KCE
ThermoFluidProperties

Property Library for Dodecamethyl-cyclohexasiloxane (D6) $C_{12}H_{36}Si_6O_6$

LibD6

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Property Functions

Calculation Programs

"D6" means Dodecamethylcyclohexasiloxane **($C_{12}H_{36}Si_6O_6$)**

Functional Dependence	Function Name	Call from Fortran program	Property or Function	Unit of the result
$c_p = f(p,t,x)$	cp_ptx_D6	CPPTXD6(P,T,X)	Specific isobaric heat capacity	kJ/(kg K)
$c_v = f(p,t,x)$	cv_ptx_D6	CVPTXD6(P,T,X)	Specific isochoric heat capacity	kJ/(kg K)
$\left(\frac{\partial p}{\partial T}\right)_v = f(p,t,x)$	dpdtv_ptx_D6	DPDTVD6(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_D6	DPDVTD6(P,T,X)	Derivative of pressure with respect to specific volume (at constant temperature)	kPa/(m³/kg)
$\eta = f(p,t,x)$	eta_ptx_D6	ETAPTXD6(P,T,X)	Dynamic viscosity	Pa·s
$h = f(p,t,x)$	h_ptx_D6	HPTXD6(P,T,X)	Specific enthalpy	kJ/kg
$\kappa = f(p,t,x)$	kappa_ptx_D6	KAPPAPTXD6(P,T,X)	Isentropic exponent	-
$\lambda = f(p,t,x)$	lamda_ptx_D6	LAMPTXD6(P,T,X)	Thermal conductivity	W/(m·K)
$\nu = f(p,t,x)$	nu_ptx_D6	NUPTXD6(P,T,X)	Kinematic viscosity	m²/s
$p_s = f(t)$	ps_t_D6	PSTD6(T)	Vapor pressure from temperature	bar
$\rho = f(p,t,x)$	rho_ptx_D6	RHOPTXD6(P,T,X)	Density	kg/m³
$s = f(p,t,x)$	s_ptx_D6	SPTXD6(P,T,X)	Specific entropy	kJ/(kg K)
$t = f(p,h)$	t_ph_D6	TPHD6(P,H)	Backward function: Temperature from pressure and enthalpy	°C
$t = f(p,s)$	t_ps_D6	TPSD6(P,S)	Backward function: Temperature from pressure and entropy	°C
$t_s = f(p)$	ts_p_D6	TSPD6(P)	Saturation temperature from pressure	°C
$u = f(p,t,x)$	u_ptx_D6	UPTXD6(P,T,X)	Specific internal energy	kJ/kg
$v = f(p,t,x)$	v_ptx_D6	VPTXD6(P,T,X)	Specific volume	m³/kg
$w = f(p,t,x)$	w_ptx_D6	WPTXD6(P,T,X)	Isentropic speed of sound	m/s

$x = f(p,h)$	x_ph_D6	XPHD6(P,H)	Backward function: Vapor fraction from pressure and enthalpy	kg/kg

Functional Dependence	Function Name	Call from Fortran program	Call in DLL LibD6 as parameter	Property or Function	Unit of the result
x = f(p,s)	x_ps_D6	XPSD6(P,S)	C_XPSD6(X,P,S)	Backward function: Vapor fraction from pressure and entropy	kg/kg
Z = f(p,t,x)	Z_ptx_D6	ZPTXD6(P,T,X)	C_ZPTXD6(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 = 0°C to 400 °C

Pressure range: from p = 0.0000022823 bar to 300 bar

Reference state

h = 0 kJ/kg and s = 0 kJ/(kg K) at t_B = 244.99 °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. Here the backward functions will also result in x = –1.

Wet-steam region

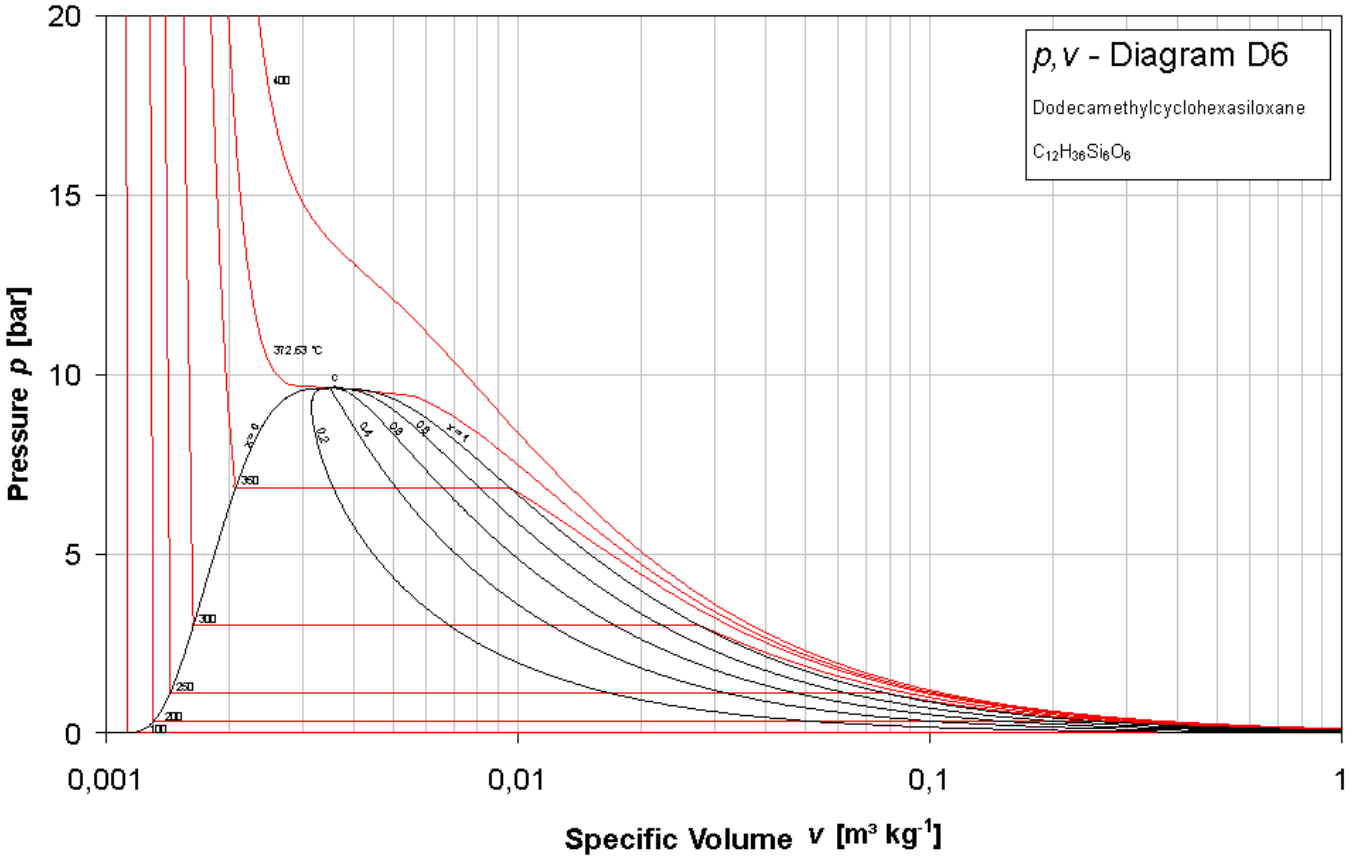
When calculating wet steam, a value between 0 and 1 (x = 0 for saturated liquid, x = 1 for saturated steam) must be entered. In this case, the backward functions result in the appropriate value between 0 and 1 for *x*. It is adequate to enter either the given value for *t* and p = –1000, or the given value for *p* and t = –1000, plus the value for *x* between 0 and 1. When *p* and *t* and *x* are entered as given values, the program will consider *p* and *t* to be appropriate to represent the saturation-pressure curve. If it is not the case the calculation for the property of the chosen function to be calculated results in –1000.

Wet steam region:
Temperature ranges from t = 0 °C to t_c = 372.63 °C
Pressure ranges from p_s (0 °C) = 0.00078994 bar to p_c = 9.61 bar

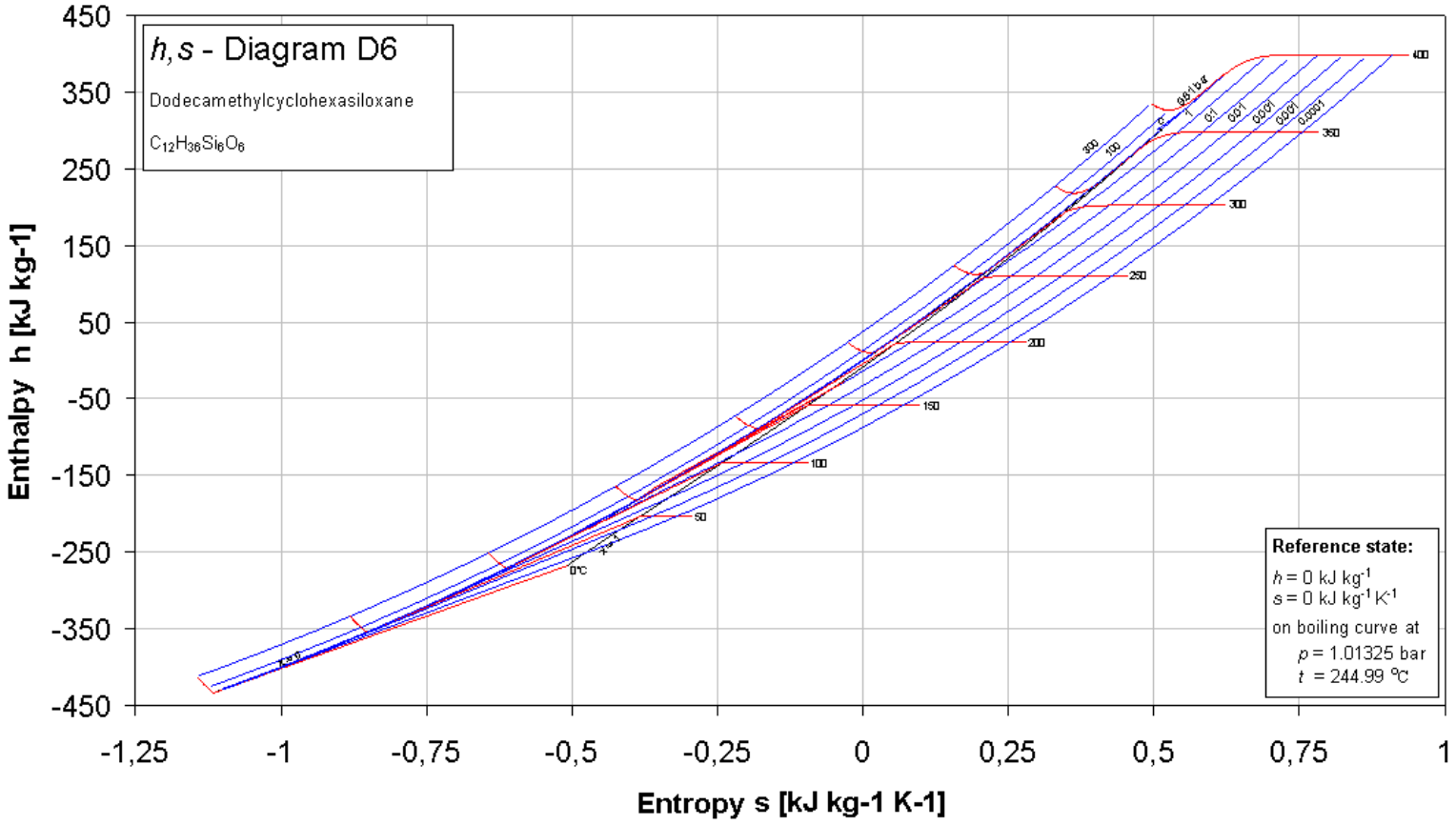
Note.

If the calculation results in –1000 (except for x), the values entered represent a state point beyond the range of validity of D6. 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.

1.2 p,v-Diagram



1.3 h,s-Diagram



1.4 T,s-Diagram