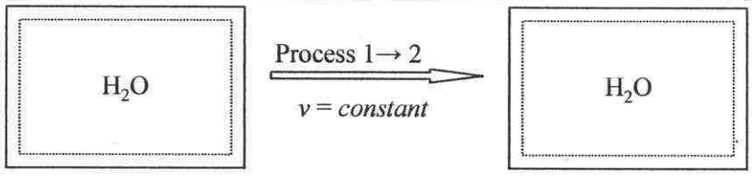
PROBLEM 3.28



$T_1 = 520°C$
$p_1 = 100$ bar

$v_2 = v_1$
$T_2 = 270°C$

Since the process occurs at constant volume, $v_2 = v_1$. State 1 is fixed by the given property values, $T_1 = 520\,°C$ and $p_1 = 100$ bar. From Table A-4, $v_1 = 0.03394\ m^3/kg$.

State 2 now can be fixed by the properties, $v_2 = v_1 = 0.03394\ m^3/kg$; $T_2 = 270\,°C$. From Table A-2 at $T_2 = 270\,°C$, $v_{f2} < v_2 < v_{g2}$. Thus, State 2 is in the saturated mixture region where pressure and temperature are NOT independent of each other. From Table A-2

$$P_2 = P_{sat} = \underline{\mathbf{54.99\ bar}}$$

Since volume remains constant during the process, the process begins in the superheated vapor region and follows a vertical path to 270°C on both the *T*-*v* and *p*-*v* diagrams.