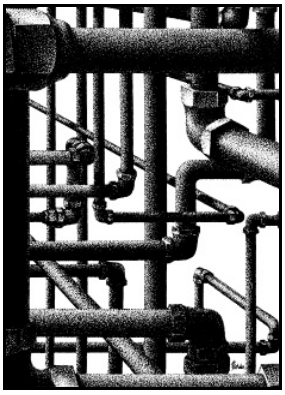
GASWorkS™

Product Description



GASWorkS™ has continued to evolve since our first quite simple but effective version of the software was released in 1991. Our latest release sports a very sophisticated map-style graphic data interface, a quick Solution routine, and provides support for several different model elements, including support for individual customer features. GASWorkS provides an extensive set of network modeling tools to assist the User in analyzing and designing distribution, transmission, gathering, fuel, and plant piping systems conveying natural gas or other compressible fluids.

GASWorkS may be used to create steady-state models of systems containing not only standard pipe type elements but also supports regulator, compressor, valve, well, and fitting type elements. GASWorkS calculates the estimated valve coefficient for regulators and the estimated power and fuel requirements for compressors. A Pipe Sizing routine is provided to assist in determining the required size for selected pipes in the model.

Solution Method

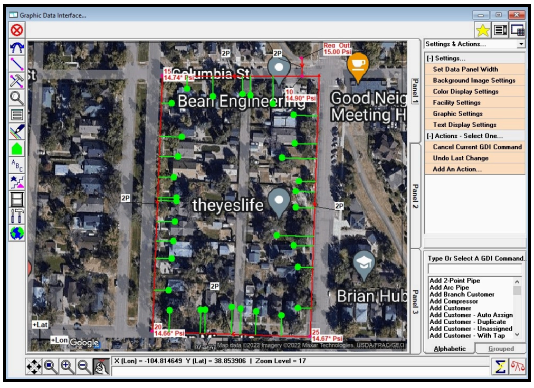
GASWorkS uses a Newton-Nodal, iterative method of solution. It supports nineteen pipe flow equations - with an equation suitable for essentially all natural gas applications.

The Solution routine provides an efficient solution for virtually any sized model - tested to 250,000 nodes. Solution options allow flowing temperature to be calculated based on environmental heat loss and gain. Gas properties are calculated at specific locations, including specific gravity, viscosity, the ratio of specific heats, and heating value, based on the gas composition. Mixed gas properties throughout the system can be calculated based on the flow distribution. Compressibility can be calculated using one of several methods, including the latest revision of AGA 8.

Graphic Data Interface

The Graphic Data Interface (GDI) provides map-style graphical access to the model data. The GDI allows the inclusion of Bitmap (BMP), Drawing Exchange Format (DXF), Joint Photographic Experts Group (JPEG), Keyhole Markup Language (KML), Portable Document Format (PDF), Shapefile (SHP), or Tagged Image File Format (TIFF) files as a reference background. Using the GDI, the User can draw the model schematic using point-and-click mouse entry, coordinate value entry, or relative distance and angle entry. The GDI provides data screens for editing and viewing the various pipes, nodes, and customer data, and analysis results.

The GDI includes a wide variety of tools for modifying the pipe, node, and customer model features, including routines for adding, deleting, and moving features - and the ability to undo (and redo) changes and deletions. Three independent display panels support various zoom commands, including the ability to zoom in by a User-specified window, zoom by a User-specified scale, and zoom to a previous view, allowing the User to move around the model image easily. A robust set of color coding and Tracing routines enhances the User's ability to graphically review the analysis results and the system's performance. The Trace routines are complemented by the inclusion of what we refer to as "valve nodes." The valve node feature was developed to assist in the design and layout of emergency isolation areas. A complete set of annotation routines allows the User to include notes and references in the model graphics.

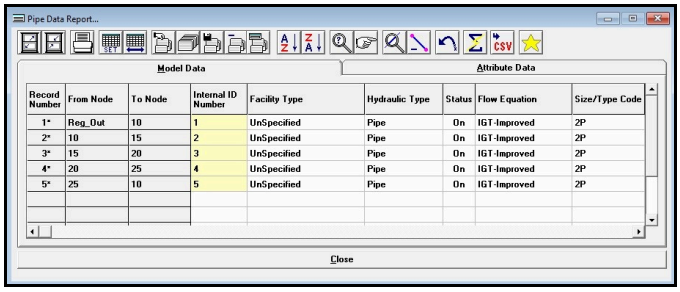


Authorised Distributor: COMPUTERS & ENGINEERING, Holzmühler Weg 87-89, D-35457 Lollar-Germany
Tel: 0049 6406 73667 Fax 0049 6406 4745 Baser@comp-engineering.com www.comp-engineering.com

The GDI display can include two-point, polyline, and arc-style pipe symbols • Node, customer, and pseudo service line symbols • Pipe, node, and customer data values as text • Piping symbols for non-pipe type elements • User-defined annotation, graphic lines, and shapes • Fitting symbols • Valve node symbols • Flow direction arrows • Marker Flags • And multiple background reference images. The User may customize the GDI's display properties by setting display colors, line and symbol types, display limit, and display size and width.

The GDI tools are accessed through descriptive tool icons on function-based "fly-out" toolbars, a command line and list interface, and a tool palette that can be arranged to meet the User's preference.

Report Routines



Record Number	From Node	To Node	Internal ID Number	Facility Type	Hydraulic Type	Status	Flow Equation	Size/Type Code
1*	Reg_Out	10	1	UnSpecified	Pipe	On	IGT-Improved	2P
2*	10	15	2	UnSpecified	Pipe	On	IGT-Improved	2P
3*	15	20	3	UnSpecified	Pipe	On	IGT-Improved	2P
4*	20	25	4	UnSpecified	Pipe	On	IGT-Improved	2P
5*	25	10	5	UnSpecified	Pipe	On	IGT-Improved	2P

The Report routines provide spreadsheet-style reporting of the model data, attribute data, and analysis results - including the ability to edit data directly from within the report by simply selecting the cell you wish to edit and making the desired change. The User may choose the items to be included in the report by collapsing the columns associated with the unwanted items.

The pipe report provides a comprehensive collection of information, including reporting of both size/type and internal diameter values, reporting of pipe inlet, outlet and average pressures, flow rates, velocities and volumes, and simultaneous reporting of linear and pressure drop per User specified length. Selection sets may be created from within the data reports, allowing unique reporting of User-specified data groups. Hierarchical queries will enable the creation of sub-sets from a previously created selection set.

Reports may be printed onto any Windows-supported device, allowing the selection of paper orientation, font size and type. Pipe, node, and customer can be viewed using the "standard" spreadsheet-style report - summary, data error, solution log, and exception reports are also provided. Customer reports may be created by exporting the model data to a third-party database, spreadsheet, or word processor application.

Other Features

Import & Export Routines - GASWorkS includes an extensive set of Import and Export routines, allowing data to be exchanged between various applications. Support is provided for ASCII, DBF, Microsoft Access and Excel data files, third-party model data files, GIS shapefiles (SHP), and a robust DXF translator, allowing both the import and export of graphical data. The DXF and SHP Import routines allow the automated creation of a GASWorkS model from a CAD drawing or GIS data set. "Quick Export" routines are provided to allow the export of complete model data with a single click.

Customer Features - Diversified load values for antenna or looped-type network configurations can be automatically distributed using the Diversity handling features - based on the British IGE calculation standards. An external database may be attached to the GASWorkS customer data features. This is especially useful for connecting the billing file data to the model data.

Main Attribute Features - An external database may be attached to the GASWorkS pipe data features. This is useful for maintaining the non-model attribute data such as the address, pipe specification, and test pressure values.

User Interface - Each GASWorkS routine is accessed through a friendly and efficient point-and-click User interface. GASWorkS is fully menu-driven and provides logical access to data and results. Online help, including an extensive collection of how-to topics, is just a click away.

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