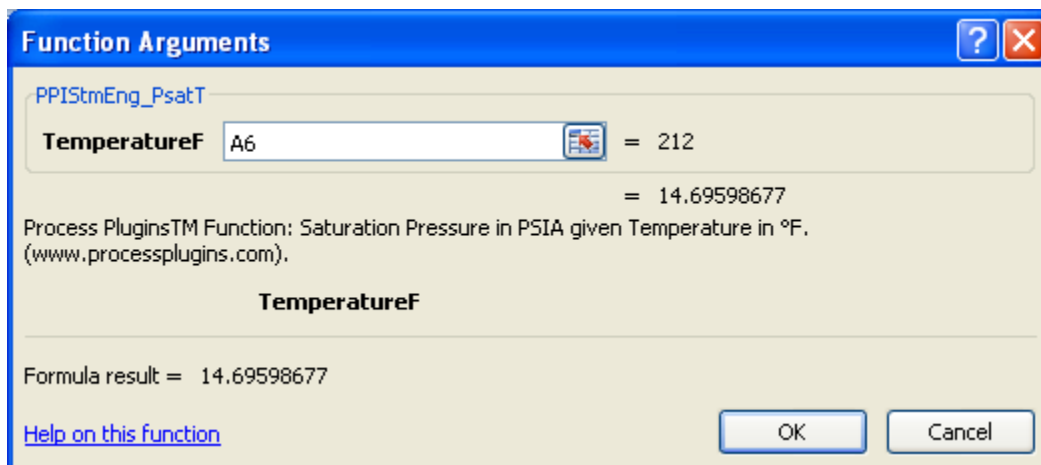
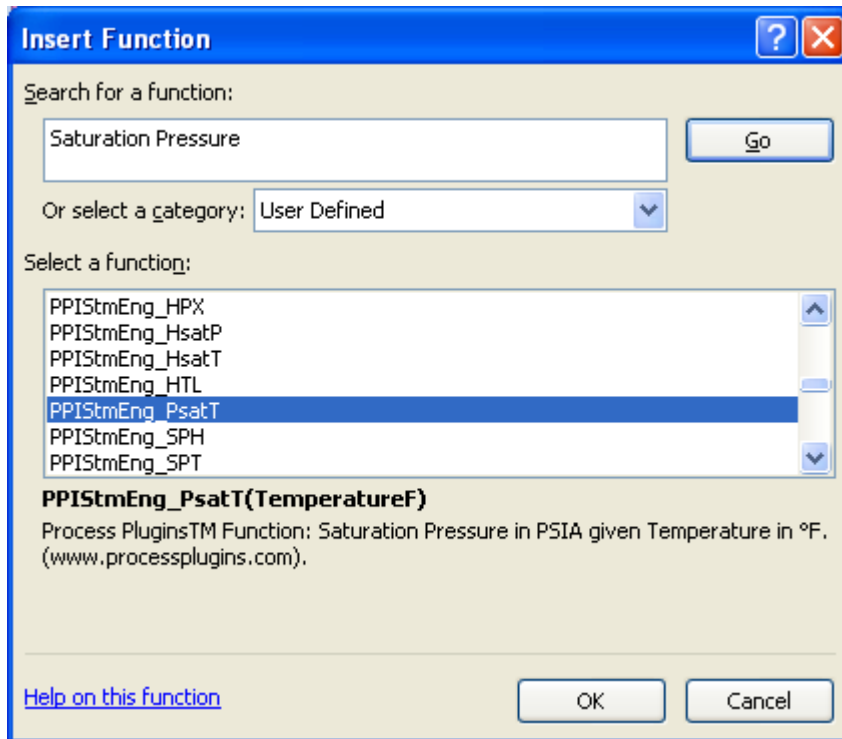
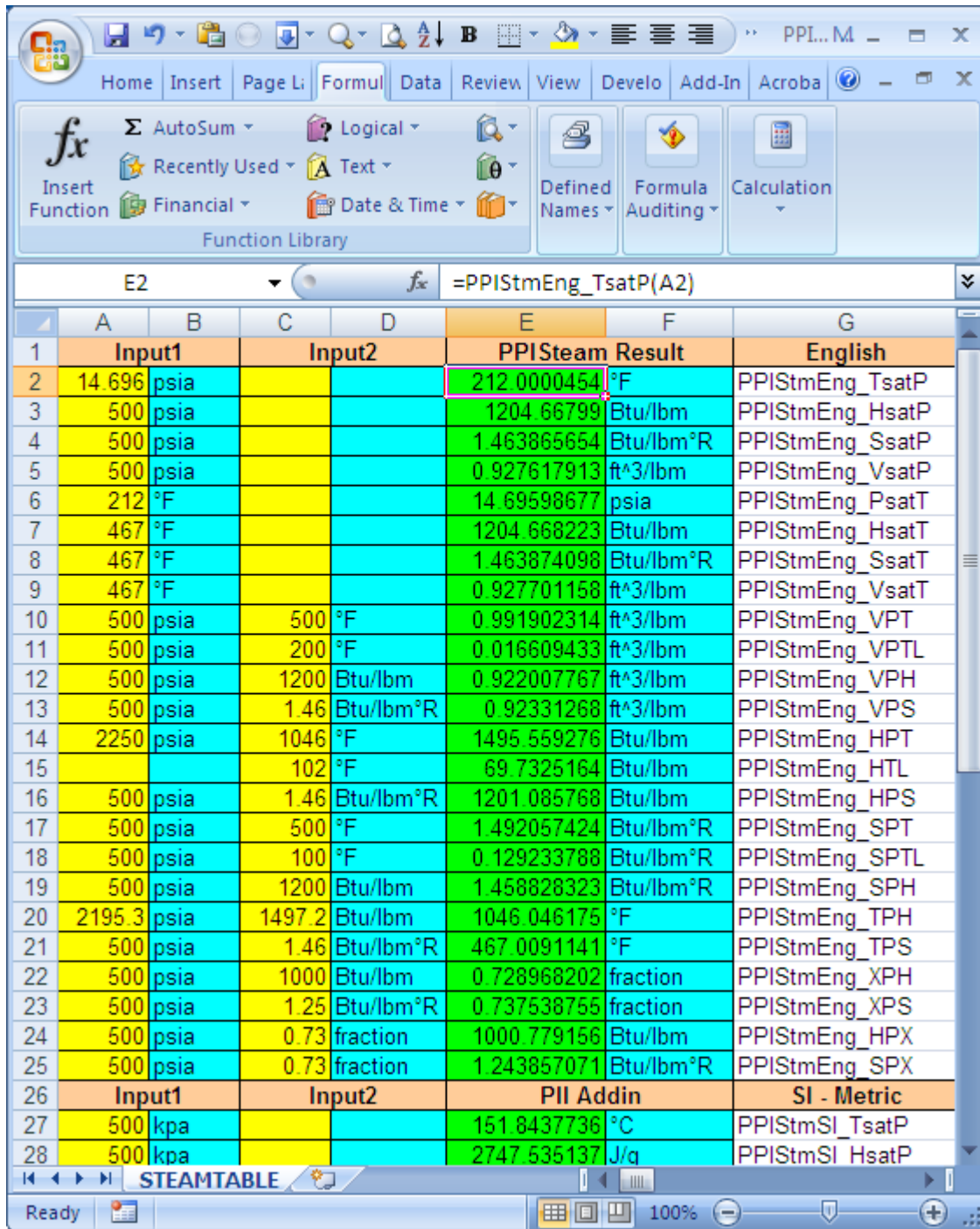


Process Plugins™ Thermodynamics Steam Functions

Process Plugins™ Steam Functions Add-In for Microsoft Excel:

Process Plugins™ comes with a [complete set](#) of Steam Functions for use in Microsoft Excel.

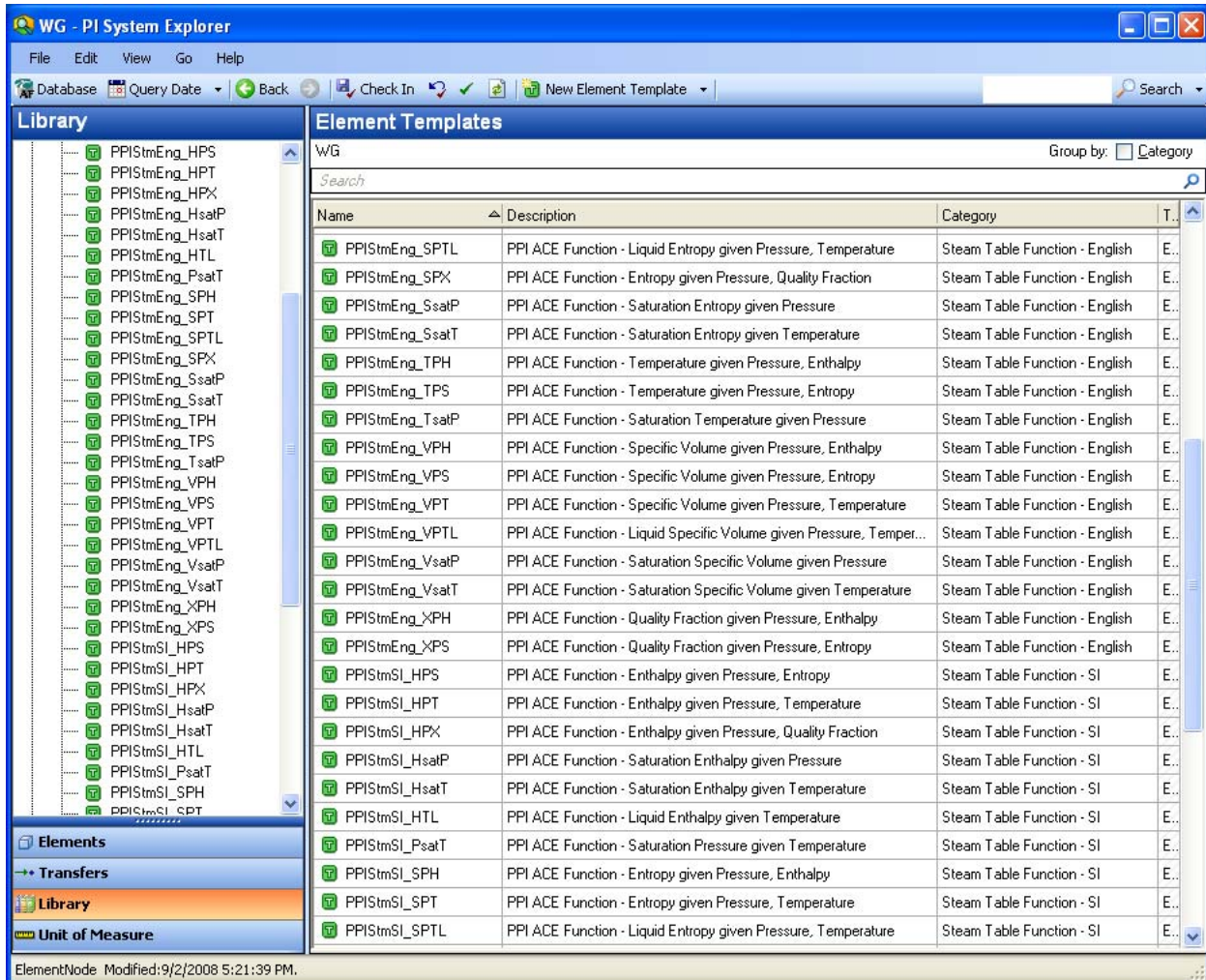




	A	B	C	D	E	F	G
1	Input1		Input2		PPI Steam	Result	English
2	14 696	psia			212 0000454	°F	PPIStmEng_TsatP
3	500	psia			1204 66799	Btu/lbm	PPIStmEng_HsatP
4	500	psia			1.463865654	Btu/lbm°R	PPIStmEng_SsatP
5	500	psia			0.927617913	ft^3/lbm	PPIStmEng_VsatP
6	212	°F			14 69598677	psia	PPIStmEng_PsatT
7	467	°F			1204 668223	Btu/lbm	PPIStmEng_HsatT
8	467	°F			1.463874098	Btu/lbm°R	PPIStmEng_SsatT
9	467	°F			0.927701158	ft^3/lbm	PPIStmEng_VsatT
10	500	psia	500	°F	0.991902314	ft^3/lbm	PPIStmEng_VPT
11	500	psia	200	°F	0.016609433	ft^3/lbm	PPIStmEng_VPTL
12	500	psia	1200	Btu/lbm	0.922007767	ft^3/lbm	PPIStmEng_VPH
13	500	psia	1.46	Btu/lbm°R	0.92331268	ft^3/lbm	PPIStmEng_VPS
14	2250	psia	1046	°F	1495 559276	Btu/lbm	PPIStmEng_HPT
15			102	°F	69 7325164	Btu/lbm	PPIStmEng_HTL
16	500	psia	1.46	Btu/lbm°R	1201 085768	Btu/lbm	PPIStmEng_HPS
17	500	psia	500	°F	1.492057424	Btu/lbm°R	PPIStmEng_SPT
18	500	psia	100	°F	0.129233788	Btu/lbm°R	PPIStmEng_SPTL
19	500	psia	1200	Btu/lbm	1.458828323	Btu/lbm°R	PPIStmEng_SPH
20	2195.3	psia	1497.2	Btu/lbm	1046 046175	°F	PPIStmEng_TPH
21	500	psia	1.46	Btu/lbm°R	467 0091141	°F	PPIStmEng_TPS
22	500	psia	1000	Btu/lbm	0.728968202	fraction	PPIStmEng_XPH
23	500	psia	1.25	Btu/lbm°R	0.737538755	fraction	PPIStmEng_XPS
24	500	psia	0.73	fraction	1000 779156	Btu/lbm	PPIStmEng_HPX
25	500	psia	0.73	fraction	1.243857071	Btu/lbm°R	PPIStmEng_SPX
26	Input1		Input2		PPI Addin		SI - Metric
27	500	kpa			151 8437736	°C	PPIStmSI_TsatP
28	500	kpa			2747 535137	J/q	PPIStmSI_HsatP

Process Plugins™ Steam Functions in PI-AF:

Process Plugins™ comes with a [complete set](#) of “Drag & Drop” Steam Function Element Templates for use in PI-AF.

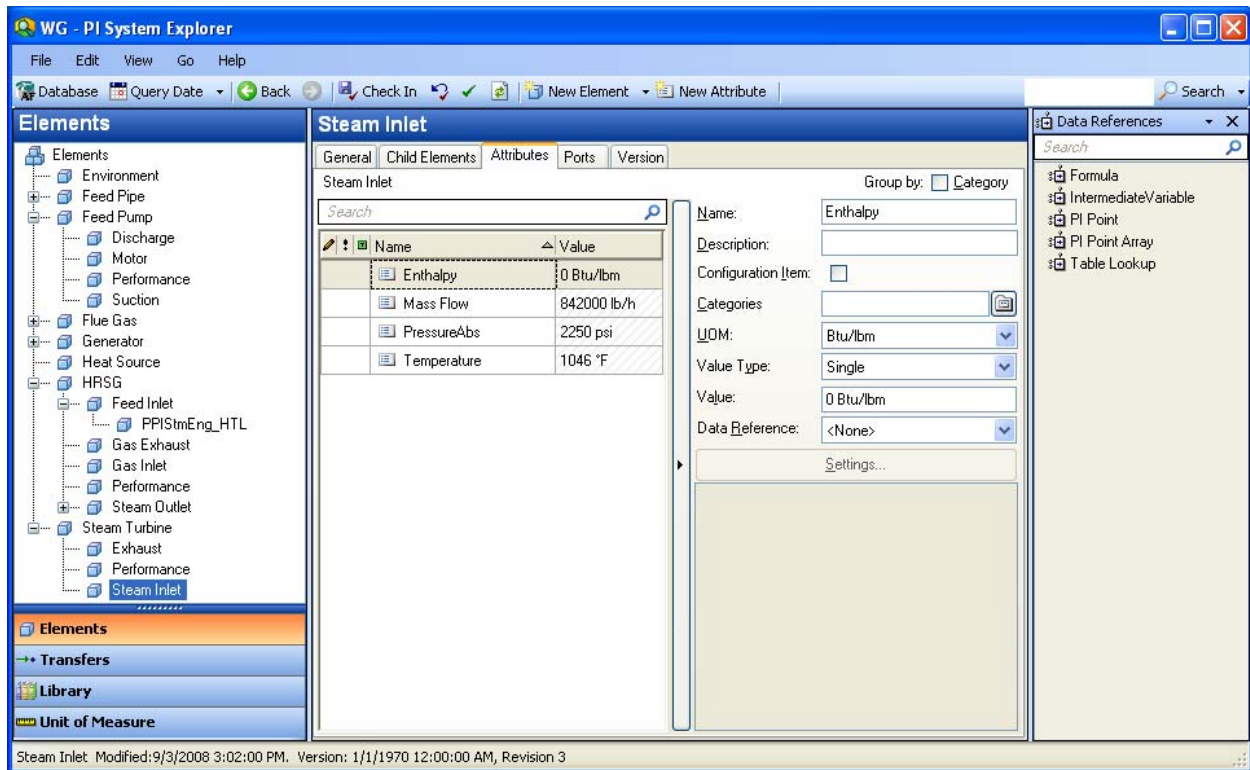


The screenshot shows the 'WG - PI System Explorer' window. The 'Library' pane on the left lists various element templates, and the 'Element Templates' pane on the right displays a detailed list of these templates. The list includes columns for Name, Description, and Category.

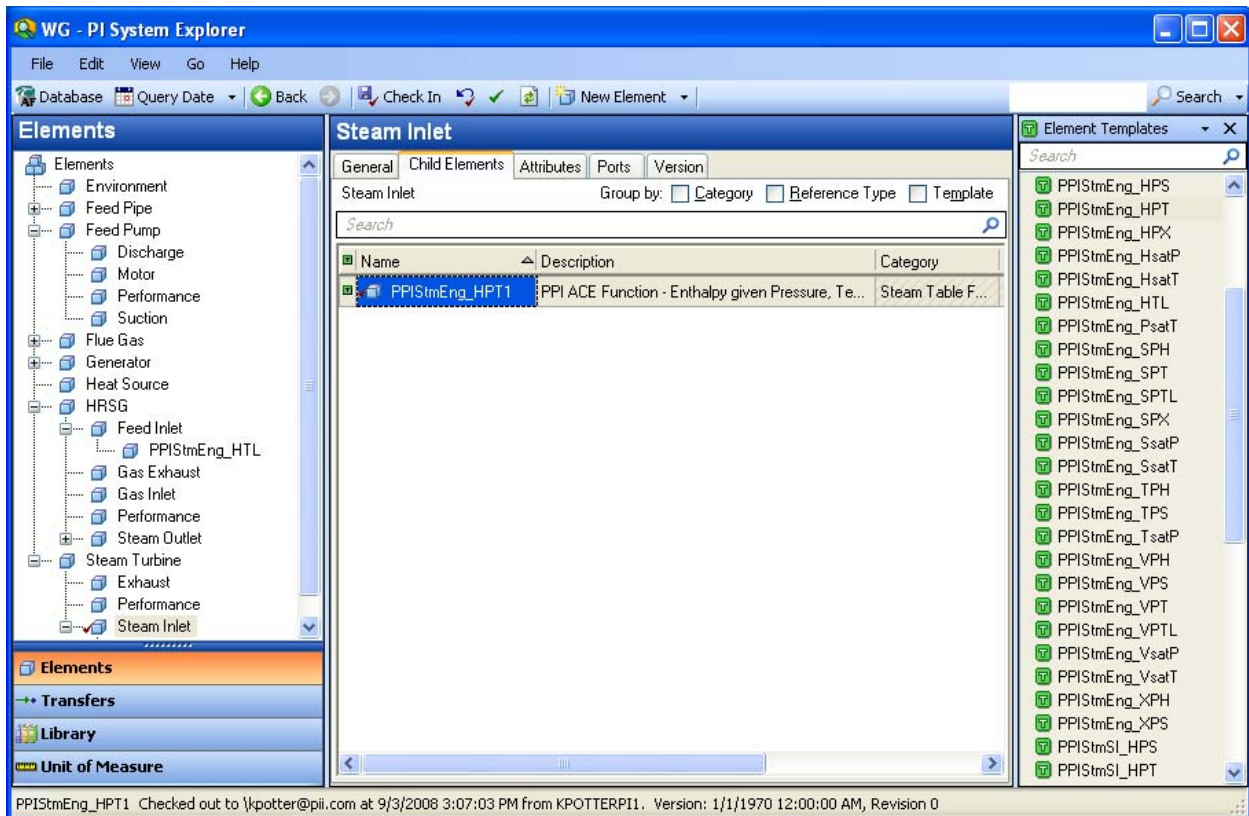
Name	Description	Category	T...
PPIStmEng_SPTL	PPI ACE Function - Liquid Entropy given Pressure, Temperature	Steam Table Function - English	E...
PPIStmEng_SPX	PPI ACE Function - Entropy given Pressure, Quality Fraction	Steam Table Function - English	E...
PPIStmEng_SsatP	PPI ACE Function - Saturation Entropy given Pressure	Steam Table Function - English	E...
PPIStmEng_SsatT	PPI ACE Function - Saturation Entropy given Temperature	Steam Table Function - English	E...
PPIStmEng_TPH	PPI ACE Function - Temperature given Pressure, Enthalpy	Steam Table Function - English	E...
PPIStmEng_TPS	PPI ACE Function - Temperature given Pressure, Entropy	Steam Table Function - English	E...
PPIStmEng_TsatP	PPI ACE Function - Saturation Temperature given Pressure	Steam Table Function - English	E...
PPIStmEng_VPH	PPI ACE Function - Specific Volume given Pressure, Enthalpy	Steam Table Function - English	E...
PPIStmEng_VPS	PPI ACE Function - Specific Volume given Pressure, Entropy	Steam Table Function - English	E...
PPIStmEng_VPT	PPI ACE Function - Specific Volume given Pressure, Temperature	Steam Table Function - English	E...
PPIStmEng_VPTL	PPI ACE Function - Liquid Specific Volume given Pressure, Temper...	Steam Table Function - English	E...
PPIStmEng_VsatP	PPI ACE Function - Saturation Specific Volume given Pressure	Steam Table Function - English	E...
PPIStmEng_VsatT	PPI ACE Function - Saturation Specific Volume given Temperature	Steam Table Function - English	E...
PPIStmEng_XPH	PPI ACE Function - Quality Fraction given Pressure, Enthalpy	Steam Table Function - English	E...
PPIStmEng_XPS	PPI ACE Function - Quality Fraction given Pressure, Entropy	Steam Table Function - English	E...
PPIStmSI_HPS	PPI ACE Function - Enthalpy given Pressure, Entropy	Steam Table Function - SI	E...
PPIStmSI_HPT	PPI ACE Function - Enthalpy given Pressure, Temperature	Steam Table Function - SI	E...
PPIStmSI_HPX	PPI ACE Function - Enthalpy given Pressure, Quality Fraction	Steam Table Function - SI	E...
PPIStmSI_HsatP	PPI ACE Function - Saturation Enthalpy given Pressure	Steam Table Function - SI	E...
PPIStmSI_HsatT	PPI ACE Function - Saturation Enthalpy given Temperature	Steam Table Function - SI	E...
PPIStmSI_HTL	PPI ACE Function - Liquid Enthalpy given Temperature	Steam Table Function - SI	E...
PPIStmSI_PsatT	PPI ACE Function - Saturation Pressure given Temperature	Steam Table Function - SI	E...
PPIStmSI_SPH	PPI ACE Function - Entropy given Pressure, Enthalpy	Steam Table Function - SI	E...
PPIStmSI_SPT	PPI ACE Function - Entropy given Pressure, Temperature	Steam Table Function - SI	E...
PPIStmSI_SPTL	PPI ACE Function - Liquid Entropy given Pressure, Temperature	Steam Table Function - SI	E...

Example Application:

In this example, Steam Turbine Inlet Enthalpy is a function of Pressure and Temperature:



We simply click the “Child Elements” tab, and then drag the Template “PPIStmEng_HPT” from the right pane to the middle pane:



WG - PI System Explorer

File Edit View Go Help

Database Query Date Back Check In New Element Search

Elements

- Environment
- Feed Pipe
- Feed Pump
 - Discharge
 - Motor
 - Performance
 - Suction
- Flue Gas
- Generator
- Heat Source
- HRSRG
 - Feed Inlet
 - PPISmEng_HTL
 - Gas Exhaust
 - Gas Inlet
 - Performance
 - Steam Outlet
- Steam Turbine
 - Exhaust
 - Performance
 - Steam Inlet

Steam Inlet

General Child Elements Attributes Ports Version

Steam Inlet Group by: Category Reference Type Template

Search

Name	Description	Category
PPISmEng_HPT1	PPI ACE Function - Enthalpy given Pressure, Te...	Steam Table F...

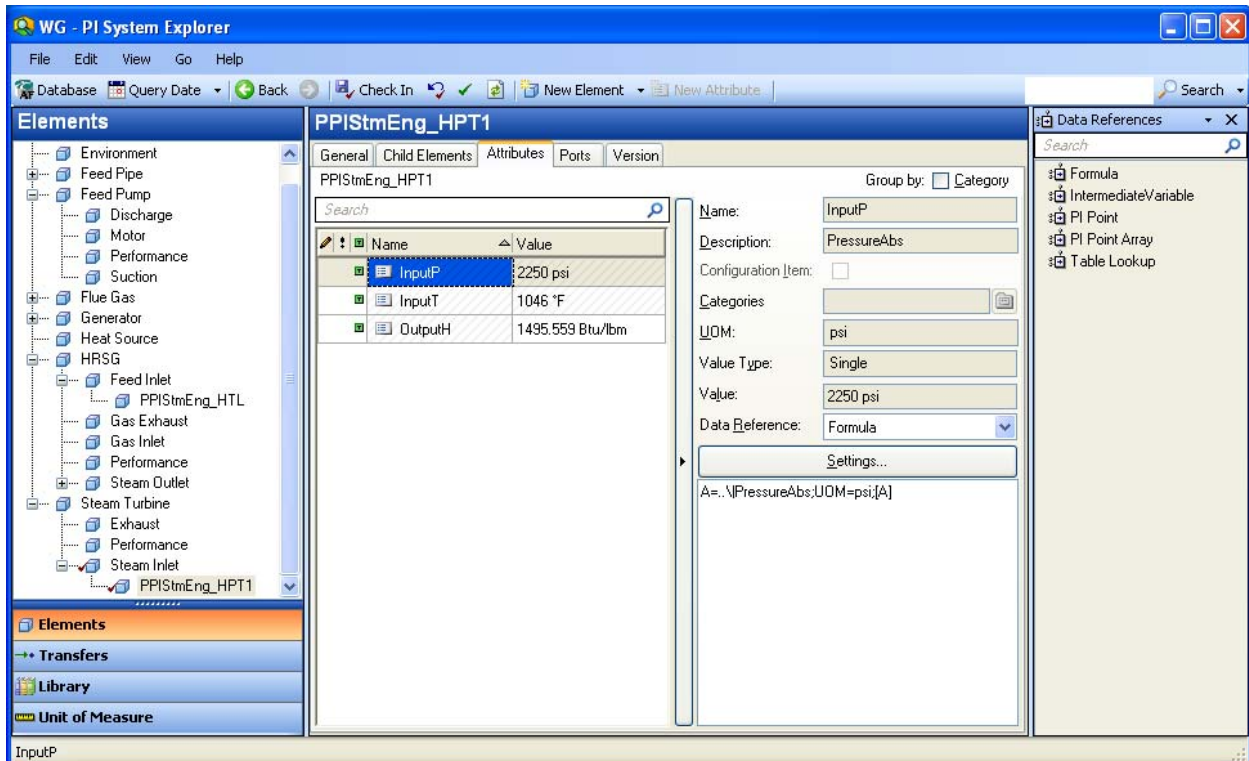
Element Templates

Search

- PPISmEng_HPS
- PPISmEng_HPT
- PPISmEng_HPX
- PPISmEng_HsatP
- PPISmEng_HsatT
- PPISmEng_HTL
- PPISmEng_PsatT
- PPISmEng_SPH
- PPISmEng_SPT
- PPISmEng_SPTL
- PPISmEng_SPX
- PPISmEng_SsatP
- PPISmEng_SsatT
- PPISmEng_TPH
- PPISmEng_TPS
- PPISmEng_TsatP
- PPISmEng_VPH
- PPISmEng_VPS
- PPISmEng_VPT
- PPISmEng_VPTL
- PPISmEng_VsatP
- PPISmEng_VsatT
- PPISmEng_XPH
- PPISmEng_XPS
- PPISmSI_HPS
- PPISmSI_HPT

PPISmEng_HPT1 Checked out to \\kpotter@pii.com at 9/3/2008 3:07:03 PM from KPOTTERPI1. Version: 1/1/1970 12:00:00 AM, Revision 0

THAT'S IT! Clicking the Attributes tab, we see that the function is working:



WG - PI System Explorer

File Edit View Go Help

Database Query Date Back Check In New Element New Attribute Search

Elements

- Environment
- Feed Pipe
- Feed Pump
 - Discharge
 - Motor
 - Performance
 - Suction
- Flue Gas
- Generator
- Heat Source
- HRSRG
 - Feed Inlet
 - PPISmEng_HTL
 - Gas Exhaust
 - Gas Inlet
 - Performance
 - Steam Outlet
- Steam Turbine
 - Exhaust
 - Performance
 - Steam Inlet
 - PPISmEng_HPT1

PPISmEng_HPT1

General Child Elements Attributes Ports Version

PPISmEng_HPT1 Group by: Category

Search

Name	Value
InputP	2250 psi
InputT	1046 °F
OutputH	1495.559 Btu/lbm

Name: InputP
Description: PressureAbs
Configuration Item:
Categories:
UOM: psi
Value Type: Single
Value: 2250 psi
Data Reference: Formula
Settings...
A=..\\PressureAbs;UOM=psi;[A]

Data References

Search

- Formula
- IntermediateVariable
- PI Point
- PI Point Array
- Table Lookup

InputP

The template automatically gets the inputs from the parent (Steam Inlet) element, and PI-ACE finds and executes the function and assigns it to the Output attribute, which can then be set to write to a PI Tag if desired.

Included Functions:

PPIStmEng_TsatP	Saturation Temperature in °F given Pressure in PSIA
PPIStmEng_HsatP	Saturation Enthalpy in Btu/lbm given Pressure in PSIA
PPIStmEng_SsatP	Saturation Entropy in Btu/lbm°R given Pressure in PSIA
PPIStmEng_VsatP	Saturation Specific Volume in ft ³ /lbm given Pressure in PSIA
PPIStmEng_PsatT	Saturation Pressure in PSIA given Temperature in °F
PPIStmEng_HsatT	Saturation Enthalpy in Btu/lbm given Temperature in °F
PPIStmEng_SsatT	Saturation Entropy in Btu/lbm°R given Temperature in °F
PPIStmEng_VsatT	Saturation Specific Volume in ft ³ /lbm given Temperature in °F
PPIStmEng_VPT	Specific Volume in ft ³ /lbm given Pressure in PSIA & Temperature in °F
PPIStmEng_VPTL	Liquid Specific Volume in ft ³ /lbm given Pressure in PSIA & Temperature in °F
PPIStmEng_VPH	Specific Volume in ft ³ /lbm given Pressure in PSIA & Enthalpy in Btu/lbm
PPIStmEng_VPS	Specific Volume in ft ³ /lbm given Pressure in PSIA & Entropy in Btu/lbm°R
PPIStmEng_HPT	Enthalpy in Btu/lbm given Pressure in PSIA & Temperature in °F
PPIStmEng_HTL	Liquid Enthalpy in Btu/lbm given Temperature in °F
PPIStmEng_HPS	Enthalpy in Btu/lbm given Pressure in PSIA & Entropy in Btu/lbm°R
PPIStmEng_SPT	Entropy in Btu/lbm°R given Pressure in PSIA & Temperature in °F
PPIStmEng_SPTL	Liquid Entropy in Btu/lbm°R given Pressure in PSIA & Temperature in °F
PPIStmEng_SPH	Entropy in Btu/lbm°R given Pressure in PSIA & Enthalpy in Btu/lbm
PPIStmEng_TPH	Temperature in °F given Pressure in PSIA & Enthalpy in Btu/lbm
PPIStmEng_TPS	Temperature in °F given Pressure in PSIA & Entropy in Btu/lbm°R
PPIStmEng_XPH	Quality fraction given Pressure in PSIA & Enthalpy in Btu/lbm

PPISmEng_XPS	Quality fraction given Pressure in PSIA & Entropy in Btu/lbm°R
PPISmEng_HPX	Enthalpy in Btu/lbm given Pressure in PSIA & Quality fraction
PPISmEng_SPX	Entropy in Btu/lbm°R given Pressure in PSIA & Quality fraction
PPISmSI_TsatP	Saturation Temperature in °C given Pressure in kPa
PPISmSI_HsatP	Saturation Enthalpy in kJ/kg given Pressure in kPa
PPISmSI_SsatP	Saturation Entropy in kJ/kgK given Pressure in kPa
PPISmSI_VsatP	Saturation Specific Volume in ft ³ /lbm given Pressure in kPa
PPISmSI_PsatT	Saturation Pressure in kPa given Temperature in °C
PPISmSI_HsatT	Saturation Enthalpy in kJ/kg given Temperature in °C
PPISmSI_SsatT	Saturation Entropy in kJ/kgK given Temperature in °C
PPISmSI_VsatT	Saturation Specific Volume in ft ³ /lbm given Temperature in °C
PPISmSI_VPT	Specific Volume in ft ³ /lbm given Pressure in kPa & Temperature in °C
PPISmSI_VPTL	Liquid Specific Volume in ft ³ /lbm given Pressure in kPa & Temperature in °C
PPISmSI_VPH	Specific Volume in ft ³ /lbm given Pressure in kPa & Enthalpy in kJ/kg
PPISmSI_VPS	Specific Volume in ft ³ /lbm given Pressure in kPa & Entropy in kJ/kgK
PPISmSI_HPT	Enthalpy in kJ/kg given Pressure in kPa & Temperature in °C
PPISmSI_HTL	Liquid Enthalpy in kJ/kg given Temperature in °C
PPISmSI_HPS	Enthalpy in kJ/kg given Pressure in kPa & Entropy in kJ/kgK
PPISmSI_SPT	Entropy in kJ/kgK given Pressure in kPa & Temperature in °C
PPISmSI_SPTL	Liquid Entropy in kJ/kgK given Pressure in kPa & Temperature in °C
PPISmSI_SPH	Entropy in kJ/kgK given Pressure in kPa & Enthalpy in kJ/kg
PPISmSI_TPH	Temperature in °C given Pressure in kPa & Enthalpy in kJ/kg
PPISmSI_TPS	Temperature in °C given Pressure in kPa & Entropy in kJ/kgK
PPISmSI_XPH	Quality fraction given Pressure in kPa & Enthalpy in kJ/kg
PPISmSI_XPS	Quality fraction given Pressure in kPa & Entropy in kJ/kgK



PPISmSI_HPX Enthalpy in kJ/kg given Pressure in kPa & Quality fraction

PPISmSI_SPX Entropy in kJ/kgK given Pressure in kPa & Quality fraction