

Industrial Fans: Types & Performance



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1. INTRODUCTION

1. An industrial fan is heavy-duty air flow device, used to provide a large flow of air or gas to various processes of many industries. This is achieved by rotating several blades, connected to a hub and shaft, and driven by a motor or turbine.



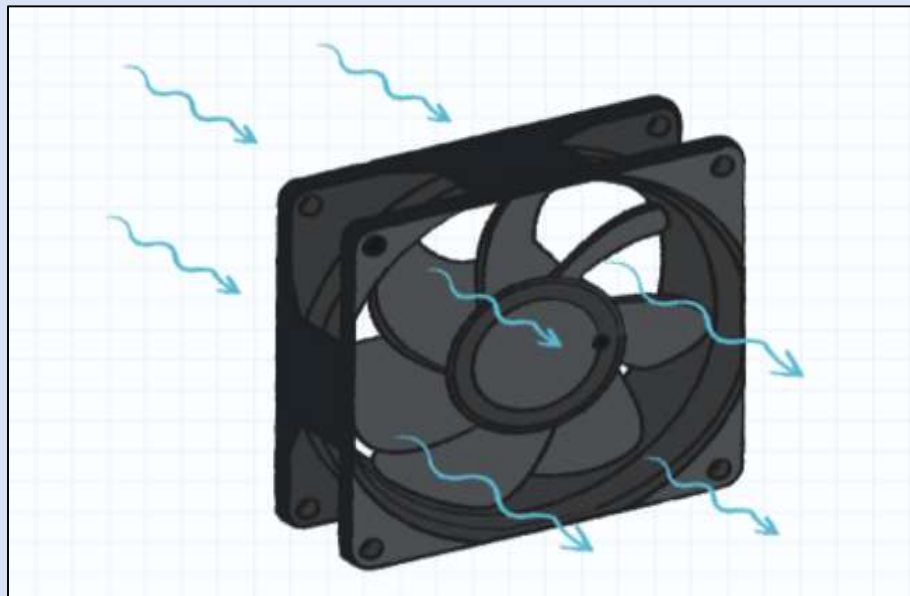
2. They are constructed from exceptionally durable materials to withstand restrictive environments and operate longer to provide constant airflow and pressure.

- Industrial Fans generate a pressure to move air (or gases) against a resistance caused by ducts, dampers, or other components in a fan system. The fan rotor receives energy from a rotating shaft and transmits it to the air..
- The different types of fans depend on various factors such as;
 1. Volume flow rate
 2. Pressure
 3. Materials that are moved
 4. Space limitations
 5. Desired efficiency of the fans

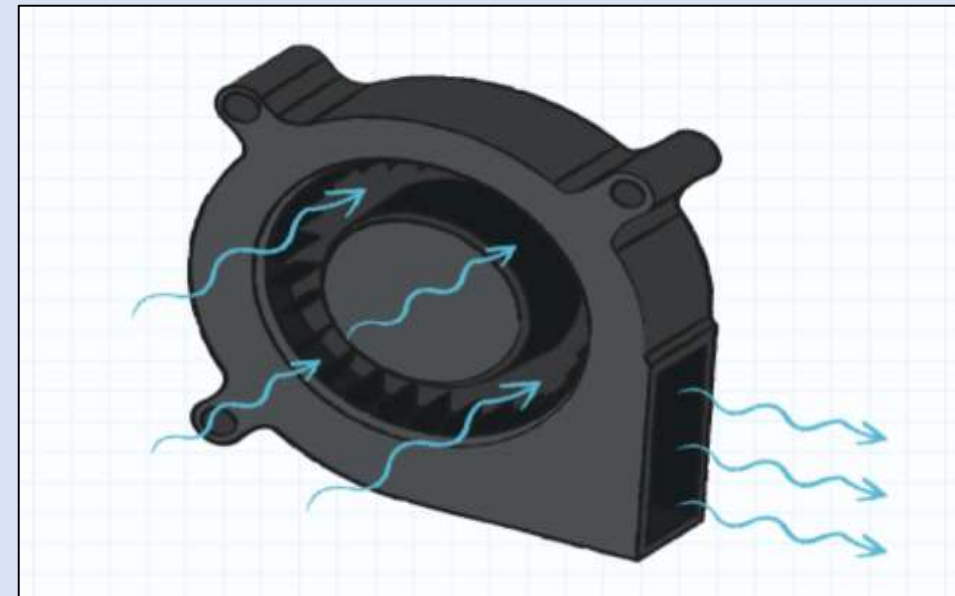
2. Types of Industrial Fans

- Industrial fans basically vary in the amount of air to be moved, their motor, the area to be cooled, and a variety of other factors. Most industrial fans may be categorized into one of two general types:

1. Centrifugal fans
2. Axial fans.



Axial fans expel air parallel to the intake



Centrifugal fans expel air 90° from the intake

2.1. Centrifugal fans

- A mechanical device for moving air or other gases in a direction at an angle to the incoming fluid.
- Air enters the impeller axially and is accelerated by the blades and discharged radially.
- Extract air at right angles to the intake of the fan and spin the air outwards to the outlet by deflection and centrifugal force.
- The impeller rotates, using air to enter the fan near the shaft and move perpendicularly from the shaft to the opening in the fan casing.



- The major types of centrifugal fan are radial, forward curved and backward curved.

1- Radial Fans

- Radial fans are industrial workhorses because of their high static pressures (up to 1400 mm WC) and ability to handle heavily contaminated airstreams.



Radial fans



Multi-vane fans ([MV](#))

2- Forward curve {Multi-vane fans ([MV](#))}

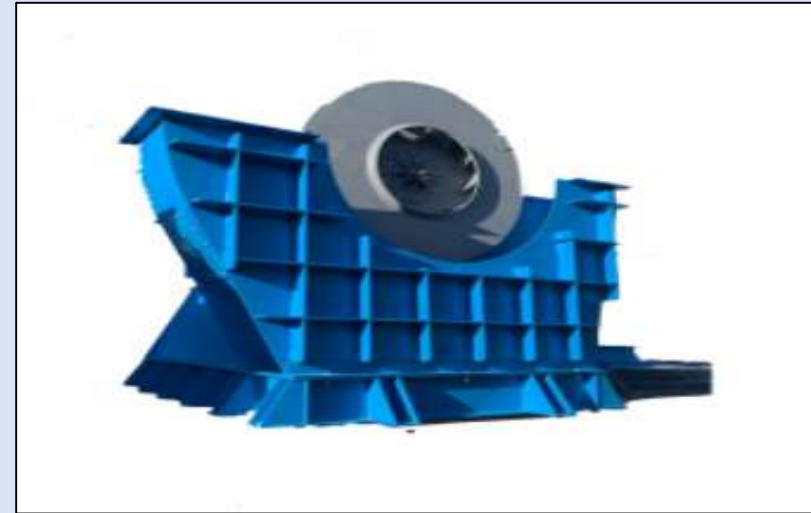
- MV fans are otherwise known as a Multi-Vane fan. These feature forward-curved blades to help clean the air from factory locations. They are considered as a low-pressure fan system and are typically used as a flue fan and other light applications.

3- Backward curved fans (BC)

- BC fans or Backward Curved fans. These have slightly higher efficiency than BL fans, but not as high as BA fans. They are non-overloading and particularly good for general clean air and light dust movement.



Backward curved fans (BC)



Backward lamina fans (BL)

4- Backward lamina fans (BL)

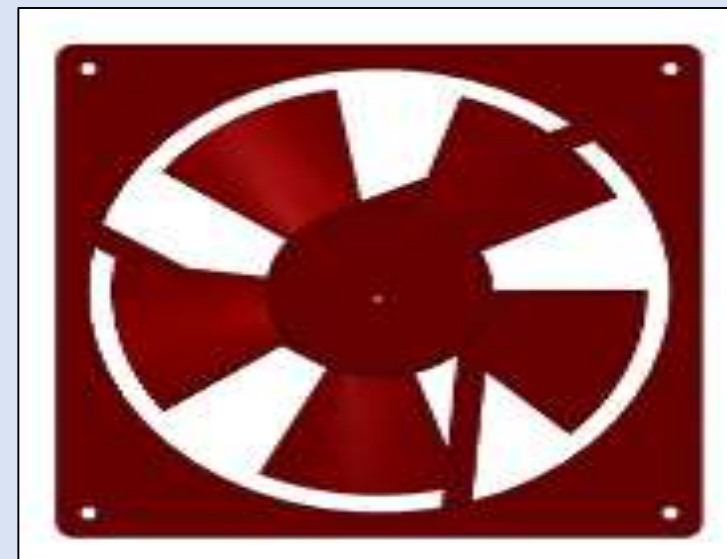
- A BL fan or Backward Lamina fan boasts backwards inclined blades. These are particularly good for general clean air and light dust movement. They can be used for a wide range of applications.

2.2. Axial fans

- wall-mounted or axial flow fan propels the air in an axial direction with a swirling tangential motion created by the rotating impeller blades.
- The axial flow fan increases the air velocity through rotational or tangential force, which produces velocity pressure (VP), kinetic energy, with a very small increase in static pressure (SP), potential energy.

What are axial fans used for?

- Moving air from one space to another
- General-purpose applications
- Cooling confined spaces i.e. computers
- Cooling larger spaces i.e. workplaces



Axial fan

- The major types of axial flow fans are tube axial, vane axial and propeller.

1. Tube axial

- These fans have a wheel inside a cylindrical housing, with close clearance between blade and housing to improve airflow efficiency.

2. Vane axial

- These fans are like tube axials, but with addition of guide vanes that improve efficiency by directing and straightening the flow. As a result, they have a higher static pressure with less dependence on the duct static pressure.

3. Propeller

- These fans usually run at low speeds and moderate temperatures. They experience a large change in airflow with small changes in static pressure. They handle large volumes of air at low pressure or free delivery.



Tube Axial



Vane axial



Propeller

3. Application of Industrial Fans

- Industrial fans are majorly required to blow air through heavy-machinery parts and building or structure facilities and are commonly used in places which require ventilation, exhaust clearing , Drying and cooling.
- They are used to create suction, pressurization, cooling, combustion air, forced ventilation, and exhaust ventilation.
- **Agriculture:** Used as a method for creating airflow in livestock barns, dairy farms, and greenhouses.
- **Cement industry:** Cement making requires a variety of processing fans that have resistance to abrasion and dust build up and can operate in high temperature applications.
- **Chemical Industry:** Use to keep chemicals cooled and avoids the buildup of hazardous fumes.

- **Oil & gas Industry :**

- Designed to perform in the harshest and most severe conditions.
- Made of exceptionally durable materials with welded flanges and components that provide resistance to weathering, abrasion, moisture, and other potentially harmful atmospheric elements.

- **Pneumatic Conveying:**

- Used in conveying systems to move cereal, grains, wood chips, and powdered materials.
- The process of pneumatic conveying is used by the food, mineral, plastics, coffee, and pharmaceutical industries. All bulk materials can be pneumatically conveyed using an abrasion resistant fan.

Conclusion

Industrial fans are widely used in numerous industrial and even domestic purposes. They are used basically to direct airflow to achieve certain objectives such as dust removal, heat removal, elimination of fumes in buildings and air purification in enclosed environments.

Over the years, advanced technology has enabled the centrifugal and axial fan manufacturers deliver high quality and efficient fans , able to deliver and remove air very effectively

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