

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.
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- 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:

- 3.3 DUCT LINER .1 (Cont'd)
- (Cont'd)
- .1 Fasten to interior sheet metal surface with 100% coverage of adhesive to ASTM C 916.
- .1 Exposed leading edges and transverse joints to be factory coated or coated with adhesive during fabrication.
- .2 In addition to adhesive, impact driven mechanical fasteners to compress duct liner sufficiently to hold it firmly in place.
- .1 Spacing of mechanical fasteners in accordance with SMAC HVAC Duct Construction Standard.
- .2 In systems, where air velocities exceeds 20.3 m/s, install galvanized sheet metal nosing to leading edges of duct liner.
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- 3.4 JOINTS .1 Seal butt joints, exposed edges, weld pin and clip penetrations and damaged areas of liner with joint tape and sealer. Install joint tape in accordance with manufacturer's written recommendations, and as follows:
- .1 Bed tape in sealer.
- .2 Apply 2 coats of sealer over tape.
- .2 Replace damaged areas of liner at discretion of Departmental Representative.
- .3 Protect leading and trailing edges of duct sections with sheet metal nosing having 15 mm overlap and fastened to duct.
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- 3.5 CLEANING .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition
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3.5 CLEANING
(Cont'd)

- .3 Waste Management: (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.