PART 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C335-05a, Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.

.2 ASTM C449/C449M-07, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.

.3 ASTM C921-09, Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

.2 Manufacturer's Trade Associations

.1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2005).

.3 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102-07, Surface Burning Characteristics of Building Materials and Assemblies.

.2 CAN/ULC-S702-09, Thermal Insulation, Mineral Fibre, for Buildings

1.2 DEFINITIONS

.1 For purposes of this section:

.1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.

.2 "EXPOSED" - will mean "not concealed" as defined herein.

.2 TIAC codes:

.1 CRF: Code Rectangular Finish.

.2 CPF: Code Piping Finish.

1.3 SHOP DRAWINGS

.1 Submit in accordance with Section 21 05 01 - Common Work Results - Mechanical:

.1 Manufacturer's catalogue literature related to installation, fabrication for pipe, fittings, valves and jointing recommendations.

.2 Installation instructions to include procedures to be used, installation standards to be achieved.

1.4 QUALIFICATIONS

.1 Installer to be specialist in performing work of this Section, and have at least 3 years successful experience in this size and type of project.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.2 Protect from weather, construction traffic.

.3 Protect against damage from any source.

.4 Store at temperatures and conditions required by manufacturer.

PART 2 Products

2.1 FIRE AND SMOKE RATING

.1 In accordance with CAN/ULC-S102.

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fibre specified includes glass fibre, rock wool, slag wool.

.2 Thermal conductivity ("k" factor) not to exceed specified values at 24 ºC mean temperature when tested in accordance with ASTM C335.

.3 Type 1: Rigid moulded mineral fibre with or without factory applied vapour retarder jacket (as scheduled in part 3).

.1 Mineral fibre: to CAN/ULC-S702.

.2 Jacket: to CGSB 51-GP-52Ma.

.3 Maximum "k" factor: to CAN/ULC-S702.

.4 Type 3: Flexible unicellular tubular elastomer.

.1 Insulation: with vapour retarder jacket.

.2 Jacket: to CGSB 51-GP-52Ma.

.3 Maximum "k" factor: 0.035 w/mºC.

.4 To be certified by manufacturer to be free of potential stress corrosion cracking corrodants.

2.3 INSULATION SECUREMENT

.1 Tape: Self-adhesive, aluminum, plain, 50 mm wide minimum.

.2 Contact adhesive: Quick setting.

.3 Canvas adhesive: Washable.

.4 Tie wire: 1.5 mm diameter stainless steel.

.5 Bands: Stainless steel, 19 mm wide, 0.5 mm thick.

2.4 CEMENT

.1 Thermal insulating and finishing cement:

.1 Hydraulic setting on mineral wool, to ASTM C449/C449M.

2.5 VAPOUR RETARDER (VR) LAP ADHESIVE

.1 Water based, fire retardant type, compatible with insulation.

2.6 INDOOR VAPOUR RETARDER (VR) FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

2.7 JACKETS

.1 Canvas:

.1 220 gm/m^2 cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.

.2 Lagging adhesive: Compatible with insulation.

PART 3 Execution

3.1 PRE- INSTALLATION REQUIREMENT

.1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.

.2 Surfaces to be clean, dry, free from foreign material.

3.2 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturer's instructions and this specification.

.3 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.

.1 Hangers, supports to be outside vapour retarder jacket.

.5 Supports, Hangers:

.1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.3 INSTALLATION OF ELASTOMERIC INSULATION

.1 Insulation to remain dry at all times. Overlaps to manufacturer's instructions. Ensure tight joints.

.2 Provide vapour retarder as recommended by manufacturer where indicated.

3.4 PIPING INSULATION SYSTEMS

.1 Includes valves, valve bonnets, strainers, flanges and fittings where indicated.

.2 Type A-2: cold application, intermediate temperature (5°C – 15°C)

- .1 Type 1 insulation with factory applied vapour retarder.
- .2 Securements: Pipe insulation with integral jacket shall be held in place by stapling the flaps on 75mm centres. Pipe insulation with integral self-sealing jacket will not require additional fastening.
- .3 Seals: seal all flaps and butt strips with lap seal adhesive, lagging adhesive. Seal over staples with a heavy brush coat of VR coating.
- .4 Fittings: miter pipe insulation to fit tightly, or with tightly placed flexible insulation covered with reinforcing membrane embedded in a vapour barrier coating. Alternately insulate fitting with tightly placed flexible insulation and apply PVC fitting covers.
- .5 Valves, Strainers: where indicated on the particular product schedule, insulate valve bodes and strainers with insulating cement or fitted pipe insulation segments or mitred blocks al to thickness of adjacent pipe insulation or insulate with tightly placed flexible insulation covered with reinforcing membrane stapled in place. Drains, blow-off plugs and caps shall be left uncovered. Alternately insulate with tightly placed insulation and apply OVC fitting covers
- .6 Flanges: where indicted insulate flanges with oversized pipe covering or mitred blocks to and applied in accordance with the manufacturers directions. Alternately insulate with tightly placed flexible insulation and apply PVC fitting covers.
- .7 Installation: TIAC Code: 1501-C

3.5 INSULATION SCHEDULE

.1 Thickness of insulation to be as listed in following table:

- .1 Run-outs means piping to individual units and equipment not exceeding 4000 mm long.
- .2 Do not insulate exposed run-outs to plumbing fixtures, chrome plated piping, valves, fittings.
- .3 Do not insulate domestic hot and cold water valves, strainers and flanges.
- .4 Insulate valves, strainers and flanges on all chilled water piping.

.5 Insulate valves, strainers and flanges on all steam piping.

.6 Insulate valves, on all 60-94°C hot water and glycol heating piping. Do not insulate flanges, and strainers. Do not insulate valves smaller then 50mm.

Application	Temp ºC	Type	Pipe sizes (NPS) and insulation thickness (mm)					
			Run-out	to 1	1 1/4 to 2	2 1/2 to 4	5 to 6	8 & over
Domestic DCWS		A-2	25	25	25	25	25	25
Domestic DCWS with vapour retarder		A-2	25	25	25	25	25	25

.2 Finishes:

.1 Installation: To appropriate TIAC code CPF/1 through CPF/5.

.2 Exposed indoors: Canvas.

.3 Concealed, indoors: canvas on valves, fittings. No further finish.

.4 Use vapour retarder jacket on type A-2 insulation compatible with insulation.

.5 Finish attachments: SS bands, at 150 mm oc.

END OF SECTION