



**ROOTS® Meters & Instruments**

# ROOTS® Meters & Instruments



**P R O D U C T S   a n d   S E R V I C E S**



**Rotary Meters**

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**Electronic Instrumentation**

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**Transfer Provers**

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**Product Remanufacturing Services**

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**Test Equipment**

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**Meter Stations**

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**Meter Sets**

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**Meter Set Components**

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**On-Site Field Training Courses**

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For almost a century, ROOTS® meters have been used for billing of commercial and industrial gas loads. Accuracy, dependability, and low maintenance are of key importance in custody transfer measurement applications. The time-proven ROOTS® meter is the preferred rotary positive displacement gas meter in distribution, transmission and production segments for accurate measurement of gas from the well to the burner.

To meet the evolving needs of our customers, our product line has expanded to include a large variety of control and measurement equipment. ROOTS Meters & Instruments is much more than just a meter supplier. We offer a wide range of ROOTS® products and services.

# ISO9001



# The ROOTS® Meter Advantage

## Proven Accuracy

- Volumetric accuracy is permanent and non-adjustable
- Measuring characteristics established by the precision machined contours of non-wearing fixed and rotating parts
- Durable components ensure a long life expectancy under normal operating conditions
- Increased rangeability due to closer tolerances improve performance regardless of pressure and flow.

## Meters For Commercial & Industrial Applications

- Line Mount Meters
- Foot Mount Meter
- High Pressure Meters

## Magnetically Coupled Accessory Units

- Large variety of readout and output options
- Non-pressurized and interchangeable modular design simplifies conversion between accessory types
- Permanently lubricated Series 3 Accessories combine a long life expectancy with a reduction in maintenance
- Commonality of Series 3 Accessory components reduces inventory requirements

## Full Line of Electronic Instrumentation

- Pressure (P), Temperature (T), and PTZ Correctors
- Temperature or Temperature with Fixed Pressure Factor (FF) Compensators
- Solid State Pulsers to interface with Automated Meter Reading (AMR) devices and for remote readings

## Customer Service

Our unsurpassed customer service is provided through the combined efforts of our Customer Service, Technical Support, and Product Services Departments. Each department takes pride in their ability to deliver courteous and professional care to all customers in a timely manner. As described below, the departments are structured to efficiently support all customer service requirements:

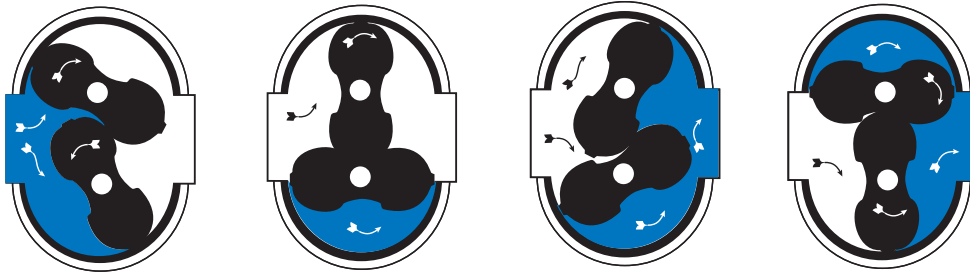
- Customer Service representatives for inquiries and order placement
- Technical Services staff for product application assistance and training
- Product Services Department for remanufacturing and testing services

## The ROOTS® Meter Operating Principle

The ROOTS® meter is designed to measure the volume of gases and gas mixtures with a high degree of accuracy. The industry accepted rotary type positive displacement operating principle ensures permanent, non-adjustable accuracy by using precision machined two-lobe impellers encased within a rigid measuring chamber.

Unlike other meter types, measurement accuracy is not affected by changes in gas specific gravity, pressure, or fluctuating flow. ROOTS® meters may be used from a few ounces to full capacity up of the meter's maximum pressure rating with highly accurate measurement over a wide operating range. This equates to a lower total cost.

The condition of a ROOTS® rotary meter can be verified by performing a differential pressure test while the meter is still in service. This simple and cost-effective preventive maintenance procedure contributes to a significant reduction in the whole life cost of the meter.



Precision machined for exceptional accuracy

**As shown in the picture, two contra-rotating impellers of two-lobe or “figure 8” design are encased within a rigid measuring chamber, with inlet and outlet connections on opposite sides. Precision machined timing gears keep the impellers in correct relative position. Optimal operating clearances between the impellers, cylinder and headplates provide a continuous, non-contacting seal.**

### ROOTS® Meter Product Line

A complete line of rotary meter sizes are available to measure a wide range of gas volumes for the majority of commercial and industrial applications in custody transfer applications. Refer to the Meter Sizing Chart in this brochure to determine the correct meter size for cost effectiveness and accurate measurement.

ROOTS® meters are suitable for handling most types of clean, common gases at either constant or varying flow rates and pressure. They are ideal for applications throughout the meter's operating range, from a few ounces to full maximum allowable operating pressure.

Our meters are widely recognized for their highly accurate measurement capabilities at both the low and high end of their rated capacity. The meter's rangeability (ability to measure gas over a wide flow range within a specified accuracy) provides the best over-all measurement accuracy on a “day-after-day” basis.

## ROOTS® Series B3 Line Mount Meters



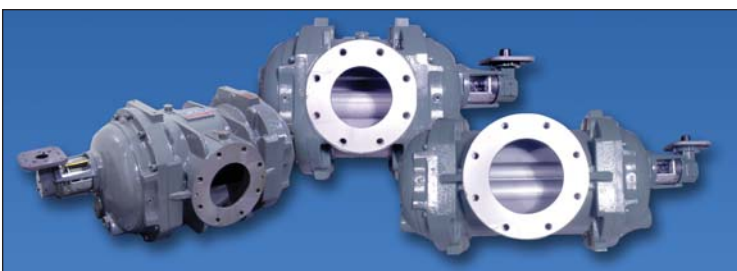
8C/11C/15C



2M/3M/5M



7M/11M/16M



23M/38M/56M



Four Inch 23M232

### Right Size the Meter to the Application

Series B3 meters are designed to provide accurate gas measurement over widely fluctuating flow, pressure, and temperature conditions. For further versatility, the five smallest meter sizes (8C through 3M) have 2" (50 mm) flanged connections, and a 6-3/4" (171 mm) flange-to-flange dimension. If application requirements change, this unique, cost-effective feature allows a quick and easy meter exchange without the need to re-pipe the meter set. Other key features include:

- Capacity ratings from 800 CFH to 56,000 CFH (22,6 m<sup>3</sup>/h to 1,585 m<sup>3</sup>/h)
- Maximum operating pressure rating of 175 PSIG (12 Bar)
- Models 8C through 5M are available with a 200 PSIG (13,8 Bar) rating upon request
- Models 8C through 2M are available with a 1-1/2" nipped connections upon request
- Operating temperature range from -40°F to +140°F (-40°C to +60°C)

For operating requirements beyond those listed, please contact your Roots Meters & Instruments representative.

### Four Inch 23M232 Meter with 4" Flanged Connection

Our 23M232 includes four inch flanged connections and a 232 PSIG (16 bar) maximum working pressure. This design complements our standard six inch 23M175. With a maximum capacity of 385 MSCFH (10,895 Nm<sup>3</sup> per hour) the 23M is an ideal measurement solution for a wide array of applications.

## ROOTS® Series 3 Accessory Units



CTR



TC



CD/TD



Solid State Pulser

### Designed for low maintenance and a long service life

- Interchangeability among Series B meter bodies of the same size
- Permanently lubricated for long life and virtually maintenance-free operation
- Modular design allows a quick-change to a different version at a lower overall cost
- Durable, weather resistant cover with improved sealing capability
- Versatile and configurable odometer masking
- Universal Instrument Drive (ID) assembly – one size fits all 8C-56M Series B Meters
- Quick and easy field installation of the low cost Solid State Pulser
- Available with factory pre-installed magnets for quick installation of the Solid State Pulser or Model 5 Prover Field Counter Pulser Module

### Counter (CTR)

An 8 digit non-compensated index registers displaced volume in Actual Cubic Feet (ACF) or in Actual Cubic Meters (m<sup>3</sup>).

### Temperature Compensated (TC)

Temperature compensation, available in meter sizes 8C-16M, is accomplished by a mechanical computer with a spiral bi-metallic thermocouple (probe) located in a sealed temperature well at the meter inlet. Series 3 TC Units provide corrected gas volume readings to a 60°F (15°C) base temperature for readout in Standard Cubic Feet (SCF) or Normal meters cubed (Nm<sup>3</sup>) between flowing temperatures of -20°F and +120°F (-29°C and +49°C).

### Counter or Temperature Compensated with Instrument Drive (CD/TD)

The Universal Instrument Drive (ID) Assembly adapts to the CTR and TC Accessory for installation of a corrector, chart recorder, or other externally mounted, mechanically driven device. The ID Assembly is mechanically linked to the CTR/TC mechanical gear reduction unit. One revolution of the instrument drive dog represents a specific displaced volume measured by the meter.

### Solid State Pulser (ICPW/ITPW)

The ROOTS® solid state pulser mounts directly to a CTR/TC Unit, generating low frequency pulses representing volumetric information for remote reading. Mechanical switches have been eliminated for maximum reliability. No battery or maintenance is required.



## ROOTS® Series 3A Accessory Units for LMMA Meters

Dresser's new S3A Accessory unit - that mounts to your LMMA meter - features the same high quality and long-term reliability of the oil-free S3 Accessory unit.

### Benefits are:

#### No Index maintenance.

Oil is not required for the polymer bushings and pre-lubricated, shielded ball bearings making the index environmentally friendly and easier to install and maintain.

#### Configurable Masking Options.

The S3A's versatile odometer masking design uses opaque or semi-transparent covers, offering configurable, trouble-free masking with no moving parts, hinges, flappers or magnets.

#### Easy-to-change ID Rotation.

Simply remove two bolts and invert the gear module so the pinion gear is driven at the bottom rather than the top of the horizontal bevel gear.

#### Conversion Kit Inventory Reduction.

The S3A uses the same #399 conversion kits as the B3 meters. Now you can stock the same Instrument Drive, Pulser or AMR Adapter #399 Kits for both Series Meters – LMMA and Series B3.

#### Proving Procedure Simplification.

With the S3A, you can prove your LMMA meters the same way you prove your B3 meters – off the odometer test wheel.

#### Lower Price.

The S3A Accessory Units are less expensive than LMMA series units – especially in the Instrument Drive and Pulser versions.

The no-maintenance, less expensive and easier-to-read S3A Accessory Unit extends the life expectancy of your LMMA meter (LMMA meter line was obsoleted in 1998) providing many additional years of reliable service.



Series A (LMMA) Meters with S3A CD and S3A ITPWD

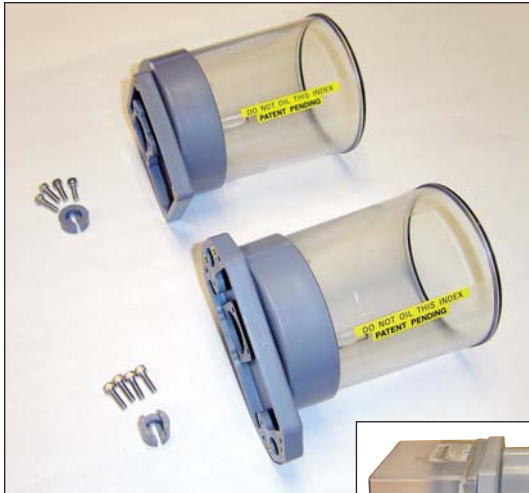


Series S3A TC

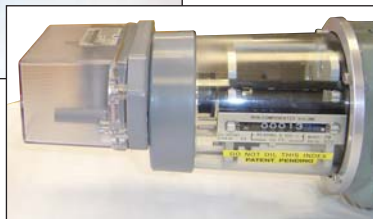


Series S3A CTR/AMR Adapter  
(shown with Itron ERT installed)

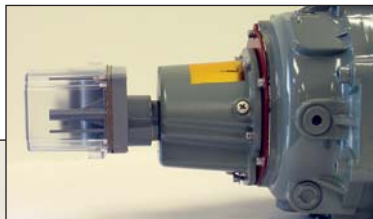
# ROOTS® AMR Adapters



**Series B3 AMR Adapter for CTR and TC**



**Series A (LMMA) CTR AMR Adapter**



**Series A (LMMA) TC AMR Adapter**

Dresser's new residential AMR Adapter for the Series 3 ROOTS CTR/TC and the Series A (LMMA) CTR/TC accessory units allows you to mount an Itron® Residential ERT® 40G for Invensys or American Meters directly onto a Dresser ROOTS Series B3 or Series A Rotary Meter. Additionally, there are now adapters available to mount American footprint Allnet, Badger, and Trace modules directly to the ROOTS® Rotary Meter.

The design utilizes a Series B3 or Series A Lexan® cover with an opening to engage the ERT or Cellnet module in a direct drive link to the gear reduction unit. Our proven ID seal system between the adapter and the Series 3 cover provides a barrier against moisture intrusion into the oil free cover. The AMR Adapter is fastened to the Series 3 or Series A cover from the inside providing a tamper proof design.

Our new direct drive AMR Adapter offers you a low cost solution for Series B3 or Series A CTR or TC meters in applications that require the adaptation of a Residential ERT or Cellnet AMR. You will also benefit from ease of use with this design as compared to the currently available solutions for Instrument Drive and Solid State Pulser version meters that connect to AMR devices.

The AMR Adapter is available as a conversion kit for field installation or factory installed on new B3 meters.

## ROOTS® Expanded Meter Line

### B3-VRM Vapor Recovery Meter

Rated for a maximum capacity of 3000 actual cubic feet per hour, the B3-VRM meters are specifically designed and tested for vapor recovery applications and conform to the California Air Resources Board specifications TP-201.1, TP-201.1A, TP-201.2, and P-201.5, as applicable. The extremely low pressure drop associated with the ROOTS positive displacement meter makes this meter ideal for the accurate measurement in low pressure recovery systems. Odometers on the vapor recovery meters are marked at 0.02 cubic foot increments, which allows accurately estimated readings in increments of 0.01 cubic feet. All B3-VRM meters are supplied with a 7 point certified accuracy curve for reference.



B3-VRM

### Series Z Compact Meters

Ideal for small commercial loads at pressures up to 15 PSIG (1 Bar), the aesthetically pleasing 5C15 (500 ACFH) and 8C15 (800 ACFH) meters are easy to install and conceal. Series Z meters provide excellent measurement accuracy starting at “pilot loads” and continuing throughout the range of the meter. To match the meter configuration to the application, the user selects the following parameters when ordering:

- Dial or Odometer type Index
- Sealed Index Cover
- Standard (Atmospheric) or 2 PSIG Compensated Index
- Top or Bottom Inlet
- Sprague 4 (male), 45 Light (male), or 1–1/2 inch NPT (female) Connections
- Optional Inlet Strainer/Screen



Series Z

### Series A (LM-MA) Meters

The 8C175 compact meter, like the Series Z, is also ideal for small commercial applications, but with a higher pressure rating. This meter is rated for a 175 PSIG (12 Bar) working pressure. Also available as a Vapor Recovery Meter that is C.A.R.B. approved and available with a High Frequency transmitter (PX).



Series A (LM-MA)

### Series A1 Foot Mount Meter

The 102M125 Foot Mount meter is used for the measurement of high volume industrial gas loads for capacities up to 965.3 MSCFH at 125 PSIG (27,334 Nm<sup>3</sup>/h at 8,6 Bar).



Series A1

## ROOTS® High Pressure Meters



Series B3-HPC

### Series B3-HPC (High Pressure Cartridge) Meters

This meter line features a common cast-steel housing for the 1M (1000 ACFH) and 3M (3000 ACFH) sizes as well as the 5M 1480 (5000 ACFH) and 7M 1480 (7000 ACFH) sizes of aluminum cartridges. The meters are available with either an ANSI Class 300# flange for the 740 PSIG Meter lines or an ANSI Class 600# flange for the 1480 PSIG Meter lines.

The 5M(5000 ACFH) and 7M (7,000 ACFH) meters are designed for higher capacity applications with a maximum allowable operating pressure of 1480 PSIG. The housing is cast steel to meet the demands of the higher flow rates and pressures.

The cartridges are field replaceable and are interchangeable between housings regardless of the pressure rating on the housing. As an option, a self-resetting full flow internal bypass is available on new meters and on replacement cartridges. Since this meter utilizes the Series 3 Accessory Units, a full line of index options is available.

The latest addition to the list of high pressure meter accessory unit options, is the Integral Micro Corrector, Model IMC/W2. See page 12 for further details on the corrector.



Series B3-HPC with Integral Micro Corrector



Removable B3-HPC Cartridge

### Series B3-HP (High Pressure) Meters

For lower pressure loads, the 1M300 (1000 ACFH) and 3M300 (3000 ACFH) are viable alternatives for pressures up to 300 PSIG. Based on the B3 meter line, the B3-HP meters offer extremely low start and stop rates and a compact design with a 6-3/4" flange-to-flange dimension and a much lower weight than traditional high pressure meters. This is achieved by using aluminum for all major meter components. The Series B3-HP meters mate with ANSI Class 300# FF flanges and are easily installed by one person without the need for a lift or hoist.



Series B3-HP

## ROOTS® Optional Electronic Products

### Solid State Transmitter (XMTR)

- High frequency pulse output
- 100 pulses per input shaft revolution
- Solid State circuitry provides a long life expectancy
- Mounts on any standard Instrument Drive
- 10 to 15 VDC



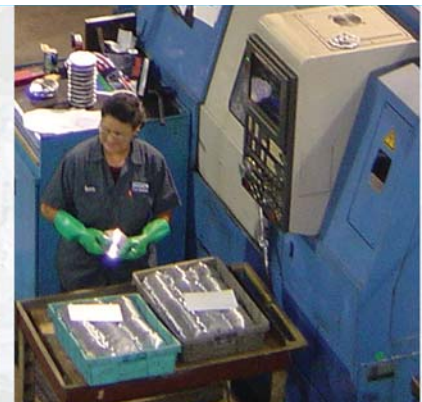
XMTR

### ROOTS® ICEX

- Provides a non-compensated, high frequency pulse output
- Mounts on all Series B meter bodies
- Available factory installed or as a field installable conversion kit
- Ensures maximum reliability by using Solid State components to eliminate mechanical switches
- Minimizes maintenance
- Available in three connections styles: MS-style circular connector, 1/2 inch liquid tight type conduit fitting, or cable gland with 4-ft. cable.



ICEX



## ROOTS® Electronic Instrumentation

The ROOTS® Micro Corrector line of products, offers both the latest technology in electronic volume correction and the best value that is available in the gas market today.



**ID Mount Version**

### ROOTS® Micro Corrector

The Micro Corrector is available in two models – the Instrument Drive/Wall mount version, and the IMC/W2 which can be mounted integrally to the meter. The IMC/W2 is available for mounting on the Series A and Series B ROOTS® meter line, as well as Romet meters. Both the IMC/W2 and the MC2 are available in PTZ+Log, P+Log, and T+Log versions.

#### Both models feature:

- Intuitive User Terminal software
- 3 separate logged data reports, which can be imported into commercially available software platforms such as MS Excel™
- 3 user programmable pulse outputs included at no additional charge: corrected volume, uncorrected volume, and fault/alarm condition
- Extremely reliable and accurate volume correction with unprecedented nominal five year battery life – data and configuration stored in E<sup>2</sup>PROM
- Newly designed instrument drive assembly senses meter rotation, eliminating the need to physically change the rotational direction



**IMC/W2**

### ROOTS® Meter with Integral Micro Corrector, Model IMC/W2

The IMC/W2 is a fully electronic, integral, gas volume corrector. Meter size and version are configurable using the User Terminal software. This feature presents a major cost savings to the customer in terms of inventory reduction. Additional cost savings can be realized on the Series B line mount meter sizes, as temperature and pressure can both be sensed internally, eliminating the need for thermowells and piping kits. A new feature that can be supplied upon request with the IMC/W2 is the Micro Generator™. A ROOTS® Meter running at approximately 25% of the meter's rated capacity can generate enough power to run the IMC/W2 which essentially turns the main alkaline battery pack into the backup battery. In addition, the IMC/W2 has Trim Table capability which, when enabled, increases rangeability and revenue during periods of low flow.

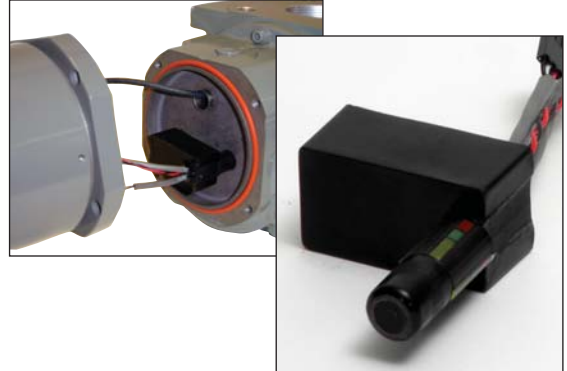
- Seamless integration with ROOTS® Model 5 prover software when using the Roots SmartProve™ interface

## ROOTS® Electronic Instrumentation

### Micro Generator

The Micro Generator uses cutting edge technology to convert the rotation of the meter impellers into electrical energy, while simultaneously providing volume pulses to the Micro Corrector.

- Reduces Battery Replacement Costs
- Increases Life of Main Battery
- Easy to Install
- Converts Rotation of Meter Impellers into Electrical Power
- Available for both Series B and Series A (LMMA) meters



Micro Generator

### SmartProve

The Dresser SmartProve™ Interface is a user friendly approach to testing the ROOTS® Micro Corrector, Models IMC/W2, and MC2, when using the ROOTS® Model 5 Transfer Prover. The specially designed cable and software allow for a combined accuracy test of the corrector and the meter. The SmartProve package consists of a Model 5 Prover software upgrade CD, the SmartProve Interface Cable, and instructions for use.



SmartProve



## Model 5 ROOTS® Provers

Model 5 Transfer Provers feature an integrated computer controlled system for verification and testing of rotary, diaphragm, and turbine gas meters. After the field meter is connected to the Prover and the test sequence is selected, the remainder of the operation is “hands-off.” Test sequencing is automatically controlled by the software settings and the test results are displayed on the computer screen.

For ease of testing and recording, the Model 5 Prover system will:

- Store unlimited predetermined field meter test configurations
- Perform and display all calculations at the end of each test and allow for saving to disk
- Provide user-friendly menu prompts
- Allow easy access to extensive Help Files

The primary components for all Model 5 Prover systems include highly accurate ROOTS® master meters as measurement standards, easy-to-use Windows®-based software, and a blower system to provide a stable air flow through the system.



2M/10M

### 10M or 2M/10M Prover

- 10M or 2M/10M master meters

Capacities:

2M: 35 to 2,300 ACFH  
(1 to 65.1 m<sup>3</sup>/h)

10M: 100 to 10,000 ACFH  
(2.83 to 283 m<sup>3</sup>/h)

- Suitable for both field and shop use
- Easily transported in a van or truck



5M/20M

### 5M/20M Prover

The cart-mounted prover gives you the increased capability to prove rotary, turbine and diaphragm meters up to 20,000 acfh, while occupying minimal floor space.

Capacities:

5M: 35 to 5,650 ACFH  
(.41 to .60 m<sup>3</sup>/h)

20M: 160 to 20,000 ACFH  
(4.5 to 566 m<sup>3</sup>/h)



# ROOTS® Provers & Accessories

## 10M/80M Proving System

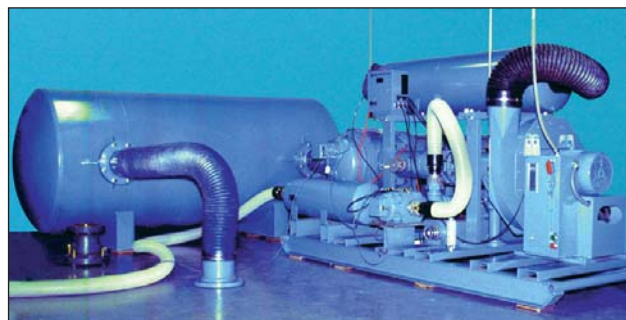
10M and 80M master meters

Capacities:

10M: 100 to 10,000 ACFH  
(2.83 to 283 m³/h)

80M: 1,600 to 80,000 ACFH  
(45,3 to 2265,3 m³/h)

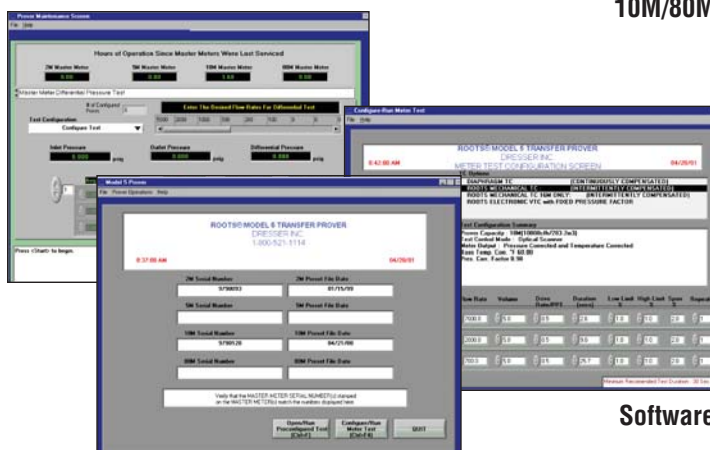
- Skid Mounted Shop System
- Ideal for testing large capacity rotary and turbine type gas meters



10M/80M

## Windows®-based Software

Easy-to-use software with icons and menus typical of Windows-based programs allow you to increase your productivity and work more intuitively with the computer. The new software is designed for all Model 5 Prover Systems and is compatible with Windows® 95, 98, 2000, ME, XP, NT 4.0 and VISTA.



Software

## USB to Serial Port Converter Cable

This converter will allow users with existing Windows® - based Model 5 Software and computers without a serial port to connect to their Model 5 Provers. The Converter Kit consists of a converter cable and Model 5 Upgrade CD. Minimum System requirements are a computer with 500MHz processor, 128MB RAM, 400MB hard disk space, Windows® 98, XP professional, an open USB port, and the Windows® - based Model 5 Software.



USB Converter Cable

## RS Optical Scanner

The optional RS Optical Scanner is used to facilitate meter testing using an automatic testing sequence. This eliminates the potential for human error associated with a manual test. The Scanner can be used on dial indexes and odometers with black and white graduated marks.



RS-PB

## Acoustic Filter

When testing turbine-type gas meters with a transfer prover, an Acoustic Filter should be installed between the Field Meter (meter under test) and the ROOTS® master meter. The Acoustic Filter reduces or eliminates the resonance phenomena induced by pulsation from the master meter at most flow rates. An Acoustic Filter is ideal for shop use with a 2M/10M Model 5 ROOTS® prover.



Acoustic Filter

# ROOTS® Test Equipment



Smart Manometer

## Smart Manometer

The Smart Manometer is a pressure measuring instrument with an accuracy of  $\pm 0.025\%$  of full scale at a truly low cost. As a replacement for glass manometers, this microprocessor based system, manufactured by Meriam Instrument, is suitable for the measurement of differential pressures across a rotary meter.



Pulse Loop Tester

## Pulse Loop Tester

The ROOTS® pulse loop tester is a battery-powered instrument designed for testing and troubleshooting one and two channel pulse output systems. LED indicators display the contact state of one or two Form A or Form C switches. An internal buzzer can also be enabled to sound when a pulse occurs through selected channels.



ICEX Pulse Loop Tester

## ICEX Pulse Loop Tester

This device is designed for easy validation that the ICEX or ICPWX (Solid State Pulser) accessory's pulse output is functioning properly. It is available with one of three optional connectors to mate to the type of connector existing on your accessory unit:

- MSC Military-type (amphenol) connector
- Cable gland\*
- Conduit\*

\* Simply insert the wires in the holes located at the Com (Black) & Sig (Red).  
A label for instructions is located at the Com (Black) & Sig (Red) push buttons.



Differential Testing Software

## Differential Testing Acceptance Calculator Software

The new DTA Calculator lets you quickly verify the operational condition of your ROOTS® Meter. Print or Save data for future comparisons. Just "clock" your meter, take your differential pressure reading, plug in your value, and the software does the rest.

## ROOTS® Meter Sets & Piping Specialty Accessories

A full line of meter set components are available for a one-stop-shopping approach to meter set design and installation. Reduce your installation cost with a professionally designed and tested ROOTS® meter set.

### Pre-Fabricated Meter Sets

Dresser offers both Standard and Customer Specified designs. These modular meter sets are packaged for economical shipping and storage. Benefits include design standardization, reduced inventories, and lower overhead costs.



Pre-Fabricated Sets

### Ultraseal® Gas Meter Valves

Ultraseal® valves are permanently lubricated and bi-directional. They meet NPFA standards and continue to maintain a bubble-tight seal after qualification testing to over 10,000 cycles. Torque values remain low even at subzero temperatures. Locking plates are also available.



Ultraseal® Valve

### Pipeline Strainers

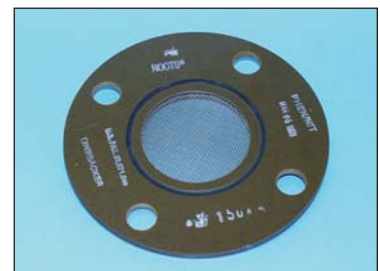
These strainers are designed to protect meters and other precision devices from the damaging effects of entrained system debris. A low pressure drop is achieved through a large element area and venturi port design. The debris bowl is tapped for cleaning.



Pipeline Strainer

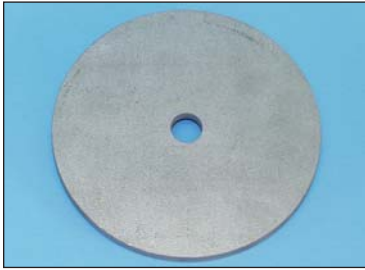
### Gasket Strainers

Using a 20 mesh stainless steel screen, the Gasket Strainer helps protect against potential damage to precision pipeline measurement and regulation equipment caused by occasional introduction of weld slag, plastic pipe shavings, or other debris.



Gasket Strainer

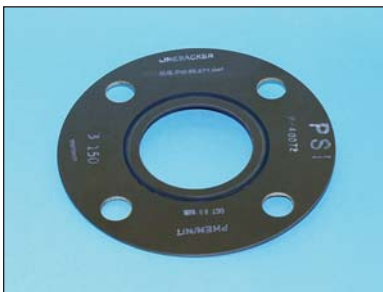
## ROOTS® Accessories



**Restricting Orifice Plates**



**Companion Flange Assemblies**



**Gaskets**



**Bolts**



**Pete's Plug II®**

### **Restricting Flow Orifice Plates**

Sized orifice plates provide low cost protection against meter overspeed. The plates are designed to choke gas flow at 100% for meters rated over 300 psig. Plates are installed 2 to 4 pipe diameters downstream for maximum effectiveness.

### **Companion Flange Assemblies**

These kits include all the equipment necessary for mounting a meter in a pipeline. The kit consists of flanges, coated flange bolts, and gaskets.

### **Flange Gaskets**

LineBacker™ gaskets, with their unique sealing element, use the lowest possible clamp and compressive load to eliminate flange leaks.

### **Coated Flange Bolts**

These bolts have a lubricious, polymer-based coating to help prevent galling of the threads in the meter body.

### **Pete's Plug II® Test Plug**

Allows user to take pressure and temperature readings quickly while eliminating the cost of leaving gauges or temperature indicators in line. Pete's Plug II® test plug is still the only pressure and temperature test plug with two self-closing valves and is rated to a maximum pressure of 500 psig at 200°F.

## ROOTS® Accessories

### ROOTS® Meter Oil

Approved for use in all ROOTS® meters. The oil is packaged in quantities from 4 ounces to 55 gallons.



Meter Oil

## ROOTS® Services

### Product Repair Services

Our Product Services Department offers repair, remanufacturing, testing and calibration service for all ROOTS® meters, provers, and instrumentation. At Roots Meters & Instruments, our focus is on customer satisfaction. Let the experts handle your ROOTS® products repair and calibration needs.

The overall cost effectiveness of factory service is enhanced by:

- Standardized and competitive service levels
- Specialization in contract services
- Inspection for warranty and upgrades
- Line Mount Meters returned freight prepaid to the first point of delivery within the United States



# Imperial Sizing Charts

| LINE MOUNTED                                       |        |         |         |        |        |        |       |        |        |        |        |        | Foot Mount |         |
|--|--------|---------|---------|--------|--------|--------|-------|--------|--------|--------|--------|--------|------------|---------|
| MODEL  | 8C175* | 11C175* | 15C175* | 2M175* | 3M175* | 5M175* | 7M175 | 11M175 | 16M175 | 23M175 | 23M232 | 38M175 | 56M175     | 102M125 |
| *Also available in 200 PSIG Rating                 |        |         |         |        |        |        |       |        |        |        |        |        |            |         |
| RATING PSIG  | 800    | 1100    | 1500    | 2000   | 3000   | 5000   | 7000  | 11000  | 16000  | 23000  | 23000  | 38000  | 56000      | 102000  |
| Corrected Capacity at Metering Pressure – in MSCFH |        |         |         |        |        |        |       |        |        |        |        |        |            |         |
| 1  | 0.84   | 1.15    | 1.57    | 2.09   | 3.1    | 5.2    | 7.3   | 11.5   | 16.7   | 24.0   | 24.0   | 39.7   | 58.5       | 106.6   |
| 3  | 0.95   | 1.30    | 1.77    | 2.36   | 3.5    | 5.9    | 8.3   | 13.0   | 18.9   | 27.2   | 27.2   | 44.9   | 66.2       | 120.5   |
| 5  | 1.05   | 1.45    | 1.98    | 2.63   | 4.0    | 6.6    | 9.2   | 14.5   | 21.1   | 30.3   | 30.3   | 50.0   | 73.8       | 134.3   |
| 10   | 1.33   | 1.82    | 2.48    | 3.31   | 5.0    | 8.3    | 11.6  | 18.2   | 26.5   | 38.1   | 38.1   | 62.9   | 92.8       | 168.9   |
| 15   | 1.60   | 2.20    | 2.99    | 3.99   | 6.0    | 10.0   | 14.0  | 22.0   | 31.9   | 45.9   | 45.9   | 75.8   | 111.8      | 203.6   |
| 20   | 1.87   | 2.57    | 3.50    | 4.67   | 7.0    | 11.7   | 16.3  | 25.7   | 37.4   | 53.7   | 53.7   | 88.7   | 130.8      | 238.2   |
| 25   | 2.14   | 2.94    | 4.01    | 5.35   | 8.0    | 13.4   | 18.7  | 29.4   | 42.8   | 61.5   | 61.5   | 101.6  | 149.8      | 272.9   |
| 30   | 2.41   | 3.32    | 4.52    | 6.03   | 9.0    | 15.1   | 21.1  | 33.2   | 48.2   | 69.3   | 69.3   | 114.5  | 168.8      | 307.4   |
| 40   | 2.95   | 4.06    | 5.54    | 7.39   | 11.1   | 18.5   | 25.9  | 40.6   | 59.1   | 84.9   | 84.9   | 140.3  | 206.8      | 376.7   |
| 50   | 3.50   | 4.81    | 6.56    | 8.74   | 13.1   | 21.9   | 30.6  | 48.1   | 70.0   | 100.6  | 100.6  | 166.1  | 244.8      | 445.9   |
| 60   | 4.04   | 5.56    | 7.58    | 10.10  | 15.2   | 25.3   | 35.4  | 55.6   | 80.8   | 116.2  | 116.2  | 191.9  | 282.9      | 515.2   |
| 70   | 4.58   | 6.30    | 8.59    | 11.46  | 17.2   | 28.6   | 40.1  | 63.0   | 91.7   | 131.8  | 131.8  | 217.7  | 320.9      | 584.5   |
| 80   | 5.13   | 7.05    | 9.61    | 12.82  | 19.2   | 32.0   | 44.9  | 70.5   | 102.5  | 147.4  | 147.4  | 243.5  | 358.9      | 653.7   |
| 90   | 5.67   | 7.80    | 10.63   | 14.18  | 21.3   | 35.4   | 49.6  | 78.0   | 113.4  | 163.0  | 163.0  | 269.3  | 396.9      | 723.0   |
| 100  | 6.21   | 8.54    | 11.65   | 15.53  | 23.3   | 38.8   | 54.4  | 85.4   | 124.3  | 178.6  | 178.6  | 295.1  | 434.9      | 792.1   |
| 110  | 6.76   | 9.29    | 12.67   | 16.89  | 25.3   | 42.2   | 59.1  | 92.9   | 135.1  | 194.2  | 194.2  | 320.9  | 472.9      | 861.4   |
| 120  | 7.30   | 10.04   | 13.69   | 18.25  | 27.4   | 45.6   | 63.9  | 100.4  | 146.0  | 209.9  | 209.9  | 346.7  | 511.0      | 930.6   |
| 125  | 7.57   | 10.41   | 14.20   | 18.93  | 28.4   | 47.3   | 66.2  | 104.1  | 151.4  | 217.7  | 217.7  | 359.6  | 530.0      | 965.3   |
| 135  | 8.11   | 11.16   | 15.21   | 20.29  | 30.4   | 50.7   | 71.0  | 111.6  | 162.3  | 233.3  | 233.3  | 385.4  | 568.0      |         |
| 150  | 8.93   | 12.28   | 16.74   | 22.32  | 33.5   | 55.8   | 78.1  | 122.8  | 178.6  | 256.7  | 256.7  | 424.1  | 625.0      |         |
| 175  | 10.29  | 14.14   | 19.29   | 25.72  | 38.6   | 64.3   | 90.0  | 141.4  | 205.7  | 295.7  | 295.7  | 488.6  | 720.1      |         |
| 200  | 11.64  | 16.01   | 21.83   | 29.11  | 43.7   | 72.8   |       |        |        |        |        | 334.8  |            |         |
| 232  |        |         |         |        |        |        |       |        |        |        |        | 384.7  |            |         |

175 PSIG Standard MAOP on sizes 8C175-56M175.  
 \* 200 PSIG MAOP Rating Optional. Contact Factory.

| HIGH PRESSURE METERS |  |       |        |       |       |        |        |        |         |
|----------------------|--|-------|--------|-------|-------|--------|--------|--------|---------|
| MODEL                | 1M300  | 1M740 | 1M1480 | 3M300 | 3M740 | 3M1480 | 5M1480 | 7M1480 | 11M1480 |
| RATING               | 1000   | 1000  | 1000   | 3000  | 3000  | 3000   | 5000   | 7000   | 11000   |
| PSIG                 | Corrected Capacity at Metering Pressure — in MSCFH |       |        |       |       |        |        |        |         |
| 125                  | 9.5  | 9.5   | 9.5    | 28.4  | 28.4  | 28.4   | 47.3   | 66.2   | 104.1   |
| 150                  | 11.2   | 11.2  | 11.2   | 33.5  | 33.5  | 33.5   | 55.8   | 78.1   | 122.8   |
| 175                  | 12.9   | 12.9  | 12.9   | 38.6  | 38.6  | 38.6   | 64.3   | 90.0   | 141.4   |
| 200                  | 14.6   | 14.6  | 14.6   | 43.7  | 43.7  | 43.7   | 72.8   | 102    | 160.1   |
| 250                  | 18.0   | 18.0  | 18.0   | 53.9  | 53.9  | 53.9   | 89.8   | 126    | 197.4   |
| 300                  | 21.3   | 21.3  | 21.3   | 64.0  | 64.0  | 64.0   | 107    | 149    | 234.8   |
| 350                  |  | 24.7  | 24.7   |       | 74.2  | 74.2   | 124    | 173    | 272.1   |
| 500                  |  | 34.9  | 34.9   |       | 105   | 105    | 175    | 244    | 384.1   |
| 600                  |  | 41.7  | 41.7   |       | 125   | 125    | 209    | 292    | 458.8   |
| 740                  |  | 51.2  | 51.2   |       | 154   | 154    | 256    | 359    | 563.4   |
| 800                  |  |       | 55.3   |       |       | 166    | 276    | 387    | 608.2   |
| 900                  |  |       | 62.1   |       |       | 186    | 310    | 435    | 682.9   |
| 1200                 |  |       | 82.4   |       |       | 247    | 412    | 577    | 906.9   |
| 1480                 |  |       | 102    |       |       | 305    | 508    | 711    | 1116.0  |

### SIZING INSTRUCTIONS

To select the proper meter size, use the Minimum Operating Pressure and the Maximum Instantaneous Hourly Flow Rate. Do not exceed meter's maximum allowable operating pressure.

To prevent oversizing of a meter, sizing should be based upon the total connected load giving consideration to the load diversity. When using this method to size a meter, a selected diversity factor times the total connected load will be used as the Maximum Instantaneous Flow Rate for sizing purposes.

A diversity factor of 0.85 is commonly used for a single application where two or more major appliances are in use (i.e., boilers, furnaces, space heaters, etc.).

As the number of appliances considered when determining a connected load increases, the diversity factor will typically decrease. For applications such as multiple ranges and water heaters, some examples of commonly used diversity factors are:

| Qty | Factor | Qty | Factor* |
|-----|--------|-----|---------|
| 0-5 | 1      | 6   | 0.9     |
| 7   | 0.85   | 8   | 0.83    |

\* The diversity factors listed above are estimates. For proper sizing, consult your company or industry standards for determining accepted values.

### ENERGY VALUE

| Gas       | BTU/Cu.Ft. |
|-----------|------------|
| Acetylene | 1498       |
| Butane    | 3200       |
| Ethane    | 1758       |
| Ethylene  | 1606       |
| Methane   | 997        |
| Natural   | 965/1055   |
| Propane   | 2550       |

**NOTE:** All capacities listed are Standard Cubic Feet per Hour (SCFH) and based upon Average Atmospheric Pressure (14.4 PSIA), Base Pressure (14.73 PSIA), and Base Temperature (60°F). Tables do not take into account Supercompressibility. Please refer to RM-135 for further information on the Application of Temperature and/or Pressure Correction Factors in Gas Measurement.

## Metric Sizing Charts

| LINE MOUNTED- METRIC               |   |      |   |       |       |       |        |        |        |        |        |        | Foot Mount |         |         |         |
|------------------------------------|---|------|---|-------|-------|-------|--------|--------|--------|--------|--------|--------|------------|---------|---------|---------|
| MODEL                              | 8C175* 11C175*15C175*2M175*3M175*5M175* 7M175 11M175 16M175 23M232 23M175 38M175 56M175 102M125 |      |   |       |       |       |        |        |        |        |        |        |            |         |         |         |
| *Also available in 200 PSIG Rating |   |      |   |       |       |       |        |        |        |        |        |        |            |         |         |         |
| RATING                             | 22,7  | 31,2 | 42,5  | 56,6  | 85    | 141,6 | 198,2  | 311,5  | 453,1  | 651,3  | 651,3  | 1076   | 1585,7     | 2888,3  |         |         |
| PSIG                               | kPa   | BAR  | Corrected Capacity at Metering Pressure – in Nm <sup>3</sup> /H |       |       |       |        |        |        |        |        |        |            |         |         |         |
| 1                                  | 6,9   | 0,1  | 23,7  | 32,6  | 44,4  | 59,2  | 88,8   | 148,0  | 207,2  | 325,7  | 473,7  | 680,9  | 680,9      | 1125,0  | 1657,9  | 3019,7  |
| 3                                  | 20,7  | 0,2  | 26,8  | 36,8  | 50,2  | 66,9  | 100,3  | 167,2  | 234,1  | 368,0  | 535,2  | 769,3  | 769,3      | 1271,1  | 1873,2  | 3411,9  |
| 5                                  | 34,5  | 0,3  | 29,8  | 41,0  | 55,9  | 74,6  | 111,9  | 186,5  | 261,1  | 410,2  | 596,7  | 857,8  | 857,8      | 1417,2  | 2088,5  | 3804,0  |
| 10                                 | 68,9  | 0,7  | 37,5  | 51,6  | 70,4  | 93,8  | 140,7  | 234,5  | 328,3  | 516,0  | 750,5  | 1078,9 | 1078,9     | 1782,4  | 2626,8  | 4784,5  |
| 15                                 | 103,4   | 1,0  | 45,2  | 62,2  | 84,8  | 113,0 | 169,6  | 282,6  | 395,6  | 621,7  | 904,3  | 1299,9 | 1299,9     | 2147,7  | 3165,0  | 5764,9  |
| 20                                 | 137,9   | 1,4  | 52,9  | 72,7  | 99,2  | 132,3 | 198,4  | 330,6  | 462,9  | 727,4  | 1058,1 | 1521,0 | 1521,0     | 2513,0  | 3703,3  | 6745,3  |
| 30                                 | 206,8   | 2,1  | 68,3  | 93,9  | 128,0 | 170,7 | 256,1  | 426,8  | 597,5  | 938,9  | 1365,7 | 1963,2 | 1963,2     | 3243,5  | 4779,8  | 8706,1  |
| 40                                 | 275,8   | 2,8  | 83,6  | 115,0 | 156,8 | 209,1 | 313,7  | 522,9  | 732,1  | 1150,4 | 1673,3 | 2405,3 | 2405,3     | 3974,0  | 5856,4  | 10667,0 |
| 50                                 | 344,7   | 3,4  | 99,0  | 136,2 | 185,7 | 247,6 | 371,4  | 619,0  | 866,6  | 1361,8 | 1980,8 | 2847,5 | 2847,5     | 4704,5  | 6932,9  | 12627,8 |
| 60                                 | 413,7   | 4,1  | 114,4   | 157,3 | 214,5 | 286,0 | 429,1  | 715,1  | 1001,2 | 1573,3 | 2288,4 | 3289,6 | 3289,6     | 5435,0  | 8009,4  | 14588,7 |
| 70                                 | 482,6   | 4,8  | 129,8   | 178,5 | 243,3 | 324,5 | 486,7  | 811,2  | 1135,8 | 1784,8 | 2596,0 | 3731,8 | 3731,8     | 6165,5  | 9086,0  | 16549,5 |
| 80                                 | 551,6   | 5,5  | 145,2   | 199,6 | 272,2 | 362,9 | 544,4  | 907,3  | 1270,3 | 1996,2 | 2903,6 | 4173,9 | 4173,9     | 6896,0  | 10162,5 | 18510,3 |
| 90                                 | 620,5   | 6,2  | 160,5   | 220,8 | 301,0 | 401,4 | 602,1  | 1003,5 | 1404,9 | 2207,7 | 3211,2 | 4616,1 | 4616,1     | 7626,5  | 11239,1 | 20471,2 |
| 100                                | 689,5   | 6,9  | 175,9   | 241,9 | 329,8 | 439,8 | 659,8  | 1099,6 | 1539,5 | 2419,2 | 3518,8 | 5058,2 | 5058,2     | 8357,0  | 12315,6 | 22432,0 |
| 125                                | 861,8   | 8,6  | 214,4   | 294,8 | 401,9 | 535,9 | 803,9  | 1339,9 | 1875,9 | 2947,8 | 4287,7 | 6163,6 | 6163,6     | 10183,3 | 15006,9 | 27334,1 |
| 150                                | 1034,2  | 10,3 | 252,8   | 347,7 | 474,0 | 632,0 | 948,1  | 1580,2 | 2212,3 | 3476,5 | 5056,7 | 7269,0 | 7269,0     | 12009,6 | 17698,3 |         |
| 175                                | 1206,6  | 12,1 | 291,2   | 400,5 | 546,1 | 728,2 | 1092,3 | 1820,5 | 2548,7 | 4005,2 | 5825,6 | 8374,4 | 8374,4     | 13835,8 | 20389,6 |         |
| 200                                | 1379,0  | 13,8 | 329,7   | 453,4 | 618,2 | 824,3 | 1236,5 | 2060,7 |        |        |        | 9479,7 |            |         |         |         |
| 232                                | 1599,6  | 16,0 |   |       |       |       |        |        |        |        |        |        |            |         |         | 10894,6 |

175 PSIG Standard MAOP on sizes 8C175-56M175.

\* 200 PSIG MAOP Rating Optional. Contact Factory.

| HIGH PRESSURE METERS - METRIC |   |       |   |        |        |        |        |        |         |         |         |
|-------------------------------|---|-------|---|--------|--------|--------|--------|--------|---------|---------|---------|
| MODEL                         | 1M300 1M740 1M1480 3M300 3M740 3M1480 5M1480 7M1480 11M1480 |       |   |        |        |        |        |        |         |         |         |
| RATING                        | 28,3  | 28,3  | 28,3  | 85,0   | 85,0   | 85,0   | 141,6  | 198,2  | 311     |         |         |
| PSIG                          | kPa   | Bar   | Corrected Capacity at Metering Pressure - in Nm <sup>3</sup> /H |        |        |        |        |        |         |         |         |
| 125                           | 861,8   | 8,6   | 268,0   | 268,0  | 268,0  | 803,9  | 803,9  | 803,9  | 1339,9  | 1875,9  | 2943,2  |
| 150                           | 1034,2  | 10,3  | 316,1   | 316,1  | 316,1  | 948,1  | 948,1  | 948,1  | 1580,2  | 2212,3  | 3471,0  |
| 175                           | 1206,6  | 12,1  | 364,1   | 364,1  | 364,1  | 1092,3 | 1092,3 | 1092,3 | 1820,5  | 2548,7  | 3998,9  |
| 200                           | 1379,0  | 13,8  | 412,2   | 412,2  | 412,2  | 1236,5 | 1236,5 | 1236,5 | 2060,7  | 2885,2  | 4526,7  |
| 250                           | 1723,7  | 17,2  | 508,3   | 508,3  | 508,3  | 1524,8 | 1524,8 | 1524,8 | 2541,3  | 3558,0  | 5582,4  |
| 300                           | 2068,4  | 20,7  | 604,5   | 604,5  | 604,5  | 1813,2 | 1813,2 | 1813,2 | 3021,9  | 4230,8  | 6638,1  |
| 350                           | 2413,2  | 24,1  |   | 700,6  | 700,6  |        | 2101,5 | 2101,5 | 3502,5  | 4903,7  | 7693,7  |
| 400                           | 2757,9  | 27,6  |   | 796,7  | 796,7  |        | 2389,9 | 2389,9 | 3983,1  | 5576,5  | 8749,4  |
| 500                           | 3447,4  | 34,5  |   | 989,0  | 989,0  |        | 2966,6 | 2966,6 | 4944,2  | 6922,2  | 10860,7 |
| 600                           | 4136,9  | 41,4  |   | 1181,2 | 1181,2 |        | 3543,3 | 3543,3 | 5905,4  | 8267,9  | 12972,1 |
| 700                           | 4826,3  | 48,3  |   | 1373,5 | 1373,5 |        | 4120,0 | 4120,0 | 6866,6  | 9613,6  | 15083,4 |
| 740                           | 5102,1  | 51,0  |   | 1450,4 | 1450,4 |        | 4350,7 | 4350,7 | 7251,0  | 10151,9 | 15928,0 |
| 800                           | 5515,8  | 55,2  |   |        | 1565,8 |        |        | 4696,8 | 7827,7  | 10959,3 | 17194,8 |
| 900                           | 6205,3  | 62,1  |   |        | 1758,0 |        |        | 5273,5 | 8788,9  | 12305,0 | 19306,1 |
| 1000                          | 6894,8  | 68,9  |   |        | 1950,3 |        |        | 5850,2 | 9750,1  | 13650,7 | 21417,4 |
| 1200                          | 8273,7  | 82,7  |   |        | 2334,8 |        |        | 7003,6 | 11672,4 | 16342,0 | 25640,1 |
| 1300                          | 8963  | 90    |   |        | 2527,1 |        |        | 7580,3 | 12635,4 | 17686,0 | 27751,5 |
| 1480                          | 10204,2   | 102,0 |   |        | 2873,1 |        |        | 8618,4 | 14363,7 | 20110,0 | 31551,9 |

# Roots® G-Rating Sizing Charts

| LINE MOUNTED       |      |      |  |       |         |         |         |         |         |        |         |         |         |         |
|--------------------|------|------|--|-------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|
| MODEL              |      |      | G16  | G25   | G40     | G65     | G100    | G160 3" | G160 4" | G250   | G400 4" | G400 6" | G650    | G1000   |
| BASE RATING (m³/h) |      |      | 25   | 40    | 65      | 100     | 160     | 250     | 250     | 400    | 650     | 650     | 1000    | 1000    |
| METER OPER. PRES.  |      |      | CORRECTED CAPACITY AT METERING PRESSURE in Nm³/h |       |         |         |         |         |         |        |         |         |         |         |
| PSIG               | kPa  | Bar  |  |       |         |         |         |         |         |        |         |         |         |         |
| 3                  | 21   | 0,2  | 29,5   | 47,3  | 76,8    | 118,1   | 189,0   | 295,3   | 295,3   | 472,5  | 767,8   | 767,8   | 1181,3  | 1890,0  |
| 5                  | 34   | 0,3  | 32,9   | 52,7  | 85,6    | 131,7   | 210,7   | 329,3   | 329,3   | 526,8  | 856,1   | 856,1   | 1317,0  | 2107,3  |
| 10                 | 69   | 0,7  | 41,4   | 66,3  | 107,7   | 165,6   | 265,0   | 414,1   | 414,1   | 662,6  | 1076,7  | 1076,7  | 1656,5  | 2650,4  |
| 15                 | 103  | 1,0  | 49,9   | 79,8  | 129,7   | 199,6   | 319,3   | 499,0   | 499,0   | 798,4  | 1297,4  | 1297,4  | 1995,9  | 3193,5  |
| 20                 | 138  | 1,4  | 58,4   | 93,4  | 151,8   | 233,5   | 373,7   | 583,8   | 583,8   | 934,1  | 1518,0  | 1518,0  | 2335,4  | 3736,6  |
| 30                 | 207  | 2,1  | 75,4   | 120,6 | 195,9   | 301,4   | 482,3   | 753,6   | 753,6   | 1205,7 | 1959,3  | 1959,3  | 3014,3  | 4822,8  |
| 40                 | 276  | 2,8  | 92,3   | 147,7 | 240,1   | 369,3   | 590,9   | 923,3   | 923,3   | 1477,3 | 2400,5  | 2400,5  | 3693,1  | 5909,0  |
| 50                 | 345  | 3,4  | 109,3  | 174,9 | 284,2   | 437,2   | 699,5   | 1093,0  | 1093,0  | 1748,8 | 2841,8  | 2841,8  | 4372,0  | 6995,2  |
| 60                 | 414  | 4,1  | 126,3  | 202,0 | 328,3   | 505,1   | 808,1   | 1262,7  | 1262,7  | 2020,4 | 3283,1  | 3283,1  | 5050,9  | 8081,5  |
| 70                 | 483  | 4,8  | 143,2  | 229,2 | 372,4   | 573,0   | 916,8   | 1432,5  | 1432,5  | 2291,9 | 3724,4  | 3724,4  | 5729,8  | 9167,7  |
| 80                 | 552  | 5,5  | 160,2  | 256,3 | 416,6   | 640,9   | 1025,4  | 1602,2  | 1602,2  | 2563,5 | 4165,6  | 4165,6  | 6408,7  | 10253,9 |
| 90                 | 621  | 6,2  | 177,2  | 283,5 | 460,7   | 708,8   | 1134,0  | 1771,9  | 1771,9  | 2835,0 | 4606,9  | 4606,9  | 7087,6  | 11340,1 |
| 100                | 689  | 6,9  | 194,2  | 310,7 | 504,8   | 776,6   | 1242,6  | 1941,6  | 1941,6  | 3106,6 | 5048,2  | 5048,2  | 7766,5  | 12426,3 |
| 125                | 862  | 8,6  | 236,6  | 378,5 | 615,1   | 946,4   | 1514,2  | 2365,9  | 2365,9  | 3785,5 | 6151,4  | 6151,4  | 9463,7  | 15141,9 |
| 150                | 1034 | 10,3 | 279,0  | 446,4 | 725,5   | 1116,1  | 1785,7  | 2790,2  | 2790,2  | 4464,4 | 7254,6  | 7254,6  | 11160,9 | 17857,4 |
| 175                | 1207 | 12,1 | 321,5  | 514,3 | 835,8   | 1285,8  | 2057,3  | 3214,5  | 3214,5  | 5143,2 | 8357,8  | 8357,8  | 12858,1 | 20573,0 |
| 200                | 1379 | 13,8 |  |       | 946,1*  | 1455,5* | 2328,9* | 3638,8  | 3638,8  | 5822,1 | 9461,0  |         |         |         |
| 232                | 1600 | 16,0 |  |       | 1087,3* | 1672,8* | 2676,4* | 4181,9  | 4181,9  | 6691,1 | 10873,0 |         |         |         |

12 bar MAOP Standard, 16 bar MAOP optional on sizes G40-G400 4". Contact Factory.

| ROOTS® HIGH PRESSURE METERS |       |     |   |         |         |         |         |         |         |         |          |          |          |          |           |
|-----------------------------|-------|-----|---|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|-----------|
| MODEL                       |       |     | G16-300   | G25-300 | G40-300 | G65-300 | G16-740 | G25-740 | G40-740 | G65-740 | G16-1480 | G25-1480 | G40-1480 | G65-1480 | G100-1480 |
| BASE RATING (m³/h)          |       |     | 25  | 40      | 65      | 100     | 25      | 40      | 65      | 100     | 25       | 40       | 65       | 100      | 160       |
| METER OPERATING PRES.       |       |     | Corrected Capacity at Meter Pressure - in Nm³/H |         |         |         |         |         |         |         |          |          |          |          |           |
| PSIG                        | kPa   | bar |   |         |         |         |         |         |         |         |          |          |          |          |           |
| 125                         | 862   | 9   | 236,6   | 378,5   | 615,1   | 946,4   | 236,6   | 378,5   | 615,1   | 946,4   | 236,6    | 378,5    | 615,1    | 946,4    | 1514,2    |
| 150                         | 1034  | 10  | 279,0   | 446,4   | 725,5   | 1116,1  | 279,0   | 446,4   | 725,5   | 1116,1  | 279,0    | 446,4    | 725,5    | 1116,1   | 1785,7    |
| 175                         | 1207  | 12  | 321,5   | 514,3   | 835,8   | 1285,8  | 321,5   | 514,3   | 835,8   | 1285,8  | 321,5    | 514,3    | 835,8    | 1285,8   | 2057,3    |
| 200                         | 1379  | 14  | 363,9   | 582,2   | 946,1   | 1455,5  | 363,9   | 583,2   | 946,1   | 1455,5  | 363,9    | 582,2    | 946,1    | 1455,5   | 2328,9    |
| 250                         | 1724  | 17  | 448,7   | 718,0   | 1166,7  | 1795,0  | 448,7   | 718,0   | 1166,7  | 1795,0  | 448,7    | 718,0    | 1166,7   | 1795,0   | 2872,0    |
| 300                         | 2068  | 21  | 533,6   | 853,8   | 1387,4  | 2134,4  | 533,6   | 853,8   | 1387,4  | 2134,4  | 533,6    | 853,8    | 1387,4   | 2134,4   | 3415,1    |
| 350                         | 2413  | 24  |   |         |         |         | 618,5   | 989,5   | 1608,0  | 2473,9  | 618,5    | 989,5    | 1608,0   | 2473,9   | 3958,2    |
| 400                         | 2758  | 28  |   |         |         |         | 703,3   | 1125,3  | 1828,6  | 2813,3  | 703,3    | 1125,3   | 1828,6   | 2813,3   | 4501,3    |
| 500                         | 3447  | 34  |   |         |         |         | 873,0   | 1396,9  | 2269,9  | 3492,2  | 873,0    | 1396,9   | 2269,9   | 3492,2   | 5587,5    |
| 600                         | 4137  | 41  |   |         |         |         | 1042,8  | 1668,4  | 2711,2  | 4171,1  | 1042,8   | 1668,4   | 2711,2   | 4171,1   | 6673,7    |
| 700                         | 4826  | 48  |   |         |         |         | 1212,5  | 1940,0  | 3152,5  | 4850,0  | 1212,5   | 1940,0   | 3152,5   | 4850,0   | 7759,9    |
| 740                         | 5102  | 51  |   |         |         |         | 1280,4  | 2048,6  | 3329,0  | 5121,5  | 1280,4   | 2048,6   | 3329,0   | 5121,5   | 8194,4    |
| 800                         | 5516  | 55  |   |         |         |         |         |         |         |         | 1382,2   | 2211,5   | 3593,8   | 5528,9   | 8846,2    |
| 900                         | 6205  | 62  |   |         |         |         |         |         |         |         | 1551,9   | 2483,1   | 4035,0   | 6207,7   | 9932,4    |
| 1000                        | 6895  | 69  |   |         |         |         |         |         |         |         | 1721,7   | 2754,7   | 4476,3   | 6886,6   | 11018,6   |
| 1200                        | 8274  | 83  |   |         |         |         |         |         |         |         | 2061,1   | 3297,8   | 5358,9   | 8244,4   | 13191,0   |
| 1300                        | 8963  | 90  |   |         |         |         |         |         |         |         | 2230,8   | 3569,3   | 5800,1   | 8923,3   | 14277,3   |
| 1480                        | 10204 | 102 |   |         |         |         |         |         |         |         | 2536,3   | 4058,1   | 6594,4   | 10145,3  | 16232,5   |



# Imperial and Metric Technical Data

| TECHNICAL DATA                  |                     | UNITS | 8C175* | 11C175* | 15C175* | 2M175* | 3M175* | 5M175* | 7M175  | 8.8M175      | 11M175 | 16M175 | 23M175 | 23M232 |
|---------------------------------|---------------------|-------|--------|---------|---------|--------|--------|--------|--------|--------------|--------|--------|--------|--------|
| Base Rating (Q Max.)            | acfh                |       | 800    | 1100    | 1500    | 2000   | 3000   | 5000   | 7000   | N/A          | 11000  | 16000  | 23000  | 23000  |
|                                 | m <sup>3</sup> /h   |       | 22,6   | 31,0    | 42,5    | 56,6   | 85,0   | 141,5  | 200,0  | 250,0        | 310,0  | 450,0  | 650,0  | 650,0  |
| Max. Operating Pressure (MAOP)* | psig                |       | 175    | 175     | 175     | 175    | 175    | 175    | 175    | N/A          | 175    | 175    | 175    | 232    |
|                                 | kPa                 |       | 1200   | 1200    | 1200    | 1200   | 1200   | 1200   | 1200   | 1200         | 1200   | 1200   | 1200   | 1600   |
| Rangeability +/- 1% Start Rate  | ratio               |       | 26:1   | 31:1    | 40:1    | 68:1   | 76:1   | 120:1  | 67:1   | 70:1         | 124:1  | 116:1  | 40:1   | 169:1  |
|                                 | cfh                 |       | 2,8    | 2,3     | 1,9     | 1,01   | 2,1    | 1,2    | 5,3    | N/A          | 3,9    | 3,2    | 23,0   | 10,33  |
| Stop Rate                       | m <sup>3</sup> /h   |       | 0,0790 | 0,0651  | 0,0549  | 0,0538 | 0,0595 | 0,0340 | 0,1509 | 0,1510       | 0,1099 | 0,0917 | 0,6513 | 0,2926 |
|                                 | cfh                 |       | 2,0    | 1,7     | 1,6     | 0,82   | 1,8    | 0,8    | 3,4    | N/A          | 3,2    | 1,9    | 18,0   | 5,75   |
| Avg. Differential, 100% Flow    | m <sup>3</sup> /h   |       | 0,0575 | 0,0493  | 0,0445  | 0,0311 | 0,0510 | 0,0227 | 0,096  | 0,0960       | 0,0915 | 0,0535 | 0,5097 | 0,1628 |
|                                 | in. w.c.            |       | 0,5    | 0,6     | 0,8     | 0,7    | 1,1    | 1,1    | 1,6    | N/A          | 1,6    | 2,1    | 1,3    | 2,08   |
| Drive Rate CTR, CD              | mbar                |       | 1,1    | 1,5     | 1,9     | 1,6    | 2,6    | 2,6    | 4,0    | 2,8          | 4,0    | 5,2    | 3,1    | 5,18   |
|                                 | cf/rev              |       | 10     | 10      | 10      | 10     | 10     | 10     | 10     | N/A          | 10     | 100    | 100    | 100    |
| Drive Rate TC, TD               | m <sup>3</sup> /rev |       | 0,1    | 0,1     | 0,1     | 0,1    | 0,1    | 1      | 1      | 1            | 1      | 1      | 1      | 1      |
|                                 | cf/rev              |       | 100    | 100     | 100     | 100    | 100    | 100    | 100    | N/A          | 100    | 1000   | N/A    | N/A    |
| Nominal Pipe Size               | m <sup>3</sup> /rev |       | 1      | 1       | 1       | 1      | 1      | 10     | 10     | 10           | 10     | 10     | N/A    | N/A    |
|                                 | in.                 |       | 2      | 2       | 2       | 2      | 2      | 3      | 3      | N/A          | 4      | 4      | 6      | 4      |
| Flange-to-Flange                | mm                  |       | 50     | 50      | 50      | 50     | 50     | 80     | 80     | 80 or 100    | 100    | 100    | 150    | 100    |
|                                 | in.                 |       | 6-3/4  | 6-3/4   | 6-3/4   | 6-3/4  | 6-3/4  | 6-3/4  | 9-1/2  | N/A          | 9-1/2  | 9-1/2  | 16     | 9-1/2  |
| Flange Connection               | mm                  |       | 172    | 172     | 172     | 172    | 172    | 172    | 241    | 241          | 241    | 241    | 406,4  | 241    |
|                                 | ANSI                |       | 150#FF | 150#FF  | 150#FF  | 150#FF | 150#FF | 150#FF | 150#FF | 150#FF       | 150#FF | 150#FF | 150#FF | 150#FF |
| Net Weight - CTR Version        | lbs.                |       | 18     | 22      | 24      | 26     | 29     | 35     | 52     | N/A          | 60     | 85     | 202    | 100    |
|                                 | kg                  |       | 8,2    | 10,0    | 10,9    | 11,8   | 13,2   | 15,9   | 23,6   | 29,0 or 31,0 | 27,2   | 38,6   | 91,6   | 45,4   |

| TECHNICAL DATA                  |                     | UNITS | 38M175 | 56M175 | 102M125 | 1M300  | 1M740  | 1M1480 | 3M300  | 3M740  | 3M1480 | 5M1480 | 7M1480 | 11M1480  |
|---------------------------------|---------------------|-------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|----------|
| Base Rating (Q Max.)            | acfh                |       | 38000  | 56000  | 102000  | 1000   | 1000   | 1000   | 3000   | 3000   | 3000   | 5000   | 7000   | 11000    |
|                                 | m <sup>3</sup> /h   |       | 1050,0 | 1575,0 | 2875,0  | 28,3   | 65,0   | 65,0   | 85,0   | 100,0  | 100,0  | 141,6  | 198,2  | 312      |
| Max. Operating Pressure (MAOP)* | psig                |       | 175    | 175    | 125     | 300    | 740    | 1480   | 300    | 740    | 1480   | 1480   | 1480   | 1480     |
|                                 | kPa                 |       | 1200   | 1200   | 860     | 2065   | 5100   | 10200  | 2065   | 5100   | 10200  | 10200  | 10200  | 10200    |
| Rangeability +/- 1% Start Rate  | ratio               |       | 90:1   | 53:1   | 38:1    | 30:1   | 18:1   | 18:1   | 50:1   | 77:1   | 77:1   | 28:1   | 60:1   | 55:1     |
|                                 | cfh                 |       | 27,0   | 40,0   | 120,0   | 1,9    | 2,5    | 2,5    | 2,1    | 3,0    | 3,0    | 7,6    | 5,8    | 12,83    |
| Stop Rate                       | m <sup>3</sup> /h   |       | 0,7646 | 1,1327 | 3,3980  | 0,0538 | 0,0708 | 0,0708 | 0,0595 | 0,0850 | 0,133  | 0,1642 | 0,363  | 0,363    |
|                                 | cfh                 |       | 20,0   | 29     | 110,0   | 1,1    | 2,0    | 2,0    | 1,8    | 2,5    | 2,5    | 4,6    | 4,6    | 4,65     |
| Avg. Differential, 100% Flow    | m <sup>3</sup> /h   |       | 0,5663 | 0,0283 | 3,1149  | 0,0311 | 0,0566 | 0,0566 | 0,0510 | 0,0708 | 0,0708 | 0,057  | 0,1303 | 0,132    |
|                                 | in. w.c.            |       | 1,9    | 2,2    | 2,0     | 0,2    | 0,4    | 0,3    | 1,0    | 1,3    | 1,35   | 0,9    | 2      | 1,04     |
| Drive Rate CTR, CD              | mbar                |       | 4,7    | 5,5    | 5,0     | 0,5    | 1,0    | 0,7    | 2,5    | 3,2    | 3,4    | 2,24   | 4,26   | 0,029    |
|                                 | cf/rev              |       | 100    | 100    | 100     | 10     | 10     | 10     | 10     | 10     | 10     | 10     | 10     | 10       |
| Drive Rate TC, TD               | m <sup>3</sup> /rev |       | 1      | 10     | 10      | 0,1    | 0,1    | 0,1    | 0,1    | 0,1    | 0,1    | 1      | 1      | N/A      |
|                                 | cf/rev              |       | N/A    | N/A    | N/A     | N/A    | N/A    | N/A    | N/A    | N/A    | N/A    | N/A    | N/A    | N/A      |
| Nominal Pipe Size               | m <sup>3</sup> /rev |       | N/A    | N/A    | N/A     | N/A    | N/A    | N/A    | N/A    | N/A    | N/A    | N/A    | N/A    | N/A      |
|                                 | in.                 |       | 6      | 8      | 10      | 1-1/2  | 2      | 2      | 2      | 2      | 2      | 3      | 3      | 4        |
| Flange-to-Flange                | mm                  |       | 150    | 200    | 254     | 40     | 50     | 50     | 50     | 50     | 50     | 80     | 80     | 101,6    |
|                                 | in.                 |       | 18     | 21     | 28      | 6-3/4  | 10-3/4 | 10-3/4 | 6-3/4  | 10-3/4 | 10-3/4 | 14-3/4 | 14-3/4 | 14-3/4   |
| Flange Connection               | mm                  |       | 457,2  | 533,4  | 711,2   | 172    | 273    | 273    | 172    | 273    | 273    | 374,65 | 374,65 | 374,65   |
|                                 | ANSI                |       | 150#FF | 150#FF | 125#FF  | 300#FF | 300#FF | 300#FF | 300#FF | 300#FF | 600#RF | 600#RF | 600#RF | 600#RF   |
| Net Weight - CTR Version        | lbs.                |       | 244    | 284    | 2390    | 26,5   | 107    | 107    | 29     | 107    | 107    | 215    | 220    | 277      |
|                                 | kg                  |       | 110,7  | 128,8  | 1084,1  | 12,0   | 48,5   | 48,5   | 13,2   | 48,5   | 48,5   | 97,52  | 99,79  | 125,6451 |

\* Available with 200 PSIG Rating

# G-Rating Technical Data

| Technical Data                 | UNITS               | G16     | G25     | G40     | G65     | G100    | G160-3" | G160-4" | G250    |
|--------------------------------|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Base Rating (qMax.)            | m <sup>3</sup> /h   | 25,0    | 40,0    | 65,0    | 100,0   | 160,0   | 250,0   | 250,0   | 400,0   |
| Max Operating Pressure (MAOP)* | bar                 | 12      | 12      | 12      | 12      | 12      | 12      | 12      | 12      |
| Rangeability +/- 1%            | ratio               | 28:1    | 37:1    | 78:1    | 89:1    | 135:1   | 70:1    | 70:1    | 103:1   |
| Start Rate                     | m <sup>3</sup> /h   | 0,0790  | 0,0549  | 0,0538  | 0,0595  | 0,0340  | 0,1510  | 0,1510  | 0,0917  |
| Stop Rate                      | m <sup>3</sup> /h   | 0,0575  | 0,0445  | 0,0311  | 0,0510  | 0,0227  | 0,0960  | 0,0960  | 0,0535  |
| Avg. Differential, 100% Flow   | mbar                | 1,6     | 1,9     | 2,2     | 3,2     | 3,7     | 2,8     | 2,8     | 3,9     |
| Drive Rate CTR, CD             | m <sup>3</sup> /rev | 0,1     | 0,1     | 0,1     | 0,1     | 1,0     | 1,0     | 1,0     | 1,0     |
| Nominal Pipe Size              | mm                  | 50      | 50      | 50      | 50      | 80      | 80      | 100     | 100     |
| Flange-to-Flange               | mm                  | 172     | 172     | 172     | 172     | 172     | 241     | 241     | 241     |
| Flange Connection              | ANSI                | 150# FF | 150# FF | 150# FF | 150# FF | 150# FF | 150# FF | 150# FF | 150# FF |
| Bolt Size**                    | Inches              | 5/8-11  | 5/8-11  | 5/8-11  | 5/8-11  | 5/8-11  | 5/8-11  | 5/8-11  | 3/4-10  |
| Net Weight - CTR Version       | kg                  | 8       | 11      | 12      | 13      | 16      | 29      | 31      | 39      |

\* 16 bar optional on sizes 640-G160 upon request

\*\* Bolt Length varies by application.

| Technical Data                | UNITS               | G400    | G650    | G1000   |
|-------------------------------|---------------------|---------|---------|---------|
| Base Rating (qMax.)           | m <sup>3</sup> /h   | 650,0   | 1000,0  | 1600,0  |
| Max Operating Pressure (MAOP) | bar                 | 12      | 12      | 12      |
| Rangeability +/- 1%           | ratio               | 40:1    | 85:1    | 53:1    |
| Start Rate                    | m <sup>3</sup> /h   | 0,6513  | 0,7646  | 1,1327  |
| Stop Rate                     | m <sup>3</sup> /h   | 0,5097  | 0,5663  | 0,8212  |
| Avg. Differential, 100% Flow  | mbar                | 3,1     | 4,7     | 5,5     |
| Drive Rate CTR, CD            | m <sup>3</sup> /rev | 1,0     | 1,0     | 10,0    |
| Nominal Pipe Size             | mm                  | 150     | 150     | 200     |
| Flange-to-Flange              | mm                  | 406,4   | 457,2   | 533,4   |
| Flange Connection             | ANSI                | 150# FF | 150# FF | 150# FF |
| Bolt Size**                   | Inches              | 3/4-10  | 3/4-10  | 3/4-10  |
| Net Weight - CTR Version      | kg                  | 92      | 111     | 129     |

\*\* Bolt Length varies by application.

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