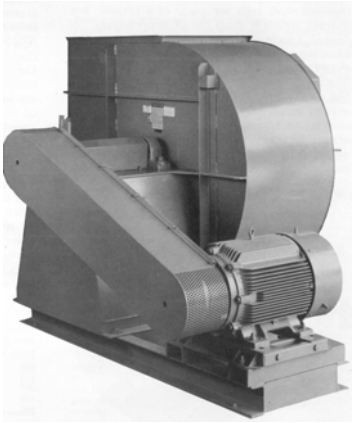
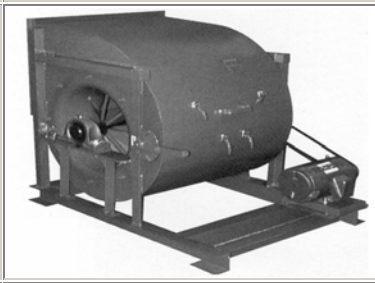
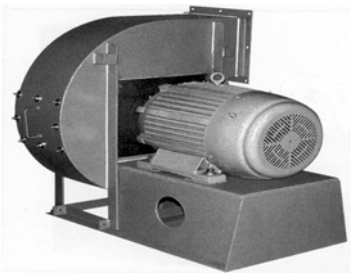
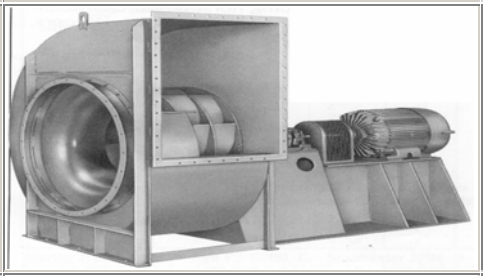
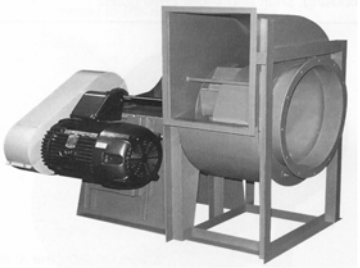
Industrial Fan - Blower Options / Accessories

Included	Item	Description
☐		**Airfoil Impellers.** Airfoil impellers are available in sizes 12" diameter through 73" diameter. Size 12 to 16" available in aluminum construction only using extruded aluminum blades. Sizes larger than 16" are made of steel using die-formed hollow airfoil blades, both sides of the blades continuously welded to the conical spun inlet shroud (rim) and the backplate.
☐		**BC Impellers.** BC wheels are constructed of steel using flat single thickness blades, continuously welded to the rim and the backplate. Note that the use of a conical spun shroud (rim) makes BC/AF fans less susceptible to the performance losses associated with poor inlet conditions. All BC and AF wheels are statically and dynamically balanced to grade G6.3 per ANSI S2.19 for smooth operation prior to being assembled in the fan, followed by final balance of the entire rotating assembly.
☐		**Housings:** All fan housings are continuously welded to provide strength and durability for extended service life - a necessity in all commercial and industrial installations. Outlet flanges for duct connection as well as rigidity are standard. Inlet collars for slip-joint connection and lifting lugs are also standard. All housings are reinforced with rigid bracing to increase structural integrity. The support angles are intermittently welded and caulked between welds to prevent bleed-through corrosion. Precisely positioned cutoff plates and aerodynamically spun inlet cones provide high efficiency and smooth airflow through the fan. All fans are available in standard discharge configuration. Fans Class I and II, sizes 270 and smaller in Arrangements 1, 4, and 9 are field rotatable to any standard discharge position.
☐		**Shafts:** Shafts are AISI Grade 1040, 1045 hot -rolled steel or Stainless Steel, accurately turned, ground, polished, and ring gauged for accuracy. Shafts are generously sized for first critical speed of at least 1.43 times the maximum speed for the class.
☐		**Bearings** Bearings are a heavy-duty, grease lubricated, anti-friction ball or roller, self-aligning, pillow block type, selected for minimum average bearing life (AFBMA L-50) in excess of 200,000 hours at the maximum fan RPM.

Industrial Fan - Blower Options / Accessories

Included	Item	Description
☐		**Fan Arrangement 1:** SWSI - Single Width, Single Inlet Arrangement 1 fans are usually belt driven. The wheel is overhung on the shaft, i.e., mounted at the end of the shaft. The motor can be mounted in any of the four AMCA standard motor positions, W, X, Y, or Z. The two fan bearings are mounted on the bearing pedestal, out of the airstream. Arrangement 1 fans are thus recommended for high temperature or contaminated air applications. Belt driven configurations offer performance flexibility. If the performance requirements change after the fan has been installed, it is simple and inexpensive to change the drive.
☐		**Fan Arrangement 3:** Both SWSI (Single Width, Single Inlet) or DWDI (Double Width Double Inlet) are available. Arrangement 3 is available in either belt driven or direct drive. Arrangement 3 Blowers may have one or both bearings located in the airstream. The wheel is mounted between the bearings and supported by the fan housing, which makes it a structurally sound, compact, and economical arrangement.
☐		**Fan Arrangement 4:** SWSI - Single Width, Single Inlet.Arrangement 4 is available in direct drive only. The fan wheel is mounted directly on the motor shaft with the motor mounted on a pedestal. An Arrangement 4 design offers low maintenance as there are no fan bearings, fan shaft or drive parts to maintain. Arrangement 4 is typically limited to size 365 or smaller.
☐		**Fan Arrangement 8:** SWSI - Single Width, Single Inlet Arrangement 8 is a modified version of Arrangement 1 used for direct drive. The Arrangement 1 bearing pedestal is extended to accommodate the motor. A flexible coupling connects the fan and motor shaft. Refer to the typical direct drive speeds under Arrangement 4. Recommended for 250 HP and larger applications.
☐		**Fan Arrangement 9:**SWSI - Single Width, Single Inlet Arrangement 9 is available as belt driven only. A motor slide base is mounted on the side of the bearing pedestal. This arrangement permits the unit to ship as a complete assembly with the motor and drive mounted. Typically, the motor is mounted on the left side of the pedestal for CW rotation fans and on the right side for CCW rotation fans.

Industrial Fan - Blower Options / Accessories

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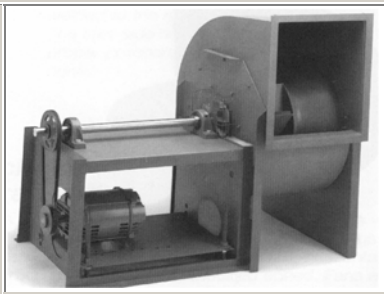
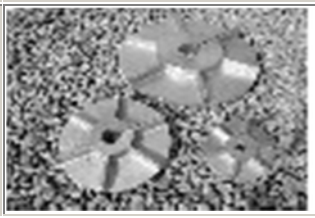
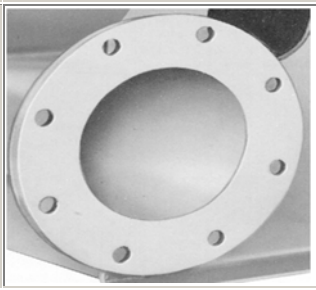
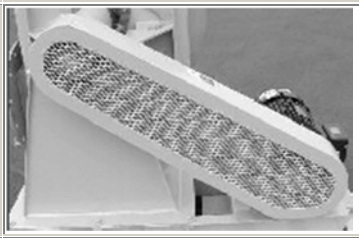
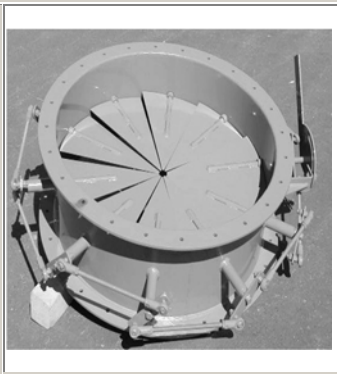
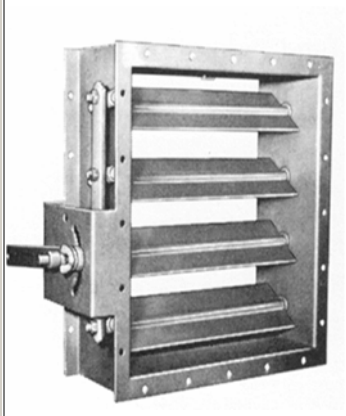
☐		**Fan Arrangement 10:** SWSI - Single Width, Single Inlet Arrangement 10 is available as belt driven only. For Class I and II fans, sizes 122 through 365, Arrangement 10 units are commonly referred to as Ventilating Sets. (Refer to Bulletin 600 for more details.) An Arrangement 10 unit has a motor slide base mounted inside the bearing pedestal. This arrangement offers a more compact design than the Arrangement 9 and is suitable for roof or outdoor installations with a weather cover. Class II Arr. 10 ventilating set with optional shaft cooler.
☐		**Spark Resistant Construction - S.R.C:** Fan applications may involve the handling of potentially explosive or flammable particles, fumes or vapors. Such applications require careful consideration by the system designer to insure the safe handling of such gases. The following are industry standards of spark resistant construction adopted from AMCA Standard 99-0401-86. It is the specifier or the user's responsibility to specify the type of spark resistant construction with full recognition of the potential hazards and the degree of protection required.
☐	**Airstream Type SRC**	**Type A:** All parts of the fan in contact with the airstream must be made of non-ferrous material - usually aluminum and limited to 250° F operation.
☐	**Wheel Type SRC**	**Type B:** The fan shall have a non-ferrous wheel and non-ferrous ring about the opening through which the shaft passes - usually an aluminum wheel and a shaft buffer plate. Airstream temperature is limited to 250°F maximum.
☐	**Buffer Type SRC**	**Type C:** The fan shall be so constructed that the shift of the wheel or shaft will not permit two ferrous parts of the fan to rub or strike. This is accomplished with an aluminum inlet cone and buffer plate. This construction is limited to 500°F. Construction to 800°F is available using steel inlet cone with copper/bronze lining.
☐		**Common Base:** Common structural sub-base base for fan, motor and drive is designed for use with spring or rubber-in-shear type isolators. Use of flexible connectors at inlet and outlet is required on fans with isolators.

Industrial Fan - Blower Options / Accessories

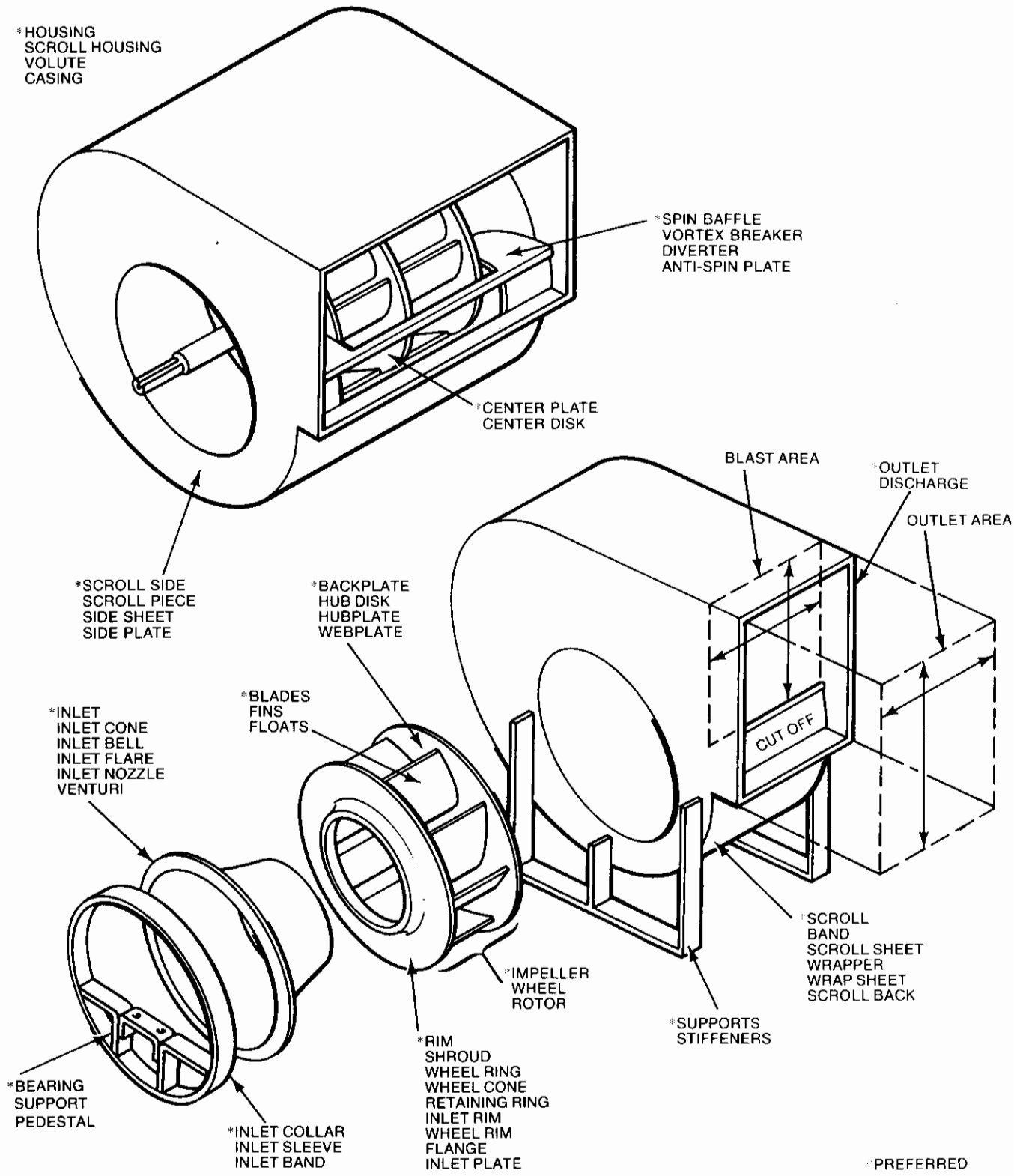
Included	Item	Description
☐		**Access Door:** Bolted, quick opening, and raised bolted access doors are available for wheel inspection or maintenance.
☐		**Drain:** Threaded pipe coupling welded to the lowest point in the housing scroll.
☐		**Shaft Seal:** A shaft seal reduces leakage and protects the bearings from contaminated airstream. It is constructed of woven fibrous materials (ceramic felt) compressed between an aluminum cover plate and the fan housing. A ceramic felt shaft seal does not make the fan gas tight. A variety of special seals is available for low leakage applications requiring more positive protection, including mechanical type stuffing boxes.
☐		**Heat Slinger or Shaft Cooler:** A cast aluminum shaft cooler is recommended to dissipate the heat and protect the fan bearings for all applications over 300 F.
☐		**Flanges:** Pre-drilled inlet or discharge flanges are available for duct or expansion joint mounting.
☐		**Belt Guard:** Belt guard protects personnel from the moving drive parts. Both standard and totally enclosed type guards are available.
☐		**Shaft Guard:** Solid or expanded metal guards cover shaft and bearings and or drive couplings are provided with access holes for bearing lubrication. Modified for ventilation on units with shaft cooler.

Industrial Fan - Blower Options / Accessories

Included	Item	Description
☐		**Variable Inlet Vane Damper:** Variable inlet vanes cause the entering air to pre-spin in the direction of wheel rotation, resulting in reduction in volume, static pressure and brake horsepower and thus providing an infinite number of fan curves approximately parallel to the original fan curve. Variable inlet vanes cost about 50% to 80% more than outlet dampers but offer significant savings in energy. Because of their simplicity, inlet vanes can be more reliable when compared to variable frequency drives. There are two types of variable inlet vanes: nested (internal type) and bolted on (external type).
☐		**Outlet Damper:** The closing of an outlet damper adds to the resistance that the fan is working against. This moves the operating point to the left of the initial rating point. The savings in horsepower depends on the relative position on the fan Cone and is usually much less than offered by other methods. Outlet dampers are typically the least expensive option and should be considered when infrequent operation at lesser capacity is desired or when handling hot, humid or particulate laden air. There are two types of outlet dampers: parallel blade and opposed blade. Parallel blade dampers are recommended for systems where air volume is modulated between full-open to about 75% of open. Opposed blade dampers cost about 10% more and are recommended for systems where volume is modulated over the entire range. Opposed blades reduce air volume in a closer relationship to the control arm movement.
☐		**Motors:** Motors from 1/3 HP Fractional to 1000 HP are available in TEFC, ODP, Severe Duty / Mill and Chemical (IEE45) and Explosionproof Enclosures. Both EPACT High Efficiency and Premium Efficiency are available. A few of the motor options available include Thermostats, Space Heaters, and Special Winding Treatment.
☐		**Variable Speed:** Efficient variable control of Fans and Blowers. Systems requiring variable control, due to plant conditions or demands facilitating need to convert constant volume to variable air volume systems. Operations using VS controls over dampers result in huge energy savings due to efficient means of control of large AC motors driving variable torque loads.

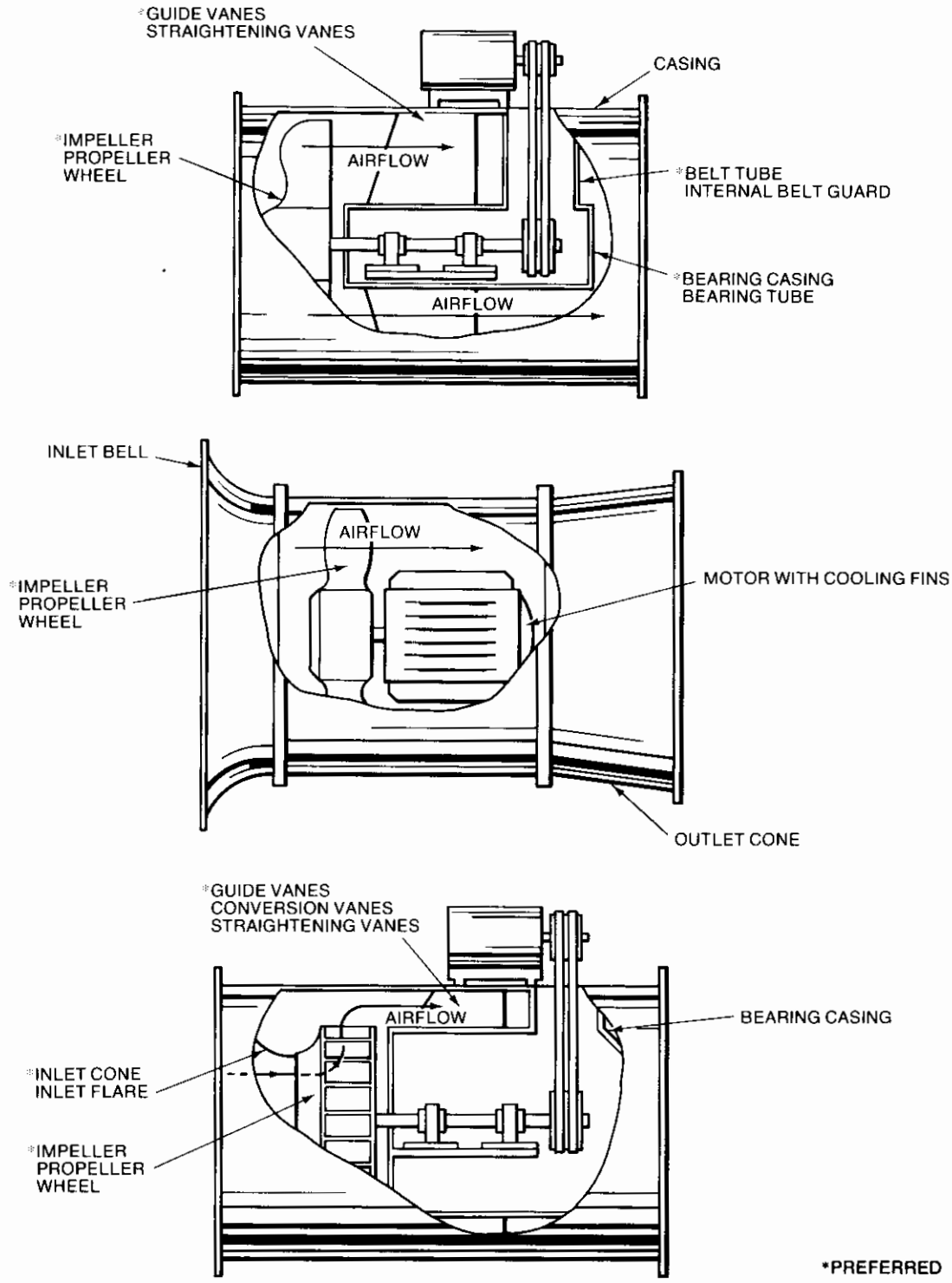
Types of Centrifugal Blowers			
Type:	**Blower Design:**	**Wheel Design:**	**Applications:**
Airfoil	Highest efficiency of all centrifugal fan designs. 9 to 16 blades of airfoil contour curved away from the direction of rotation. Air leaves the impeller at a velocity less than its tip speed and relatively deep blades provide for efficient expansion within the blade passages. For given duty, this will be the highest speed of the centrifugal fan designs.		For Clean Air Service Only. Make Up Air Blowers, Filtered Supply Fans, Forced Draft Ventilation, Combustion Air, Air Strippers, Decarbonators, Emergency Exhaust, and applications requiring Non-Overloading Horsepower curve *Characteristics*.
Backward Inclined	Efficiency is only slightly less than that of airfoil fans. Backward-inclined or backward-curved blades are single thickness, 9 to 10 blades curved or inclined away from the direction of rotation. Efficient for the same reasons given for the airfoil fan above.		Thermal Oxidizers, Boiler Exhaust, Clean Side of Dust Collectors and Bag Houses, Odor Control Systems, Fume Scrubbers, Oven and Furnace Exhaust.
Radial	Simplest of all impellers, least efficient. Has and the wheel centrifugal fans and least high mechanical strength It is easily repaired. For a given point of rating, this Blower design requires medium speed. This classification includes radial blades (R) and modified radial blades (M), usually 6 to 10 Blades.		Used primarily for material-handling applications in industrial plants. Impellers can be of extra heavy duty construction, utilizing Abrasion Resistant "AR" Construction materials such as Tungsten Carbide. Radial wheels do not use close tolerance Inlet Cones and typically do not allow material build up. Radial design impellers are often selected to attain higher total pressure than Airfoil or Backward Inclined impellers. Industrial. Radial wheels are not commonly used in HVAC applications.
Forward Curved	Efficiency is less than airfoil and backward-curved bladed fans. Usually fabricated of lightweight and loin cost construction. Has 24 to 64 shallow blades with both the heel and tip curved forward. Air exits the wheel at a velocity greater than wheel. Tip speed and primary energy transferred to the air is by use of high velocity in the wheel. For given duty, wheel is the smallest of all centrifugal types and operates at lowest speed.		Used primarily in low-pressure heating, ventilating, and air-conditioning applications such as domestic furnaces, central station air handling units, and packaged air-conditioning equipment, make-up air units and roof top units.

APPENDIX B



COMMON TERMINOLOGY FOR CENTRIFUGAL FAN COMPONENTS

Figure 42



COMMON TERMINOLOGY FOR AXIAL AND TUBULAR CENTRIFUGAL FANS

Figure 43