

What's New in Flowmaster V7.8

Fact Sheet

New Features

- Data Wizard for Pipe Roughness
- Data Wizard for Pipe Schedules
- Additional Heat Transfer Options - Multiple Pipe Layers
- Additional Heat Transfer Options - Buried & Partially Buried Pipes
- Flow Coefficient Curve Creator
- Enhanced Fluid Properties
- New Cylindrical Compliant Gas Pipe
- New Cylindrical Elastic Gas Pipe
- Compressible Check Valve
- New Heat Exchangers
- Charting Enhancements
- Results Data Browser
- Pack / Unpack Enhancements

Flowmaster V7.8 offers major new functionality, building on the performance of the Flowmaster V7 platform. Enhancements have been made across the product to:

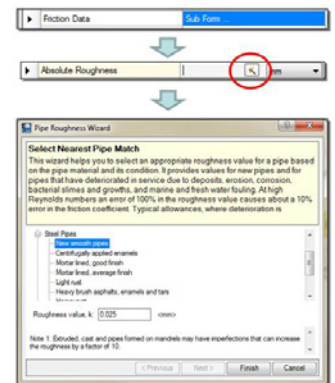
- System Modelling & Simulation
- Data Management & Collaboration

Whilst many of these enhancements are designed with a focus on the Process industry there is also additional functionality for Power Generation and cross-industry users.

System Modelling & Simulation

Data Wizard for Pipe Roughness

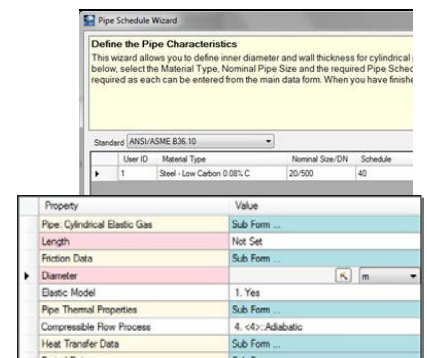
A data wizard has been added that provides the user with assistance in selecting an appropriate roughness value for a pipe based on the pipe material and its condition. It provides values for new pipes and for pipes that have deteriorated in service due to deposits, erosion, corrosion, bacterial slimes and growths, and marine and fresh water fouling.



Data Wizard for Pipe Schedules

In many industries (including gas, oil, process, power generation and shipbuilding) flow lines tend to be constructed using readily available pipes defined by the standard ANSI/ASME pipe schedules. A new data wizard has been added to most cylindrical pipes that allows users to set pipe schedule specifications.

These specifications are then used to calculate and populate the pipe data sheet including diameter, material type and wall thickness with a user entered option for length and absolute roughness. This will help reduce the time spent pre-processing the data outside of Flowmaster as well as reduce the risk of introducing human error. The wizard contains default schedules from the US, Europe, and Japan with a user option to add additional schedules via comma separated values (CSV) files.



Additional Heat Transfer Options - Multiple Pipe Layers

With Flowmaster V7.8.0 it is now possible to specify up to three layers of insulation for most cylindrical pipes, rather than the single layer that was previously allowed. The thermal resistance of the three layers is incorporated into the overall heat transfer coefficient, calculated and used by Flowmaster when a full heat transfer analysis is selected. This allows users to simply specify the insulation properties instead of pre-processing this information prior to entering it into Flowmaster.

Additional Heat Transfer Options - Buried & Partially Buried Pipes

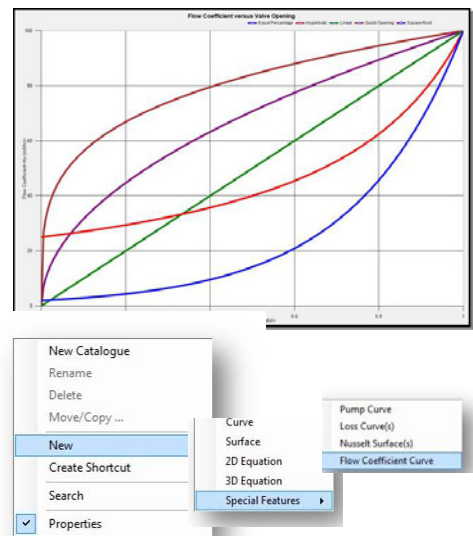
Buried and partially buried pipes are fairly common in the oil & natural gas industries. For exposed pipes it is appropriate to assume that the external medium is always air when calculating the external heat transfer coefficient for use in the Flowmaster rigorous heat transfer models. Flowmaster V7.8.0 introduces new options for specifying heat transfer information for most fully exposed, buried, and partially buried cylindrical pipes. These options allow the user to specify the conditions external to the pipe including: burial depth, soil material, external fluid, and external fluid velocity. With this information Flowmaster can then calculate an average external heat transfer coefficient for use with the full heat transfer options. The process greatly reduces the pre-processing necessary for the user to calculate an external heat transfer coefficient for use in Flowmaster, though this is still an option.

Flow Coefficient Curve Creator

Within Flowmaster V7.8.0, all control valves have been enhanced to allow the specification of flow coefficient versus valve opening both in compressible and incompressible analysis. This enables users to use a more common form of manufacturers' data without the need to convert to a loss coefficient. A new Flow Coefficient Unit has also been added to all Flowmaster default unit sets.

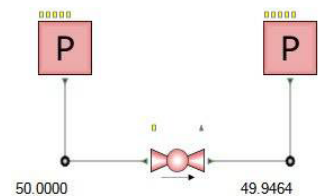
To facilitate the use of flow coefficient versus valve opening data, a new flow coefficient curve creator has been added to the Performance Data>Special Features option.

This tool allows users to set a single flow coefficient value and valve opening, and select which type of inherent flow characteristic to use, including: linear, hyperbolic, quick opening and equal percentage. These curves can then be saved to the database for future use with control valves.



Rigorous Energy Balance Solver - Compressible

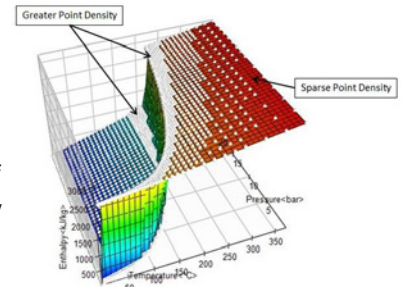
Flowmaster V7.8.0 integrates the new Rigorous Energy Solver for compressible analysis. This solver is available to all customers with compressible analysis capabilities as part of the standard compressible license. The Rigorous Energy Solver complements the existing temperature based compressible solver. It aims to balance the energy of the system (in the form of enthalpy) and deduce the network temperatures from equations of state rather than propagating the temperature around the network based on local energy balances and iterating, ensuring temperatures are consistent (i.e. match) at junction points.



Enhanced Fluid Properties

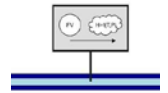
Flowmaster V7.8.0 also introduces the larger integration of NIST REFPROP 9.0 into Flowmaster V7. NIST REFPROP 9.0 is a fluid database that is maintained by the National Institute of Standards and Technology in the USA and is considered one of the most complete fluid property databases currently available. The integration offers two options to the user for defining fluids for use in Flowmaster:

- i) a direct link to the external REFPROP 9.0 library; or
- ii) an interface to import the fluid property information from the library to a Flowmaster based fluid template.



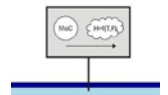
New Cylindrical Compliant Gas Pipe

To accompany the introduction of the Rigorous Energy Solver for compressible flows, a new pipe model has been introduced for slow transient vapour phase flows (such as gas transport and distribution, or other 'gas packing' applications). The Cylindrical Compliant Gas Pipe is based on the Finite Volume method and is designed for mass conservation. The new pipe can also account for the Joule-Thomson effect on the length of the pipe.



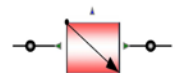
New Cylindrical Elastic Gas Pipe

Another new pipe model for fast transient vapour phase flows (such as pipe rupture and sudden valve closing) complements the Cylindrical Compliant Gas Pipe described in the previous section. The new Cylindrical Elastic Gas Pipe works in conjunction with the Rigorous Energy Solver for compressible flows. It is based on the Method of Characteristics and is designed for tracking pressure surge, similar to the current Compressible Gas Pipe. The new pipe can also account for the Joule-Thomson effect on the length of the pipe.



Compressible Check Valve

A check valve for use in compressible analyses has been introduced with Flowmaster V7.8.0. The valve allows users multiple options of operation including: a simple non-return valve which prevents backflow but does not account for pressure losses; a 'Simple Check' with flow coefficient, gas flow factor and crack pressure specified; or the ability to specify more complete pressure loss data with pressure drop versus inlet flow rate.

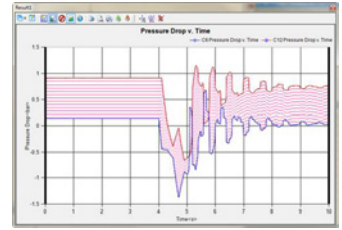


Heat Exchangers

V7.8.0 delivers 40 new heat exchanger components and each of these utilises heat transfer correlations from the VDI Heat Atlas, 1994 Edition, VDI-Gesellschaft Verfahrenstechnik U Chemieingenieurwesen. The components are compatible with the Flowmaster V7.7 thermal solvers as well as the new Rigorous Energy Solver developed as part of Flowmaster V7.8.0.

Post Processing - Charting Enhancements

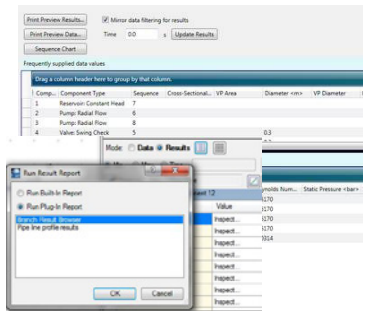
Charts can now be saved, with customisations, to a network document or results document folder. The chart can be recalled for re-use and allows additional overlay plots assisting simulation engineers in improving efficiency and traceability.



The plot integration enhancement to integrate between two lines and the shaded integration area can be customised for fill pattern and fill colour.

Results Data Browser

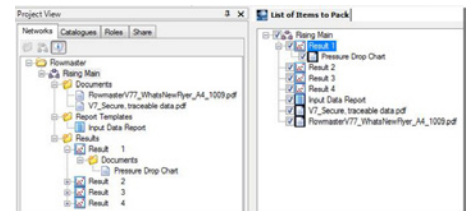
A new Results Data Browser (building further on the Input Data Browser), allows the viewing and export of simulation results at a specified time within the simulation period. The report can be saved as a template for re-use.



Data Management & Collaboration

Pack/Unpack Enhancements

Enhancements to the Pack/Unpack feature now allows for the inclusion of Documents, Report Templates and Results Documents folders associated with a network.



SQL Express 2008

SQL Server 2008 R2 Express edition is now shipped with Flowmaster V7.8 as an installation option in the standard install package. The Express 2008 R2 edition now supports 10 GB database files, which represents a significant increase over previous versions.

Oracle Support

In response to a strong demand from our Enterprise level customers, Flowmaster V7.8 now delivers support for the Oracle database engine. The Flowmaster V7 application is now capable of connecting to either a Microsoft SQL Server database or an Oracle database. Flowmaster V7 supports Oracle 10g Release 2 Enterprise, Standard and Express Editions.

In addition to these included features, two additional tools are also available with Flowmaster V7.8, the CAD Piping Import Tool and the GIS Import Tool. For further information on this additional functionality contact your Flowmaster representative.