

PART 1 - GENERAL

- 1.1 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.
- .2 Reference Standards:
- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
    - .1 ANSI/ASHRAE/IESNA 90.1, SI; 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).
    - .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.
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1.1 REFERENCES  
(Cont'd)

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- .2 Reference Standards: (Cont'd)
- .2 (Cont'd)
- .7 ASTM C 612, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- .8 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 Green Seal Environmental Standards (GSES)
- .1 Standard GS-36, Commercial Adhesives.
- .5 South Coast Air Quality Management District (SCAQMD), California State
- .1 SCAQMD Rule 1168, Adhesive and Sealant Applications.
- .6 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.
- .7 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.

1.2 ACTION AND  
INFORMATIONAL  
SUBMITTALS

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- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
- .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.
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1.2 ACTION AND  
INFORMATIONAL  
SUBMITTALS  
(Cont'd)

- .3 Shop Drawings:
  - .1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
- .4 Samples:
  - .1 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed.
  - .2 Mount sample on 12 mm plywood board.
  - .3 Affix typewritten label beneath sample indicating service.
- .5 Manufacturers' Instructions:
  - .1 Provide manufacture's written duct insulation jointing recommendations. and special handling criteria, installation sequence and cleaning procedures.

1.3 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.

1.4 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.
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## 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 .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, will 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 Canvas:
- .1 220 gm/m<sup>2</sup> cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.
- .2 Lagging adhesive: compatible with insulation.
- .3 Aluminum:
- .1 To ASTM B 209 with and without moisture barrier as scheduled in PART 3 of this section.
  - .2 Thickness: 0.50 mm sheet.
  - .3 Finish: Smooth.
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- 2.3 JACKETS (Cont'd)
- .3 Aluminum: (Cont'd)
    - .4 Jacket banding and mechanical seals: 12 19 mm wide, 0.5 mm thick stainless steel.
      - .1 Stainless steel:
    - .5 Type: 316.
    - .6 Thickness: 0.25 0.50 mm sheet.
    - .7 Finish: Smooth.
- 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.
  - .3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449.
  - .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 untreated.
  - .5 Outdoor Vapour Retarder Mastic:
    - .1 Vinyl emulsion type acrylic, compatible with insulation.
    - .2 Reinforcing fabric: Fibrous glass, untreated 305 g/m<sup>2</sup>.
  - .6 Tape: self-adhesive, aluminum, reinforced, 50 75 mm wide minimum.
  - .7 Contact adhesive: quick-setting
  - .8 Canvas adhesive: washable.
    - .1 Maximum VOC limit 50 200 250 g/L to SCAQMD Rule 1168 GSES GS-36.
  - .9 Tie wire: 1.5 mm stainless steel.
  - .10 Banding: 12 mm wide, 0.5 mm thick stainless steel.
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| <u>2.4 ACCESSORIES</u><br>(Cont'd) | .11 | Facing: 25 mm stainless or galvanized steel hexagonal wire mesh stitched on one face of insulation. |
|                                    | .12 | Fasteners: 4 mm diameter pins with 35 mm diameter clips, length to suit thickness of insulation.    |

PART 3 - EXECUTION

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| <u>3.1 APPLICATION</u> | .1 | Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets. |
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| <u>3.2 PRE-<br/>INSTALLATION<br/>REQUIREMENTS</u> | .1 | Pressure test ductwork systems complete, witness and certify. |
|   | .2 | Ensure surfaces are clean, dry, free from                     |
|   | .2 | Ensure surfaces are clean, dry, free from foreign material.   |

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| <u>3.3 INSTALLATION</u> | .1 | Install in accordance with TIAC National Standards.                                     |
|                         | .2 | Apply materials in accordance with manufacturers 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.                        |
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- 3.3 INSTALLATION  
(Cont'd)
- .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:

Duct Type	TIAC Code	Vapour Retarder	Thickness (mm)
Rectangular Cold and Dual Temperature Supply Air Ducts	C-1	Yes	50
Rectangular Warm Air Ducts	C-1	No	25
Supply, Return and Exhaust Ducts Exposed in Space being Served	C-1	Yes	25
Outside Air Ducts to Mixing Plenum	C-1	Yes	25
Mixing Plenums	C-1	Yes	25
Exhaust Duct between Dampers and Louvres	C-1	No	25

3.4 DUCTWORK .1 (Cont'd)  
INSULATION SCHEDULE  
(Cont'd)

- .2 Exposed round ducts 600 mm and larger, smaller sizes where subject to abuse:  
.1 Use TIAC code C-1 insulation, scored to suit diameter of duct.  
.1 Finishes: conform to following table:

	TIAC Code	
	Rectangular	Round
Indoor, concealed	none	none
Indoor, exposed within mechanical room	CRF/1	CRD/2
Indoor, exposed elsewhere	CRF/2	CRD/3
Outdoor, exposed to precipitation	CRF/3	CRD/4
Outdoor, elsewhere	CRF/4	CRD/5

- 3.5 CLEANING .1 Clean in accordance with Section 01 74 11 - Cleaning.  
.1 Remove surplus materials, excess materials, rubbish, tools and equipment.  
.2 Waste Management: separate waste materials for reuse and recycling.