

**Property Library for  
Decamethyltetrasiloxane (MD2M)  
 $C_{10}H_{30}Si_4O_3$**

**LibMD2M**

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# Property Functions

## 1 Calculation Programs

"MD2M" means Decamethyltetrasiloxane ( $C_{10}H_{30}Si_4O_3$ )

Functional Dependence	Function Name	Call from Fortran program	Property or Function	Unit of the result
$c_p = f(p, t, x)$	cp_ptx_MD2M	CPPTXMD2M(P,T,X)	Specific isobaric heat capacity	kJ/(kg K)
$c_v = f(p, t, x)$	cv_ptx_MD2M	CVPTXMD2M(P,T,X)	Specific isochoric heat capacity	kJ/(kg K)
$\left(\frac{\partial p}{\partial T}\right)_v = f(p, t, x)$	dpdtv_ptx_MD2M	DPDTVMD2M(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_MD2M	DPDVTMD2M(P,T,X)	Derivative of pressure with respect to specific volume (at constant temperature)	kPa/(m <sup>3</sup> /kg)
$\eta = f(p, t, x)$	eta_ptx_MD2M	ETAPTXMLD2M(P,T,X)	Dynamic viscosity	Pa·s
$h = f(p, t, x)$	h_ptx_MD2M	HPTXMLD2M(P,T,X)	Specific enthalpy	kJ/kg
$\kappa = f(p, t, x)$	kappa_ptx_MD2M	KAPPAPTXMLD2M(P,T,X)	Isentropic exponent	-
$\lambda = f(p, t, x)$	lamda_ptx_MD2M	LAMPXMLD2M(P,T,X)	Thermal conductivity	W/(m·K)
$\nu = f(p, t, x)$	nu_ptx_MD2M	NUPTXMLD2M(P,T,X)	Kinematic viscosity	m <sup>2</sup> /s
$p_s = f(t)$	ps_t_MD2M	PSTMD2M(T)	Vapor pressure from temperature	bar
$\rho = f(p, t, x)$	rho_ptx_MD2M	RHOPTXMLD2M(P,T,X)	Density	kg/m <sup>3</sup>
$s = f(p, t, x)$	s_ptx_MD2M	SPTXMLD2M(P,T,X)	Specific entropy	kJ/(kg K)
$t = f(p, h)$	t_ph_MD2M	TPHMD2M(P,H)	Backward function: Temperature from pressure and enthalpy	°C
$t = f(p, s)$	t_ps_MD2M	TPSMD2M(P,S)	Backward function: Temperature from pressure and entropy	°C
$t_s = f(p)$	ts_p_MD2M	TSPMD2M(P)	Boiling temperature from pressure	°C
$u = f(p, t, x)$	u_ptx_MD2M	UPTXMLD2M(P,T,X)	Specific internal energy	kJ/kg
$v = f(p, t, x)$	v_ptx_MD2M	VPTXMLD2M(P,T,X)	Specific volume	m <sup>3</sup> /kg
$w = f(p, t, x)$	w_ptx_MD2M	WPTXMLD2M(P,T,X)	Isentropic speed of sound	m/s
$x = f(p, h)$	x_ph_MD2M	XPHMD2M(P,H)	Backward function: Vapor fraction from pressure and enthalpy	kg/kg

Functional Dependence	Function Name	Call from Fortran program	Call in DLL LibMD2M as parameter	Property or Function	Unit of the result
$x = f(p,s)$	x_ps_MD2M	XPSMD2M(P,S)	C_XPSMD2M(X,P,S)	Backward function: Vapor fraction from pressure and entropy	kg/kg
$Z = f(p,t,x)$	Z_ptx_MD2M	ZPTXMD2M(P,T,X)	C_ZPTXMD2M(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  $t = 0^\circ\text{C}$  to  $400^\circ\text{C}$   
Pressure range: from  $p = 0.0000627805$  bar to 300 bar

### Reference state

$h = 0$  kJ/kg and  $s = 0$  kJ/(kg K) at  $t_B = 194.35^\circ\text{C}$  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.

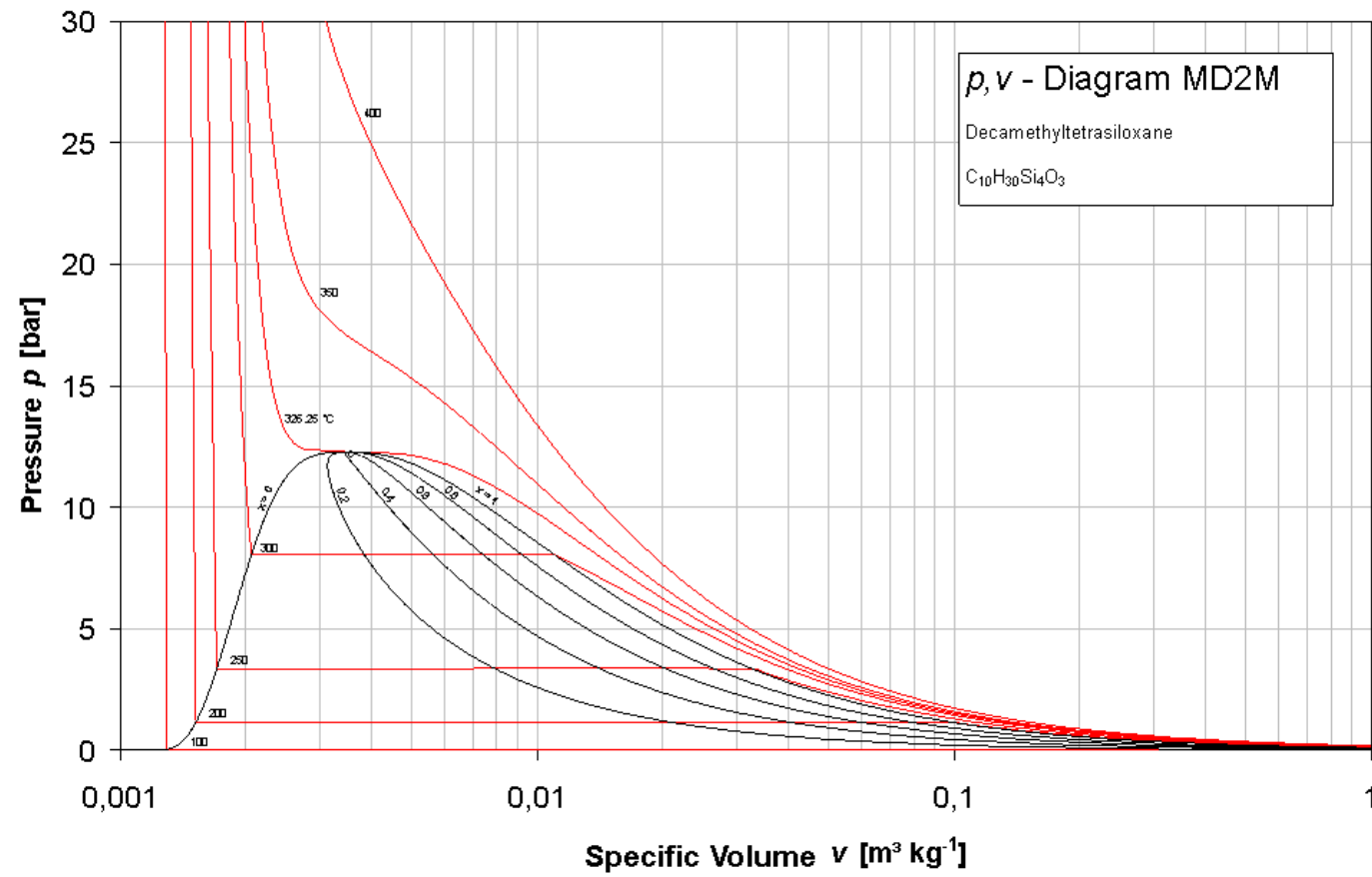
If  $p$  and  $t$  and  $x$  are entered as given values, the program considers  $p$  and  $t$  to be appropriate to represent the vapor pressure curve. If this is not the case the calculation for the property of the chosen function results in  $-1000$ .

Wet steam region:            Temperature ranges from  $t = 0\text{ °C}$  to  $t_c = 326.25\text{ °C}$   
                                    Pressure ranges from  $p_s(0\text{ °C}) = 0.00078994\text{ bar}$  to  $p_c = 12.27\text{ bar}$

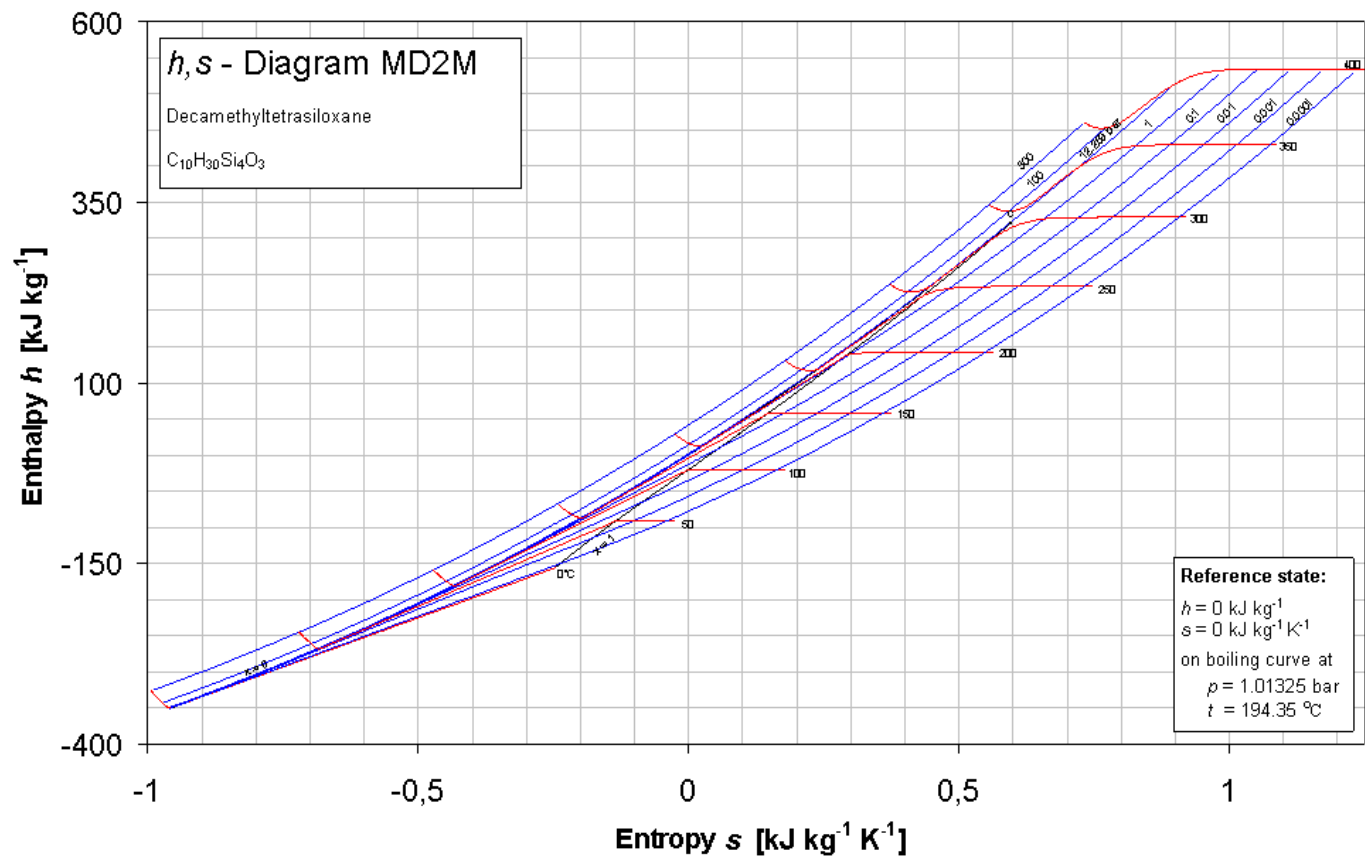
#### **Note.**

*If the calculation results in  $-1000$ , the values entered represent a state point beyond the range of validity of MD2M. 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.*

## 2 p,v-Diagram



### 3 h,s-Diagram



# 4 T,s-Diagram

