



Flownex[®] SE Version 8.12.6 Release Notes

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1. Scope

This document contains the release notes of Flownex® Simulation Environment 8.12.6 in December 2020. Flownex® SE 8.12.6 includes major enhancements to even further improve user-friendliness and ease of use, enhanced solving capability and speed, additional features and solvers, new models and components, etc. The major and minor enhancements will be described in the release note.

2. References

2.1 APPLICABLE DOCUMENTS AND DATA

The following documents and data are applicable:

TITLE	REFERENCE NUMBER
[1] General User Manual	Flownex® SE 18.pdf
[2] Flownex® Library Theory Manual	Flownex® Theory Manual.pdf
[3] Flownex® Library Manual	Flownex® Manual.pdf
[4] Control Library Manual	DCS Library Manual.pdf
[5] Electrical Library Manual	Electrical Network Solver Manual.pdf
[6] Flownex® Demo Manual	Flownex® Demo Network Manual.pdf

2.2 APPLICABLE SOFTWARE

The following software files are applicable:

SOFTWARE DESCRIPTION	VERSION NUMBER	FILE NAME
[7] Flownex® Simulation Environment	8.12.6	<i>FNXSE 8.12.6.exe</i>

3. Enhancements

3.1 MAJOR ENHANCEMENTS

3.1.1 Ansys Mechanical Coupling

The Ansys Mechanical Flow Solver Coupling component has been improved to allow the simulation of complex 3D conduction and stress in Ansys Mechanical coupled to a flow and heat transfer simulation in Flownex®. This enhancement includes the addition of a deep solver coupling between Flownex® and Ansys Mechanical, allowing data exchange between iterations, full transient co-simulation functionality and unit integration.

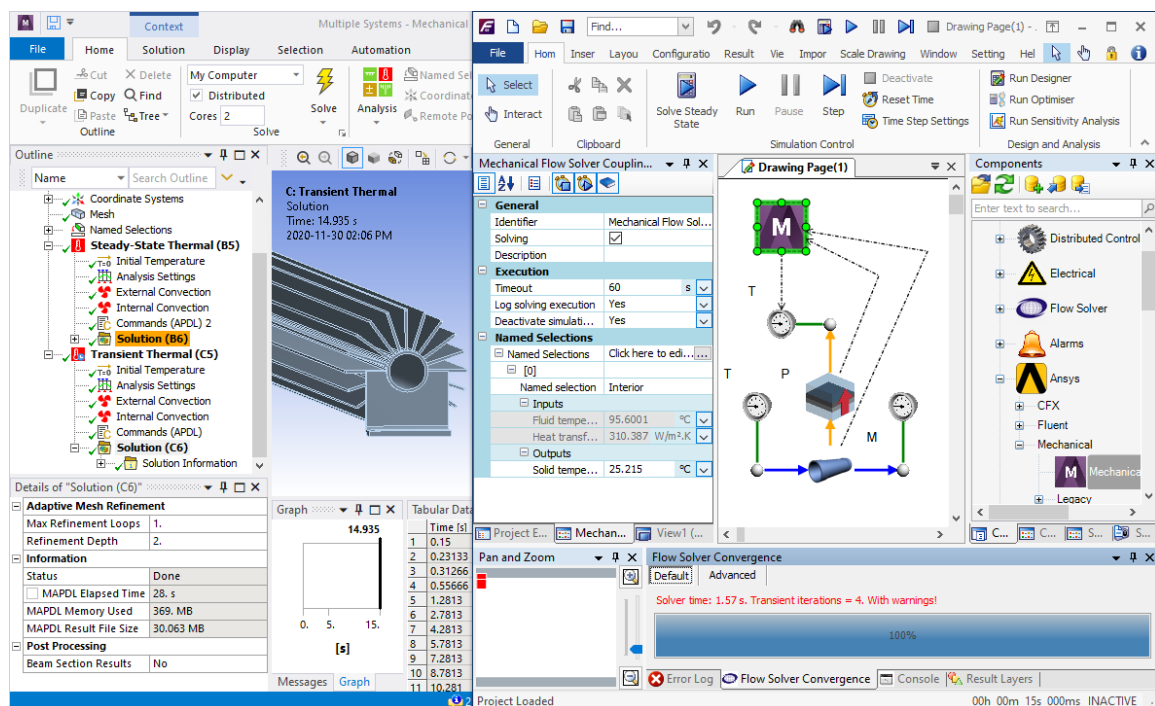


Figure 1: Ansys Mechanical Coupling.

3.1.2 Nuclear Reactor Builder Scripts

3.1.2.1 Script Generated Reactor Results

Results in tabular form corresponding to the grid layout of the generated reactor network are written to a text file in the ScriptResults subfolder of the project folder. The tabular results are reported at the end of a steady state run as well as during user specified times and at the end of transient runs. A feature is provided to specify output variables that are reported at every time step. These results are written to a comma separated values (csv) file as a time series residing in the ScriptResults subfolder.

3.1.2.2 Reactor Generation Script

Various improvements were made to the geometric parameter calculations. Network topology generation for the transitions between different types of reactor zones was extended.

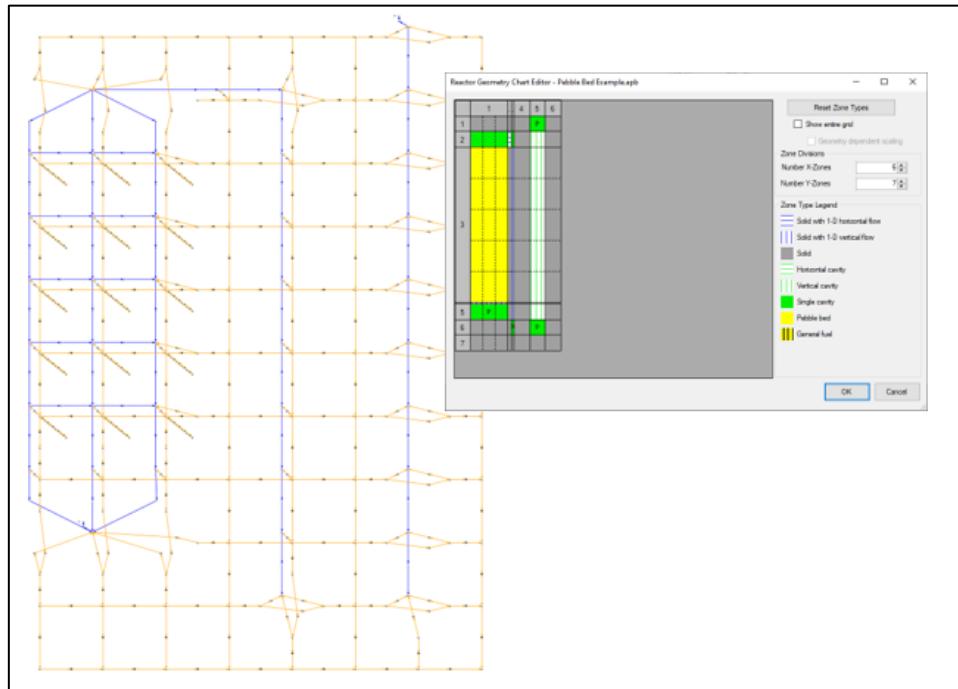


Figure 2: Reactor Generation Script Enhancements.

3.2 MINOR ENHANCEMENTS

3.2.1 FMI

- The “Description”, “Minimum” and “Maximum” values have been added to the imported FMU variables. The description will be displayed if it is not blank. Minimum and maximum values will be displayed if they are specified in the FMU and the “Display variable information” property is turned on. A warning is given if the minimum or maximum values for inputs are exceeded.

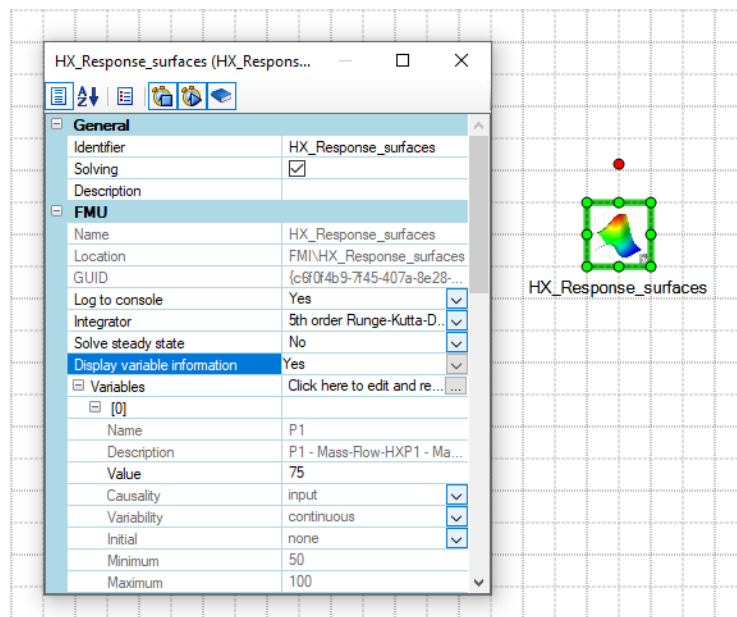


Figure 3: Description, Minimum and Maximum Values added to Imported FMU's.

3.2.2 Licensing

- The License modules selection have been updated so that it can work for users that do not have write access to their ProgramData folders.

3.2.3 Scripting

- Functions to retrieve minimum and maximum temperatures and pressures, as well as critical temperatures and pressures from two-phase fluids via Scripts have been added.
- Added the ability for Scripts to properly work with lists and Snaps – functions were added that get called in the Script before and after loading and saving Snaps. This gives users flexibility to implement their own Snap saving and loading code.

3.2.4 Composite Heat Transfer Component

- The “Area multiplication factor” input for the Composite Heat Transfer (CHT) component has been moved to a separate category to indicate that the input is applied to all surfaces.

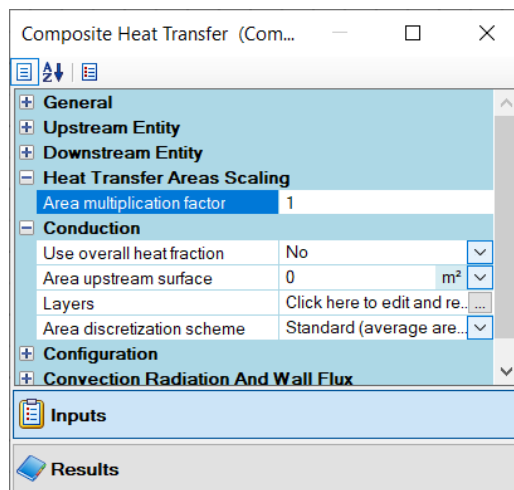


Figure 4: Area Multiplication Factor Moved to Separate Category.

3.3 BUG FIXES

3.3.1 Licensing

- Fixed the problem where many of the modules were missing when using a borrowed license from the server.

3.3.2 Find Dialog

- Fixed the problem where the Find dialog did not open the property page for components on closed pages (it appeared that multi edit did not work).

3.3.3 Graphs

- Line Graph: Removed trailing list separator from the 'Save As CSV' file rows.

3.3.4 Scripts

- Fixed the Solid Properties script, as the script did not compile correctly due to the enthalpy function that was removed.
- Fixed the problem where properties for two-phase non condensable mixtures returned zero values as results in the Mixed Fluid Properties Script.

3.3.5 Solver Results

- Fixed the problem where the Fluid volume and Fluid mass results in the Flow Solver Results window did not update when it was linked to an Action or displayed on the canvas.

3.3.6 Composite Heat Transfer Component

- Fixed the problem where an error was issued when connecting the Composite Heat Transfer element to non-pipe flow elements because the roughness could not be determined when the Dittus-Boelter option was specified.
- Fixed the Composite Heat Transfer element StPr chart option not allowing the user to specify the flow area.
- Fixed the Reynolds number result on the Composite Heat Transfer element for StPr chart input option not displaying correctly.

4. Manual Updates

The following sections in the Flownex® General User Manual have been updated:

- Updated the section of the Ansys Mechanical coupling.
- Added a description related to Data Transfer Links and data transfer to the Advanced Configuration section.

The following sections in the Flownex® Library Manual have been updated:

- Updated the theory for the Restrictor with Discharge Coefficient.
- Updated the theory for the Nozzle component.

The following Tutorials have been updated:

- Updated Tutorial 32 – Coal Combustion.
- Updated Tutorial 43 – ANSYS Mechanical Integration.
- Added Tutorial 48 – 6SigmaRoom & Flownex Co-Simulation.