

## PART 1 - GENERAL

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| <u>1.1 SUMMARY</u>                 | .1 | Section Includes:<br>.1 Materials and installation of low-pressure metallic ductwork, joints and accessories and Fire Rated Ductwork.  |
| <u>1.2 MEASUREMENT AND PAYMENT</u> | .1 | Payment for provision of all items specified in this Section shall be by Lot Price. No separate payment will be made for work specified in the Contract Documents. All costs incurred by Contractor in meeting with the requirements of this Section shall be included in the bid price for the Work.  |
| <u>1.3 REFERENCES</u>              | .1 | American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).  |
|                                    | .2 | American Society for Testing and Materials International, (ASTM).<br>.1 ASTM A480/A480M-12, Standard for General Specification Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.<br>.2 ASTM A635/A635M-09b, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot Rolled, Alloy Carbon Structure, High Strength Low Alloy and High Strength Low Alloy with Improved Formability, General Requirements For.<br>.3 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc Coated, Galvanized or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.<br>.4 ASTM A36/36M-08, Standard Specification for Carbon Structural Steel. |
|                                    | .3 | Department of Justice Canada (Jus).<br>.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.   |
|                                    | .4 | Health Canada/Workplace Hazardous Materials Information System (WHMIS).<br>.1 Material Safety Data Sheets (MSDS).  |
|                                    | .5 | National Fire Protection Association (NFPA).<br>.1 NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems, 2012 Edition.  |
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1.3 REFERENCES  
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- .5 (Cont'd)
- .2 NFPA 90B, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems, 2012 Edition.
- .6 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
  - .1 ANSI/SMACNA 006-2006, HVAC Duct Construction Standards - Metal and Flexible, 3rd Edition.
  - .2 ANSI/SMACNA 016-2012, HVAC Air Duct Leakage Test Manual, 2nd Edition.
- .7 Transport Canada (TC).
  - .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.4 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Section 01 33 00.
- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets for the following:
  - .1 Sealants.
  - .2 Tape.
  - .3 Proprietary Joints.

1.5 QUALITY  
ASSURANCE

- .1 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.
- .2 Health and Safety:
  - .1 Construction occupational health and safety in accordance with Section 01 35 29.
- .3 Indoor Air Quality (IAQ) Management Plan.
  - .1 Develop and implement an Indoor Air Quality (IAQ) Management Plan in accordance with Section 01 45 00.

1.6 DELIVERY,  
STORAGE AND  
HANDLING

- .1 Protect on site stored or installed absorptive material from moisture damage.
  - .2 Waste Management and Disposal:
    - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.
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1.6 DELIVERY,  
STORAGE AND  
HANDLING  
(Cont'd)

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- .2 (Cont'd)
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for reuse and recycling and place in designated containers Steel, Metal, Plastic, waste in accordance with Waste Management Plan.
- .5 Fold up metal and plastic banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 SEAL

- .1 Classification as follows:

CLASSIFICATION

Maximum Pressure Pa	SMACNA Seal Class
500	C
250	C
125	C
125	Unsealed

- .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
  - .3 Class C: transverse joints and connections made air tight with gaskets or sealant tape Longitudinal seams unsealed.
  - .4 Unsealed seams and joints.

2.2 SEALANT

- .1 Sealant: oil resistant, water borne polymer type flame resistant duct sealant. Temperature range of minus 30°C to plus 93°C.

2.3 TAPE .1 Tape: polyvinyl treated, open weave fiberglass tape, 50 mm wide.

2.4 DUCT LEAKAGE .1 In accordance with SMACNA HVAC Air Duct Leakage Test Manual.

2.5 FITTINGS .1 Fabrication: to SMACNA  
.2 Transitions:  
.1 Diverging: 20 degrees maximum included angle.  
.2 Converging: 30 degrees maximum included angle.  
.3 Offsets:  
.1 Full as indicated.  
.4 Obstruction deflectors: maintain full cross-sectional area.  
.1 Maximum included angles: as for transitions.

2.6 ALUMINUM .1 To SMACNA. Aluminum type: 3003-H-14.  
.2 Thickness, fabrication and reinforcement: to SMACNA  
.3 Joints: to SMACNA.

2.7 HANGERS AND SUPPORTS .1 Hangers and Supports:  
.1 Strap hangers: of same material as duct but next sheet metal thickness heavier than duct  
.1 Maximum size duct supported by strap hanger: 500.  
.2 Hanger configuration: to SMACNA.  
.3 Hangers: galvanized steel angle with galvanized steel rods to SMACNA following table:

Duct Size (mm)	Angle Size (mm)	Rod Size (mm)
up to 750	25 x 25 x 3	6
751 to 1050	40 x 40 x 3	6
1051 to 1500	40 x 40 x 3	10
1501 to 2100	50 x 50 x 3	10
2101 to 2400	50 x 50 x 5	10
2401 and over	50 x 50 x 6	10

2.7 HANGERS AND  
SUPPORTS

(Cont'd)

- .1 (Cont'd)
- .4 Building Attachments:
  - .1 Concrete inserts, powder actuated fasteners, or structural steel fasteners appropriate for building materials.
  - .2 Do not use powder actuated concrete fasteners for lightweight aggregate concrete or for slabs less than 102 mm thick.
  - .3 Upper Attachment (Concrete):
    - .1 Drive pin fastener and nail expansion anchor may be used for ducts up to 450 mm maximum dimension.
    - .2 Threaded stud fastener may be used for ducts up to 900 mm maximum dimension.
    - .3 Concrete attachments shall be made of steel.
  - .4 Upper Attachment (Steel):
    - .1 Do not attach hangers or supports to steel deck. Attach hangers or supports to structural steel members only.
    - .2 Provide hanger support members between structural steel members to suit hanger requirements. Hanger support members shall conform to ASTM A36/A36M. Hot-dip galvanize hanger support members and associated connecting plates after fabrication.
    - .3 No cutting or drilling of structural steel members will be permitted without prior approval of Contract Administrator.
  - .5 Trapeze Supports: Steel shapes conforming to ASTM A36/A36M, hot dipped galvanized after fabrication.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Do work in accordance with NFPA 90A, NFPA 90B, ASHRAE, SMACNA.
- .2 Do not break continuity of insulation vapour barrier with hangers or rods.
  - .1 Insulate strap hangers 100 mm beyond insulated duct.

3.1 GENERAL  
(Cont'd)

- .3 Install proprietary manufactured flanged duct joints in accordance with manufacturer's written instructions.
- .4 Interface between ductwork and louvers: at locations where ductwork is connected to louver for either intake or exhaust purposes, ductwork shall be installed, sloped, and connected to louver so water entering ductwork system positively drains back to and out of louver.

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 minimally as follows:

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

3.3 WATERTIGHT DUCT

- .1 Provide watertight duct for:
  - .1 Fresh air intake.
- .2 Form bottom of horizontal duct without longitudinal seams.
  - .1 Seal other joints with duct sealer.

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 FIELD  
QUALITY CONTROL

- .1 Verification requirements include:
  - .1 Materials and resources.
  - .2 Storage and collection of recyclables.
  - .3 Construction waste management.
  - .4 Resource reuse.
  - .5 Recycled content.
  - .6 Local/regional materials.
  - .7 Low-emitting materials.