

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) | .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 | .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. |

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/m² 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/m² 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/m².
- .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.

- 2.4 ACCESSORIES
(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

- 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, witness and certify.
 - .2 Ensure surfaces are clean, dry, free from
 - .2 Ensure surfaces are clean, dry, free from foreign material.

- 3.3 INSTALLATION
- .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.