

Question #78370, Engineering / Chemical Engineering

Air (ideal and perfect gas) with mass of 8.000kg is heated at constant pressure of 9.000mbar (gage) from -20.810C to 179.148C. Determine the heat required in MJ, and the change of the system volume ($\Delta V = V_2 - V_1$)

Solution

$$Q = mc_p\Delta T = (8)(1006)(179.148 - 20.810) = 1.274 \text{ MJ.}$$

$$\Delta V = \frac{mR\Delta T}{p} = \frac{(8)(287.058)(179.148 - 20.810)}{900} = 404.0 \text{ m}^3.$$

Answer provided by AssignmentExpert.com