

Basic knowledge Compressors

Compressors are used for compressing and pumping gases. Their higher pressure ratio distinguishes them from fans.

There are different types of compressor, depending on the area of application. The most important ones are briefly explained here.

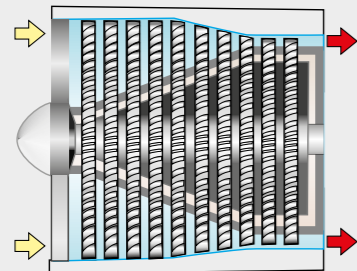
The characteristics of compressors include:

- delivery quantity – volume of the delivered fluid/time
- operating pressure – attainable positive pressure
- pressure ratio Π = final pressure / suction pressure
- volumetric efficiency – conveyed volumetric flow rate / theoretical (due to geometry) possible volumetric flow rate

Turbo compressors

- a type of driven turbomachine, the energy is transferred from the compressor to the fluid via flow forces
- depending on the direction of fluid flow, a distinction is made between radial and axial compressors
- can compress very high volumetric flow rates, very high flow velocities can be achieved (transonic compressors)

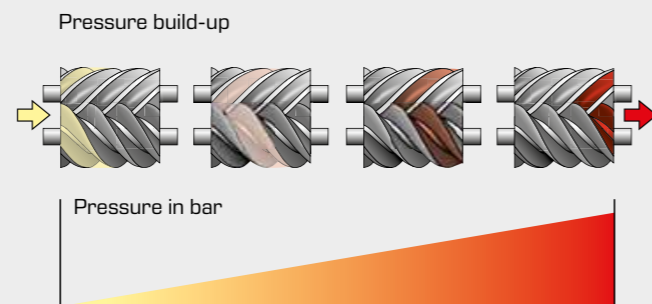
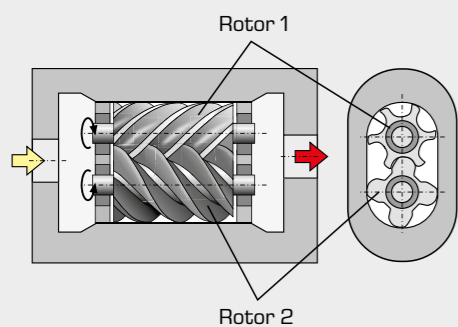
- **design:** housing with control unit, shaft with one or more rotors and blades
- **applications:** in gas turbines, jet engines or fans for hot-blast furnaces in steel mills, in exhaust gas turbochargers in internal combustion engines



Screw compressors (comparable to screw pumps)

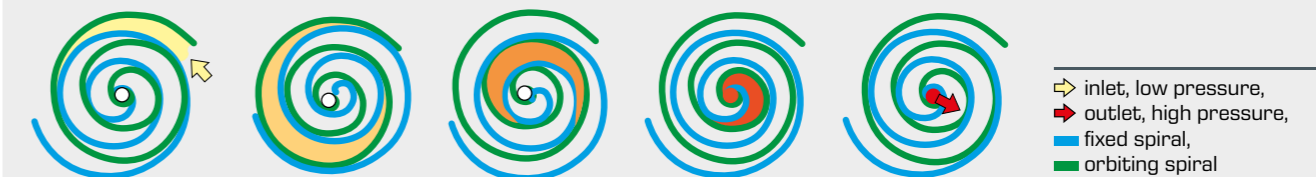
- work according to the positive displacement principle
- are characterized by very continuous delivery without pulsation and can generate very high pressures

- **design:** their housing contains two or more rotors that rotate in opposite directions, with an external screw thread profile. As the threads of the screws engage, the fluid is transported.
- **applications:** industrial use in large plants for the production of compressed air or in refrigeration technology



Scroll compressors

- a type of driven positive displacement machine, the energy is transferred from the compressor to the fluid via a variable volume
- **design and functionality:** two intertwining/interlocking spirals with a minimum distance from each other. One spiral is stationary (stator), the other one (rotor) follows a circular trajectory. This movement causes two chambers to be formed whose volume is continuously reduced. The inlet for the fluid / gas to be pumped is on the outside, the outlet for the compressed gas is in the middle of the spirals. The pairs of spirals do not touch each other and can therefore work without lubricant.
- **applications:** e.g. refrigeration plants or heat pumps



Piston compressors

- a type of driven positive displacement machine, the energy is transferred from the compressor to the fluid via a variable volume
- **design and functionality:** together with the cylinder and cylinder cover, the piston (displacer) forms a closed space with variable volumes. A crank mechanism generates the periodic reciprocating movement of the piston in the cylinder. Automatic valves in the cylinder cover allow the fluid to flow into and out of the cylinder chamber. The operation is comparable to that of a petrol engine.
- **applications:** gas compression, high pressure, starting internal combustion engines, most commonly used

