CENTRIFUGAL FAN

Introduction

The centrifugal fan uses the centrifugal power generated from the rotation of impellers to increase the pressure of air/gases. When the impellers rotate, the gas near the impellers is thrown-off from the impellers due to the centrifugal force and then moves into the fan casing. As a result the gas pressure in the fan casing is increased. The gas is then guided to the exit via outlet ducts. After the gas is thrown-off, the gas pressure in the middle region of the impellers decreases.

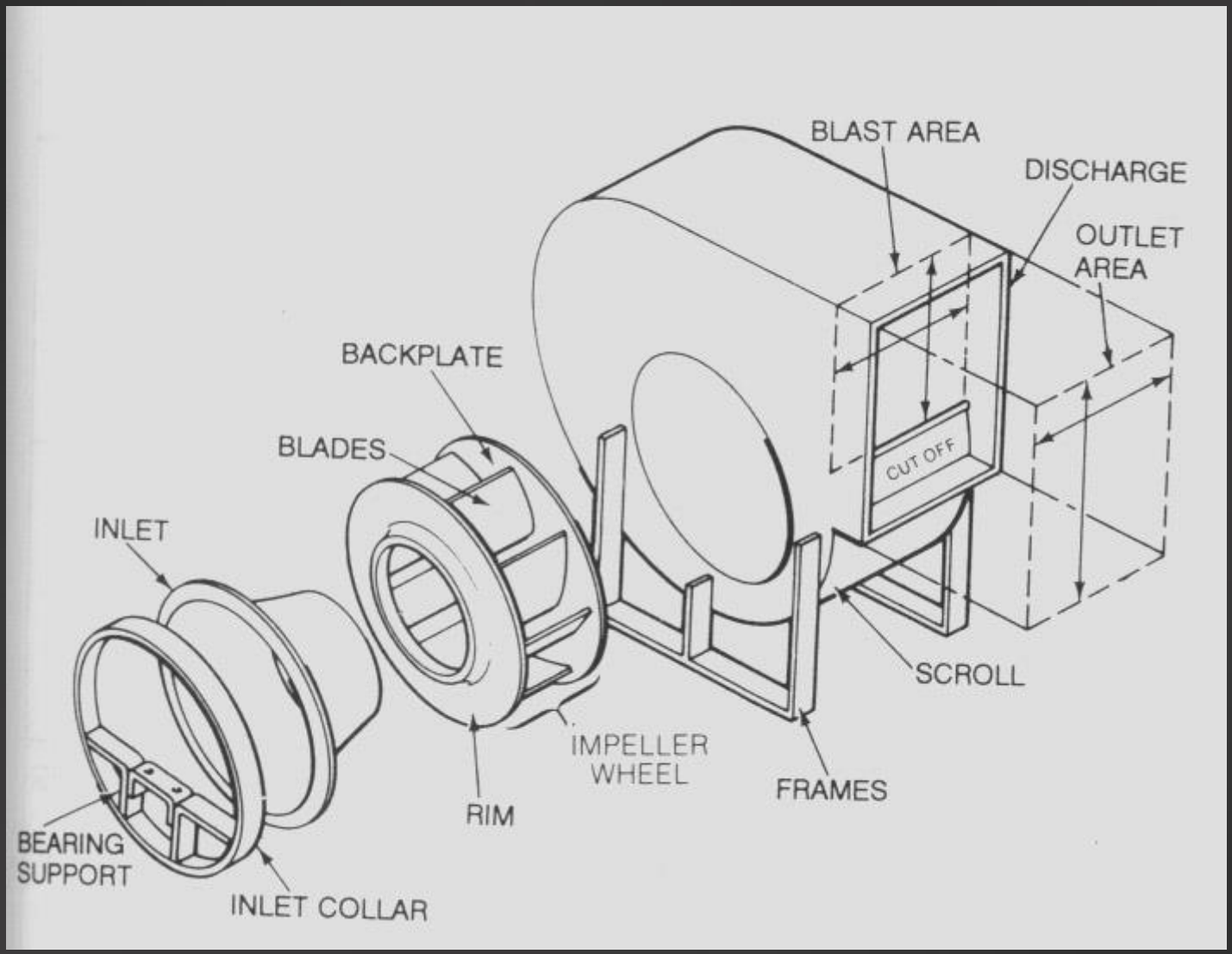
Main parts of a centrifugal fan are Fan Housing, Impellers, Inlet and outlet ducts, Drive Shaft, Drive mechanism. It has a fan wheel composed of a number of fan blades, or ribs, mounted around a hub. As shown in Figure 1, the hub turns on a driveshaft that passes through the fan housing. The gas enters from the side of the fan wheel, turns 90 degrees and accelerates due to centrifugal force as it flows over the fan blades and exits the fan housing.

Woking

- Motion of air through an impeller
- There are three stages to the pressure development through a centrifugal fan impeller:1)We know that air is forced through the impeller in the radial direction due to centrifugal effects. As the radius of the impeller increases the magnitude of the centrifugal force on the air increases. This increase in centrifugal force with radius produces a pressure gradient, whereby the static pressure in the blade passage increases with radius.
- 2)Generally the outlet area of the blade passage is larger than the inlet area, thus the blade passage acts as a diffuser.

- The relative velocity reduces as the air flows through the blade passage, leading to an additional increase in the static pressure at the impeller out let. Air enters a centrifugal fan impeller axially, then passes through the impeller radially, the airflow is then collected in the volute casing and discharged at right angles to the inlet flow.
- As the impeller rotates, the air contained within the blade passage is forced outwards due to the centrifugal force. This process happens continually producing a continuous flow through the impeller.
- 3)In an open inlet centrifugal fan, air enters the impeller radially. The motion of the blades adds rotational momentum to the flow, increasing the velocity of the flow in the tangential direction.

- As the air moves radially through the impeller, the absolute velocity of the flow will increase, with the maximum absolute velocity at the impeller outlet. This increase in the absolute velocity of the air leads to an increase in the kinetic energy and dynamic pressure across the impeller.
- Centrifugal force increasing on particle. The particle leaves the impeller following an almost tangential track. Dotted line showing the track of the particle. Here it can be seen entering the blade passage and starting to rotate The particle is now almost spinning at the same speed as the impeller, generating the maximum centrifugal force


BLAST AREA
DISCHARGE
OUTLET AREA
BACKPLATE
BLADES
CUT OFF
INLET
SCROLL
IMPELLER WHEEL
FRAMES
RIM
BEARING SUPPORT
INLET COLLAR

Industrial Uses

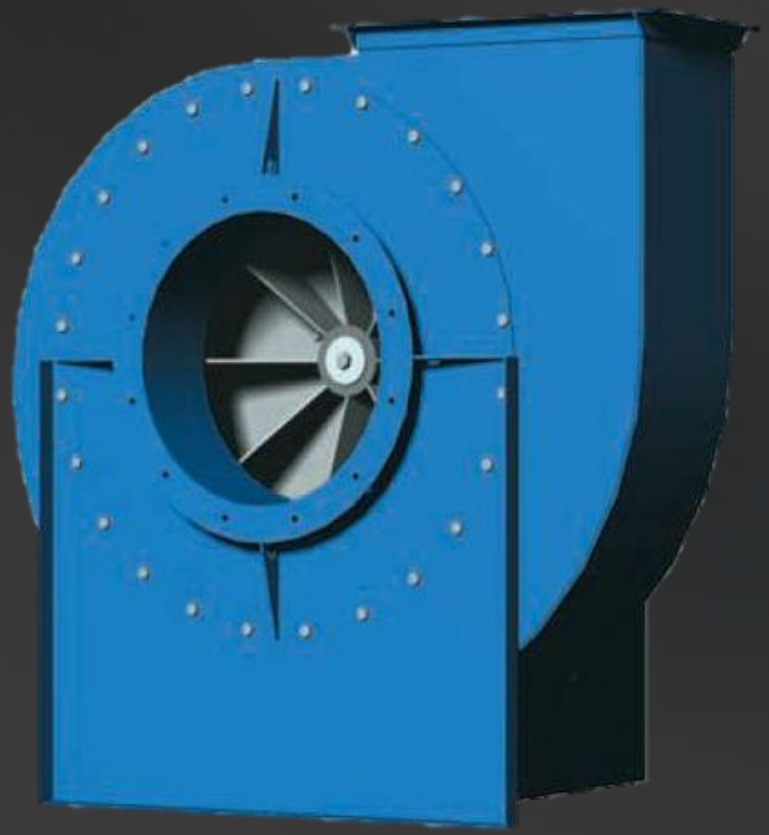
- Centrifugal fans are used to move high volumes of clean air at low-to-medium static pressures. The Centrifugal fan blades are backwardly inclined and designed with the same aerodynamics that create flight, making this fan one of the most efficient centrifugal fans.
- Less horsepower is required to produce the same performance as other fan models.
- Operational sound levels are lower.
- Energy costs are lower.

- centrifugal fan in multiple sizes, arrangements, construction classes, and impeller and housing widths. Whether standard or custom.
- Centrifugal fan is designed and built with unmatched quality and backed by responsive, respectable service.

Applications

- De-dusting
- Paint Booths
- Chemicals Petrochemicals
- Agriculture & Silos
- Glass Industry
- Boilers And Ovens
- Textile
- Wood And Paper
- Incineration Plants

Advantages



- **First-rate energy efficiency:** Constant airflow allows centrifugal fans to generate energy that reaches up to 84% static efficiency. These higher efficiency levels are ideal for sustaining larger air systems.
- **Enhanced durability:** These fans are durable enough to properly operate in the most corrosive and erosive environments.

- **Ability to restrict overloading.** Certain centrifugal fans are fitted with non-overloading horsepower curves will ensure the motor will not overload if its capacity is exceeded.
- **Easy to maintain.** Lighter material fans can be easily cleaned when you deem it necessary. Moreover, certain fans have self-cleaning characteristics, making daily maintenance that much easier.
- **High versatility.** Centrifugal fans are useful for multiple airflow/pressure combinations, and they can process several airflow conditions, including clean, dry, and wet air
- **Multiple sizes.** These fans are available in several sizes to accommodate diverse applications—such as those found in tight spaces or difficult to reach areas.

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