

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)
  - .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 Installation of Warm Air Heating and Air-Conditioning Systems.
  - .4 Sheet Metal and Air-Conditioning Contractors' National Association (SMACNA)
    - .1 SMACNA HVAC Duct Construction Standards - Metal and Flexible, 2005.
  - .5 Underwriters' Laboratories (UL)
    - .1 UL 181-2005, Standard for Factory-Made Air Ducts and Air Connectors.
  - .6 Underwriters' Laboratories of Canada (ULC)
    - .1 CAN/ULC-S110-2007, Standard Methods of Tests for Air Ducts.
- 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 flexible ducts and include product characteristics, performance criteria, physical size, finish and limitations.
    - .2 Indicate:
      - .1 Thermal properties.
      - .2 Friction loss.
      - .3 Acoustical loss.
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- 1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)
- .2 Product Data: (Cont'd)
    - .2 Indicate: (Cont'd)
      - .4 Leakage.
      - .5 Fire rating.
  - .3 Test and Evaluation Reports:
    - .1 Catalogue or published ratings to be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.
  - .4 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 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.
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- 1.3 DELIVERY,  
STORAGE AND  
HANDLING  
(Cont'd)
- .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 flexible ducts 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 GENERAL
- .1 Factory fabricated to CAN/ULC-S110.
  - .2 Pressure drop coefficients listed below are based on relative sheet metal duct pressure drop coefficient of 1.00.
  - .3 Flame spread rating not to exceed 25. Smoke developed rating not to exceed 50.
- 2.2 METALLIC -  
INSULATED
- .1 Type 2: spiral wound flexible aluminum with factory applied, 37 mm thick flexible glass fibre thermal insulation with vapour barrier and vinyl or aluminum jacket.

2.2 METALLIC - .2 Performance:  
INSULATED  
(Cont'd)

- .1 Factory tested to 2.5 kPa without leakage.
- .2 Maximum relative pressure drop coefficient: 3.
- .3 Thermal loss/gain: 1.3 W/m<sup>2</sup>. degrees C mean.

2.3 NON-METALLIC - .1 Type 4: non-collapsible, coated aluminum  
INSULATED foil/mylar type mechanically bonded to, and helically supported by, external steel wire with factory applied, 37 mm thick flexible mineral fibre thermal insulation with vapour barrier and vinyl jacket, as indicated.

.2 Performance:  
.1 Factory tested to 2.5 kPa without leakage.  
.2 Maximum relative pressure drop coefficient: 3.  
.3 Thermal loss/gain: 1.3 W/m<sup>2</sup>. degrees C mean.

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 flexible ducts 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 DUCT  
INSTALLATION .1 Install in accordance with: CAN/ULC-S11, NFPA  
90A, NFPA 90B and SMACNA.
- 3.3 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  
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.