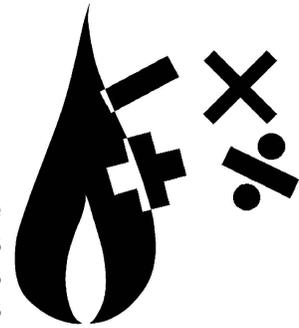# GASCalc™ 5.0

GASCalc™ 5.0 is a Windows™ based suite of calculation tools for the natural gas professional. Routines are provided for calculating numerous parameters associated with the design and operation of natural gas gathering, transmission, distribution, plant, or fuel piping systems. Its robust set of calculation routines and features include...

GASCalc 5.0 Calculations & Features

GAS PROPERTY VALUES

Physical Properties	Calculates various physical properties including heating value, specific gravity (ideal or real), specific heat ratio, and viscosity for a specified gas composition.	Supported Heating Value Methods:
		  AGA 8 -1992
		  GPA 2172 - 1986
		  GPA 2172 - 2009
		  GPSA - 1998

Thermodynamic Properties	Calculates various thermodynamic property values including enthalpy, entropy, constant pressure and volume specific heat values for a specified gas composition at specified pressure and temperature conditions.	Supported Heating Value Methods: AGA 10 - 2003

Compressibility	Calculates compressibility, density, and supercompressibility of a gas composition at specified pressure and temperature conditions. Automatically or individually calculated.	Supported methods:
		  AGA 8 - 1985
		  AGA 8 - 1992
		  AGA NX19
		  GERG - 1988
		  GPA 2145 - 2009
		  GPSA

Sonic Velocity	Calculates the speed of sound value for User specified pressure and temperature conditions and gas composition.	Supported methods:
		  AGA 10 - 2003
		  GPSA

Pressure, Volume, Temperature (P, V, T)	Calculates associated pressure, temperature, and volume values for specified conditions.	

Atmospheric Pressure	Calculates the atmospheric pressure for a given elevation or an elevation based on pressure value. Automatically or individually calculated.	Supported methods:
		  AGA Measurement
		  ASHRAE - 2009
		  Handbook Of Chemistry & Physics
		  ISHM
		  NOAA - 1976

Average Pressure	Calculates the average pressure in a pipe segment or pair of values.	
Average Temperature	Calculates the average temperature in a pipe segment or pair of values.	

METER VALUES

Fixed Pressure Factor	Calculates required adjustment factor for gas measured using a fixed pressure factor.	
Standard Volume	Calculates the equivalent standard (base) volume for a volume measured at non-standard conditions.	

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GASCalc 5.0 Calculations & Features

Base Conditions Conversion	Converts a volume at one set of standard (base) conditions to the equivalent volume at another set of standard (base) conditions.	
Volume Comparison	Calculates the difference in volumes at different standard (base) conditions. Useful for calculating "lost and unaccounted for" values.	
Orifice Meter	Calculates values associated with measurement by an orifice meter. Includes calculation of orifice diameter, pressure differential, and flow values.	Supported methods: AGA 3 - 1985 AGA 3 - 1992 ISO - 5167
Diaphragm Meter	Calculates values associated with sizing of the diaphragm displacement meters.	Supported methods: GRI/SWRI Rockwell Sprague
Rotary Meter	Calculates values associated with sizing of the rotary meters.	
Turbine Meter	Calculates values associated with sizing of the turbine meters.	
Cone Meter	Calculates values associated with measurement by a v-cone meter.	Supported methods: McCrometer
Pulse Output Meter	Calculates values associated with measurement by a pulse output meter.	Supported methods: AGA 7
Meter MatchMaker	Finds appropriate meters based on specified sizing criteria.	
Flow Limiting Device	Calculates values associated with sizing flow limiting orifices and nozzles.	Supported methods: AGA 7
PIPE VALUES		
Pipe Flow	Calculates various values associated with flow through a single or series of pipe segments. Allows calculation of diameter, length, flow rate, roughness, pressure drop, and downstream temperature. Allows fittings to be attached.	Supported methods: AGA partially and fully turbulent Colebrook Cox Darcy-Weisbach IAPMO low and high IGE3 low, medium, general IGT-Improved IMC high and low Mueller high and low Oliphant Panhandle A and B Pole LP Spitzglass high and low Weymouth
Service Line Sizing	Calculates various values associated with flow through a service line - from main tap to termination riser. Allows fittings to be attached and inclusion of EFV. Calculates various EFV values including maximum protected length and reset time.	
Blowdown Time	Calculates the estimated time required to vent a line to the atmosphere.	
Pipe Volume	Calculates the volume of gas contained in a single or series of pipe segments at specified beginning and ending conditions.	

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GASCalc 5.0 Calculations & Features

Fill Time	Calculates various values associated with filling a single or series of pipe segments at specified beginning and ending conditions.	
Vent Time	Calculates various values associated with venting a single or series of pipe segments at specified beginning and ending conditions.	
Purging & Clearing	Calculates various values associated with purging and/or clearing a pipe segment.	

Steel Pipe Design Formula	Calculates design values for steel pipe segments.	Supported methods:
		  ASME/ANSI B31.8
		  US DOT 192

Plastic Pipe Design Formula	Calculates design values for plastic pipe segments.	Supported methods:
		  API 15LE
		  ASME/ANSI B31.8
		  PPI
		  US DOT 192

Maximum Allowable Operating Pressure (MAOP)	Calculates the MAOP value for a pipe segment based on User specified values and conditions.	Supported methods:
		  ASME/ANSI B31.8
		  US DOT 192

Bending Stress - Span	Calculates values associated with a pipe span. Supports pinned and fixed end conditions.	
Hoop Stress	Calculates hoop stress and SMYS comparison for User specified conditions.	

External Loading	Calculates stress values associated with roadway, railway, and unclassified crossings.	Supported methods:
		  API 1102
		  ASME - GPTC
		  PPI

Thermal Expansion	Calculates stress and change in length values associated with the temperature change of a pipe segment.	
Total Pipe Stress	Calculates the total combined stress for a pipe segment.	Supported methods: ASME/ANSI B31.8
Buoyancy	Calculates buoyancy and weight requirements for wet environment crossings.	
Permeation	Calculates the volume gas lost by way of permeation through a pipe wall.	

Hydraulic Diameter	Calculates the hydraulic diameter of plastic pipe based on dimensional values and tolerances.	Supported methods:
		  Generic
		  PPI

Flow Area	Calculates the flow area of a pipe or opening based on User specified conditions.	
VALVES & FITTINGS		
Regulator & Monitor System	Calculates sizing, flow, and pressure values associated with flow through a regulator and monitor pressure control station.	
Regulator & Relief Valve System / 2-Stage	Calculates sizing, flow, and pressure values associated with flow through a regulator and relief valve pressure control station. Supports single or two stage stations.	

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GASCalc 5.0 Calculations & Features

Regulator Values	Calculates sizing values associated with flow through a regulator.	Supported methods: American Meter American Meter AFV Equimeter/Rockwell Fisher Grove 80 Grove 900 ISA - S75.01 Mooney Table Based Values
Fitting Values	Calculates sizing values associated with flow through a line fitting (elbow, tee, or valve) using equivalent length values.	
Valve Values	Calculates sizing values associated with flow through a line valve.	
Relief Valve Values	Calculates sizing values associated with flow through a relief valve.	Supported methods: American Meter AFV API 520 ASME BPV Equimeter/Rockwell Fisher Mooney Table Based Values
Relief Valve & Piping System	Calculates sizing, flow, and pressure values associated with flow through a relief valve system.	
Station MatchMaker	Finds appropriate stations based on specified design and operating conditions.	
Device MatchMaker	Finds appropriate devices based on specified sizing criteria.	
MISCELLANEOUS CALCULATIONS		
Gas Loss From Damage	Estimates the volume of gas lost from a punctured or severed line.	
Compressor Values	Calculates various values associated with flow through a compressor unit.	
Well Flow	Calculates various values associated with flow through a well casing.	
Pipe Tap	Calculates various values associated with flow through a pipe side wall tap.	
Velocity	Calculates the flow velocity through an opening.	
Reynolds Number	Calculates the Reynolds Number associated with User specified flow conditions.	
Container Volume	Calculates the volume of various shaped containers.	
UTILITY CALCULATIONS		
Unit Conversions	Calculates dimensional equivalent of User specified value. Supports over 100 different dimensional units.	

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GASCalc 5.0 Calculations & Features

Energy Conversions	Calculates energy equivalent of User specified energy unit. Supports 30 different energy types.	
Value Interpolation	Calculates an intermediate value from a set of specified table values. Automatically or individually calculated.	
Value Extrapolation	Calculates an extended value from a set of specified table values.	

SELECTED PROGRAM FEATURES

Dimensional Units - Supports standard US, metric, and diverse unit systems. Includes a wide range of industry related units.

Applications - Allows external applications to be executed directly from the main menu.

User Interface - Provides intuitive and easy to understand and use fill-in-the-blank data screens for interacting with the many calculation routines.

Pipe & Device Property Tables - A comprehensive set of tables provides values required by the various pipe, fittings, devices and equipment calculations.

Property Table Editor - An extensive editor is provided for modifying the Fitting, Compressor, Pipe, Valve, Regulator, Well, Relief Valve, Meter, and EFV Property Tables which support the various calculation routines. The User can add, delete, and modify the models contained in the various Property Tables to meet their individual specific requirements.

Value Selection Tables - An extensive set of tables are provided to assist in the selection of certain required calculation values. Such as SMYS, HDB, HDS, MOE, Material Density, and Thermal Expansion Coefficients.

Device Selector - A handy device selection utility is provided to allow efficient selection of regulators and relief valves by selecting the Manufacturer, Model, Size, Orifice etc.

Many of the calculation routines are also available through the GASCalc 5.0 Application Program Interface (API). The API allows access to the supported calculation routines by way of programmatic function calls, allowing the User to create and access the calculation routines through their own or a custom developed user interface. The API is available at additional charge.