

HVAC FANS – NON-LABORATORY

DESIGN & INSTALLATION

1. This section applies to the following fan types:
 - a. Air handling unit supply fans
 - b. Return fans
 - c. Relief fans
 - d. Exhaust fans
2. Design
 - a. Location of equipment and what it serves determines quality of associated motor, bearings, etc.
 - b. Select the most efficient wheel style (plenum, fan-wall, airfoil, backward inclined or forward curve, etc that is offered for fan style). Fan-wall style design are easier to maintain and replace.
 - c. Fans that do not bear the AMCA Performance Air and Sound Certified Rating Seal shall not be specified and are not be acceptable.
 - d. Fan/Motor/Blower system shall be sized with a 20% safety factor for blower speed, motor HZ and pressure.
 - e. All Fans shall have VFD drives with by-passes.
 - f. Direct drive fans are preferred over belt driven fans.
 - g. Direct Drive Fans:
 - Fan speed shall be limited in balancing through the setup of the VFD to the maximum fan speed required to deliver design airflow.
 - h. Belt Driven Fans:
 - Provided with variable pitch sheaves for motor sizes 5 HP and less.
 - All sheaves shall be replaced with fixed pitch sheaves of the appropriate size as determined in the final balancing.
 - Sheaves shall be set such that the fan is at the maximum speed at 60 HZ.
 - Fans shall be capable of operating at 60 HZ without overloading.
 - i. Fan motor shall be sized such that the fan operates below the service factor.
 - j. Design the Inlet / Outlet conditions for minimal system effect/pressure drop.
3. Service and Clearance
 - a. Fans shall be designed to be serviced.
 - b. Fans shall not be designed to be installed >12" above the ceiling.
 - c. Plug fans shall be designed with safety provisions for maintenance and shall be discussed with WUSM Engineering.

4. Seismic and Vibration Isolation
 - a. Fans shall be installed with vibration isolation.
 - b. Fans shall be restrained to meet seismic requirements.
5. Related Sections
 - a. Air Handling Units
 - b. HVAC Fans – Laboratory

EQUIPMENT AND PRODUCT REQUIREMENTS

1. Exhaust Fan Approved Manufacturers: (in order of preference)
 - a. Greenheck
 - b. Cook
 - c. Twin City
2. General requirements for fans:
 - a. AMCA rated.
 - b. Factory-fabricated, -assembled, -tested, and -finished, belt-driven or direct-drive fans consisting of housing, wheel, fan shaft, bearings, motor, drive assembly, and support structure.
 - c. Delivered as factory-assembled units, to the extent allowable by shipping limitations.
 - d. Provide safety protection for direct drive fans.
3. Shafts:
 - a. Statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with adjustable alignment and belt tensioning.
 - b. Turned, ground, and polished hot-rolled steel with keyway. Ship with protective coating of lubricating oil.
 - c. Designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.
4. Grease-Lubricated Shaft Bearings:
 - a. Self-aligning, pillow-block-type, tapered roller bearings with double-locking collars and two-piece, cast-iron housing and zerk fittings for greasing.
 - b. Extend lubrication tubes for interior bearings or ducted units to outside of unit case.
 - c. Bearing Rating Life
 - Ball-Bearing: ABMA 9, L10 at 200,000 hours.
 - Roller-Bearing: ABMA 11, L10 at 200,000 hours.
 - d. Specification of any bearings that require greasing at intervals less than three months shall not be specified. It is the University desire to grease bearings every three months via a Preventative Maintenance schedule. The University frowns on automatic greasing equipment.

5. Belt Drives:

- a. Factory mounted, with adjustable alignment and belt tensioning.
- b. Service Factor Based on Fan Motor Size: 1.5.
- c. Fan Pulleys: Cast iron or cast steel with split, tapered bushing; dynamically balanced at factory.
- d. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
- e. Belts:
 - Shall utilize poly chain belts, no exceptions.
 - Multi-belt fan motor drives
 - Oil resistant
 - Non-sparking
 - Non-static
 - matched sets for multiple belt drives.
- f. Belt Guards:
 - To be easily dis-assembled to service.
 - Fabricate to comply with OSHA and SMACNA requirements of diamond-mesh wire screen welded to steel angle frame or equivalent, prime coated.
 - Secure to fan or fan supports without short circuiting vibration isolation. Include provisions for adjustment of belt tension, lubrication and use of tachometer with guard in place.
- g. Motor Mount:
 - Adjustable for belt tensioning.
 - No spring auto tensioners.
 - Us a double adjuster motor mount only.

6. Accessories:

- a. Access for Inspection, Cleaning, and Maintenance: Comply with requirements in ASHRAE 62.1.
- b. Scroll Drain Connection: NPS 1 steel pipe coupling welded to low point of fan scroll.
- c. Weather Cover: Enameled-steel sheet with ventilation slots, bolted to housing.

END OF SECTION

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