KCE
ThermoFluidProperties

Property Library for Tetradecamethyl-hexasiloxane (MD4M) $C_{14}H_{42}O_5Si_6$

LibMD4M

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Property Functions

1 Calculation Programs

1.1 Calculation Programs

"MD4M" means Tetradecamethylhexasiloxane ($C_{14}H_{42}O_5Si_6$)

Functional Dependence	Function Name	Call from Fortran program	Property or Function	Unit of the result
c_p = f(p,t,x)	cp_ptx_MD4M	CPPTXMD4M(P,T,X)	Specific isobaric heat capacity	kJ/(kg K)
c_v= f(p,t,x)	cv_ptx_MD4M	CVPTXMD4M(P,T,X)	Specific isochoric heat capacity	kJ/(kg K)
$\left(\frac{\partial p}{\partial T}\right)_v$ = f(p,t,x)	dpdtv_ptx_MD4M	DPDTVMD4M(P,T,X)	Derivative of pressure with respect to temperature (at constant specific volume)	kPa/K
$\left(\frac{\partial p}{\partial v}\right)_T$ = f(p,t,x)	dpdvt_ptx_MD4M	DPDVTMD4M(P,T,X)	Derivative of pressure with respect to specific volume (at constant temperature)	kPa/(m³/kg)
η = f(p,t,x)	eta_ptx_MD4M	ETAPTXMD4M(P,T,X)	Dynamic viscosity	Pa·s
h = f(p,t,x)	h_ptx_MD4M	HPTXMD4M(P,T,X)	Specific enthalpy	kJ/kg
κ = f(p,t,x)	kappa_ptx_MD4M	KAPPAPTXMD4M(P,T,X)	Isentropic exponent	-
λ = f(p,t,x)	lamda_ptx_MD4M	LAMPTXMD4M(P,T,X)	Thermal conductivity	W/(m·K)
ν = f(p,t,x)	nu_ptx_MD4M	NUPTXMD4M(P,T,X)	Kinematic viscosity	m²/s
p_s = f(t)	ps_t_MD4M	PSTMD4M(T)	Vapor pressure from temperature	bar
ρ = f(p,t,x)	rho_ptx_MD4M	RHOPTXMD4M(P,T,X)	Density	kg/m³
s = f(p,t,x)	s_ptx_MD4M	SPTXMD4M(P,T,X)	Specific entropy	kJ/(kg K)
t = f(p,h)	t_ph_MD4M	TPHMD4M(P,H)	Backward function: Temperature from pressure and enthalpy	°C
t = f(p,s)	t_ps_MD4M	TPSMD4M(P,S)	Backward function: Temperature from pressure and entropy	°C
t_s = f(p)	ts_p_MD4M	TSPMD4M(P)	Saturation temperature from pressure	°C
u = f(p,t,x)	u_ptx_MD4M	UPTXMD4M(P,T,X)	Specific internal energy	kJ/kg
v = f(p,t,x)	v_ptx_MD4M	VPTXMD4M(P,T,X)	Specific volume	m³/kg
w = f(p,t,x)	w_ptx_MD4M	WPTXMD4M(P,T,X)	Isentropic speed of sound	m/s
x = f(p,h)	x_ph_MD4M	XPHMD4M(P,H)	Backward function: Vapor fraction from pressure and enthalpy	kg/kg

Functional Dependence	Function Name	Call from Fortran program	Call in DLL LibMD4M as parameter	Property or Function	Unit of the result
$x = f(p,s)$	x_ps_MD4M	XPSMD4M(P,S)	C_XPSMD4M(X,P,S)	Backward function: Vapor fraction from pressure and entropy	kg/kg
$Z = f(p,t,x)$	Z_ptx_MD4M	ZPTXMD4M(P,T,X)	C_ZPTXMD4M(W,P,T,X)	Compression factor	-

Units:

t in °C

p in bar

x in (kg of saturated steam)/(kg wet steam)

Range of validity

Temperature range: from t = 26.85°C to 399.85 °C

Pressure range: from p = 0.00001 bar to 300 bar

Reference state

h = 0 kJ/kg and s = 0 kJ/(kg K) at t_B = 259.573 °C on the boiling curve (x = 0; $p_s = p_N$ = 1.01325 bar)

Details on the vapor fraction *x* and on the calculation of wet steam

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 –1000.

Wet steam region: Temperature range from t = 26.85 °C to t_c = 379.05 °C

Pressure range from p_s (26.85 °C) = 0.00001093377 bar to p_c = 8.7747391 bar

Note.

If the calculation results in –1000, the values entered represent a state point beyond the range of validity of MD4M. For further information on each function and its range of validity see Chapter 3. The same information may also be accessed via the online help pages.