

For the following properties for water, determine the water's phase and sketch the state on p - v and T - v plots: $p = 10$ bar (abs), $T = 179.88$ °C

SOLUTION:

Using the “Saturated Water – Pressure” table, at $p = 10 \text{ bar (abs)}$, $T_{\text{sat}} = 179.88 \text{ }^\circ\text{C}$. Since the given temperature is the same as the saturation temperature at this pressure, it means that the water is in a SLVM state. It’s not possible to determine the corresponding specific volume since the water quality is not given. We do know, however, that the specific volume should have a value $0.0011272 \text{ m}^3/\text{kg} \leq v \leq 0.19436 \text{ m}^3/\text{kg}$.

From the “Saturated Water – Pressure” table:

	Liquid					Vapor				
Press. (bar)	Temp. (C)	Volume (v_f , m^3/kg)	Internal Energy (u_f , kJ/kg)	Enthalpy (h_f , kJ/kg)	Entropy (s_f , $\text{kJ}/\text{kg}/\text{K}$)	Volume (v_g , m^3/kg)	Internal Energy (u_g , kJ/kg)	Enthalpy (h_g , kJ/kg)	Entropy (s_g , $\text{kJ}/\text{kg}/\text{K}$)	
7	164.95	0.0011080	696.23	697.00	1.9918	0.27277	2571.8	2762.8	6.7071	
8	170.41	0.0011148	719.97	720.86	2.0457	0.24034	2576.0	2768.3	6.6616	
9	175.35	0.0011214	741.55	742.50	2.0990	0.21987	2579.0	2773.0	6.6213	
10	179.88	0.0011272	761.39	762.52	2.1381	0.19436	2582.7	2777.1	6.5850	
15	190.23	0.0011533	842.03	844.50	2.3143	0.15171	2533.4	2721.0	6.4430	
20	212.38	0.0011767	906.14	908.50	2.4468	0.099585	2599.1	2798.3	6.3390	

