Part 1 General

1.01 SECTIONS INCLUDES

.1 Piping insulation.

.2 Adhesives, tie wires, tapes.

.3 Recovery jackets.

1.02 RELATED REQUIREMENTS

.1 Entire Specification – All areas of common work.

1.03 REFERENCE STANDARDS

.1 National Research Council of Canada (NRCAN)

.1 National Energy Code of Canada for Buildings 2011, with Provincial Amendments.

.2 American Society for Testing and Materials (ASTM International)

.1 ASTM C335/C335M-17, Standard Test Method for Steady-State Heat Transfer Properties of Horizontal Pipe Insulation.

.2 ASTM C411-17, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

.3 ASTM C449-07(2013), Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.

.4 ASTM C547-17, Standard Specification for Mineral Fiber Pipe Insulation.

.5 ASTM C553-13, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

.6 ASTM C612-14, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

.7 ASTM C921-10(2015), Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

.3 Underwriter's Laboratories of Canada (ULC)

.1 CAN/ULC-S102-10, Surface Burning Characteristics of Building Materials and Assemblies.

.2 CAN/ULC-S701-11, Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.3 CAN/ULC-S702-14, Thermal Insulation, Mineral Fiber, for Buildings.

.4 CAN/ULC-S702.2-10, Thermal Insulation, Mineral Fiber, for Buildings, Part 2: Application Guidelines.

1.04 QUALITY ASSURANCE

.1 Insulation shall be installed by skilled workmen regularly engaged in this type of work.

.2 Materials shall meet or exceed fire and smoke hazard ratings as stated in this section and defined in applicable building codes.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit shop drawings which indicate complete material data, "k" value, temperature rating, density, finish, recovery jacket of materials proposed for this project and indicate thickness of material for individual services.

.3 Submit samples of proposed insulating and recovering materials.

1.06 JOB CONDITIONS

.1 Deliver material to job site in original non-broken factory packaging, labeled with manufacturer's density and thickness.

.2 Perform work at ambient and equipment temperatures as recommended by the adhesive manufacturer. Make good separation of joints or cracking of insulation due to thermal movement or poor workmanship.

1.07 ALTERNATIVES

.1 Alternative insulations are subject to approval. Alternatives shall provide the same thermal resistance within 5% at normal conditions as material specified.

Part 2 Products

2.01 ACCEPTABLE MANUFACTURERS

.1 Refer to section 21 05 01.

2.02 GENERAL

.1 Insulation Materials, Recovery Jackets, Vapor Barrier Facings, Tapes and Adhesives shall be In accordance with CAN/ULC-S102:

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

.2 All insulation materials shall meet Building Code Standards, and packages or containers of such materials shall be appropriately labeled.

.3 Insulate fittings and valve bodies with preformed insulated fittings.

2.03 MATERIALS

.1 Cold Piping: Formed fine fibrous glass or formed mineral fiber pipe insulation, with factory applied vapor barrier jacket, factory molded to conform to piping, “k" value maximum 0.035 W/m-°K at 24°C. Service temperature: 4°C to 100°C.

.2 Hot Piping: Formed fine fibrous glass or mineral fiber pipe insulation, with factory applied general purpose jacket, factory molded to conform to piping, "k" value maximum 0.035 W/m-°K, at 24°C. Service temperature up to 150° C.

.3 Recovery Jackets:

.1 Polyvinyl Chloride (PVC): One-piece molded type and sheet with pre-formed shapes. All PVC jacket joints shall be sealed with CFIA compliant sealants.

.2 Aluminum: To ASTM B209. Thickness: 0.50 mm sheet. Finish: smooth. Joining: longitudinal and circumferential slip joints with 50 mm laps. Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner. Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5mm thick at 300 mm spacing.

2.04 INSULATION SECUREMENTS AND SEAL

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

.2 Contact adhesive: Quick setting and canvas adhesive: Washable.

.3 Tie wire: 1.5mm diameter stainless steel.

.4 Bands: Type 304 stainless steel, 15mm wide and 0.5mm thick.

.5 Waterproof caulking to all outdoor pipe:

2.05 VAPOUR RETARDER

.1 Lap adhesive: Water based, fire retardant type, compatible with insulation.

.2 Indoor finish: Vinyl emulsion type acrylic, compatible with insulation.

.3 Outdoor: Vinyl emulsion type acrylic, compatible with insulation.

.4 Reinforcing fabric: Fibrous glass, untreated 305 g/m^2.

Part 3 Execution

.1 Do not install covering before piping and equipment has been tested and approved.

.2 Ensure surface is clean and dry prior to installation. Ensure insulation is dry before and during application. Finish with systems at operating conditions.

3.01 INSTALLATION

.1 Ensure insulation is continuous through inside walls. Pack around pipes with fire proof self-supporting insulation material, properly sealed.

.2 Insulate complete system including piping, fittings, valves, unions, flanges, strainers. Do not insulate flexible connections and expansion joints. Terminate insulation neatly with plastic material trowelled on a bevel.

.3 Finish insulation neatly at hangers, supports and other protrusions.

.4 Locate insulation or cover seams in least visible locations. Locate seams on piping in ceiling spaces on the underside of the pipe.

.5 Provide recovering jackets on exposed insulation throughout, including equipment rooms. Insulation located in pipe shafts and suspended ceiling spaces is not considered exposed. Make smooth uneven insulated surfaces before recovering.

.6 Cover insulation exposed to outdoors with aluminum jacket secured with aluminum bands on 200mm center. Lap circumferential joints 75mm minimum and seal with compatible waterproof lap cement. Lock form longitudinal joints and seal.

.7 Cold Piping: Seal lap joints with 100% coverage of vapor barrier adhesive. Seal butt joints with 50mm wide strips of vapor barrier sealed with vapor barrier adhesive. For fittings and valves, apply hydraulic insulating cement; or apply factory fabricated insulation half shells, seal all laps and joints.

.8 Flare out staples may be used to secure jacket laps on hot systems. Staples are to be applied on 100mm centers.

.9 Hot Piping: For fittings and valves, apply hydraulic insulating cement; or apply factory fabricated insulation half shells.

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

3.02 INSULATION THICKNESS SCHEDULE

	Piping	Pipe Sizes mm	Insulation Thickness mm	Recovery Jacket
.1	Domestic Cold Water Piping	15 to 20 25and Over	15 25	LoSmoke PVC*
.2	Domestic Hot Water Supply and Recirculation Piping	15 to 50 Over 50	25 40	LoSmoke PVC*
.3	Domestic Hot Water Piping (Outdoor)	15 to 50 64 to 102 ≥ 127	64 76 89	Aluminum
.4	Domestic Cold Water Piping (Outdoor)	All Sizes	50	Aluminum
.5	Condensate Drains from Equipment (Indoor)	15 to 20 25 and Over	15 25	LoSmoke PVC*
.6	Roof Drains and complete storm drainage piping within building	All sizes	25	LoSmoke PVC*
.7	Vents within 3m of roof or wall Outlet	All Sizes	25	LoSmoke PVC*

* Colour of PVC jacketing in all exposed areas shall be coordinated with General Contractor and Architect prior to ordering and install (e.g. black PVC in Foyer, white PVC in Field House).

NOTE: Pipe insulation for piping installed in 50mm x 100mm wall cavity can be reduced to 15mm, for pipe sizes 40mm to 65mm . Install insulation to thickness specified for piping outside the wall cavity.
Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

END OF SECTION