READ THIS FIRST

Notice to the Design Engineer, please refer to the Port of Seattle, Facilities and Infrastructure standards for reference before editing this specification.

This Project Spec Document may need additional modifications to suit your project. It is recommended that you proofread each section, paying attention to any “Notes” boxes such as this one--you should remove these “Notes” sections as you go. Also, do a search for all bracket characters “ [ ] “ as they are used to show you areas containing options or project specific details (you can use Microsoft Word’s Find feature {Ctrl-F} to jump to an open bracket “ [ “ character quickly). Again, these bracket characters should be removed.

It is important that every paragraph be numbered to allow for easy referencing. If you use the document’s built in styles and formatting your outline should be fine (turn on the formatting toolbar by going to View > Toolbars > Formatting). Most paragraphs will use the style “Numbered Material” and can be promoted (Shift) or demoted (Shift-Tab).

You should not have to manually enter extra spaces, carriage returns or outline characters such as A, B, C, or 1.01, 1.02; the formatting will do this for you. The entire document is 11 pt. Arial. If you paste items in, you may need to reapply the “Numbered Material” format.

1. GENERAL
   1. SUMMARY OF WORK
      1. The extent and location of “Fans” Work is shown in the Contract Documents. Section includes roof exhausts, wall exhausts, cabinet [exhaust] fans, ceiling exhaust fans, backward inclined centrifugal fans, forward curved centrifugal fans, airfoil centrifugal fans, radial centrifugal fans, tubular centrifugal fans, inline centrifugal fans, vent sets, vane axial fans, tube axial fans, propeller fans, motors, drives and accessories.
   2. GOVERNING CODES, STANDARDS AND REFERENCES

List reference standards that are included within the text of this section. Edit the following as required for Project conditions.

* + 1. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
       1. AMCA (Air Movement and Control Association)
          1. AMCA 99 - Standards Handbook.
          2. AMCA 210 - Laboratory Methods of Testing Fans for Rating.
          3. AMCA 300 - Reverberant Room Method for Sound Testing of Fans.
          4. AMCA - Methods for Calculating Fan Sound Ratings from Laboratory Test Data.
       2. ABMA (American Boiler Manufacturers Association)
          1. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings.
          2. ABMA STD 11 - Load Ratings and Fatigue Life for Roller Bearings.
       3. ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers)
          1. ASHRAE 51 - Laboratory Methods for Testing Fans for Rating AMCA Standard 210.
       4. NEMA (National Electrical Manufacturers Association)
          1. NEMA MG1 - Motors and Generators.
       5. OSHA (Occupational Safety and Health Administration)
       6. Port of Seattle standards
       7. SMACNA (Sheet Metal and Air Conditioning Contractors’ National Association)
       8. UL (Underwriters Laboratories, Inc.)
          1. UL 705 (Underwriters Laboratories, Inc.) - Power Ventilators.
  1. SUBMITTALS

Only request submittals needed to verify compliance Project requirements.

* + 1. Submit materials data in accordance with of Section 01 33 00 - Submittals. Furnish manufacturers’ technical literature, standard details, product specifications, and installation instructions.
    2. Submittals shall include the following:
       1. Shop Drawings: Indicate size and configuration of fan assembly, mountings, weights, ductwork and accessory connections.
       2. Product Data: Submit data on all fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.
       3. Test Reports: Indicate performance data for adjustable axial fan blades for at least five blade settings, including maximum.
       4. Manufacturer's Installation Instructions: Submit fan manufacturers’ instructions.
       5. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
  1. QUALIFICATIONS
     1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
     2. Installer: Company specializing in performing Work of this section with minimum three years documented experience and is approved by manufacturer.
  2. DELIVERY, STORAGE, AND HANDLING
     1. Protect motors, shafts, and bearings from weather and construction dust.
  3. ENVIRONMENTAL REQUIREMENTS
     1. Do not operate fans for any purpose until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.
  4. FIELD MEASUREMENTS
     1. Verify field measurements prior to fabrication.
  5. MAINTENANCE SERVICE
     1. Provide service and maintenance of fans for one to five years from Date of Substantial Completion.
  6. EXTRA MATERIALS
     1. Spare and extra parts shall be identified for all products, but not provided. Include spare parts information in Operation and Maintenance Manuals.

Include spare parts information in Operation and Maintenance Manuals.

Supply two sets of belts for each fan.

1. PRODUCTS

A. If only one product is acceptable (single or sole source product), obtain an approved Competition Waiver and submit to the CPO Construction, Contract Administrator. The language shall read as: “Manufacturer Name, Product # XXXXX, No Equal.” Refer to CPO-6 Competition Waiver Policy for more information.

B. If a Competition Waiver is not approved or more than one product is acceptable, this section must list a minimum of 2 products plus the language “Or Approved Equal,” along with salient characteristics. Refer to CPO Construction’s Salient Characteristics Guidelines for more information.

* 1. CENTRIFUGAL FANS

Edit the following descriptive specifications to identify Project requirements.

* + 1. Loren Cook, Pace, Trane, Twin Cities, Howden, New York Blower, Or Approved Equal.
    2. Performance
       1. Performance Ratings: Conform to AMCA 210 [and bear the AMCA Certified Rating Seal.]
       2. Sound Ratings: AMCA 301, tested to AMCA 300 [, and bear AMCA Certified Sound Rating Seal.]
       3. Fabrication: Conform to AMCA 99.
       4. Performance Base: [Sea level] [\_\_\_] conditions.
       5. Temperature Limit: Maximum [300 degrees F] [600 degrees F] [[\_\_\_] degrees F].
       6. Static and Dynamic Balance: Eliminate vibration or noise transmission to occupied areas.

Select the following paragraph and insert performance requirements for one or identical units. When specifying units of differing sizes, use a schedule.

* + - 1. Air Flow: [\_\_\_] cfm.
      2. Static Pressure: [\_\_\_] in wg.
    1. Wheel and inlet

Aluminum construction is found only in high-pressure fan wheels. The cast steel hub is common on AMCA 99 Class III fans.

* + - 1. Backward Inclined: Steel [or aluminum] construction with smooth curved inlet flange, heavy back plate, backward curved blades welded or riveted to flange and back plate; cast iron [or cast steel] hub riveted to back plate and keyed to shaft with set screws.
      2. Forward Curved: [Black enamel] [Galvanized] steel construction with inlet flange, back plate, shallow blades with inlet and tip curved forward in direction of airflow, mechanically secured to flange and back plate; steel hub swaged to back plate and keyed to shaft with set screw.
      3. Airfoil Wheel: Steel construction with smooth curved inlet flange, heavy back plate die formed hollow airfoil shaped blades continuously welded at tip flange, and back plate; cast iron [or cast steel] hub riveted to back plate and keyed to shaft with set screws.
      4. Radial: Steel construction with [inlet flange,] heavy [reinforced] back plate, plate blades [with reinforcing gussets] [and] [wearing strips] welded or riveted to back plate [and flange]; cast iron [or cast steel] hub riveted to back plate and keyed to shaft with set screws.
    1. Housing
       1. Steel, spot welded [for AMCA 99 Class I and II fans, and continuously welded for Class III], braced, designed to minimize turbulence with spun inlet bell and shaped cut-off.
       2. Factory finish before assembly to manufacturer's standard. For fans handling air downstream of humidifiers, [provide two additional coats of paint.] [fabricate of galvanized steel.] [Prime coating on aluminum parts is not required.]
       3. Provide bolted construction with horizontal flanged split housing [, where indicated].
       4. Fabricate plug fans without volute housing, in lined steel cabinet.
    2. Bearings and sleeves

Bearing life is percent failure at the rated hours; i.e., L-10 life at 50,000 hours means 10 percent of the bearings may be expected to fail at 50,000 hours.

* + - 1. Bearings: pillow block type, self-aligning, grease-lubricated [ball bearings, with ABMA 9 [L-10 life at 50,000 hours] [L-50 life at 100,000 hours]] [roller bearings, or ABMA 11, [L-10 life at 120,000 hours] [L-50 life at 400,000 hours]].
      2. Shafts: Hot rolled steel, ground and polished, with key way, protectively coated with lubricating oil, and shaft guard.
      3. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, keyed. Variable and adjustable pitch sheaves for motors 15 hp and under, selected so required rpm is obtained with sheaves set at mid-position. Fixed sheave for 20 hp and over, matched belts, and drive rated as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.
      4. Belt Guard: Fabricate to SMACNA Standard; 0.106 inch thick, 3/4 inch diamond mesh wire screen welded to steel angle frame or approved equal, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.
    1. Accessories
       1. Fixed Inlet Vanes: Steel construction with fixed cantilevered inlet guide vanes welded to inlet bell.
       2. Adjustable Inlet Vanes: Steel construction with blades [supported at both ends] [cantilevered] with two permanently lubricated bearings, variable mechanism [out of air stream] terminating in single control lever with control shaft for double width fans [and locking quadrant].
       3. Discharge Dampers: [Parallel] [Opposed] blade steel damper assembly with blades constructed of two plates formed around and welded to shaft, channel frame, sealed ball bearings, with blades linked out of air stream to single control lever.
       4. Inlet/Outlet Screens: Galvanized steel welded grid.
       5. Access Doors: Shaped to conform to scroll, with quick opening latches and gaskets.
       6. Scroll Drain: 1/2 inch steel pipe coupling welded to low point of fan scroll.
       7. Electrical characteristics and components.

Select one or more of the following subparagraphs appropriate to the equipment requirements.

* + - 1. Section 26 27 26 – Wiring Devices: Requirements for electrical characteristics.
      2. Division 26 Electrical. Requirements for motors.
      3. [[\_\_\_] hp.] [[\_\_\_] rated load amperes.] Type: [Open drip proof] [TEFC] [NEMA MG1, [\_\_\_].]
      4. [\_\_\_] volts, [single] [three] phase, 60 Hz.
      5. [\_\_\_] amperes maximum [fuse size] [circuit breaker size] [overcurrent protection].
      6. [\_\_\_] minimum circuit ampacity.
      7. [\_\_\_] percent minimum power factor at rated load.
      8. Disconnect Switch: Factory mount [in control panel] [on equipment].
  1. TUBULAR CENTRIFUGAL FAN
     1. Manufacturers: Loren Cook, Pace, Trane, Acme, Or Approved Equal.
     2. General: Factory assembled unit consisting of housing, fan, motor and accessories. AMCA rated and UL approved.
     3. Fan: Aluminum casting with radially projected airfoil blades. Fan bearings rated at 200,000 hours average life.
     4. Housing: 14 gage steel with stiffening rings and square mounting frame, baked enamel finish.
     5. Drives: Electronic Variable Frequency, match existing installed types. Adjustable belt drives, Woods, Browning, Or Approved Equal. Belt guard in accord with OSHA requirements; guard to have tachometer openings.
     6. Straightening Vanes: Radially projected aluminum air foil vanes.
     7. Inlet Control Vanes: Vortex type steel dampers and bronze bearings in steel housing with peripheral control mechanism out of air stream, control arm suitable for automatic operation.
  2. AXIAL FANS

Edit the following descriptive specifications to identify Project requirements.

* + 1. Manufacturers: Loren Cook, FlaktWoods, Howden, Or Approved Equal.
    2. Product Requirements:
       1. Performance Ratings: Conform to AMCA 210 [and bear the AMCA Certified Rating Seal.]
       2. Sound Ratings: AMCA 301, tested to AMCA 300 [and bear AMCA Certified Sound Rating Seal.] [Sound power levels shall not exceed those of equipment scheduled.]
       3. Fabrication: Conform to AMCA 99.
       4. Performance Base: [Sea level] [\_\_\_] conditions.
       5. Temperature Limit: Maximum [300 degrees F] [600 degrees F] [[\_\_\_] degrees F].

Select the following paragraph and insert performance requirements for one or identical units. When specifying units of differing sizes, use a schedule.

* + 1. Performance:
       1. Air Flow: [\_\_\_] cfm.
       2. Static Pressure: [\_\_\_] inch wg.
       3. RPM: [\_\_\_].
    2. Hub and Impeller:
       1. Airfoil Impeller Blades: Adjustable die cast aluminum alloy [or glass reinforced polyester resin] [or welded steel die formed blades with belt drive].
       2. Hub: Die cast aluminum alloy or cast iron hub [or with belt drive of spun, welded steel], bored and keyed to shaft; to facilitate indexing of blade angle with [manual] [automatic] adjustment stops.
       3. Controllable Pitch Assemblies: Incorporate ball bearing counterbalanced blade and variable pitch assembly into hub with mechanical link to casing exterior mounted actuator, or pneumatic or electric actuator incorporated within hub.
       4. Cast Components: X-ray components after fabrication and statically and dynamically balance assembly before attachment to motor or shaft. [Whirl test to 125% of operating speed after attachment]
    3. Casing:
       1. Fabricate casing of [1/4 inch] [[\_\_\_] inch] steel for fans [40 inch] [50 inch] [[\_\_\_] inch] in diameter and smaller and [3/8 inch] [[\_\_\_] inch] steel for larger fans.
       2. Continuously weld, with inlet and outlet flange connections, and motor or shaft supports. Incorporate flow straightening guide vanes for fans specified for static pressures greater than [one inch wg] [1.5 inch wg] [2 inches wg] [[\_\_\_] inches wg].
       3. Finish [with one coat enamel applied to interior and exterior] [by hot dip galvanizing finished assembly].
    4. Bearings and Drives:

Bearing life means that at the rated hours, a percent failure is anticipated; i.e. L-10 life at 50,000 hours means that 10 percent of the bearings may be expected to have failed at 50,000 hours.

* + - 1. Bearings: Heavy-duty pillow block type, self-aligning, grease-lubricated [ball bearings, with ABMA 9 [L-10 life at 50,000 hours] [L-50 life at 100,000 hours]] [roller bearings, or ABMA 11, [L-10 life at 120,000 hours] [L-50 life at 400,000 hours]].
      2. Shafts: Hot rolled steel, ground and polished, with keyway, protectively coated with lubricating oil.
      3. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, keyed. Variable and adjustable pitch sheaves for motors 15 hp and under selected so required rpm is obtained with sheaves set at mid-position; fixed sheave for 20 hp and over, matched belts, and drive rated as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.
      4. Belt Guard: Fabricate to SMACNA Standards; 0.106 inch thick, 3/4 inch diamond mesh wire screen welded to steel angle frame or approved equal, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.
      5. Lubrication: Extend lubrication fittings to outside of casing.
    1. Accessories:
       1. Guide Vanes: Welded steel construction with airfoil vanes and casing flanges, finished to match casing.
       2. Adjustable Inlet Vanes: Steel construction with blades [supported at both ends] [cantilevered] with two permanently lubricated bearings, variable mechanism [out of air stream] terminating in single control lever with control shaft for double width fans [and locking quadrant.]
       3. Inlet Bell: Bell mouth inlet fabricated of [steel] [aluminum] [fiberglass reinforced plastic] with flange.
       4. Outlet Cones: Fabricated of steel with flanges, outlet area/inlet area ratio of [1.5/1.0] [\_\_\_], with center pod as recommended by manufacturer.
       5. Inlet Screens: Galvanized steel welded grid to fit inlet bell.
       6. Dampers: Welded steel construction, consisting of two semi-circular vanes pivoted on oil-retaining bearings in short casing section, finished [with one coat enamel] [by hot dip galvanizing]. Provide [air stream operation closing blades by reverse airflow and gravity] [hand operation with hand wheel control of screw and link mechanism] [motor actuation]. [Use backdraft dampers with two or more units in parallel.]
       7. Access Doors: Shaped to conform to casing with quick opening latches and gaskets.
       8. Blade Pitch Actuator: Factory mounted and calibrated, [electric actuator requiring single phase power and accepting electric input] [electric actuator requiring single phase power and accepting pneumatic control input signal] [pneumatic actuator requiring [25 psi] main supply pressure and accepting pneumatic control input signal]. [Automatically variable blade pitch having stepless control across full pitch range during fan operation. Index markings for various pitch settings.]
       9. Stall Alarm Probe: Factory installed sensing probe to detect fan operation in stall.
       10. Vibration Detector: Factory installed vibration switch to stop fan [with extra set of contacts].
    2. Electrical characteristics and components.

Select one or more of the following subparagraphs appropriate to the equipment requirements.

* + - 1. Section 26 27 26 – Wiring Devices: Requirements for electrical characteristics.
      2. Division 26 Electrical: Requirements for motors.
      3. [[\_\_\_] hp.] [[\_\_\_] rated load amperes.] Type: [Open drip proof] [TEFC] [NEMA MG1, [\_\_\_].]
      4. [\_\_\_] volts, [single] [three] phase, 60 Hz.
      5. [\_\_\_] amperes maximum [fuse size] [circuit breaker size] [overcurrent protection].
      6. [\_\_\_] minimum circuit ampacity.
      7. [\_\_\_] percent minimum power factor at rated load.

Competition waiver to be submitted to CPO for [Variable Speed Drive Company] to be the only approved product for the Port.

* + - 1. Variable speed drives of same type and model, No Equal, as currently installed for fans and pumps at SeaTac airport.
      2. Disconnect Switch: Factory mount [in control panel] [on equipment].
  1. PROPELLER FANS

Edit the following descriptive specifications to identify Project requirements.

* + 1. Manufacturers: PennBarry, Loren Cook, Acme, Or Approved Equal.
    2. General: Belt driven steel propeller fan mounted in factory sleeve, AMCA rated capacities and UL approved.
    3. Performance:
       1. Air Flow: [\_\_\_] cfm.
       2. Static Pressure: [\_\_\_] inches wg.
       3. RPM: [\_\_\_].
    4. Construction.
       1. Impeller: Shaped steel or steel reinforced aluminum blade with heavy hubs, statically and dynamically balanced, keyed and locked to shaft, directly connected to motor or provided with V-belt drive.
       2. Frame: One piece, square steel with die formed venturi orifice, mounting flanges and supports, with baked enamel finish.
    5. Accessories:
       1. Back-draft Damper: Multiple blade with offset hinge pin, blades linked.
       2. Outlet Damper: Multiple blade with offset hinge pin, blades linked, line voltage motor drive, power open, spring return.
       3. Safety Screens: Expanded galvanized metal over inlet, motor, and drive [and outlet]; to comply with OSHA regulations.
       4. Hood: Weather shield, to exclude rain and snow.
       5. Controller: Solid-state speed controller.
    6. Electrical characteristics and components.

Select one or more of the following subparagraphs appropriate to the equipment requirements.

* + - 1. Section 26 27 26 – Wiring Devices: Requirements for electrical characteristics.
      2. Division 26 Electrical - Requirements for motors:
      3. [[\_\_\_] hp.] [[\_\_\_] rated load amperes.] Type: Open drip proof, TEFC, NEMA MG1, [\_\_\_].
      4. [\_\_\_] volts, single or three phase, 60 Hz.
      5. [\_\_\_] amperes maximum fuse size, circuit breaker size and overcurrent protection.
      6. [\_\_\_] minimum circuit ampacity.
      7. [\_\_\_] percent minimum power factor at rated load.
      8. Disconnect Switch: Factory mount in control panel and on equipment.
  1. ROOF [EXHAUSTERS] [VENTILATORS]

Edit the following descriptive specifications to identify Project requirements.

* + 1. Manufacturers: PennBarry, Loren Cook, Acme, Or Approved Equal.
    2. Centrifugal fan in spun aluminum housing, AMCA rated capacities. ETL and UL approved.
    3. Direct drive to 1200 cfm or belt drive above 1200 cfm.
    4. Product Requirements:
       1. Performance Ratings: Conform to AMCA 210 [and bear the AMCA Certified Rating Seal.]
       2. Sound Ratings: AMCA 301, tested to AMCA 300 [, and bear AMCA Certified Sound Rating Seal.]
       3. Fabrication: Conform to AMCA 99.
       4. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.

Select the following paragraph and insert performance requirements for one or identical units. When specifying units of differing sizes, use a schedule.

* + 1. Performance
       1. Air Flow: [\_\_\_] cfm.
       2. Static Pressure: [\_\_\_] inch wg.
       3. Fan Tip Speed: [\_\_\_] fpm.
       4. Fan RPM: [\_\_\_].
    2. Construction
       1. Fan Unit: Open, backward-inclined, non-ferrous fan wheel. V-belt or direct driven as indicated, with [spun aluminum] [with fiberglass coating inside and outside] [galvanized steel with baked-on enamel] [fiberglass reinforced plastic] [up blast spun aluminum with grease tray] housing. Housing shall be hinged for access to fan and motor. Resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire bird screen; square base to suit roof curb with continuous curb gaskets.
       2. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so [required rpm is obtained with sheaves set at mid-position] [for 150% of motor horsepower and 20% speed variation; 1800 rpm]; fan shaft with self-aligning pre-lubricated ball bearings.
    3. Accessories

The self-flashing curb does not have built-in cant strips.

* + - 1. Roof Curb: [8 inch] [12 inch] [16 inch] [20 inch] [24 inch] [[\_\_\_] inch] high. [self-flashing] [galvanized steel] [aluminum] with continuously welded seams [, built-in cant strips]. [, one inch insulation and curb bottom] [, interior baffle with acoustic insulation, curb bottom] [, ventilated double wall] [, hinged curb adapter], and factory installed nailer strip.
      2. Disconnect Switch: Factory-wired, non-fusible, in housing for thermal overload protected motor [and wall mounted [multiple speed switch] [or] [solid state speed controller]].
      3. Back-draft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked [and line voltage motor drive, power open, spring return].
    1. Electrical characteristics and components.

Select one or more of the following subparagraphs appropriate to the equipment requirements.

* + - 1. Section 26 27 26 – Wiring Devices: Requirements for electrical characteristics.
      2. Division 26 Electrical: Requirements for motors.
      3. Motor: [[\_\_\_] hp ([\_\_\_] W).] [[\_\_\_] rated load amperes.] Type: Open drip proof, on adjustable motor brackets, TEFC, NEMA MG1, [\_\_\_].
      4. [\_\_\_] volts, single or three phase, 60 Hz.
      5. [\_\_\_] amperes maximum fuse size, circuit breaker size and overcurrent protection.
      6. [\_\_\_] minimum circuit ampacity.
      7. [\_\_\_] percent minimum power factor at rated load.
      8. Disconnect Switch: Factory mount in control panel and on equipment.
  1. WALL EXHAUSTERS

Select the following paragraph and insert performance requirements for one or identical units. When specifying units of differing sizes, use a schedule.

* + 1. Performance
       1. Air Flow: [\_\_\_] cfm.
       2. Static Pressure: [\_\_\_] inch wg.
       3. Fan Tip Speed: [\_\_\_].
       4. Fan RPM: [\_\_\_].
    2. Construction
       1. Fan Unit: V-belt or direct driven with spun aluminum housing; resiliently mounted motor; 1/2 inch mesh, 0.062 inch thick aluminum wire bird screen.
       2. Sheaves: For V-belt drives, provide cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.
    3. Accessories
       1. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor [and wall mounted [multiple speed switch] [or] [solid state speed controller]].
       2. Back-draft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked [and line voltage motor drive, power open, spring return].
    4. Electrical characteristics and components.

Select one or more of the following subparagraphs appropriate to the equipment requirements.

* + - 1. Section 26 27 26 – Wiring Devices: Requirements for electrical characteristics.
      2. Division 26 Electrical. Requirements for motors.
      3. [[\_\_\_] hp ([\_\_\_] W).] [[\_\_\_] rated load amperes.] Type: Open drip proof, TEFC, NEMA MG1, [\_\_\_].
      4. [\_\_\_] volts, single or three phase, 60 Hz.
      5. [\_\_\_] amperes maximum fuse size, circuit breaker size and overcurrent protection.
      6. [\_\_\_] minimum circuit ampacity.
      7. [\_\_\_] percent minimum power factor at rated
  1. CABINET AND CEILING EXHAUST FANS

Select the following paragraph and insert performance requirements for one or identical units. When specifying units of differing sizes, use a schedule.

* + 1. Manufacturers: Loren Cook, ILG, Pace, PennBarry, Or Approved Equal.
    2. Performance
       1. Air Flow: [\_\_\_] cfm.
       2. Static Pressure: [\_\_\_] inch wg.
       3. Fan RPM: [\_\_\_].
    3. Construction
       1. Centrifugal Fan Unit: [Rated and tested in accordance with AMCA standards] V-belt or direct driven with [16 gage] galvanized steel housing [lined with 1/2 inch acoustic insulation], [resilient mounted motor] [steel support frame for fan and motor assembly isolated from basic casing with spring isolators], gravity back-draft damper in discharge.
       2. Disconnect Switch: Cord and plug in housing for [self resetting] thermal overload protected motor [and wall mounted [switch] [multiple/variable speed switch] [solid state speed controller]].
       3. Grille: [Slot type] [No perforated grille faces] [Molded white plastic] [Aluminum [with baked white enamel finish]] [with blank-off on the inlet duct connection]. [Enameled-metal discharge wall cap].
       4. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.
    4. Electrical characteristics and components.

Select one or more of the following subparagraphs appropriate to the equipment requirements.

* + - 1. Section 26 27 26 – Wiring Devices: Requirements for electrical characteristics.
      2. Division 26 Electrical: Requirements for motors.
      3. [[\_\_\_] hp ([\_\_\_] W).] [[\_\_\_] rated load amperes.] Type: Open drip proof, TEFC, NEMA MG1, [\_\_\_].
      4. [\_\_\_] volts, single or three phase, 60 Hz.
      5. [\_\_\_] amperes maximum fuse size, circuit breaker size and overcurrent protection.
      6. [\_\_\_] minimum circuit ampacity.
      7. [\_\_\_] percent minimum power factor at rated

1. EXECUTION
   1. PREPARATORY WORK
      1. Section 01 31 13 - Project Coordination: Coordination and project conditions.
      2. Inspection: Prior to all Work of this section, carefully inspect the Work of all other trades and verify that all such Work is complete to the point where this Work may properly commence.
      3. Verify that roof curbs are installed and dimensions are as [shown on shop drawings] [instructed by the manufacturer].
      4. Discrepancies: In the event of a discrepancy, do not proceed with the Work in dispute until all such discrepancies have been resolved by the Engineer.
      5. Notification: Notify the proper agency and receive sign-off inspection when required before proceeding with the Work.
   2. INSTALLATION
      1. Mount rooftop units on factory built roof-mounting curb providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.
      2. Install all equipment in accordance with the manufacturer’s recommendations.
      3. Locate remote panels [where indicated.] [\_\_\_\_\_\_\_\_.]
      4. Connect controls to remote locations.
      5. Mount indoor units on vibration isolators.
      6. Connect indoor units to supply and return ductwork with flexible connections.
   3. TESTS
      1. Prior to final inspection of the Work in this section, perform all required tests and obtain all required approvals of regulatory agencies.
      2. Should the results of a test indicate an improperly functioning system, correct the problem to the satisfaction of the Engineer at no additional cost to the Port.
   4. MANUALS
      1. Prepare and furnish operation and maintenance manuals.
2. MEASUREMENT AND PAYMENT
   1. GENERAL
      1. No separate measurement or payment will be made for the Work required by this section. The cost for this portion of the Work will be considered incidental to, and included in the payments made for the applicable bid items in the [Schedule of Unit Prices] [Lump Sum price bid for the Project].

End of Section

Revision History:

05/01/2014 Conversion to 2004 CSI Numbering System

10/15/2014 Added Sole Source and Salient Characteristics Note to Part 2 and revisions

01/29/2015 Revised Sole Source