractor encounters in performance of the Work, Contractor will immediately notify Consultant in writing of such differing site conditions.
- H. Where the Contract Documents require the Contractor to provide professional services for architecture or engineering, the Contractor shall cause such services to be performed by appropriately licensed professionals.

### 3.2 SUPERVISION OF CONSTRUCTION PROCEDURES

- A. Contractor will supervise and direct the Work. Contractor will be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work. All loss, damage, liability, or cost of correcting defective work arising from the use of any construction means, methods, techniques, sequences or procedures will be borne by Contractor, notwithstanding that such construction means, methods, techniques, sequences or procedures are referred to, indicated or implied by the Contract Documents, unless Contractor has given timely notice to Owner and Consultant in writing that such means, methods, techniques, sequences or procedures are not safe or suitable, and Owner has then instructed Contractor in writing to proceed at Owner's risk.
- B. Contractor will utilize its best skill, efforts, and judgment to provide efficient business administration and supervision, to furnish at all times an adequate supply of workers and materials, and to perform the Work in an expeditious and economical manner consistent with the interests of Owner.
- C. Contractor will be responsible for:
  - 1. The proper observance of property lines and set back requirements as shown in the Contract Documents;
  - 2. The location and layout of the Work as shown in the Contract Documents with respect to the position of the Work on the

- property and the elevation of the Work in relation to grade; and
3. Setting and maintaining construction stakes.

- D. Contractor will be responsible to Owner for the acts and omissions of its employees and Subcontractors as well as persons either directly or indirectly employed by Subcontractors.
- E. Contractor will not be relieved of its obligation to perform the Work in accordance with the Contract Documents as a result of any tests, inspections, certifications or approvals by Owner, Consultant or their subconsultants.
- F. Contractor will be responsible for inspection of portions of the Work already completed to determine that such portions are in proper condition to receive subsequent portions of the Work.
- G. Contractor recognizes that the Project site and the surrounding area is frequently visited by the public and is important to Owner's image and function and will maintain the premises free from debris and waste materials resulting from Construction. At the completion of Construction, Contractor shall promptly remove construction equipment, tools, surplus materials, waste materials and debris.

### **3.3 LABOUR AND MATERIALS**

- A. Unless otherwise provided in the Contract Documents, Contractor will provide and pay for all labour, materials, equipment, tools, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.
- B. Contractor will at all times enforce strict discipline and good order among those performing the Work and will not permit employment of any unfit person or anyone not skilled in the tasks assigned to them.
- C. Contractor is fully responsible for the Project and all materials and work connected therewith until Owner has accepted the Work in writing. Contractor will replace or repair at its own expense any materials or work damaged or stolen, regardless of whether it has received payment for such work or materials from Owner.
- D. Contractor will remedy all damage or loss to any property caused in whole or in part by Contractor, any Subcontractor, or by anyone for whose acts any of them may be liable.
- E. Contractor will be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. Consultant may require Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of Consultant, would lead to a reasonable certainty that any material used, or proposed to be used, in the work meets the requirements of the Contract Documents. All such data will be furnished at Contractor's expense. This provision will not require Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at Contractor's expense.
- F. Contractor will coordinate and supervise the work performed by Subcontractors so that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. Contractor and all Subcontractors will at all times afford each trade, any separate contractor, or Owner, reasonable opportunity for the installation of Work and the storage of materials.
- G. Contractor warrants to Owner that the materials and equipment furnished for the Work will be new unless otherwise specified by the Contract Documents, and that the Work will be free from defects, and will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective in the discretion of Owner. If required by Consultant, Contractor will furnish satisfactory evidence as to the kind and quality of the materials and equipment used in performing the Work.
- H. Owner may elect to purchase materials required for the Work. In that event, Contractor will comply with the procedures set forth in the Contract Documents relating to such materials.

### **3.4 COMPLIANCE WITH LAWS**

Contractor will comply with all applicable laws, ordinances, rules, regulations, and orders of any public authorities relating to performance of the Work.

### **3.5 TAXES**

- A. Contractor will pay all sales, use, consumer, payroll, workers compensation, unemployment, old age pension, surtax, and similar taxes assessed in connection with the performance of the Work.
- B. Owner will pay all taxes and assessments on the real property comprising the Project site.

### **3.6 PERMITS AND FEES**

- A. Owner will obtain and pay for all zoning and use permits and permanent easements necessary for completion of the Work.
- B. Contractor will obtain and pay for the building permit, and all other permits, governmental fees, licenses and inspections necessary for the proper execution and completion of the Work.
- C. Contractor will secure any certificates of inspection and of occupancy required by authorities having jurisdiction over the Work. Contractor will deliver these certificates to Consultant prior to issuance of the Certificate of Substantial Performance by

Consultant.

### **3.7 CONTRACTOR'S ON-SITE REPRESENTATIVE**

Contractor will employ a competent representative acceptable to Owner to supervise the performance of the Work. This representative will be designated in writing by Contractor prior to commencement of work and will not be changed prior to Final Inspection of the Work without prior written consent of Owner. This representative will represent Contractor for all purposes, including communication with Owner.

### **3.8 CONTRACTOR'S CONSTRUCTION SCHEDULES**

- A. Contractor will prepare and submit for Owner's and Consultant's information Contractor's construction schedule for the Work in accordance with the requirements of the Contract Documents.
- B. Contractor will prepare and maintain a Submittal schedule which is coordinated with Contractor's construction schedule and sets forth specified times for Consultant to review Submittals.

### **3.9 DOCUMENTS AND SUBMITTALS AT THE SITE**

Contractor will keep at the Project site for use by Owner, Consultant, or their representatives, a record copy of the Project Manual, the Drawings, all Addenda, and all Modifications. These documents will be maintained in good order and currently marked to record changes and selections made during construction. In addition, Contractor will keep at the Project site one copy of all Submittals.

### **3.10 SUBMITTALS**

- A. Submittals are not Contract Documents and do not alter the requirements of the Contract Documents unless incorporated into the Contract Documents by a Modification.
- B. Contractor will review, approve, and submit to Consultant Submittals in accordance with the Contract Documents. By approving Submittals, Contractor represents that it has determined and verified field measurements, field construction criteria, materials, catalog numbers, and similar data, and that it has checked and coordinated each Submittal with the requirements of the Work and of the Contract Documents or will make such determination, verification, check, and coordination prior to commencing the relevant portion of the Work. In reviewing Submittals Consultant will be entitled to rely upon Contractor's representation that such information is correct and accurate.
- C. Contractor will inform Consultant in writing at the time of submission of any Submittal or portion thereof which deviates from the requirements of the Contract Documents. Contractor will provide Consultant with documentation demonstrating to Consultant that the Submittal is equal to or better than the specified product or work. Contractor will not be relieved of responsibility for deviations from the requirements of the Contract Documents by Consultant's acceptance of a Submittal unless Contractor has informed Consultant in writing of the deviation and Consultant has incorporated the deviation into the Contract Documents by a Modification.
- D. Contractor will not perform any portions of the Work requiring Submittals until the respective Submittal has been reviewed and accepted in writing by Consultant.
- E. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, Owner will be entitled to rely upon such certifications, and neither Owner nor Consultant will be expected to make any independent examination with respect thereto.
- F. Submittals not required by the Contract Documents may be returned to Contractor without action.

### **3.11 CUTTING AND PATCHING**

Contractor will be responsible for any cutting, fitting, and patching that may be required to complete the Work and make its parts fit together properly.

### **3.12 ACCESS TO WORK**

Contractor will permit Owner and Consultant, their respective representatives and subconsultants, access to the Work wherever located at any time.

### **3.13 ROYALTIES AND PATENTS**

Contractor will pay all royalties and license fees required by the Work or by Contractor's chosen method of performing the Work. Contractor will defend and hold Owner harmless from all suits or claims for infringement of any patent, license or other intellectual property rights or any loss on account thereof.

### **3.14 INDEMNIFICATION**

- A. Contractor will indemnify and hold harmless Owner, its representatives, employees, agents, architects, and consultants from and against any and all claims, damages, liability, demands, costs, judgments, awards, settlements, causes of action, losses and expenses (collectively "Claims" or "Claim"), including but not limited to legal fees (on a solicitor and his own client basis), consultant fees, expert fees, copy costs, and other expenses, arising out of or resulting from performance of the Work, attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of real or personal property, including loss of use resulting therefrom, except to the extent that such liability arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity includes, without limitation, indemnification of Owner from all losses or injury to Owner's property,



except to the extent that such loss or injury arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity applies, without limitation, to include Claims occurring both during performance of the Work and/or subsequent to completion of the Work. In the event that any Claim is caused in part by a party indemnified hereunder, that party will bear the cost of such Claim to the extent it was the cause thereof. In the event that a claimant asserts a Claim for recovery against any party indemnified hereunder, the party indemnified hereunder may tender the defense of such Claim to Contractor. If Contractor rejects such tender of defense and it is later determined that the negligence of the party indemnified hereunder did not cause all of the Claim, Contractor will reimburse the party indemnified hereunder for all costs and expenses incurred by that party in defending against the Claim. Contractor will not be liable hereunder to indemnify any party for damages resulting from the sole negligence of that party.

- B. In addition to the foregoing, Contractor will be liable to defend Owner in any lawsuit filed by any Subcontractor relating to the Project. Where liens have been filed against Owner's property, Contractor (and/or its bonding company which has issued bonds for the Project) will obtain lien releases and record them in the appropriate provincial and/or local jurisdiction and provide Owner with a title free and clear from any liens of Subcontractors. In the event that Contractor and/or its bonding company are unable to obtain a lien release, Owner in its absolute discretion may require Contractor to provide a bond around the lien or a bond to discharge the lien at Contractor's sole expense.
- C. In addition to the foregoing, Contractor will indemnify and hold Owner harmless from any claim of any other contractor resulting from the performance, nonperformance or delay in performance of the Work by Contractor.
- D. The indemnification obligation herein will not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or a Subcontractor under worker's compensation acts, disability benefit acts, or other employee benefit acts.

### **3.15 PROJECT MEETINGS**

Contractor will attend and participate in meetings as required by the Contract Documents.

## **SECTION 4 - ADMINISTRATION OF THE CONTRACT**

### **4.1 CONSULTANT**

In the event that Owner terminates its contractual relationship with Consultant, Owner will appoint in writing another Consultant, whose status under the Contract Documents will be that of the former Consultant in all respects.

### **4.2 CONSULTANT'S ADMINISTRATION OF THE CONTRACT**

- A. Consultant will make periodic visits to the site to familiarize itself generally with the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents. Although Consultant is required to make periodic inspections, it is not required to make exhaustive or continuous onsite inspections. On the basis of its observations while at the site, Consultant will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defects and deficiencies in the Work. Consultant's failure to observe a defect or deficiency in the Work will not relieve Contractor of its duty to perform the Work in accordance with the Contract Documents.
- B. Consultant will review Contractor's payment requests and determine the amounts due Contractor in accordance with Section 9.
- C. Communications between Contractor and Owner relating to the Work will be through Consultant. Communications between Owner or Contractor with Consultant's subconsultants relating to the Work will be through Consultant. Communications between Owner or Consultant and subcontractors relating to the Work will be through Contractor. Communications between Contractor and any separate contractor will be through Consultant, except as otherwise specified in the Contract Documents.
- D. Owner and/or Consultant will have the right to reject and require removal of the following at Contractor's expense:
  - 1. Any portion of the Work that does not meet the requirements of the Contract Documents.
  - 2. Any portion of the Work damaged or rendered unsuitable during installation or resulting from failure to exercise proper protection.
- E. Consultant will have authority to suspend the Work, with concurrence of Owner, whenever such suspension may be necessary in its reasonable opinion to insure the proper performance of the Work.
- F. Consultant will review Contractor's Submittals and will accept or take other appropriate action regarding the Submittals. Consultant's review of the Submittals will be for the limited purpose of checking for general conformance with the Contract Documents and will not be conducted for the purpose of determining the accuracy and completeness of details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor. Consultant's review of Submittals will not relieve Contractor of its obligations under the Contract Documents. Consultant's review of Submittals will not constitute acceptance of safety precautions or construction means, methods, techniques, sequences or procedures. Consultant's acceptance of a specific item will not indicate acceptance of an assembly of which the item is a component.
- G. Consultant has authority to order Construction Change Directives and Field Changes in accordance with Section 7.
- H. Consultant will conduct inspections to determine the dates of Substantial Performance and final completion, will receive and review written guarantees and related documents required by the Contract and assembled by Contractor, and will review and certify or reject Contractor's final payment request.

- I. Consultant will be the interpreter of the performance and requirements of the Contract Documents. Consultant's interpretations will be in writing or in the form of drawings.
- J. Consultant's decisions in matters relating to aesthetic effect will be final if consistent with the Contract Documents and approved by Owner.

## **SECTION 5 - SUBCONTRACTORS**

### **5.1 AWARD OF SUBCONTRACTS FOR PORTIONS OF THE WORK**

- A. Contractor will enter into contracts with Subcontractors to perform all portions of the Work that Contractor does not customarily perform with its own employees.
- B. Contractor will not contract with any Subcontractor who has been rejected by Owner. Contractor will not be required to contract with any Subcontractor against whom it has a reasonable objection.
- C. If Owner rejects any Subcontractor proposed by Contractor, Contractor will propose an acceptable substitute to whom Owner has no reasonable objection.
- D. Contractor will not make any substitution for any Subcontractor that has been accepted by Owner and Consultant without the prior written approval of Owner and Consultant.

### **5.2 SUBCONTRACTUAL RELATIONS**

- A. Contractor's responsibility for the Work includes the labour and materials of all Subcontractors, including those recommended or approved by Owner. Contractor will be responsible to Owner for proper completion and guarantee of all workmanship and materials under any subcontracts. Any warranties required for such work will be obtained by Contractor in favor of Owner and delivered to Consultant. It is expressly understood and agreed that there is no contractual relationship between Owner with any Subcontractor, and under no circumstances will Owner be responsible for the non-performance or financial failure of any Subcontractor or any effects therefrom.
- B. Contractor agrees to pay the Subcontractors promptly upon receipt of payment from Owner for that portion of the funds received which represents the Subcontractor's portion of the Work completed to Contractor's satisfaction for which Owner has made payment.
- C. Contractor will require each Subcontractor to:
  - 1. Be licensed by the province in which the Project is located where such licensing is required by the governing authority;
  - 2. Be bound by the terms of the Contract Documents as far as they are applicable to the Subcontractor's work;
  - 3. Assume toward Contractor the same obligations Contractor has assumed toward Owner, including the prompt payment of its Subcontractors;
  - 4. Submit its applications for payment to Contractor in time to permit Contractor to make timely application to Owner;
  - 5. Execute claim or lien releases or lien waivers for payments made by Contractor; and
  - 6. Make all claims for Changes in the Work to Contractor in the same manner as Contractor is required to make such claims to Owner.

## **SECTION 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

### **6.1 OWNER'S RIGHT TO PERFORM WORK OR AWARD SEPARATE CONTRACTS**

- A. Owner reserves the right to perform work itself or to award separate contracts in connection with the Project.
- B. When separate contracts are awarded, "Contractor" in the Contract Documents in each case will mean the contractor who signs each separate contract.

### **6.2 MUTUAL RESPONSIBILITY**

- A. Contractor will afford other contractors reasonable opportunity to place and store their materials and equipment on site and to perform their work and will properly connect and coordinate its Work with theirs where applicable.
- B. If any part of Contractor's Work depends upon the work of any separate contractor for proper performance or results, Contractor will inspect and promptly report to Consultant any apparent discrepancies or defects in such work that render it unsuitable for proper performance and results. Failure of Contractor to so inspect and report will constitute an acceptance of the work of the separate contractor as fit and proper to receive Contractor's Work, except as to defects not then reasonably discoverable.
- C. Contractor will promptly remedy damage caused by Contractor or any Subcontractor to the completed or partially completed work of other contractors or to the property of Owner or of other contractors.

### **6.3 OWNER'S RIGHT TO CLEAN UP**

If a dispute arises among Contractor and separate contractors as to the responsibility under their separate contracts for maintaining the Project free from waste materials and rubbish, Owner may clean the Project, allocate the cost among those responsible as Owner and Consultant determine to be just, and withhold such cost from any amounts due or to become due to Contractor.

## **SECTION 7 - CHANGES IN THE WORK**

### **7.1 CHANGES IN THE WORK RESULTING FROM AN INSTRUCTION BY OWNER OR CONSULTANT TO CONTRACTOR**

- A. If Owner or Consultant gives Contractor an instruction that modifies the requirements of the Contract Documents or delays Substantial Performance, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If compliance with the instruction affects the cost to Contractor to perform the Work, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in cost subject to the conditions set forth in Section 7.1, Paragraphs B through G. If compliance with the instruction delays Substantial Performance, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in Section 7.1, Paragraphs B through G and Section 7.3, Paragraph A and Contractor will be paid liquidated damages for the delay as set forth in Section 7.3, Paragraph B.
- B. If Contractor receives an instruction from Owner or Consultant that Contractor considers to be a Change in the Work, Contractor, before complying with the instruction, will notify Consultant in writing that Contractor considers such instruction to constitute a Change in the Work. If Consultant agrees that compliance with the instruction will constitute a Change in the Work, Contractor will furnish a proposal for a Modification in accordance with Section 7.1, Paragraphs C. and D. within ten (10) days.
- C. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) as a result of an instruction by Owner or Consultant, Contractor will furnish a proposal for a Change Order containing a price breakdown itemized as required by Owner. The breakdown will be in sufficient detail to allow Owner to determine any increase or decrease in Direct Costs as a result of compliance with the instruction. Any amount claimed for subcontracts will be supported by a similar price breakdown and will itemize the Subcontractor's profit and overhead charges. Profit and overhead will be subject to the following limitations:
  - 1. The Subcontractor's profit and overhead will not exceed ten (10) percent of its Direct Costs on work performed. Subcontractor's profit and overhead will not exceed five (5) percent on work performed by its sub-subcontractors.
  - 2. Contractor's profit and overhead on work performed by its own crews will not exceed ten (10) percent of its Direct Costs.
  - 3. Contractor's profit and overhead mark up on work performed by its Subcontractors will not exceed five (5) percent of the Subcontractors' charges for such work.
  - 4. Amounts due Owner as a result of a credit change will be the actual net savings to Contractor from the Change in the Work as confirmed by Consultant. On credit changes, profit and overhead on the originally estimated work will not be credited back to Owner. If both additions and credits are involved in a single Change in the Work, overhead and profit will be figured on the basis of net increase, if any, related to that Change in the Work.
- D. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an instruction from Owner or Consultant, Contractor will include in its proposal justification to support Contractor's claim that compliance with the instruction will delay Substantial Performance.
- E. Upon receipt of Contractor's proposal for Modification, Consultant and Owner will determine whether to proceed with the Change in the Work. If Consultant and Owner determine to proceed with the Change in the Work, they will issue a Change Order, a Construction Change Directive or a Field Change as appropriate.
- F. Contractor agrees that if it complies with an instruction from Owner or Consultant without first giving written notice to Consultant as provided in Section 7.1., Paragraph B, and receiving a Change Order, Construction Change Directive or Field Change, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.
- G. If Contractor is instructed to perform work which it claims constitutes a Change in the Work but which Owner and Consultant do not agree constitutes a Change in the Work, Contractor will comply with the instruction. Contractor may submit its claim for adjustment to the Contract Sum, the Contract Time, or both as a dispute pursuant to Section 13 within thirty (30) days after compliance with the instruction. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 13 within thirty (30) days after compliance with the instruction, then Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.
- H. Contractor agrees that it is responsible for submitting accurate cost and pricing data to support its Change Order Proposals. Owner will have the right to examine the Contractor's records to verify the accuracy and appropriateness of the pricing data used to price change order proposals.

### **7.2 CHANGE IN THE WORK RESULTING FROM AN EVENT OR CIRCUMSTANCE**

- A. If an event or circumstance other than an instruction from Owner or Consultant affects the cost to Contractor of performing the Work or delays Substantial Performance, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If the circumstance or event affects the cost to Contractor to perform the Work and is caused by a willful or negligent act or omission of Owner or Consultant, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in Contractor's cost to perform the Work resulting from the event or circumstance, subject to the conditions set forth in Section 7.2, Paragraphs B through F. If the event or circumstance delays Substantial Performance and is described in Section 7.3, Paragraph A, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in such section. If the circumstance or event delays Substantial Performance and is caused by a willful or negligent act or omission of Owner or Consultant, then Contractor will be compensated for costs incident to the delay in accordance with Section 7.3, Paragraph B. Contractor will not be entitled to any adjustment to the Contract Sum or other damages from Owner as a result of any event or circumstance unless the event or circumstance results from a willful or negligent act or omission of Owner or Consultant.
- B. If a Change in the Work results from any event or circumstance caused by the willful or negligent act or omission of Owner or Consultant, Contractor will give Owner Written Notice of such event or circumstance within twenty-four (24) hours after commencement of the event or circumstance so that Owner can take such action as is necessary to mitigate the effect of the

event or circumstance. Contractor will not be entitled to any adjustment in either the Contract Time or the Contract Sum based on any damages or delays resulting from such event or circumstance during a period more than twenty-four (24) hours prior to Contractor giving such Written Notice to Owner.

- C. Contractor will submit in writing any claims for an adjustment in the Contract Time and/or the Contract Sum resulting from an event or circumstance within the time limits set forth below. In the event that Contractor fails to submit its claim in writing within the time limits set forth below, then Contractor agrees it will not be entitled to any adjustment in the Contract Time or the Contract Sum or to any other damages from Owner due to the circumstance or event and waives any claim therefor.
  - 1. Claims for an adjustment in the Contract Time due to Adverse Weather will be made by the tenth (10th) of the month following the month in which the delay occurred.
  - 2. Claims for an adjustment in the Contract Time and/or the Contract Sum due to any other circumstance or event will be submitted within seven (7) days after the occurrence of the circumstance or event.
- D. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) because of an event or circumstance resulting from the willful or negligent act or omission of Owner or Consultant, Contractor will furnish a proposal for a Change Order containing a price breakdown as described in Section 7.1, Paragraph C. Any amount claimed for increased labour costs as a result of the event or circumstance must be supported by a certified payroll. Any claim for rented equipment or additional material costs must be supported by invoices.
- E. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an event or circumstance, Contractor will include with its claim copies of daily logs, letters, shipping orders, delivery tickets, Project schedules, and other supporting information necessary to justify Contractor's claim that the event or circumstance delayed Substantial Performance. If Contractor is entitled to an adjustment in the Contract Time as a result of an event or circumstance caused by the willful or negligent act or omission of Owner or Consultant, Contractor will be compensated for all costs related to the delay in accordance with Section 7.3, Paragraph B.
- F. Within thirty (30) days after receipt of Contractor's claim, Consultant will either deny the claim or recommend approval to Owner. If Owner approves the claim, the adjustment in the Contract Time and/or Contract Sum will be reflected in a Change Order pursuant to Section 7.5 or a Construction Change Directive pursuant to Section 7.6. If Owner or Consultant denies Contractor's claim, Contractor may submit its claim as a dispute pursuant to Section 13 within thirty (30) days of receipt of the denial of the claim. If Contractor fails to submit its claim for resolution pursuant to Section 13 within the thirty (30) day time period, then Contractor agrees it is not entitled to any adjustment in the Contract Time and/ or Contract Sum or any other damages as a result of the event or circumstance and waives any claim therefor.

### **7.3 EXTENSIONS OF TIME**

- A. If Substantial Performance of the Project is delayed because of any of the following causes, then the Contract Time will be extended by Change Order for a period of time equal to such delay:
  - 1. Labour strikes or lock-outs;
  - 2. Adverse Weather;
  - 3. Unusual delay in transportation;
  - 4. Unforeseen governmental requests or requirements;
  - 5. A Change in the Work resulting from an instruction by Owner or Consultant to Contractor subject to the conditions set forth in Section 7.1.; or
  - 6. Any other event or circumstance caused by the willful or negligent act or omission of Owner or Consultant.
- B. Contractor will not be entitled to any compensation for delay described in Section 7.3, Paragraph A, subparagraphs 1, 2, 3 and 4. For each day of delay in Substantial Performance described in Section 7.3, Paragraph A, subparagraphs 5 and 6, Contractor will be paid liquidated damages in the amount per day set forth in the Supplementary Conditions to compensate Contractor for all damages resulting from any delay including but not limited to damages for general conditions costs, additional job site costs, additional home office overhead costs, disruption costs, acceleration costs, increase in labour costs, increase in subcontract costs, increase in materials costs, and any other costs incident to the delay. Contractor will be entitled to no other compensation relating to the delay.
- C. In no event will any time extension or cost adjustment be given on account of delay which reasonably should have been anticipated by the Contractor or in circumstances where performance of the Work is, was, or would have been, delayed by any other cause for which the Contractor is not entitled to an extension.

### **7.4 DOCUMENTATION OF CHANGES IN THE WORK**

Every Change in the Work will be documented by a Change Order, a Construction Change Directive or a Field Change. If Owner, Consultant and Contractor reach agreement regarding the adjustment in the Contract Sum, if any, and the adjustment in the Contract Time, if any, resulting from a Change in the Work, then the parties will execute a Change Order pursuant to Section 7.5. If Owner, Consultant and Contractor cannot reach agreement regarding the adjustment in Contract Sum or the adjustment in Contract Time resulting from a Change in the Work, then Owner and Consultant will issue a Construction Change Directive pursuant to Section 7.6. Field Changes require the agreement of Consultant and Contractor only.

### **7.5 CHANGE ORDERS**

Contractor's signature upon a Change Order is Contractor's acknowledgment that it is not entitled to any additional adjustment in the Contract Sum or the Contract Time or any other damages or compensation as a result of the Change in the Work other than that provided for in the Change Order, irrespective of whether a subsequent claim for additional compensation or time extensions relating to the Change in the Work is described as a change in the requirements of the Contract Documents, a delay, a disruption of the Work, an acceleration of the Work, an impact on the efficiency of performance of the Work, an equitable adjustment, or other claim and irrespective of whether the impact of the Change in the Work is considered singly or in conjunction with the impact of other Changes in the Work.

## **7.6 CONSTRUCTION CHANGE DIRECTIVES**

- A. Contractor will promptly comply with all Construction Change Directives.
- B. Pending final resolution of any adjustment in the Contract Sum or Contract Time relating to a Construction Change Directive, the amounts proposed by Owner in the Construction Change Directive may be included in Contractor's payment requests once the work relating thereto is completed.
- C. If after the work described in the Construction Change Directive is completed, Owner, Consultant, and Contractor reach agreement on adjustments in the Contract Sum, Contract Time, or both, such agreement will be reflected in an appropriate Change Order.
- D. If the parties do not reach agreement regarding an adjustment to the Contract Sum, Contract Time, or both relating to the Construction Change Directive within thirty (30) days of the completion of the work described therein, then Contractor may submit its claim for an adjustment pursuant to Section 13 within thirty (30) days of the completion of such work. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 13 within thirty (30) days of completion of the work described in the Construction Change Directive, then it will not be entitled to an adjustment in Contract Sum or Contract Time resulting from such work except as set forth in the Construction Change Directive and waives any claim therefor.

## **7.7 FIELD CHANGES**

Consultant and Contractor will sign a Field Change order listing the Change In The Work and the Contract Sum including markups before Contractor proceeds with the Field Change.

## **7.8 WAIVER OF CLAIMS**

Except as set forth in Section 7, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time or for any damages of any kind whatsoever resulting from an instruction from Owner or Consultant, any event or circumstance, or any act or omission of Owner or Consultant and Contractor expressly waives any and all claims therefor.

## **SECTION 8 - TIME**

### **8.1 TIME IS OF THE ESSENCE**

All time limits stated in the Contract Documents are of the essence. By executing the Agreement, Contractor confirms that the Contract Time is a reasonable period for performing the Work. Contractor will proceed expeditiously with adequate resources and will achieve Substantial Performance within the Contract Time.

### **8.2 COMMENCEMENT OF THE WORK**

Contractor will not commence work on the Project site until the date set forth in the Written Notice to proceed. However, Contractor may enter into subcontracts and secure material for the Project after receipt of the Agreement with Owner's authorized signature. Owner will issue the Written Notice to proceed within forty-five (45) days after Owner receives acceptable bonds and evidence of insurance pursuant to Section 11 unless Owner earlier terminates the Agreement pursuant to Section 14.

### **8.3 DELAY IN COMPLETION OF THE WORK**

- A. For each day after the expiration of the Contract Time that Contractor has not achieved Substantial Performance, Contractor will pay Owner the amount set forth in the Supplementary Conditions as liquidated damages for Owner's loss of use of the Project and the added administrative expense to Owner to administer the Project during the period of delay. In addition, Contractor will reimburse Owner for any additional Consultant's fees, expert fees, legal fees (on a solicitor and his own client basis), copy costs, and other expenses incurred by Owner as a result of the delay. Owner may deduct any liquidated damages or reimbursable expenses from any money due or to become due to Contractor. If the amount of liquidated damages and reimbursable expenses exceeds any amounts due to Contractor, Contractor will pay the difference to Owner within ten (10) days after receipt of a written request from Owner for payment.
- B. At the time Consultant certifies that Contractor has achieved Substantial Performance, Consultant will identify the remaining items to be completed for final completion of the Work and will establish with Contractor a reasonable time for completion of those items. Consultant will set forth the items to be completed and the time established for their completion in a Certificate of Substantial Performance. For each day that Contractor exceeds the time allowed for completion of the items set forth in the Certificate of Substantial Performance, Contractor will pay to Owner as liquidated damages for additional administrative expenses the amount set forth in the Supplementary Conditions. In addition, Contractor will reimburse Owner for any additional Consultant's fees, expert fees, legal fees (on a solicitor and his own client basis), copy costs, and other expenses incurred by Owner as a result of the delay in completing such items.

## **SECTION 9 - PAYMENTS AND COMPLETION**

### **9.1 SCHEDULE OF VALUES**

Contractor will submit to Consultant a schedule of values which allocates the Contract Sum to various portions of the Work. The schedule of values will be supported by such data to substantiate its accuracy as required by Consultant. This schedule, when accepted by Owner and Consultant, will be used as a basis for reviewing Contractor's payment requests.

## 9.2 PAYMENT REQUESTS

- A. Not more than once a month, Contractor will submit a payment request to Consultant for the Work completed, materials stored on the site, and for materials stored offsite as of the date of the payment request.
  - 1. The amount of the payment request will be based upon the schedule of values and will be equal to the value of the Work completed:
    - a. Less retention amounts specified in Supplementary Conditions;
    - b. Less all prior amounts paid by Owner to Contractor as part of the Contract Sum; and
    - c. Less allowable offsets.
  - 2. The payment request may include Changes in the Work that have been performed by Contractor and authorized by Owner and/or Consultant pursuant to Section 7.
  - 3. If a payment request includes materials stored offsite, Contractor will include with the payment request a list of the materials, the location where they are stored and the written request of Contractor and its performance bond surety that payment be made for such materials.
  - 4. Each payment request will separately itemize GST or, where applicable, HST.
- B. Contractor warrants and guarantees that upon the receipt of payment for materials and equipment, whether incorporated in the Project or not, title to such materials and equipment will pass to Owner free and clear of all liens, claims, security interests, or encumbrances. Notwithstanding this payment and passage of title, Contractor will remain responsible for all such materials and equipment until actual delivery to the project site, incorporation into the Work, and final acceptance by Owner. Contractor further warrants that no material or equipment covered by a payment request is subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or any other person or entity.

## 9.3 PAYMENT REQUEST CERTIFICATION

- A. Consultant will, within seven (7) days after receipt of Contractor's payment request, forward to Owner the payment request certified for such amount as Consultant determines is properly due. If Consultant certifies less than the full amount of the payment request, Consultant will notify Contractor and Owner of Consultant's reasons for withholding certification of the full amount requested.
- B. The certification of the payment request will constitute a representation by Consultant to Owner based upon Consultant's observations at the site and the data comprising the payment request, that the Work has progressed to the point indicated and that, to the best of Consultant's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Performance, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion, and to specific qualifications expressed by Consultant. However, the certification of the payment request will not constitute a representation that Consultant has:
  - 1. Conducted exhaustive or continuous on-site inspections to check the quantity or quality of the Work;
  - 2. Reviewed construction means, methods, techniques, sequences, or procedures;
  - 3. Reviewed copies of requisitions received from Subcontractors or other data requested by Owner to substantiate Contractor's right to payment; or
  - 4. Made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Sum.
- C. In taking action on Contractor's payment request, Owner will be entitled to rely on the accuracy and completeness of the information furnished by Contractor.

## 9.4 DECISIONS TO WITHHOLD CERTIFICATION AND PAYMENT

- A. Consultant may withhold certification of a payment request in whole or in part to the extent reasonably necessary to protect Owner if, in the opinion of Consultant, the representations to Owner required by Section 9.3, Paragraph B cannot be accurately made. If Consultant is unable to certify payment in the amount of the payment request, Consultant will notify Contractor and Owner as provided in Section 9.3, Paragraph A. If Contractor and Consultant cannot agree on a revised amount, Consultant will promptly certify a payment request for the amount for which Consultant is able to make such representations to Owner. Consultant may also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a payment request previously certified, to such extent as may be necessary in Consultant's opinion to protect Owner from loss because of:
  - 1. Defective work not remedied;
  - 2. Third-party claims filed or reasonable evidence indicating probable filing of such claims;
  - 3. Failure of Contractor to make payments properly to Subcontractors for labour, materials, equipment, construction or services;
  - 4. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
  - 5. Damage to Owner or another contractor for which Contractor is responsible;
  - 6. Reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance will not be adequate to cover the cost of completing the Work and damages for the anticipated delay; or
  - 7. Contractor's persistent failure to carry out the Work in accordance with the Contract Documents.
- B. Owner reserves the right to withhold payments to Contractor, subsequent to Consultant's certification of any payment request, in order to protect Owner from loss due to any condition described in Section 9.4, Paragraph A, Subparagraphs 1 through 7. Upon satisfactory resolution of any such conditions, payments so withheld will be made.

## 9.5 PROGRESS PAYMENTS

- A. Owner will pay Contractor progress payments within the parameters of Section 9.2 within fifteen (15) days after Owner receives:
  - 1. Contractor's payment request, certified by Consultant, for work to date;
  - 2. up to date evidence of compliance with applicable workers compensation legislation and as required herein and a statement

from the provincial authority administering workers compensation authorizing payment and release of the requested funds;  
and

3. Statutory Declarations on Forms CCDC 9A and/or 9B (2001), as applicable, by Contractor and its subcontractors. Owner will make payments to Contractor by either placing the payments in the mail addressed to Contractor or by electronic transfer at Owner's discretion.

- B. Upon receipt of any payment from Owner, Contractor will pay to each Subcontractor the amount paid to Contractor on account of such Subcontractor's portion of the Work.
- C. Contractor will maintain a copy of each payment request at the Project site for review by the Subcontractors.
- D. No payment made under the Contract Documents, either in whole or in part, will be construed to be an acceptance of defective or improper materials or workmanship.
- E. In addition and notwithstanding the foregoing, Owner will also withhold and retain 10% of payments made to Contractor.
- F. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within forty-five (45) days after Contractor achieves Substantial Performance, submits its payment request for retained funds, delivers to the Consultant Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

## **9.6 FINAL PAYMENT**

- A. Owner will make full and final payment of the Contract Sum within thirty (30) days of the completion of all of the following requirements:
  - 1. Contractor has submitted its final payment request;
  - 2. Contractor has provided proof of clear title issued after expiration of the time within which liens may be asserted;
  - 3. Contractor has provided up to date evidence of compliance with applicable workers compensation legislation and as required herein throughout the duration of the Project and has provided a statement from the provincial authority administering workers compensation authorizing payment and release of the requested funds;
  - 4. Contractor and its subcontractors have submitted Statutory Declarations on Forms CCDC 9A and/or 9B (2001), as applicable;
  - 5. Contractor has submitted a Final Payment Affidavit and Consent of Surety;
  - 6. The time for retaining hold back funds under applicable law has expired;
  - 7. Contractor has collected and provided to Owner all manufacturers' and other guaranties and warranties, properly signed and endorsed to Owner, that are required by the Contract Documents that extend for a period beyond one year after substantial completion. (Delivery of such guaranties and warranties will not relieve Contractor for any obligation assumed under any other provision of the Contract Documents); and
  - 8. Consultant has declared to Owner in writing that the Work is complete and has certified Contractor's final payment request.
- B. Acceptance of final payment by Contractor or any Subcontractor will constitute a waiver of claims by the payee except for those claims previously made in writing pursuant to Section 7 and identified by Contractor in its affidavit as still pending.
- C. If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner.

## **SECTION 10 - PROTECTION OF PERSONS AND PROPERTY**

### **10.1 SAFETY PRECAUTIONS AND PROGRAMS**

Contractor will be responsible to Owner for initiating and supervising all safety programs in connection with the performance of the Work.

### **10.2 SAFETY OF PERSONS AND PROPERTY**

- A. Contractor will take reasonable precautions to prevent damage, injury, or loss to:
  - 1. All persons on the site;
  - 2. The Work and materials and equipment to be incorporated into the Work; and
  - 3. Other property at the site or adjacent to it.
- B. Contractor will give notices and comply with applicable laws, ordinances, rules, regulations, and other lawful requirements of public authorities bearing on the safety or protection of persons and property. No work will be performed that may pose an undue safety hazard to Contractor, Contractor's employees, or any other person.
- C. Contractor will designate a responsible member of its organization at the site whose duty will be the prevention of accidents. This person will be Contractor's onsite representative unless otherwise designated in writing by Contractor to Owner and Consultant.

### **10.3 EMERGENCIES**

In case of an emergency endangering life or threatening the safety of any person or property, Contractor may, without waiting for specific authorization from Consultant or Owner, act at its own discretion to safeguard persons or property. Contractor will immediately notify Consultant of such emergency action and make a full written report to Consultant within five (5) days after the event.

## 10.4 HAZARDOUS MATERIALS

In the event the Contractor encounters on the site material reasonably believed to be hazardous materials which have not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and Consultant in writing. The Work in the affected area shall be resumed in the absence of hazardous materials, or when it has been rendered harmless, by written agreement of the Owner and Contractor.

## SECTION 11 - INSURANCE AND BONDS

### 11.1 CONTRACTOR'S LIABILITY INSURANCE

- A. Contractor will obtain the following insurance and provide evidence thereof as described below prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier:
1. Workers Compensation Insurance for Contractor, including optional personal coverage, covering all persons of Contractor who may enter upon the Project and/or participate in the Work in any degree and/or provide materials or services relative thereto, including without limitation, partners, officers, directors, managers, owners, agents, employees, proprietors, and volunteers of Contractor. The Contractor will provide to Owner a "Certificate in good standing" from the Contractor's applicable Provincial Safety and Insurance Board. In addition, Contractor will ensure, and collect evidence thereof, that each Subcontractor obtains and maintains Workers Compensation Insurance for all persons of each Subcontractor.
  2. Commercial General Liability Insurance - The insurance coverage will not be less than the insurance required by IBC Form 2100, or its equivalent replacement, provided that IBC Form 2100 will contain the latest edition of the relevant Canadian Construction Documents Committee ("CCDC") endorsement form. To achieve the desired limit, umbrella or excess liability insurance may be used. The policy will provide primary coverage in the event of any Occurrence, Claim, or Suit, with:
    - a. Limits of the greater of: Contractor's actual coverage amounts or the following:
      - 1) CAD\$2,000,000 Aggregate - Products / Completed Operations;
      - 2) CAD\$1,000,000 Personal and Advertising Injury;
      - 3) CAD\$1,000,000 Per Occurrence;
      - 4) CAD\$50,000 Fire Damage (any one fire);
      - 5) CAD\$5,000 Medical Expense (any one person).
      - 6) CAD\$1,000,000 Non Owned Automobile.
    - b. Endorsements attached thereto including the following:
      - 1) describing the Agreement and specifying limits as shown above.
      - 2) adding Owner and Consultant as additional insureds.
  3. Automobile Liability Insurance, with: (1) combined single limit each accident or occurrence in the amount of CAD\$1,000,000 or Contractor's actual coverage, whichever is greater; and (2) coverage applying for bodily injury, death, and damage to property, and covering all licensed vehicles owned or leased by Contractor. Where the policy has been issued pursuant to a government operated automobile insurance system, Contractor will provide Owner with confirmation of automobile insurance coverage for all automobiles registered in the name of the Contractor.
  4. All risk contractor's equipment insurance covering construction machinery and equipment used by Contractor for the performance of the Work. This insurance will be in a form acceptable to Owner and will not allow subrogation claims by the insurer against Owner.
- B. Contractor will provide evidence of such insurance to Owner as follows:
1. Deliver to Owner a certificate of insurance, on CSIO form or equivalent:
    - a. Listing Owner and Consultant as additional insureds on general liability policies or excess policies;
    - b. Listing and attaching all endorsements set forth above;
    - c. Identifying the Project;
    - d. Attaching an endorsement which provides Owner not less than 30 days notice in writing in advance of any cancellation, change, or amendment restricting coverage;
    - e. Listing the insurance companies providing coverage. All companies must either (1) be included on the Office of the Superintendent of Financial Institutions - OSFI listing of Federally regulated Financial Institutions, or (2) be listed in AM Best's guide having a rating of B+ VII or better; and
    - f. Bearing the name, address, and telephone number of the producer and an original signature of the authorized representative of the producer.
- C. Contractor will maintain, from commencement of the Work, insurance coverage required in Section 11.1 as follows:
1. General liability and any excess liability policies through expiration of warranty period specified in Section 12.2, Paragraph B, including completion of any warranty repairs; and
  2. All other insurance through Final Payment.
- D. Owner reserves the right to reject any insurance company, policy, endorsement, or certificate of insurance with or without cause.
- E. The cost of insurance as required above will be the obligation of Contractor. Contractor will be responsible for payment of all deductible amounts under all insurance.
- F. Owner will provide builders risk insurance for the cost of the Project. The policy will be written on an all risk basis with coverage for perils of wind, flood, earthquake, and terrorism, with exclusions standard for the insurance industry. The policy will be subject to a CAD\$5,000 deductible per occurrence which will be the responsibility of Contractor and will not be a reimbursable expense. Owner will provide a copy of the terms and conditions of the builders risk policy to Contractor upon Contractor's request. Contractor will comply with terms, conditions, and deadlines of the builders risk policy. The terms, conditions, and deadlines of the builders risk policy shall govern coverage. In addition, when there is a loss which may be covered by the builders risk insurance policy, Contractor will comply with the following:
1. Contractor will report the loss immediately to builders risk commercial insurer by calling 1-866-537-7475 and shall make such further written submissions as required and otherwise comply with all requirements of the builders risk policy.



2. Contractor will report the loss immediately to the Owner.
3. Contractor will immediately notify its general liability insurance carrier of the loss.
4. Contractor will take all necessary and appropriate actions to protect the property and individuals from further loss, harm, and injury. In the event there are damages resulting from fire or water, restoration shall be performed only by a certified restoration contractor.
5. To the extent possible, Contractor will preserve and not disturb the evidence of the loss until after the builders risk commercial insurer and all interested parties and their insurance carriers have had the opportunity to view and investigate the site and loss.
6. Contractor will cooperate with Owner and the builders risk commercial insurer in the investigation, documentation, and settlement of loss claims, including without limitation promptly responding to all requests for information and documentation from the builders risk commercial insurer and/or Owner.

## **11.2 PERFORMANCE BOND AND LABOUR AND MATERIAL PAYMENT BOND**

- A. Prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier, Contractor will furnish to Owner a performance bond and a labour and material payment bond each in an amount equal to fifty percent (50%) of the Contract Sum, including applicable taxes, as security for all obligations arising under the Contract Documents. Such bonds will:
  1. Be written on forms in accordance with the latest edition of the Form CCDC 222 (1979) and Form CCDC 221 (1979);
  2. Be issued by a Canadian surety company or companies listed by the Treasury Board of Canada in Contracting Policy - Appendix L as approved for bonding purposes, licensed in the province in which the Project is located, and holding valid certificates of authority as acceptable sureties or reinsurance companies on provincial or federal bonds;
  3. Be issued in the names of the Owner; and
  4. Have proper corporate seals attached.
- B. Owner reserves the right to reject any surety company, performance bond, or labour and material payment bond with or without cause.
- C. The cost of the bonds as required above will be the obligation of Contractor.

## **SECTION 12 - UNCOVERING AND CORRECTION OF WORK**

### **12.1 UNCOVERING OF WORK**

Contractor will notify Consultant at least twenty-four (24) hours in advance of performing work that would cover up work or otherwise make it difficult to perform inspections required by the Specifications or by applicable governing authorities. Should any such work be covered without proper notification having been given to Consultant, Contractor will uncover that work for inspection at its own expense.

### **12.2 CORRECTION OF WORK**

- A. Contractor will promptly correct any portion of the Work that is rejected by Consultant or which fails to conform to the requirements of the Contract Documents, whether observed before or after Substantial Performance and whether or not fabricated, installed, or completed. Contractor will bear the cost of correcting such rejected Work, including additional testing and inspection costs, compensation for Consultant's services, and any other expenses made necessary thereby.
- B. Contractor will remedy any defects due to faulty materials, equipment, or workmanship which appear within a period of one (1) year from the date of Substantial Performance or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents. Contractor will pay all costs of correcting faulty work, including without limitation additional Consultant's fees, expert fees, legal fees (on a solicitor and his own client basis), copy costs, and other expenses when incurred.
- C. Nothing in the Contract Documents will be construed to establish a period of limitation within which Owner may enforce the obligation of Contractor to comply with the Contract Documents. The one year period specified above has no relationship to the time within which compliance with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish Contractor's liability with respect to Contractor's obligations.

### **12.3 ACCEPTANCE OF NONCONFORMING WORK**

- A. If Owner prefers to accept any portion of the Work not in conformance with the Contract Documents, Owner may do so instead of requiring removal and correction of the nonconforming Work. In that event, the Contract Sum will be reduced by an amount agreed upon by the parties which reflects the difference in value to Owner between the Work as specified and the nonconforming Work. Such adjustment may consider increased maintenance costs, early replacement costs, increased inefficiency of use, and the like and will be effective whether or not final payment has been made. Such adjustment will be reflected in a Change Order pursuant to Section 7.5.
- B. Temporary or trial usage by Owner or Consultant of mechanical devices, machinery, apparatus, equipment, or other work or materials supplied under the Contract Documents prior to written acceptance by Consultant, will not constitute Owner's acceptance.

## **SECTION 13 - RESOLUTION OF DISPUTES**

### **13.1 SUBMITTAL OF DISPUTE**

In the event there is any dispute arising under this Agreement which cannot be resolved by agreement between the parties, either party may submit the dispute with all documentation upon which it relies to the Director of Architecture, Engineering, and Construction, Meetinghouse Facilities Department, 50 East North Temple, Salt Lake City, Utah 84150 U.S.A., who will convene a dispute resolution conference within thirty (30) days. The dispute resolution conference will constitute settlement negotiations and any settlement proposal made pursuant to the conference will not be admissible as evidence of liability. In the event that the parties do not resolve their dispute pursuant to the dispute resolution conference, either party may commence legal action to resolve the dispute. Any such action must be commenced within six (6) months from the first day of the dispute resolution conference or be time barred. Submission of the dispute to the Director as outlined above is a condition precedent to the right to commence legal action to resolve any dispute. In the event that either party commences legal action to adjudicate any dispute without first submitting the dispute to the Director, the other party will be entitled to obtain an order dismissing the litigation without prejudice and awarding such other party any costs and expenses (including legal fees on a solicitor and his own client basis, consultant fees, expert fees, copy costs, and other expenses) incurred by that party in obtaining the dismissal.

### **13.2 CONTRACTOR TO PROCEED WITH DILIGENCE**

Pending final resolution of a dispute hereunder, Contractor will proceed diligently with the performance of its obligations under this Agreement.

## **SECTION 14 - TERMINATION**

### **14.1 TERMINATION BY CONTRACTOR**

In the event Owner materially breaches any term of the Contract Documents, Contractor will promptly give Written Notice of the breach to Owner. If Owner fails to cure the breach within ten (10) days of the Written Notice, Contractor may terminate the Agreement by giving Written Notice to Owner and recover from Owner the percentage of the Contract Sum represented by the Work completed on the Project site as of the date of termination together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation or damages as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor's indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

### **14.2 TERMINATION BY OWNER FOR CAUSE**

Should Contractor fail to provide Owner with the bonds and certificates of insurance required by Section 11 within the time specified therein, make a general assignment for the benefit of its creditors, fail to apply enough properly skilled workmen or specified materials to properly prosecute the Work in accordance with Contractor's schedule, or otherwise materially breach any provision of the Contract Documents, then Owner may, without any prejudice to any other right or remedy, give Contractor Written Notice thereof. If Contractor fails to cure its default within ten (10) days, Owner may terminate the Agreement by giving Written Notice to Contractor. In such case, Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor and/or take possession of the premises and all materials, tools, equipment, and appliances thereon, and finish the Work by whatever method Owner deems expedient. Contractor will not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds the expense of finishing the Work, including compensation for additional administrative, architectural, consultant, and legal services (including without limitation legal fees on a solicitor and his own client basis, expert fees, copy costs, and other expenses), such excess will be paid to Contractor. If such expense exceeds the unpaid balance, Contractor will pay the difference to Owner. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor's indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

### **14.3 TERMINATION BY OWNER FOR CONVENIENCE**

Notwithstanding any other provision contained in the Contract Documents, Owner may, without cause and in its absolute discretion, terminate the Agreement at any time. In the event of such termination, Contractor will be entitled to recover from Owner the percentage of the Contract Sum equal to the percentage of the Work which Consultant determines has been completed on the Project site as of the date of termination, together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor. Without limitation, Contractor's indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

## **SECTION 15 - MISCELLANEOUS PROVISIONS**

### **15.1 GOVERNING LAW**

The parties acknowledge that the Contract Documents have substantial connections to the province of Alberta. The Contract Documents will be deemed to have been made, executed, and delivered in the province of Alberta. To the maximum extent permitted by law, (i) the Contract Documents and all matters related to their creation and performance will be governed by and enforced in accordance with the laws of the province of Alberta, excluding conflicts of law rules; and (ii) all disputes arising from or related to the

Contract Documents will be decided only in a local court of Alberta and not in any other court, province, or territory. Toward that end, the parties hereby consent to the jurisdiction of the local courts of Alberta and waive any other venue to which they might be entitled by virtue of domicile, habitual residence, place of business, or otherwise.

#### **15.2 NO WAIVER**

No action or failure to act by Owner, Consultant, or Contractor will constitute a waiver of a right or duty afforded them under the Contract Documents, nor will such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

#### **15.3 RULE OF CONSTRUCTION**

Owner and Contractor agree that the Contract Documents will be deemed to have been drafted by both Owner and Contractor and will not be construed against either Owner or Contractor because of authorship.

#### **15.4 COSTS AND LEGAL FEES**

In the event either party commences legal action to enforce or rescind any term of the Contract Documents, the prevailing party will be entitled to recover its costs and expenses (including legal fees on a solicitor and his own client basis, consultant fees, expert fees, copy costs, and other expenses), incurred in that action and on all appeals, from the other party.

#### **15.5 TESTS AND INSPECTIONS**

- A. Owner and Consultant have the right to have tests made when they deem it necessary. Tests conducted by Owner or Consultant will be paid for by Owner. Should a test reveal a failure of the Work to meet Contract Document requirements, the cost of the test as well as subsequent tests related to the failure necessary to determine compliance with the Contract Documents will be paid for by Owner, with the cost thereof deducted from the Contract Sum by Modification.
- B. Tests will be made in accordance with recognized standards by a competent, independent testing laboratory. Materials found defective or not in conformity with Contract Document requirements will be promptly replaced or repaired at the expense of Contractor.
- C. Owner and Consultant have the right to obtain samples of materials to be used in the Work and to test samples for determining whether they meet Contract Document requirements. Samples required for testing will be furnished by Contractor and selected as directed by Consultant. Samples may be required from the sample's source, point of manufacture, point of delivery, or point of installation at Consultant's discretion. Samples not required as a Submittal in the Specifications will be paid for by Owner. Should tests reveal a failure of the Sample to meet the Contract Document requirements, Contractor will provide other Samples that comply with the requirements of the Contract Documents.

END OF DOCUMENT

# AGREEMENT BETWEEN OWNER AND CONTRACTOR

## FOR A FIXED SUM (Canada)

The Church of Jesus Christ of Latter-day Saints in Canada, an Alberta special act corporation ("Owner") and \_\_\_\_\_ ("Contractor") hereby enter into this *Agreement Between Owner and Contractor for a Fixed Sum (Canada)* ("Agreement") and agree as follows:

1. **Property/Project.**

Property/Project Number: SAMPLE  
Property Address ("Project Site"):  
Project Type:  
Project Name ("Project"):  
Stake Name:

2. **Scope of the Work.** Contractor will furnish all labour, materials, equipment, construction, and services necessary to complete the Work in accordance with the Contract Documents.

3. **Contract Documents.**

- a. The Contract Documents consist of:
  - 1) This Agreement;
  - 2) The General Conditions for a Fixed Sum (Canada), the Supplementary Conditions, and the Specifications (Divisions 01 through 49) contained in the Project Manual entitled \_\_\_\_\_, dated \_\_\_\_\_, and prepared by \_\_\_\_\_ ("Consultant");
  - 3) The Drawings prepared by Consultant entitled \_\_\_\_\_, sheet numbers \_\_\_\_\_, dated \_\_\_\_\_;
  - 4) Addendum No. \_\_\_\_\_ dated \_\_\_\_\_; and
  - 5) All Modifications to the Contract Documents.
- b. The Contract Documents are incorporated into this Agreement by reference as if fully set forth herein.
- c. The definitions set forth in the General Conditions for a Fixed Sum (Canada) will apply to the Contract Documents.
- d. The Contract Documents contain the entire and integrated agreement between the parties hereto and supersede all prior negotiations, representations, or agreements, either written or oral.
- e. Modifications or other amendments to the Contract Documents must be in writing and as provided in the General Conditions for a Fixed Sum (Canada).

4. **Time of Commencement and Substantial Performance.**

- a. Contractor will commence the Work on the date for commencement set forth in the Written Notice to proceed from Owner to Contractor.
- b. Contractor will achieve Substantial Performance and have the Work ready for Owner's inspection no later than \_\_\_\_\_ (\_\_\_\_\_) days from the date of commencement set forth in the Written Notice to proceed from Owner to Contractor, as adjusted in accordance with the Contract Documents.
- c. Time is of the essence.

5. **Contract Sum.**

- a. Owner will pay Contractor for performance of Contractor's obligations under the Contract Documents the Contract Sum in the amount of \_\_\_\_\_ Canadian Dollars (CAD \_\_\_\_\_) (plus GST or HST where imposed), subject to additions and deductions as provided in the Contract Documents.
- b. Owner will make payments to Contractor in accordance with the Contract Documents.

6. **Relationship of the Parties.** Contractor is an independent contractor and is not the agent or employee of Owner.

7. **Assignment.** Neither party to this Agreement will assign any right or obligation hereunder without the prior written consent of the other, which consent may be granted or withheld in such party's absolute discretion. Contractor will not assign moneys due or to become due to Contractor hereunder, nor will Contractor pledge the credit of Owner or bind Owner to any third party.

8. **Notice.** The parties designate the addresses, facsimile numbers, and email addresses as set forth in the signature blocks below to be used for sending Written Notice to the other party:
9. **Effective Date.** The effective date of this Agreement is the date indicated by the Owner's signature.
10. **English / French Contract Documents.** When any of the Contract Documents are prepared in both the English and French languages, it is agreed that in the event of any apparent discrepancy between the English and French versions, the English language version shall prevail. The Contract Documents are drawn in English by agreement and at the request of the parties. (Cette entente est rédigée en anglais à la demande de toutes les parties.)

**OWNER:**

The Church of Jesus Christ of Latter-day Saints in  
Canada, an Alberta special act corporation.

**CONTRACTOR:**

(company)

Signature:

Signature:

Print Name:

Print Name:

Title:

Title:

Address:

Address:

Telephone No:

Telephone No:

Facsimile No:

Facsimile No:

Email:

Email:

Effective Date:

GST / HST No:

License No:

Reviewed By:

Date Signed:

# **S P E C I F I C A T I O N S**

**BLANK PAGE**

# **SUPPLEMENTARY CONDITIONS**

## **FOR FIXED SUM (CANADA)**

---

### **ITEM 1 - GENERAL**

1. Conditions of the Contract apply to each Division of the Specifications.
2. Provisions contained in Division 01 apply to all Divisions of the Specifications.

### **ITEM 2 - LIQUIDATED DAMAGE AMOUNTS:**

1. The amount of liquidated damages to be paid to the Contractor for delays under General Conditions Section 7.3, Paragraph B is CAD\$190.00 per day.
2. The amount of liquidated damages to be deducted by Owner from final payment for delays in Substantial Performance of the Work under General Conditions Section 8.3, Paragraph A is CAD\$190.00 per day.
3. The amount of liquidated damages to be deducted by Owner from final payment for delays in completing work itemized on the Substantial Performance Certificate under General Conditions Section 8.3, Paragraph B is CAD\$115.00 per day.

### **ITEM 3 - PERMITS**

1. Section 3.6, Paragraph B – modify as follows: The Owner will obtain and pay for the Building Permit. The Contractor will obtain and pay for all other permits, government fees, licenses, inspections, and certifications as necessary for the proper execution and completion of the work.

### **ITEM 4 - PROVINCE SPECIFIC SUPPLEMENTARY CONDITIONS**

#### **British Columbia**

#### **RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN BRITISH COLUMBIA:**

*Replace Section 9.5.E and F with the following:*

- E In addition and notwithstanding the foregoing, Owner will also withhold and retain 10% of payments made to Contractor. These funds may be held in a separate account at a savings institution for the duration of the contract.
- F Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within fifty-five (55) days after Contractor achieves Substantial Performance, submits its payment request for retained funds, delivers to the Consultant Owner's form entitled "Contractor's Performance Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

#### **EARLY RELEASE OF RETENTION FUNDS FOR EARLY COMPLETING SUBCONTRACTORS ON PROJECTS IN BRITISH COLUMBIA:**

*Add the following to Section 9.5:*

- F. Owner may release to Contractor the proportionate share of retention funds relative to a subcontract which is completed prior to Contractor's completion of the Project within fifteen (15) days of Contractor's satisfaction of the following:
  1. Contractor has submitted a final payment request relative to the subcontract work and including a request for release of retention funds;
  2. A certificate of substantial performance has been properly issued, noticed, and delivered for the subcontract;
  3. A period of fifty-five (55) days has expired from the issuance and/or delivery of the



- certificate of substantial performance on the subcontract;
4. No liens have been filed and remain outstanding;
  5. Contractor has provided proof of clear title issued after expiration of the time within which liens may be asserted;
  6. Contractor has provided up to date evidence of compliance with applicable workers compensation legislation and as required herein throughout the duration of the subcontract and has provided a statement from the provincial authority administering workers compensation authorizing payment and release of the requested funds relative to the subcontract;
  7. Contractor and its subcontractors relative to the subcontract have submitted Statutory Declarations on Forms CCDC 9A and/or 9B (2001), as applicable, for purposes of the subcontract; and
  8. Consultant has certified Contractor's final payment request on the subcontract.

END OF DOCUMENT