

## **PART 1 - GENERAL**

### **1.1 SUMMARY**

- .1 Section Includes:
  - .1 Fans, motors, accessories and hardware for commercial use.

### **1.2 REFERENCES**

- .1 Air Conditioning and Mechanical Contractors (AMCA)
  - .1 AMCA Publication 99-2003, Standards Handbook.
  - .2 AMCA 300-1996, Reverberant Room Method for Sound Testing of Fans.
  - .3 AMCA 301-1990, Methods for Calculating Fan Sound Ratings from Laboratory Test Data.
- .2 American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)
  - .1 ANSI/AMCA 210-1999, Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

### **1.3 SYSTEM DESCRIPTION**

- .1 Performance Requirements:
  - .1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards in force.
  - .2 Capacity: flow rate, static pressure, W, efficiency, revolutions per minute, power, model, size, sound power data and as indicated on schedule.
  - .3 Fans: statically and dynamically balanced, constructed in conformity with AMCA 99.
  - .4 Sound ratings: comply with AMCA 301, tested to AMCA 300.
  - .5 Performance ratings: based on tests performed in accordance with ANSI/AMCA 210.

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

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
    - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
  - .1 Submit shop drawings and product data in accordance with Section

01 33 00 - Submittal Procedures.

- .3 Provide :
  - .1 Fan performance curves showing point of operation, kW and efficiency.
  - .2 Sound rating data at point of operation.
  
- .4 Indicate:
  - .1 Motors, sheaves, bearings, shaft details.
  - .2 Minimum performance achievable with variable speed controllers.
  
- .5 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .2 Instructions: submit manufacturer's installation instructions.
    - .1 Contract Administrator will make available 1 copy of systems supplier's installation instructions.
  
- .6 Closeout Submittals:
  - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

#### **1.5 MAINTENANCE**

- .1 Extra Materials:
  - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

### **PART 2 - PRODUCTS**

#### **2.1 FANS GENERAL**

- .1 Capacity: flow rate, total pressure, bhp, efficiency, revolutions per minute, power, model, size, sound power data, as specified.
- .2 Fans: statically and dynamically balanced, constructed in conformity with AMCA 99.
- .3 Sound ratings: comply with AMCA (Air Moving and Conditioning Association) 301, tested to AMCA 300.
- .4 Performance ratings: based on tests performed in accordance with ANSI/AMCA

210, and ANSI/ASHRAE 51.

- .5 Motors:
  - .1 Sizes as indicated specified.
  - .2 Inverter duty where noted.
- .6 Accessories and hardware: matched sets of V-belt drives, adjustable motor bases, belt guards, coupling guards, outlet dampers and vanes as indicated.
- .7 Interior and exterior surfaces to be sandblasted to commercial standard, SSPC-SP6, with one Prime Coat 2 mils Mobil Zinc 4 Epoxy Val-Chem Zinc-Rich, one Intermediate Coat 5 mils Val-Chem Hi-Build Epoxy and one Finish Coat 2 mils Val-Chem Epoxy Enamel.
- .8 Scroll casing drains.
- .9 Bearing lubrication systems plus extension lubrication tubes where bearings are not easily accessible.
- .10 Vibration isolation: to Section 23 05 48 - Vibration Control for HVAC Equipment.
- .7 Flexible connections: to Section 23 33 00 - Air Duct Accessories.

**2.2 EXHAUST FAN, EF-1 (Fume Hood)**

- .1 Capacity:

Airflow (L/s)	731
Ext Static Pressure, (Pa)	375
Drive	Belt
Motor (kW)	0.56
Electrical	575/3/60

- .1 Fan wheels:
  - .1 Aluminum construction.
  - .2 Maximum operating speed of centrifugal fans not more than 50 % of first critical speed.
  - .3 Air foil blades.
- .2 Bearings: heavy duty split pillow-block grease lubricated ball or roller self aligning type with oil retaining, dust excluding seals and a certified minimum rated life of 200,000 hours in accordance with (Anti-Friction Bearing Manufacturers Association) AFBMA L-10 life standard. Bearings to be rated and selected in accordance with AFBMA 9 and AFBMA 11.
- .3 Housings:
  - .1 Volute with inlet cones: fabricated steel for wheels 300 mm or greater, steel for smaller wheels, braced, and with welded supports.
  - .2 Provide latched airtight access doors with handles.
- .6 Acceptable Product: CML Northern Blower Model 7500-1225 or approved equal in accordance with B6.

**2.2 EXHAUST FAN, EF-2**

.1 Capacity:

Aiflow (L/s)	354
Static Pressure, (Pa)	63
Drive	Belt
Motor (kW)	0.38
Electrical	120/1/60

.2 Housing/Cabinet Construction

- .1 Square design constructed of heavy gauge galvanized steel and shall include square duct mounting collars
- .2 Housing and bearing supports shall be constructed of heavy gauge bolted and welded steel construction to prevent vibration and to rigidly support the shaft and bearing assembly.

.3 Wheel:

- .1 Non-overloading, centrifugal wheel
- .2 Constructed of aluminum
- .3 Statically and dynamically balanced in accordance to AMCA Standard 204-05
- .4 The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency
- .5 Single thickness blades are securely riveted or welded to a heavy gauge back plate and wheel cone.

.4 Shafts and Bearings:

- .1 Fan shaft shall be ground and polished solid steel with an anti corrosive coating
- .2 Permanently sealed bearings or pillow block ball bearings
- .3

.5 Acceptable Product: Greenheck Model BSQ-80-5 or approved equal in accordance with B6.

**PART 3 - EXECUTION**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

**3.2 FAN INSTALLATION**

- .1 Install fans as indicated, complete with resilient mountings specified in Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment, flexible electrical leads and flexible connections in accordance with Section 23 33 00 - Air Duct Accessories.
- .2 Provide sheaves and belts required for final air balance.
- .3 Bearings and extension tubes to be easily accessible.

- .4 Access doors and access panels to be easily accessible.

### **3.4 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.

### **3.5 CLEANING**

- .1 Proceed in accordance with Section 01 74 00 - Cleaning and Waste Management.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.