

### SIM DISTRIBUTION (PYRO) MODE

Flags	Output Streams	Value	Units	Amounts	Latent H	Total H	S
	Total Gas	132221.62	Nm3/h	kg	Nm3	kmol	
	Total Condensed	7.72	t/h	205165.22	132223.63	5954.47	-110201.69
<b>SRC</b>	<b>ESP_Gas</b>	<b>132221.62</b>	<b>Nm3/h</b>	<b>Amounts</b>		<b>Latent H</b>	<b>Total H</b>
DST ?	Temperature	341.01	°C	kg	Nm3	kmol	kWh
	Pressure	1.00	bar				
Fix	Total	100.00	wt-%	197727.94	132221.62	5899.17	16889.87 -96908.37 22606
	SO2(g)	13.70		51774.08	18115.29	808.23	3217.29 -63419.55 3868
	SO3(g)	0.07		325.15	91.03	4.06	21.59 -424.90 20
	H2O(g)	4.54		4823.69	6001.39	267.76	819.78 -17166.48 977
	CO2(g)	4.46		11566.88	5890.86	262.83	991.86 -27736.79 1095
	O2(g)	6.81		12852.21	9002.35	401.65	1082.25 1082.25 1556
	N2(g)	70.43		116385.92	93120.71	4154.65	10757.11 10757.11 15087
O	Dust	52.59					
O	SO3/SOX	0.50					
<b>SRC</b>	<b>ESP_Fume</b>	<b>0.00</b>	<b>t/h</b>	<b>Amounts</b>		<b>Latent H</b>	<b>Total H</b>
DST ?	Temperature	341.76	°C	kg	Nm3	kmol	kWh
Inert	21 Pressure	1.00	bar				
Fix	Total	100.00	wt-%	2.59	0.30	0.01	0.08 -0.53
	SeO2(g)	7.49		0.19	0.04	0.00	0.01 -0.05

Fig. 1. Open Sim module and select Distribution Mode.

The Sim Distribution mode flowsheet principles on drawing and running the model are quite similar to the Sim Reactions and Particle modes. However, the unit process models are not based on a fixed variable list. Instead, the model editor looks more like the HSC traditional Balance module. The basic ideas of the model are also quite similar to the old Balance module.

The streams consist of rows instead of columns, which are used, in the Reactions and Particle modes. This makes it easier to create, for example, stream databases. The Distribution mode Unit Editor, Fig. 1, automatically converts all the input streams on the Input sheet into elements. These elements will be divided into output streams and species on the Dist sheet using the distribution values, which may be constants or formulas. These distributions may also be regulated using the controls, which are located on the Controls sheet.

These principles make the Distribution mode more feasible for high temperature and pyrometallurgical applications where the specification of all the chemical reactions is a difficult task. However, the Distribution mode may also be used for low temperature and hydrometallurgical applications. The Distribution mode also automatically calculates the heat and material balances.

## Distribution Mode Unit Editor - Status Bar Selections

The Distribution mode uses slightly a different Unit Editor than the Reactions and Particle mode, Fig. 1. At the bottom of the form there are several buttons:

### Close

This selection closes the Unit Editor

### Sync is ON

This selection keeps the stream variables the same in the source and destination unit. This setting should always be ON., This setting may be set to OFF only when importing old models or streams in order to unify the stream variables.

### Open Str

This selection opens the Stream Open dialog, which makes it possible to replace the existing stream variables and compositions with some other stream, which exist in the stream database. The amount, temperature, and pressure remain the same.

### Save Str

This option makes it possible to save the selected stream into the stream database.

### Del Str

This option makes it possible to delete a stream from the model. However, it is recommended to delete the stream from the flowsheet. This option may be needed when importing old BAL models to new Sim module.

### Up

This option moves the stream upward in the model.

### Down

This option moves the stream downward in the model.

### Ins Row

This option inserts new row in the stream.

### Del Row

This option deletes rows from the stream.

### Show/Hide

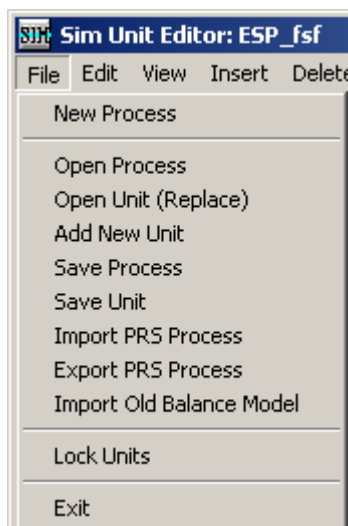
This option shows all the columns on the first four sheets or hides the rarely needed columns.

### Run

This option runs the process model.

## Distribution Mode Unit Editor - Menu Selections

Most of the Distribution Mode Unit Editor menu selection is similar to the Reactions and Particle model editor selections. Here is a brief summary of the available options:



### File Menu

#### **New Process**

- This option creates a new empty process flowsheet

#### **Open Process**

- This option opens an old flowsheet file (\*.FLS)

#### **Open Unit (Replace)**

- This option opens the old unit file (\*.UNI) and replaces the current unit model with this file.

#### **Add New Unit**

- This option creates a new unit. However, it is highly recommended to add new units by drawing these onto the flowsheet. This option may be needed when importing old BAL models to new Sim module.

#### **Save Process**

- This option saves the whole process into one FLS file with one UNI file for each unit.

#### **Import PRS Process**

- This option opens a unit model (\*.PRS) with the old format.

#### **Export PRS Process**

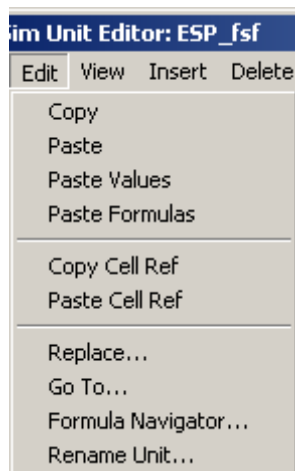
- This option saves a unit model (\*.PRS) with the old format.

#### **Import Old Balance Model**

- This option imports the old Balance Module models (\*.BAL) unit models.

#### **Lock Units**

- This option may be used to lock and hide all the other model sheets than Input and Output.



## Edit Menu

### **Copy**

- This option copies the content of the selected cells.

### **Paste**

- This option pastes the clipboard content to the selected cells.

### **Paste Values**

- This option pastes the clipboard content to the selected cells as values.

### **Paste Formulas**

- This option pastes the clipboard content to the selected cells (only formulas)

### **Copy Cell Ref**

- This option copies the cell reference of the selected cell to the clipboard. This is a very convenient way to copy-paste cell references, for example, to the Controls sheet where the user has to specify the Target and Variable cells.

### **Paste Cell Ref**

- This option pastes the cell reference from the clipboard to the selected cell. This is a very convenient way to copy-paste cell references, for example, to the Controls sheet where the user has to specify the Target and Variable cells.

### **Replace...**

- This option may be used to replace strings in the cells within the given string.

### **Got To...**

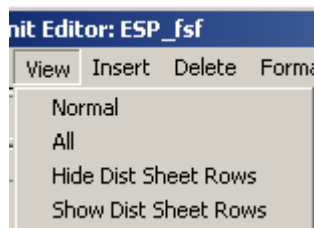
- This dialog may be used to find named cells or cell references.

### **Formula Navigator...**

- When "cell with formula" is selected, then this dialog may be used to jump to those cells used in this formula.

### **Rename Unit...**

- This option may be used to rename the unit. However, it is highly recommended to use the flowsheet Process Tab instead of this dialog. This option may be needed when importing old BAL models to new Sim module.



## View Menu

### **Normal**

- This option shows only the most important columns on the first four sheets.

### **All**

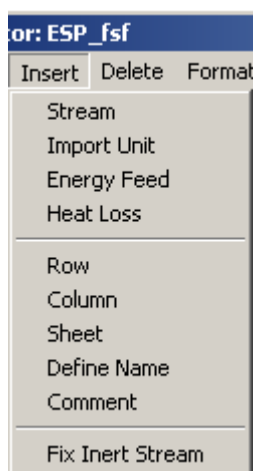
- This option shows all the columns on the first four sheets.

### **Hide Dist Sheet Rows**

- This option hides the species rows on the Dist Sheet

### **Show Dist Sheet Rows**

- This option shows the species rows on the Dist Sheet



## Insert Menu

### **Stream**

- This option may be used to insert a stream. However, it is recommended to insert streams by using the flowsheet. This option may be needed when importing old BAL models to new Sim module.

### **Import Unit**

- This option may be used to import units. However, it is recommended to insert units by using the flowsheet. This option may be needed when importing old BAL models to new Sim module.

### **Energy Feed**

- This option may be used to add an energy input into a selected stream on the Input sheet.

### **Heat Loss**

- This option may be used to add an energy output into a selected stream on the Output sheet.

### **Row**

- This option may be used to insert rows. Note: this option does not work if you try to insert rows into fixed areas.

### **Column**

- This option may be used to insert columns. Note: this option does not work if you try to insert columns into fixed areas.

### **Sheet**

- This option may be used to insert a sheet. These sheets may be used for your own calculations, like operating cost, dimensioning, sizing, etc.

### **Define Name**

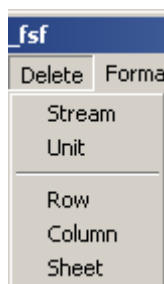
- This option may be used to define names to the cells or areas.

### **Comment**

- This option may be used to connect text comments to the cells.

### **Fix Inert Stream...**

- This option may be used to fix an inert stream which goes from the Input sheet to Output sheet without taking part in the reactions.



## Delete Menu

### **Stream**

- This option may be used to delete a stream. However, it is recommended to delete streams by using the flowsheet. This option may be needed when importing old BAL models to new Sim module.

### **Unit**

- This option may be used to delete a unit. However, it is recommended to delete units by using the flowsheet. This option may be needed when importing old BAL models to new Sim module.

### **Row**

- This option may be used to delete rows. Note: this option does not work if you try to delete rows from the fixed areas.

### **Column**

- This option may be used to delete columns. Note: this option does not work if you try to delete columns from fixed areas.

### **Sheet**

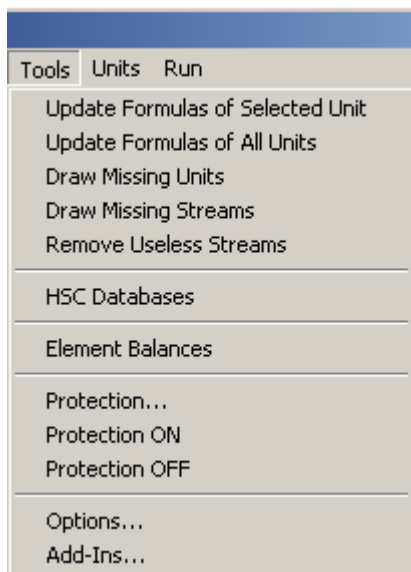
- This option may be used to delete sheets. Note: this option does not work if you try to delete the first 6 fixed sheets, you can only delete your own sheets.



## Format Menu

### **Number, Font, ...**

- These options work in quite a similar way as in MS Excel.



## Tools Menu

### **Update Formulas of Selected Unit**

- This option updates all the automatically created formulas. Basically, the Unit Editor maintains the formulas automatically, but sometimes you may need to select this option to update formulas. This is quite an important option.

### **Update Formulas of All Units**

- This option updates all the automatically created formulas. It does the same operation as the previous option but for all the units.

### **Draw Missing Units**

- When importing old models, then these units may be missing from the flowsheet. This option draws the missing units onto the flowsheet.

### **Draw Missing Streams**

- When importing old models, then some streams may be missing from the flowsheet. This option draws the missing streams onto the flowsheet.

### **Remove Useless Streams**

- This option removes those streams, which are not used in the model from the flowsheet.

### **HSC Databases**

- This option shows the active H, S and Cp databases that are used to calculate the heat balances.

### **Element balances**

- This option may be used to calculate a summary of the element balances.

### **Protection...**

- The user may specify protected cells using this dialog.

### **Protection ON**

- This selection turns the protection ON.

### **Protection OFF**

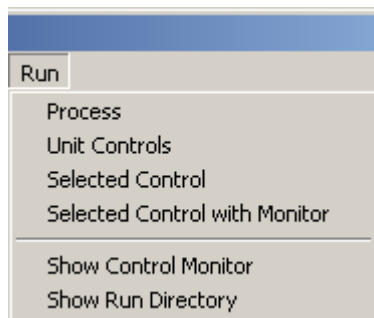
- This selection turns the protection OFF.

### **Options...**

- This dialog may be used to change the workbook options.

### **Add-Ins...**

- This dialog may be used to turn the HSC7.DLL add-in functions ON/OFF.



## Run Menu

### **Process**

- This option runs the process model.

### **Unit Controls**

- This option runs the controls of the selected unit.

### **Selected Control**

- This option runs the selected control only.

### **Selected Control with Monitor**

- This option runs the selected control and also shows the Control Monitor.

### **Show Control Monitor**

- This option shows the Control Monitor.

### **Show Run Directory**

- This option shows a summary of the process model calculations and the material transportation. This dialog may be used, for example, to find stream connection errors.