# Fluid mover (compressor)

# Type of compressor

There are two types of compressors being considered, a reciprocating compressor and a centrifugal compressor. To determine which one is better suited for the design we must look at flow rates, pressure range, gas type, cost, and efficiency.

A **reciprocating compressor** is widely used for compressing gasses. It consists of a piston and a cylindrical chamber for the gas. The piston moves up and down using a rotor, sucking in the gas from the inlet valve, compressing it and then pushing it out of the outlet valve. It is a simple and cheap compressor to design and install. It can operate at high pressures and is efficient. Its main drawback is the fact that it struggles with flowrates above 100 CFM (0.0472 m3/s). It will generate a massive amount of heat with high flowrates and may cause damage to the pump/compressor. The other drawback is that it causes pulses in the movement of the fluid, which is not optimal for when the fluid moves through heat exchangers and the reactor.

A **centrifugal compressor** makes use of blades to accelerate the fluid and then slowing it down using a diffuser, this causes an increase in pressure. Centrifugal compressors can have a compact design and does not need a lot of maintenance. It has a high efficiency and deals well with gasses like hydrogen. Most importantly, it can be designed to handle high flowrates and it does not generate pulses like the reciprocating compressors.

**The centrifugal compressor is better suited for this design as we are operating at flowrates much higher then 0.0472 m3/s.** The reciprocating compressor will not work well for this design.

# Design of a centrifugal compressor