

PART 1 - GENERAL

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM C 423-09a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - .2 ASTM C 916-85(2007), Standard Specification for Adhesives for Duct Thermal Insulation.
 - .3 ASTM C 1071-12, Standard specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
 - .4 ASTM C 1338-08, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
 - .5 ASTM G 21-09, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- .2 Canada Green Building Council (CaGBC)
 - .1 LEED Canada 2009 for Design and Construction, LEED Canada 2009 for Design and Construction Leadership in Energy and Environmental Design Green Building Rating System Reference Guide.
- .3 National Fire Protection Association (NFPA)
 - .1 NFPA 90A-12, Standard for the Installation of Air Conditioning and Ventilating Systems.
 - .2 NFPA 90B-12, Standard for the Installation of Warm Air Heating and Air Conditioning Systems.
- .4 North American Insulation Manufacturers Association (NAIMA)
 - .1 NAIMA AH116-2002, Fibrous Glass Duct Construction Standards.
- .5 Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)
 - .1 SMACNA, HVAC Duct Construction Standards, Metal and Flexible-2005.
- .6 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.2 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for duct liners and include product characteristics, performance criteria, physical size, finish and limitations.
 - .3 Sustainable Design Submittals:
 - .1 LEED Canada submittals: in accordance with Section 01 35 21 - LEED Requirements.
 - .2 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
 - .3 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
 - .4 Regional Materials: submit evidence that project incorporates required percentage 30 % of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
 - .5 Construction IAQ Management Plan:
 - .1 Submit Indoor Air Quality (IAQ) Plan for construction and pre-occupancy phases of building.

1.3 CLOSEOUT
SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Operation and Maintenance Data: submit operation and maintenance data for duct liners for incorporation into manual.
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1.4 DELIVERY,
STORAGE AND
HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect duct liners from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21 - LEED Requirements.
- .5 Packaging Waste Management: remove for reuse or return of pallets, crates, padding, banding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.

PART 2 - PRODUCTS

2.1 DUCT LINER

- .1 General:
 - .1 Mineral Fibre duct liner: air surface coated mat facing.
 - .2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50 when tested in accordance with CAN/ULC-S102 and NFPA 90A NFPA 90B.
 - .3 Recycled Content: EcoLogo certified with minimum 35% by weight recycled content.
 - .4 Fungi resistance: to ASTM C 1338 and ASTM G 21.

2.1 DUCT LINER
(Cont'd)

- .2 Rigid:
 - .1 Use on flat surfaces.
 - .2 25 mm thick, to ASTM C 1071 Type 2, fibrous glass rigid board duct liner.
 - .3 Density: 48 kg/m³ minimum.
 - .4 Thermal resistance to be minimum 0.76 (m².degrees C)/W for 25 mm thickness 1.15 (m².degrees C)/W for 38 mm thickness 1.53 (m².degrees C)/W for 50 mm thickness when tested in accordance with ASTM C 177, at 24 degrees C mean temperature.
 - .5 Maximum velocity on faced air side: 20.3 m/s.
 - .6 Minimum NRC of 0.70 at 25 mm thickness based on Type A mounting to ASTM C 423.
 - .7 Recycled Content: EcoLogo certified containing minimum 45% by weight recycled content.

- .3 Flexible:
 - .1 Use on round or oval surfaces.
 - .2 25 mm thick, to ASTM C 1071 Type 1, fibrous glass blanket duct liner.
 - .3 Density: 24 kg/m³ minimum.
 - .4 Thermal resistance to be minimum 0.37 (m².degrees C)/W for 12 mm thickness 0.74 (m².degrees C)/W for 25 mm thickness 1.11 (m².degrees C)/W for 38 mm thickness 1.41 (m².degrees C)/W to 50 mm thickness when tested in accordance with ASTM C 177, at 24 degrees C mean temperature.
 - .5 Maximum velocity on coated air side: 25.4 m/s.
 - .6 Minimum NRC of 0.65 at 25 mm thickness based on Type A mounting to ASTM C 423.

2.2 ADHESIVE

- .1 Adhesive: to NFPA 90A and NFPA 90B.

- .2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50. Temperature range minus 29 degrees C to plus 93 degrees C.

- .3 Water-based fire retardant type.

- .4 To meet VOC Limit requirements as specified in other sections.

- 2.3 JOINT TAPE .1 Poly-Vinyl treated open weave fiberglass membrane 50 mm wide.
- 2.4 SEALER .1 Meet requirements of NFPA 90A and NFPA 90B.
- .2 Flame spread rating shall not exceed 25.
Smoke development rating shall not exceed 50.
Temperature range minus 68 degrees C to plus 93 degrees C.

PART 3 - EXECUTION

- 3.1 EXAMINATION .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for duct liner installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 GENERAL .1 Do work in accordance with SMACNA HVAC Duct Construction Standard and NAIMA AH116.
- .2 Line inside of ducts where indicated.
- .3 Duct dimensions, as indicated, are clear inside duct lining.
- 3.3 DUCT LINER .1 Install in accordance with manufacturer's recommendations, and as follows:

3.5 CLEANING .3 Waste Management: (Cont'd)
 (Cont'd)

Waste Management and Disposal and Section
01 35 21 - LEED Requirements.
.1 Remove recycling containers and bins
 from site and dispose of materials at
 appropriate facility.