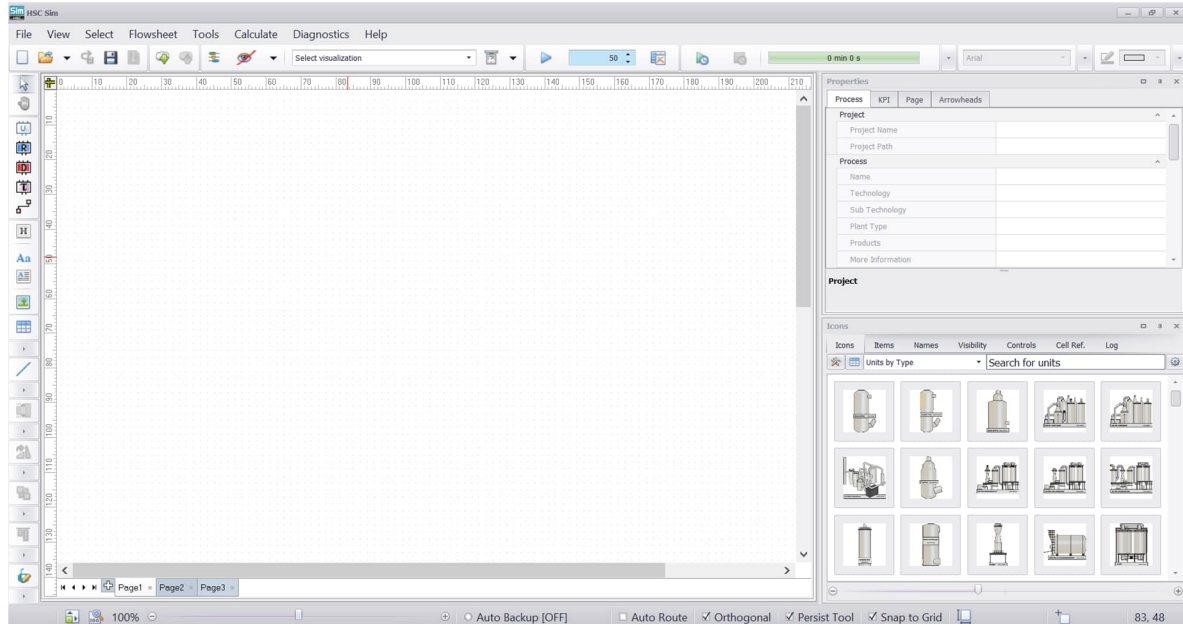


## 40. Sim Module - Common Tools



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## 40.1. Drawing flowsheets and adding tables to flowsheets

This chapter explains how to draw and add tables to a flowsheet. In addition to the instructions chapter, the user should also read unit-specific Chapters 41-47 and 55 of this manual before running the simulations (41- 42 Distribution Units, 43-44 Reactions Units, 45-46 Minerals Processing Units, 47 Converter Units, and 55 Dynamic Units, which are needed if different units are combined in the flowsheet).

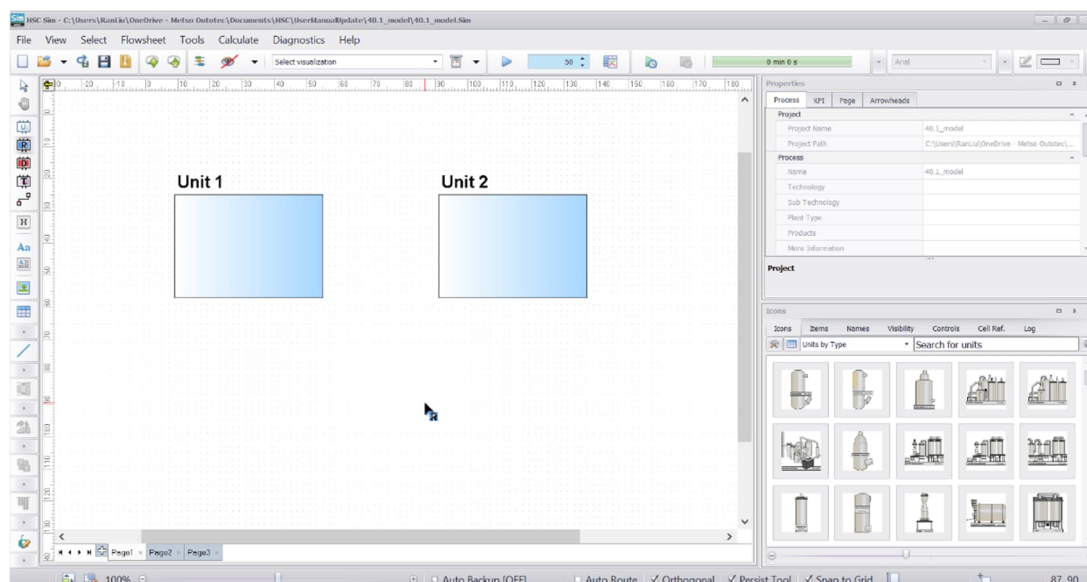
The most important icons for drawing are:



**Fig. 1.** Icons for drawing Units and Streams, where the first icon is Select and the second icon is Pan Tool, U = Generic Units, R = Reactions Units, D = Distributions Units,  $\tau$  = Dynamic Units and the last icon is Streams

### 40.1.1. Drawing units

Select the unit by left-clicking the unit icon. The cursor shows the user which icon is active. Move the cursor to somewhere on the flowsheet and draw a unit by a) holding down the left mouse button b) moving the mouse to increase the size of the unit c) releasing the button to stop drawing, see **Fig. 2**. The user can change the size of the units later.



**Fig. 2.** Drawing two Reactions units. The Reaction unit is the active icon in this figure, see the mouse cursor

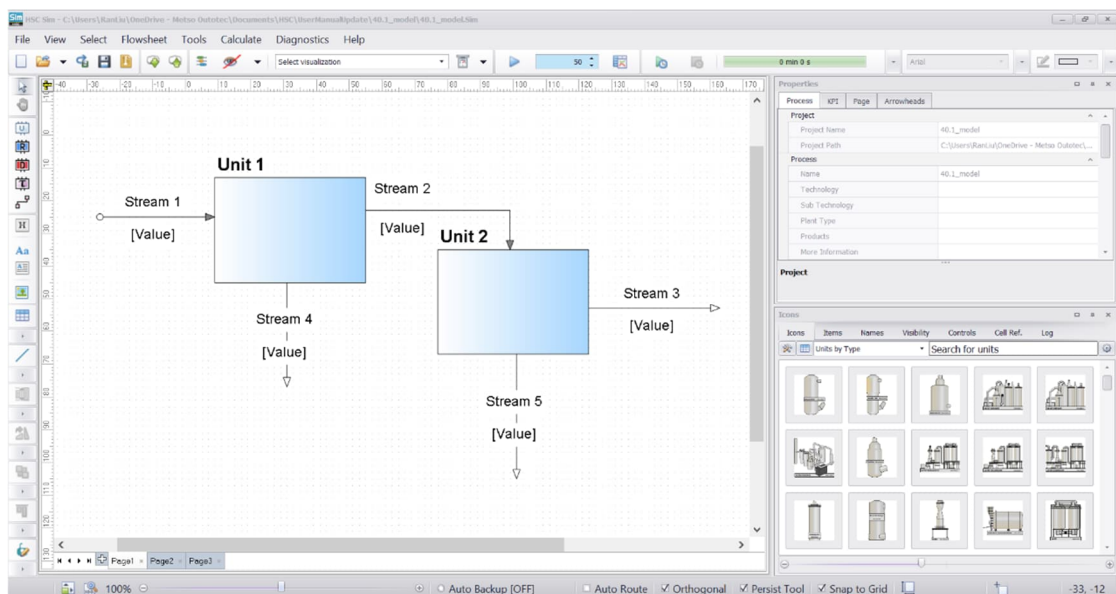
## 40.1.2. Drawing streams

Select the stream icon with the mouse (left button). Move the cursor to somewhere on the flowsheet and click the mouse (left button) to start the stream. The user can add a corner to the stream with another click and double-click (left button) to end the drawing of the stream, see **Fig. 3**.

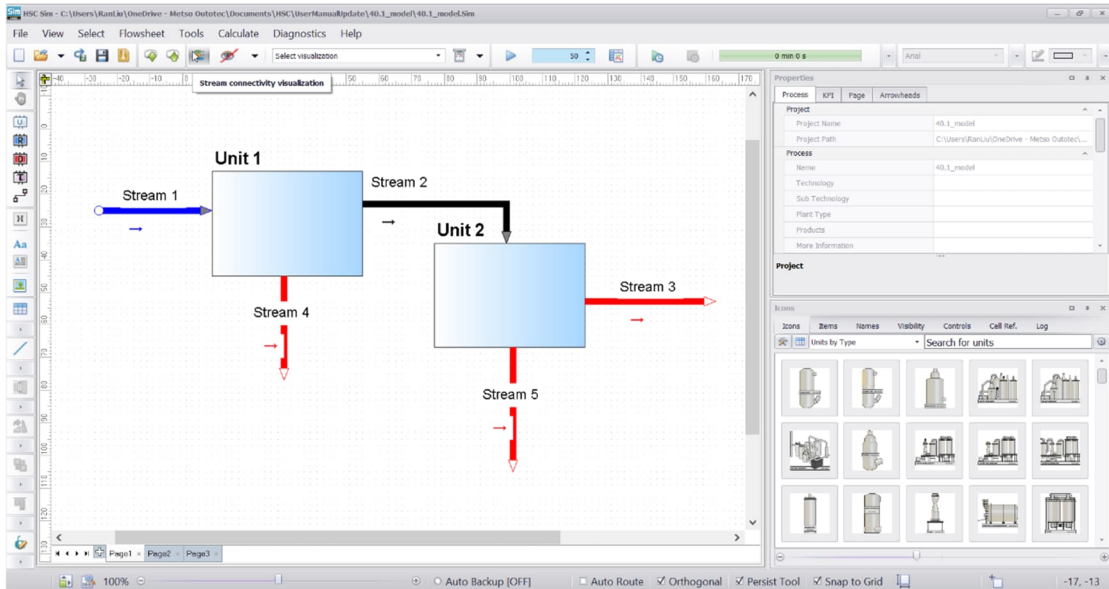
### Editing Streams

How to a) make a corner on the stream b) change the angle of the stream and c) remove the corners of the stream d) change the input and output units of the stream e) check the connection of the streams.

- Choose the **Select** icon and by holding down the **shift + left mouse button**, the user can make corners on the streams by moving the mouse.
- Choose the **Select** icon and click the stream to see the nodes (blue squares). Hold down the mouse button on a node and move the mouse to change the angle of the stream (hold shift for continuous changing of the angle).
- Choose the **Select** icon, select the stream, then select one stream node (blue square), move one node on top of another node to remove a stream corner.
- Choose the **Select** icon and move the beginning or end of the stream to a new unit or out of the unit. HSC Sim will suggest a new connection to the stream that the user can accept (OK) or Cancel.
- When the flowsheet is ready, check that the streams are connected to the correct units. The user can check connections visually, see **Fig. 4**. A white circle or arrow means that the stream source or destination is unknown (a gray arrow means it is known). Blue stream means input, black stream is between two units and red stream means output. It is also possible to click in the **View** menu **Toolbars** to show the **Process Tree**. The most time-consuming task is selecting streams one by one and looking at the **properties** (process sheet) to see the source and destination of the stream.



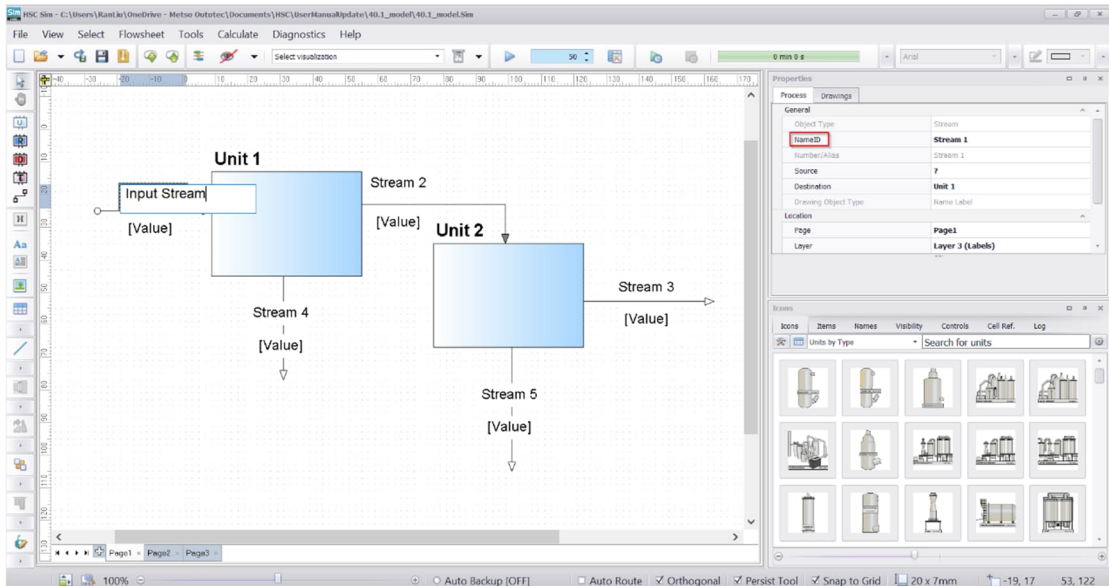
**Fig. 3.** Drawing streams



**Fig. 4.** Visualizing stream connections



### 40.1.3. Renaming and deleting units and streams

Choose the Select icon and rename units and streams by double-clicking the name label or click the name label and F2 or edit properties (process sheet) - NameID cell, see **Fig. 5**. Units and streams can also be deleted by choosing them with Selection tool and pressing delete button.




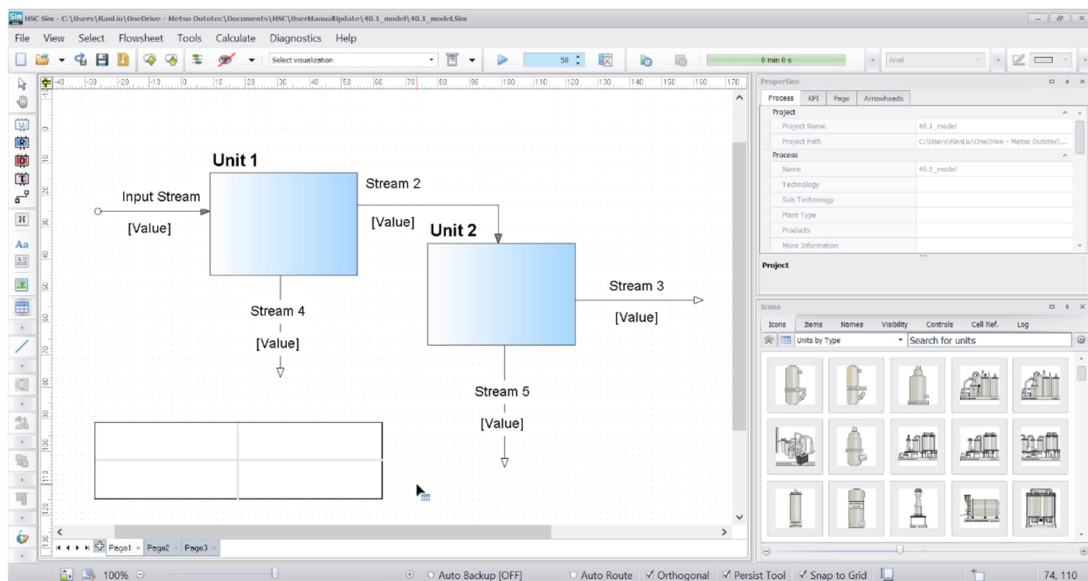
**Fig. 5.** Renaming units and streams

### 40.1.4. Inserting tables and stream tables (typically done after simulations)

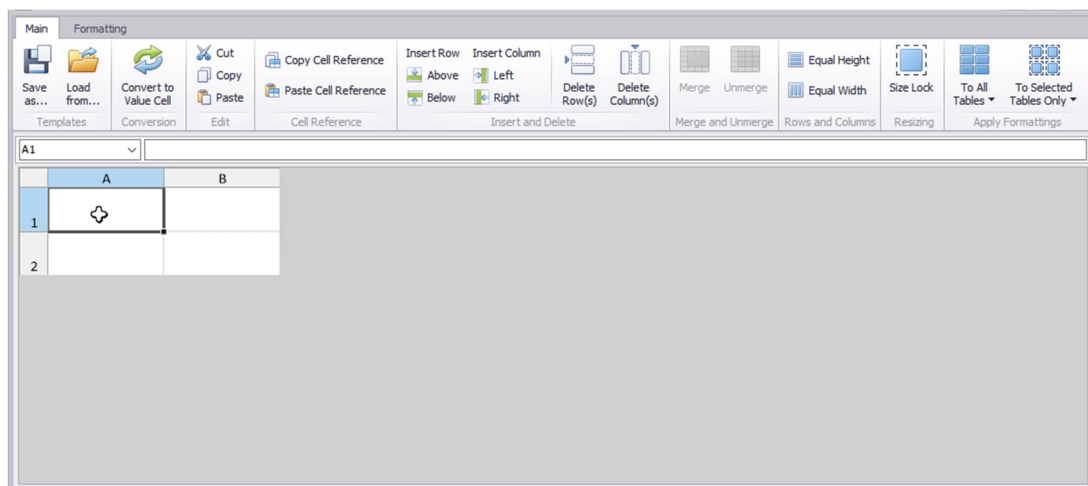
The user can add **Tables**  or **Title Tables**  to visualize important parameters of the results. Choose the Table icon and draw the table in the same way as user draws the units. The user can open table editor by double-clicking the table, where the user can add more rows and columns. It is important to uncheck **Size lock** when adjusting the table size. It is typical to use this table to show a summary of the results. The user

can insert header labels and add any process values as cell references in this table (copy cell reference from the unit sheets and paste cell reference in the table), see **Fig. 6 - Fig. 8**.

The user can also insert **stream tables** by clicking the Stream Table Editor icon  , which will open the editor where the user can add variables by double-clicking them. (Note that the variable list may be empty if you haven't created a variable list in the reactions unit. Creating a variable list is shown in section 43 Sim Reactions Unit -> 43.2. Creating a Variable List). A visible variable list can be sorted by dragging the variables up and down in the list, see **Fig. 9**. The user can check which stream tables or flow tables (**Fig. 10**) can be visible or invisible in the editor or does that later from **View Menu...stream tables...show/hide all**.



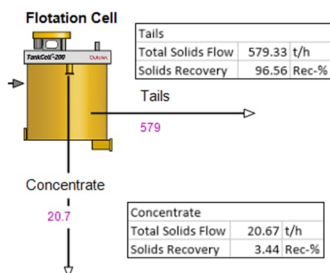
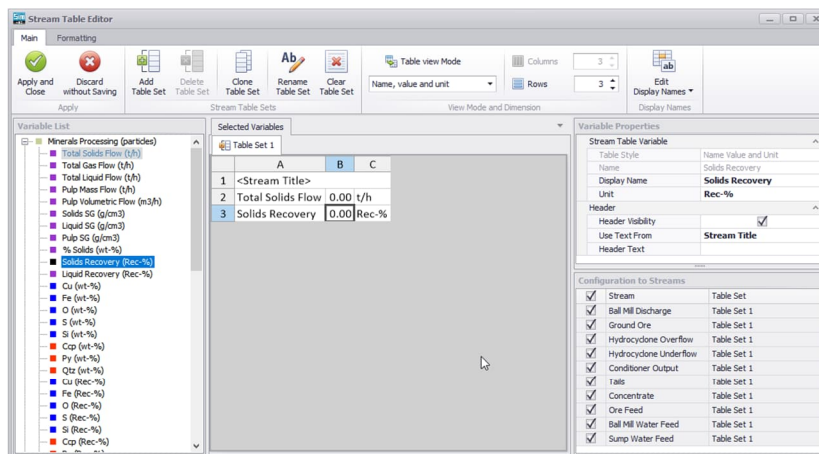
**Fig. 6.** Table added to the flowsheet.



**Fig. 7.** Table editor, remember to uncheck **Size lock** when inserting rows and columns.

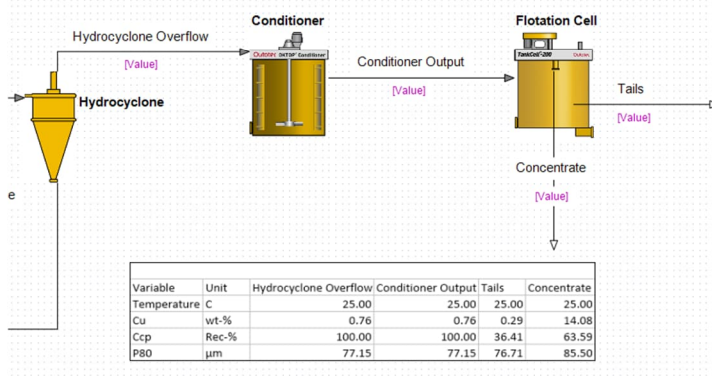
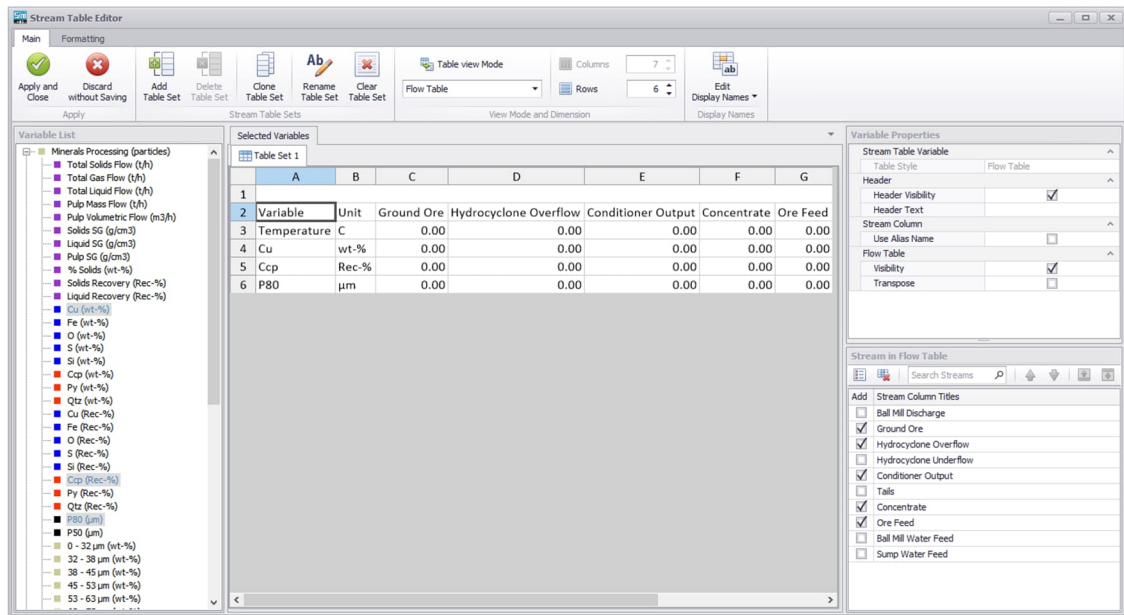
Title		
Organization/Author(s)		
HSC	Version	Logo
Date		

**Fig. 8.** Title Table where user can add flowsheet information.



**Fig. 9.** Stream tables editor for adding stream tables to the flowsheet. Add and remove variables by double-clicking. User can choose different Table Sets for each stream or just one set for all streams.

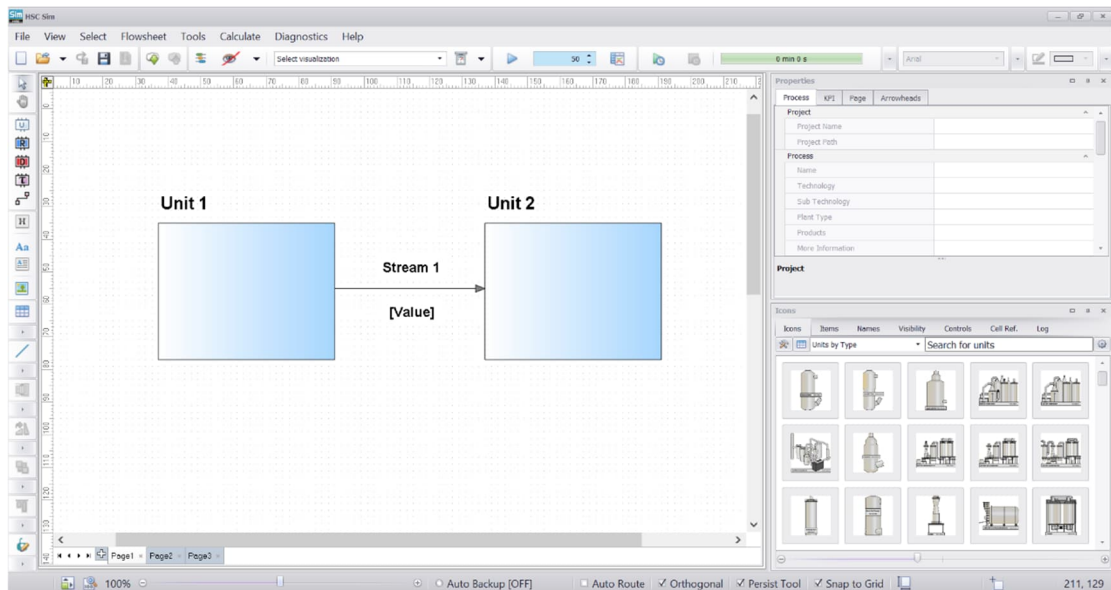




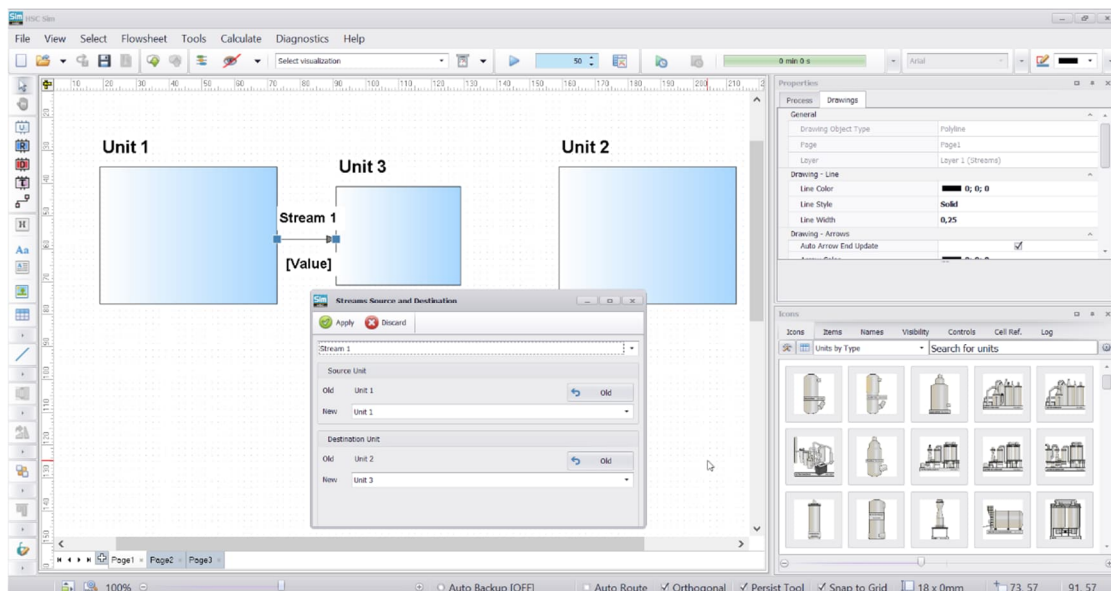
**Fig. 10.** In Stream tables the user can now also create Flow Tables to the simulation sheet (by changing Table view Mode in Stream Table Editor).

## 40.1.5. Editing a flowsheet

Sometimes the user wants to edit a flowsheet later and add new units. Adding a new unit (Unit 3) in the middle of a stream (Stream 1) connected to two units (Unit 1 and Unit 2) is explained here. First, draw a new unit (Unit 3) and connect Stream 1 from Unit 1 to Unit 3. Then add a new stream (Stream 2), which starts from Unit 3 and ends at Unit 2, see **Fig. 11 - Fig. 13**. Information in Unit 1 and Unit 2 is automatically updated so the user only needs to make changes in Unit 3 and Stream 2 to run the simulation.

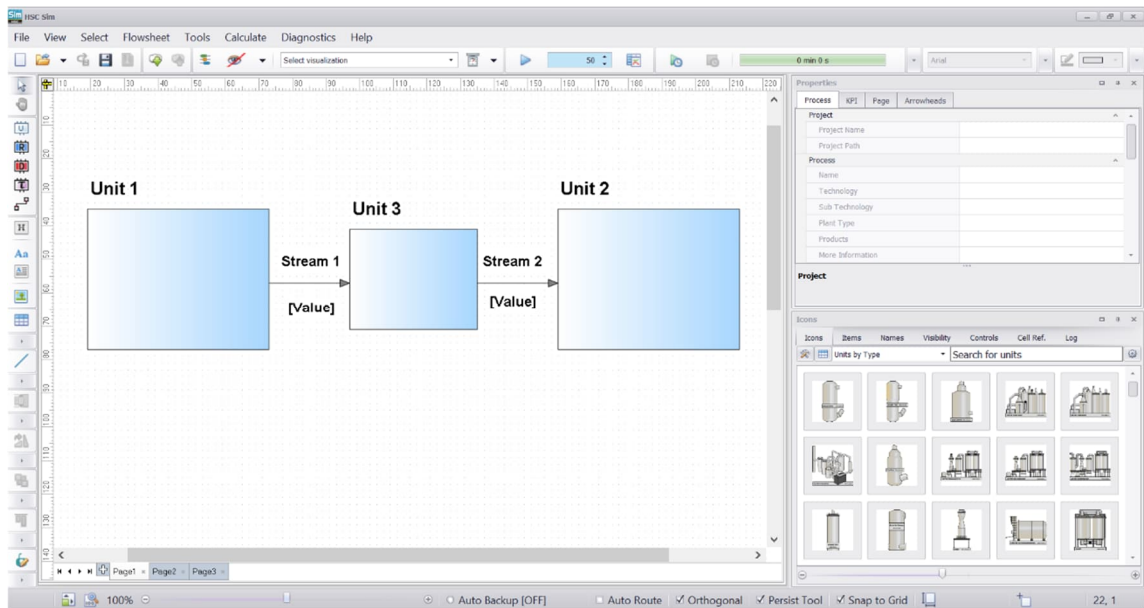


**Fig. 11.** Adding a unit to a stream between two units: Starting situation.



**Fig. 12.** Adding a unit to a stream between two units: Add new unit (Unit 3) and change the stream destination from unit 2 to unit 3 by dragging the blue square in the stream to be connected to unit 3. Make sure to select “apply” in the dialogue to confirm the new destination of this stream.





**Fig. 13.** Adding a unit to a stream between two units: Final situation after connecting Stream 1 to Unit 3 and drawing a new stream (Stream 2) from Unit 3 to Unit 2.

## 40.2. Menus in the flowsheet window

In this section, the Sim flowsheet menus (File, View, Select, Tools, Drawing Tools, Window and Help) are introduced.

### File menu

This menu is similar to many other programs where the user can (see also **Fig. 14**):

1. **Start New Process...** which opens an empty flowsheet.
2. **Open Process...** which is a \*.Sim or \*.fls file (HSC7 flowsheet).
3. **Open Recent Process...** shows the 10 most recent simulations made by the user
4. **Download from ModelBase...** opens the Model Base and shows the ready-made models that can be downloaded
5. **Open Process from Rex...** Import from Rex experimental database (login needed)
6. **Import Another Flowsheet Into This...** opens the file explorer and user can import \*.Sim or \*.fls files into the current work
7. **Save Process** quick save process (overwrites previous version)
8. **Save Process As...** saves process with the file name and location given by the user
9. **Save as Zip...** saves process as zip file. User can give the file name and location
10. **Save as LCA JSON...** saves the current flowsheet in the LCA or JSON format
11. **Save Without Models As...** Only drawings will be saved. All models and data will be deleted.
12. **Save without Database As...** All except database will be saved.
13. **Upload to ModelBase...** Opens the Model Base and the current flowsheet can be saved there.
14. **Save Backup.** Process should be saved first before a backup can be made. It is recommended to save a backup from time to time during the simulation.
15. **Auto Backup – ON / OFF** enables the auto-backup feature. The auto-backup file will be created periodically (15, 30 or 60 minutes) without overwriting (each auto-backup file is stored separately).
16. **Backup Manager...** If the user has saved backups, they can be managed (checked, restored, deleted) here.
17. **Export Flowsheet Image...** The user can export the flowsheet as an image (doc, png, vdx, pdf, svg or dxf) or copy a flowsheet picture to the clipboard to use it in reports and presentations.
18. **Print Flowsheet** prints the flowsheet.
19. **Sim Settings** to change or restore default settings of the flowsheet, see **Fig. 15**.
20. **Exit HSC Sim** will close the Sim program.

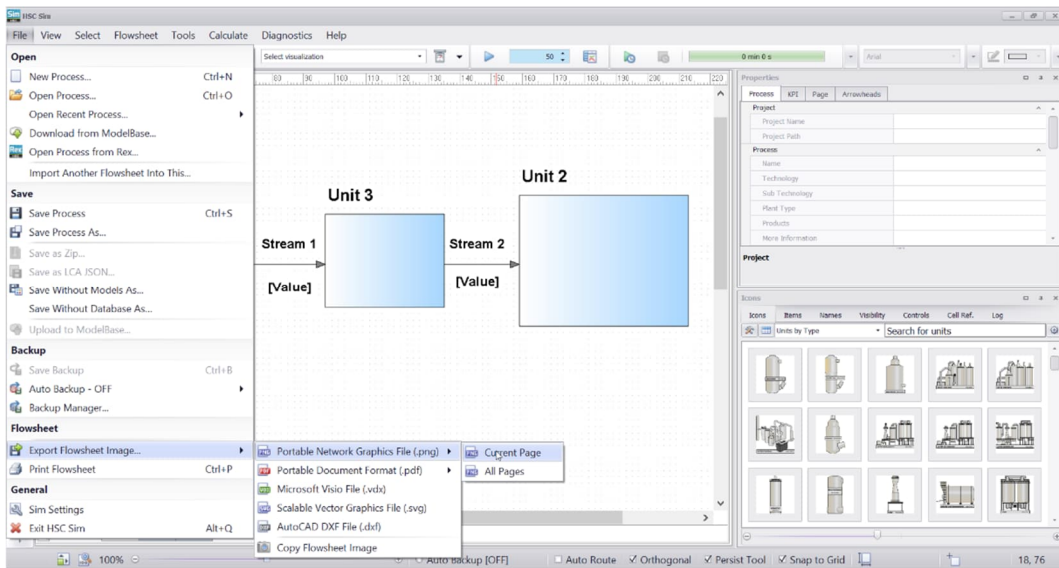


Fig. 14. File menu.

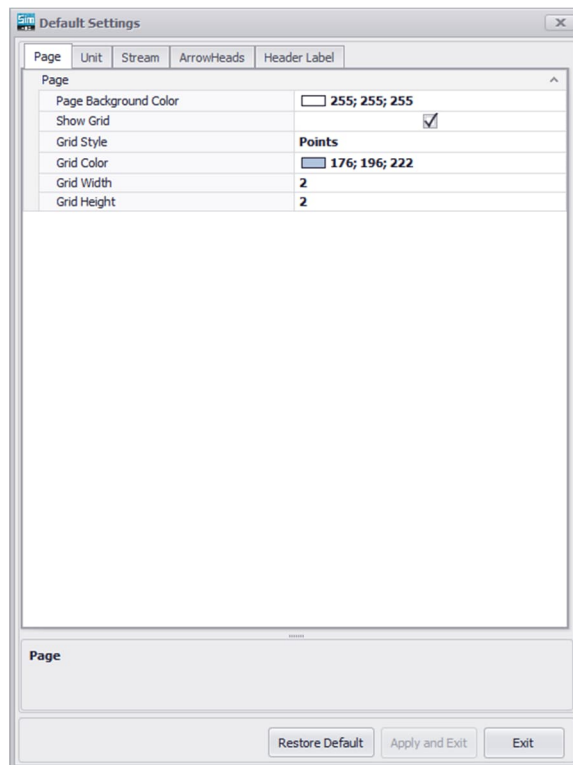


Fig. 15. Flowsheet settings.

## View menu

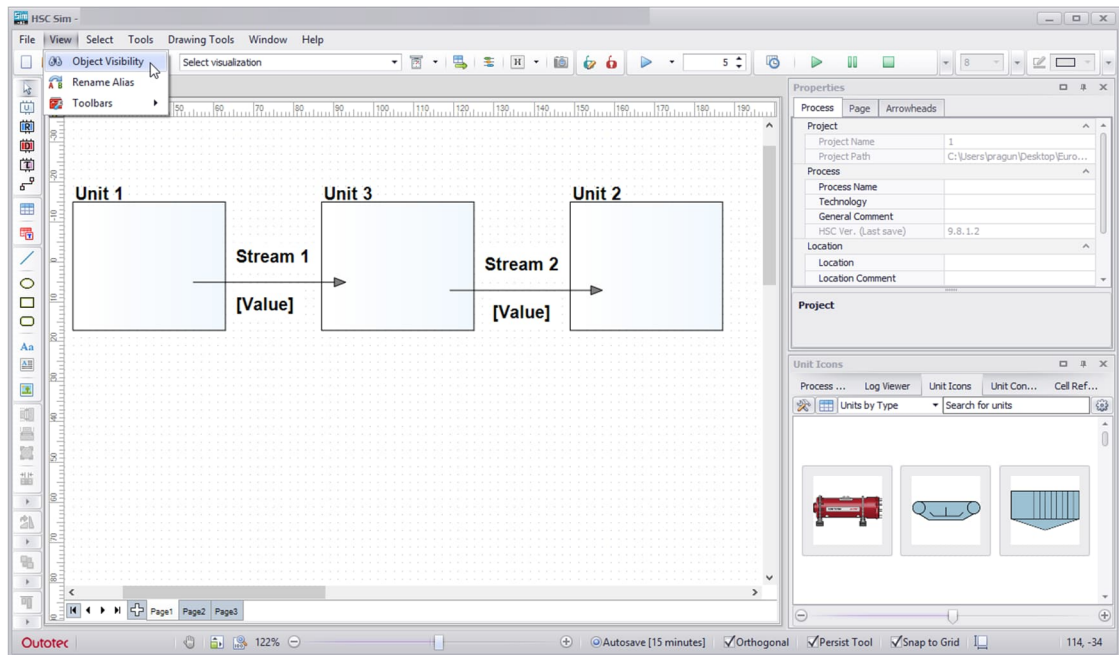


Fig. 16. View menu.

In the View menu the user can:

1. Manage left and top toolbars.

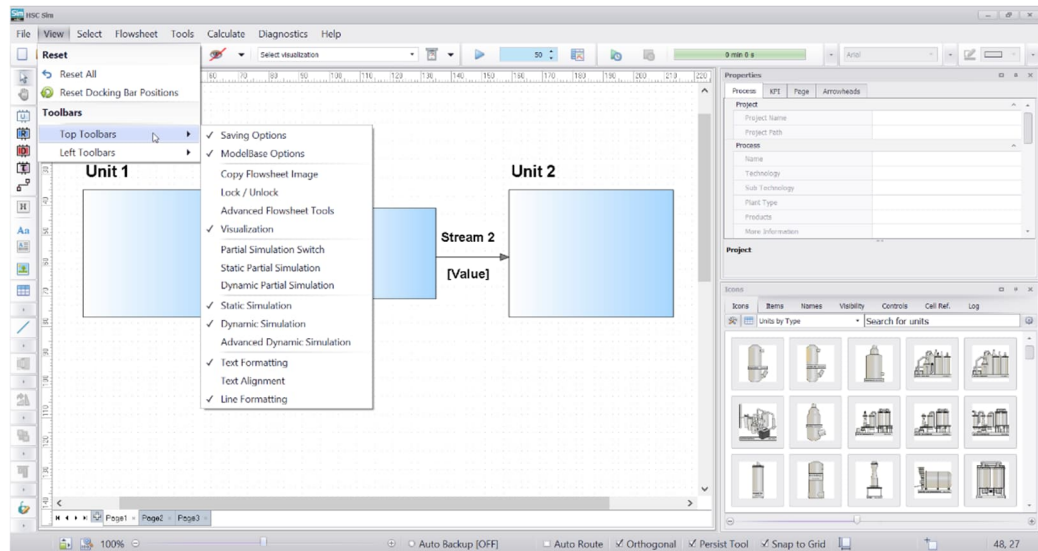


Fig. 17. Top toolbar options.

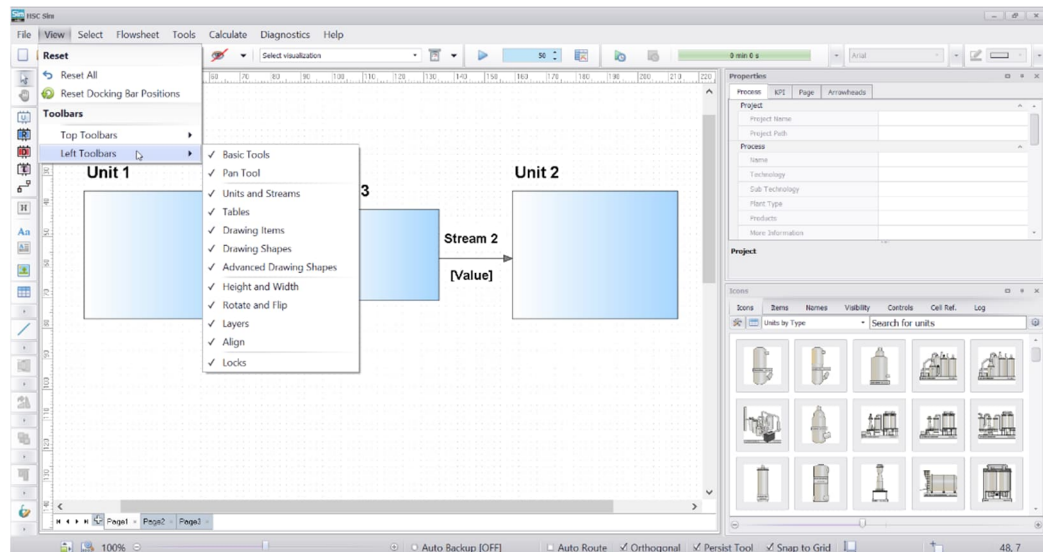


Fig. 18. Left toolbar options.

2. Reset all settings done in the View menu or only settings of docking bars.

## Select menu

The Select menu is typically used to edit or move many properties at once. Here the user can: (see Fig. 19 below)

1. Select all **Units** on the flowsheet.
2. Select all **Unit Name Labels** on the flowsheet.
3. Select all **Streams** on the flowsheet
4. Select all **Stream Name Labels** on the flowsheet.
5. Select all **Stream Value Labels** on the flowsheet.
6. Select all **Stream Tables** on the flowsheet.
7. Select **Header Label** on the flowsheet.
8. Select all **Name Labels** on the flowsheet.
9. Select all **Value Labels** on the flowsheet.
10. Select all **Text Labels** on the flowsheet.
11. Select **All Labels** on the flowsheet.
12. Select **Multi-line Text Boxes** on the flowsheet.
13. Select all **General Tables** on the flowsheet.
14. Select all **Value Cells** on the flowsheet.
15. Select all **Title Tables** on the flowsheet.
16. Select **All Tables** (not including stream tables) on the flowsheet.
17. Select **Polylines** on the flowsheet.
18. Select **Picture Boxes** on the flowsheet.
19. Select all **Other Drawing Objects** on the flowsheet.
20. Select **All Items** on the flowsheet.



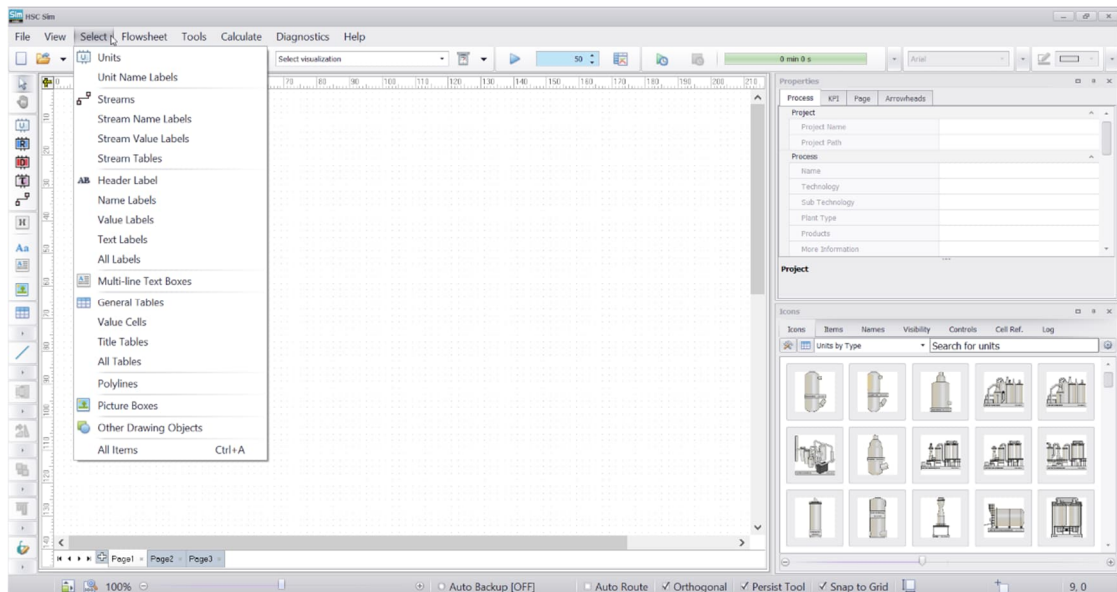


Fig. 19. Select menu.

## Flowsheet menu

In the Flowsheet menu, user can find monitoring tools, visualization tools or drawing tools.

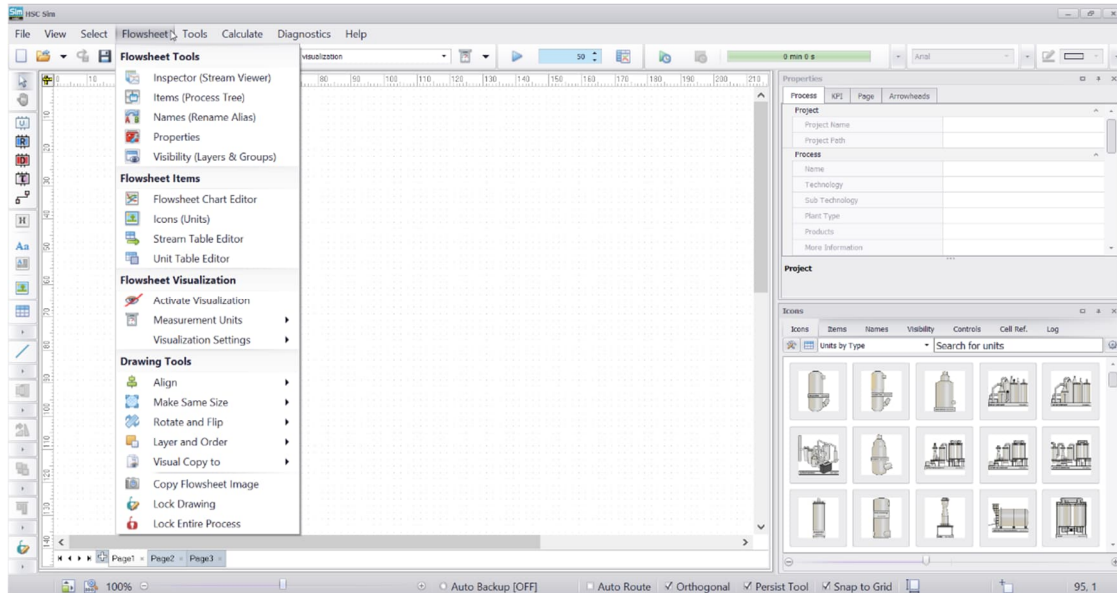


Fig. 20. Flowsheet menu

In the section of Flowsheet Tools, user can inspect stream data with the **Inspector** (Stream Viewer), check the list of items with **Items** (Process Tree), manage names of units or streams with **Names** (Rename Alias), read flowsheet information and settings with **Properties** and manage the visibility of layers or groups in the flowsheet with **Visibility** (Layers & Groups)

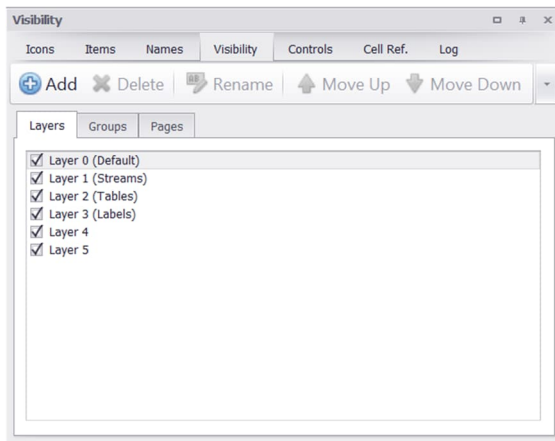
To manage charts, tables or icons in the flowsheet, user can find tools such as **Flowsheet Chart Editor**, **Icons**, **Stream Table Editor** and **Unit Table Editor**.

Visualization of the flowsheet and the settings of it can be found from the section Flowsheet Visualization in this menu. User can turn on and off the visualization, change the measurement units in the visualization and adjust other settings.

The last section of this menu is Drawing Tools with which user can edit the flowsheet by aligning, sizing, rotating, grouping and so on.

One handy way of editing the flowsheet is Edit Pages and Layers – the **Visibility** tool where user can set layers and properties which are visible or invisible on the flowsheet. Each page can have many layers. Different flowsheet items can be put to different layers in **Properties** windows. Then user can show or hide different items using Layers check boxes.

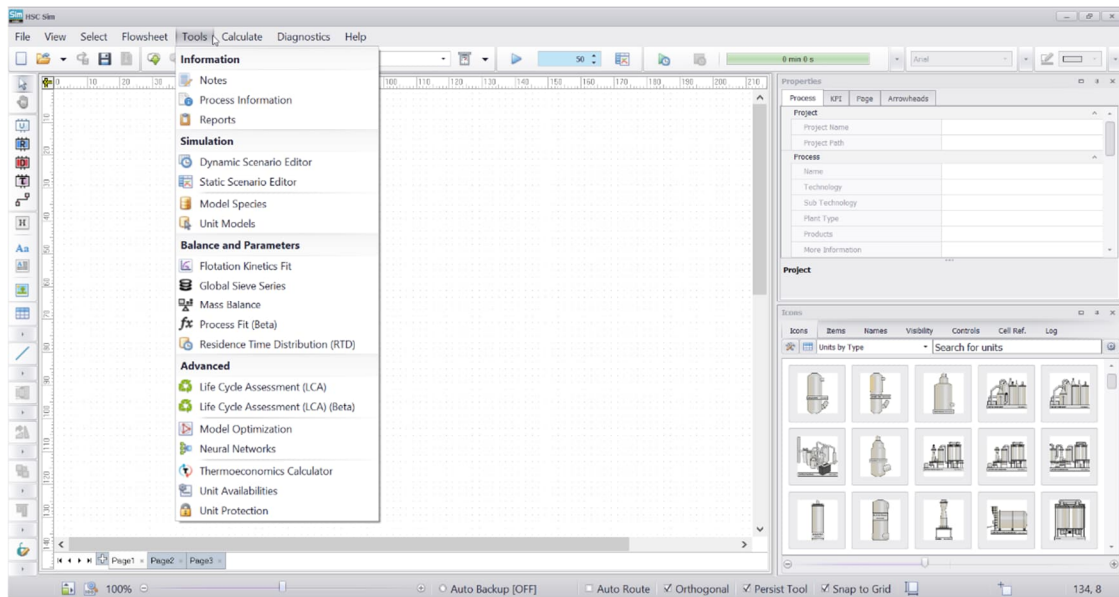
More details about Drawing Tools can be found from section **40.3**.



**Fig. 21.** Visibility tool

## Tools menu

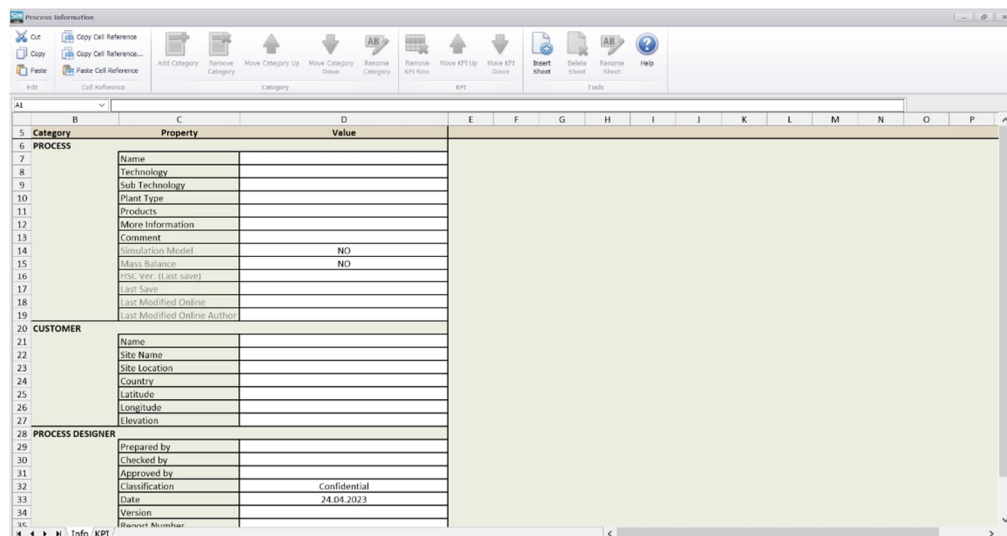
The Tools menu includes many advanced options that might be needed in flowsheet simulation. New user needs detailed instructions on how to use those tools. Some tools are explained here and others in different Chapters, see the list below.



**Fig. 22.** Tools menu options.

The Tools menu includes:

1. Notes
2. Process Information



**Fig. 23.** The user can add Process Information to this sheet.

3. Reports (see section 40.2.1)
4. Dynamic Scenario Editor
5. Static Scenario Editor (see section 40.2.3)
6. Model Species (see Chapter 28)
7. Unit Models (see section 40.2.2)
8. Flotation Kinetics Fit
9. Global Sieve Series
10. Mass Balance (see Chapters 51 and 52)
11. Process Fit (Beta)

12. Residence Time Distribution (RTD)
13. Life Cycle Assessment (LCA) (see Chapter 49)
14. Life Cycle Assessment (LCA) (Beta)
15. Model Optimization
16. Neural Networks (see Chapter 95)
17. Thermoeconomics Calculator (see Chapter 54)
18. Unit Availabilities
19. Unit protection

## 40.2.1. Reports

A summary of flowsheet results can be saved and printed here. There are two pages in this report sheet: one for units and one for streams. This report uses Hydro\_example.Sim.

Streams ID	BALANCE:	INPUT:	Cold Water	OUTPUT:	Hot Water	INTERMEDIATE:	Streams ID
Source							Source
Destination							Destination
T	Temperature	°C	25,00		60,00		T
Pv	Pressure	bar	1,00		1,00		Pv
A	Amount	t/h	0,00	197,38	197,38	0,00	A
H	Enthalpy	kW	8 028,12	-869 914,76	-861 886,63	8 028,12	H
V	Volume	m <sup>3</sup> /h	0,00	0,00	0,00	0,00	V
Ht	Thermal Energy Flow	kW	8 028,12	0,00	0,00	8 028,12	Ht
Hc	Heat Content Flow	kW	8 028,12	0,00	0,00	8 028,12	Hc
Ex	Exergy	kW	437,53	2 857,51	2 857,51	3 295,05	Ex
Cp	Heat Capacity	kJ/kgK	0,01	4,18	4,18	4,19	Cp
P3g	Gas Phase	t/h	0,00	0,00	0,00	0,00	P3g
P2a	Water Phase	t/h	0,00	197,38	197,38	197,38	P2a
H2O	H2O	t/h	0,00	197,38	197,38	197,38	H2O
Spdd	Pressure Drop	bar		0,00		0,00	Spdd
Spd	Delay	s		0,00		0,00	Spd

Fig. 24. Stream balance sheet of the report file.

Streams ID	Type	Temperature (°C)	Pressure (bar)	Mass Flow (t/h)	Gas Flow (Nm <sup>3</sup> /h)	Liquid Flow (t/h)	Solids Flow (t/h)	Enthalpy Flow (kW)	Exergy Flow (kW)	Elements (t/h)
Cooler										
Cold Water	Input	25,00	1,00	197,38	0,00	197,38	0,00	-869 914,76	2 857,51	22,09
Hot Water	Output	60,00	1,00	197,38	0,00	197,38	0,00	-861 886,63	3 295,05	22,09
BALANCE:				0,00	0,00	0,00	0,00	8 028,12	437,53	0,00
Leaching										
Air	Input	25,00	1,00	14,06	11 071,85	0,00	0,00	0,00	183,16	0,00
FeS	Input	25,00	1,00	60,00	0,00	50,00	10,00	-223 449,80	28 606,72	0,00
H2SO4	Input	25,00	1,00	10,10	0,00	10,10	0,00	-23 278,49	4 671,32	0,00
Offgas	Output	70,00	1,00	12,43	9 909,31	0,00	0,00	159,16	138,34	0,00
Solution	Output	70,00	1,00	71,74	0,00	67,45	4,28	-254 915,78	25 834,80	0,00
BALANCE:				0,00	-1 162,54	7,36	-5,72	-8 028,33	-7 488,06	0,00

Fig. 25. Unit balance sheet of the report file.

Stream ID	Source	Destination	Mass Flow (t/h)	Temperature (°C)	Pressure (bar)	Volume (m³/h)	Enthalpy Flow (kW)	Heat Capacity (kJ/kgK)	Energy Flow (kW)	Thermal Energy Flow (kW)	Heat Content Flow
1	Air	Leaching	14,06	25,00	1,00	0,00	0,00	1,01	385,16	0,00	
3	Cold Water	Cooler	197,38	25,00	1,00	0,00	-869 914,76	4,18	2 857,51	0,00	
4	Fa5	Leaching	60,00	25,00	1,00	0,00	-223 449,80	3,58	28 606,72	0,00	
5	H2SO4	Leaching	10,10	25,00	1,00	0,00	-23 278,49	1,42	4 671,32	0,00	
6	Hot Water	Cooler	197,38	60,00	1,00	0,00	-861 886,63	4,19	3 295,05	8 028,12	8
7	Offgas	Leaching	12,43	70,00	1,00	0,00	159,16	1,03	138,34	159,16	
8	Solution	Leaching	71,74	70,00	1,00	0,00	-254 915,78	2,74	25 834,80	2 429,31	2
9	Input Stream:		281,55				-1 116 643,05		36 318,71		
10	Output Stream:		281,55				-1 116 643,26		29 268,19	10 616,59	10
11	BALANCE:		0,00				-0,21		-7 050,53		

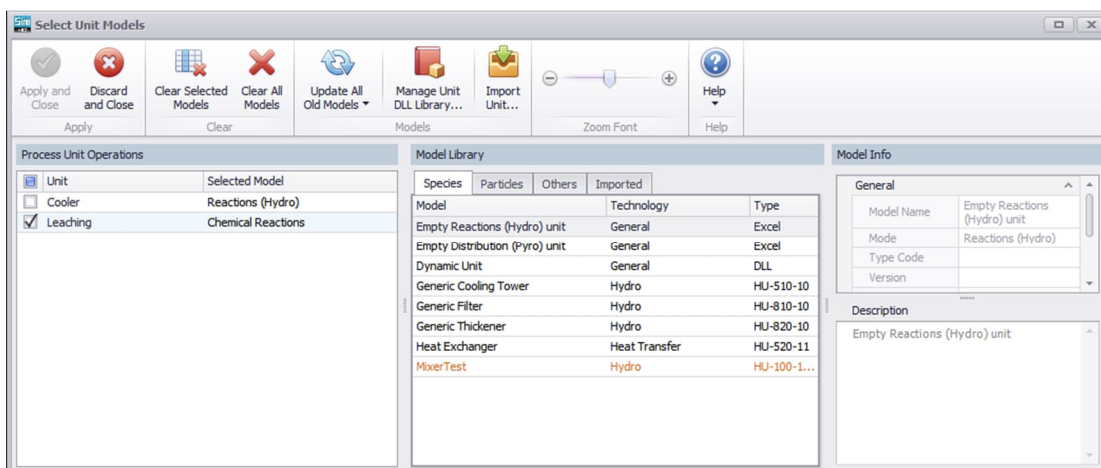
Fig. 26. Properties sheet of the report file.



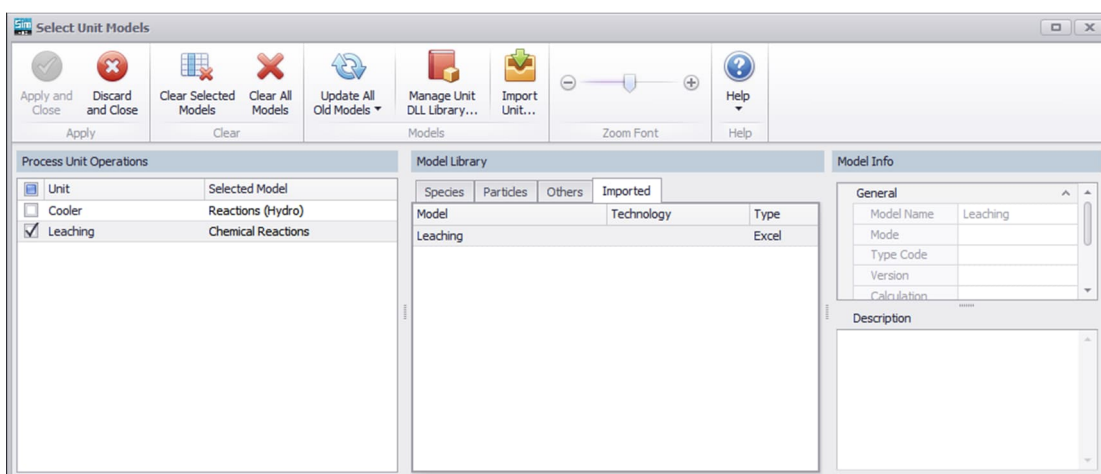
## 40.2.2. Select Unit Models

The user can choose different models for the units. The Select Unit Models window (see **Fig. 27**) can be opened from the Tools menu or by right-clicking if the cursor is on top of one of the units and choosing Select Unit Models option. On the left side of the window is the list of the units on the flowsheet. In the middle part the user can select a unit model from the Reactions, Distributions, Particles, Others and Import (users own unit models) sheet. **Double-click** the unit to select it and then click OK. Most of the units are DLL type but there are still some Excel Wizards available for the Reactions units. If Excel Wizards are chosen, the user needs to check the stream names. Information about the units can be found on the right side of the selector window. Empty Reactions or Distributions units are the same as R and D unit Icons on the main flowsheet DrawBar, see **Fig. 1**. Instructions on how users can make their own DLL units is available in Chapter 50.

If user has many units with similar settings: draw flowsheet with all units, edit one unit, save flowsheet and import this unit information to other units using import Unit button (browse \*.xlsx file and click Open, Select Imported sheet and units, double-click imported excel unit and click ok), see **Fig. 28**.



**Fig. 27.** Select Unit Models window.

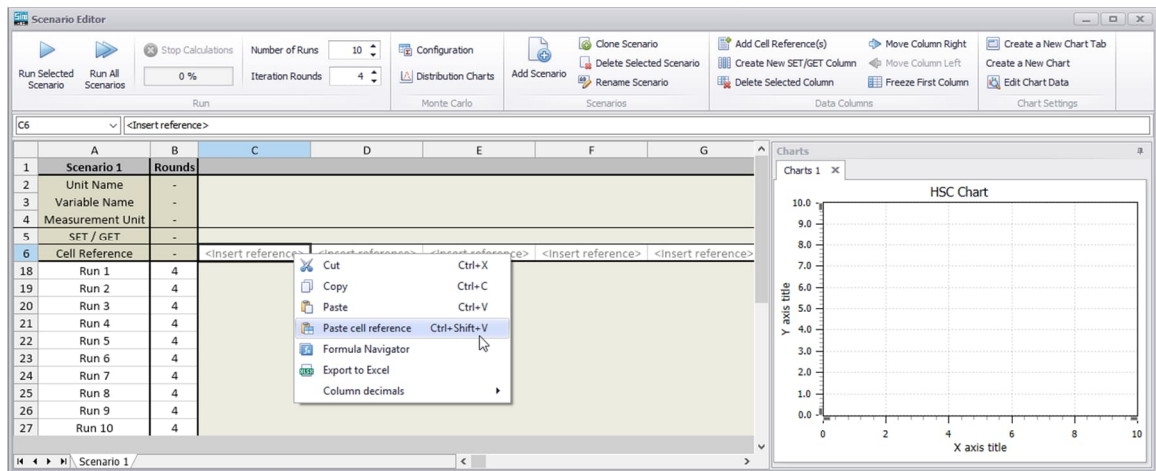


**Fig. 28.** Imported units. Are shown after Import Unit... icon is used.

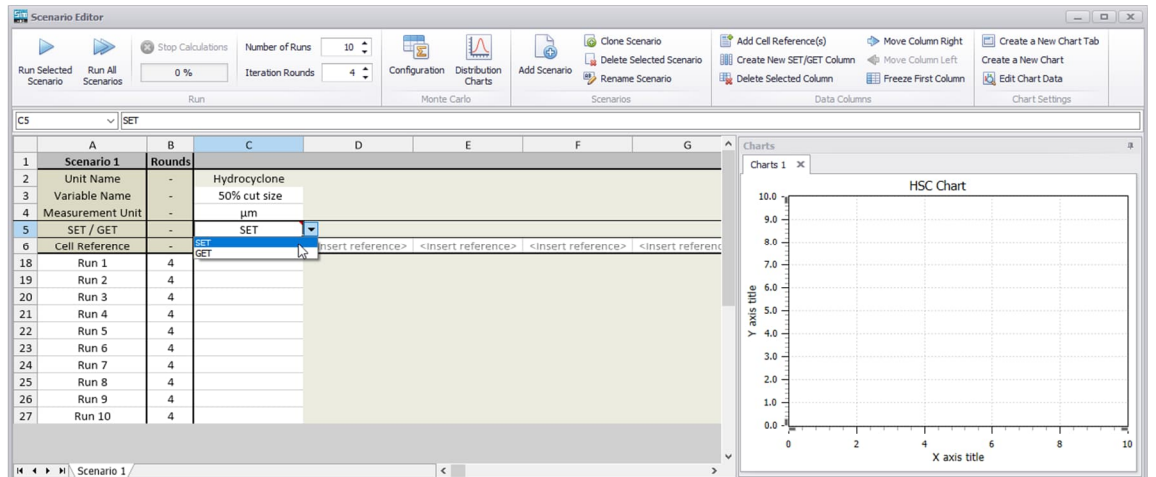
## 40.2.3. Static Scenario Editor

The Static Scenario Editor lets user run user’s process model with different operating parameters and see how they affect process variables. The calculated results can then be collected in the charts.

To use the Static Scenario Editor, first select the processing parameter that is wanted to be regulated and copy its cell reference from the appropriate cell. Next, open the Scenario Editor and paste the cell reference in the first SET/GET column (**Fig. 29**). Then add a name and measurement unit for this variable, but most importantly specify whether the variable will be a regulated (SET) or a calculated variable (GET) (**Fig. 30**).



**Fig. 29.** Add variables to the Scenario Editor by pasting the cell reference of the variable cell.



**Fig. 30.** Specify the SET/GET value for the variable.

After adding enough variables, specify the parameter values for the SET columns, add some charts, and finally run the scenario (**Fig. 31**).

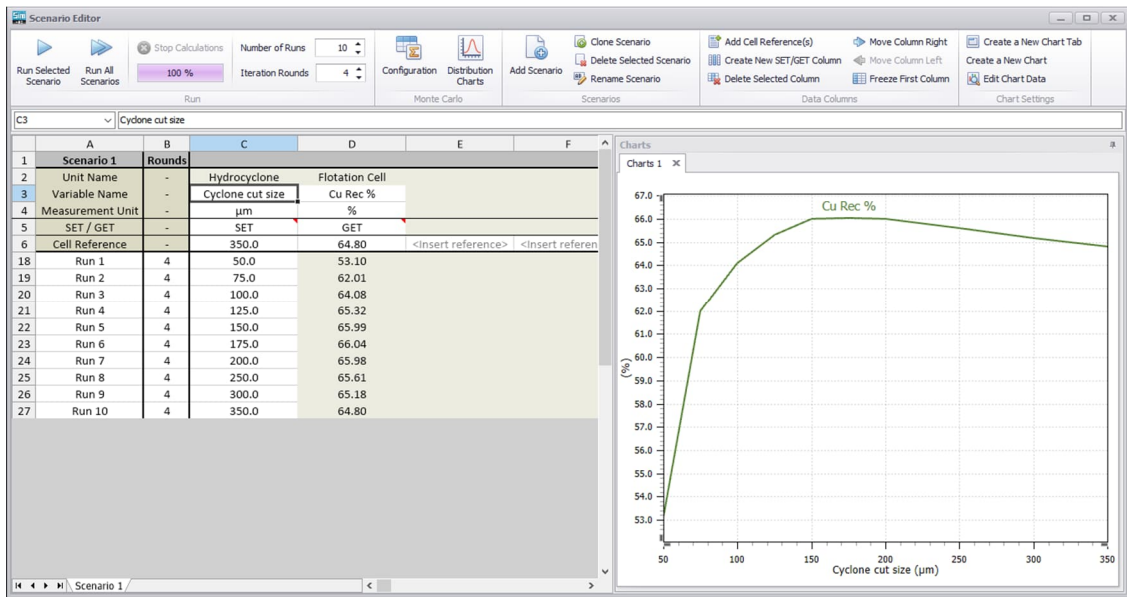
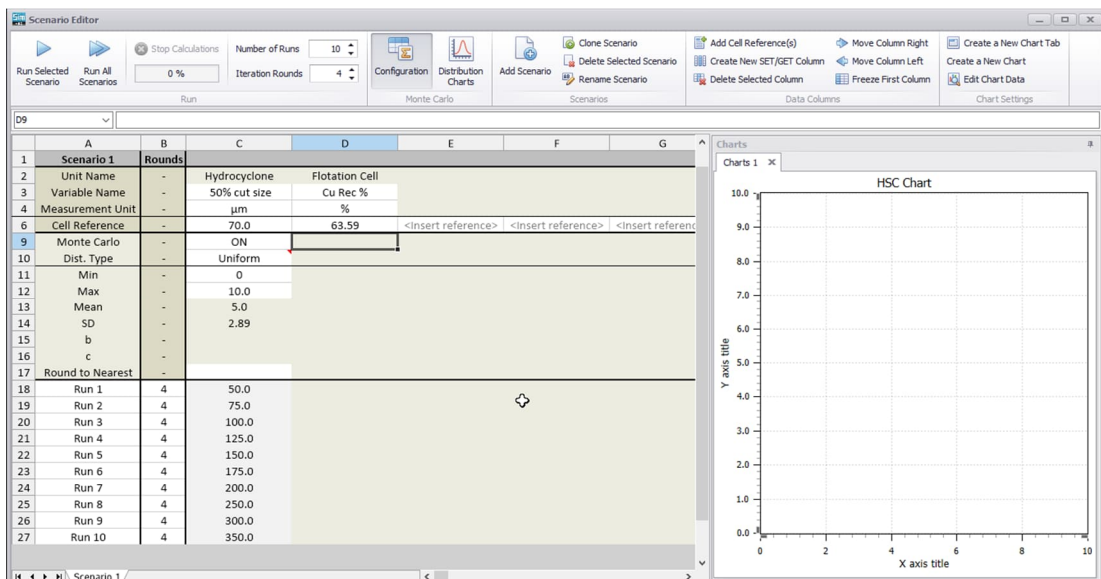
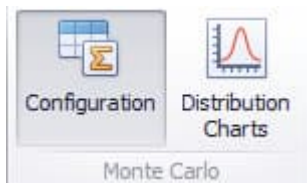


Fig. 31. Results of the scenario.

#### 40.2.4. Scenario Editor – Monte Carlo simulation

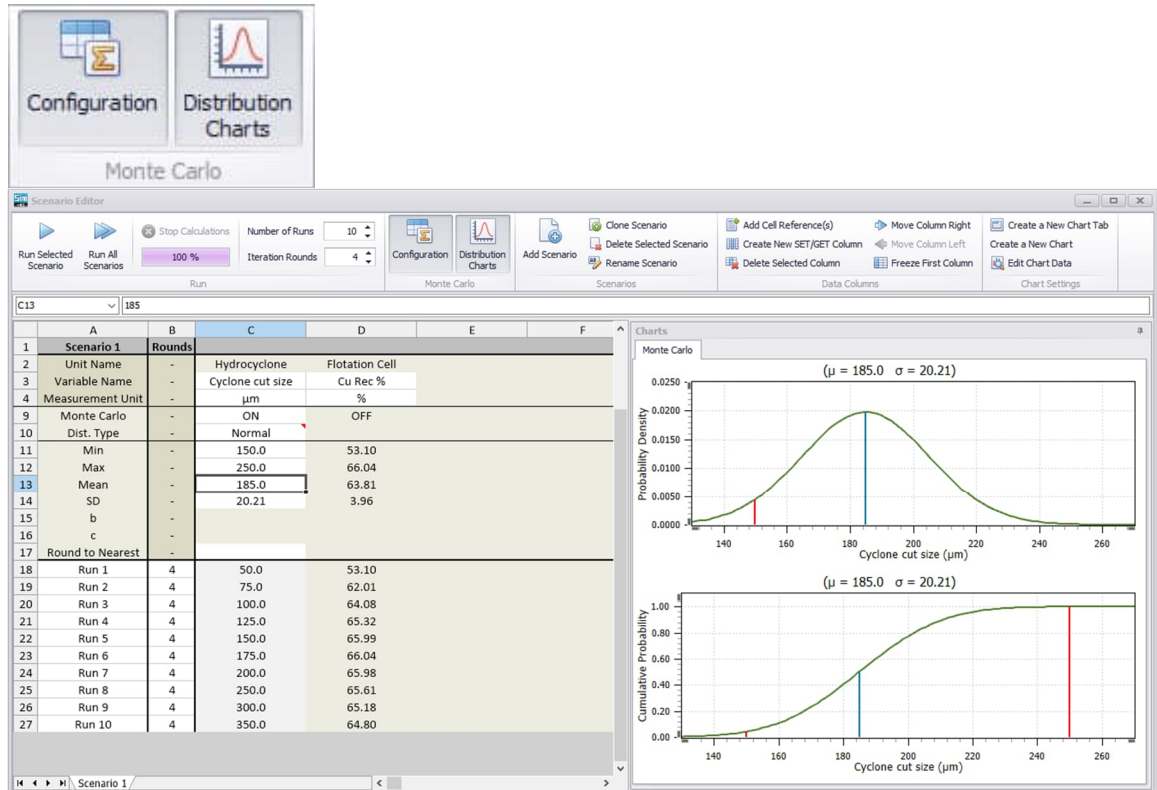
The scenario editor allows the user to simulate the process with randomly selected input parameters. This can be sometimes a useful method for finding optimum process parameter windows for complex models.

To activate the random sampling of a SET variable, check the Monte Carlo configuration rows visible and set the Monte Carlo value ON for the SET columns to be sampled with randomly selected values (Fig. 32).



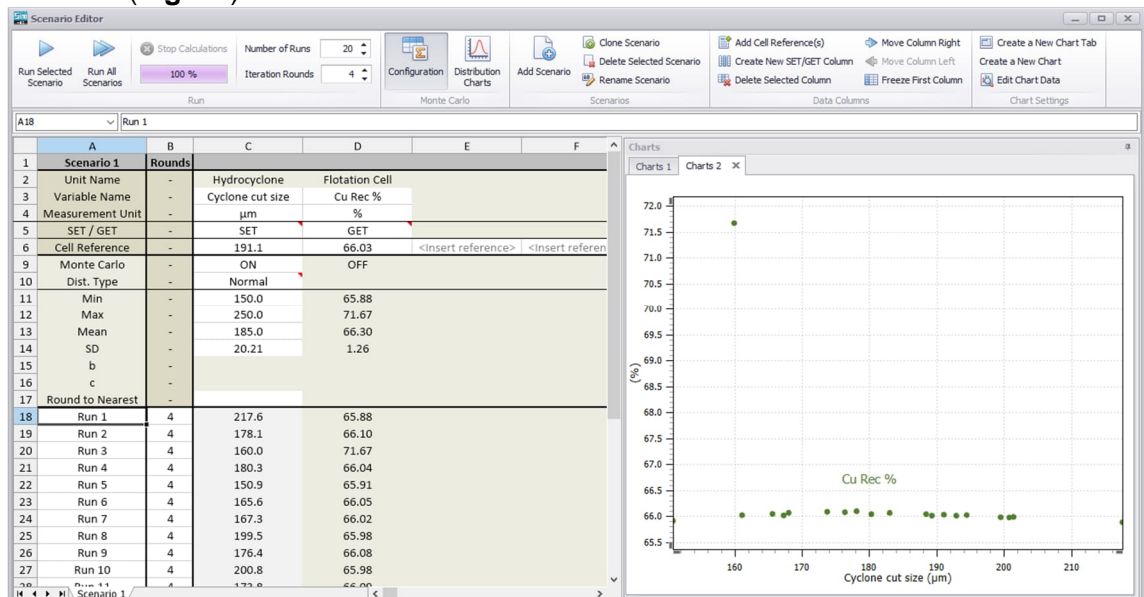
**Fig. 32.** Setting SET columns as randomly sampled variables.

The randomly sampled SET variables can be specified with a probability distribution (Uniform, Normal, Laplace or Trapezoid) and with parameters which adjust the distribution. To visualize the distribution, check the Distribution Charts option and move between the SET columns (**Fig. 33**).



**Fig. 33.** Specifying probability distributions.

Once the variables and distributions are specified, run the scenario and plot the results in charts (**Fig. 34**).



**Fig. 34.** Simulation results.

## Calculate menu

Calculate menu is a collection of commands related to running simulations. The commands are divided into two sections, one is for static simulations and the other one for dynamic simulations. In both sections, there are also two different kinds of command for running the simulation: fully or partially. Full simulation is a normal simulation of the whole flowsheet, while the partial simulation will only simulate some objects selected by the user. There is a dot border in the partial simulation buttons to distinguish them from full simulations.

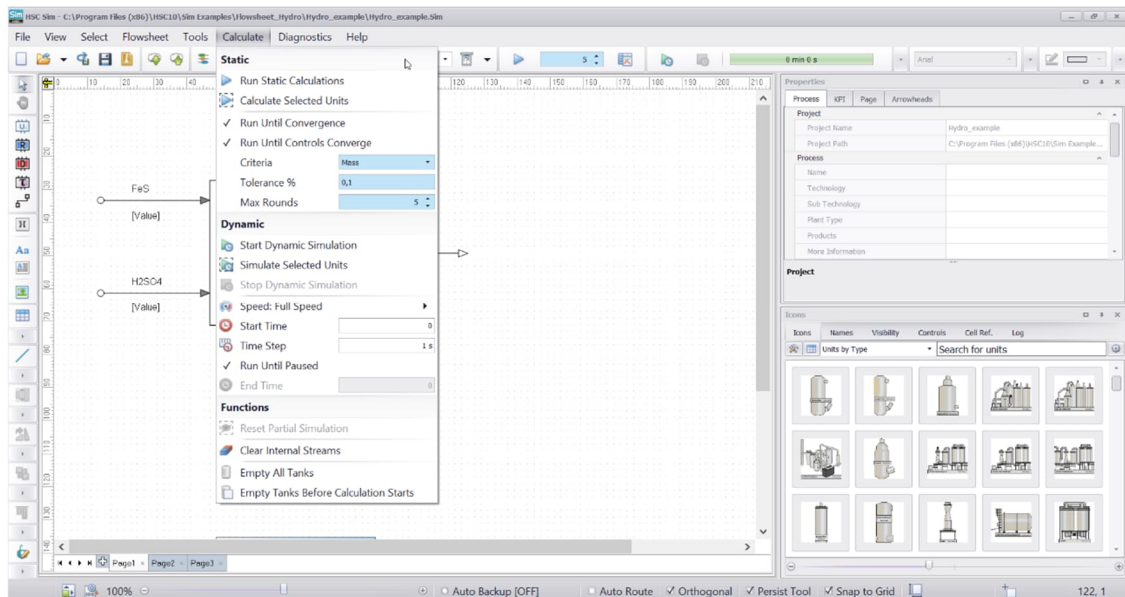


Fig. 35. Calculate menu

For static simulations, there are options to run the simulation until convergence or until user-defined controls are converged. It's also possible to define criteria, tolerance or max rounds of simulation.

For dynamic simulations, user has options to set the speed, start time, end time or time step – to adjust time increase per discrete calculation step. Dynamic simulation can also be run until it is paused by the user.

## Sim Model Convergence Monitor

Sim Model Convergence Monitor is used to finalize steady state calculations when convergence criteria are met, see Fig. 43. It works for static models. The monitored variables are mass, enthalpy, or both. An option is available to check the controls before completing the calculations. The convergence monitor checks the global (whole process flowsheet, all pages) mass or enthalpy balance, or both at the same time. The mass balance error is calculated as the absolute relative difference between the mass coming into the process and the mass leaving it:

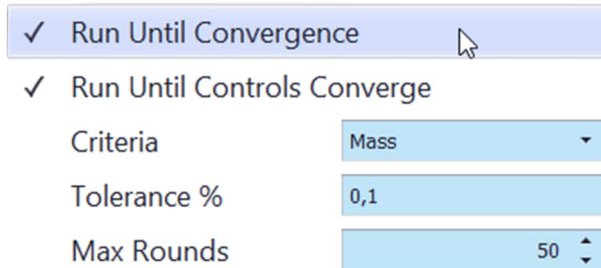
$$MB = abs\left(\frac{\text{Total mass in} - \text{Total mass out}}{\text{Total mass in}}\right) * 100\%$$

The enthalpy balance error is calculated as the absolute relative difference between the enthalpy coming into the process and the enthalpy leaving it:



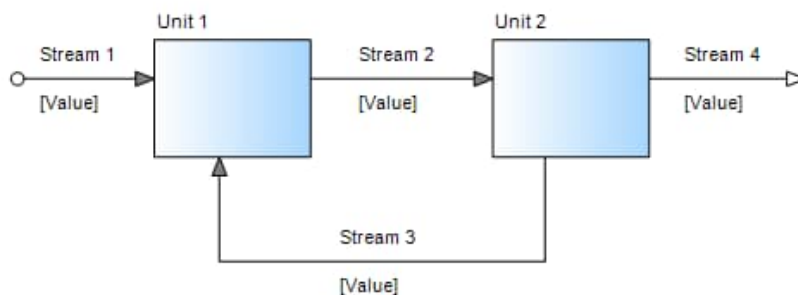
$$EB = \text{abs} \left( \frac{\text{Total enthalpy in} - \text{Total enthalpy out}}{\text{Total enthalpy in}} \right) * 100\%$$

If a calculated selected balance (mass or enthalpy) error is less than a specified value, the calculations are finalized. When both mass and enthalpy are selected as convergence criteria, each of the balances has to be less than the tolerance in order for the calculations to be finalized.



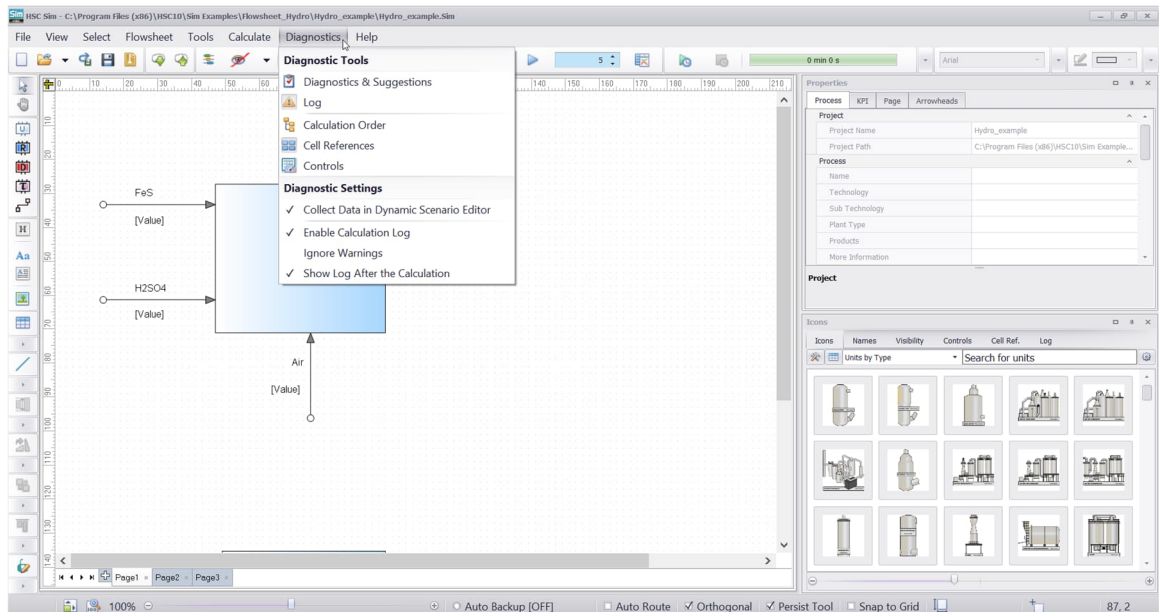
**Fig. 36.** The convergence monitor can be used to complete a steady state calculation once the convergence criteria are met. The convergence monitor can check the global mass or enthalpy balance, or both at the same time. The numerical value of the convergence criterion is shown in the Log Viewer. The convergence monitor can also check that all the controls are set at their setpoints before completing the calculations.

Some other functions are also available in the calculate menu. By resetting the partial simulation, units selected for previous partial simulations will be deselected. With function **Clear Internal Streams**, use can set stream parameters to zero. In addition, it is also possible for users to remove contents from all tanks by selecting **Empty All Tanks** or **Empty Tanks Before Calculation Starts**, which will remove contents from all tanks before every calculation.



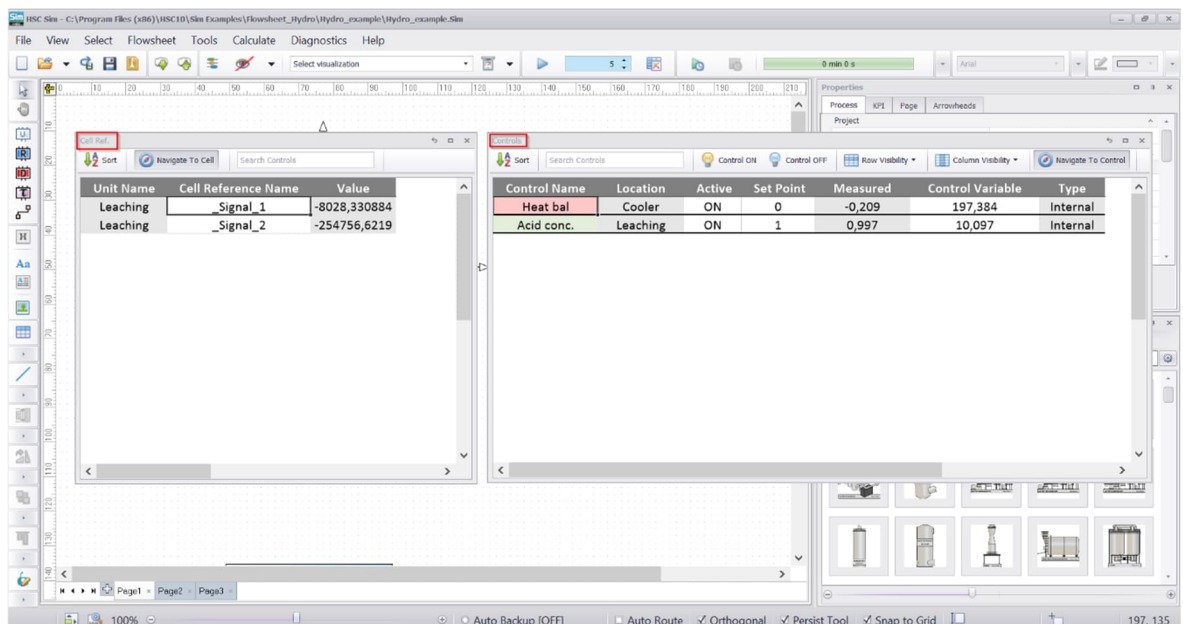
**Fig. 37.** Stream 3 is an internal stream. The user can empty this stream by clicking on the **Clear Internal Streams** in Calculate menu.

## Diagnostics menu



**Fig. 38.** Diagnostics menu

In Diagnostics menu, user can find several tools and settings to monitor the whole situation of the flowsheet. **The Diagnostics & Suggestions** tool can be used to check problems in this flowsheet and some suggestions to solve the problems. To browse through logs and possible warnings or errors, log tool should be turned on before simulation by toggling the **“Enable Calculation Log”** option on in the settings section of this menu. There are also tools to check all the cell references in this flowsheet – **Cell References** and all the controls – **Controls**.



**Fig. 39.** Cell References and Controls

In the Settings section, user can choose whether data should be collected for the Dynamic Scenario Editor or not. It is also possible to turn on and off the **Calculation**

**Log** just like mentioned above. Moreover, warnings in the calculation log can be filtered out with the option “**Ignore Warnings**”.

#### 40.2.5. Calculation order

With this option the user can see the flowsheet information and connections of the process streams with colors. If a stream is not connected to the unit, it will not be visible in this process tree.

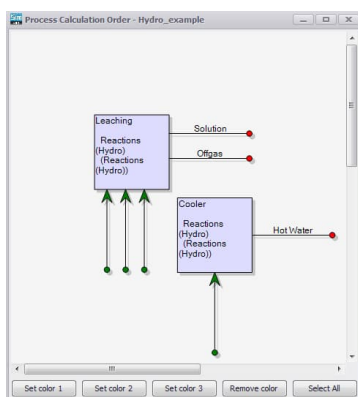


Fig. 40. Process calculation order.

#### Window and Help menus

The Help menu shows a link to Tutorial Videos, a link to the Sim manual, update checking for the latest version of HSC, and a list of software developers and technical advisors, see Fig. 41 and Fig. 43.

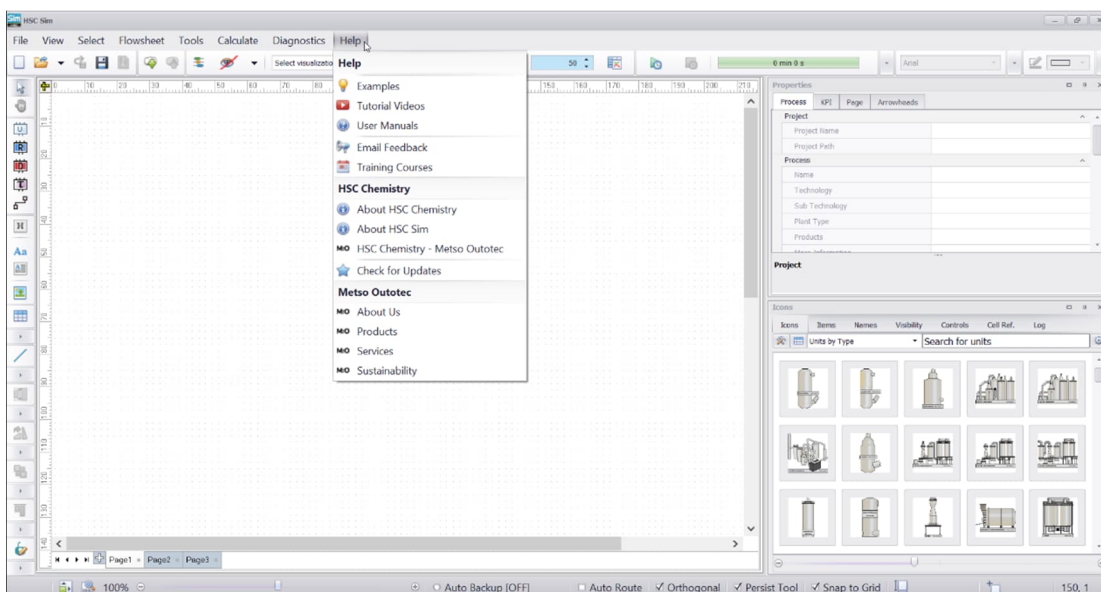


Fig. 41. Help menu.

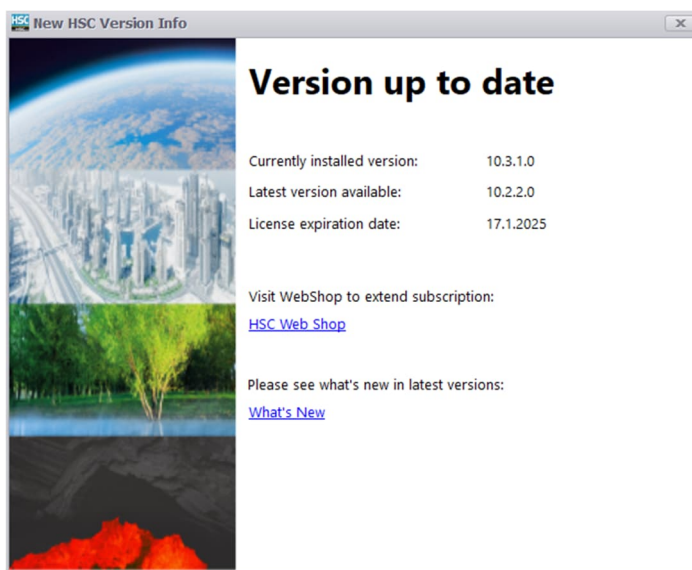


Fig. 42. Check for Updates menu.

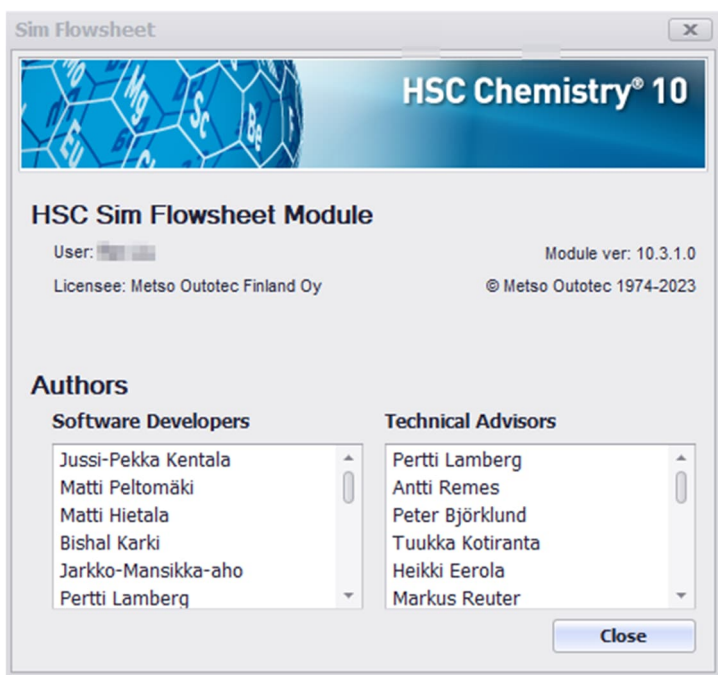
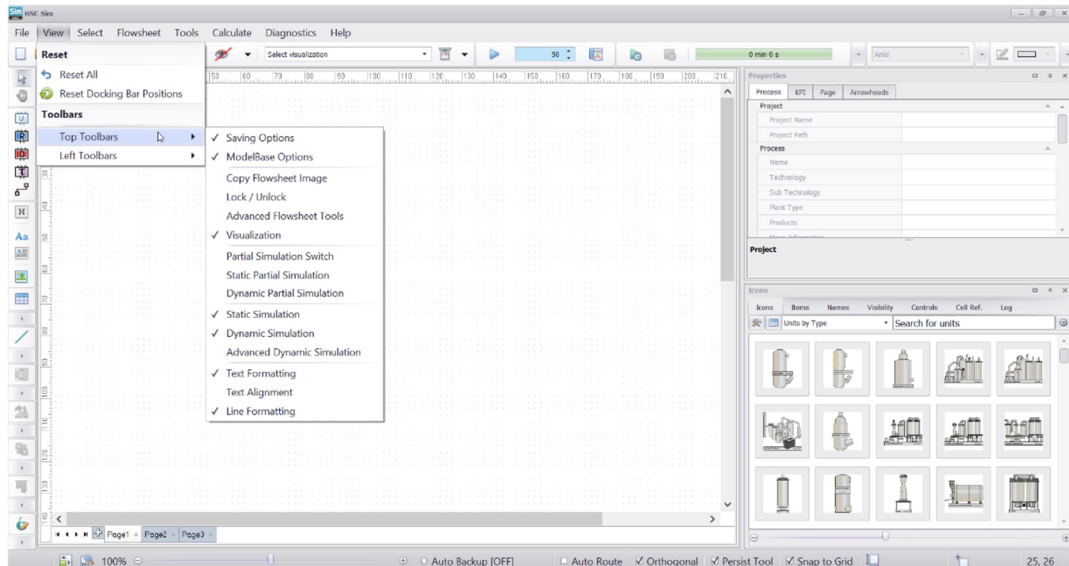


Fig. 43. About HSC Sim.

## 40.3. Toolbars

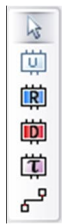
In the View Toolbars menu, the user can check and uncheck toolbars. It is also possible to **Reset Docking Bar Positions** back to their default places. Toolbars are divided into two lists: Top Toolbars, and Left Toolbars, see **Fig. 44**.



**Fig. 44.** List of tools.

### 40.3.1. Left and Top Toolbars

The Left and Top Toolbars are listed and guidance on their usage briefly described in **Fig. 45 -Fig. 58**. Many drawing options can be later edited from docking toolbar **Properties** after they have been drawn (section 40.3.2).



**Fig. 45.** Units and Streams. Select or Draw Units or Draw Streams (see also section 40.1).



**Fig. 46.** Visualization. Select or deselect the visualization mode and select the stream property that is visualized. The user can also change measurement units, open the Stream Table Editor, visualize stream connections, add a header, and copy the flowsheet image to the clipboard using this toolbar.



**Fig. 47.** Drawing tool. With this toolbar the user can draw a line, add shapes like an ellipse, a rectangle, a rounded rectangle and so on. It is also possible to add a header, text label, a text box, a picture and a table.



**Fig. 48.** User can insert a **Table** or **Title Table** using this toolbar (see also section 40.1.4).



**Fig. 49.** Height and Width. With this toolbar the user can make the size or spacing of the selected units or streams equal. At least 3 units are needed for equal spacing of the units.



**Fig. 50.** Align. With this toolbar the user can align selected units in many ways, thus making it easier to draw professional-looking flowsheets.



**Fig. 51.** Layers. With this toolbar the user can change the position of overlapping units or edit pages and layers (**Error! Reference source not found.**).

**Fig. 52.** Rotate and Flip. With this toolbar the user can rotate or flip units.



**Fig. 53.** Lock and Unlock. With this toolbar user can disable or enable the edit mode for flowsheet drawing and lock or unlock any editing of the entire process, but with the drawing lock you can still edit unit properties by opening the unit. Note! Both lock options disable drawing of the flowsheet, see **Fig. 58**.



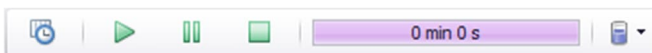
**Fig. 54.** Text Formatting. With this toolbar you can easily edit text labels.



**Fig. 55.** With the status bar the user can fit and zoom the flowsheet and check and uncheck the Orthogonal, Persist Tool, Autosave, and Snap to Grid options. If the user wants to draw **Orthogonal** streams or lines (see **Fig. 45** and **Fig. 47**), check this option. The **Persist Tool** remembers the last used drawing tool so that the user does not have to select the same tool again separately. The **Snap to Grid** option aligns the streams and units according to the grid on the flowsheet, thus making it easier to draw professional-looking flowsheets. The user also sees the size of the chosen object and position of the mouse cursor.

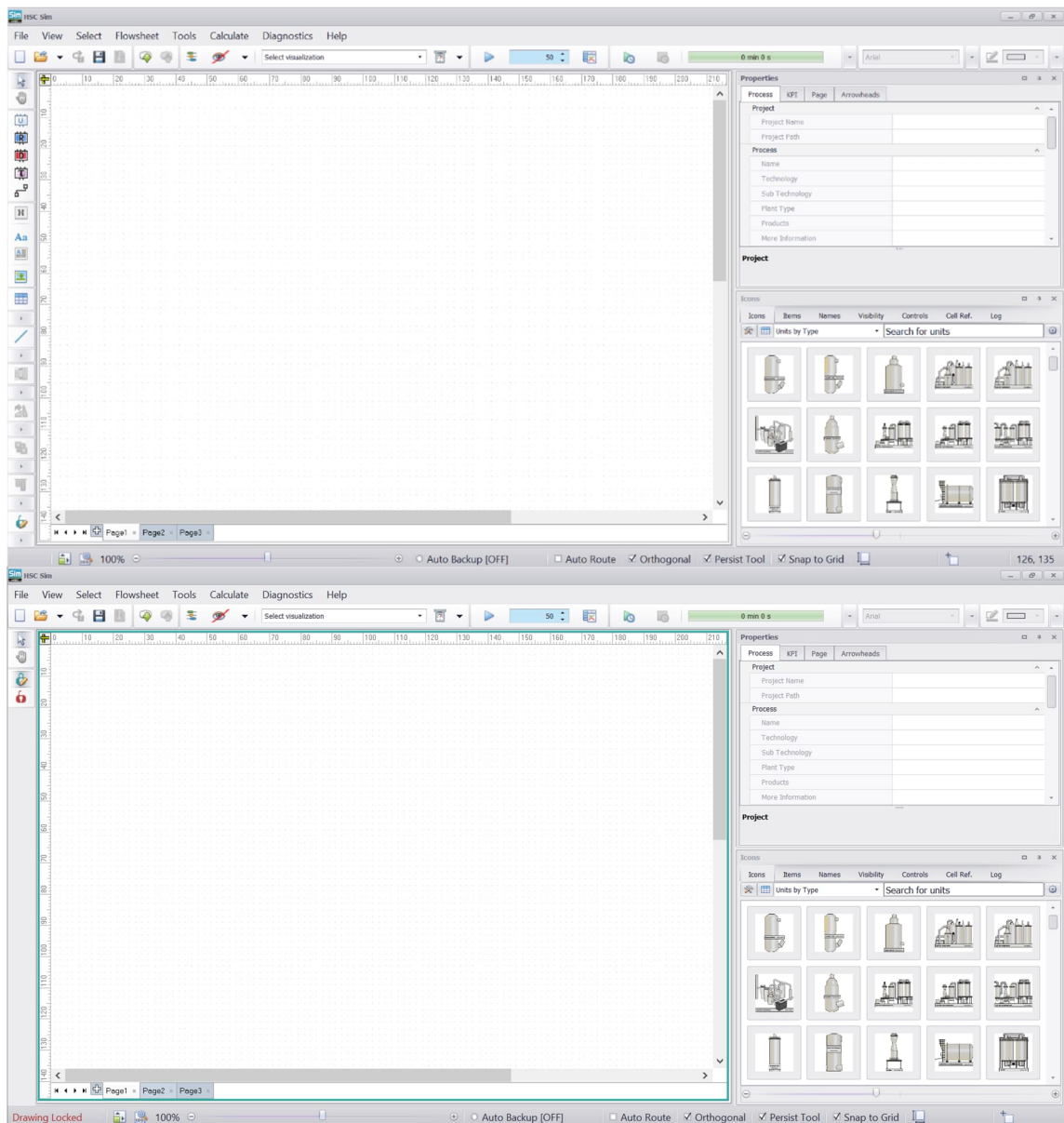


**Fig. 56.** With this section of the top toolbar, user can start a new or open an old process. It is also possible to save the process, save a backup, a zip file (archive) of the process or use the Model Base to download or upload models.



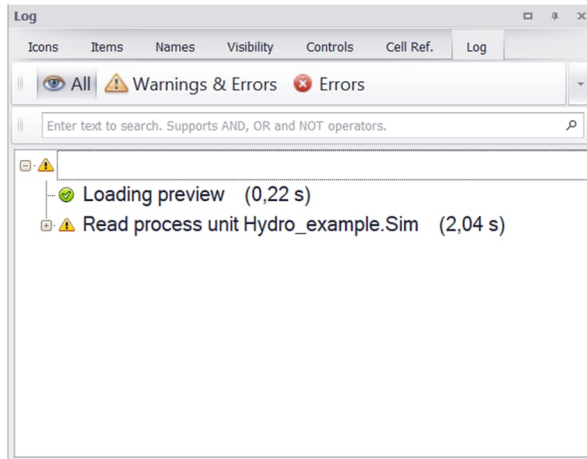
**Fig. 57.** Dynamic. With this toolbar the user can open the dynamic dialog, run/pause/stop the dynamic simulation, follow the simulation time, as well as empty the tanks in every unit (see also Chapter 55).



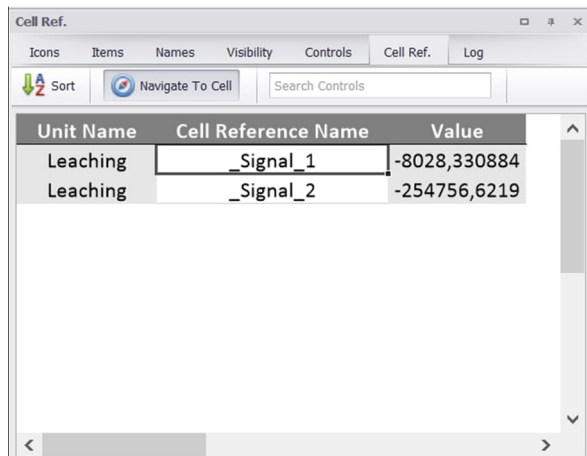


**Fig. 58.** Drawing lock on (Fig. 53) makes the drawing toolbars disappear and highlights the flowsheet frame in green (or red if the user locks the entire process).

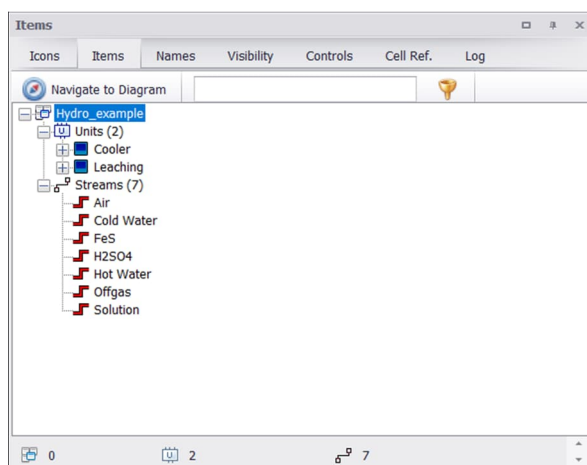
## 40.3.2. Docking bars



**Fig. 59.** Log viewer. This docking bar tool shows the user possible warnings and errors found during the simulation.



**Fig. 60.** Cell References. This docking bar tool shows the user possible Cell References and their location in the flowsheet. Same tool can be found from the calculate menu.



**Fig. 61.** Process Tree. In this docking bar the user sees the flowsheet as a process tree.

Control Name	Location	Active	Set Point	Measured	Control Variable	Type
Heat bal	Cooler	ON	0	-0,209	197,384	Internal
Acid conc.	Leaching	ON	1	0,997	10,097	Internal

**Fig. 62.** Unit Controls. In this docking bar, the user can check and modify the unit controls in the simulation.

**Properties - Unit Drawings**

Process: Drawings

**General**

Drawing Object Type: Rectangle

Page: Page1

Layer: Layer 0 (Default)

**Image**

Show Unit Image:

Unit Image: (none)

**Background**

Transparent:

**Drawing - InTitle**

Font Name: Arial

Font size: 8

Font Bold:

Font Italic:

Font Color: 0; 0; 0

InTitle Align Horizontal: Center

Text Align Vertical: Middle

**Drawing - Line**

Line Color: 0; 0; 0

Line Style: Solid

Line Width: 0,25

**Drawing - Fill**

Fill Color 1: 255; 255; 255

Fill Color 2: 166; 214; 255

**Properties - Unit Process**

Process: Drawings

**General**

Object Type: Unit

NameID: Leaching

Number/Alias: Leaching

Mode: Reactions (Hydro)

Type: Excel

Model: Chemical Reactions

Technology:

SubTechnology:

Availability%: 100

**Location**

Page: Page1

Layer: Layer 0 (Default)

**Visibility**

Unit:

Name Label:

Show Title Inside Unit:

**Fig. 63.** Properties - Unit Drawings and Process.

**Properties - Stream Drawings**

Process: Drawings

**General**

Drawing Object Type: Polyline

Page: Page1

Layer: Layer 0 (Default)

**Drawing - Line**

Line Color: 0; 0; 0

Line Style: Solid

Line Width: 0,25

**Drawing - Arrows**

Auto Arrow End Update:

Arrow Color: 0; 0; 0

Start Arrow Head Style: None

Start Arrow Size: 3

Start Arrow Fill Color: 255; 255; 255

End Arrow Head Style: Triangle

End Arrow Size: 3

End Arrow Fill Color: 255; 255; 255

**Drawing - Shadow**

Shadow Style: None

**Properties - Stream Process**

Process: Drawings

**General**

Object Type: Stream

NameID: Solution

Number/Alias: Solution

Source: Leaching

Destination: ?

Has Duplicates:

**Location**

Page: Page1

Layer: Layer 0 (Default)

**Visibility**

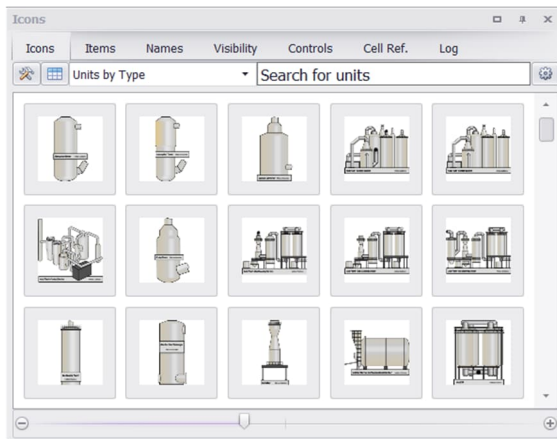
Stream:

Name Label:

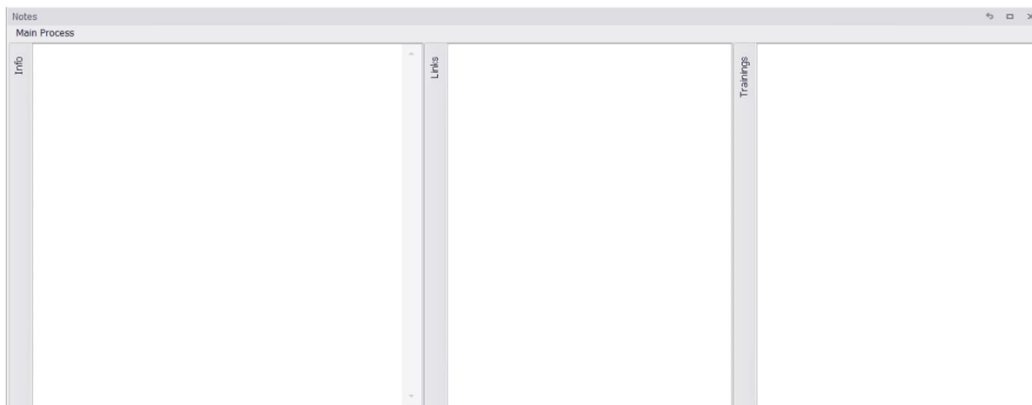
Value Label:

Stream Table:

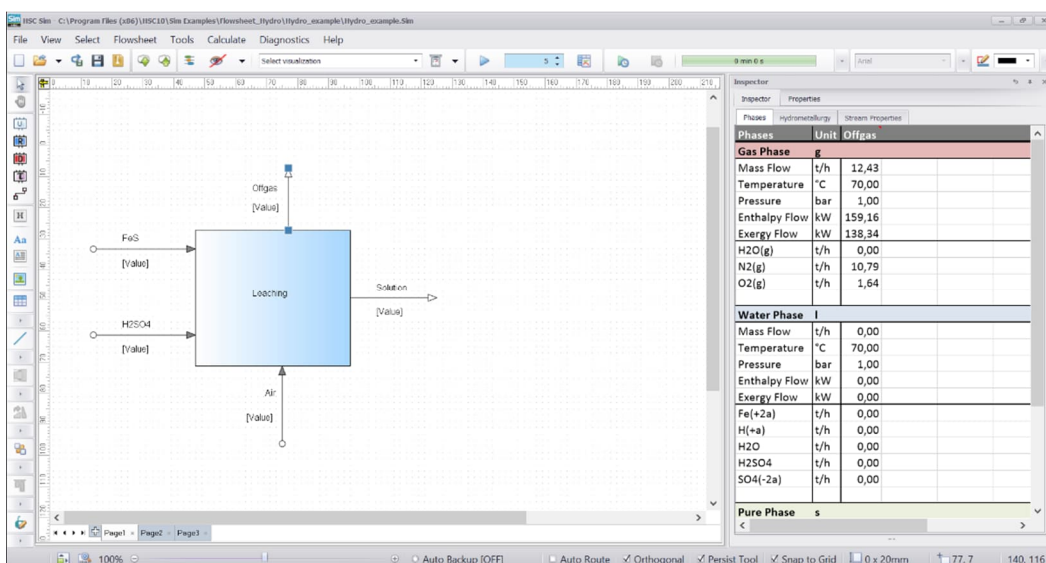
**Fig. 64.** Properties - Stream Drawings and Process



**Fig. 65.** Unit Icons (Icons). With this docking bar tool user can add Unit pictures to the flowsheet. The unit pictures are of generic type (see section 40.2.2). The user can switch the view, browse picture location, search by name, or change directory (top bar) or zoom icons (bottom bar).

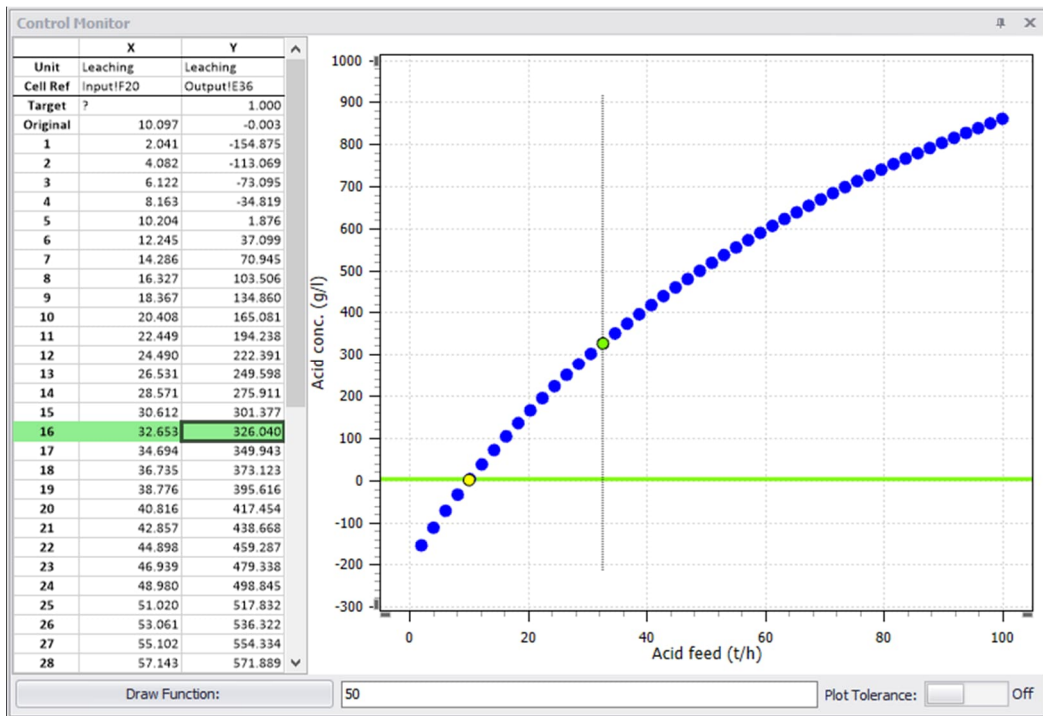


**Fig. 66.** Tools...Notes. The user can add notes, for example instructions on how to use the flowsheet here.



**Fig. 67.** Flowsheet...Inspector (Stream Viewer). In this docking bar tool the user can see a tabulated summary of the stream properties.





**Fig. 70.** View...Toolbars...Control monitor. Click Draw Function to visualize how **run control** is reached.



#### 40.4. Importing HSC Sim 7 models (HSC Sim 6 models are not supported)

In HSC Sim there is a built-in support for importing HSC Sim 7 models and then using them in Sim. However, there are some points and limitations that the user should take into consideration when importing Sim 7 models into Sim. If points listed here do not help please contact the developers.

##### Major points:

- Sim calculations have dramatically stricter error checks than Sim 7. When the user imports an old model and tries to run it, often the calculation will notify of an error in the flowsheet. The user can locate the errors using the log viewer and then fix them manually.
- There are some changes in the Sim hydro variable list logic when compared to Sim 7. If the imported model variable list contains species not found in the database, the user needs to go through them case by case in the Sim variable list editor. The user can add entries to the database, use a different database entry, or delete the species from the variable list to fix this (see Chapter 43, section 43.2.1).
- Sim 7 solvent extraction hydro Excel Wizards are no longer supported in Sim. If the imported model contains them in Sim, the user will not be able to run the model successfully.
- There is a completely new DLL unit operation system in Sim, which has been implemented for some Mineral Process unit operation models. Sim has partial support for using old Sim 7 minpro Excel Wizard models and the user should be able to run calculations for the imported Sim 7 minpro Excel Wizards. However, the user cannot currently edit or make the Excel Wizards for the old minpro models. If users want to edit their old mineral process models, they should replace the old minpro Excel Wizards with the new DLL models.

##### Minor points:

- Sim uses different Stream Tables than Sim 7. Because of this, users cannot edit Sim 7 Stream Tables in Sim but they can make new ones using Sim tools.
- The visibility of the connected streams is forced on for input and output streams in Sim. If there are any such streams hidden in the imported Sim 7 model, they will appear in Sim.
- A few drawing objects like a Bézier curve are not supported in the first version of Sim.
- In some rare cases, Sim does not recognize Sim 7 stream connections correctly. Information about this will be given in the import log. Afterwards the user should manually confirm the notified stream connections.
- In Sim 7, the user had the possibility to encrypt some units. This function is no longer supported in Sim, which means those units will not be loaded during the import.
- External workbook references work differently in Sim 7 and Sim. When user imports a Sim 7 model, all external references are changed and will include "REF" at the beginning of the reference.
- Sim 7 used automatically safe division for all division operations in the workbook. This meant that, for example, 0/0 did not give an error as the answer. Sim adds the "safediv" function to division operations.
- Sim will change the sheet names of the workbook if the sheet contains illegal characters like "/".

## 40.5. Fixes for typical Sim problems

### Make it easier to read what's on your screen

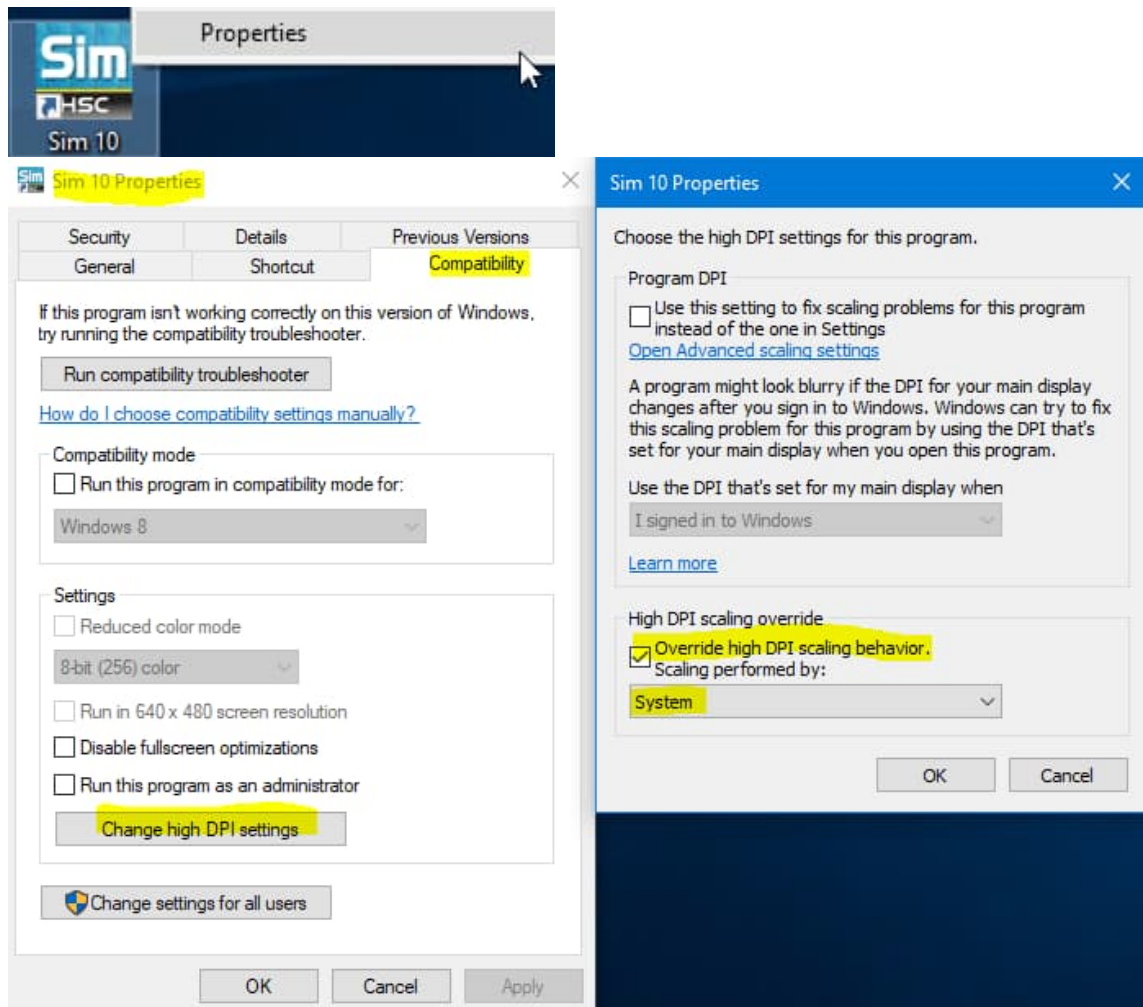
You can change the size of text and other items on your screen by choosing one of these options. To temporarily enlarge just part of the screen, use the [Magnifier](#) tool.

- Smaller - 100% (default)
- Medium - 125%
- Larger - 150%

Preview



**Fig. 71.** If you use text and other items size that is larger than 100 % you may have problems of drawing flowsheets in Sim.



**Fig. 72.** Solution to window resize problem in Sim. You need to check “Disable display scaling on high DPI settings” or “Override high DPI scaling behavior” from Sim properties.