

## **Part 1 - General**

### **1.1 SUMMARY**

- .1 This Section includes requirements for selective demolition and removal of existing gable end exhaust fans, and small interior fans, and related mechanical components and incidentals required to complete work described in this Section, ready for new construction.

### **1.2 REFERENCE STANDARDS**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA S350 M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

### **1.3 DEFINITIONS**

- .1 Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .3 Remove and Salvage: Detach items from existing construction and deliver them Departmental Representative, ready for reuse.
- .4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed and salvaged, or removed and reinstalled.
- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.

### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Action Submittals: Provide the following in accordance with Section 01 33 00 - Submittal Procedures before starting work of this Section:

- .1 Construction Waste Management Plan (CWM Plan): Submit plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19 - Waste Management and Disposal.
- .2 Landfill Records: Indicate receipt and acceptance of selective demolition waste [and hazardous wastes by a landfill facility licensed to accept hazardous wastes].

## 1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.

## 1.6 SITE CONDITIONS

- .1 Existing Conditions: Refer to section 02 82 00.01 for asbestos abatement minimum precautions.

## Part 2 - Products

### 2.1 REPAIR MATERIAL

- .1 General Patching and Repair Materials: Refer to Section 02 41 19 for listing of patching and repair materials incidental to removal or demolition of components associated with work of this Section.
- .2 HVAC Repair Materials: Use only new materials required for completion or repair matching materials damaged during performance of work of this Section; new materials are required to meet assembly or system characteristics as existing systems indicated to remain and carry CSA approval labels required by the Authority Having Jurisdiction.
- .3 Firestopping Repair Materials: Use firestopping materials compatible with existing firestopping systems where removal or demolition work affects rated assemblies, restore to match existing fire rated performance.

### 2.2 SALVAGE AND DEBRIS MATERIALS

- .1 Material Ownership: Demolished materials become Contractor's property, and will be removed from Project site, except for items indicated as being reused, salvaged, or otherwise indicated to remain Departmental Representative's property.
- .2 Salvaged Materials: Carefully remove materials designated for salvage and store in a manner to prevent damage or devaluation of materials.

### **Part 3 - Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Existing Conditions: Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid; Departmental Representative will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.

#### **3.2 PREPARATION**

- .1 Protection of Existing Systems to Remain: Protect systems and components indicated to remain in place during selective demolition operations and as follows:
  - .1 Prevent movement and install bracing to prevent settlement or damage of adjacent services and parts of existing buildings scheduled to remain.
  - .2 Notify Departmental Representative and cease operations where safety of buildings being demolished, adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.
  - .3 Prevent debris from blocking drainage inlets.
  - .4 Protect mechanical systems that must remain in operation.

#### **3.3 EXECUTION**

- .1 Demolition/Removal: Coordinate requirements of this Section with information contained in Section 02 41 19 and 02 41 19, and as follows:
  - .1 Disconnect and cap gas supply and electrical services in accordance with requirements of local Authority Having Jurisdiction.
  - .2 Do not disrupt active or energized utilities without approval of the Departmental Representative.
  - .3 Demolish parts of existing building to accommodate new construction and remedial work as indicated.
  - .4 At end of each day's work, leave worksite in safe condition.
  - .5 Perform demolition work in a neat and workmanlike manner:
    - .1 Remove any tools or equipment after completion of work, and leave site clean and ready for subsequent renovation work.
    - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.

#### **3.4 CLOSEOUT ACTIVITIES**

- .1 Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site or recycle centre, except where explicitly noted otherwise for materials being salvaged for reuse in new construction.

- .2 Hazardous Substances Disposal: Arrange for disposal of hazardous substances in accordance with requirements of Section 02 82 00.01.

**END OF SECTION**

## **Part 1 - General**

### **1.1 REFERENCES**

- .1 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
  - .1 SMACNA HVAC Duct Construction Standards, Metal and Flexible, 1995.
  - .2 SMACNA HVAC Air Duct Leakage Test Manual, 1985.
- .2 Canadian Standards Association (CSA).
  - .1 CSA B228.1-1968, Pipe Ducts and Fittings for Residential Type Air Conditioning Systems.
- .3 American Society for Testing and Materials (ASTM).
  - .1 ASTM A480/A480M-90, Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
  - .2 ASTM A525M-87, Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process. (Metric).
  - .3 ASTM A621/A621M-82 (1988), Specification for Steel Sheet and Strip, Carbon, Hot-Rolled, Drawing Quality.
- .4 National Fire Protection Association (NFPA).
  - .1 ANSI/NFPA 90A-1989, Installation of Air Conditioning and Ventilating Systems.
  - .2 ANSI/NFPA 90B-1989, Installation of Warm Air Heating and Air Conditioning Systems.
  - .3 ANSI/NFPA 96-1991, Vapour Removal from Cooking Equipment.

### **1.2 SHOP DRAWINGS AND PRODUCT DATA**

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

### **1.3 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.

## **Part 2 - Products**

### **2.1 SEAL CLASSIFICATION**

- .1 Ductwork classification as follows:

Pressure Class (Pa)	Seal Class	Leakage Class		Systems Applicability
		Rectangular	Round	
250	C	24	12	All systems

.2 Seal classification:

.1 Class C: transverse joints and connections made air tight with sealant. Longitudinal seams unsealed.

## 2.2 SEALANT

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

.1 Standard of Acceptance: Foster 30-02, Duro Dyne SWB.

## 2.3 TAPE

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

.1 Standard of Acceptance: Duro Dyne FT-2.

## 2.4 DUCT LEAKAGE

.1 New ductwork only in accordance with SMACNA HVAC Duct Leakage Test Manual.

## 2.5 FITTINGS

.1 Fabrication: to SMACNA.

.2 Radiused elbows:

.1 Rectangular: standard radius or short radius with single thickness turning vanes.

.2 Round: smooth radius piece. Centreline radius: 1.5 times diameter.

.3 Mitred elbows, rectangular:

.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° entry on branch.

.2 Round main and branch: enter main duct at 45°.

.3 Provide balancing dampers as indicated.

.5 Transitions:

.1 Diverging: 20° maximum included angle.

- .2 Converging: 30° maximum included angle.
- .6 Offsets:
  - .1 Short radiused elbows as indicated.
- .7 Obstruction deflectors: maintain full cross- sectional area. Maximum included angles: as for transitions.

## 2.6 FIRESTOPPING

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

## 2.7 GALVANIZED STEEL

- .1 To ASTM A525M, ASTM A90, ASTM G90 zinc coating.
- .2 Lock forming quality: to ASTM A527.
- .3 Thickness, fabrication and reinforcement: to ASHRAE and SMACNA.
- .4 Joints: to ASHRAE and SMACNA and proprietary manufactured duct joint. Proprietary manufactured flanged duct joint shall be considered to be a class A seal.
  - .1 Standard of Acceptance: Ductmate Canada Ltd., Namasco Ductmate, Exanno Nexus.

## 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: 510 mm.
- .2 Hanger configuration: to ASHRAE and SMACNA.
- .3 Hangers: black steel angle with black steel rods to the following table:

Duct Size (mm)	Angle Size (mm)	Rod Size (mm)
up to 750	25 x 25 x 3	6

- .4 Upper hanger attachments:
  - .1 For concrete: manufactured concrete inserts.
    - .1 Standard of Acceptance: Myatt fig. 485.
  - .2 For steel joist: manufactured joist clamp or steel plate washer.
    - .1 Standard of Acceptance: Grinnell fig. 61 or 86.
  - .3 For steel beams: manufactured beam clamps:
    - .1 Standard of Acceptance: Grinnell fig. 60.

## Part 3 - Execution

### 3.1 GENERAL

- .1 Do work in accordance with ASHRAE and SMACNA and as indicated.

- .2 Support risers in accordance with ASHRAE and SMACNA.
- .3 Install breakaway joints in ductwork on accessible side of fire separation.
- .4 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: as follows:

Duct Size (mm)	Spacing (mm)
to 1500	3000

### 3.3 SEALING AND TAPING

- .1 Apply sealant to outside of joint to manufacturer's recommendations.
- .2 Bed tape in sealant and recoat with minimum of 1 coat of sealant to manufacturers recommendations.
- .3 Where possible, form bottom edge of horizontal ductwork without longitudinal seam, and where unavoidable, seal bottom longitudinal seam with duct sealant.

### 3.4 LEAKAGE TESTS

- .1 In accordance with SMACNA HVAC Duct Leakage Test Manual for 312 and 250 Pa pressure class systems only.
- .2 Do leakage tests in sections.
- .3 Make trial leakage tests as instructed to demonstrate workmanship.
- .4 Install no additional ductwork until trial test has been passed.
- .5 Test section minimum of 10 m long with not less than 3 branch takeoffs and two 90° elbows.
- .6 Complete test before insulation or concealment.

**END OF SECTION**

## **Part 1 - General**

### **1.1 REFERENCES**

- .1 Canadian Standards Association (CSA).
  - .1 CSA B228.1-1968, Pipes, Ducts and Fittings for Residential Type Air Conditioning.

### **1.2 PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate the following:
  - .1 Flexible connections.
  - .2 Duct access doors.
  - .3 Turning vanes.
  - .4 Instrument test ports.

### **1.3 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.

### **1.4 SUSTAINABLE DESIGN SUBMITTALS**

- .1 Construction waste management plan.
  - .1 A Construction Waste Management Plan is in place to divert waste material from landfill. Wherever practical, send waste material for reuse or recycling, and generally document this for the contractor's waste management final report.
- .2 Adhesives and Sealants.
  - .1 Include following information with Product Data submission for materials specified under this section:
    - .1 Submit manufacturer's certification indicating VOC limits of Products used onsite and within the building envelope. Product shall comply with California's SCAQMD #1168.
- .3 Paints and Coatings.
  - .1 Provide low VOC Products as specified herein and complying with local regulations regarding toxic and hazardous materials.
  - .2 Ensure primers, paints and coatings used onsite and within building envelope meet or exceed requirements of following standards:
    - .1 Interior and Exterior Paints: GS-11
    - .2 Anti-Corrosive Paint: GS-11
    - .3 Clear Wood Finishes and other coating not covered in GS-11: SCAQMD #1113.

- .3 Submit manufacturer's certification indicating VOC limits of Products.
- .4 If requesting substitute product, ensure proposed substitution achieves above stated goals.

## **1.5 MAX. VOC CONTENT FOR SOLVENT CLEANING ACTIVITIES**

- .1 Following are some of the Maximum allowed VOC Content for following activities, as per SCAQMD Rule 1171-9 (refer to SCAQMD manual for complete list and updates):
  - .1 Product cleaning during onsite surface preparation for coatings or adhesives application, and repair and maintenance cleaning:
    - .1 General maximum VOC 25g/L.
    - .2 Electrical apparatus components and electronic components.
    - .3 Cleaning of coatings or adhesives application equipment max. VOC 25g/L.
  - .2 Refer to SCAQMD for additional information and clarification and complete list of applications.
  - .3 Any discrepancies are to be approved by Departmental Representative. Obtain written approval prior to use on site.

## **Part 2 - Products**

### **2.1 GENERAL**

- .1 Manufacture in accordance with CSA B228.1.

### **2.2 FLEXIBLE CONNECTIONS**

- .1 Frame: galvanized sheet metal frame 1.6 mm thick with fabric clenched by means of double locked seams.
- .2 Material:
  - .1 Fire resistant, self-extinguishing, neoprene coated glass fabric, temperature rated at minus 40°C to plus 90°C, density of 1 kg/m<sup>2</sup>.

### **2.3 ACCESS DOORS IN DUCTS**

- .1 Non-insulated ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame.
- .2 Insulated ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame and 25 mm thick rigid glass fibre insulation.
- .3 Gaskets: neoprene or foam rubber.
- .4 Hardware:
  - .1 Up to 300 x 300 mm: 2 sash locks complete with safety chain.
  - .2 301 to 450 mm: 4 sash locks complete with safety chain.

- .3 451 to 1000 mm: piano hinge and minimum 2 sash locks.
- .4 Doors over 1000 mm: piano hinge and 2 handles operable from both sides.
- .5 Hold open devices.
- .5 Standard of Acceptance: Nailer-Hart, Controlled Air, Ruskin.

## **2.4 TURNING VANES**

- .1 Factory or shop fabricated single thickness or double thickness to the recommendations of SMACNA and as indicated.

## **2.5 INSTRUMENT TEST PORTS**

- .1 Plastic plugs fitted to holes to maintain integrity of duct leakage classification.

## **Part 3 - Execution**

### **3.1 INSTALLATION**

- .1 Flexible connections:
  - .1 Install in following locations:
    - .1 Inlets and outlet of exhaust fan.
    - .2 As indicated.
  - .2 Length of connection: 100 mm.
  - .3 Minimum distance between metal parts when system in operation: 75 mm.
  - .4 Install in accordance with recommendations of SMACNA.
  - .5 When fan is running:
    - .1 Ducting on each side of flexible connection to be in alignment.
    - .2 Ensure slack material in flexible connection.
- .2 Access doors and viewing panels:
  - .1 Size:
    - .1 600 x 600 mm for person size entry.
    - .2 460 x 250 mm for servicing entry.
    - .3 300 x 300 mm for viewing.
    - .4 As indicated.
  - .2 Location:
    - .1 At fire dampers.
    - .2 At control dampers.
    - .3 At devices requiring maintenance.
    - .4 At locations required by code.
    - .5 Access inside plenums
    - .6 Elsewhere as indicated.
- .3 Instrument test ports.

- .1 General:
  - .1 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
  - .2 Locate to permit easy manipulation of instruments.
  - .3 Install insulation port extensions as required.
  - .4 Locations.
    - .1 For traverse readings:
      - .1 At inlets and outlets of fan systems.
      - .2 At main and sub-main ducts.
    - .2 As indicated.
- .4 Turning vanes:
  - .1 Install in accordance with recommendations of SMACNA and as indicated.

**END OF SECTION**

## **Part 1 - General**

### **1.1 REFERENCES**

- .1 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
- .1 SMACNA HVAC Duct Construction Standards, Metal and Flexible-1985.

### **1.2 PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

## **Part 2 - Products**

### **2.1 GENERAL**

- .1 Manufacture to SMACNA standards.

### **2.2 SINGLE BLADE DAMPERS**

- .1 Of same material as duct, but one sheet metal thickness heavier. V-groove stiffened.
- .2 Size and configuration to recommendations of SMACNA, except maximum height 250 mm.
- .3 Locking quadrant.
- .4 Inside and outside nylon or bronze end bearings.
- .5 Channel frame of same material as adjacent duct, complete with angle stop.

### **2.3 MULTI-BLADED DAMPERS**

- .1 Factory manufactured of material compatible with duct.
- .2 Opposed blade: configuration, metal thickness and construction to recommendations of SMACNA.
- .3 Maximum blade height: 100 mm.
- .4 Bearings: pin in bronze bushings.
- .5 Linkage: shaft extension with locking quadrant.
- .6 Channel frame of same material as adjacent duct, complete with angle stop.

## **Part 3 - Execution**

### **3.1 INSTALLATION**

- .1 Install where indicated.
- .2 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
- .3 All dampers to be vibration free.

**END OF SECTION**

## **Part 1 - General**

### **1.1 REFERENCES**

- .1 National Fire Protection Association (NFPA).
  - .1 ANSI/NFPA 90A-1989, Installation of Air Conditioning and Ventilating Systems.
- .2 Canadian Standards Association (CSA).
  - .1 CAN4-S112-M82 (R1987), Fire Test of Fire Damper Assemblies.
  - .2 CAN4-S112.2-M84, Fire Test of Ceiling Firestop Flap Assemblies.
- .3 Underwriters Laboratories of Canada (ULC).
  - .1 ULC-S505-1974, Fusible Links for Fire Protection Service.

### **1.2 PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate the following:
  - .1 Fire dampers.
  - .2 Operators.
  - .3 Fusible links.

### **1.3 MAINTENANCE DATA**

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

### **1.4 MAINTENANCE MATERIALS**

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide following:
  - .1 Six (6) fusible links of each type.

### **1.5 CERTIFICATION OF RATINGS**

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

## **Part 2 - Products**

### **2.1 FIRE DAMPERS**

- .1 Fire dampers: arrangement Type B, listed and bear label of ULC and ANSI/NFPA 90A. Fire damper assemblies to be fire tested in accordance with CAN4-S112.
- .2 Factory fabricated for fire rating requirement to maintain integrity of fire wall and/or fire separation.

- .1 Construction;
  - .1 Galvanized ductwork – Mild steel
  - .2 Stainless steel ductwork – Stainless steel (same grade)
- .3 Top hinged: Interlocking blade type; sized to maintain full duct cross section.
- .4 Fusible link actuated, weighted to close and lock in closed position when released or having negator-spring-closing operator for multi-leaf type or roll door type in horizontal position with vertical air flow.
- .5 40 x 40 x 3 mm retaining angle iron frame, on full perimeter of fire damper, on both sides of fire separation being pierced.
- .6 Acceptable material: Controlled Air, Maxam, Nailor, E.H. Price, Ruskin.

### **Part 3 - Execution**

#### **3.1 INSTALLATION**

- .1 Install in accordance with ANSI/NFPA 90A and in accordance with conditions of ULC listing.
- .2 Maintain integrity of fire separation.
- .3 After completion and prior to concealment obtain approvals of complete installation from Departmental Representative.
- .4 Install access door adjacent to each damper. See Section 23 33 00 - Air Duct Accessories.
- .5 Coordinate with installer of fire stopping.

**END OF SECTION**

## **Part 1 - General**

### **1.1 REFERENCES**

- .1 Air Movement and Control Association International, Inc. (AMCA).
  - .1 AMCA 99-1986, Standards Handbook.
  - .2 ANSI/AMCA 210-1985, Laboratory Methods of Testing Fans for Rating.
  - .3 AMCA 300-1985 Revised 1987, Reverberant Room Method for Sound Testing of Fans.
  - .4 AMCA 301-1990, Methods for Calculating Fan Sound Ratings from Laboratory Test Data.
- .2 American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE).
  - .1 ANSI/ASHRAE 51-1985, Laboratory Methods of Testing Fans for Rating.
- .3 Canadian General Standards Board (CGSB).
  - .1 CGSB 1-GP-181M-77, Coating, Zinc Rich, Organic, Ready Mixed.

### **1.2 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide fan curves and sound rating data, showing point of operation, electrical data, dimensions, construction and accessories.

### **1.3 OPERATION AND MAINTENANCE DATA**

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

### **1.4 MANUFACTURED ITEMS**

- .1 Catalogued or published ratings shall be those obtained from tests carried out by manufacturer or those ordered by him from independent testing agency signifying adherence to codes and standards in force.
- .2 Provide confirmation of testing.

## **Part 2 - Products**

### **2.1 FANS GENERAL**

- .1 Fans: statically and dynamically balanced, constructed in conformity with AMCA 99.
- .2 Sound ratings: comply with AMCA (Air Moving and Conditioning Association) 301, tested to AMCA 300. Unit shall bear AMCA certified sound rating seal.
- .3 Performance ratings: based on tests performed in accordance with ANSI/AMCA 210, and ANSI/ASHRAE 51. Unit shall bear AMCA certified rating seal.
- .4 Factory primed before assembly in colour standard to manufacturer.
- .5 Vibration isolation: spring-type base and hanging isolators c/w mounting brackets.

- .6 Flexible connections: to Section 23 33 00 - Duct Accessories.

## **2.2 IN-LINE CENTRIFUGAL FANS (EF-1)**

- .1 Fan:
  - .1 Welded aluminum construction
  - .2 Backward incline blade, non-overloading, statically and dynamically balanced.
  - .3 Stainless steel shaft.
  - .4 Stainless steel nameplate.
  - .5 Stainless steel hardware.
  - .6 Polyethylene extended lube lines.
  - .7 Variable speed V-Belt drive, 1.5 SF.
- .2 Bearings; heavy duty, split pillow-block pre-lubricated bearing, with dust excluding seals and a certified minimum rated life of 500,000 hours.
- .3 Disconnect switch in NEMA 4 enclosure, wired and mounted to unit.
- .4 Unit to be c/w backdraft damper, on discharge side, full opening size, aluminum blades.
- .5 Housing:
  - .1 Heavy gauge galvanized steel housing, painted (factory default color).
- .6 Motor:
  - .1 208V, 1ph, capable of 387 L/S (820 cfm) of airflow at 187 Pa (0.75" W.C.).
- .7 Acceptable material: Twin City Fan, Model BSI-100A.

## **2.3 DESTRATIFICATION FAN**

- .1 Inline destratification fan, aluminum housing, 333 mm diameter, 406 cfm, 800 sqft coverage area, 29 dB, c/w wall mounted variable speed controller. Electrical requirements: 17 W, 120V, 1-phase, 60 Hz.
- .2 Standard of Acceptance: Airius D-15-SP.

## **EXECUTION**

### **3.1 FAN INSTALLATION**

- .1 Install fans as indicated, complete with vibration isolators, flexible electrical leads and flexible connections.
- .2 Provide sheaves and belts required for final air balancing.
- .3 Bearings and extension tubes to be easily accessible.
- .4 Access doors and access panels to be easily accessible.

**END OF SECTION**

## **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 the following:
  - .1 Capacity
  - .2 Throws
  - .3 NC level
  - .4 Material and Finish
  - .5 Static Pressure Loss
  - .6 Connection Size

### **1.2 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.

### **1.3 MAINTENANCE DATA**

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

### **1.4 MAINTENANCE MATERIALS**

- .1 Provide maintenance materials in accordance with Section 01 78 00 – Closeout Submittals.
- .2 Include:
  - .1 Keys for volume control adjustment.
  - .2 Keys for air flow pattern adjustment.

### **1.5 MANUFACTURED ITEMS**

- .1 Grilles, registers and diffusers shall be product of one manufacturer for generic type, i.e., grilles and registers by one, diffusers by one, or same.

### **1.6 CERTIFICATION OF RATINGS**

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

## **Part 2 - Products**

### **2.1 GENERAL**

- .1 Provide standard product to meet capacity, noise level and neck size as indicated. NC = 25 max., S.P. drop = 25 Pa max.

- .2 Where grilles and registers penetrate fire walls and fire partitions, provide approved steel sleeve secured to structure in accordance with NFPA 90A-2009.
- .3 Frames:
  - .1 Steel: standard with exposed welded joints and mitered corners.
  - .2 Aluminum: extruded satin finish with mechanical fasteners and mitered corners.
  - .3 Provide full perimeter gaskets.
  - .4 Provide plaster frames as plaster stops where set into plaster or gypsum board at all locations.
- .4 Sizes and capacities: as indicated.

## **2.2 EXHAUST GRILLE TYPE E**

- .1 E-1, Size as indicated on drawings, 14 ga aluminum, square, louvered face with mounting frame to suit gypsum wall type, blades parallel with long dimension, 45 deg. deflection, 19mm spacing, off-white baked enamel finish.
  - .1 Standard of acceptance: E.H. Price 630, Titus, Nailor.
- .2 E-2, same as E-1 except 150 mm x 150 mm in size.

## **Part 3 - Execution**

### **3.1 INSTALLATION**

- .1 Install in accordance with manufacturer's instructions.
- .2 Install with stainless steel screws.

**END OF SECTION**