ThermoFluidProperties

Property Library for Acetone

with LibC3H6O

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Property Functions

Functional Dependence	Function Name	Call from Fortran Program	Property or Function	Unit of the Result
$a = f(p,t,x)$	a_ptx_C3H6O	A_PTX_C3H6O(P,T,X)	Thermal diffusivity	m²/s
$c_p = f(p,t,x)$	cp_ptx_C3H6O	CP_PTX_C3H6O(P,T,X)	Specific isobaric heat capacity	kJ/(kg K)
$c_v = f(p,t,x)$	cv_ptx_C3H6O	CV_PTX_C3H6O(P,T,X)	Specific isochoric heat capacity	kJ/(kg K)
$\eta = f(p,t,x)$	eta_ptx_C3H6O	ETA_PTX_C3H6O(P,T,X)	Dynamic viscosity	Pa . s
$h = f(p,t,x)$	h_ptx_C3H6O	H_PTX_C3H6O(P,T,X)	Specific enthalpy	kJ/kg
$\kappa = f(p,t,x)$	ka_ptx_C3H6O	KA_PTX_C3H6O(P,T,X)	Isentropic exponent	-
$\lambda = f(p,t,x)$	lam_ptx_C3H6O	LAM_PTX_C3H6O(P,T,X)	Thermal conductivity	W/(m . K)
$\nu = f(p,t,x)$	ny_ptx_C3H6O	NY_PTX_C3H6O(P,T,X)	Kinematic viscosity	m²/s
$Pr = f(p,t,x)$	pr_ptx_C3H6O	PR_PTX_C3H6O(P,T,X)	*Prandtl*-number	-
$p_s = f(t)$	ps_t_C3H6O	PS_T_C3H6O(T)	Vapor pressure from temperature	bar
$\rho = f(p,t,x)$	rho_ptx_C3H6O	RHO_PTX_C3H6O(P,T,X)	Density	kg/m^3
$s = f(p,t,x)$	s_ptx_C3H6O	S_PTX_C3H6O(P,T,X)	Specific entropy	kJ/(kg K)
$\sigma = f(t)$	sigma_t_C3H6O	SIGMA_T_C3H6O(T)	Surface tension from temperature	N/m
$t = f(p,h)$	t_ph_C3H6O	T_PH_C3H6O(P,H)	Backward function: Temperature from pressure and enthalpy	°C
$t = f(p,s)$	t_ps_C3H6O	T_PS_C3H6O(P,S)	Backward function: Temperature from pressure and entropy	°C
$t_s = f(p)$	ts_p_C3H6O	TS_P_C3H6O(P)	Saturation temperature from pressure	°C
$u = f(p,t,x)$	u_ptx_C3H6O	U_PTX_C3H6O(P,T,X)	Specific internal energy	kJ/kg
$v = f(p,t,x)$	v_ptx_C3H6O	V_PTX_C3H6O(P,T,X)	Specific volume	m³/kg
$w = f(p,t,x)$	w_ptx_C3H6O	W_PTX_C3H6O(P,T,X)	Isentropic speed of sound	m/s

Functional Dependence	Function Name	Call from Fortran Program	Property or Function	Unit of the Result
$x = f(p,h)$	x_ph_C3H6O	X_PH_C3H6O(P,H)	Backward function: Vapor fraction from pressure and enthalpy	kg/kg
$x = f(p,s)$	x_ps_C3H6O	X_PS_C3H6O(P,S)	Backward function: Vapor fraction from pressure and entropy	kg/kg

Units: *t* in °C
p in bar
x in (kg saturated steam)/(kg wet steam)

Range of validity

for transport properties (a, η, λ, ν, Pr):

Temperature range: from - 94.65 °C to 276.85 °C
Pressure range: from 2.3265 x 10^{-5} bar to 3200 bar

for other properties:

Temperature range: from - 94.65 °C to 276.85 °C
Pressure range: from 2.3265 x 10^{-5} bar to 7000 bar

Reference state

h = 0 kJ/kg and s = 0 kJ/(kg K) at p = 1,01325 bar on the saturated liquid line (x = 0)

Details on the vapor fraction *x*

The wet steam region is calculated automatically by the subprograms. For this purpose the following fixed details on the vapor fraction *x* are to be considered:

Single-phase region

If the state point to be calculated is located in the single-phase region (liquid or superheated steam) x = –1 must be entered as a pro-forma value.

Wet-steam region

If the state point to be calculated is located in the wet steam region, a value for *x* between 0 and 1 (x = 0 for saturated liquid, x = 1 for saturated steam) must be entered. In this case, the backward functions result in the appropriate value between 0 and 1 for *x*. When calculating wet steam either the given value for *t* and p = -1000 or the given value for *p* and t = -1000 and in both cases the value for *x* between 0 and 1 must be entered.

If *p* and *t* and *x* are entered as given values, the program considers *p* and *t* to be appropriate to represent the vapor pressure curve. If this is not the case the calculation for the property of the chosen function results in –1.

Wet steam region: Temperature ranges from t_{min} = - 94.65 °C to t_c = 234.95 °C

Pressure ranges from $p_{min} = 2.3265 \times 10^{-5}$ bar to p_c = 46.9215 bar

Note:

If the input values are located outside the range of validity, the calculated function will always result in –1000. Please find more exact details on every function and its corresponding range of validity in the enclosed program documentation in Chapter 3.