

PT Addendum 02
No:
Date: February 23, 2024
Owner: Northern Health
Stantec # 144320228

This addendum is to be read with and constitutes part of the tender document.

GENERAL

0.0 SPECIFICATIONS

Spec Section 23 05 00 – Common Work for HVAC Systems

- a) Added Clause 2.1.5.11.: All access panels in Pharmacy department shall be airtight with fully welded door and frame, continuous bulb trim gasket and stainless steel piano hinge, prime coat to Architect's choice, and a stainless-steel Philips head screws standard latch.

Spec Section 23 05 93 – Testing, Adjusting, and Balancing for HVAC

- a) Revised Clause 1.5.2.1. to read: **Prework:** Prior to demolition, in renovated areas, measure and record supply, return and exhaust airflow into existing areas that are not included in the renovations. After renovations are completed, rebalance existing branches and main ducts to the conditions as found in the pre-construction measurements. Provide written report indicating all areas that have been pre-measured including Pitot tube traverse sheets.

Spec Section 23 36 00 – Air Terminal Units

- b) Added Clause 2.5 – Air Valves (Non-Critical Areas)

.1 General

- .1 Manufacturers, other than those listed in the acceptable manufacturers list, wishing to bid shall make a detailed submission responding to each point outlined in the specification in the exact same form. A listing of valve for valve taken from the drawings, shall be included showing the design selection and the alternate proposed with airflow capacities and minimum static pressure requirement.
- .2 At an inlet velocity of 10 m/s [2000 FPM] the differential static pressure required to operate any air valve size shall not exceed 37 Pa [0.15" w.g.] for any unit with an attenuator section and without a reheat coil.
- .3 Total pressure drop of air valve (including coil, damper, crossflow and attenuator) shall not exceed 0.5" SP.
- .4 Re-heat coil shall be upstream of the attenuator.
- .5 Provide attachment tabs on the top of the casing for ceiling hangers.
- .6 Control enclosure for field mounted controls.
- .7 Airflow sensor shall be rated for Inlet Air Pressure of 750 Pa (3 in wg).
- .8 Air valves shall incorporate a multi-point flow sensor.
- .9 Casing constructed from 0.76 mm [22 ga] thick galvanized steel. Provide attachment

- tabs on the top of the casing for ceiling hangers.
- .10 Provide 900mm (or as scheduled otherwise) discharge sound attenuator or silencer as indicated below (fibre-free insulation).
- .11 Provide special construction units where scheduled for high moisture areas.
- .2 Construction:
 - .1 pressure independent type with pneumatic velocity sensor, damper assembly, factory calibrated controller and actuator with adjustable minimum stop
 - .2 damper arranged "normally open" for morning warm-up.
 - .3 controller capable of maintaining air quantity within $\pm 5\%$ of set value, between zero and stipulated rated air flow,
 - .4 sound level below specified values when operating from minimum to maximum inlet static pressure.
- .3 Silencer/attenuator:
 - .1 on box discharge, acoustically treated open end or multiple outlet attenuator 900mm (30 in) long.
 - .2 edges concealed by metal nosing at inlet and discharge, with notch and tuck fabrication and seams protected by Z strips
 - .3 acoustic fiber free lining - elastomeric:
 - .1 20 mm [3/4"] thick FF Fibre Free Foam insulation.
 - .2 spray coated, flexible, closed cell elastomeric insulation in sheet form, with self-adhering backing, Zero permeability and water absorption.
 - .3 flame spread rating not to exceed 25, smoke development rating not to exceed 50.
 - .4 fastened to interior sheet metal surface with 100% coverage of adhesive, and fasteners at 1 pin per 0.2m² (2 sq ft) but not less than 1 row on each duct side.
 - .5 tested to ASTM C411.
 - .6 designed to inhibit organic growth.
- .4 Duct liner fasteners:
 - .1 2.0 mm (1/16 in) diameter pins,
 - .2 length selected to suit thickness of insulation,
 - .3 32 mm (1¼ in) square Nylon retaining clips.
- .5 Reheat Coils:
 - Water reheat coils enclosed in galvanized steel casing and factory installed on air valves.
 - Copper tubes and aluminum fins. Coil performance shall be in accordance with ARI Standard 410.
 - Capacities as scheduled.
- .6 Access Panels:
 - .1 200 mm x 125 mm [8" x 5"] lift-off galvanized access panel. Positive gasket seal and

- camlocks.
- .2 Mounted in frame and located upstream of reheat coil on the top and bottom of air valve
- .7 Control Dampers:
 - .1 Heavy gauge steel damper with peripheral gasket and self-lubricated bronze oilite or Delrin bearings.
 - .2 Air leakage past closed damper not to exceed 2% of the nominal rating at 750 Pa [3"] inlet static pressure.
- .8 Controllers And Actuators
 - .3 Microprocessor based controller and damper actuator will be supplied by the Controls Contractor. The controller shall be provided in a preassembled unit for mounting on the air valve.
 - .4 Controller and actuator shall be field mounted on the air valve by the controls contractor.
 - .5 Coordinate the installation of the BMS supplied equipment with the BMS supplier to ensure that it is installed and operates fully in accordance with the manufacturers recommendations.
 - .6 Air flow sensor to be provided by Terminal Box Manufacturer.
 - .7 Commission and factor test/ calibrate each box before leaving the factory.
 - .8 Resettable to any air volume between zero and maximum rated volume.
 - .9 External taps for balancing gauge.
 - .10 Controls arranged for pressure independent, constant volume operation or variable volume operation.
 - .11 Standard of Acceptance: SDVQ-5000 (supply)and SDEQ-5000 (return/exhaust)
- c) Added Clause 2.6 – Air Valve Identification
 - 1. The manufacturer shall number the air valves in accordance with numbers shown on the drawings. Secure 50 mm [2"] high, Gothic style self-adhesive, black stick on-letters, (Letrasign or Brady Quick-Align) on one side and on the bottom of all air valves.
- d) Added Clause 3.1.8: Mechanical contractor shall confirm handing of VAV box reheat coils and controller.
- e) Added Clause 3.1.9: Contractor to review dimensional differences between the Proposed product and the Specified product to ensure VAV's can be installed with proper service access.
- f) Revised Clause 3.3.1. to read: Electrical Division 26 will provide 120 Volt, single phase UPS power supply with a junction box for each group of terminal boxes with maximum of 12 terminal box controls fed from one junction box.

Section 25 05 00 – Common Work for Controls System

- a) Added Clause 1.2.6.:The new system shall be fully integrated with the existing system and operator interface through the existing operator's work station located in the UHNBC Site.
- b) Revised Clause 1.4.7. to read: The contractor shall review all contract documents and visit the site prior to the closing date of the tender and site confirm the requirements regarding the routing of interconnecting transmission network, etc.
- c) Added Clause 1.4.11 to 13. as follows:

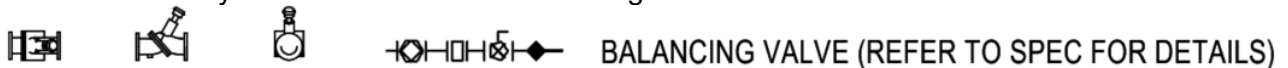
- .1 .11 All existing items which need to be removed, and which have a reasonable salvage value, such control devices, shall be carefully removed and handed over to the Owner. Coordinate with VCH FMO prior to removal of existing control devices, and the list of items that are required to be salvaged.
 - .2 .12 Removal of control related equipment / devices must be done in collaboration with the control contractor. Handing over to the Owner includes moving to Owner's designated storage place on site. These items shall not become the property of the Contractor. Obtain a written receipt from the Owner detailing each of the items handed over.
 - .3 .13 Remove all redundant material not required by the Owner from the site.
- d) Added Clause 1.8.2.5. to 7. as follows:
- .4 .5 Terminal strips within the motor control centres (MCC) for control connections;
 - .5 .6 Fire alarm equipment including fire smoke damper wiring and control, fire alarm devices and connections.
 - .6 .7 All magnetic starters for equipment shall have the following features supplied under Division 26:
 - .7 .1 Hand-off-automatic selector or on-off selector or start-stop buttons in cover with hand-automatic bridge if applicable.
 - .8 .2 120-volt control transformers
 - .9 .3 Four auxiliary dry contacts for interlocks; two normally open and two normally closed.
- e) Revised Clause 1.8.3. to read: Note Division 26:
- f) Revised Clause 1.8.4.4.1. to read: All wiring shall be run in conduit, and cable tray even in fully accessible ceiling areas. Non-continuous support systems such as J-hooks are not acceptable.

Issued Spec Section 23 07 16 – HVAC Equipment Insulation

1.0 DRAWINGS

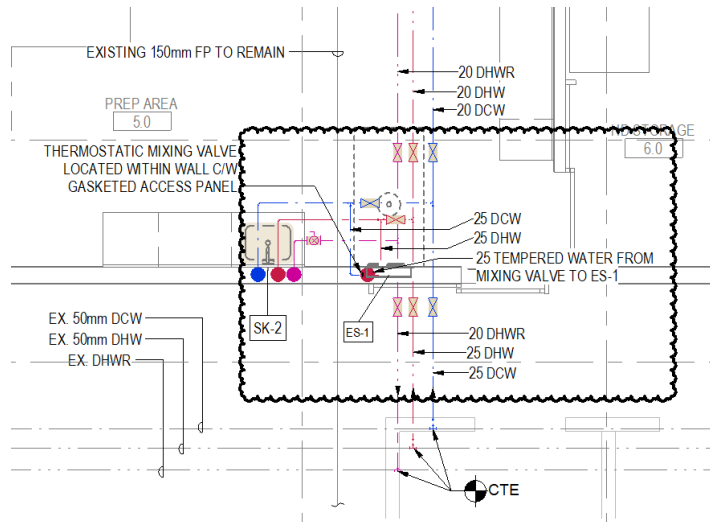
M001 – MECHANICAL SYMBOL LEGEND AND GENERAL NOTES

Revised symbols for circuit setter balancing valve



M202 – LEVEL 0 – PLUMBING – DEMO & NEW

Revised DCW pipe connection to existing main from 20mm to 25mm
Added pipe size tags to emergency shower



M501 – MECHANICAL SCHEDULES
 Added Silencer Schedule

SILENCERS																		
UNIT NO.	SERVICE	MAKE	MODEL	LOCATION	AIRFLOW	AIR PRESSURE DROP INCL. SYSTEM EFFECTS	HEIGHT (MM)	WIDTH (MM)	LENGTH (MM)	INSERTION LOSS (dB)								NOTES
										63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
SIL-SA-1	RTU-3A & 3B	PRICE	RHT96/8D	PROCESSED STORES 0018	1,800	27	400	700	2438	7	10	17	25	23	19	12	9	2,3,5,6,7,9
SIL-SA-2	RTU-3A & 3B	PRICE	RLT24/6C	CORRIDOR 0013a	90	30	300	300	610	4	5	7	12	10	12	10	8	2,3,5,6,7,9
SIL-SA-3	RTU-3A & 3B	PRICE	RMT72/4C	LIBRARY 6.2	180	57	250	250	1829	6	9	14	25	29	27	16	11	2,3,5,6,7,9
SIL-EA-1	EF-WW-0-1A & 1B	PRICE	RSP	UPPER ROOF	2,000	25	400	750	914	4	4	6	12	11	7	6	5	1,2,3,4,5,6,8
SIL-EA-2	EF-WW-0-1A & 1B	PRICE	RH24/2B	NON-HD CLEAN ROOM 2.0	50	10	150	200	610	1	3	7	13	15	14	11	8	2,3,5,6,7,8
SIL-EA-3	EF-WW-0-1A & 1B	PRICE	RM120/6C	LIBRARY 6.2	180	40	200	300	3047	12	18	35	55	43	29	18	14	2,3,5,6,7,8

NOTES:
 1. PACKLESS SILENCER
 2. INSTALL SILENCER AS PER MANUFACTURER'S RECOMMENDATION.
 3. REFER TO MECHANICAL DRAWINGS FOR THE SIZE AND SHAPE OF THE SILENCER.
 4. SILENCER TO BE FIBER-FREE.
 5. COORDINATE WITH SHEET METAL CONTRACTOR FOR EXACT SIZE AND GEOMETRY OF SILENCERS PRIOR TO ORDERING.
 6. SILENCER SHALL SUIT THE DUCTWORK LAYOUT. MECH CONTRACTOR TO CONFIRM THE SILENCER SIZE AND GEOMETRY.
 7. SILENCER C/W POLYMER FILM BAGGED PROTECTION TO PREVENT FIBREOUS MATERIAL BEING EXPOSED TO AIRSTREAM.
 8. 316 L STAINLESS STEEL
 9. GALVANIZED STEEL

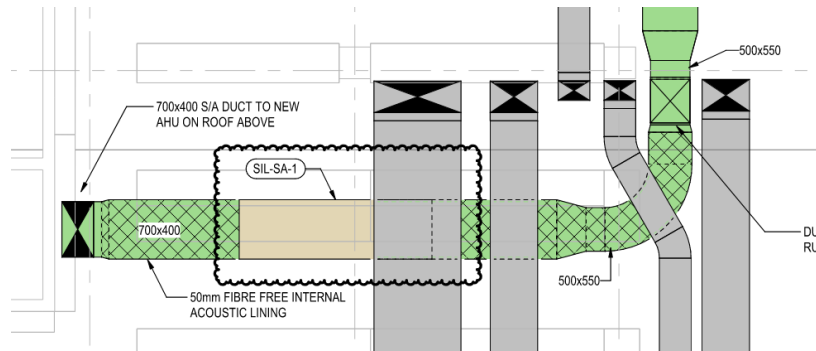
Revised model number in VAV Schedule

VAV SCHEDULE									
AREA SERVED	TAG	MANUFACTURER	MODEL	UNIT SIZE	MAX PRIMARY (L/s)	MIN PRIMARY (L/s)	TERMINAL LINER	REHEAT (L/s)	V
1.0 EXISTING OFFICE	EVAV-WW-016	PRICE	SDEQ	4	45	0	FG75	-	
6.2 LIBRARY	EVAV-WW-017	PRICE	SDEQ	7	180	0	FG75	-	
1.0 EXISTING OFFICE	SVAV-WW-015	PRICE	SDVQ	4	45	28	FG50	45	
6.2 LIBRARY	SVAV-WW-016	PRICE	SDVQ	7	180	138	FG50	180	

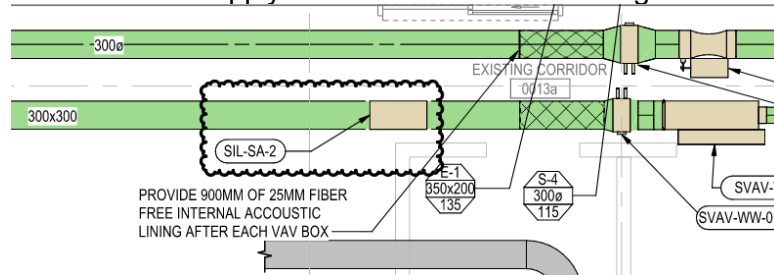
NOTES:
 1. VAV'S TO BE SUPPLIED WITH ATTENUATORS, TO BE FIBRE FREE.

M103 – LEVEL 0 – HVAC – NEW

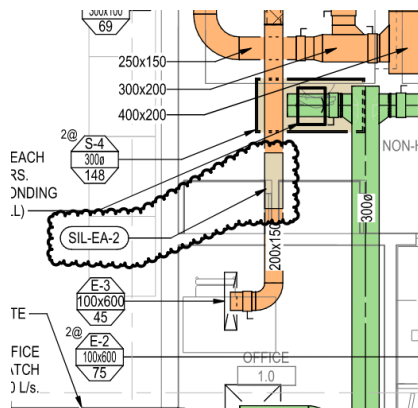
Added supply ductwork silencer in Processed Stores 0018 – Serving supply main.



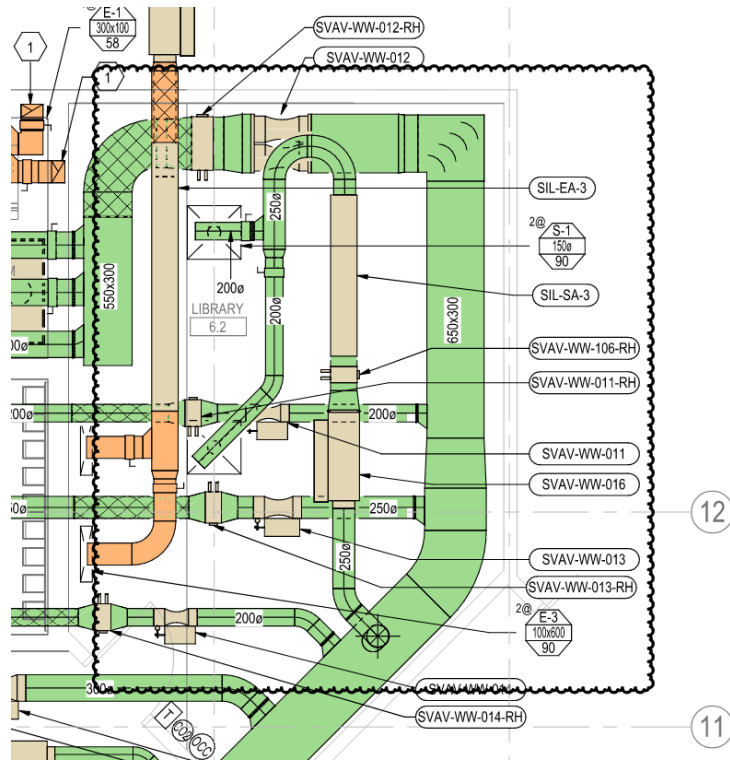
Added supply ductwork silencer in Existing Corridor 003a – Serving Office 1.0



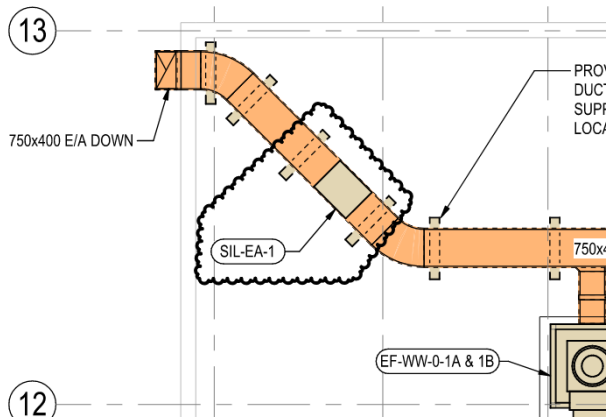
Added exhaust ductwork silencer in Non-HD Clean Room 2.0 – Serving Office 1.0



Revised supply ductwork layout in Library 6.2
 Added supply ductwork silencer in Library 6.2
 Added exhaust ductwork silencer in Library 6.2



M106 – LEVEL 2, LEVEL 3, & UPPER ROOF – HVAC – NEW
 Added exhaust ductwork silencer on Upper Roof – Serving exhaust main.



2.0 CLARIFICATIONS

Question: Submittal - Price Break Down

Can you please provide the price break down requested to be submitted for the project?

Answer: Individual specification will indicate if shop drawings submittals is required.

Question: The other item not addressed in the attached emails is the requirement for the hoods and fridges to be on Emergency power.

Answer: NHA to provide information

Question: I also was not clear on where the digital readouts that show room pressure and temperature for each of the clean rooms and HD storage were. As we have found out, for record keeping and product shelf life, an accurate and easy to access data readout in the prep area is the best practice.

Answer: The location of all readout shall be coordinated with Clinical prior to installation.

Question: Are there any new mechanical drawings to be issued as part of addendum 2

Answer: No

Question: For the mixing valve for ES-1, This is a 1" mix valve but it shows only ¾" DCW ran to it. Can the engineer that this will give enough flow.

Answer: Mixing valve for ES-1 is to have 25mm (1") DCW and DHW connections. Refer to M202 drawing update.

Question: Who is responsible for the building permit?

Answer: Building permit has been already issued.

Question: What is below the pharmacy lab currently? is it slab on grade or suspended slab? when the requirement for installing the drain for the emergency eye wash and shower will be decided with what is under the pharmacy concrete.

Answer: At our best knowledge is slab on grade but can't be confirmed now, slab to be scanned prior to any needed demolition.

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END OF ADDENDUM #02

PART 1 GENERAL	2
1.1 Related Work.....	2
1.2 General	2
1.3 sustainability Requirements	2
1.4 Regulatory Requirements	2
1.5 Applicable Codes and Standards	2
1.6 General	3
1.7 Qualifications and Samples	3
1.8 Sample Boards.....	4
1.9 Asbestos Insulating Materials	4
PART 2 PRODUCTS	4
2.1 Preformed Block and Board Insulation	4
2.2 Flexible Sheet Insulation.....	4
2.3 Removable Insulation Covers	5
2.4 Accessories.....	5
2.5 Equipment Insulation Scope and Thickness Table	5
2.6 FASTENING.....	6
2.7 JACKETS.....	6
PART 3 EXECUTION	6
3.1 Application.....	6
3.2 Nameplates	7
3.3 Insulation - Hot Applications.....	7
3.4 Insulation - Cold Applications.....	7
3.5 Block Insulation Finish	7
3.6 Flexible Sheet Finish	7

Part 1 General

1.1 RELATED WORK

- .1 This section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 GENERAL

- .1 Provide thermal insulation for all heating and cooling equipment as called for and scheduled.
- .2 Journeyman insulation applicators, skilled in this trade shall perform the work.
- .3 Be responsible for ensuring that sufficient space is provided to allow proper installation of insulation materials.
- .4 As applicable, use the latest edition of the "B.C. Insulation Contractors Association (BCICA) Standards Manual", as a reference standard, if sufficient detail/information is not specified herein.

1.3 SUSTAINABILITY REQUIREMENTS

- .1 To meet VGH sustainability goals, adhesives shall meet the VOC limits of the South Coast Air Quality Management District Rule #1168. MSDS sheets for VOC content shall be submitted with the adhesive and sealant shop drawings for approval.

1.4 REGULATORY REQUIREMENTS

- .1 Flame spread ratings and smoke developed classifications shall be as required by the Vancouver Building By-Law and NFPA 90A. Generally, the flame spread rating throughout the material shall not exceed 25 and the smoke developed classification shall not exceed 50.
- .2 Materials shall not flame, smolder, glow, or smoke at the temperature to which they are exposed in service.
- .3 Insulation thickness and insulating values shall be in accordance with ASHRAE 90.1-2016 and NRC Model National Energy Code of Canada for Buildings (MNECB). The more stringent insulation value (between the two codes) will be the level required for this project.
- .4 All insulation materials are to be formaldehyde free. Note that listed insulations under products section are to be used for reference only, and they do not necessarily comply with formaldehyde free requirement.

1.5 APPLICABLE CODES AND STANDARDS

- .1 Material and method of application to comply with or be tested in accordance with the latest version of the following Standards;
 - .1 B.C. Building Code and local by-laws
 - .2 B.C. Insulation Contractors Association (BCICA) Standards Manual
 - .3 Thermal Insulation Association of Canada (TIAC) National Insulation Standard, excluding section 12
 - .4 ASHRAE/IES 90.1 Energy Standard for Buildings except Low-Rise Residential Buildings
 - .5 NFPA 255 Test of Surface Burning Characteristics of Building Materials
 - .6 CAN/ULC-S102 Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering, and Miscellaneous Materials and Assemblies
 - .7 ASTM C411 Standard Test Method for Hot Surface Performance of High Temperature Thermal Insulation

- .8 ANSI/NFPA 90A Air Conditioning and Ventilating Systems and Installation.
- .9 ANSI/NFPA 90B Warm Air Heating and Air Conditioning Systems.
- .10 CGSB 51-GP-10M Thermal Insulation, Mineral Fiber, Block or Board, for Ducting.
- .11 CGSB 51-GP-11M Thermal Insulation, Mineral Fiber, Blanket for Piping, Ducting, Machinery and Boilers.
- .12 ASTM C518 Standard Test Method for Steady State Thermal Transmission Properties by Means of Heat Flo Meter Apparatus
- .13 ASTM C533 Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation
- .14 .9 ASTM C534 Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
- .15 ASTM C552 Standard Specification for Cellular Glass Thermal Insulation
- .16 ASTM C553 Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
- .17 ASTM C177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- .18 ASTM C612 Standard Specification for Mineral Fiber Block and Board Thermal Insulation
- .19 ASTM C1126 (Gr.1) Standard Specification for Faced and Unfaced Rigid Cellular Phenolic Thermal Insulation
- .20 CGSB 51-GP-52MA Vapour Barrier, Jacket and Facing Material for Pipe, Duct, and Equipment Thermal Insulation.
- .21 CAN/CGSB-51.2 Thermal Insulation, Calcium Silicate, for Piping, Machinery and Boilers.
- .22 CAN/CGSB-51.12 Cement, Thermal Insulating and Finishing.
- .23 CAN/CGSB-51.40 Thermal Insulation, Flexible, Elastomeric, Unicellular, Sheet and Pipe Covering.
- .24 CGSB 51.53-95 Polyvinyl Chloride) Jacket Sheeting, for Insulated Pipes Vessels and Round Ducts.

1.6 GENERAL

- A. Provide thermal insulation for all heating and cooling equipment as called for and scheduled.
- B. Journeyman insulation applicators, skilled in this trade shall perform the work.
- C. Be responsible for ensuring that sufficient space is provided to allow proper installation of insulation materials.
- D. Insulation systems shall be in accordance with the latest edition of the following standards unless specified.
- E. Flame spread and smoke density of all products shall not exceed 25/50 per ASTM E84 with or without integral jacket.

1.7 QUALIFICATIONS AND SAMPLES

- A. Submit, for approval, substantiating manufacturers documentation (and samples when requested) for all materials, applications and finishing methods to establish that all will satisfy this specification and meet all applicable code requirements, before commencing work.

B. Definitions

- .1 "EXPOSED". All equipment shall be considered to be exposed in boiler room, chiller room, valve room and fan rooms.

1.8 SAMPLE BOARDS

- A. Submit sample assembly of each type of insulation and covering. Mount samples on PVC coroplast board with typewritten label beneath each sample indicating service and material specification.
- B. Include samples of vapor barrier installation including coatings (indoors), mastics (outdoors), and reinforcing membranes, on a round surface sample minimum 300 mm x 300 mm (12 in x 12 in).

1.9 ASBESTOS INSULATING MATERIALS

- A. If the Contractor, during renovations, should discover asbestos (or material suspected to be asbestos) on piping, ductwork, etc., he shall immediately cease all work in that area and contact Owner's representative. The Owner will take immediate appropriate action to verify presence of friable asbestos. The Contractor will not be entitled to a claim for any delays resulting from the investigation of or removal of asbestos.

Part 2 Products

2.1 PREFORMED BLOCK AND BOARD INSULATION

- .1 Mineral Fibre (High Temperature) Rigid
- .1 Thermal Conductivity at 93°C - 0.046 W/m/deg.C.
- .2 Acceptable Manufacturers: Fibrex FBX1900, Owens-Corning Rocboard 1280, Rocblok PK-16, Roxul RHF.
- .2 Calcium Silicate (High Temperature) Rigid
- .1 Thermal Conductivity at 93°C - 0.060 W/m/deg.C.
- .2 Acceptable Manufacturers: Calsilite, Johns Manville Thermo-12.
- .3 Perlite Insulation - High Temperature:
- .1 Without integral jacket.
- .2 Thermal Conductivity at 90°C - 0.071W/m/deg.C.
- .3 Acceptable Products: Knauf, Temperlite 1200.
- .4 Phenolic Insulation Rigid Board
- .1 With integral FRK jacket for ducts.
- .2 Thermal conductivity at 24°C – 0.019 W/m/deg.C.
- .3 Flame spread and smoke density does not exceed 25/50 per ASTM E84 with or without integral jacket.

2.2 FLEXIBLE SHEET INSULATION

- .1 Flexible Closed Cell
- .1 Thermal Conductivity at 24°C - 0.036 W/m/deg.C.
- .2 Acceptable Manufacturer: Bonotex Polyethylene, Therma-Cel.
- .2 Flexible Foamed Elastomeric
- .1 Thermal Conductivity at 24°C - 0.039 W/m/deg.C.
- .2 Acceptable Manufacturers: F/R Armaflex II, Rubatex R-180FS.

2.3 REMOVABLE INSULATION COVERS

- B. Flexible mineral fibre or fibre glass fully enclosed on all sides and edges within Alpha Maritex #8459-2-8S silicone fibre glass cloth suitable for temperatures involved with stainless steel wire mesh against hot surface.
- C. Insulation covers to be laced in place with brass/stainless steel hooks and copper/stainless steel wire and be easily removable.

2.4 ACCESSORIES

- .1 Jacket Fastenings (Multi-Purpose)
 - .1 Staples (flare type). Stainless steel.
 - .2 Compatible jacket finishing tape.
- .2 Corner Beads
 - .1 38 mm x 38 mm x 0.37 mm thick galvanized steel or aluminum as commercially available.
- .3 Finish Jacket
 - .1 Thermocanvas Jacket
 - .1 Fattal's Thermocanvas, Robson Flamex FR Canvas, Tai-Can Canvas.
 - .2 Metal Jacket
 - .1 Childers 0.53 mm [22 ga], Alcan Thermoclad I, or other as commercially available.
- .4 Reinforcing Membrane
 - .1 Glass reinforcing membrane, as commercially available.
- .5 Reinforcing Mesh
 - .1 25.4 mm square galvanized wire mesh, as commercial available .
- .6 Insulating Cement
 - .1 Ryder Thermokote MW High Temp, Partek No. 1.
- .7 Hard Finish Cement
 - .1 As commercially available.
- .8 Fabric Adhesive
 - .1 Bakelite 120-18, Childers CP-52, Epolux Cadalag 336, Foster 8142W, Robson White Lag.
- .9 Fabric Coating
 - .1 Bakelite 120-09, Childers CP-50, Epolux Cadalag 336, Foster 30-36.

2.5 EQUIPMENT INSULATION SCOPE AND THICKNESS TABLE

Equipment	Thickness - mm [ins]	Scope
Air Separator(s)	50 [2]	A
Expansion joints	50 [2]	C
Flash tank	50 [2]	A
Heat Exchanger(s) (shell, end & head)	50 [2]	A
Heat Exchanger(s) (plate type)	50 [2]	C

Equipment	Thickness - mm [ins]	Scope
Humidifier separator bodies	50 [2]	C
Steam pressure reducing valve	50 [2]	C
Chilled and hot water expansion tanks and air separators	25 [1]	B

SCOPE A: Preformed block insulation (high temperature)

SCOPE B: Flexible sheet insulation

SCOPE C: Removable insulation cover

SCOPE D: Preformed board insulation

2.6

FASTENING

- .1 Tape shall be shelf adhesive 100 mm wide.
- .2 Contact adhesive shall be quick-setting.
- .3 Lap seal adhesive shall be quick-setting for joints and lap sealing for vapor barriers.
- .4 Adhesive for canvas shall be washable, for cementing canvas to equipment insulation.
- .5 Steel wire shall be 1.3 mm diameter galvanized anneal.
- .6 Stainless steel wire shall be 1.3 mm diameter, type 304.
- .7 Steel brands shall be 19 x 0.4 mm stainless steel.

2.7

JACKETS

- .1 Material:
 - .1 Canvas where exposed, ULC listed plain weave cotton fabric at 200 g/m².
- .2 Applications:
 - .1 Heat exchangers.
 - .2 Hot water storage tanks.
 - .3 Hot wells.
 - .4 Cold water storage tanks.
 - .5 Water storage tanks.
 - .6 Breechings and boilers
 - .7 Diesel generators exhaust piping and mufflers.
- .3 Material:
 - .1 Metal 0.6 mm thick aluminum alloy sheet, use only in areas subject to traffic or mechanical damage, and were specifically called for on mechanical dwg's or equipment schedules.

Part 3

Execution

3.1

APPLICATION

- .1 Apply insulation to equipment only after all connections to it are completed and all tests have been made and systems accepted as tight.
- .2 Apply insulation and insulation finish, in a workmanlike manner carefully securing it permanently to all surfaces of the equipment. Finish the work so that the finished product is pleasing to the eye, uniform in application and smooth in finish with all edges protected and sealed.

- .3 When more than one layer of insulating material is used to achieve the specified thickness, stagger the seams and joints to eliminate leakage paths.
- .4 Weld insulation attachment fittings to surfaces, as required, to completely secure block insulation with mechanical, wire or strap fastenings.

3.2 NAMEPLATES

- .1 Install insulation so that name and registration plates, cleanouts, manholes, inspection openings and gauge and controller tapings remain uncovered. Cut back insulation around the base of these items at 45 degrees and finish with finishing cement.

3.3 INSULATION - HOT APPLICATIONS

- .1 Apply high temperature insulation block and/or preformed/molded pipe insulation and secure firmly to all surfaces with mechanical, wire or strap fastenings. Insulation shall be cut as required, shaped and fitted neatly to all contours, without voids.
- .2 The insulation on equipment heads shall receive a 12 mm [1/2"] trowel coat, dry thickness of insulating hard coat finishing cement, to provide a smoothly contoured surface. The cement shall be reinforced with a layer of reinforcing mesh or a reinforcing membrane.
- .3 Apply high temperature mineral fibre rigid insulation to the boiler breeching. Exterior application shall be sealed from moisture. Over the insulation, apply 0.53 mm [22 ga] thick aluminum. The longitudinal seams shall be located to shed water. Attach with holding strap at 150 mm [6"] on centres. Provide a complete aluminum jacket system using all of the parts, accessories and installation procedures of the manufacturer. Seal all outdoor jacketing watertight. Overlap all seams by a minimum of 75 mm [3"]. Expansion springs on bands may be required.

3.4 INSULATION - COLD APPLICATIONS

- .1 Apply flexible sheet insulation on all cold surfaces. Secure material and longitudinal and butt joints with foam plastic adhesive. Insulation shall be cut as required and be shaped and fitted neatly to all contours, without voids.
- .2 Chiller to be insulated in accordance with manufacturers recommendations.
- .3 Chiller flange insulation to be easily removable without damage.
- .4 Secure board insulation on ducts and flat surfaces with adhesive and pins. Seal the vapour barrier finish joints with self-adhesive foil tape.

3.5 BLOCK INSULATION FINISH

- .1 Premium Finish
- .2 Over hard finish cement apply thermocanvas jacket using fabric adhesive. Finish fabric jacket with one (1) coat of fabric coating.

3.6 FLEXIBLE SHEET FINISH

- .1 Insulated flexible sheet insulation shall be painted with a heavy brush coating of foam plastic, white insulation coating.

END OF SECTION