

**Part 1 General**

**1.1 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Indicate following:
  - .1 Sealants.
  - .2 Tape.
  - .3 Proprietary Joints.

**1.2 CERTIFICATION OF RATINGS**

- .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

**1.3 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan

**Part 2 Products**

**2.1 DUCT SYSTEM PRESSURE CLASS**

- .1 Fabricate duct and duct system components to SMACNA 250 Pa pressure class.

**2.2 SEAL CLASSIFICATION**

- .1 Classification as follows:

Maximum Pressure Pa	SMACNA Seal Class
500	B
- .2 Seal classification:
  - .1 Class A: longitudinal seams, transverse joints, duct wall penetrations and connections made airtight with sealant and tape.
  - .2 Class B: longitudinal seams, transverse joints and connections made airtight with sealant, tape or combination thereof.
  - .3 Class C: transverse joints and connections made air tight with gaskets, sealant or combination thereof. Longitudinal seams unsealed.

## 2.3 SEALANT

- .1 Sealant: water based, polymer type flame resistant duct sealant. Temperature range of minus 30 deg C to plus 93 deg C.
  - .1 Acceptable material: Foster 32-19, United, DuroDyne.

## 2.4 DUCT LEAKAGE

- .1 In accordance with SMACNA HVAC Duct Leakage Test Manual.

## 2.5 FITTINGS

- .1 Fabrication: to SMACNA.
- .2 Radiused elbows:
  - .1 Rectangular: Centreline radius of 1.5 times duct dimension in plane of rotation except where duct velocities are less than 4 m/s where radius may be reduced to 1 times.
  - .2 Round: Centreline radius of 1.5 times duct diameter except where duct velocities are less than 4 m/s where radius may be reduced to 1 times.
  - .3 Oval: Centreline radius of 1.5 times duct dimension in plane of rotation except where duct velocities are less than 4 m/s where radius may be reduced to 1 times.
- .3 Mitred elbows, rectangular (to be used only where shown or with permission of Departmental Representative):
  - .1 To 400 mm: with single thickness turning vanes.
  - .2 Over 400 mm: with double thickness turning vanes.
- .4 Branches:
  - .1 Rectangular main and branch: with radius on branch 1.5 times width of duct 45 deg. entry on branch.
  - .2 Round main and branch: enter main duct at 45 deg. with conical connection.
  - .3 Provide volume control damper in branch duct near connection to main duct.
- .5 Transitions:
  - .1 Diverging: 20 deg. maximum included angle.
  - .2 Converging: 30 deg. maximum included angle.
- .6 Offsets:
  - .1 Full short radiused elbows.

## 2.6 FIRESTOPPING

- .1 Retaining angles around duct, on both sides of fire separation.
- .2 Firestopping material and installation must not distort duct.

## 2.7 GALVANIZED STEEL

- .1 Lock forming quality: to ASTM A653, G90 zinc coating.
- .2 Thickness, fabrication and reinforcement: to SMACNA.
- .3 Joints: to SMACNA or proprietary manufactured duct joint. Proprietary manufactured flanged duct joint to be considered to be a class B seal.
  - .1 Acceptable material: Ductmate.

## 2.8 HANGERS AND SUPPORTS

- .1 Strap hangers: of same material as duct but next sheet metal thickness heavier than duct. Maximum size duct supported by strap hanger: 500 mm.
- .2 Hanger configuration: to SMACNA.
- .3 Hangers: black or galvanized steel angle with galvanized steel rods to SMACNA or following table (whichever is heavier construction).

Duct Size (mm)	Angle Size (mm)	Rod Size (mm)
up to 750	25x25x3	6
751 to 1050	40x40x3	6
1051 to 1500	40x40x3	10
1501 to 2100	50x50x3	10
2101 to 2400	50x50x5	10
- .4 Upper hanger attachments:
  - .1 For concrete: manufactured concrete inserts.
  - .2 For steel joist: manufactured joist clamp.
  - .3 For steel beams: manufactured beam clamps:

## Part 3 Execution

### 3.1 GENERAL

- .1 Do work in accordance with SMACNA.

- .2 Do not break continuity of insulation vapour barrier with hangers or rods on duct transporting cold air. Insulate strap hangers 100 mm beyond insulated duct.
- .3 Support risers in accordance with SMACNA.
- .4 Install breakaway joints in ductwork on sides of fire separation.
- .5 Install proprietary manufactured flanged duct joints in accordance with manufacturer's instructions.

### **3.2 HANGERS**

- .1 Strap hangers: install in accordance with SMACNA.
- .2 Angle hangers: complete with locking nuts and washers.
- .3 Hanger spacing: in accordance with SMACNA or following table (whichever is closer spacing).

Duct Size (mm)	Spacing (mm)
to 1500	3000
1501 and over	2500

### **3.3 WATERTIGHT DUCT**

- .1 Provide watertight duct for:
  - .1 Minimum 3000 mm from duct mounted humidifier in all directions.
  - .2 Minimum 3000 mm from each air intake.
  - .3 As indicated.
- .2 Form bottom of horizontal duct without longitudinal seams. Solder joints of bottom and side sheets. Seal other joints with duct sealer.
- .3 Slope horizontal branch ductwork down towards lowpoint. Slope header ducts down toward risers.

### **3.4 SEALING AND TAPING**

- .1 Apply sealant to outside of joint to manufacturer's recommendations.
- .2 Bed tape in sealant and recoat with minimum of one coat of sealant to manufacturers recommendations.

### **3.5 LEAKAGE TESTS**

- .1 Refer to Section 23 05 94 - Pressure Testing of Ducted Air Systems.

- .2 In accordance with SMACNA HVAC Duct Leakage Test Manual.
- .3 Do leakage tests in sections.
- .4 Make trial leakage tests as instructed to demonstrate workmanship.
- .5 Install no additional ductwork until trial test has been passed.
- .6 Test section minimum of 10 m long with not less than two branch takeoffs and two elbows.
- .7 Complete test before insulation or concealment.

**END OF SECTION 23 31 00**