Simcenter Flomaster Release Highlights

Software Version 2210
October 2022

SIEMENS

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Introduction

This document provides a high-level summary of this release. It includes a summary of the new features in this release, any authorization code changes required, any major installation changes, and any transitioning issues you should be aware of before installing. Additionally, any last-minute issues found in the final stages of testing are included.

New Features

The following new features are available in this release:

- **Drift Flux Model** - For thermo fluid systems engineers working in green energy who need to account for the effects two phase conditions on flow rates when working with fluids including ammonia, CO_2, and hydrogen. Simcenter Flomaster 2210 includes a drift flux model using the Bhagwat–Ghajar correlation calculates the relative velocities of the liquid and vapor fractions accounting for slip ratio between the two phases and for the relative volumes of vapor and liquid. This means that engineers will have a full understanding of the flow regime at different points in the pipe and the pressure and flows through the system.

- **Modelling of Drag Reducing Agent** - Drag Reducing Agent (DRA) is used in pipelines to reduce turbulence in pipes and hence reducing the frictional pressure losses. The effectiveness of the DRA reduces as it degrades in the line. Simcenter Flomaster 2210 includes the following enhancements to account for the effects of DRA in pipelines

  - A new fluid template for modelling of DRA fluids including a Degradation Coefficient and Efficiency vs Concentration data fields.

  - Enhancements to the incompressible pipe model using the Colebrook-White equation to account for the effects of DRA on the pressure losses in the pipes
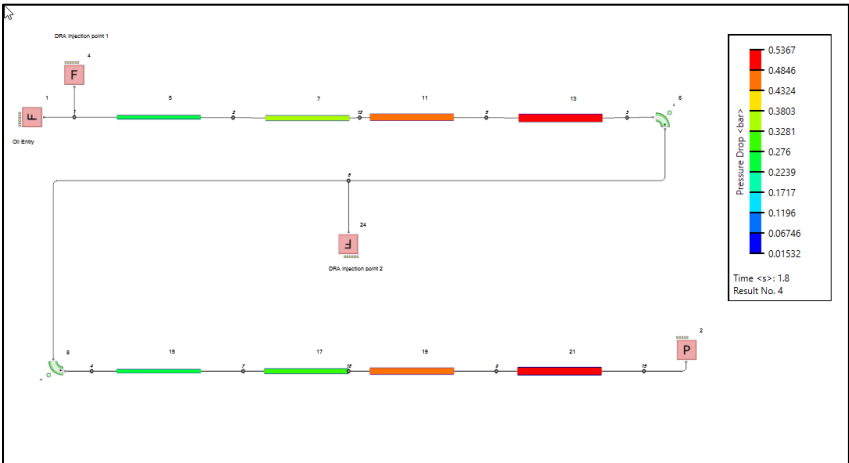

Figure 1 - Pressure Drop Variation with DRA Degredation

- **Quicker Simulations through enhanced hybrid results and use of SIMD instructions** – In Simcenter Flomaster 2210 enhancements have been made to the

simulator and hybrid result writer to reduce the run time required for a simulation. These enhancements address both simulation performance and the speed at which results can be written and include.

- o Using the Single Instruction, Multiple Data (SIMD) instructions available on modern CPUs for appropriate vector operations

- o Utilizing a new method of writing hybrid results to improve the speed at which results can be written. This has been shown to have benefits in all networks but particularly those with large numbers of segmented components writing results at internal nodes such as elastic pipes. It should be noted that hybrid results generated in previous versions of Simcenter Flomaster will need to be checked in prior to database upgrade or transferred via pack unpack to be accessible in this release.

- **Executable Digital Twin (xDT) Export** – Simcenter Flomaster 2210 introduces two new components for modelling the boundaries between the xDT model and the Flomaster network along a new dialogue for exporting the model on the Export ribbon.
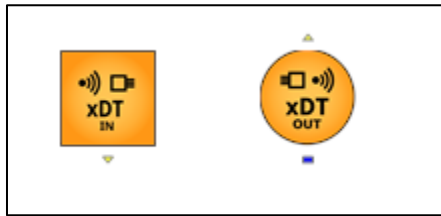
Figure 2 - xDT Input and Output Components

- **Result Filter** – Simcenter Flomaster 2210 introduces a new Result Filter which can lead to a smaller result set and quicker simulation for both hybrid and database results. Results can be filtered by either component (e.g., not writing results for all bends) or by individual feature for a given component type (e.g., not writing results of level for all internal nodes of an elastic pipe). Filters can be saved allowing them to be used with different networks in the database and allowing different filters for different simulation configurations.
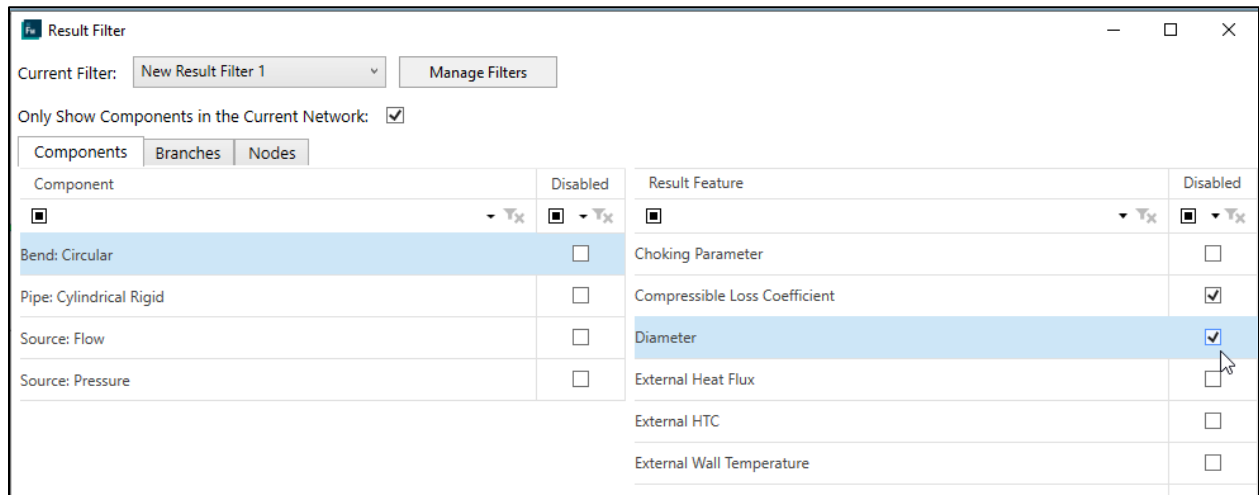
Figure 3 - Result Filter Disabling Individual Results

- **Output Parameters available in Network View in addition to Experiments** – Output Parameters can be used in Simcenter Flomaster to calculate outputs based on other input and output parameters and have been historically available in the Experiments workflow. Output Parameters can now be created, edited, and viewed in the Network View – Experiments tab in addition to their existing availability in the experiments work flow
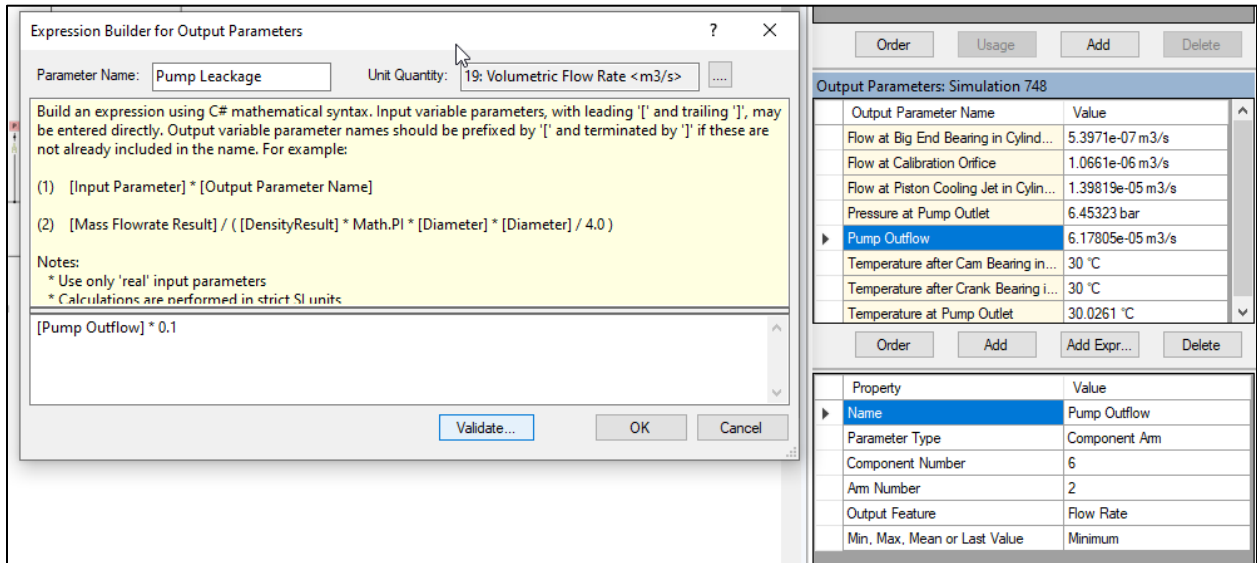
Figure 4 - Creating An Output Expression

- **New Incompressible Flow Balancing workflow –** Flow Balancing is a Simcenter Flomaster simulation type that allows a user to specify and flow and the component calculates a geometric parameter that would satisfy it. For a valve this would be position, an orifice the size of the orifice and for a discrete loss the loss coefficient. Simcenter Flomaster 2210 introduces a new tool on the Apps ribbon that automates the process of setting the data for the simulation, running the simulation, and updating the calculated values in the component
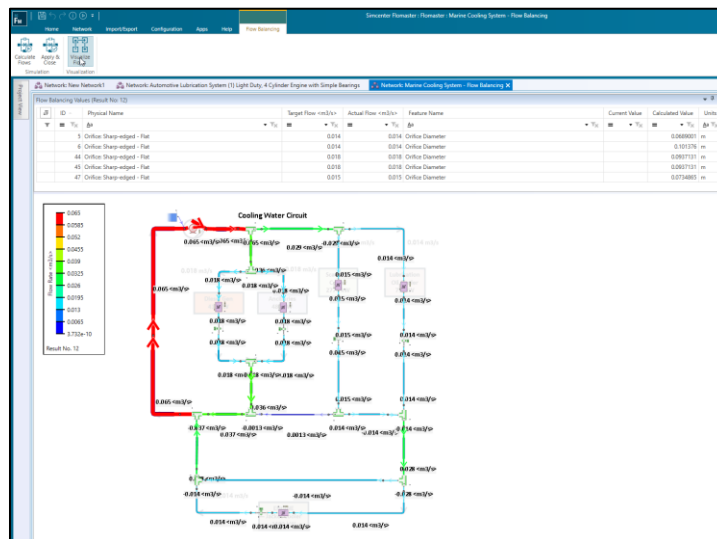
Figure 5 - Flow Balancing Workflow

- **Enhanced Tabular Result Performance** – The performance of the dialogue used for outputting tabular (numeric) data has been improved over previous releases, in addition it's now easier to copy data to another application using the copy all button

- **Component Help** – The Component Help feature in Simcenter Flomaster 2210 allows the user to quickly view information about the currently selected component including the number of arms, component and model help and the underlying model used.
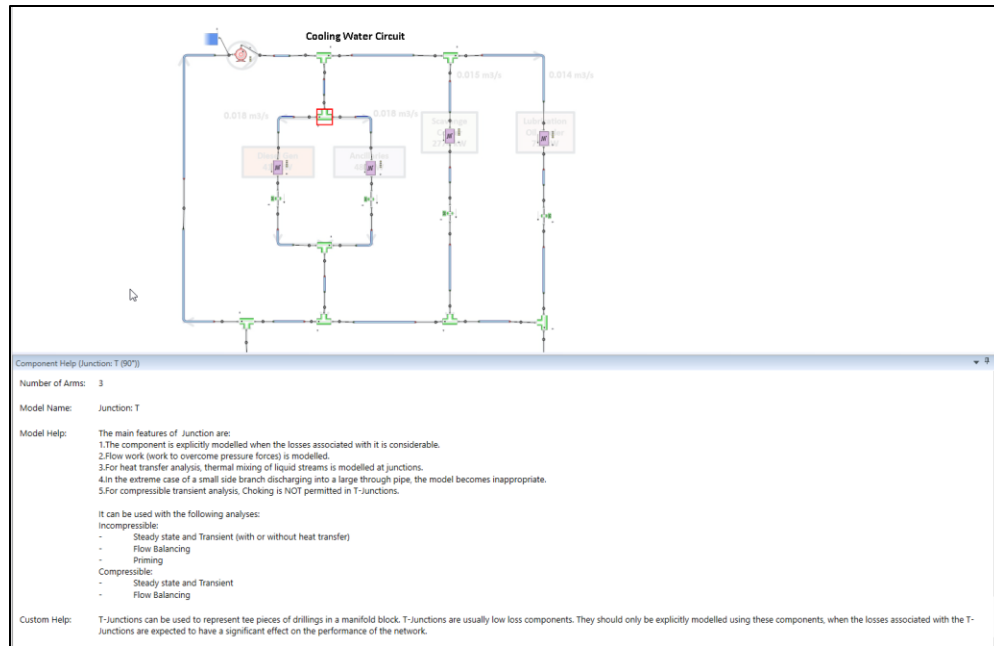
Figure 6 - Component Help for T-Junction

- **Improved Modelling of Laminar Flow in Bends** – The bend components have been updated with enhanced corrections for Reynolds Number. The following enhancements have been made:

  - A new Surface for the correction of factor for flows greater than 10^4 with Reynolds number and R/d ratio based on figure 9.3 of Internal Flow Systems. This removes the previous recommendation to update the existing curve feature when R/d ratio was less than 2.

 - New curves have been added for correction of results for Reynolds number of less than 104 based on figure 9.18 of Internal Flow Systems

These updates will be applied to new bends added to networks, bends in existing networks won't be updated and this should be done manually. The updates may lead to different results in some networks.

- **Hydrodynamic Force Export for Steady State simulations** – Hydrodynamic Force is now calculated in Steady State calculations for Elastic Pipes, Valves, Abrupt and Gradual Transitions.

- **Enhanced Hydraulic Grade Line Plot** – Following customer feedback the following enhancements have been made to the Hydraulic Grade Line (HGL) plot:

  - Chart configuration settings are saved

- o The HGL plot can be printed as well as exported to an image

- o The plot can be customized including line colors, axis, and text size

- o When exporting to Excel all lines are exported

- o Axis ranges and intervals can be edited

- **Drag and Drop charts** – Simcenter Flomaster 2210 introduces a new method of plotting results where a result feature can be dragged from the result table onto the schematic to create a new plot. Subsequent results can be added to the plot by dragging them onto it.

- **Restart can be used with Incompressible Priming Simulations** – Restart has been enabled for Priming simulations allowing the start of a simulation to be run, a state file written, and then multiple restart simulations run after the point to see the effect of different control actions on the initial condition.

- **New Keyboard shortcuts** – New keyboard short cuts have been added to speed user operations, these are:

  - o Run Simulation – F5

  - o Select Session Unit – Alt + U

- **Add links to networks** – Links can now be added to networks in the project tree, this allows links to be made to internal repositories related to the network.

- **Component Count in Network Properties** – The number of components in the active network is now shown on the properties pane for the network.

- **Scripted Fluids** – A new capability do define a fluid using a script (similar to a scripted N-Arm) allowing a user to define fluid properties programmatically.

Sample Systems

- **Water Cooling System** - In Simcenter Flomaster, a closed water cooling system can be modelled with a special focus on the pressure-related physics. The 'Water Cooling' sample system simulates the behavior of a large cooling system in which a pump changeover is performed, to ensure that sufficient pressure is constantly supplied. The system also incorporates the use of a water surge drum, which can absorb sudden rises of pressure and provide extra water to the system. The purpose of this sample system is to study the pump changeover procedure conditions and analyze the advantages and disadvantages of including the surge tank.

- **Electronics Cooling Using Reduced Order Models -** There are many ways to cool and arrange electronic components in a cooling circuit, Simcenter Flomaster gives the user the ability to explore all possible scenarios of in order to choose the most appropriate and efficient design. This sample system details one example of a cooling model in a datacenter where fluid is moved around a liquid loop to coldplates underneath important electronics components in the server rack. The reduce order models have been generated from Simcenter Flotherm™ as Boundary Condition Independent ROMs (BCI-ROMs) which have been brought into the simulation through a Functional Mockup Unit (FMU). It includes 4 networks – one of which shows a simple FMU connection, and the others showing 3 examples of full datacenter cooling

systems – with circuit boards in series, in parallel and a mix of both. The models can easily be modified to create arrangements in any desired order to fulfil the system requirements. Simcenter Flomaster allows the user to use the speed and simplicity of 1D fluid flow modelling in association with accurate 3D heat transfer models to produce realistic circuit cooling simulations.

For a detailed list of new features, refer to your product specific release notes manual or README file, available in the installed software tree or on Support Center.

Licensing

This release uses Mentor Standard Licensing (MSL) for the Siemens Advanced Licensing Technology (SALT) 1.5.0, mgcld vendor daemon and licenses.

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https://support.sw.siemens.com/en-US/product/1586485382

Alternatively license server is available from product installation or media.

If you are currently using the environment variable MGLS_LICENSE_FILE then you need to set a new environment variable SALT_LICENSE_SERVER with the same value. MGLS_LICENSE_FILE can remain set to support older versions.

For more information on SALT and Siemens License Server refer to Knowledge Base article MG612613 "Getting Started with Siemens Advanced Licensing Technology (SALT) and the Siemens License Server (SLS)", Knowledge Base article MG612618 "Siemens Advanced Licensing Technology (SALT) Migration Guide for Mentor Products" on Support Center and new licensing documentation: Siemens Digital Industries Software License Server Installation Instructions and Siemens Digital Industries Software Licensing Manual for Mentor Products.

Authorization Codes

No changes to authorization codes are required for this release.

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account.sw.siemens.com/licenses

For additional information on licensing, refer to the *Siemens Digital Industries Software Licensing Manual for Mentor Products*.

Product Transition

As previously mentioned Simcenter Flomaster 2210 succeeds Simcenter Flomaster 2022.1**.**

FloMASTER V8.0 and onwards represented a substantial repackaging of the product compared with earlier, V7.x releases. If you are currently a Flowmaster V7 user, please contact your account team for further information (see support information below) on what is available Simcenter Flomaster 2210 and how you can migrate to it.

Supported Platforms

Simcenter Flomaster 2210 requirements:

Operating system support:

- Windows 10 build 1909, 20H2, 21H1, 21H2 - x64

- Windows 11 – X64

Simcenter Flomaster's Windows support policy can be view here – https://support.sw.siemens.com/knowledge-base/MG595757

Operating systems should include the latest Microsoft published updates.

- Microsoft .NET 6.0 or higher is required

- 5 GB available hard drive space for full installation

- Minimum screen resolution of 1280 x 1024 with normal font size selected and scaling set to 100% (this is the same as setting DPI to 96 pixels per inch).

Database server support:

- Microsoft SQL Server 2019

- Microsoft SQL Server 2017

- Microsoft SQL Server 2016 SP1

- Microsoft SQL Server 2014 SP2

Compatible releases

The following releases are compatible with Simcenter Flomaster 2210

- Simcenter FLOEFD 2020.2

- Simcenter Motorsolve 2020.1, 2020.2, 2021.1.

- Simcenter Amesim 2020.1, 2020.2, 2021.1, 2021.2, 2022.1, 2210

- COMOS – 10.3.3

- Active Workspace 5.3 with Team Center 13.3

- Simcenter 3D – The Simcenter 3D Flomaster Co-Simulation link will work with Simcenter 3D 2021.2 using the latest available Thermal-Flow service pack for Simcenter 3D 2021.2 - Simcenter3D_ThermalFlow_Jan-11-2022_2022.1.2_svn168686 or later.

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