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**Property Libraries Software for Excel, MATLAB, Mathcad, Dymola, SimulationX, LabVIEW, Engineering Equation Solver, Smart Phones, Tablets, Pocket Calculators, and Online Use**

**FluidEXL Graphics for Excel®**

Menu bar of FluidEXL

Calculating an isentropic expansion

Menu for choosing the library and function

Choosing diagrams for water and steam and for humid air for displaying the calculated property values

p	t	x	s	h	v
bar	°C	kg/kg	kJ/kgK	kJ/kg	m³/kg
20	400	-1		3248.23	
10					
5					
1					
0.5					
0.1					

**FluidLAB for MATLAB®**

Function call of FluidLAB

```
h = h_pT('Air', p, T);
```

Command Window

```
h =  
45.5088
```

**FluidVIEW for LabVIEW®**

Using FluidVIEW ILibAir.vi BlockDiagram

Using FluidVIEW ILibAir.vi

Specific isobaric heat capacity

Vapor fraction x in kg/kg

**FluidMAT for Mathcad®**

Function Name

Function Category

Function call in Mathcad®

h = h\_pT('Air', p, T)

**FluidDYM for DYMOLA®, SimulationX®**

FluidDYM\_SeaWa\_TestModel\_Example1

Plot

FluidDYM\_LibSeaWa\_Input z = 67.9239

**FluidEES for Engineering Equation Solver®**

Function Information

Equations Window

Calculating the Enthalpy - h\_pTWHuAirProp

Unit Settings: [K][J][KPa][kg][degrees]

h = 45.4866 [kJ/kg] p = 101.3 [kPa] t = 20 [C]

**Online Property Calculator**

Zittau's Fluid Property Calculator

Fluid: Specific enthalpy [kJ/kg]

Unit System: SI

Enter given values: Range of validity

Pressure p: 100 bar

Temperature t: 400 °C

Vapor fraction x: 1 kg/kg

Calculate / Recalculate

Result: Specific enthalpy h = 3097.38 [kJ/kg]

**App International Steam Tables for iPhone, iPad, iPod touch, and Android Phones, and Tablets**

International Steam Tables (IAPWS-IF97)

Report: Superheated vapor - region 1

Pressure: 100 bar

Temperature: 400 °C

Specific enthalpy: 3097.38 kJ/kg

Specific entropy: 6.3698 kJ/kgK

Density: 36.2742 kg/m³

Internal energy: 3046.0861 kJ/kg

Enthalpy: 3075.0544 kJ/kg

Entropy: 6.3698073 kJ/kgK

Volume: 0.027561 m³/kg

Speed of sound: 2.8022914 km/s

Dynamic viscosity: 1.8477027E-05 kg/m·s

Thermal conductivity: 1.27294142 W/m·K

[www.thermodynamics-zittau.de](http://www.thermodynamics-zittau.de)

**The following thermodynamic and transport properties can be calculated<sup>a</sup>:**

**Thermodynamic Properties**

- Vapor pressure  $p_s$
- Saturation temperature  $T_s$
- Density  $\rho$
- Specific volume  $v$
- Enthalpy  $h$
- Internal energy  $u$
- Entropy  $s$
- Exergy  $e$
- Isobaric heat capacity  $c_p$
- Isochoric heat capacity  $c_v$
- Isoentropic exponent  $\kappa$
- Speed of sound  $w$
- Surface tension  $\sigma$

**Transport Properties**

- Dynamic viscosity  $\eta$
- Kinematic viscosity  $\nu$
- Thermal conductivity  $\lambda$
- Prandtl-number  $Pr$

**Backward Functions**

- $T, v, s(p, h)$
- $T, v, h(p, s)$
- $p, T, v(h, s)$
- $p, T(v, h)$
- $p, T(v, u)$

**Thermodynamic Derivatives**

- All partial derivatives can be calculated.

<sup>a</sup> Not all of these property functions are available in all property libraries listed before.