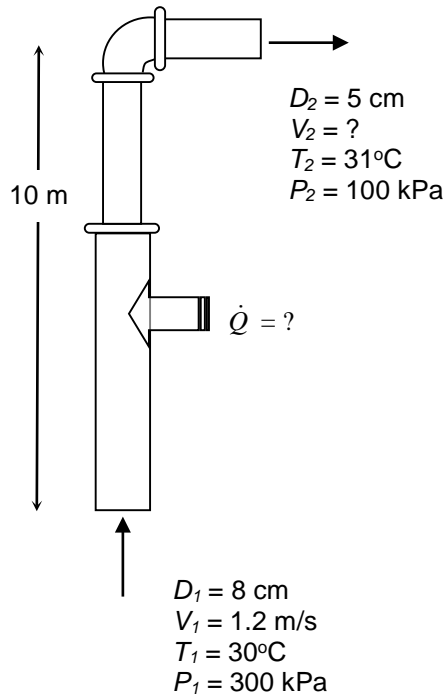## Example

Water flows through a piping system as shown in the figure. The properties at the inlet and the exit of the pipe are known. Modeling water as an incompressible substance with $\rho = 996$ kg/m³ and $c = 4.47$ kJ/kg-K

(a) find the exit velocity of the water, and
(b) find the rate of heat transfer added to the water.
(c) How does the enthalpy change compare with the kinetic and potential energy terms?

$D_2 = 5$ cm
$V_2 = ?$
$T_2 = 31°C$
$P_2 = 100$ kPa

10 m

$\dot{Q} = ?$

$D_1 = 8$ cm
$V_1 = 1.2$ m/s
$T_1 = 30°C$
$P_1 = 300$ kPa

Example

Steam flows steadily through a nozzle. The steam enters the nozzle with a pressure of 200 psia and negligible velocity. The steam exits the nozzle at 2 psia. The specific internal energy of the steam at the inlet and exit is 1183 B/lbm and 900.7 B/lbm, respectively. The specific volume at the inlet and exit is 2.853 ft³/lbm and 146.6 ft³/lbm, respectively. If the nozzle is well insulated, find the velocity at the nozzle exit. (B = 778 ft-lbf)