

Part 1 General

1.1 REFERENCES

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
 - .1 ANSI/ASHRAE 90.1-04-SI Edition, Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .2 ASTM International Inc.
 - .1 ASTM C335-05ae1, Standard 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 C533-07, Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
 - .4 ASTM C547-07, Standard Specification for Mineral Fiber Pipe Insulation.
 - .5 ASTM C553-02, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .6 ASTM C612-04e1, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - .7 ASTM C795-03, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
 - .8 ASTM C921-03a, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 51-GP-52MA-89, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
 - .2 CAN/CGSB 51.53-95, Poly (Vinyl Chloride) Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals:
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, include product characteristics, performance criteria, physical size, finish and limitations.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Store at temperatures and conditions recommended by manufacturer.

Part 2 Products

2.1 COMPONENTS

2.2 FIRE AND SMOKE RATING

- .1 Fire and smoke ratings to CAN/ULC-S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.3 INSULATION

- .1 Mineral fibre: includes glass fibre, rock wool, slag wool.
 - .1 Recycled content: (Post-Consumer + Post-Industrial) in accordance with Section 01 35 21 - LEED Requirements.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C335.
- .3 TIAC Code A-1: rigid moulded mineral fibre without factory applied vapour retarder jacket.
 - .1 Mineral fibre: ASTM C547.
 - .2 Maximum "k" factor: ASTM C547.
- .4 TIAC Code A-3: rigid moulded mineral fibre with factory applied vapour retarder jacket.
 - .1 Mineral fibre: ASTM C547.
 - .2 Jacket: to CGSB 51-GP-52MA.
 - .3 Maximum "k" factor: ASTM C547.
- .5 TIAC Code C-1: rigid mineral fibre board, unfaced.
 - .1 Mineral fibre: ASTM C612.
 - .2 Maximum "k" factor: ASTM C612.
- .6 TIAC Code C-4: rigid mineral fibre board faced with factory applied vapour retarder jacket.
 - .1 Mineral fibre: ASTM C612.
 - .2 Jacket: to CGSB 51-GP-52MA.
 - .3 Maximum "k" factor: ASTM C612.
- .7 TIAC Code C-2: mineral fibre blanket unfaced or faced with factory applied vapour retarder jacket (as scheduled in PART 3 of this section).
 - .1 Mineral fibre: ASTM C553.
 - .2 Jacket: to CGSB 51-GP-52MA.
 - .3 Maximum "k" factor: ASTM C553.
- .8 TIAC Code A.6: flexible unicellular tubular elastomer.
 - .1 Insulation: with vapour retarder jacket.
 - .2 Jacket: to CGSB 51-GP-52MA.

- .3 Maximum "k" factor.
- .4 Certified by manufacturer free of potential stress corrosion cracking corrodents.
- .9 TIAC Code A-2: rigid moulded calcium silicate in sections and blocks, and with special shapes to suit project requirements.
 - .1 Insulation: ASTM C533.
 - .2 Maximum "k" factor: ASTM C533.
 - .3 Design to permit periodic removal and re-installation.

2.4 CEMENT

- .1 Thermal insulating and finish
 - .1 To: ASTM C449/C449M.
 - .2 Hydraulic setting Air drying on mineral wool, to ASTM C449.

2.5 JACKETS

- .1 Polyvinyl Chloride (PVC):
 - .1 One-piece moulded type and sheet to CAN/CGSB 51.53 with pre-formed shapes as required.
 - .2 Colours: to match adjacent finish paint .
 - .3 Minimum service temperatures: -20 degrees C.
 - .4 Maximum service temperature: 65 degrees C.
 - .5 Moisture vapour transmission: 0.02 perm.
 - .6 Fastenings:
 - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
 - .2 Tacks.
 - .3 Pressure sensitive vinyl tape of matching colour.
 - .7 Special requirements:
 - .1 Outdoor: UV rated material at least 0.5 mm thick.
 - .8 Covering adhesive: compatible with insulation.
 - .1 Maximum VOC limit 80 g/L .
- .2 ABS Plastic:
 - .1 One-piece moulded type and sheet with pre-formed shapes as required.
 - .2 Colours: to match adjacent finish paint.
 - .3 Minimum service temperatures: -40 degrees C.
 - .4 Maximum service temperature: 82 degrees C.
 - .5 Moisture vapour transmission: 0.012 perm.
 - .6 Thickness: 0.75 mm.
 - .7 Fastenings:
 - .1 Solvent weld adhesive compatible with insulation to seal laps and joints
 - .2 Tacks.

- .3 Pressure sensitive vinyl tape of matching colour.
- .8 Locations:
 - .1 For outdoor use ONLY.
- .3 Canvas:
 - .1 220 gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
 - .2 Lagging adhesive: compatible with insulation.
 - .1 Maximum VOC limit 80 g/L .
- .4 Aluminum:
 - .1 To ASTM B209.
 - .2 Thickness: 0.50 mm sheet.
 - .3 Finish: smooth .
 - .4 Joining: longitudinal and circumferential slip joints with 50 mm laps.
 - .5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.
 - .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5mm thick at 300 mm spacing.
- .5 Stainless steel:
 - .1 Type: 304 or 316.
 - .2 Thickness: 0.25 mm.
 - .3 Finish: smooth.
 - .4 Joining: longitudinal and circumferential slip joints with 50 mm laps.
 - .5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.
 - .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5mm thick at 300 mm spacing.

2.6 INSULATION SECUREMENTS

- .1 Tape: self-adhesive, aluminum, plain , 50 mm wide minimum.
- .2 Contact adhesive: quick setting.
 - .1 Maximum VOC limit 80 g/L.
- .3 Canvas adhesive: washable.
 - .1 Maximum VOC limit 80 g/L.
- .4 Tie wire: 1.5 mm diameter stainless steel.
- .5 Bands: Stainless steel, 19 mm wide, 0.5 mm thick.
- .6 Facing: 25 mm galvanized steel hexagonal wire mesh on on one face of insulation with expanded metal lath on other face of insulation.
- .7 Fasteners: 2 mm diameter pins with 35 mm diameter clips. Length of pin to suit thickness of insulation.

2.7 VAPOUR RETARDER LAP ADHESIVE

- .1 Water based, fire retardant type, compatible with insulation.
 - .1 Maximum VOC limit 80 g/L

2.8 INDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.

2.9 OUTDOOR VAPOUR RETARDER MASTIC

- .1 Vinyl emulsion type acrylic, compatible with insulation.
- .2 Reinforcing fabric: Fibrous glass, untreated 305 g/m².

Part 3 Execution

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PRE- INSTALLATION REQUIREMENTS

- .1 Pressure testing of equipment and adjacent piping systems complete, witnessed and certified.
- .2 Surfaces clean, dry, free from foreign material.

3.3 INSTALLATION

- .1 Install in accordance with TIAC National Standards
 - .1 Hot equipment: To TIAC code 1503-H.
 - .2 Cold equipment: to TIAC code 1503-C.
- .2 Elastomeric Insulation: to remain dry. Overlaps to manufacturer's instructions. Joints tight and sealed properly.
- .3 Provide vapour retarder as recommended by manufacturer.
- .4 Apply materials in accordance with insulation and equipment manufacturer's instructions and this specification.
- .5 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.
- .6 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Hangers, supports outside vapour retarder jacket.
- .7 Supports, Hangers:
 - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.4 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

- .1 Application: At expansion joints, valves, primary flow measuring elements flanges and unions at equipment.
- .2 Installation to permit movement of expansion joint without damage to adjacent insulation.

3.5 CLEANING

- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION