

Property Library for Ammonia

LibNH3

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Property Functions

Functional Dependance	Function Name	Call from Fortran-Program	Property or Function	Unit of the Result
$a = f(p, t, x)$	a_ptx_NH3	A_PTX_NH3(P, T, X)	Thermal diffusivity	m ² /s
$c_p = f(p, t, x)$	cp_ptx_NH3	CP_PTX_NH3(P, T, X)	Specific isobaric heat capacity	kJ/(kg K)
$c_v = f(p, t, x)$	cv_ptx_NH3	CV_PTX_NH3(P, T, X)	Specific isochoric heat capacity	kJ/(kg K)
$\eta = f(p, t, x)$	eta_ptx_NH3	ETA_PTX_NH3(P, T, X)	Dynamic viscosity	Pa s
$h = f(p, t, x)$	h_ptx_NH3	H_PTX_NH3(P, T, X)	Specific enthalpy	kJ/kg
$\kappa = f(p, t, x)$	kappa_ptx_NH3	KAP_PTX_NH3(P, T, X)	Isentropic exponent	-
$\lambda = f(p, t, x)$	lambda_ptx_NH3	LAM_PTX_NH3(P, T, X)	Thermal conductivity	W/(m K)
$\nu = f(p, t, x)$	ny_ptx_NH3	NY_PTX_NH3(P, T, X)	Kinematic viscosity	m ² /s
$p_s = f(t)$	ps_t_NH3	PS_T_NH3(T)	Saturation pressure	bar
$Pr = f(p, t, x)$	Pr_ptx_NH3	PR_PTX_NH3(P, T, X)	<i>Prandtl</i> -number	-
$\rho = f(p, t, x)$	rho_ptx_NH3	RHO_PTX_NH3(P, T, X)	Density	kg/m ³
$s = f(p, t, x)$	s_ptx_NH3	S_PTX_NH3(P, T, X)	Specific entropy	kJ/(kg K)
$t = f(p, h)$	t_ph_NH3	T_PH_NH3(P, H)	Backward function: Temperature from pressure and enthalpy	°C
$t = f(p, s)$	t_ps_NH3	T_PS_NH3(P, S)	Backward function: Temperature from pressure and entropy	°C
$t_s = f(p)$	ts_p_NH3	TS_P_NH3(P)	Saturation temperature	°C
$u = f(p, t, x)$	u_ptx_NH3	U_PTX_NH3(P, T, X)	Specific internal energy	kJ/kg
$v = f(p, t, x)$	v_ptx_NH3	V_PTX_NH3(P, T, X)	Specific volume	m ³ /kg

Functional Dependence	Function Name	Call from Fortran-Program	Property or Function	Unit of the Result
$w = f(p, t, x)$	w_ptx_NH3	W_PTX_NH3(P,T,X)	Isentropic speed of sound	m/s
$x = f(p, h)$	x_ph_NH3	X_PH_NH3(P,H)	Backward function: Vapor fraction from pressure and enthalpy	kg/kg
$x = f(p, s)$	x_ps_NH3	X_PS_NH3(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: from - 77.65 °C to 446.85 °C
Pressure: from 0.0609422 bar to 10000 bar

Reference state:

Saturated liquid $t = 0$ °C
 $h = h'(t = 0$ °C) = 200 kJ/kg, $s = s'(t = 0$ °C) = 1 kJ/(kg K)

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 -1000 .

Wet steam region: Temperature ranges from $t = -77.65^\circ\text{C}$ to $t_c = 132.36^\circ\text{C}$

Pressure ranges from $p = 0.0609422$ bar to $p_c = 113.6114$ bar

Note:

If the calculation results in -1000 , the values entered represent a state point beyond the range of validity of LibNH3. 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.