

## **PART 1 - GENERAL**

### **1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.

### **1.2 REFERENCES**

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
    - .1 ANSI/ASHRAE/IESNA 90.1-2010, SI; Energy Standard for Buildings Except Low-Rise Residential Buildings.
  - .2 American Society for Testing and Materials International, (ASTM)
    - .1 ASTM B 209M-10, Specification for Aluminum and Aluminum Alloy Sheet and Plate (Metric).
    - .2 ASTM C 335/C335M-10E1, Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
    - .3 ASTM C 411-11, Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
    - .4 ASTM C 449-07(2013), Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
    - .5 ASTM C 547-12, Specification for Mineral Fiber Pipe Insulation.
    - .6 ASTM C 553-13, Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
    - .7 ASTM C 612-10, Specification for Mineral Fiber Block and Board 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 (R1999).
  - .5 Underwriters Laboratories of Canada (ULC)
    - .1 CAN/ULC-S102-10, Surface Burning Characteristics of Building Materials and Assemblies.
    - .2 CAN/ULC-S701-11, Thermal Insulation Polyotrene, Boards and Pipe Covering.
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### **1.3 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" - will mean "not concealed" as defined herein.
  - .3 Insulation systems - insulation material, fasteners, jackets, and other accessories.
  
- .2 TIAC Codes:
  - .1 CRD: Code Round Ductwork,
  - .2 CRF: Code Rectangular Finish.

### **1.4 SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
  
- .2 Submit for approval manufacturer's catalogue literature related to installation, fabrication for duct jointing recommendations.

### **1.5 MANUFACTURERS' INSTRUCTIONS**

- .1 Submit manufacturer's installation instructions in accordance with Section 01 33 00 - Submittal Procedures.
  
- .2 Installation instructions to include procedures used, and installation standards achieved.

### **1.6 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 member of TIAC.

### **1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
  
  - .2 Protect from weather and construction traffic.
  
  - .3 Protect against damage from any source.
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- .4 Store at temperatures and conditions recommended by manufacturer.

## **PART 2 - PRODUCTS**

### **2.1 FIRE AND SMOKE RATING**

- .1 In accordance with CAN/ULC-S102-10:
  - .1 Maximum flame spread rating: 25.
  - .2 Maximum smoke developed rating: 50.

### **2.2 INSULATION**

- .1 Mineral fibre: as specified includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24° C mean temperature when tested in accordance with ASTM C 335-10E1.
- .3 TIAC Code C-1: Rigid mineral fibre board to ASTM C 612-10, with or without 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 553-13 faced with or without factory applied vapour retarder jacket to CGSB 51-GP-52MA (as scheduled in PART 3 of this section).
  - .1 Mineral fibre: to ASTM C 553-13.
  - .2 Jacket: to CGSB 51-GP-52MA.
  - .3 Maximum "k" factor: to ASTM C 553-13.

### **2.3 JACKETS**

- .1 Canvas:
  - .1 220 gm/m<sup>2</sup> cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921-03.
- .2 Lagging adhesive: Compatible with insulation.

### **2.4 ACCESSORIES**

- .1 Vapour retarder lap adhesive:
    - .1 Water based, fire retardant type, compatible with insulation.
  - .2 Indoor Vapour Retarder Finish:
    - .1 Vinyl emulsion type acrylic, compatible with insulation.
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- .3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449-07.
- .4 ULC Listed Canvas Jacket:
  - .1 220 gm/m<sup>2</sup> cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921-03 untreated.
- .5 Tape: self-adhesive, aluminum, plain reinforced, 50 mm wide minimum.
- .6 Contact adhesive: quick-setting
- .7 Canvas adhesive: washable.
- .8 Tie wire: 1.5 mm stainless steel.
- .9 Banding: 19 mm wide, 0.5mm thick stainless steel.
- .10 Fasteners: 4 mm diameter pins with 35 mm diameter clips, length to suit thickness of insulation.

### **PART 3 - EXECUTION**

#### **3.1 PRE-INSTALLATION REQUIREMENTS**

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

#### **3.2 INSTALLATION**

- .1 Install in accordance with TIAC National Standards.
  - .2 Apply materials in accordance with manufacturers instructions and as indicated.
  - .3 Use two layers with staggered joints when required nominal 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.
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- .1 Apply high compressive strength insulation where insulation may be compressed by weight of ductwork.
- .6 Fasteners: At 300 mm oc in horizontal and vertical directions, minimum two rows each side.

### **3.3 DUCTWORK INSULATION SCHEDULE**

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

	<u>TIAC Code</u>	<u>Vapour Retarder</u>	<u>Thickness (mm)</u>
Exhaust and Supply duct between dampers and outdoors, or minimum 3 meters	C-1	yes	50

- .2 Insulation finishes: conform to the following table:

<u>Location</u>	<u>Finish</u>
Exposed rectangular duct	Canvas
Exposed round duct	Canvas or PVC
Concealed ducts	None