Answer on Question #64197, Physics / Molecular Physics | Thermodynamics

If the pressure in a steam boiler as shown by the gauge is 3.6 bar, what is the temperature of the steam?

Find: T- ?

Given:

T_0=273 K

p_0=1 bar

p=3.6 bar

Solution:

The steam is in the boiler and the volume of steam is not changed.

Gas law at constant volume:

$\frac{p}{T} = \frac{p_0}{T_0}$ (1)

Of (1) $\Rightarrow$ $T = \frac{p}{p_0} T_0$ (2)

Of (2) $\Rightarrow$ T=982.8 K

T=t°C+273 (3)

Of (3) $\Rightarrow$ t=709.8°C

Answer:

982.8 K (709.8°C)