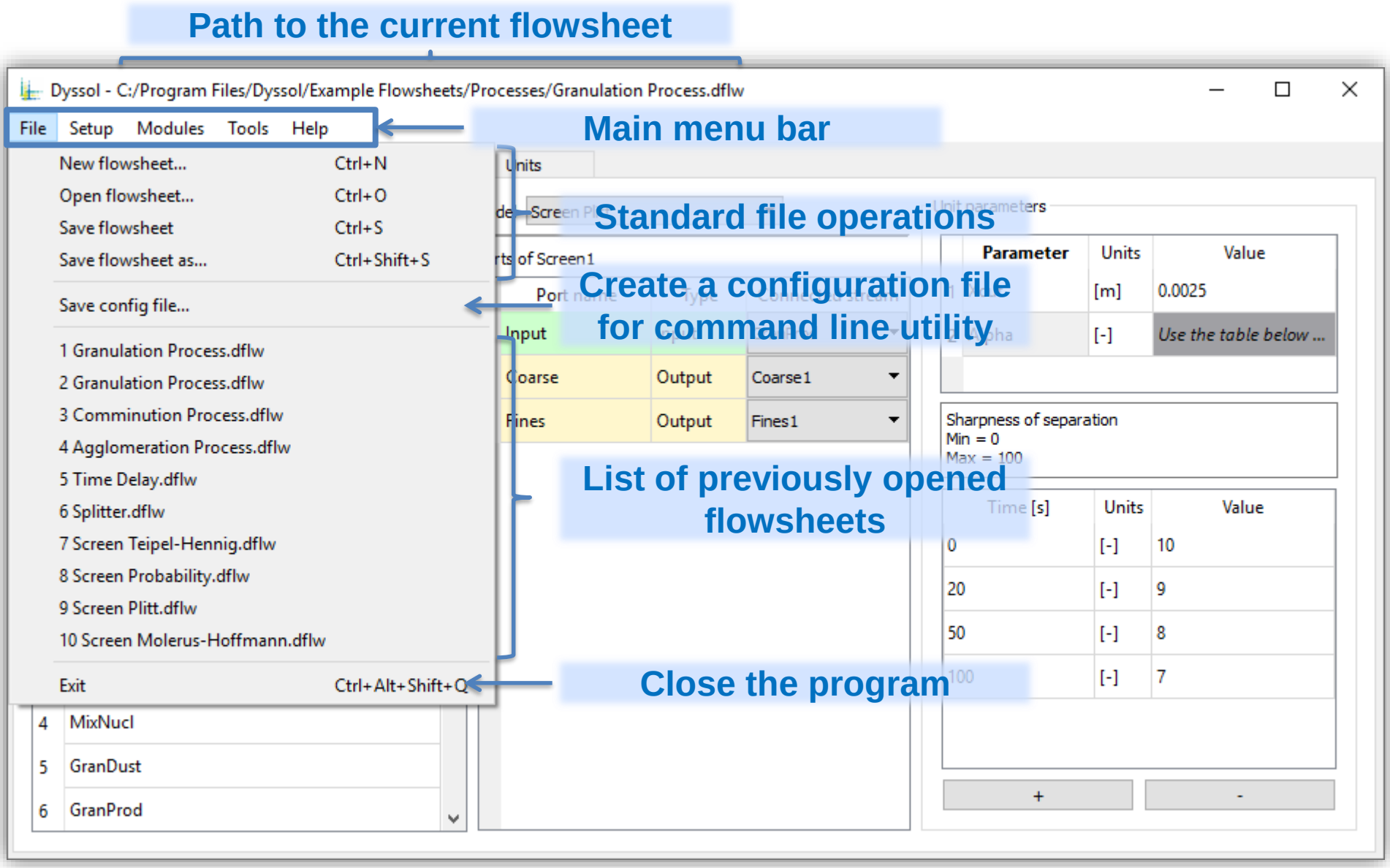
Dynamic flowsheet simulation system Dyssol

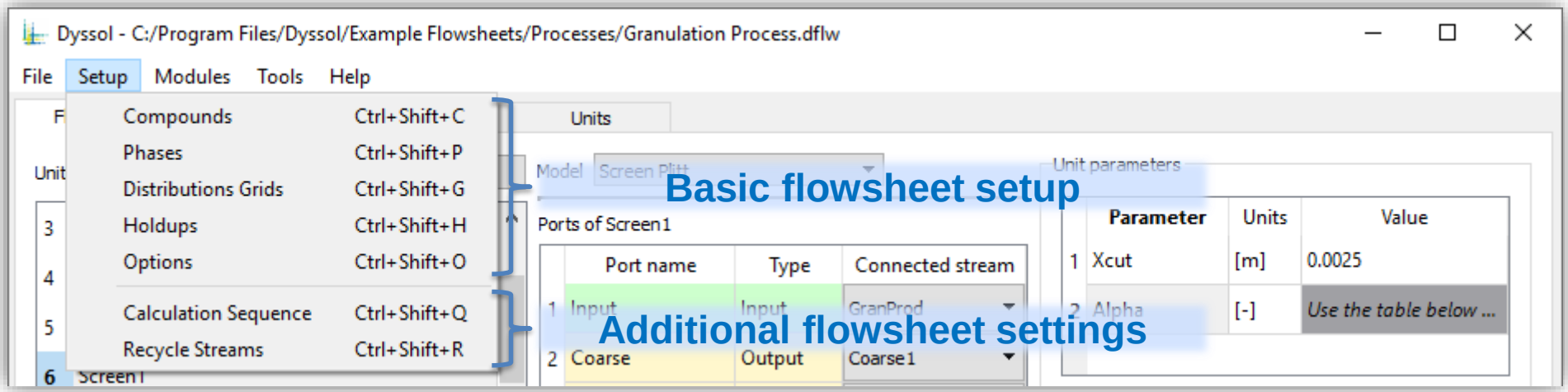
User Interface

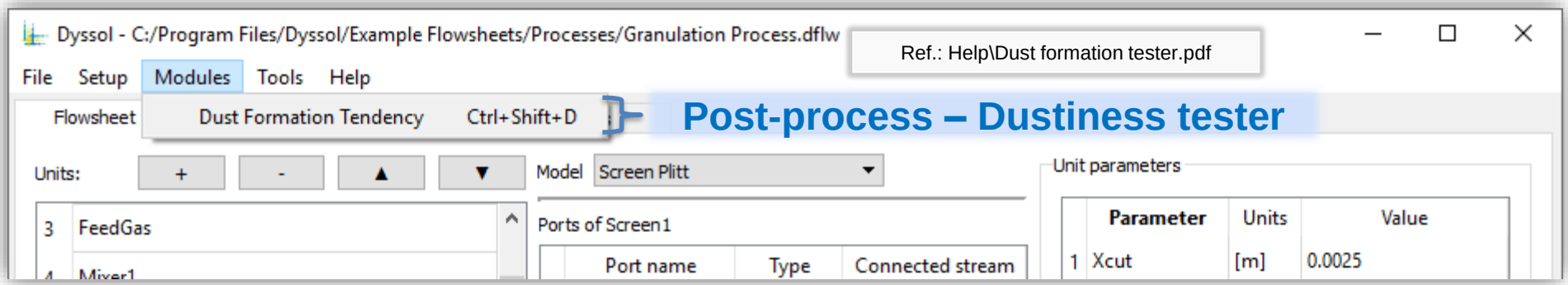
User interface

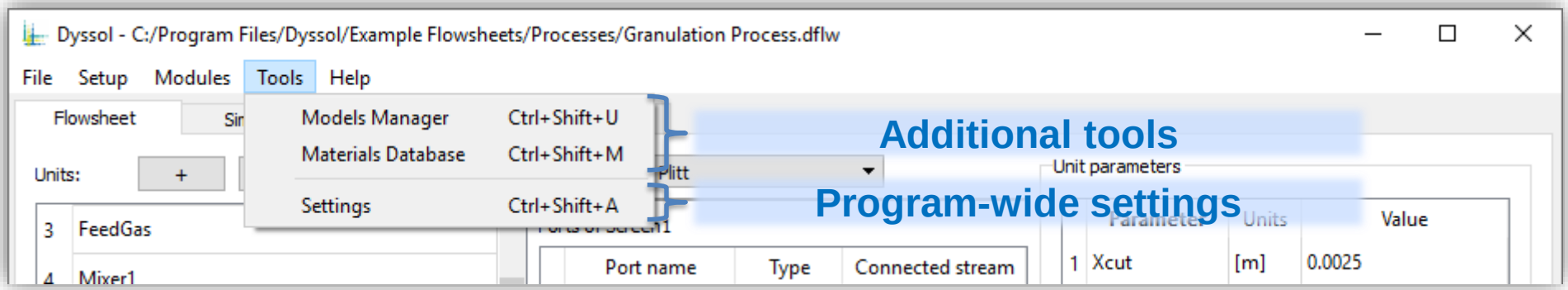

Path to the current flowsheet
Dyssol - C:/Program Files/Dyssol/Example Flowsheets/Processes/Granulation Process.dflw
File
Setup
Modules
Tools
Help
Main menu bar
New flowsheet... Ctrl+N
Open flowsheet... Ctrl+O
Save flowsheet Ctrl+S
Save flowsheet as... Ctrl+Shift+S
Standard file operations
Save config file...
Create a configuration file for command line utility
1 Granulation Process.dflw
2 Granulation Process.dflw
3 Comminution Process.dflw
4 Agglomeration Process.dflw
5 Time Delay.dflw
6 Splitter.dflw
7 Screen Teipel-Hennig.dflw
8 Screen Probability.dflw
9 Screen Plitt.dflw
10 Screen Molerus-Hoffmann.dflw
List of previously opened flowsheets
Exit Ctrl+Alt+Shift+Q
Close the program
Units
Parameter
Units
Value
[m]
0.0025
[-]
Use the table below ...
Sharpness of separation
Min = 0
Max = 100
Time [s]
Units
Value
0
[-]
10
20
[-]
9
50
[-]
8
100
[-]
7
Input
Coarse
Output
Coarse1
Fines
Output
Fines1
4 MixNucl
5 GranDust
6 GranProd
+
-

Main window

Menu entries

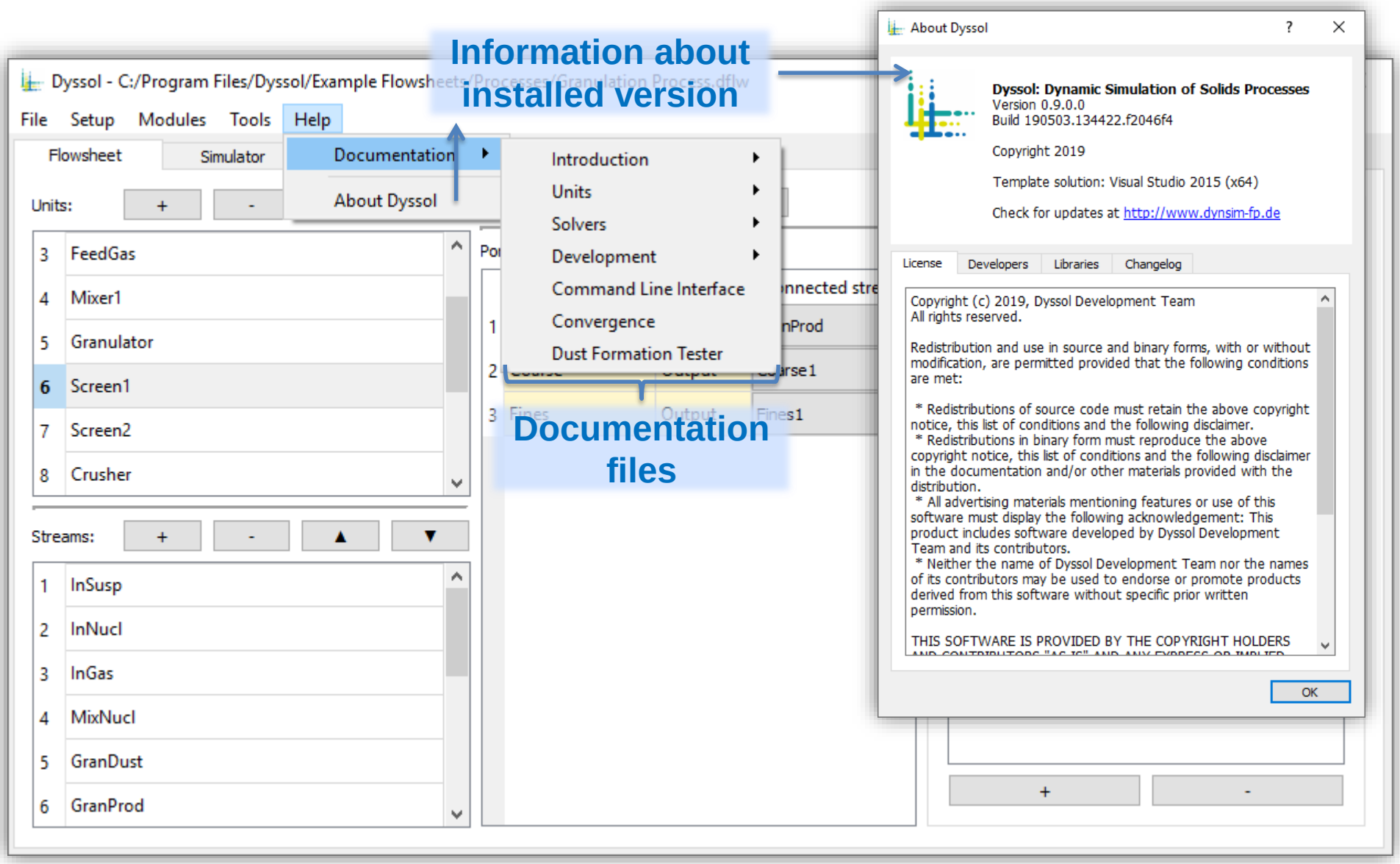






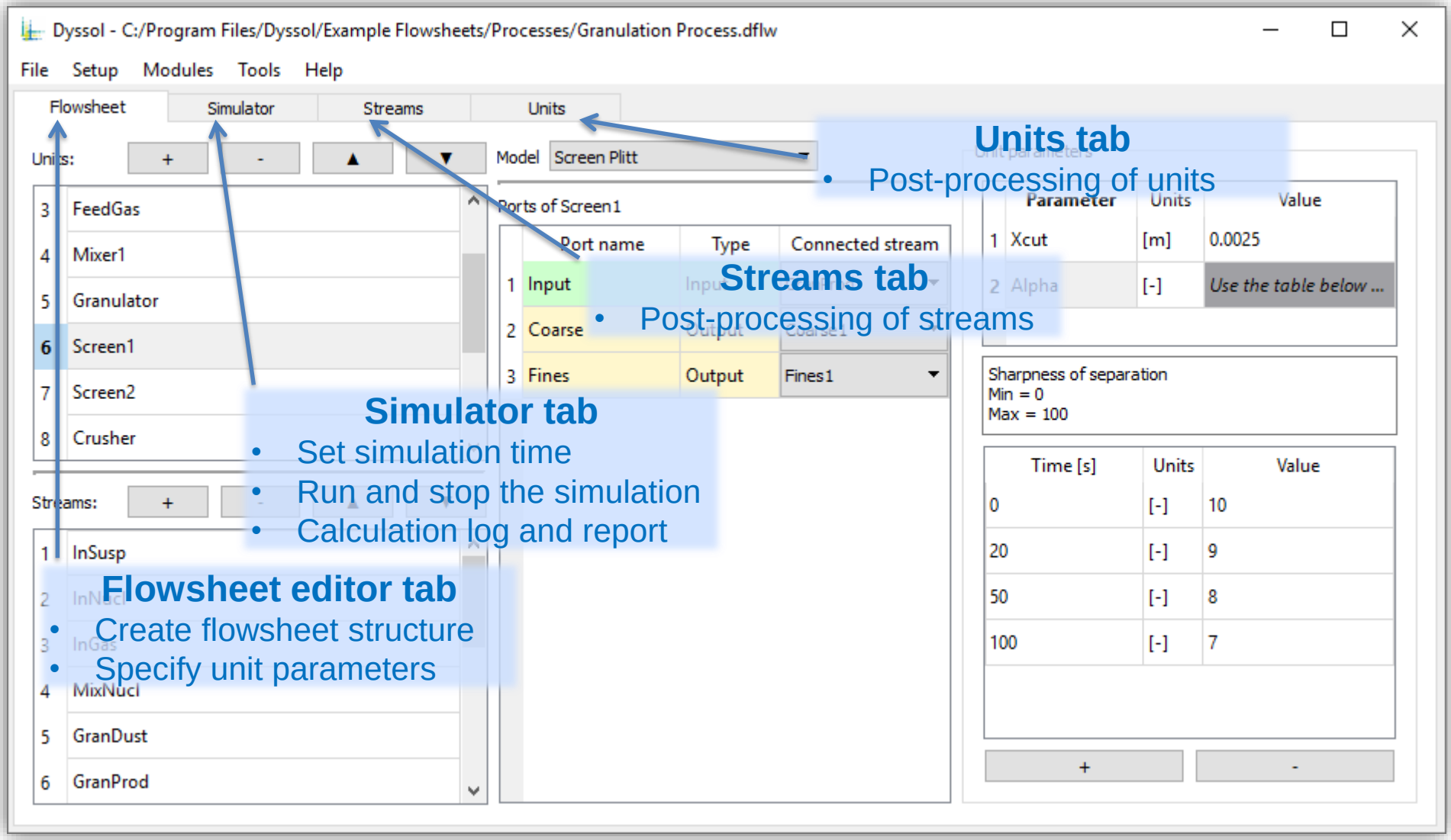
Main window

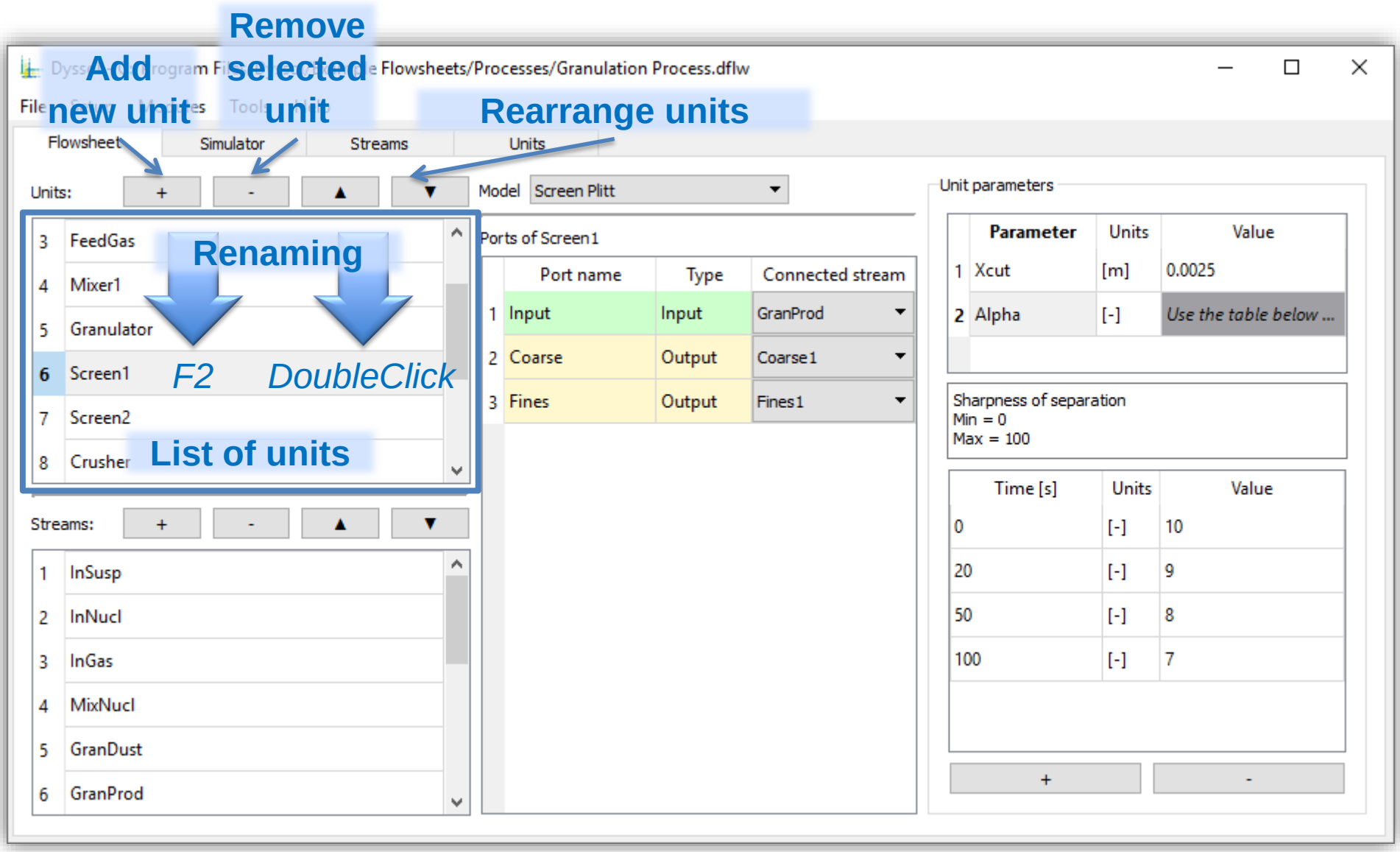
Help menu



Main window

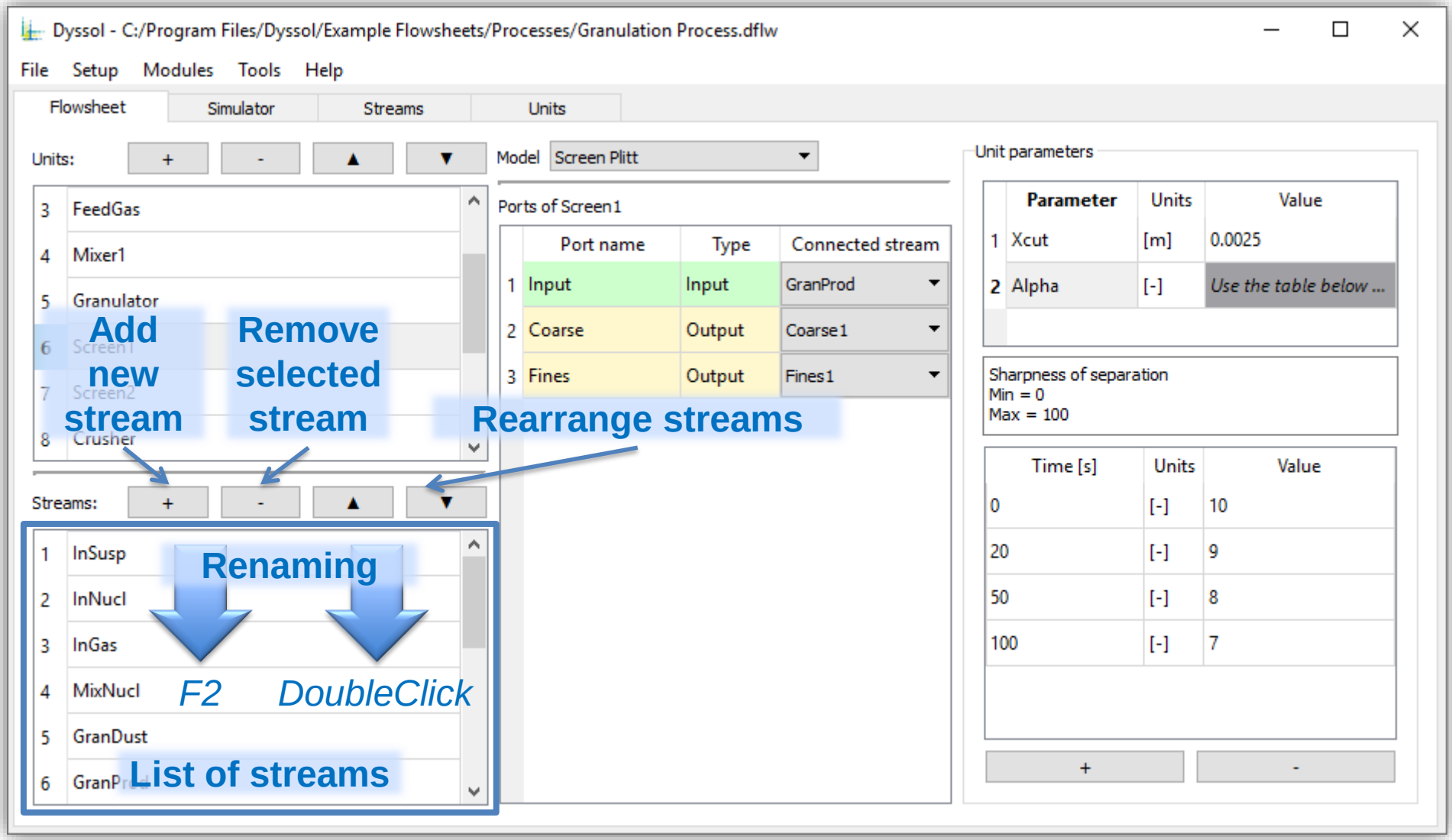
Tabs




Add new unit
Remove selected unit
Rearrange units
Flowsheets/Processes/Granulation Process.dflw
Flowsheet
Simulator
Streams
Units
Units:
+
-
▲
▼
Model
Screen Plitt
3 FeedGas
4 Mixer1
5 Granulator
6 Screen1
7 Screen2
8 Crusher
Renaming
F2
DoubleClick
List of units
Streams:
1 InSusp
2 InNucl
3 InGas
4 MixNucl
5 GranDust
6 GranProd
Ports of Screen1
Port name
Type
Connected stream
1 Input Input GranProd
2 Coarse Output Coarse1
3 Fines Output Fines1
Unit parameters
Parameter
Units
Value
1 Xcut [m] 0.0025
2 Alpha [-] Use the table below ...
Sharpness of separation
Min = 0
Max = 100
Time [s]
Units
Value
0 [-] 10
20 [-] 9
50 [-] 8
100 [-] 7
+
-

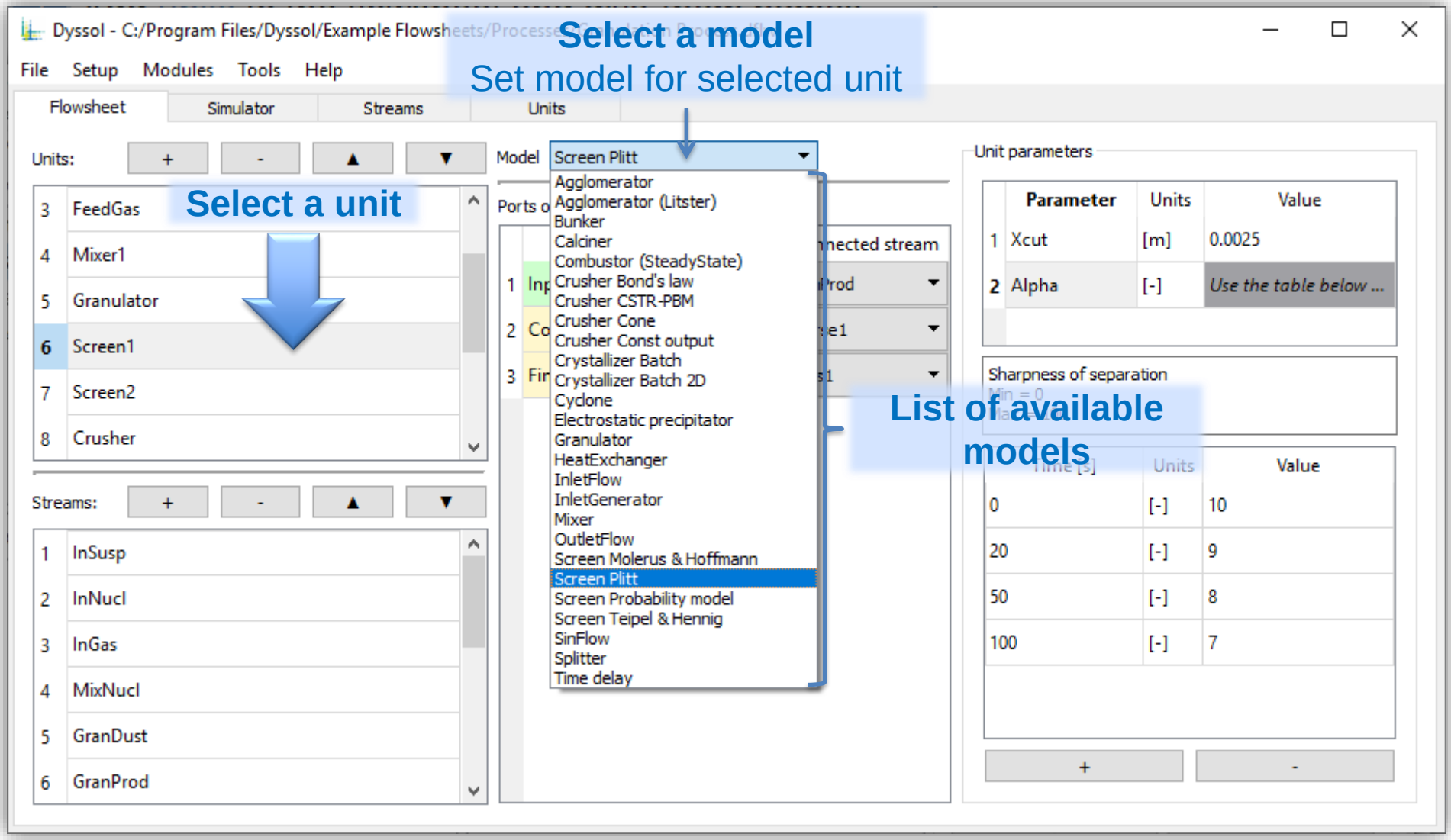
Flowsheet tab

Streams



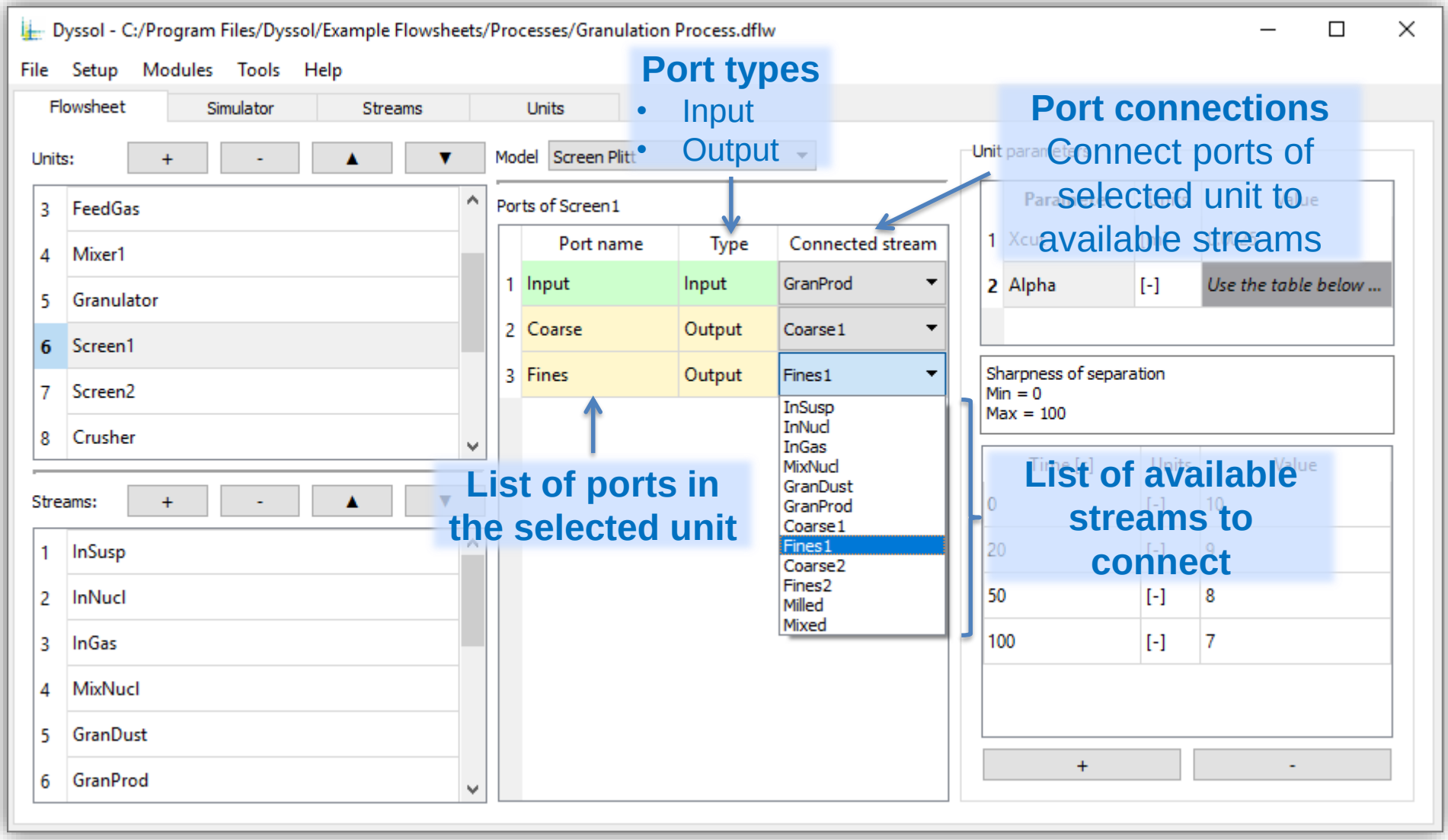
Flowsheet tab

Model selection



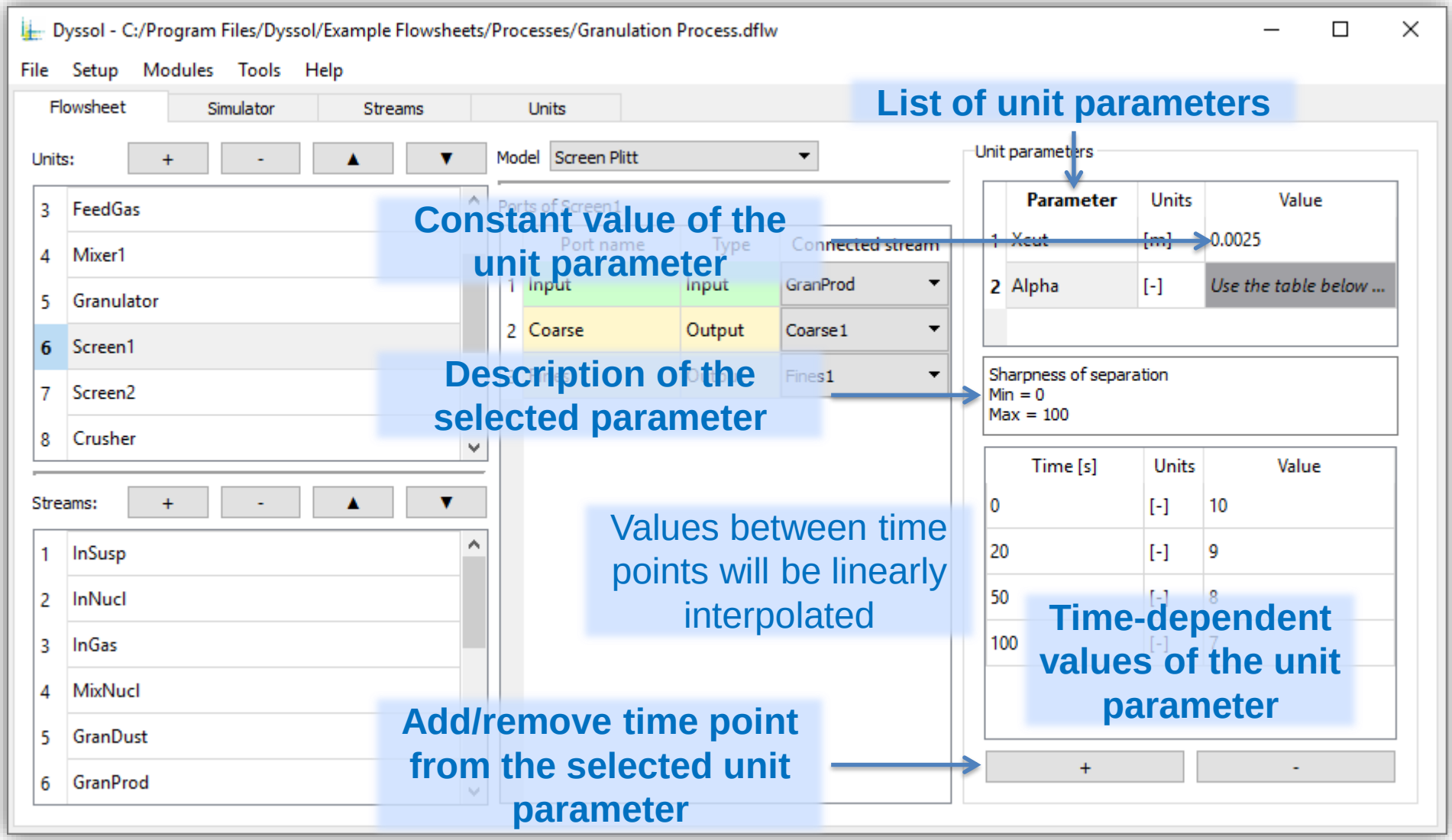
Flowsheet tab

Ports connection



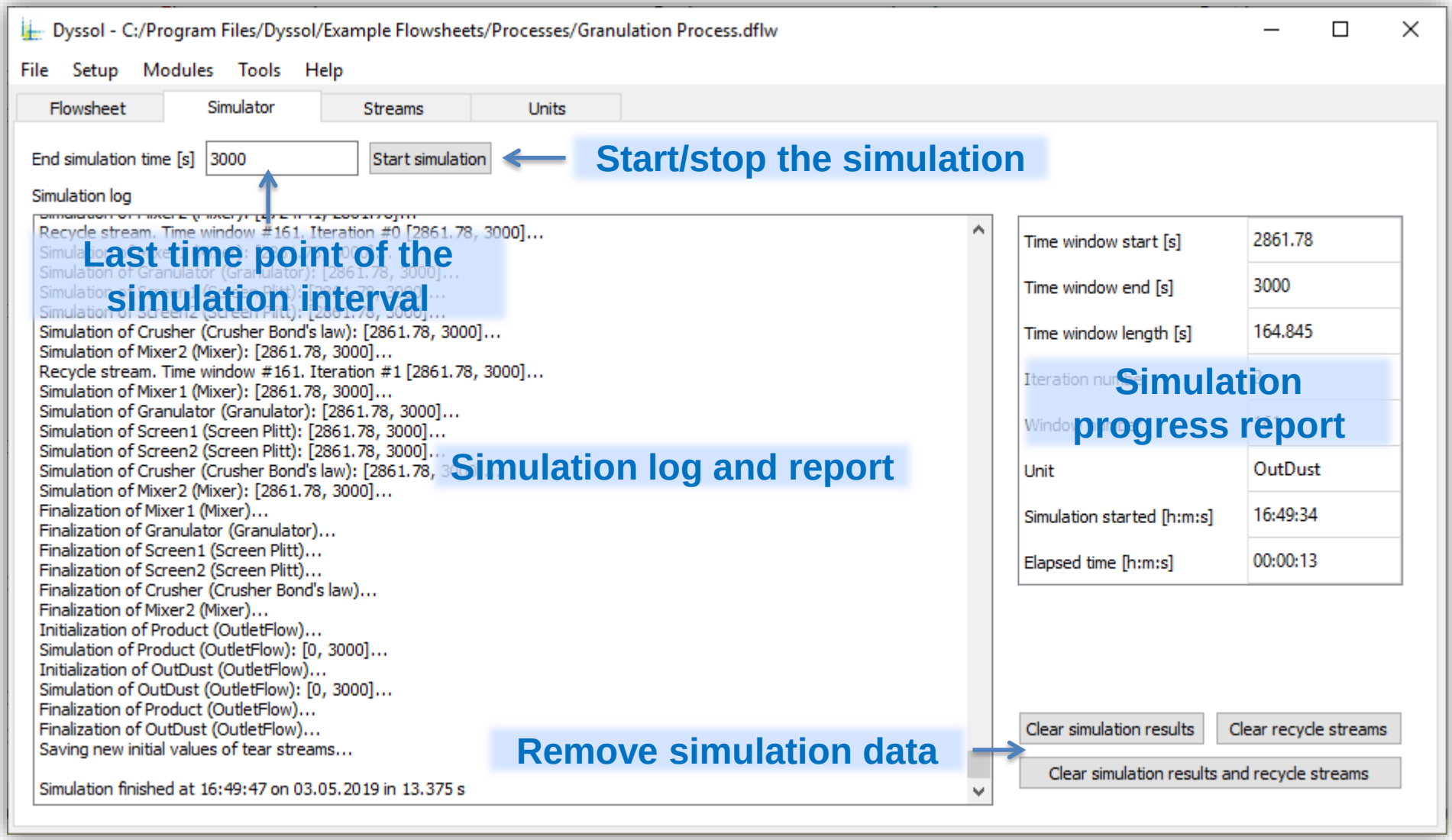
Flowsheet tab

Unit parameters



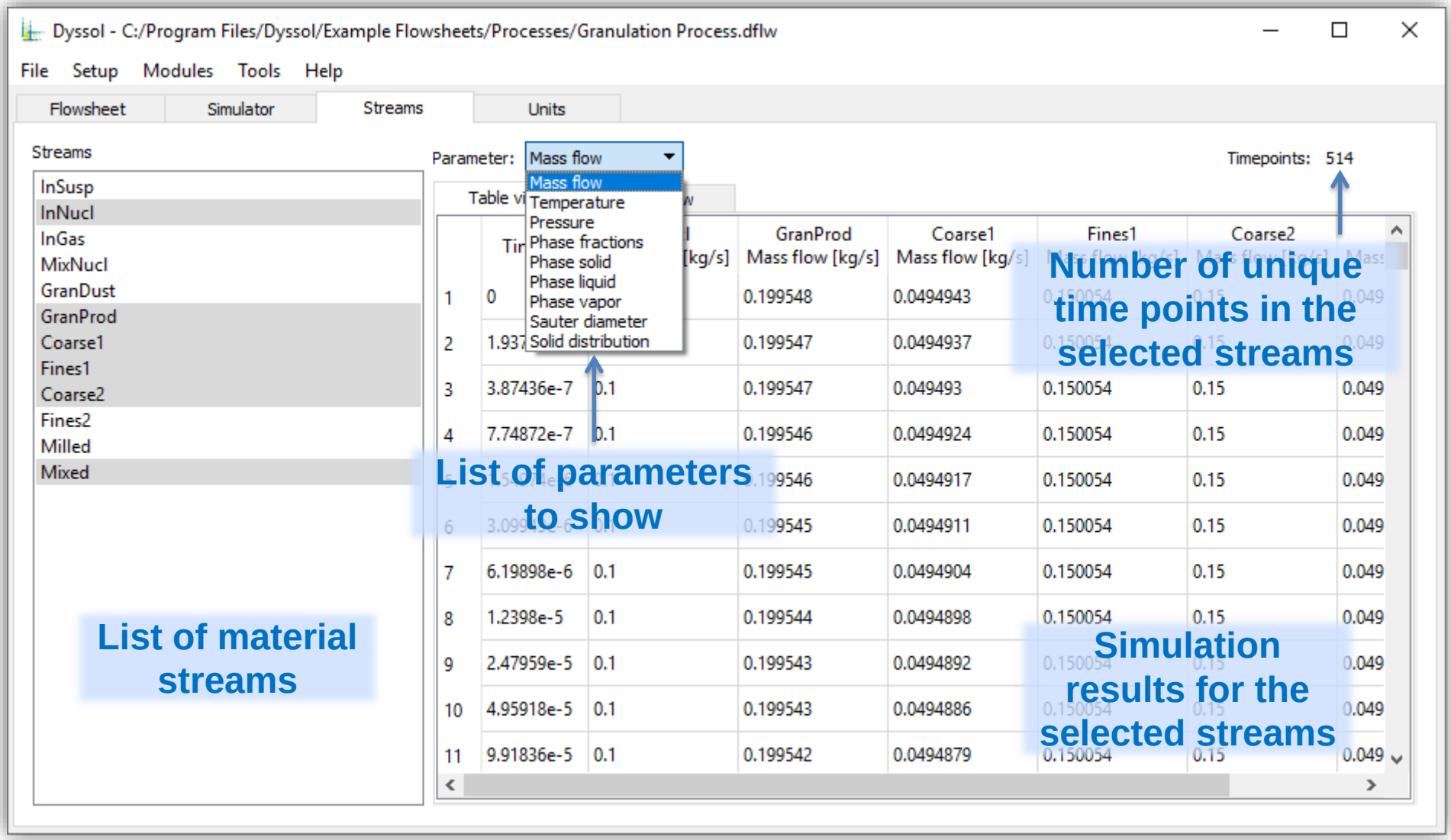
Simulator tab

Main controls



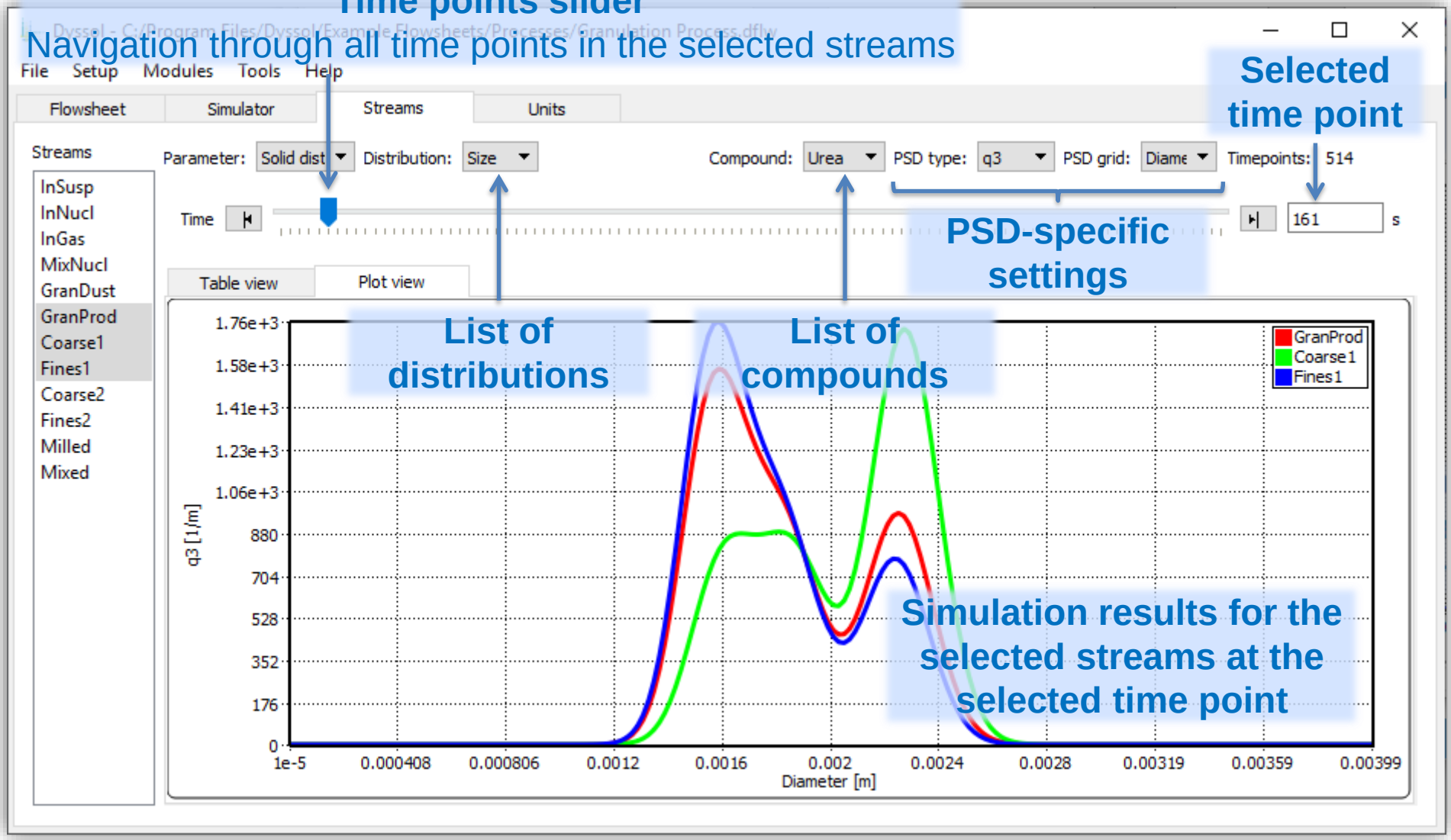
Streams tab

Table view



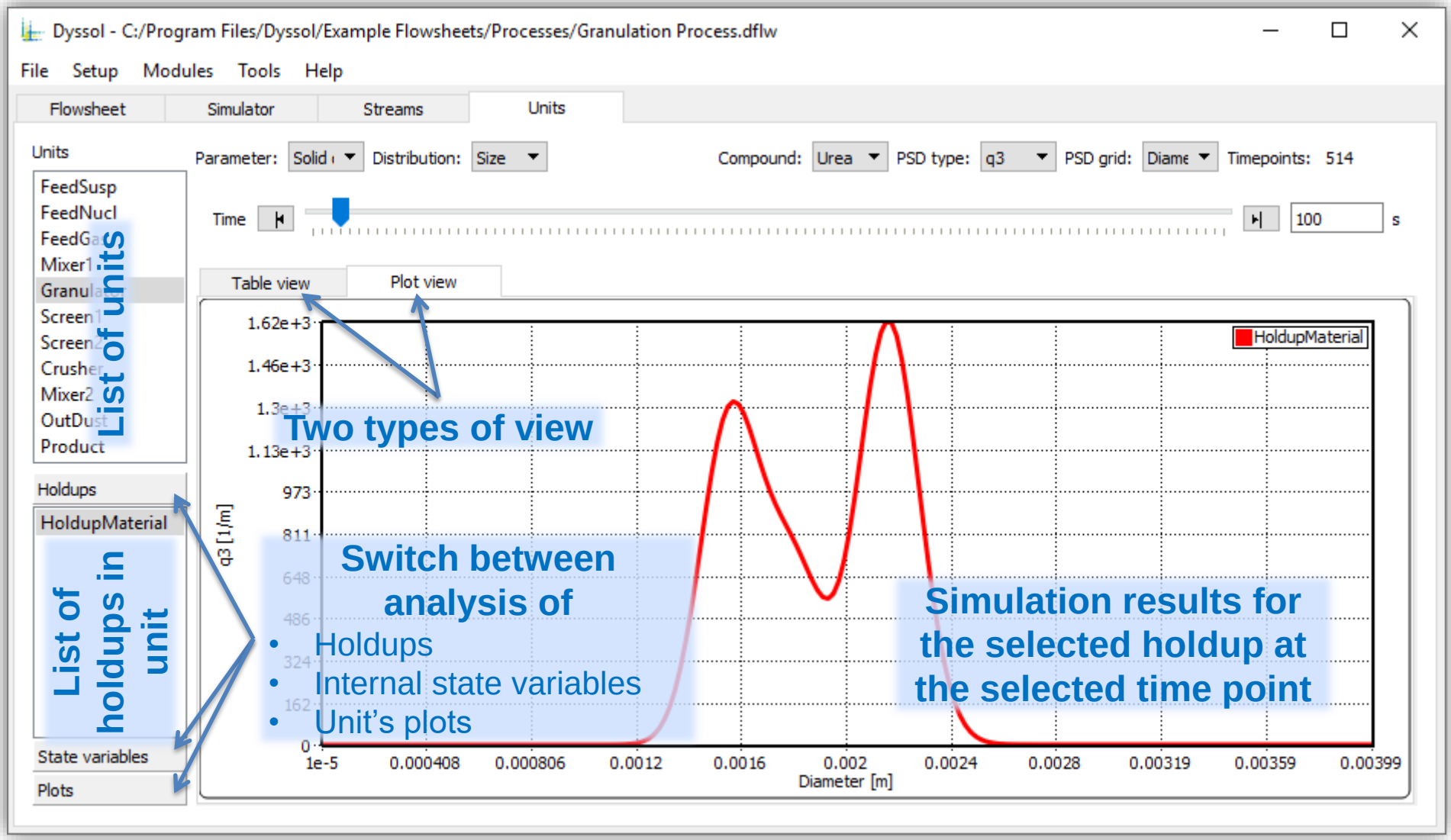
Streams tab

Plot view



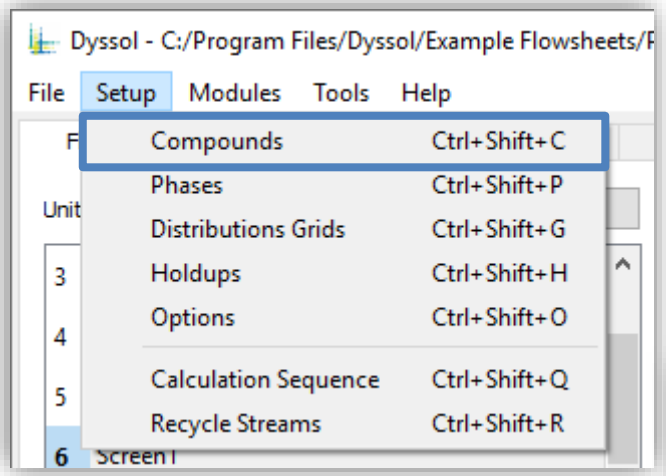
Units tab

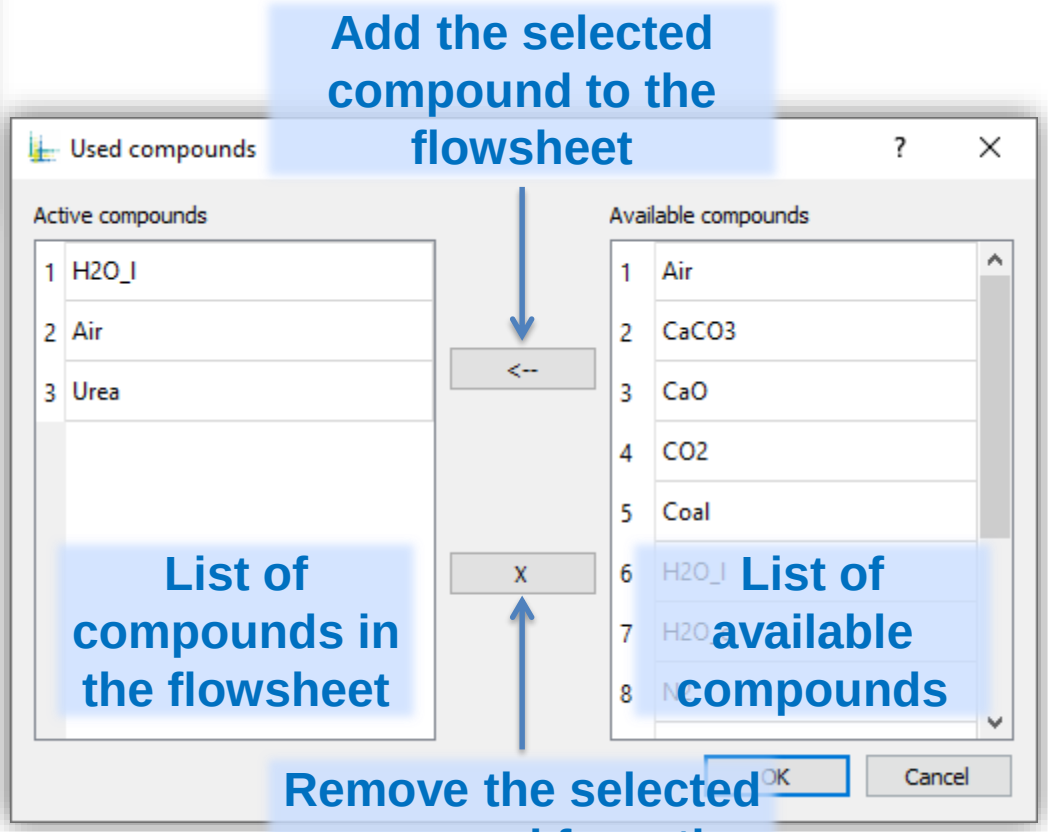
Main controls



Flowsheet setup

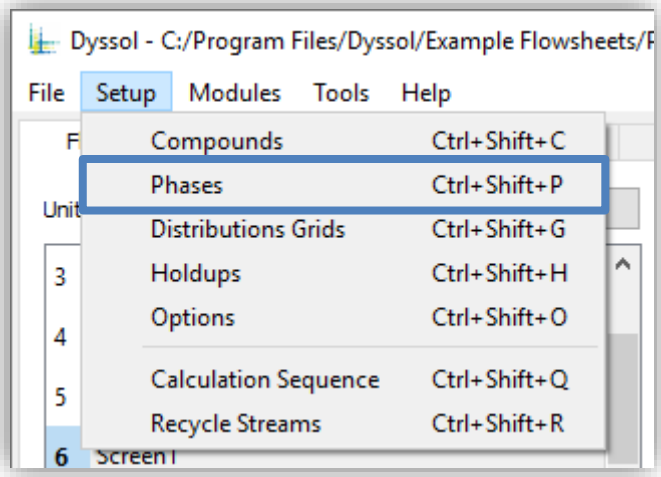
Compounds





Flowsheet setup

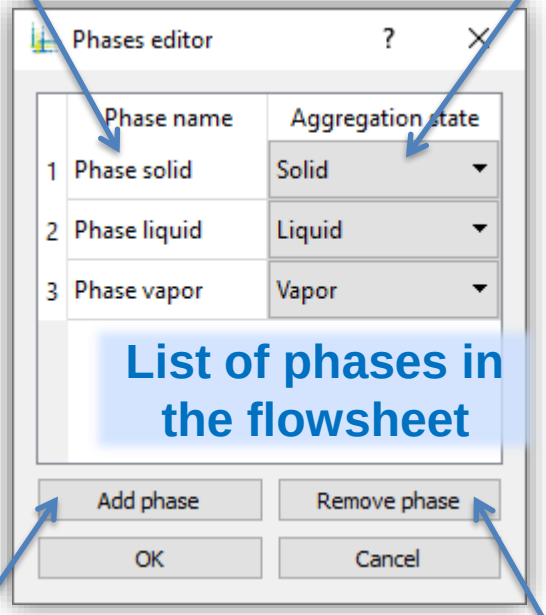
Phases editor



Aggregation state

- Solid
- Liquid
- Gas

Phase name



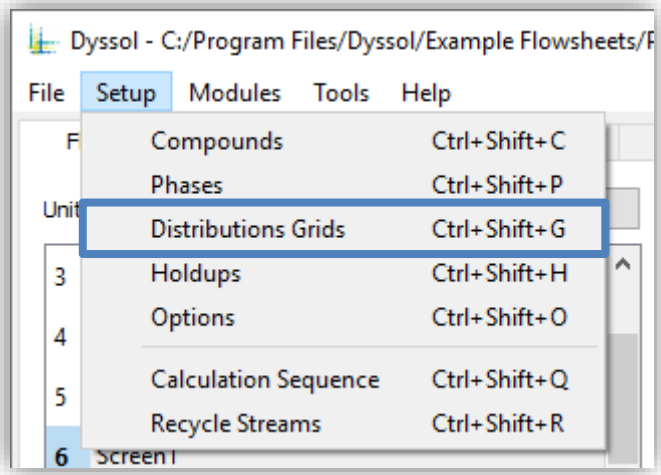
List of phases in the flowsheet

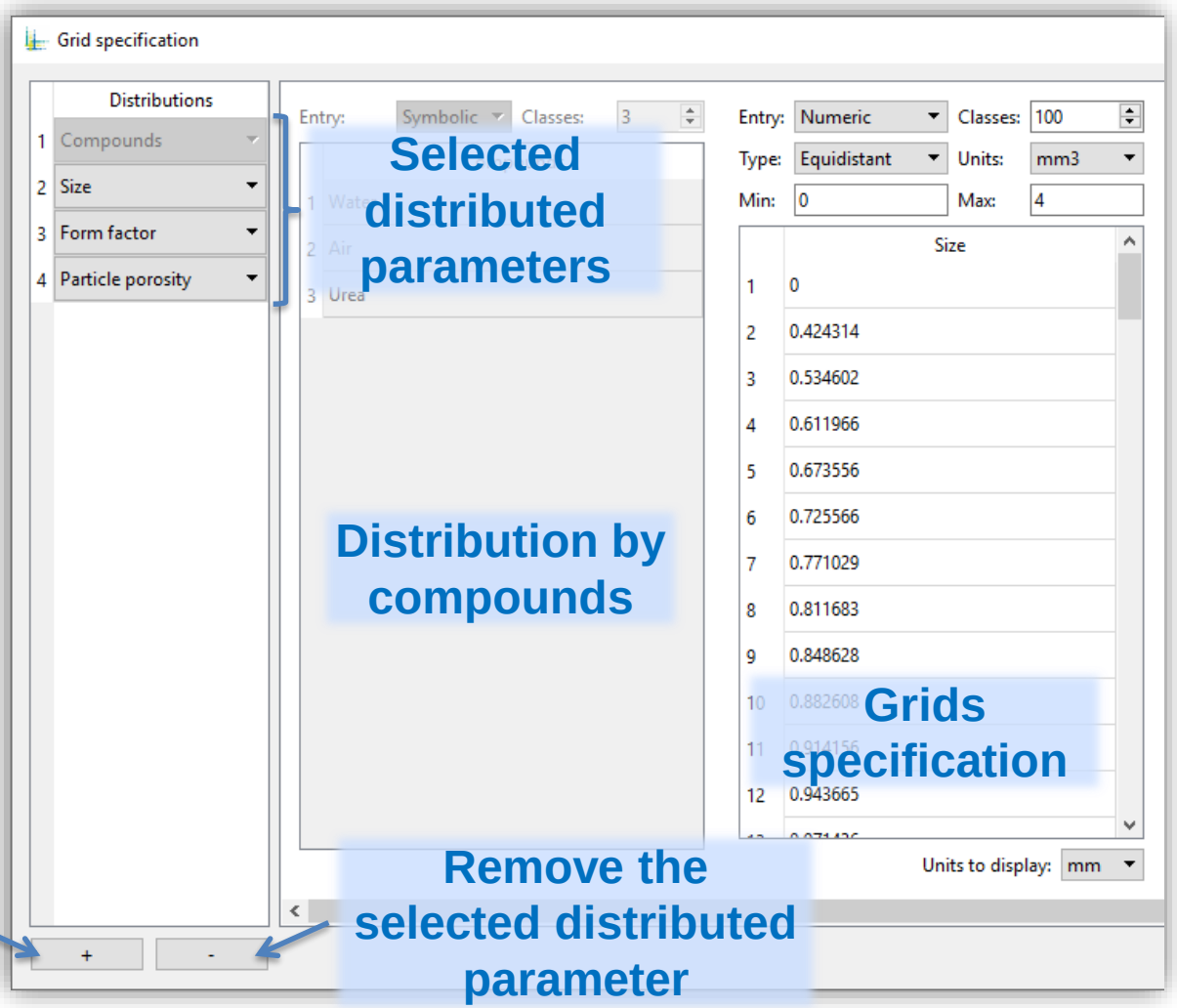
Add new phase to the flowsheet

Remove the selected phase from the flowsheet

Flowsheet setup

Grids specification





Selected distributed parameters

Distribution by compounds

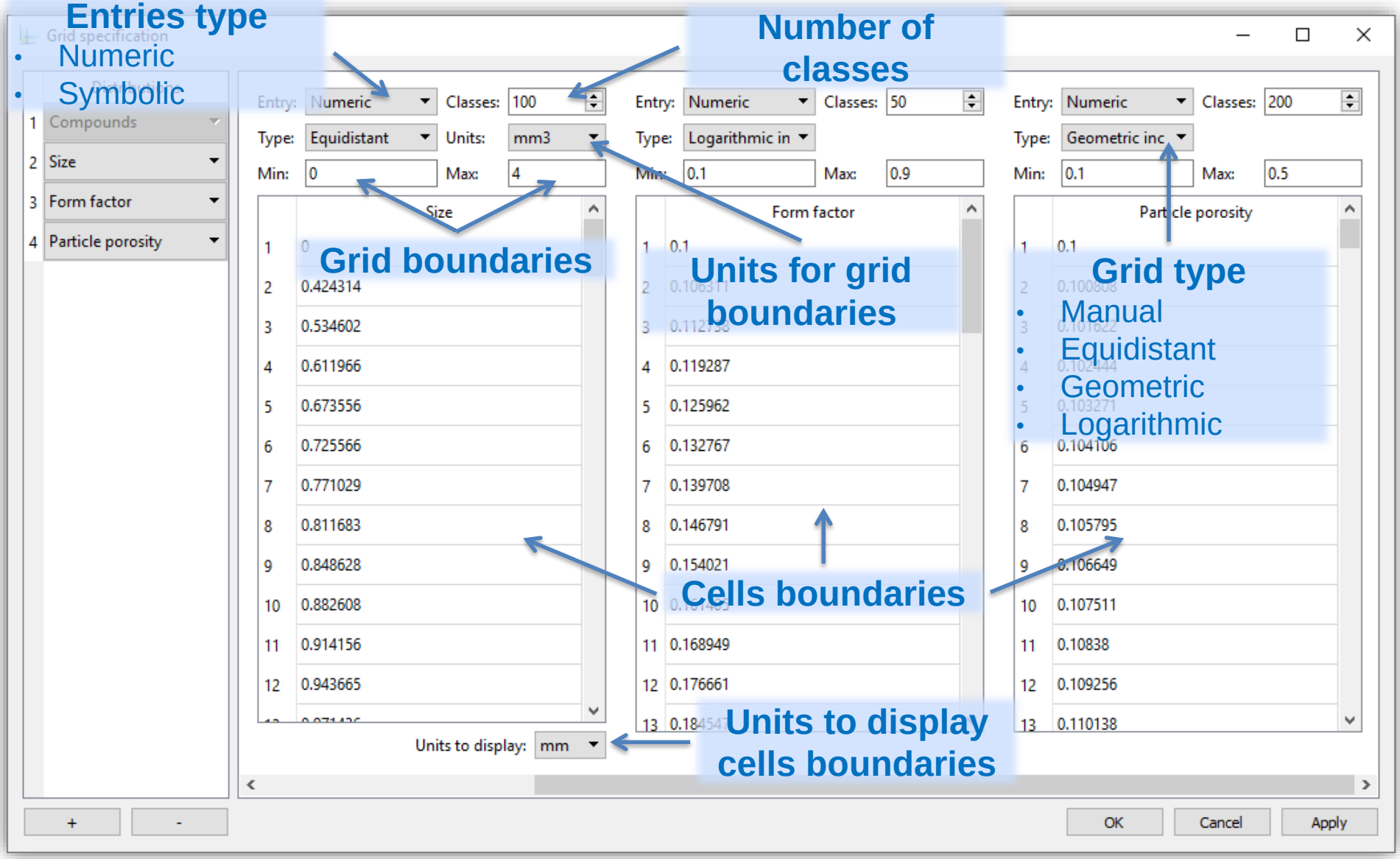
Grids specification

Add distributed parameter

Remove the selected distributed parameter

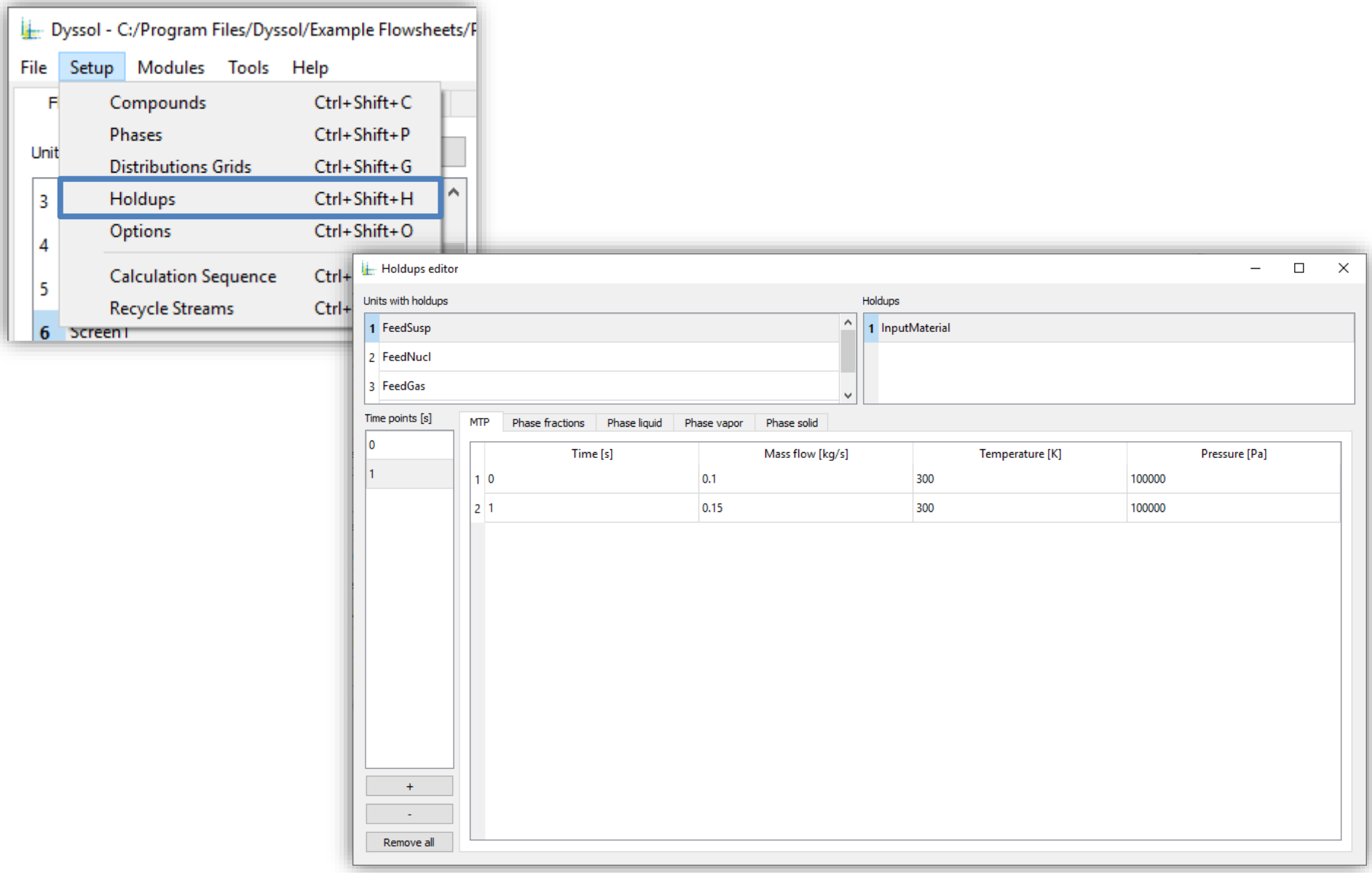
Flowsheet setup

Grids specification



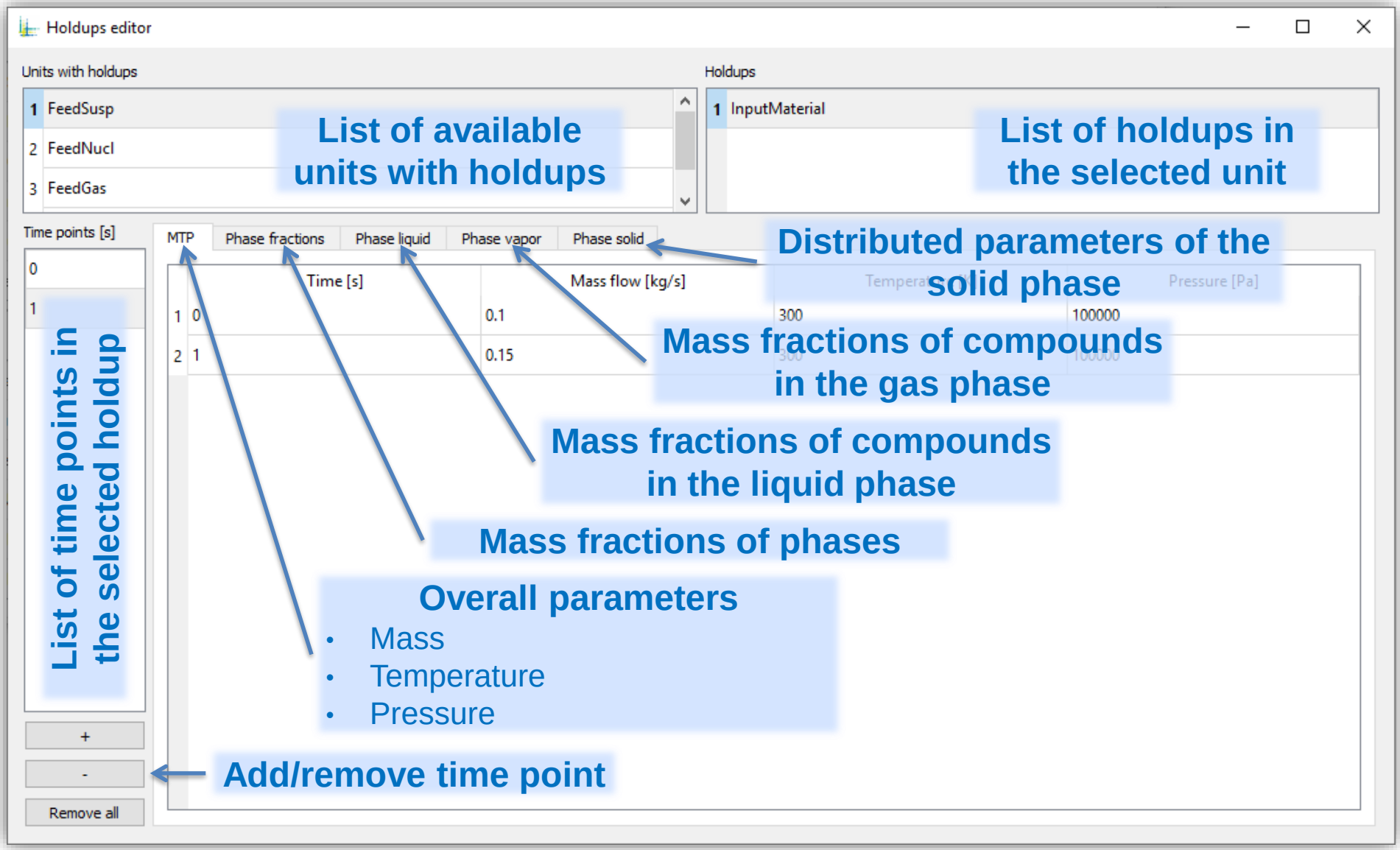
Flowsheet setup

Holdups editor



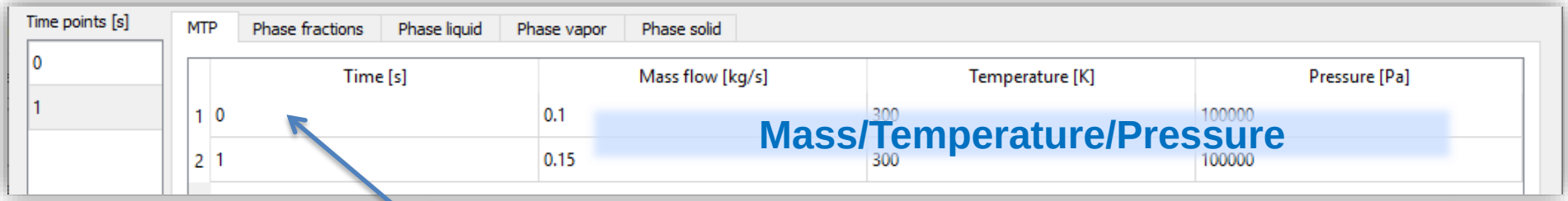
Flowsheet setup

Holdups editor – Main controls

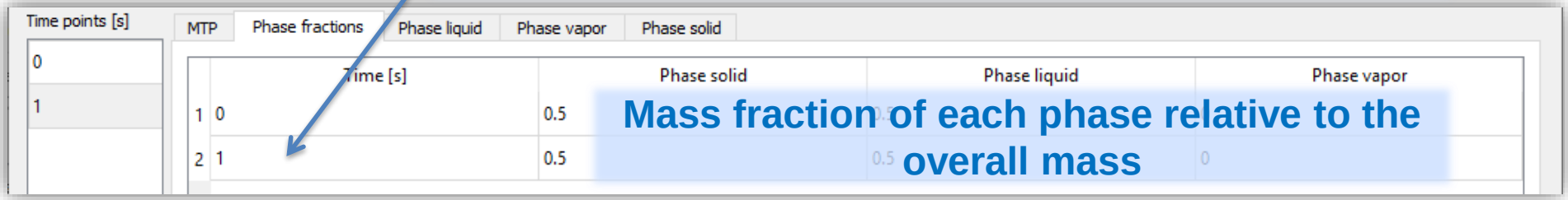


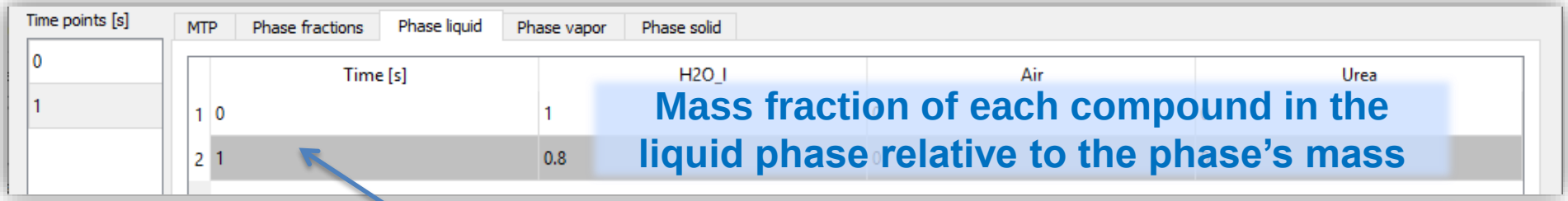
Flowsheet setup

Holdups editor – Concentrated parameters

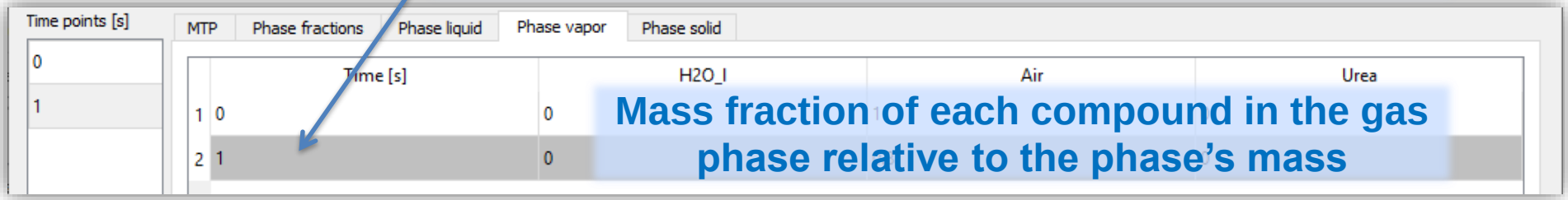


Values between time points will be linearly interpolated



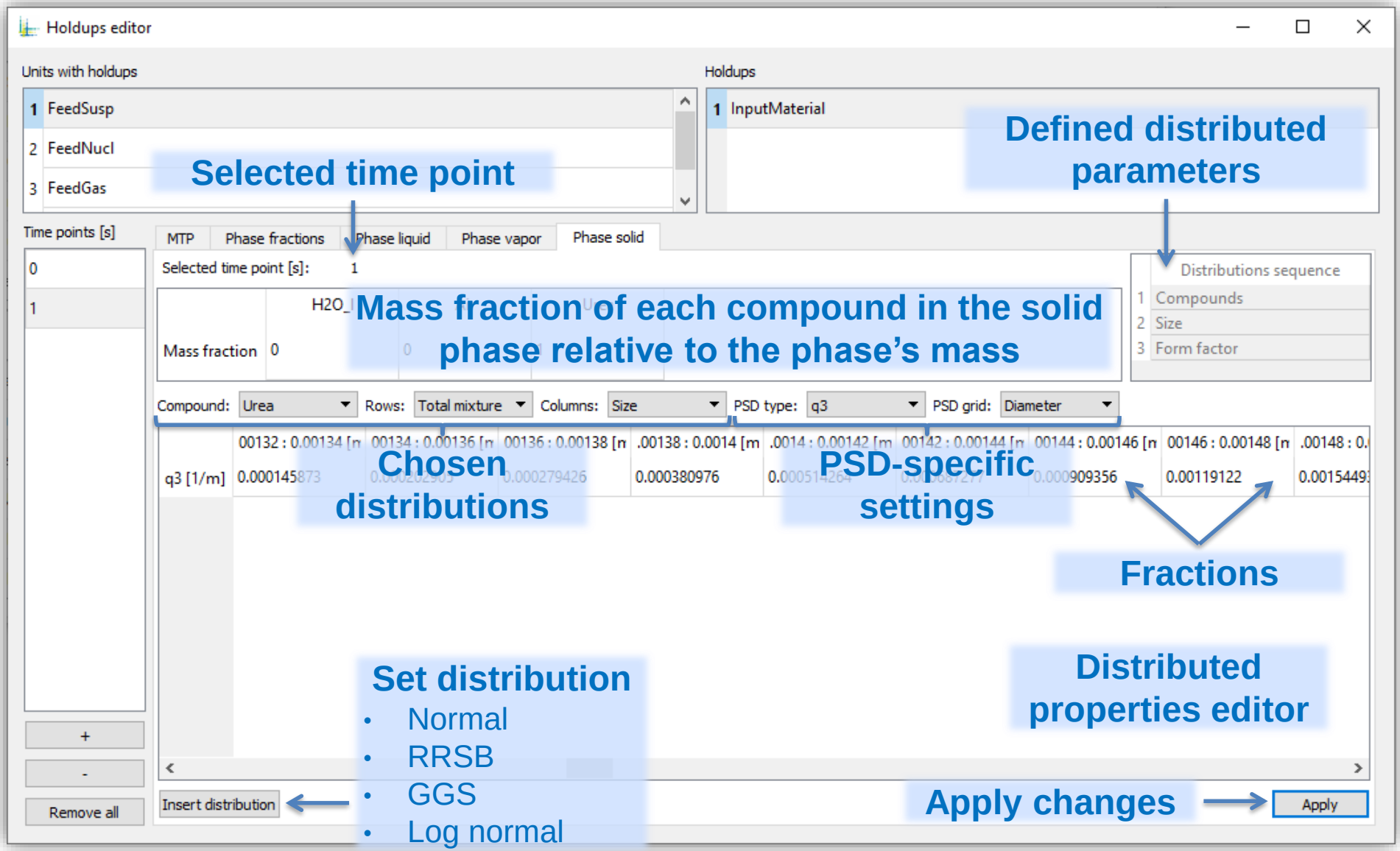


Sum of fractions for each time point must be equal to one



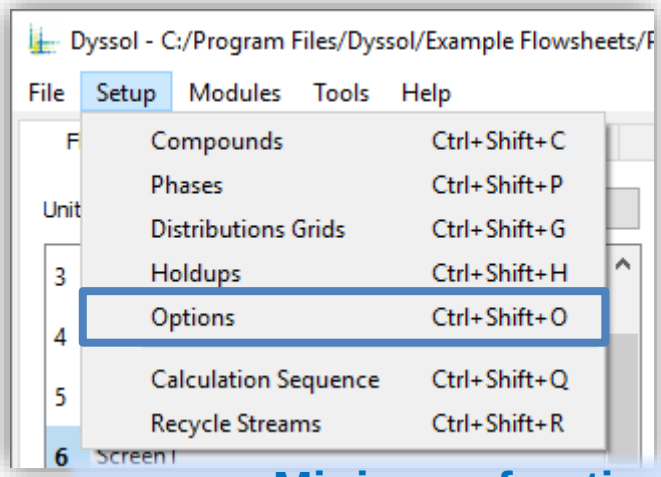
Flowsheet setup

Holdups editor – Distributed parameters



Options

General

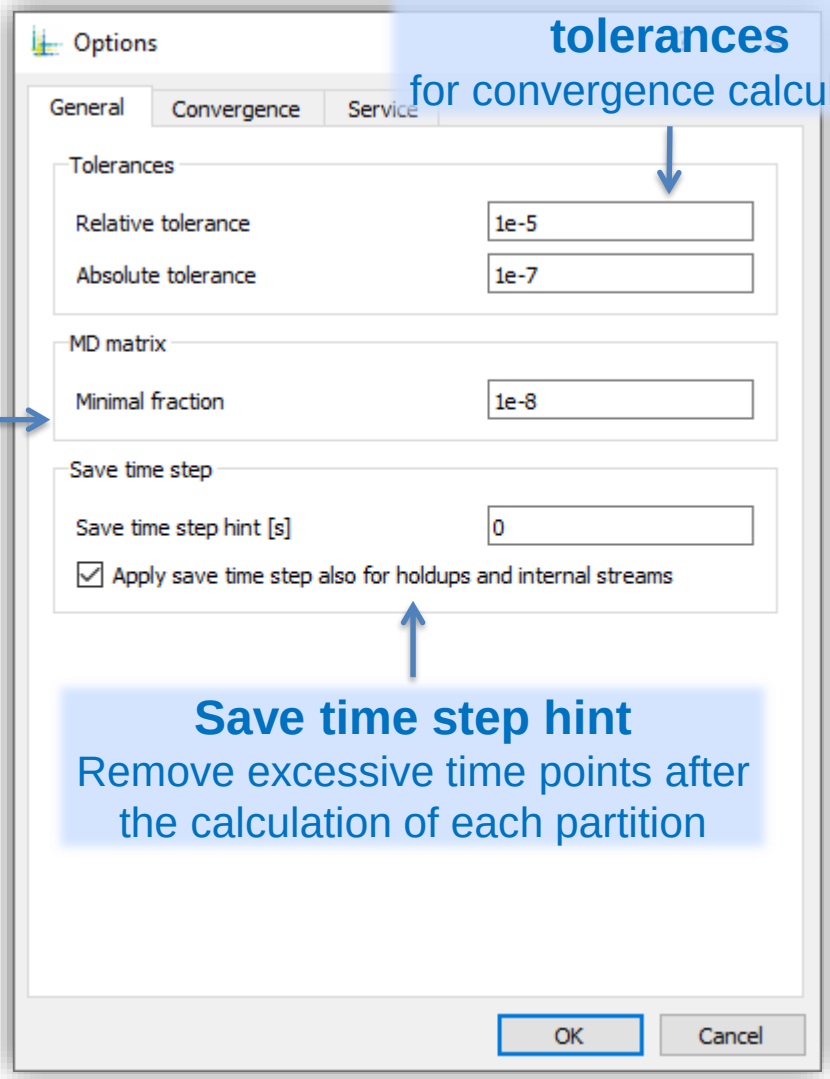


Minimum fraction

that is considered in the multidimensional distributed set of parameters

Absolute and relative tolerances

for convergence calculation



Save time step hint

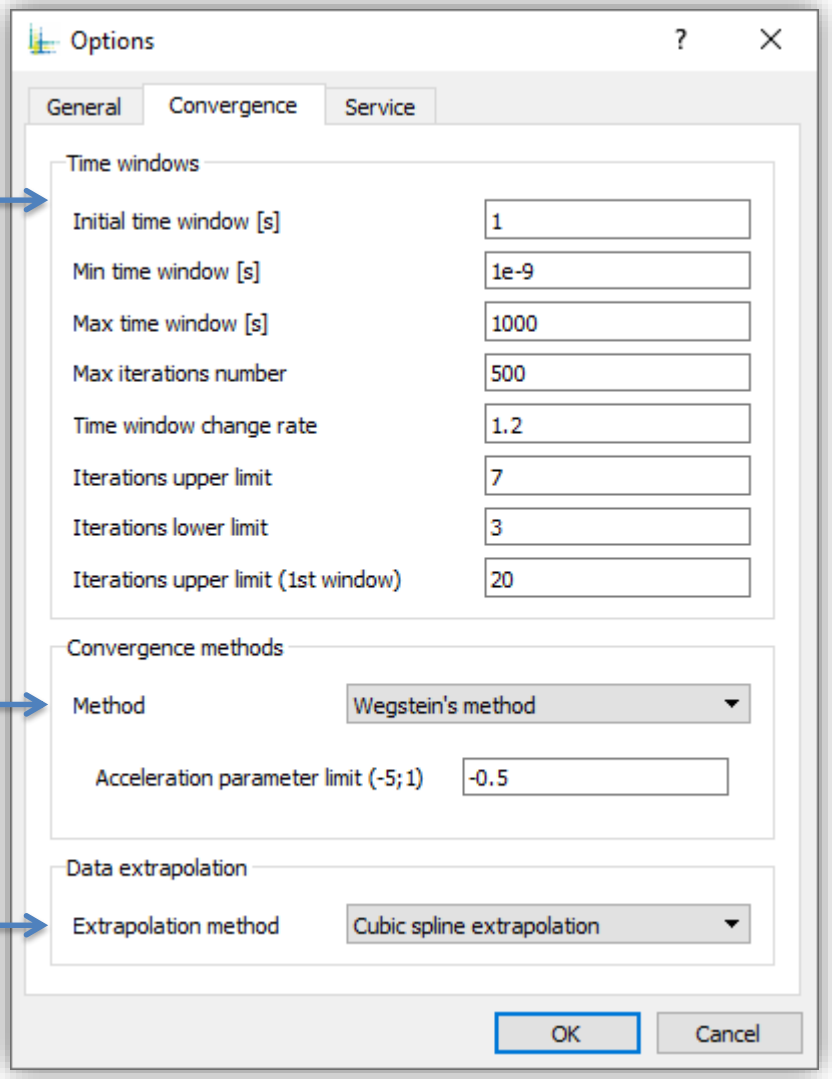
Remove excessive time points after the calculation of each partition

Ref.: Help\Convergence.pdf

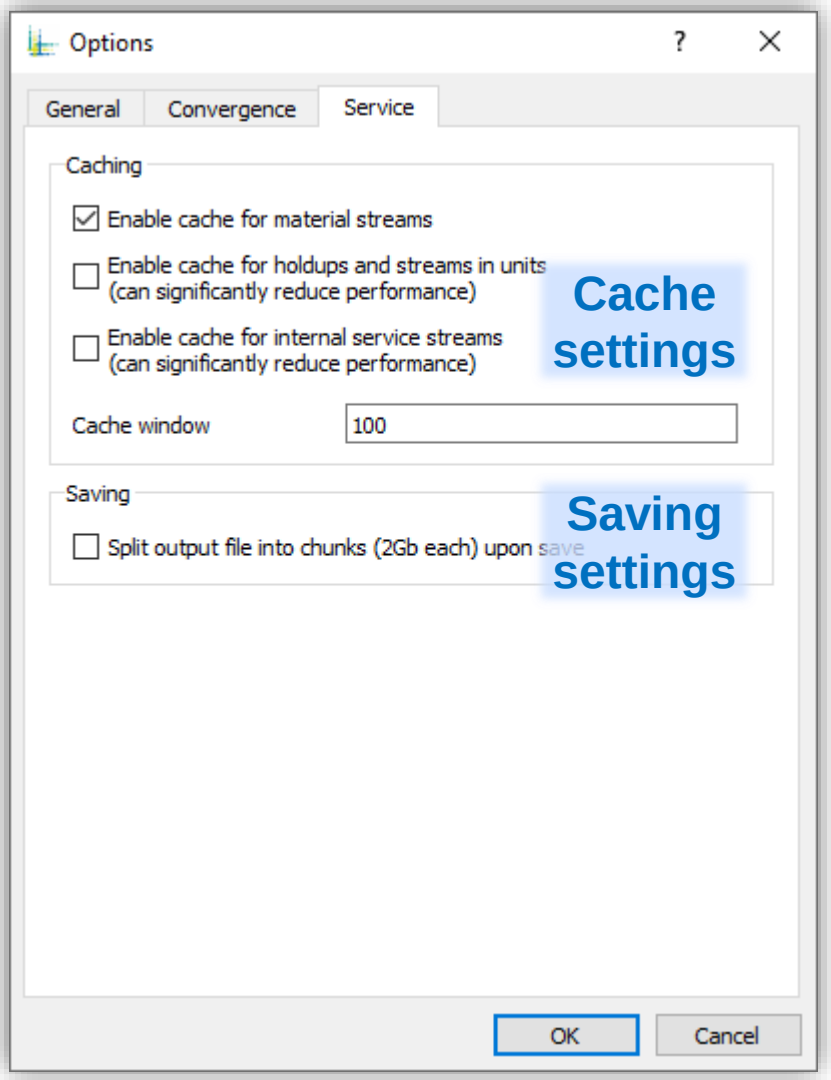
Settings for waveform relaxation method

Select convergence method

Select extrapolation method

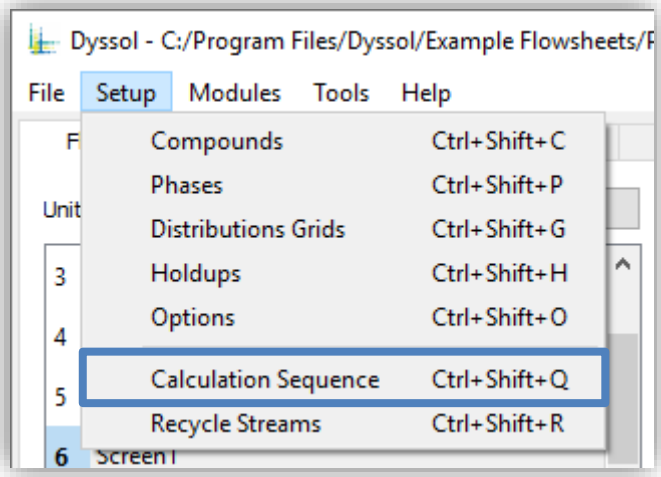


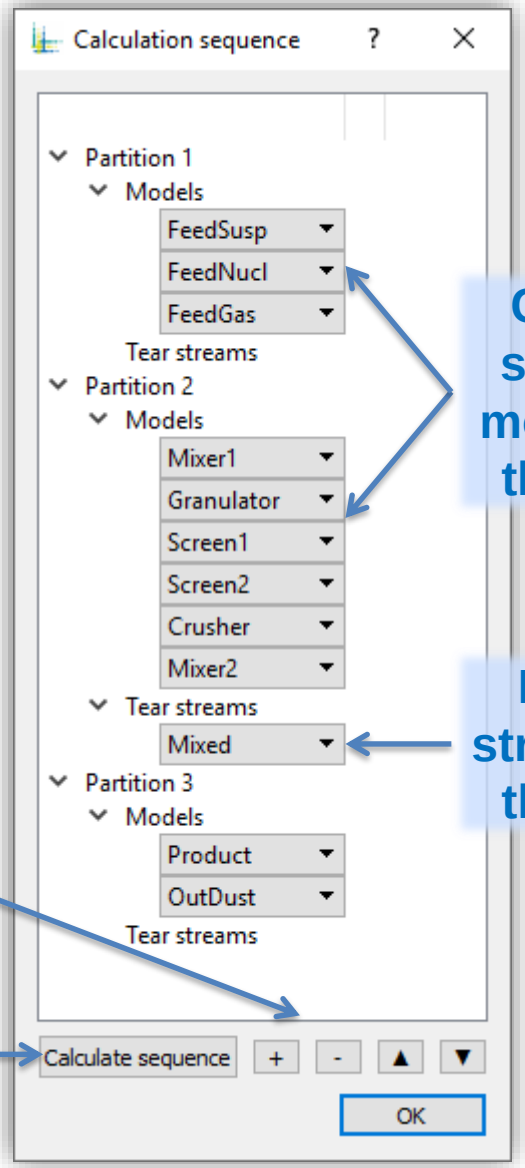
Ref.: Help\Convergence.pdf


Options
General
Convergence
Service
Caching
Enable cache for material streams
Enable cache for holdups and streams in units
(can significantly reduce performance)
Enable cache for internal service streams
(can significantly reduce performance)
Cache window
100
Cache settings
Saving
Split output file into chunks (2Gb each) upon save
Saving settings
OK
Cancel

Flowsheet setup

Calculation sequence





Calculation sequence of models within the partition

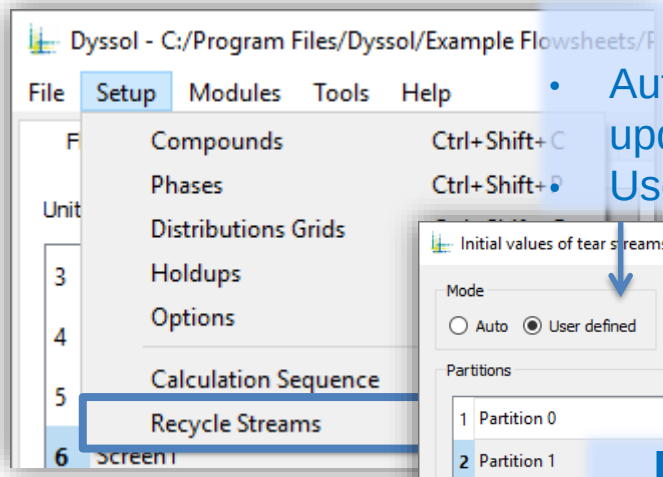
List of tear streams within the partition

Add, remove, rearrange models, tear streams or partitions

Update calculation sequence

Flowsheet setup

Recycle streams



Mode selection

- Auto: use obtained simulation result in subsequent simulations, update them on change
- User defined: manually set all stream parameters

Initial values of tear streams

Mode: Auto / User defined

Clear all initial values ← Remove all initial values

Partitions:
1 Partition 0
2 Partition 1
3 Partition 2

← List of partitions

Tear streams:
1 Mixed

← List of tear streams within the partition

Time points [s]:
0
0.1
+
-
Remove all

← Control over time points

MTP | Phase fractions | Phase liquid | Phase vapor | Phase solid

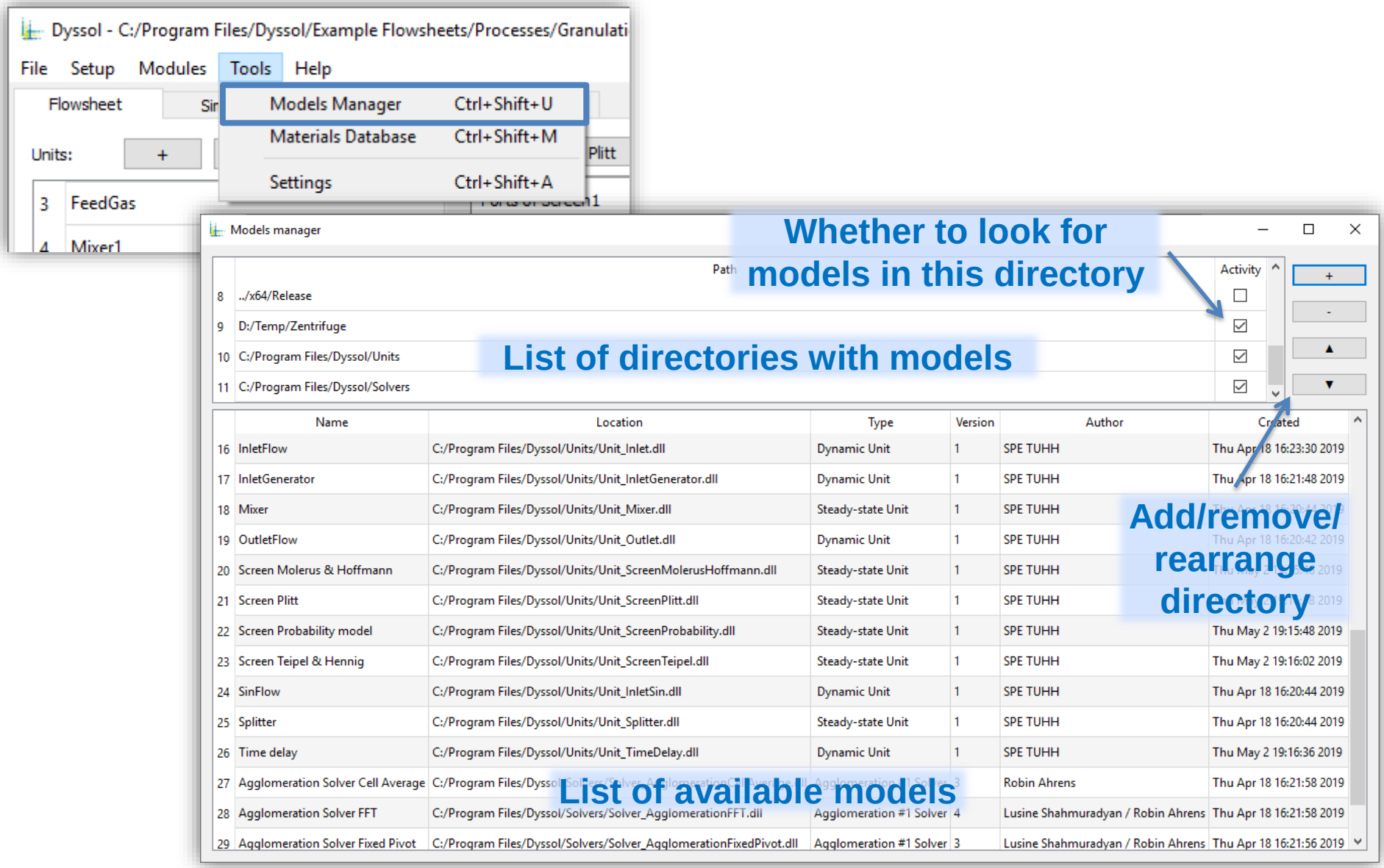
	Time [s]	Mass flow [kg/s]	Temperature [K]	Pressure [Pa]
1	0	0.0491	300	100000
2	0.1	0.0492	300	100000

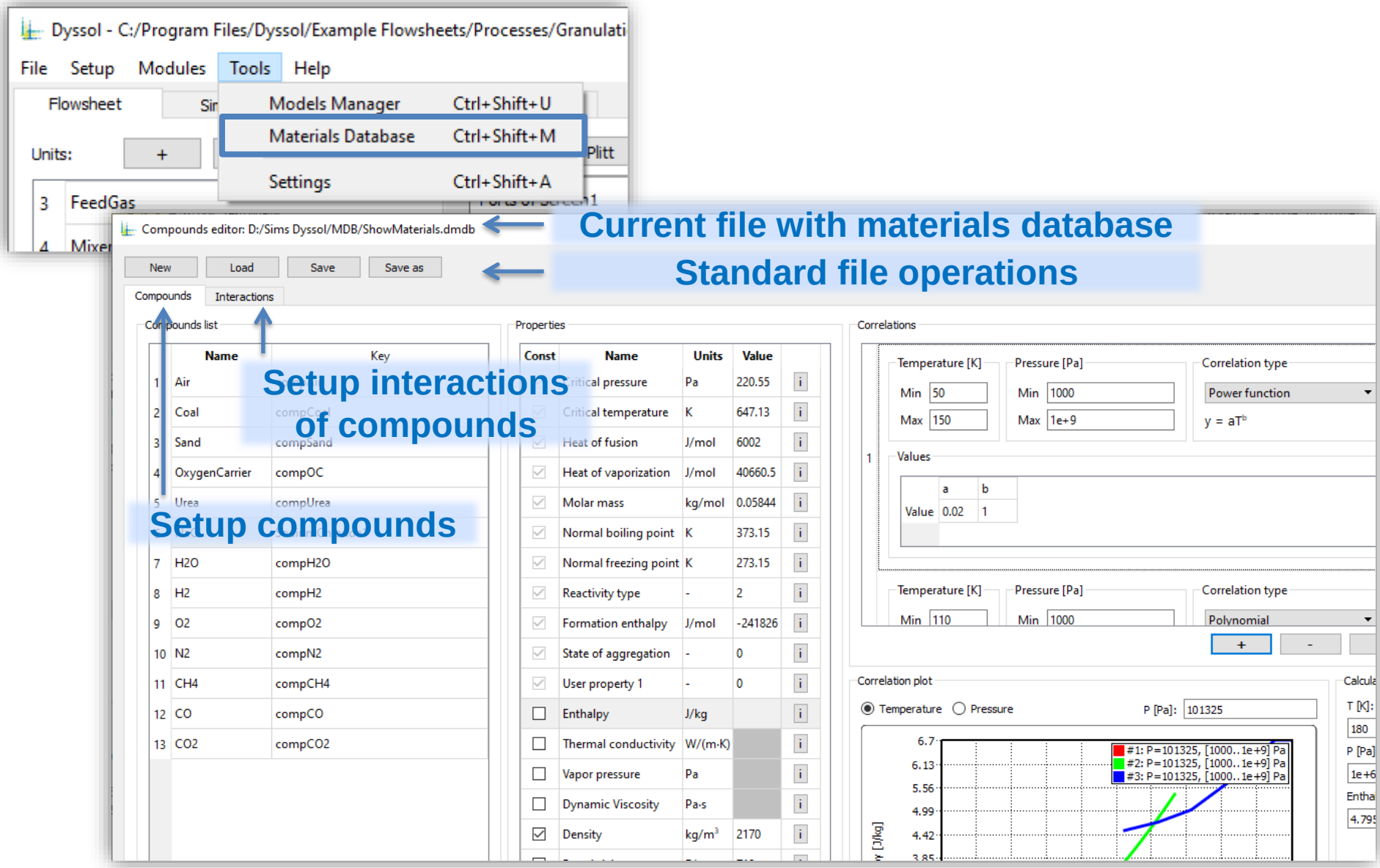
← List of time points in the selected tear stream

Customizable parameters

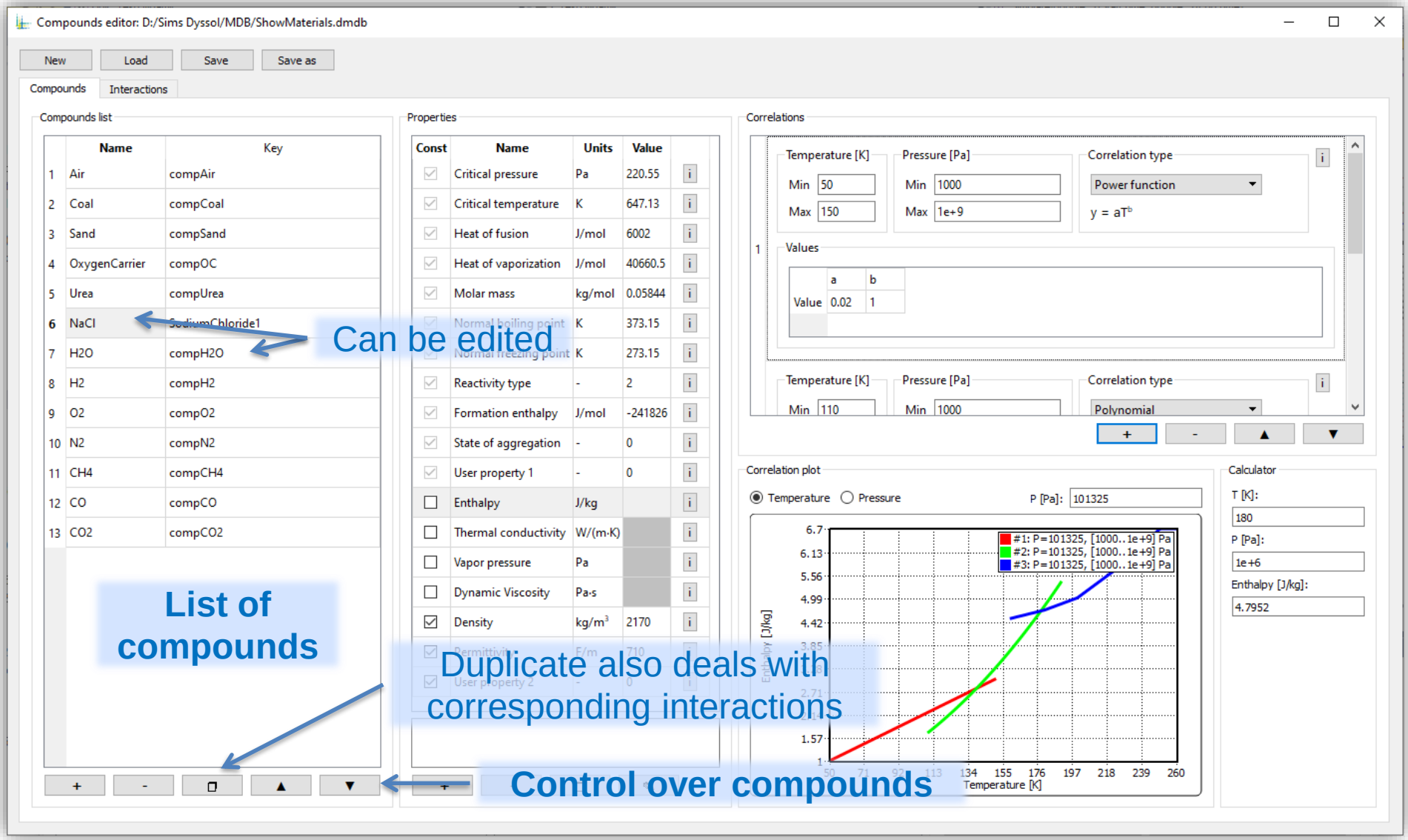
Tools

Models manager

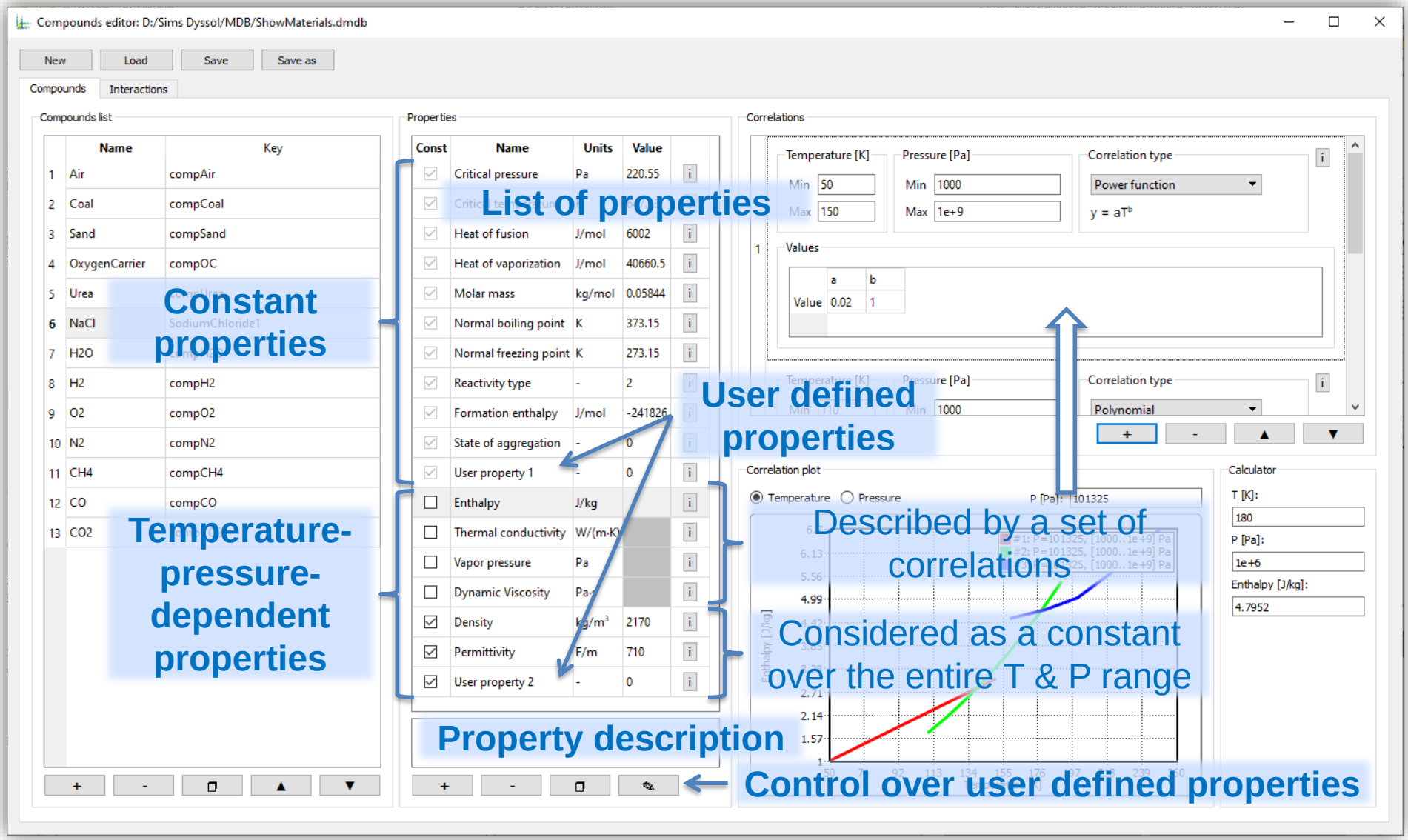



Dyssol - C:/Program Files/Dyssol/Example Flowsheets/Processes/Granulati
File
Setup
Modules
Tools
Help
Flowsheet
Units:
Models Manager Ctrl+Shift+U
Materials Database Ctrl+Shift+M
Settings Ctrl+Shift+A
3 FeedGas
Compounds editor: D:/Sims Dyssol/MDB/ShowMaterials.dmdb
Current file with materials database
New
Load
Save
Save as
Standard file operations
Compounds
Interactions
Compounds list
Name
Key
1 Air
2 Coal
3 Sand
4 OxygenCarrier
5 Urea
7 H2O compH2O
8 H2 compH2
9 O2 compO2
10 N2 compN2
11 CH4 compCH4
12 CO compCO
13 CO2 compCO2
Setup interactions of compounds
Setup compounds
Properties
Const
Name
Units
Value
Heat of fusion J/mol 6002
Heat of vaporization J/mol 40660.5
Molar mass kg/mol 0.05844
Normal boiling point K 373.15
Normal freezing point K 273.15
Reactivity type - 2
Formation enthalpy J/mol -241826
State of aggregation - 0
User property 1 - 0
Enthalpy J/kg
Thermal conductivity W/(m·K)
Vapor pressure Pa
Dynamic Viscosity Pa·s
Density kg/m³ 2170
Correlations
Temperature [K]
Min 50
Max 150
Pressure [Pa]
Min 1000
Max 1e+9
Correlation type
Power function
y = aT^b
Values
a
b
Value 0.02 1
Temperature [K]
Min 110
Pressure [Pa]
Min 1000
Correlation type
Polynomial
Correlation plot
Temperature
Pressure
P [Pa]: 101325
#1: P=101325, [1000..1e+9] Pa
#2: P=101325, [1000..1e+9] Pa
#3: P=101325, [1000..1e+9] Pa
6.7
6.13
5.56
4.99
4.42
T [K]:
180
P [Pa]
1e+6
Entha
4.795

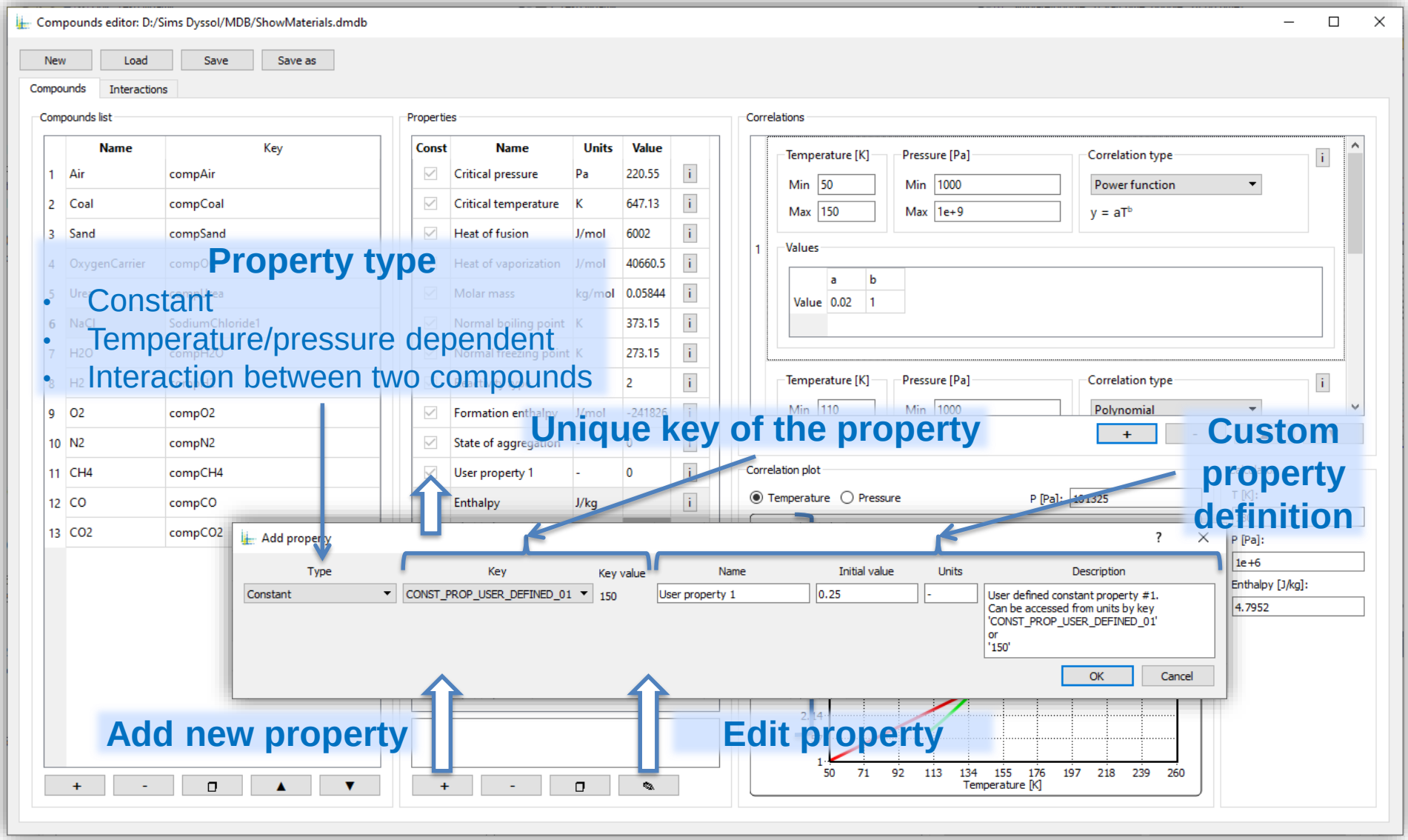
Materials database – Compounds



Materials database – Properties



Materials database – Properties editor



Property type

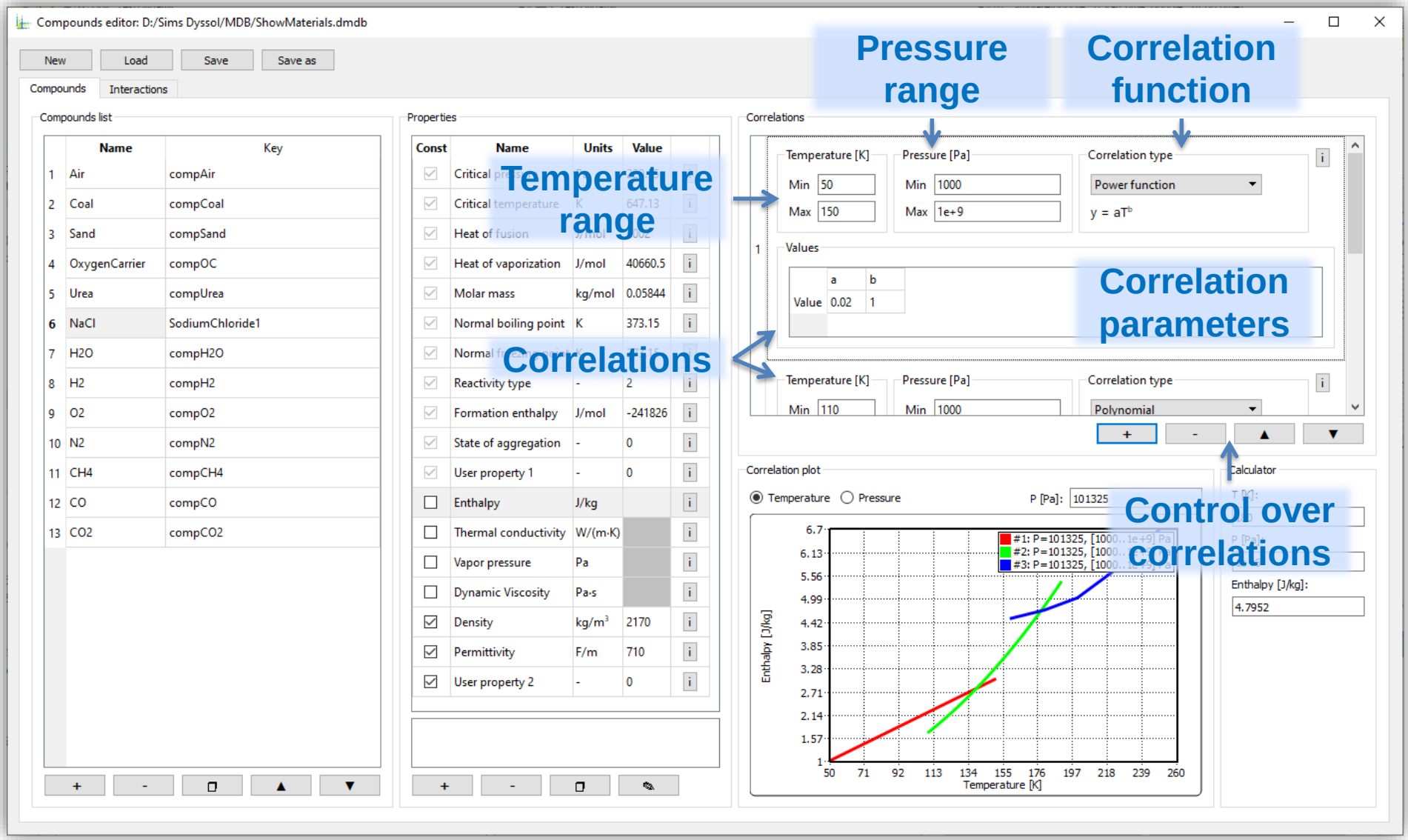
- Constant
- Temperature/pressure dependent
- Interaction between two compounds

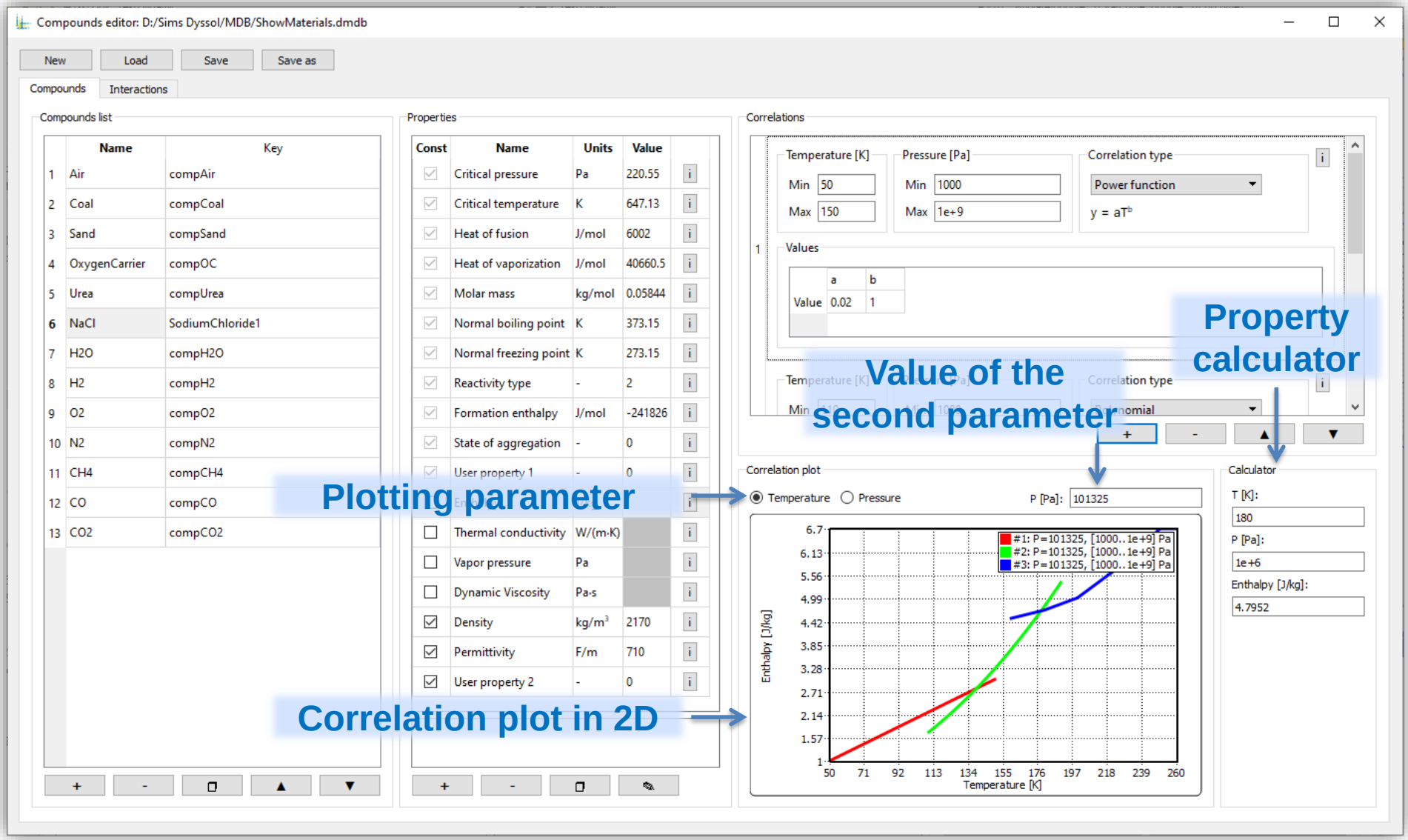
Unique key of the property

Custom property definition

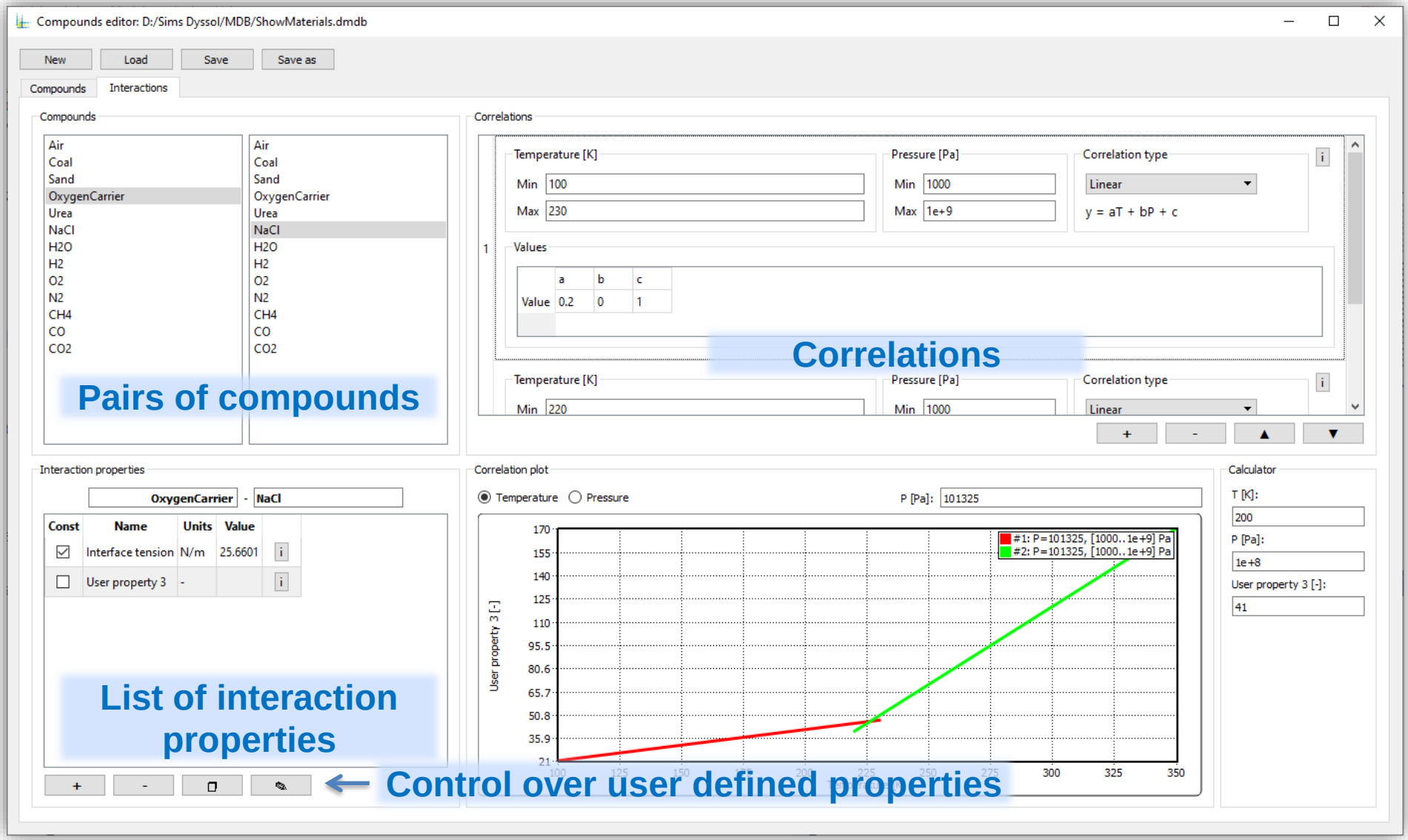
Add new property

Edit property


Compounds editor: D:/Sims Dyssol/MDB/ShowMaterials.dmdb
New
Load
Save
Save as
Compounds
Interactions
Compounds list
Name
Key
1 Air compAir
2 Coal compCoal
3 Sand compSand
4 OxygenCarrier compOC
5 Urea compUrea
6 NaCl SodiumChloride1
7 H2O compH2O
8 H2 compH2
9 O2 compO2
10 N2 compN2
11 CH4 compCH4
12 CO compCO
13 CO2 compCO2
Properties
Const
Name
Units
Value
Heat of vaporization J/mol 40660.5
Molar mass kg/mol 0.05844
Normal boiling point K 373.15
Reactivity type - 2
Formation enthalpy J/mol -241826
State of aggregation - 0
User property 1 - 0
Enthalpy J/kg
Thermal conductivity W/(m·K)
Vapor pressure Pa
Dynamic Viscosity Pa·s
Density kg/m3 2170
Permittivity F/m 710
User property 2 - 0
Pressure range
Correlation function
Temperature range
Correlations
Correlation parameters
Control over correlations
Correlations
Temperature [K]
Pressure [Pa]
Correlation type
Min 50
Max 150
Min 1000
Max 1e+9
Power function
y = aT^b
Values
a b
Value 0.02 1
Min 110
Min 1000
Polynomial
Correlation plot
Temperature
Pressure
P [Pa]: 101325
#1: P=101325, [1000...1e+9] Pa
#2: P=101325, [1000...
#3: P=101325, [1000...
Enthalpy [J/kg]
Temperature [K]
Calculator
Enthalpy [J/kg]:
4.7952


Compounds editor: D:/Sims Dyssol/MDB/ShowMaterials.dmdb
New
Load
Save
Save as
Compounds
Interactions
Compounds list
Name
Key
1 Air compAir
2 Coal compCoal
3 Sand compSand
4 OxygenCarrier compOC
5 Urea compUrea
6 NaCl SodiumChloride1
7 H2O compH2O
8 H2 compH2
9 O2 compO2
10 N2 compN2
11 CH4 compCH4
12 CO compCO
13 CO2 compCO2
Properties
Const
Name
Units
Value
Critical pressure Pa 220.55
Critical temperature K 647.13
Heat of fusion J/mol 6002
Heat of vaporization J/mol 40660.5
Molar mass kg/mol 0.05844
Normal boiling point K 373.15
Normal freezing point K 273.15
Reactivity type - 2
Formation enthalpy J/mol -241826
State of aggregation - 0
User property 1 - 0
Thermal conductivity W/(m·K)
Vapor pressure Pa
Dynamic Viscosity Pa·s
Density kg/m3 2170
Permittivity F/m 710
User property 2 - 0
Correlations
Temperature [K]
Min 50
Max 150
Pressure [Pa]
Min 1000
Max 1e+9
Correlation type
Power function
y = aT^b
Values
a b
Value 0.02 1
Property calculator
Value of the second parameter
Correlation plot
Temperature
Pressure
P [Pa]: 101325
Plotting parameter
Correlation plot in 2D
#1: P=101325, [1000..1e+9] Pa
#2: P=101325, [1000..1e+9] Pa
#3: P=101325, [1000..1e+9] Pa
Enthalpy [J/kg]
Temperature [K]
Calculator
T [K]: 180
P [Pa]: 1e+6
Enthalpy [J/kg]: 4.7952

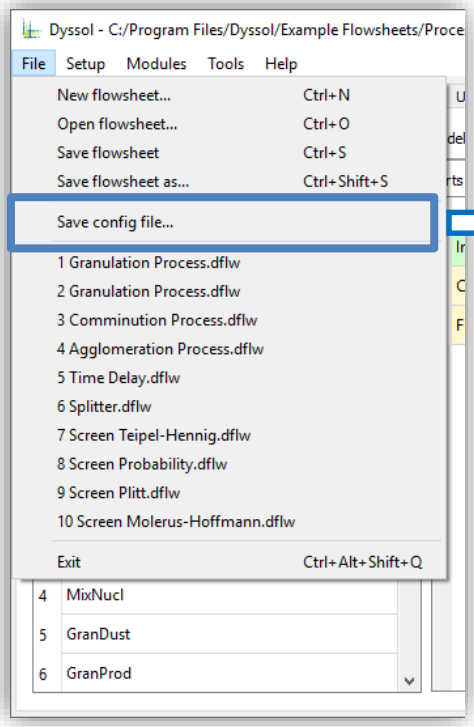
Materials database – Interactions

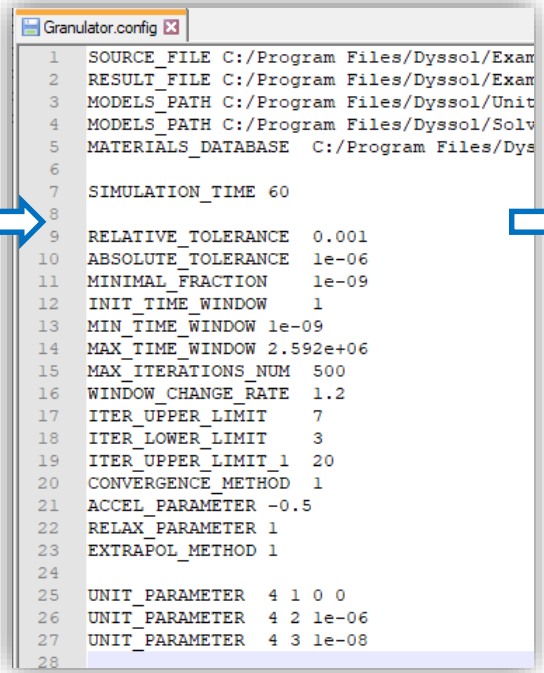


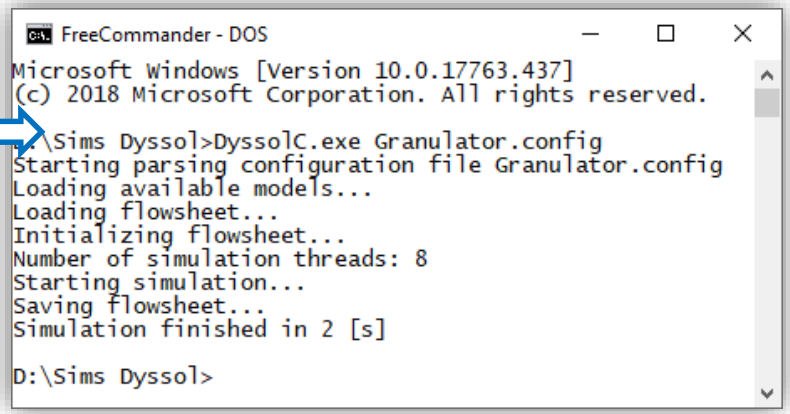
Command line interface

Command line interface

- Run simulations in command line mode
- Batch runs of multiple simulations
- Change simulation parameters: simulation time, unit parameters, grid parameters, holdups, distributed parameters of solids, simulation options
- Cannot change the flowsheet structure
- Possibility to save flowsheet as the configuration file for the command line mode:







Ref.: Dyssol\Help\Command Line.pdf