PART 1 - GENERAL

1.1 REFERENCES

.1 American National Standards Institute/Air Movement and Control Association (ANSI/AMCA)
.1 ANSI/AMCA Standard 99-2010, Standards Handbook.
.2 ANSI/AMCA Standard 210-2007/(ANSI/ASHRAE 51-07), Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
.3 ANSI/AMCA Standard 300-2008, Reverberant Room Method for Sound Testing of Fans.
.4 ANSI/AMCA Standard 301 1990, Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

.2 Canada Green Building Council (CaGBC)
.1 LEED Canada 2009 for Design and Construction, LEED Canada 2009 for Design and Construction Leadership in Energy and Environmental Design Green Building Rating System Reference Guide.

.3 The Master Painters Institute (MPI)
.1 Architectural Painting Specification Manual - current edition.
.1 MPI #18, Primer, Zinc Rich, Organic.

1.2 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 HVAC fans and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Newfoundland and Labrador.
.2 Provide:
.1 Fan performance curves showing point of operation, kW and efficiency.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.3 Shop Drawings:(Cont'd)
.2 Provide:(Cont'd)
.2 Sound rating data at point of operation.
.3 Indicate:
.1 Motors, sheaves, bearings, shaft details.
.2 Minimum performance achievable with variable speed controllers.

.4 Sustainable Design Submittals:
.1 LEED Canada submittals: in accordance with Section 01 35 21 - LEED Requirements.
.2 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
.3 Recycled Content:
.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
.4 Regional Materials: submit evidence that project incorporates required percentage 30 % of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.3 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials:
.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
.1 Provide:
.1 Matched sets of belts.
.2 Furnish list of individual manufacturer's recommended spare parts for equipment, include:
.1 Bearings and seals.
.2 Addresses of suppliers.

1.3 MAINTENANCE MATERIAL SUBMITTALS (Cont'd)

.1 (Cont'd)
.1 (Cont'd)
.1 Provide:(Cont'd)

.3 List of specialized tools necessary for adjusting, repairing or replacing.

1.4 DELIVERY, STORAGE AND HANDLING

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

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21 - LEED Requirements.

.5 Packaging Waste Management: remove for reuse or return of pallets, crates, padding, banding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.

PART 2 - PRODUCTS

2.1 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, total 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 ANSI/AMCA Standard 99.
.4 Sound ratings: comply with ANSI/AMCA Standard 301, tested to ANSI/AMCA Standard 300. Supply unit with ANSI/AMCA certified sound rating seal.
.5 Performance ratings: based on tests performed in accordance with ANSI/AMCA Standard 210. Supply unit with ANSI/AMCA certified rating seal, except for propeller fans smaller than 300 mm diameter.

2.2 FANS GENERAL

.1 Motors:
.1 In accordance with Section 23 05 13 - Common Motors Requirements for HVAC Equipment supplemented as specified herein.
.2 For use with variable speed controllers.
.3 Sizes as specified on drawing schedule.
.4 Two speed with two windings and speeds of approximately 1200 or 900 r/min low and 1800 r/min high as indicated.
.5 Two speed with split winding, constant horsepower constant or variable torque and speeds as indicated.

.2 Accessories and hardware: matched sets of V-belt drives, adjustable slide rail motor bases, belt guards, coupling guards fan inlet or outlet safety screens as indicated and as specified in Section 23 05 13 - Common Motor Requirements for HVAC Equipment, inlet or outlet dampers and vanes and as indicated.

2.2 FANS GENERAL (Cont'd)

.3 Factory primed before assembly in colour standard to manufacturer.

.4 Scroll casing drains.

.5 Bearing lubrication systems plus extension lubrication tubes where bearings are not easily accessible.

.6 Vibration isolation: to Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.

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

2.3 CENTRIFUGAL FANS

.1 Fan wheels:
.1 Welded steel or aluminum construction.
.2 Maximum operating speed of centrifugal fans not more than 50% of first critical speed.
.3 Air foil backward inclined blades, as indicated.

.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 100,000 hours.

.3 Shaft seals on exhaust fans:
.1 Single disc seals.

.4 Housings:
.1 Volute with inlet cones: fabricated steel for wheels 300 mm or greater, steel or aluminum, for smaller wheels, braced, and with welded supports.
.2 For horizontally and vertically split housings provide flanges on each section for bolting together, with gaskets of non-oxidizing non-flammable material.
.3 Provide latched airtight access doors with handles.

.5 Variable volume control devices:
.1 Mounted by fan manufacturer.

2.3 CENTRIFUGAL FANS (Cont'd)

.5 Variable volume control devices:(Cont'd)

.2 Adjustable inlet vanes: operated from a mechanism linked to each damper vane. Support each vane at ends in bronze bearings . On DWDI fans interconnect vanes to operate in unison. Provide locking devices for manual operation.

.3 Variable speed drives: to NEMA ICS 7.1.

2.4 CABINET FANS - GENERAL PURPOSE

.1 Fan characteristics and construction: as centrifugal fans.

.2 Cabinet hung single or multiple wheel with DWDI centrifugal fans in factory fabricated casing complete with vibration isolators motor, variable speed V-belt drive and guard inside or outside casing.

.3 Fabricate casing of zinc coated or phosphate treated steel reinforced and braced for rigidity. Provide removable panels for access to interior. Paint uncoated, steel parts with corrosion resistant paint to MPI #18. Finish inside and out, over prime coat, with rust resistant enamel. Internally line cabinet with 50 mm thick rigid acoustic insulation, pinned and cemented, complete with perforated metal liner.

2.5 IN-LINE CENTRIFUGAL FANS

.1 Characteristics and construction: as for centrifugal fan wheels, with axial flow construction and direct or belt drive.

.2 Provide AMCA arrangements 1 or 9 as indicated with stiffened flanges, smooth rounded inlets, and stationary guide vanes.

2.6 PROPELLER FANS

.1 Fabricate multibladed propellers of aluminum of airfoil shape within bell mouth entrance on integral mounts, with grease lubricated ball bearings, with extended lubrication fittings, suited for operating in any position, direct or belt driven, complete with motor as indicated.

2.6 PROPELLER FANS (Cont'd)

.2 Provide bird screen andautomatic back draft dampers on discharge, with gasketted edges.

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 HVAC fans 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 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.

3.3 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

3.3 CLEANING (Cont'd)

.2 Final Cleaning:(Cont'd)
equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END