

# Selecting Fans

## Impeller Structures



## Selecting the Correct Impeller Structure

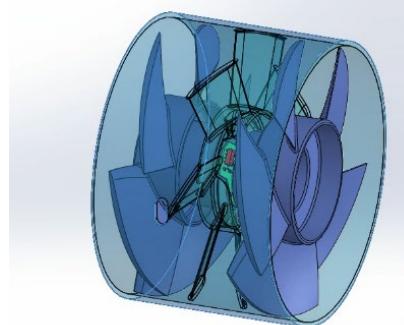
- Selecting the correct impeller structure for your application is important because the impeller structure impacts fan:
  - Airflow
  - Efficiency
  - Noise level
- JE can support designs for the following impeller structural designs:
  - Axial
  - Diagonal (Mixed-Flow)
  - Centrifugal
  - Tangential

# Impeller Structure: Axial

**Typical axial fan applications need high air flow with medium to high static pressure increase**

- The air flow in axial fans with an impeller that is similar to a propeller is conducted largely parallel to the axis of rotation, in other words in the axial direction. Axial fans with free air delivery at zero static pressure have the lowest power input that rises with increasing back pressure. Axial fans for cooling of electronic equipment are mostly equipped with external housing. The electric motor is integrated in the fan hub. This compact design allows space-saving accommodation of all devices. The flange is equipped with mounting holes.

## Engine Cooling Modules

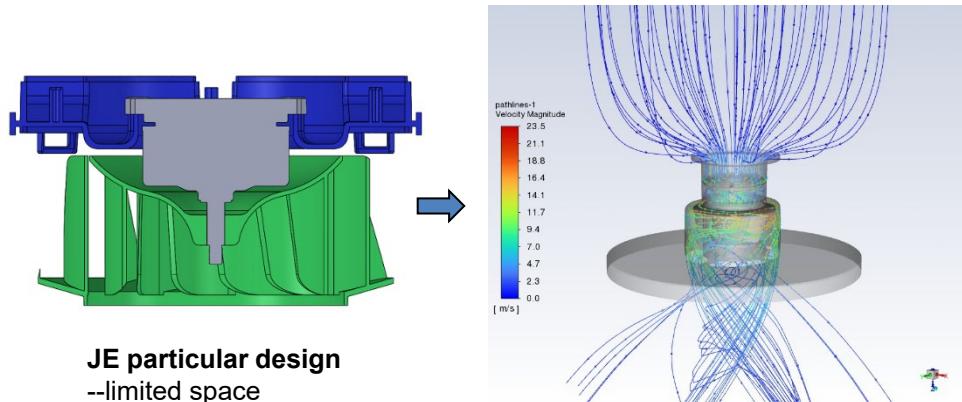


## Duct Fan

# Impeller Structure: Diagonal (Mixed-Flow)

Typical diagonal fan applications need high air flow with high static pressure increase

- At first glance diagonal fans only differ slightly from axial fans. Intake is axial, whereas exhaust is diagonal. Due to the conical shape of the wheel and housing, the air is pressurized more in the diagonal fan.
- In direct comparison with axial fans of the same size and comparable performance, these fans are distinguished by the lower operating noise at high pressures.

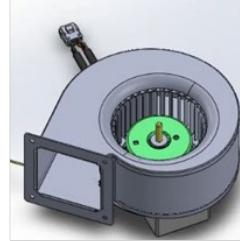


**JE particular design**  
--limited space  
--diagonal tunnel  
--higher air volume  
--lower noise

# Impeller Structure: Centrifugal

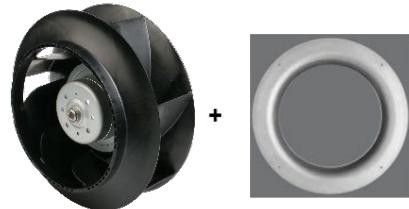
Typical centrifugal fan applications need high pressure increase at limited flow rates

- Generally, many air movement tasks can be performed excellently by axial and/or diagonal fans. But if the airflow must be deflected at an angle of  $90^\circ$  , for example, or if even greater pressure increase is necessary, centrifugal fans are more effective and more efficient.



**JE forward centrifugal fan**

\* Hint: forward centrifugal must be applied in a scroll structure



**JE backward centrifugal fan**

\* Hint: backward centrifugal must be applied with inlet ring



Variation of integrated inlet ring and installation plate, so-called plug fan

# Impeller Structure: Tangential

Typical tangential fan applications need high air flow with low pressure increase

- Tangential fans are used especially to produce a wide airflow distribution through devices. The air flows through the roller-shaped impellers twice in the radial direction: in the intake area from the outside to the inside and in the outflow area from the inside to the outside. Whirls form in the roller due to the vanes, which guarantee a steady flow of air through the impeller. In some business, we call this kind of impeller is a mouse cage.



A tangential fan with SP motor

Its variation

Typical application:

- electrical fan heater
- evaporator fan for show case
- evaporator fan for air conditioner

Weakness:

- impeller diameter is small & limited due to vibration

## Selecting the Correct Impeller Structure

- Selecting the correct impeller structure can result in improved comfort and productivity within the space being ventilated, as well as reduce operating costs.

# Thank You

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