

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 22 11 16 - Domestic Water Piping.
- .2 Section 23 05 05 - Installation Pipework.
- .3 Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

1.2 REFERENCES

- .1 Unless otherwise indicated, all the works must be done in accordance with the in force edition of the National Building Code.
- .2 Furthermore, the works will be done in accordance with any other code or norm having jurisdiction, as per the latest edition, notably including, but not limited to:
 - .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
 - .1 ASHRAE Standard 90.1-01, Energy Standard for Buildings, Except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).
 - .2 American Society for Testing and Materials International (ASTM).
 - .1 ASTM B209M-01, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate Metric.
 - .2 ASTM C335-04, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
 - .3 ASTM C411-04, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
 - .4 ASTM C449/C449M-00, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
 - .5 ASTM C533-2004, Calcium Silicate Block and Pipe Thermal Insulation.
 - .6 ASTM C547-2003, Mineral Fiber Pipe 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 Manufacturers' Trade Associations.
 - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).
 - .4 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S102-03, Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S701-01, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .3 CAN/ULC-S702-1997, Thermal Insulation, Mineral Fibre, for Buildings.
 - .4 CAN/ULC-S702.2-03, Thermal Insulation, Mineral Fibre, for Buildings, Part 2: Application Guidelines.
 - .5 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
 - .2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
 - .6 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.
 - .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
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1.3 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 specified.

1.4 SUBMITTALS

- .1 Submit documents and samples required.
- .2 Quality Assurance.
 - .1 Installer: Specialist in performing work of this Section, and have at least 3 years successful experience in this size and type of project, qualified to standards of TIAC.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling, and Unloading:
 - .1 Deliver, store, and handle in accordance with manufacturer's written instructions.
 - .2 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
 - .3 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .2 Storage and Protection:
 - .1 Protect from weather, construction traffic.
 - .2 Protect against damage.
 - .3 Store at temperatures and conditions required by manufacturer.
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PART 2 - PRODUCTS

2.1 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC-S102 Standard.
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.2 INSULATION

- .1 Thermal conductivity ("k" factor) not to exceed specified values at 24 °C mean temperature when tested in accordance with ASTM C335 Standard.
- .2 Insulation type **P-1**: Rigid moulded mineral fibre with factory applied vapour retarder jacket.
 - .1 Mineral fibre: to CAN/ULC-S702 and ASTM C547 Standards.
 - .2 Vapour retardant to CGSB 51GP-52Ma Standard.
 - .3 Maximum "k" factor: of 0.033 W/m °C at an average temperature of 24 °C.
 - .4 Temperature limits: -29 °C à 454 °C.
 - .5 Acceptable products: Manson Alley-K, Knauf, Johns-Manville.
 - .1 Acceptable products: Manson Alley-K.

2.3 INSULATION SECUREMENTS

- .1 Tape: self-adhesive, aluminum reinforced, 50 mm wide minimum.
 - .1 Acceptable products: Tape Fattal Insultape made by S. Fattal Canvas Inc.
 - .2 Vapour Retarder Lap Adhesive.
 - .1 Water based, fire retardant type, compatible with insulation.
 - .2 Acceptable products: Foster 87-75 without asbestos fiber, with a coverage density of 6 m²/L.
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- .3 Indoor Vapour Retarder Finish.
 - .1 Vinyl emulsion type acrylic, compatible with insulation.
 - .2 Acceptable products: Foster 30-36 without asbestos fiber, with a coverage density of 1.25 m²/L.

2.4 JACKETS

- .1 Canvas:
 - .1 220 gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
 - .2 Lagging adhesive: Compatible with insulation.
 - .3 Acceptable products: Fattal Thermocanvas.

2.5 ACCEPTABLE PRODUCTS

- .1 Specified product or equivalent of Owens Corning; Johns Manville; Knauf; Certain Teed.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 PRE-INSTALLATION REQUIREMENT

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

3.3 INSTALLATION

- .1 Install in accordance with TIAC National Standards.
 - .2 Apply materials in accordance with manufacturers instructions and this specification.
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- .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 Install hangers, supports outside vapour retarder jacket.
- .5 Supports and Hangers:
 - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.4 PIPING INSULATION SCHEDULES

- .1 Unless otherwise specify, the insulation of the piping include the insulation of the valve, filters, and accessoires.
- .2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, and fittings.
- .3 Insulate the piping and equipment as indicated in the following table:

SYSTEMS AND EQUIPMENTS		FLUID TEMPERATURE °C	INSULATION TYPE
.1	Potable cold water	4 (39)	P-1
.2	Drain piping and venting of electric or natural gas humidifiers.	118 (244)	P-1
.3	Low pressure steam systems; up to 103 kPa (15 lb / in ²)	118 (244)	P-1

- .4 Thickness of the P-1 insulation type.

FLUID TEMPERATURE °C	NOMINAL DIMENSION OF THE PIPING (NPS)			
	1 and less	1¼ to 2	2½ to 4	5 and more
	THICKNESS (mm)			
151-240	64		76	89
121-150	51	64		76
96-120	38		51	
50-95	25		38	
14-49	25		38	

3.5 FINISHES

- .1 Exposed Indoors: Canvas.
- .2 Concealed, indoors: Canvas on valves, fittings. No further finish.
- .3 Installation: Appropriate to TIAC.

3.6 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

- .1 Application: At expansion joints, valves, flanges, and unions at equipment.
- .2 Design: To permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.
- .3 Insulation:
 - .1 Insulation, fastenings, and finishes: Same as system.
 - .2 Jacket: Canevas.

3.7 CLEANING

- .1 Perform cleaning site.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.

END OF SECTION
