ENGINEERED SOFTWARE

PIPE-FLO®

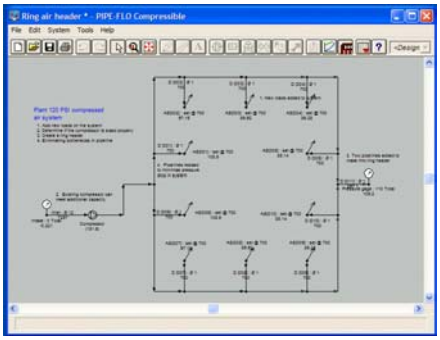
Compressible

The perfect tool to design, build, operate, and maintain steam and gas piping systems.

When analyzing a piping system transporting compressible fluids, you need a tool to help visualize the interaction of pipelines, compressors, components, and controls throughout the system.

PIPE-FLO Compressible provides you a clear picture of the entire system by integrating the following tasks into a single program:

- A piping schematic showing how the system components and pipelines are connected.
- A powerful calculation engine showing system operation.
- Communication tools help you share your design with others.
- Access to supporting documents in electronic format.



Now everyone from the boardroom to the plant floor will have an understanding of how a compressible piping system operates, along with all the information needed to design, build, operate, and maintain the system.

Using PIPE-FLO Compressible you can:

- Draw a piping system schematic showing all the compressors, components, vessels, control valves, and interconnecting pipelines.
- Size the connecting pipelines using electronic pipe, valve, and gas data tables.
- Select control valves from manufacturer's Electronic Catalogs, to optimize the system operation.
- Provide immediate access to supporting documents needed to design, build, operate, and maintain the piping system.

PROGRAM OVERVIEW

Providing a Clear Picture

The program's FLO-Sheet provides you with a familiar piping schematic, complete with all the compressors, vessels, components, controls, along with the interconnecting pipelines. You can use your own naming convention with PIPE-FLO, providing you with a familiar view of the piping system. Point to an item on the FLO-Sheet and the fly-by viewer provides the highlights, to get more detail double-click on the item and PIPE-FLO displays a detailed property sheet.

The FLO-Sheet displays the calculated results, showing you the pressures and flow rates in your system. PIPE-FLO highlights trouble spots in your system such as pipelines with choked flow, pipelines with high or low fluid velocities and pressures, system bottlenecks, and improper control valve position.

Integrated System Calculations

PIPE-FLO Compressible performs all the calculations needed to size individual pipelines, select control valves, size flow meters, balancing orifices, and perform a rigorous compressible gas hydraulic network analysis of the entire piping system.

Individual pipelines are sized with user created pipe specifications streamlining the design process. PIPE-FLO looks up the pipe sizes, valve and fitting properties, and gas properties using engineering data tables on disk. With full control over the engineering data tables, you can customize the operation of PIPE-FLO to meet your company's standards. The pipe specifications can be saved and used as templates for starting future projects.

PIPE-FLO calculates the design point values needed for control valve selection. Then it can select control valves from manufacturer's electronic catalogs. Once the control valves are selected, they can be placed into the piping system, providing you with a clear view of how the total system operates.

A piping system is called on to operate under a variety of conditions. With PIPE-FLO, you can turn compressors on and off, open and close pipelines, change vessel pressures, and adjust set points for control valves. This operating information can be saved in a lineup with PIPE-FLO calculating how the system operates. This provides you with a clear picture under a variety of expected operating conditions.

Communicate with others
PIPE-FLO Compressible incorporates many communication and collaboration tools, helping you share the piping system model with other designers, engineers, clients, and equipment vendors, along with the plant operating and maintenance personnel. PIPE-FLO's design files and pipe specifications serve as templates providing design control for the piping projects. Starting a project using a design file your pipe specifications are immediate available for use. When selecting a pipe specification the pipe material, schedule, sizing rules, and design limits are automatically established. By creating or modifying the pipe, valve, and fluid tables, you can further customize PIPE-FLO providing you with total design control.

You can share your system design with other PIPE-FLO Compressible users. Simply select the E-mail System File menu item and PIPE-FLO Compressible starts up your e-mail client, and attaches the current project to the e-mail. The recipients can open your system with their copy of PIPE-FLO Compressible and review the design. The calculated results can be viewed within the program, sent to any Windows supported printed or plotter, or e-mailed as PDF files, all from within PIPE-FLO Compressible.

Access to Design Information
A tremendous amount of information is needed to design, build, test, operate, and maintain a fluid piping system. FLO-Links provide immediate access to necessary design documents. For example, you can create a FLO-Link for a pipeline to display the isometric drawing developed under a CAD program. When you click on the link, the CAD program starts and displays the isometric drawing. The referenced CAD drawing can be located on your network or on the Internet.

FLO-Links can start other applications used to operate or maintain your piping system. For example, you can create a FLO-Link for a control valve and have PIPE-FLO start your maintenance management software and display the maintenance history for the selected control valve.

Advanced Calculation Method
PIPE-FLO Compressible assumes an adiabatic process (no heat transfer). The program calculates the pressure drop in a pipeline assuming the Fanno flow and takes into account area changes. The fluid properties are calculated as it passes through the system using the ideal gas law.

The program supports all valve and fitting types found in the Crane Technical Paper 410 and allows the addition of custom valves and fittings.

PIPE-FLO automatically configures the lineup for each network calculation by tracing the system loops and setting up the flow and pressure drop equations needed for the calculations. The program calculates the balanced flow rates and pressures in a piping lineup using the a variety of convergence methods including the Steepest Decent, Hardy-Cross, Genetic Algorithm, Flow Averaging, and Pressure Averaging. PIPE-FLO Compressible uses all five convergence methods concurrently. As the end of each iteration, the program uses the results from the method that has the greatest convergence, and then inserts those assumed flow rates into the solution space for the next iteration. As a result, the program uses the best results at the start of each iteration.

Control valve sizing is performed using the method outlined in the Instrument Society of America Standard ISA S75.01 Flow Equations for Sizing Control Valves.

Flow meter and balancing orifice sizing is performed using the method outlined in the American Society of Mechanical Engineers Standard ASME MFC-3M Measurement of Fluid Flow in Pipes Using Orifice, Nozzle, and Venturi.