

4. How to Use W-PROPATH

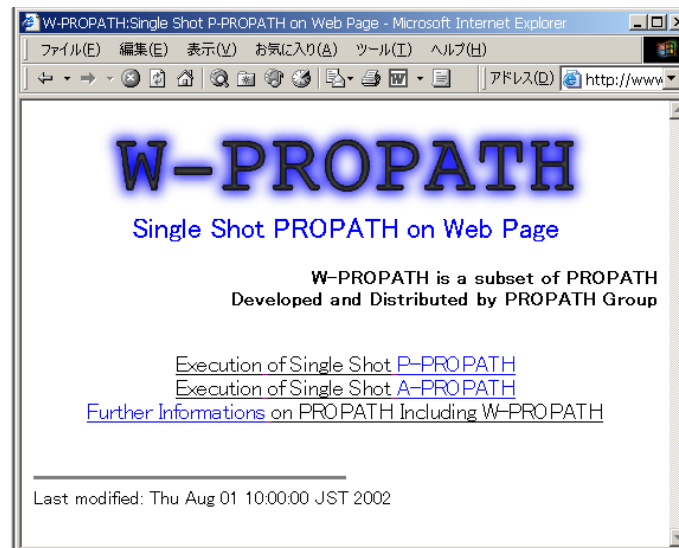
The URL of W-PROPATH is as follows.

<http://www2.mech.nagasaki-u.ac.jp/PROPATH/>

In this section, the words enclosed with the pair of square brackets means the menu item or clickable words in the W-PROPATH web page.

P-PROPATH on W-PROPATH

1. Access the above URL with your frames compatible web browser.

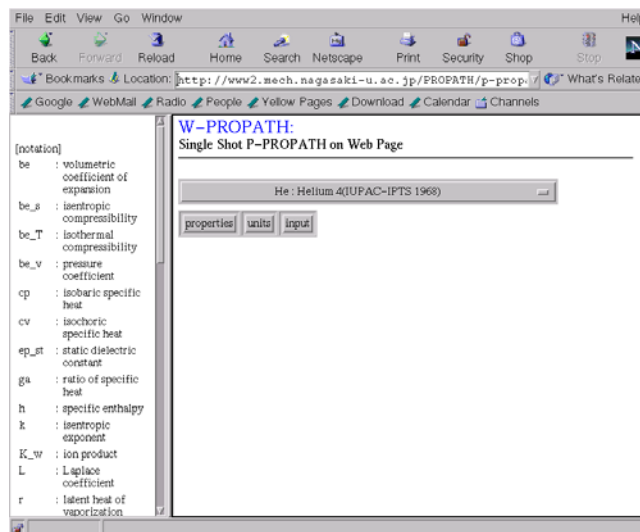


2. Set the "Character Set" to Western.

Example in the Linux Netscape browser



- Click on [Execution of W-PROPATH]. The substance selection page is displayed.



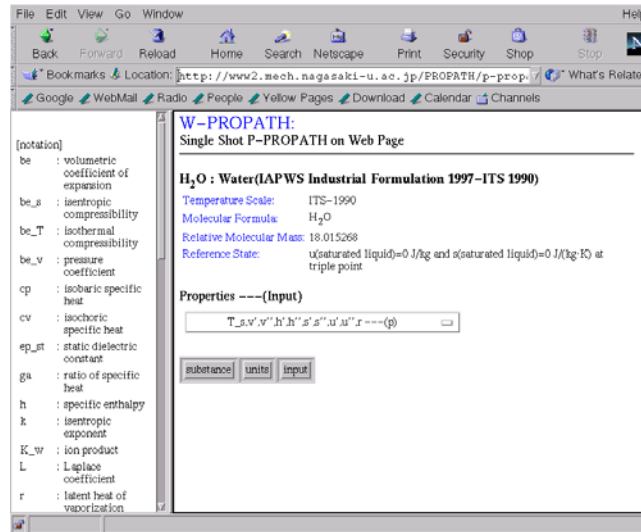
The nomenclature for W-PROPATH is shown in the left frame. Particular symbols are used in W-PROPATH such as “mu” for “ μ ”. Refer to the left frame when you find symbols you don’t understand in the right frame.

You select a substance in the right frame. Clicking on the long horizontal bar, you get the substances pull-down list and you select a substance from the list. If you click on [Properties] or [Units], the properties selection page or the units selection page appears respectively. [Input(s)] leads you to the page for data input.

- Select a substance from the pull-down list in the right frame.



5. Click on [Properties]. The properties selection page appears. You can select properties in the pull-down list. Clicking on [Substances] brings you back to the substance selection page.



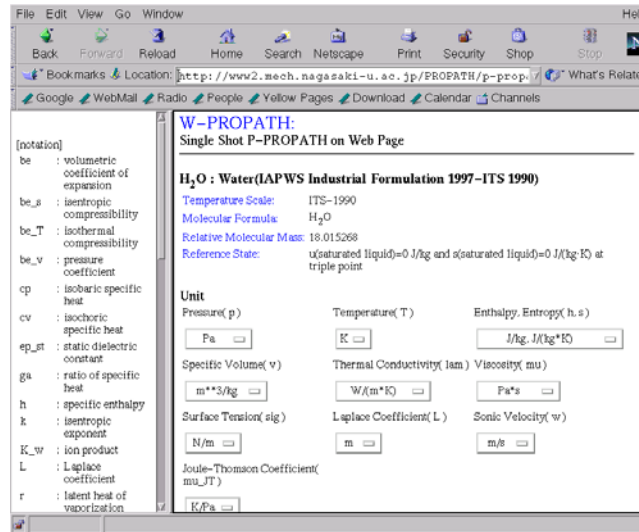
6. Select a property, or properties, from the pull-down list.

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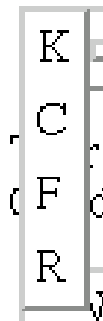
T_s,v',v'',h',h'',s',s'',u',u'',r ---(p)
T_s,L,lam',lam'',mu',mu'' ---(p)
T_s,cp',cp'',cv'',ga'',Pr',Pr'',sig ---(p)
T_s,T_s',T_s'',T_lam,T_mel,T_m,T_sb ---(p)
P_s,v',v'',h',h'',s',s'',u',u'',r ---(T)
P_s,L,lam',lam'',mu',mu'' ---(T)
P_s,cp',cp'',cv'',ga'',Pr',Pr'',sig ---(T)
P_s,P_lam,P_mel ---(T)
v, h, s, u --- (p, T)
lam,mu,cp,cv,gam,Pr --- (p, T)
k,mu_JT,K_w,be,be_s,be_T,be_v,ep_st,w --- (p, T)
T,x --- (p, h)
h,T,u,v,x --- (p, s)
x --- (p, u)
T,x --- (p, v)
h,s,u,v --- (p, x)
x --- (T, h)
x --- (T, s)
x --- (T, u)
x --- (T, v)
h,s,u,v --- (T, x)
cr,fc,trp
T90 --- (T68), T68 --- (T90)

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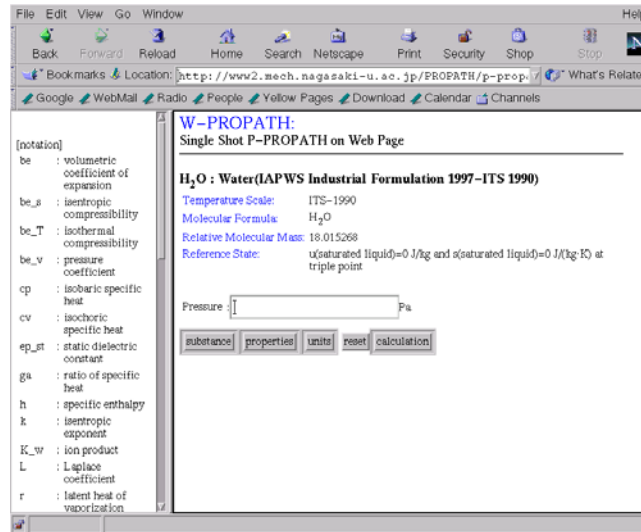
7. Click on [Units]. The units selection page appears. You can select one from listed units. Clicking on [defaults] resets all units to defaults.



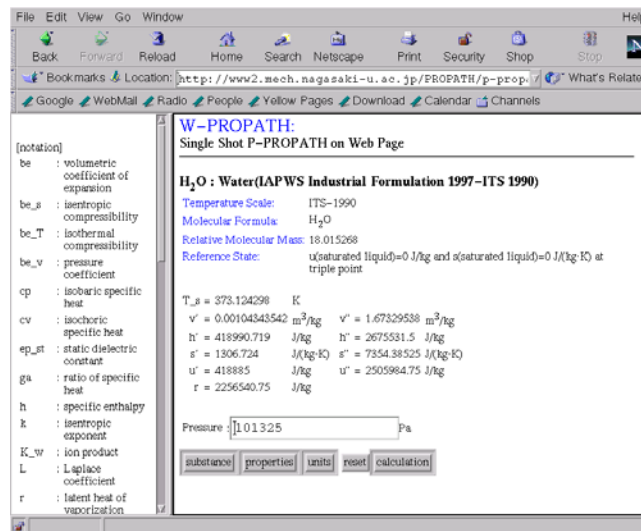
8. For example, the unit pull-down list for temperature looks as below. You can choose K(Kelvin), °C(Celsius), F(Fahrenheit) or R(Rankine).



9. Click on [Input]. The page for data input and calculation appears.

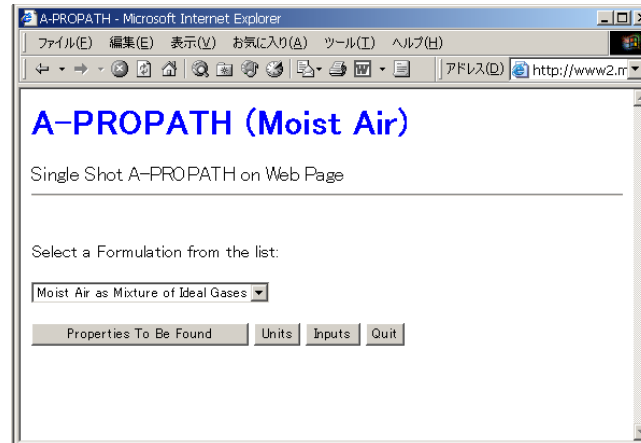


10. Input the required value from the server and click on [calculation]. Then the results page is then displayed.



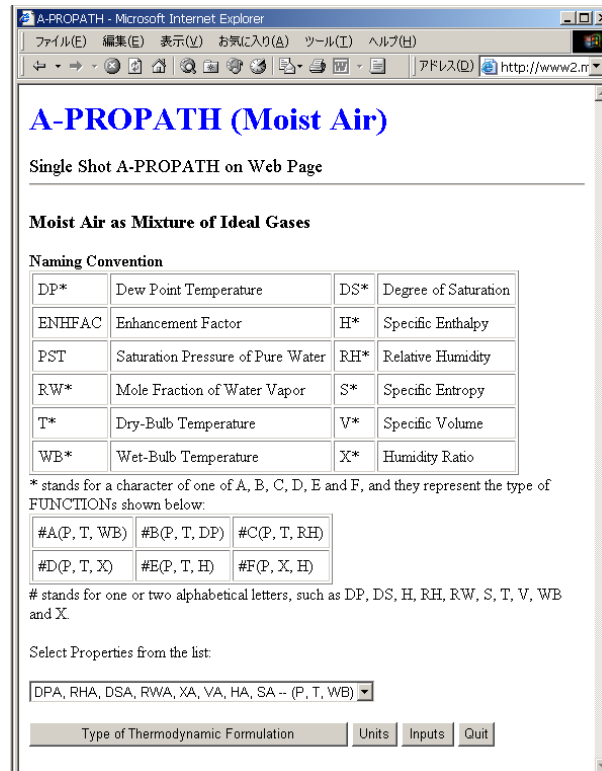
A-PROPATH on W-PROPATH

1. Select [Execution of Single Shot A-PROPATH] in the first menu. The following display appears.



- **[Select a formulation from the list:]** Users can select a formulation for moist air. If users select [Moist Air as Mixture of Ideal Gases] in the list, properties of moist air are calculated assuming an ideal gas mixture. If users choose [Most air as Real fluid], moist air is treated as a real fluid.
- **[Properties to be found]** Users select calculated properties and specified properties in this menu. See the following description.
- **[Units]** This menu allows users to change the units of temperature and pressure. The unit of temperature is [K] or [°C], and that of pressure is [Pa] or [bar].
- **[Inputs]** Users specify a specified condition in this menu. See the following description.
- **[Quit]** This menu is used to return to the first menu.

2. Click [Properties to be found], the following display appears.



Users select a group including calculated properties in the list [Select Properties from the list:]. For example, [WBC, DPC, DSC, RWC, XC, VC, HC, SC – (P, T, RH)] means that the functions of WBC, DPC, DSC, RWC, XC, VC, HC, and SC are calculated from specified P, T, and RH. All functions in A-PROPATH are named based on the rule tabulated in the table [Naming Convention].

- If users have selected calculated properties and specified properties, users can proceed to [Inputs] menu. The following display appears.

The screenshot shows the A-PROPATH web interface in a Microsoft Internet Explorer browser window. The page title is "A-PROPATH (Moist Air)". Below the title, there is a section titled "Single Shot A-PROPATH on Web Page". Underneath, the heading "Moist Air as Mixture of Ideal Gases" is displayed. The interface includes three input fields: "Pressure: [] [Pa]", "Temperature: [] [K]", and "Thermodynamic Wet-Bulb Temperature: [] [K]". Below these fields are two buttons: "Type of Thermodynamic Formulation" and "Properties To Be Found". At the bottom, there are three buttons: "Units", "Calculation", and "Quit".

As shown above, if users have selected [WBC, DPC, DSC, RWC, XC, VC, HC, SC – (P, T, RH)] in the [Properties to be found], pressure, temperature, and relative humidity appear as specified values.

- If users have completed specified values, users can click [Calculation]. Users can see the following display if the calculation has been terminated successfully.

The screenshot shows the A-PROPATH web interface after a successful calculation. The page title is "A-PROPATH (Moist Air)". Below the title, there is a section titled "Single Shot A-PROPATH on Web Page". Underneath, the heading "Moist Air as Mixture of Ideal Gases" is displayed. The interface shows the following calculated properties:

Wet-Bulb Temperature :	WB = 19.447052	[C]
Dew Point Temperature :	DP = 16.6998901	[C]
Degree of Saturation :	DS = 0.592247903	[-]
Mole Fraction of Water Vapor :	RW = 0.0190118086	[-]
Humidity Ratio :	X = 0.012054136	[kg/kgDA]
Specific Volume :	V = 0.872441769	[m ³ /kgDA]
Specific Enthalpy :	H = 55841.3398	[J/kgDA]
Specific Entropy :	S = 205.737457	[J/kgDA K]

Below the properties, there are three input fields: "Pressure: 1 [] [bar]", "Temperature: 25 [] [C]", and "Relative Humidity: 0.6 [] [-]". At the bottom, there are two buttons: "Type of Thermodynamic Formulation" and "Properties To Be Found". At the very bottom, there are three buttons: "Units", "Calculation", and "Quit".