

## SECTION 15850

### AIR HANDLING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

###### A. Section Includes:

1. Utility Set Fans
2. Central Centrifugal Fans.
3. In-Line Tubular Centrifugal Fans.
4. Variable-Pitch Vane Axial Fans.
5. Propeller-Type Ventilation Fans.
6. Power Roof Ventilators.
7. Ceiling Type Exhaust Fans.

###### B. Related Sections:

1. Section 15010 - Basic Mechanical Requirements.
2. Section 15050 - Basic Mechanical Materials and Methods.
3. Section 15240 - Mechanical Sound and Vibration Control.
4. Section 15855 - Air Handling Units with Coils: Cabinet Fans.
5. Section 15990 - Testing, Adjusting and Balancing.

##### 1.02 REFERENCES

- A. Air Movement and Control Association, Inc. (AMCA).
- B. National Electrical Manufacturer's Association (NEMA).
- C. Underwriter's Laboratories, Inc. (UL).

##### 1.03 SYSTEM DESCRIPTION

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A. Design Requirements:

1. General:

- a. Placement within a mechanical room is required for all major mechanical equipment. Only small units may be roof-mounted, and shall be made as inconspicuous as possible by placing as far away as possible from edge of roof, painting, screening or a combination of these. UCB approval is required.
- b. Centrifugal, tubular centrifugal, axial and propeller fans may be used. The use of propeller fans shall be kept to a minimum.
  - c. Specify that scroll-type fans are required to have a continuously-welded housing (spot or tack-weld or lock-seam construction is not acceptable). Bearing life shall be stated to be L50 life of 200,000 hours at the maximum speed for the class of fan provided.
- d. Equipment shall be of adequate size to handle air quantities and static pressure efficiently in accordance with design.
- e. Specify each type of fan separately.
- f. All fans shall be statically and dynamically machine balanced and shall have solid shafts. See UCB Standards 15010-1.05.
- g. All fan motors shall operate within name-plate values and shall be in accordance with "Motors" paragraph in Section 15050 - Basic Mechanical Materials and Methods.
- h. Fan ratings shall be based upon test performance in strict accordance with AMCA Standard 210-67 Test Code for Air Moving Devices.
- i. Specify that each fan bear the seal authorized by AMCA indicating that ratings are certified and that fans not bearing this seal will not be accepted.
- j. Fans, motors and drives shall be located for safe and easy access for periodic inspection and maintenance.
- k. Systems selected for operation above 6 inches static pressure must be approved by the University.
- l. Specify that fan nameplate indicate maximum permissible fan RPM.
- m. Specify that all belt-drive motors over 5 HP shall have dual push-pull adjustment screws for the motor mounts. For retrofits, require that the motor mounts be replaced if not of this type. (Same as Section 15050-1.03-g.)
  - n. When fans and/or motors are located in a hazardous environment or are handling an explosive or potentially-explosive airstream, specify spark-resistant fan

construction and explosion-proof motors, as required. The fan should be specified to meet AMCA Spark Resistant Construction, Type A, B, or C as required. The fan and motor should both be well grounded.

o. If the design fan RPM at design airflow rate and pressure approaches the maximum safe fan RPM as listed by the manufacturer for that class of fan, specify a more heavy-duty class of fan. This will provide a safety margin to allow for adverse field conditions which can increase the fan system pressure. This margin of safety can also perhaps allow for some possible future changes.

p. Specify fan inlet and outlet screens as required for personnel protection.

## 2. Drives:

a. Single belt drives shall not be used on equipment with 1 HP motor and above.

b. Drives shall always be installed with provisions for center distance adjustment.

c. Motors shall be located on their respective motor bases allowing for 1/6 of the total motor base travel for installation of new belts with remaining 5/6 of the travel available for belt tightening.

d. Arc of contact on the smaller sheave should not be less than 120 degrees.

e. Ratios of sheaves should not exceed 8 to 1.

f. Belt speed should not exceed 5000 feet per minute.

g. A full and free circulation of air should be around the drive at all times.

h. Drives operating in explosive atmosphere or potentially explosive should be well grounded and be equipped with static conducting non-sparking belts.

i. Specify OSHA-approved belt-drive covers with tachometer access, with side made of expanded metal.

j. Specify belt covers.

k. Rated for 150 percent (minimum) of fan motor power.

l. Before allowing or specifying synchronous drives such as the Gates Poly Chain, verify that all associated equipment (fan, motor, fan mountings, etc.) is designed to handle the stress of starting up with this type of drive where there is absolutely no slippage.

## 3. Utility Set Fans:

a. When only design solution requires exposure to weather, specify weather covers with quick release fasteners for ease of access to belts and bearings.

b. Greaseable ball bearings for all accessible fans.

## 4. Central Centrifugal Fans:

- a. Motors 5HP or over shall have bearings of the split pillow block, double row roller or ball, grease lubricated type with pedestal-type supports.
  - b. Shall be air foil blade type.
5. Variable-Pitch Vane Axial Fans:
- a. University approval for use of these fans will require careful acoustical design treatment to the barrel casing, flexible connections and inlet and discharge conditions.
6. Power Roof Ventilators:
- a. The use of power roof ventilators is acceptable only if fan can be screened from view and is not used to exhaust toxic fumes.
  - b. Wall-mounted power ventilators are strongly discouraged.
7. Ceiling Type Exhaust Fans:
- a. Specify motor speed not to exceed 1150 RPM.
  - b. Specify housing of heavy gage steel completely insulated internally with acoustical material to deaden sound.

#### 1.04 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of specified fans with characteristics, sizes, and capacities required, whose specified fan has been in satisfactory use in similar service for not less than 3 years.
- B. Codes and Standards: Comply with the following:
  - 1. AMCA Compliance: Provide fans which have been tested and rated in accordance with AMCA standards, and bear AMCA Certified Ratings Seal.
  - 2. NEMA Compliance: Provide motors and electrical accessories complying with NEMA standards.
  - 3. UL Compliance: Provide power ventilators which are designed, manufactured, and tested in accordance with UL 705 "Power Ventilators".

## PART 2 - PRODUCTS

### 2.01 UTILITY-SET FANS AND ALTERNATIVES

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A. Manufacturers:

Acme  
Barry Blower  
Cook  
Greenheck  
New York Blower  
Strobic  
Twin City  
Trane

2.02 CENTRAL CENTRIFUGAL FANS

A. Manufacturers:

Acme  
Barry Blower  
Buffalo  
Cook  
Greenheck  
New York Blower  
Pace  
Twin City  
Trane

2.03 IN-LINE TUBULAR CENTRIFUGAL FANS

A. Manufacturers:

Acme  
Barry Blower  
Chicago Blower  
Cook  
Greenheck  
New York Blower  
Twin City

2.04 VANE AXIAL FANS (FIXED-PITCH ONLY)

A. Manufacturers:

Chicago Blower  
Flakt  
Greenheck  
Joy  
Stobic  
Trane "Variax Fan"  
Woods

## 2.05 PROPELLER-TYPE VENTILATION FAN

### A. Manufacturers:

Acme  
Aerovent  
Cames  
Cook  
Greenheck  
Penn

## 2.06 POWER ROOF VENTILATORS

### A. Manufacturers:

Acme  
Cames  
Cook  
Greenheck  
Jenn-Air  
Penn

## 2.07 CEILING TYPE EXHAUST FANS

### A. Manufacturers:

Acme  
Cames  
Cook  
Greenheck  
Jenn-Air  
Pace  
Penn Co. (Zephyr Model)

## PART 3 - EXECUTION

### 3.01 INSTALLATION

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- A. In general, for project specifications, remove "Design Requirements" sub-paragraph A in Part 1, paragraph 1.03 "System Description" of this Design Guide and use list to expand on specific requirements of installation for each product specified.
- B. Specify that all fans, AHUs, etc. "Shall be installed plumb and level by technicians trained accordingly".

END OF SECTION