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ECADEMY

BASIC PRINCIPLES AND TYPES OF PUMPS

MAIN IMPELLER TYPES

What is an impeller?

The impeller is the main component of a centrifugal pump.

When the impeller rotates, it generates the force required to move – or “pump” – the fluid.

Impellers are also used in compressors, turbines and many other machines that move fluids or gas.

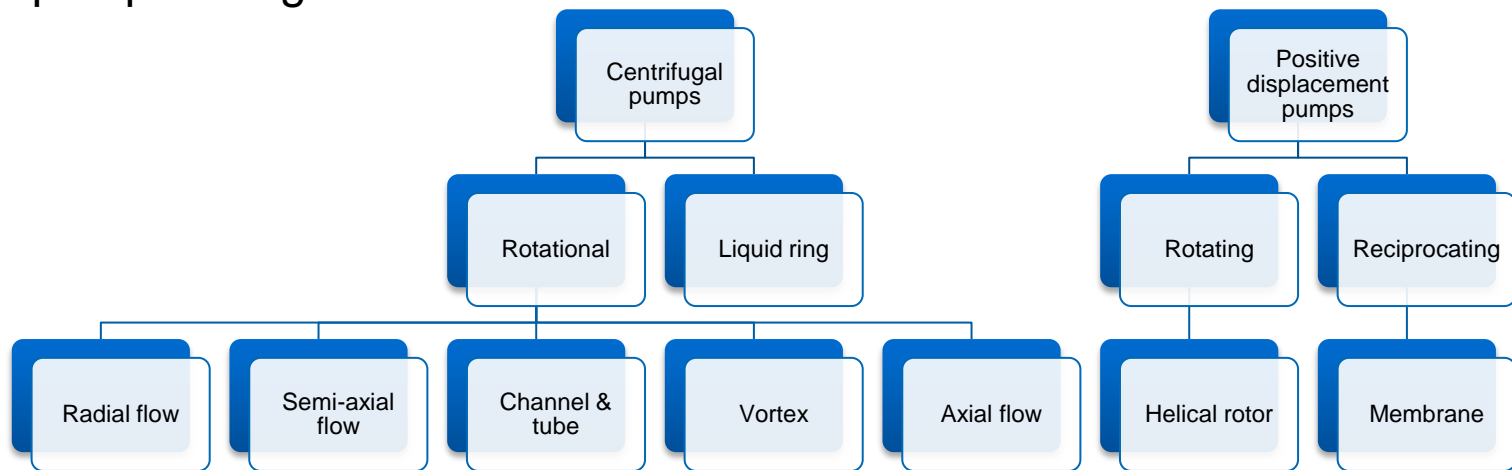


Main impeller types

The vast majority of the pumps Grundfos sells are centrifugal pumps, although positive displacement pumps are also a part of the range.

Pumps are often categorised by the type of impeller they use, with the main types in Grundfos pumps being:

- Radial flow impellers
- Semi-axial flow impellers
- Channel impellers
- Vortex impellers
- Axial flow impellers
- Helical rotors
- Membrane



Radial flow impellers

Radial flow impellers work by moving the fluid out of the pump “radially” or perpendicular to the pump shaft.

This pump design creates a relatively high level of pressure compared to flow.

Radial flow impellers are typically used in circulating pumps, machine tool pumps, boiler feed pumps and industrial pumps with flows up to 20–30 m³/h. They are also used in most single-stage pumps.



Semi-axial flow impellers

Semi-axial flow impellers are similar to radial flow impellers, but subject the fluid to a degree of radial flow in order to improve efficiency.

Semi-axial flow impellers can handle greater flows than radial impellers, and pumps with semi-axial flow impellers are typically used for larger water intake or distribution purposes in water supply, irrigation and cooling applications.



Channel and tube impellers

Channel impellers, also known as solids handling impellers, are designed to allow large free passage of solids measuring 80 mm or more in diameter.

Because they are able to cope with solids and fibres, pumps with channel impellers are used in wastewater applications.

In 2012, Grundfos launched the S-tube impeller, a new type of channel impeller where the channel is shaped like a tube. This design improves efficiency and clog-free reliability.



Vortex impellers

A vortex impeller creates vortices in the pump housing that moves fibers, solids and sand through the pump. This makes these impellers ideal for handling liquids with long fibers, particles and abrasive sand.

Although vortex impeller pumps deliver high clog-free reliability, they are typically only about half as efficient as channel impellers. Because of this, pumps with vortex impellers are normally used in smaller wastewater applications with large amounts of fibers and sand, but where reliability is more important than efficiency.



Axial flow impellers

An axial flow impeller is essentially a propeller and motor shaft unit, housed in a tube. The propeller simply moves the liquid along through the tube.

Axial flow impellers do not generate much pressure, but they are very good at providing high flow (more than 40,000 m³/hour).

Pumps with axial flow impellers are mainly used for recirculating liquids between tanks in wastewater treatment plants, and for flood control applications where large volumes of water need to be pumped at a low head.





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