

CoolProp IAPWS IF97 Test

$$p1 := 101325 \text{ Pa} \quad T1 := 308.15 \text{ K}$$

1.0 Saturation Test

1.1 Saturation ancillary function test

$$p_{\text{sat}}(T) := \text{CoolProp_saturation_ancillary}(\text{"water"}, \text{"P"}, 0, \text{"T"}, T) \quad p_{\text{sat}}(T1) = 5629.1473 \text{ Pa}$$

$$p_{\text{sat}}(T) := \text{CoolProp_saturation_ancillary}(\text{"IF97::water"}, \text{"P"}, 0, \text{"T"}, T) \quad p_{\text{sat}}(T1) = \blacksquare \text{ Pa}$$

$$T_{\text{sat}}(p) := \text{CoolProp_saturation_ancillary}(\text{"water"}, \text{"P"}, p, \text{"T"}, 0) \quad T_{\text{sat}}(p1) = \blacksquare \text{ }^\circ\text{C}$$

$$T_{\text{sat}}(p) := \text{CoolProp_saturation_ancillary}(\text{"IF97::water"}, \text{"P"}, p, \text{"T"}, 0) \quad T_{\text{sat}}(p1) = \blacksquare \text{ }^\circ\text{C}$$

1.2 Props function test

$$p_{\text{sat}}(T) := \text{CoolProp_Props}(\text{"P"}, \text{"Q"}, 0, \text{"T"}, T, \text{"water"}) \quad p_{\text{sat}}(T1) = 5629.0161 \text{ Pa}$$

$$p_{\text{sat}}(T) := \text{CoolProp_Props}(\text{"P"}, \text{"Q"}, 0, \text{"T"}, T, \text{"IF97::water"}) \quad p_{\text{sat}}(T1) = \blacksquare \text{ Pa}$$

$$T_{\text{sat}}(p) := \text{CoolProp_Props}(\text{"T"}, \text{"P"}, p, \text{"Q"}, 0, \text{"water"}) \quad T_{\text{sat}}(p1) = 99.9743 \text{ }^\circ\text{C}$$

$$T_{\text{sat}}(p) := \text{CoolProp_Props}(\text{"T"}, \text{"P"}, p, \text{"Q"}, 0, \text{"IF97::water"}) \quad T_{\text{sat}}(p1) = \blacksquare \text{ }^\circ\text{C}$$

2.0 Subcooled or superheated function Test

$$h_{\text{pT}}(p, T) := \text{CoolProp_Props}(\text{"H"}, \text{"P"}, p, \text{"T"}, T, \text{"IF97::water"}) \quad h_{\text{pT}}(p1, T1) = 146.7308 \frac{\text{kJ}}{\text{kg}}$$

$$\rho_{\text{pT}}(p, T) := \text{CoolProp_Props}(\text{"D"}, \text{"P"}, p, \text{"T"}, T, \text{"IF97::water"}) \quad \rho_{\text{pT}}(p1, T1) = 994.0385 \frac{\text{kg}}{\text{m}^3}$$

$$C_{\text{pT}}(p, T) := \text{CoolProp_Props}(\text{"C"}, \text{"P"}, p, \text{"T"}, T, \text{"IF97::water"}) \quad C_{\text{pT}}(p1, T1) = 4.1789 \frac{\text{kJ}}{\text{kg } \Delta^\circ\text{C}}$$

$$C_{\text{vT}}(p, T) := \text{CoolProp_Props}(\text{"O"}, \text{"P"}, p, \text{"T"}, T, \text{"IF97::water"}) \quad C_{\text{vT}}(p1, T1) = 3.7174 \frac{\text{kJ}}{\text{kg } \Delta^\circ\text{C}}$$

$$\mu_{\text{pT}}(p, T) := \text{CoolProp_Props}(\text{"V"}, \text{"P"}, p, \text{"T"}, T, \text{"IF97::water"}) \quad \mu_{\text{pT}}(p1, T1) = \blacksquare$$

$$\mu_{\text{pT}}(p, T) := \text{CoolProp_Props}(\text{"V"}, \text{"P"}, p, \text{"T"}, T, \text{"water"}) \quad \mu_{\text{pT}}(p1, T1) = 7.1913 \cdot 10^{-4} \text{ s Pa}$$

$$k_{\text{pT}}(p, T) := \text{CoolProp_Props}(\text{"L"}, \text{"P"}, p, \text{"T"}, T, \text{"IF97::water"}) \quad k_{\text{pT}}(p1, T1) = \blacksquare$$

$$k_{\text{pT}}(p, T) := \text{CoolProp_Props}(\text{"L"}, \text{"P"}, p, \text{"T"}, T, \text{"water"}) \quad k_{\text{pT}}(p1, T1) = 0.6217 \frac{\text{watt}}{\text{m } \Delta^\circ\text{C}}$$

Pressure(kPa)	101.325	35.00 °C
Saturation properties given pressure		
Pressure	101.325 kPa a	
Tsat	99.9743 °C	
hl	419.0 kJ/kg	
rho_l	958.37 kg/m ³	
sl	1.31 kJ/kgK	
hv	2675.5 kJ/kg	
rho_v	0.60 kg/m ³	
sv	7.35 kJ/kgK	
Properties given pressure and temperature		
Pressure	101.3250 kPa a	
Temperature	35.000 °C	
IF97 Region	1	
h	146.731 kJ/kg	
rho	994.0385 kg/m ³	
s	0.51 kJ/kgK	
Cp	4.1789E+00 kJ/(kg°C)	
Cv	4.0955E+00 kJ/(kg°C)	
μ	7.1932E-04 Pa s	
κ	6.2203E-01 W/(m K)	
Prandtl No	4.832532474	
Vapour fraction	0 %	
Speed of sound	1521.984325 m/s	