KCE

ThermoFluidProperties

Property Library for Carbonyl Sulfide

LibCOS

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Property Functions

Functional Dependence	Function Name	Call from Fortran Program	Property or Function	Unit of the Result
$c_p = f(p,t,x)$	cp_ptx_COS	CP_PTX_COS(P,T,X)	Specific isobaric heat capacity	kJ/(kg K)
$c_v = f(p,t,x)$	cv_ptx_COS	CV_PTX_COS(P,T,X)	Specific isochoric heat capacity	kJ/(kg K)
$h = f(p,t,x)$	h_ptx_COS	H_PTX_COS(P,T,X)	Specific enthalpy	kJ/kg
$\kappa = f(p,t,x)$	ka_ptx_COS	KA_PTX_COS(P,T,X)	Isentropic exponent	-
$p_s = f(t)$	ps_t_COS	PS_T_COS(T)	Vapor pressure from temperature	bar
$\rho = f(p,t,x)$	rho_ptx_COS	RHO_PTX_COS(P,T,X)	Density	kg/m^3
$s = f(p,t,x)$	s_ptx_COS	S_PTX_COS(P,T,X)	Specific entropy	kJ/(kg K)
$\sigma = f(t)$	sigma_t_COS	SIGMA_T_CO(T)	Surface tension from temperature	N/m
$t = f(p,h)$	t_ph_COS	T_PH_COS(P,H)	Backward function: Temperature from pressure and enthalpy	°C
$t = f(p,s)$	t_ps_COS	T_PS_COS(P,S)	Backward function: Temperature from pressure and entropy	°C
$t_s = f(p)$	ts_p_COS	TS_P_COS(P)	Saturation temperature from pressure	°C
$u = f(p,t,x)$	u_ptx_COS	U_PTX_COS(P,T,X)	Specific internal energy	kJ/kg
$v = f(p,t,x)$	v_ptx_COS	V_PTX_COS(P,T,X)	Specific volume	m^3/kg
$w = f(p,t,x)$	w_ptx_COS	W_PTX_COS(P,T,X)	Isentropic speed of sound	m/s
$x = f(p,h)$	x_ph_COS	X_PH_COS(P,H)	Backward function: Vapor fraction from pressure and enthalpy	kg/kg
$x = f(p,s)$	x_ps_COS	X_PS_COS(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

Temperature range: from - 138.85 °C to 376.85 °C

Pressure range: from 6.44346 x 10^{-4} bar to 500 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} = - 138.85 °C to t_c = 105.62 °C

Pressure ranges from p_{min} = 6.44346 x 10^{-4} bar to p_c = 63.6876 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 software documentation in Chapter 3.