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**Part 1            General**

**1.1               RELATED REQUIREMENTS**

- .1      Section 23 05 00 – Common Work Results for HVAC.
- .2      Section 23 07 13 – Duct Insulation

**1.2               REFERENCES**

- .1      American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)
- .2      National Fire Protection Association (NFPA)
  - .1          NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.
  - .2          NFPA 90B, Standard for Installation of Warm Air Heating and Air-Conditioning Systems.
- .3      Sheet Metal and Air-Conditioning Contractors' National Association (SMACNA)
  - .1          SMACNA HVAC Duct Construction Standards - Metal and Flexible, 2005.
  - .2          SMACNA IAQ Guideline for Occupied Buildings under Construction, 2005.
- .4      Underwriters' Laboratories (UL)
  - .1          UL 181-2005, Standard for Factory-Made Air Ducts and Air Connectors.
- .5      Underwriters' Laboratories of Canada (ULC)
  - .1          CAN/ULC-S110-2007, Standard Methods of Tests for Air Ducts.

**1.3               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.
    - .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.

- .2 Construction IAQ Management Plan:
  - .1 Submit Indoor Air Quality (IAQ) Plan for pre-occupancy phases of building.
  - .2 During construction meet or exceed the requirements of SMACNA IAQ Guideline for Occupied Buildings Under Construction.

#### **1.4 MATERIALS/PRODUCT REPLACEMENT**

- .1 Where materials or products are specified by their trademark, consult the Instructions to Bidders document for the procedures to follow regarding the request for approval for materials or product replacement.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements 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 off ground, ideally indoors or in a clean, dry, well ventilated area and in accordance with manufacturer's recommendations.
  - .2 Store and protect flexible ducts from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

### **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 METAL DUCTS - UNINSULATED**

- .1 Type 1: Flexible duct: spiral wound flexible aluminum.
- .2 Performance:
  - .1 Factory tested to 1.5 kPa without leakage.
  - .2 Maximum relative pressure drop coefficient: 3.

#### **2.3 METAL DUCTS - INSULATED**

- .1 Type 1: Flexible duct: spiral wound flexible aluminum, factory coated of an flexible minerale fiber insulating having a thickness of 25 mm. All with a vapour barrier jacket and a reinforced liner laminated mylar.
- .2 Performance:

- .1 Factory tested to 1.5 kPa without leakage.
- .2 Maximum relative pressure drop coefficient: 3.
- .3 Thermal conductivity: average of  $0.04 \text{ W/m}^2\text{-}^\circ\text{C}$  at  $24^\circ\text{C}$ , according to ASTM C-518 et C-177

## 2.4 METAL DUCTS SOUNDPROOF, MEDIUM PRESSURE

- .1 Type 2: flexible duct: spiral wound flexible perforated aluminum, factory coated of an flexible acoustical insulating having a thickness of 25 mm. All with a vapour barrier jacket and a reinforced liner laminated mylar.
- .2 Performance:
  - .1 Factory tested to 1.5 kPa without leakage.
  - .2 Maximum relative pressure drop coefficient: 3.
  - .3 Thermal conductivity: average of  $0.04 \text{ W/m}^2\text{-}^\circ\text{C}$  at  $24^\circ\text{C}$ , according to ASTM C-518 et C-177.
  - .4 Sound attenuation: minimum values (dB/m) according to the following table:

Duct Diameter	Frequency (Hz)				
(mm)	125	250	500	1000	2000
100	0.6	3	12	27	0
150	1.2	3	12	22	27
200	2.0	5	12	19	20
300	2.4	5	12	16	15

## 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-S110 and NFPA 90A.

### 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 recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**