

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 23 05 29 Pipe Hangers & Supports for HVAC Equipment and Piping
- .2 Section 23 33 00 - Air Duct Accessories
- .3 Section 23 33 14 - Dampers - Balancing
- .4 Section 23 33 16 - Fire & Smoke Dampers
- .5 Section 23 51 00 - Breeching, Chimneys & Stacks

1.2 REFERENCES

- .1 Definitions:
 - .1 For purposes of this section:
 - .1 "CONCEALED" - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces.
 - .2 "EXPOSED" - means "not concealed" as previously defined.
 - .3 Insulation systems - insulation material, fasteners, jackets, and other accessories.
 - .2 TIAC Codes:
 - .1 CRD: Code Round Ductwork,
 - .2 CRF: Code Rectangular Finish.
 - .3 Reference Standards:
 - .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
 - .1 ANSI/ASHRAE/IESNA 90.1; Energy Standard for Buildings Except Low-Rise Residential Buildings.
 - .2 ASTM International Inc.
 - .1 ASTM B 209M, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
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- .2 ASTM C 335, Standard Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
- .3 ASTM C 411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
- .4 ASTM C 449/C 449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
- .5 ASTM C 547, Standard Specification for Mineral Fiber Pipe Insulation.
- .6 ASTM C 553, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
- .7 ASTM C 612, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- .8 ASTM C 795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
- .9 ASTM C 921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 51-GP-52Ma, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
- .4 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (2005).
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
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- .1 Provide manufacturer's printed product literature and datasheets for duct insulation, and include product characteristics, performance criteria, physical size, finish and limitations.
 - .1 Description of equipment giving manufacturer's name, type, model, year and capacity.
 - .2 Details of operation, servicing and maintenance.
 - .3 Recommended spare parts list.
- .3 Shop Drawings:
 - .1 Provide drawings in accordance with Section 01 33 00 Submittal Procedures.
- .4 Manufacturers' Instructions:
 - .1 Provide manufacture's written duct insulation jointing recommendations, and special handling criteria, installation sequence, cleaning procedures.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .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.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address and ULC markings.

PART 2 PRODUCTS

2.1 FIRE AND SMOKE RATING

- .1 To CAN/ULC-S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.2 INSULATION

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- .1 Mineral fibre: as specified includes glass fibre, rock wool, slag wool.
 - .2 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C 335.
 - .3 TIAC Code C-1: Rigid mineral fibre board to ASTM C 612, with factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this Section).
 - .4 TIAC Code C-2: Mineral fibre blanket to ASTM C 553 faced with factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this section).
 - .1 Mineral fibre: to ASTM C 553.
 - .2 Jacket: to CGSB 51-GP-52Ma.
 - .3 Maximum "k" factor: to ASTM C 553.

2.3 JACKETS

- .1 Lagging adhesive: compatible with insulation.
- .2 Stainless steel (for outdoor ductwork only):
 - .1 Type: 316.
 - .2 Thickness: 0.25 mm sheet.
 - .3 Finish: Stucco embossed.
 - .4 Jacket banding and mechanical seals: 19 mm wide, 0.5 mm thick stainless steel.

2.4 ACCESSORIES

- .1 Vapour retarder lap adhesive:
 - .1 Water based, fire retardant type, compatible with insulation.
 - .2 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449.
 - .3 Tape: self-adhesive, aluminum, reinforced, 50 mm wide minimum.
 - .4 Contact adhesive: quick-setting.
 - .5 Tie wire: 1.5 mm stainless steel.
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- .6 Banding: 19 mm wide, 0.5 mm thick stainless steel.
- .7 Fasteners: 2 mm diameter pins with 35 mm square clips, length to suit thickness of insulation.

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 test ductwork systems complete, witnessed and certified.
- .2 Ensure surfaces are clean, dry and free from foreign material.

3.3 INSTALLATION

- .1 Install in accordance with TIAC National Standards.
- .2 Apply materials in accordance with manufacturer's instructions and as indicated.
- .3 Use 2 layers with staggered joints when required nominal thickness exceeds 75 mm.
- .4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Ensure hangers, and supports are outside vapour retarder jacket.
- .5 Hangers and supports in accordance with Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.
 - .1 Apply high compressive strength insulation where insulation may be compressed by weight of ductwork.
- .6 Fasteners: install at 300 mm on centre in horizontal and vertical directions, minimum 2 rows each side.

3.4 DUCTWORK INSULATION SCHEDULE

- .1 Insulation types and thicknesses: conform to following table:

	<u>TIAC Code</u>	<u>Vapour Retarder</u>	<u>Thickness (mm)</u>	<u>Jacketed</u>
Supply, return and exhaust ducts in ceiling plenums	C-2	yes	25	no

Supply, return and exhaust ducts in mechanical service rooms	C-1	yes	25	yes
Outside air ducts to mixing plenum or equip intake	C-1	yes	50	yes
Mixing plenums	C-1	yes	25	yes
Exhaust duct between dampers and outside air louvres	C-2	yes	50	yes
Exhaust duct within 4.0 m of building envelope penetration	C-2	yes	50	yes
Round intake air/ Exhaust air ducts Misc small (<300 mm)	C-2	yes	25	no

3.5 CLEANING

.1 Clean in accordance with Section 01 74 00 - Cleaning and Waste Management.

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

END OF SECTION
