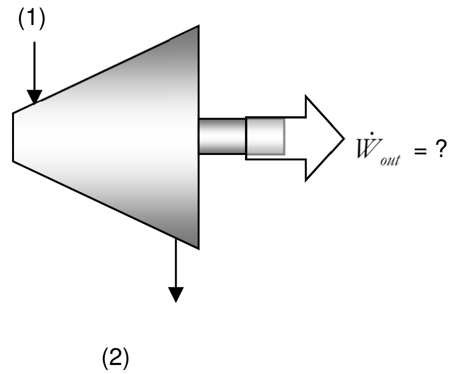
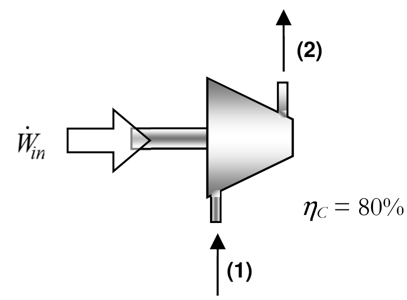
EXAMPLE: Steam turbine

1.25 kg/s of steam flows through a steady state turbine. The steam enters at 1 MPa and 300°C, and leaves at 100 kPa. If the process is adiabatic and reversible, find the power delivered by the turbine in kW.



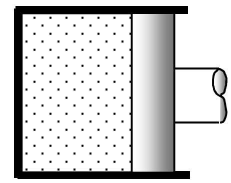
EXAMPLE: Isentropic efficiency (AKA adiabatic efficiency)

1 kg/s of steam flows through a steady-state compressor. The steam enters the compressor at 100 kPa as a saturated vapor. The exit pressure is 1.0 MPa. If the **adiabatic efficiency** (ding ding ding!) is 80%,



(a) find the power *input* to the compressor (in kW) and
(b) the temperature of the steam leaving the compressor.
(c) Sketch the process on a *T-s* diagram. Label the ideal and actual exit state points.

EXAMPLE: Isothermal piston-cylinder



A piston-cylinder device contains 1 kg of water. Initially, the water is at 200°C and 1000 kPa. The water is compressed in a **reversible isothermal** process until the water is a saturated liquid.

(a) Sketch the process on *P-v* and *T-s* diagrams.
(b) Find the heat transfer for the process, in kJ.
(c) Find the work for the process, in kJ.