

Glass Tube Flowmeter Model GT1000

Variable Area

Industrial Glass Tube, Variable Area Flowmeters

Description

The Brooks® GT 1000 combines ruggedness and simplicity in design to provide a versatile glass tube flowmeter suitable for a wide range of applications. The GT 1000 O-ring construction minimizes process downtime by allowing for convenient in-line removal of the glass tube for cleaning and maintenance.

Features

- Brass or 316L SS (1.4404) end fittings
- Flanged or threaded connections
- Horizontal or vertical connections
- Horizontal end fittings 360 degrees rotatable
- Standard accuracy +2% full scale / Class 2.5 acc VDI/VDE
- Epoxy painted cast aluminum frame with outstanding environmental resistance
- Fluid resistant O-ring design allows tube removal without removal from the process piping

Product Specifications

Capacities and Pressure Drops	See Capacities and Pressure Drop Tables
Flow Accuracy	Standard: ±2% Full Scale, Class 2.5 acc VDI/VDE Optional: ±1% Full Scale, Class 1.6 acc VDI/VDE
Repeatability	≤ 0.5% Full Scale
Pressure Ratings/PED Categories	See Pressure Ratings/PED Categories Tables for maximum non-shock pressure
Scales	Single or dual detachable aluminum plate Nominal Lengths: 127mm, 200mm and 250mm Graduations: Choice of direct reading units, millimeter or percentage of maximum flow with factor tag
Ambient Temperature Limits	33 to 125°F (1°C to 52°C)
Operating Fluid Temperature Limits (Meter)	Maximum: 250°F (121°C) Minimum: 33°F (1°C)
Operating Fluid Temperature Limits (Alarms)	Maximum: 250°F (121°C) - Reed Switch Maximum: 167°F (75°C) - Inductive Switch - Refer to Inductive Alarm Temperature Limits Minimum: 33°F (1°C) - Reed Switch/Inductive Switch
Dimensions	See Dimensions Figures
Optional Equipment	Mounting hardware for flush or front of panel



Product Specifications (continued)

Materials of Construction								
Metering Tube	Borosilicate glass							
Window	Polycarbonate with UV inhibitor							
Floats	Size 2 and 6: Sapphire, glass, Carboloy®, 316 stainless steel							
	Size 7: Glass, 316 stainless steel							
	Sizes 8-13: 316 stainless steel							
Float Stops	Size 2, 6, 12 and 13: Teflon®							
	Size 7, 8, 9 and 10: 316 stainless steel springs							
Housing	Cast Aluminum with Epoxy paint							
End Fittings	Brass or 316/316L stainless steel (1.4404)							
O-rings	Viton® fluoroelastomers, Buna-N, Kalrez® perfluoroelastomers (Stainless steel body only), EPDM (Stainless steel body only)							
Hardware	Stainless steel							
Connections	Brass or stainless steel fittings: NPT or BSPT/RC female connections							
	Stainless steel fittings: 150 lbs. flanges per ANSI B 16.5							
Connection Orientation	Vertical or horizontal on inlet and/or outlet							
Certifications	International Calibration Certificate							
	Material Certification to DIN 3.1							
	Declaration of Compliance 2.1 Oxygen Service							

GT1000 Pressure Ratings and PED Categories

Maximum Ope	Maximum Operating Pressure (PSIG/bar) at Fluid Temperature: Up to 250°F (121°C)									
Meter	NPT	ANSI 150# RF	PED							
Size	Threaded Connections	Flanged Connections	Category							
2	500/34.5	240/16.5	SEP							
6	450/31	240/16.5	SEP							
7	300/20.7	240/16.5	SEP							
8	250/17	240/16.5	SEP							
9	200/13.8	200/13.8	SEP							
10	175/12.1	175/12.1	SEP							
12	100/6.9	100/6.9	See Note							
13	75/5.2	75/5.2	See Note							
N 1 . C:										

Note: Size 12 and 13 do not conform to Pressure Equipment Directive 97/23/EC, therefore cannot be sold or used in the EU/EFTA.

Product Specifications - Capacities and Pressure Drop

Meter Sizes 2 & 6: Spherical Floats

				WATER			AIR*			
	SPHERICAL	Flow	Rate	Pressure	Drop	V. I. C.**	Flow	Rate	Pressure	Drop
TUBE	FLOAT	cc/min.	l/h	Inches WC	kPa	cSt	slpm	m3/nh	Inches WC	kPa
	GLASS	0.42	0.025	0.3	0.08	1.0	0.039	0.0021	0.3	0.08
SIZE 2	SAPPHIRE	0.84	0.05	0.4	0.09	1.0	0.06	0.0033	0.4	0.1
R-2-127-AAAAT	316 SS	1.9	0.11	0.7	0.17	1.0	0.11	0.0066	0.8	0.19
	CARBOLOY	3.9	0.23	1.1	0.27	1.0	0.2	0.011	1.2	0.3
	GLASS	4.2	0.25	0.3	0.08	1.0	0.3	0.016	0.3	0.08
SIZE 2	SAPPHIRE	8.0	0.48	0.4	0.1	1.0	0.41	0.023	0.4	0.11
R-2-127-DT	316 SS	16	0.98	0.9	0.22	1.0	0.68	0.038	1.0	0.24
	CARBOLOY	27	1.6	1.5	0.38	1.0	1.0	0.057	1.7	0.42
	GLASS	47	2.8	0.6	0.16	1.0	2.0	0.11	0.7	0.18
SIZE 2	SAPPHIRE	71	4.2	8.0	0.21	1.0	2.7	0.15	0.9	0.23
R-2-127-BT	316 SS	110	7.1	1.8	0.45	1.0	4.1	0.23	2.0	0.51
	CARBOLOY	170	10	3.0	0.75	1.0	5.9	0.33	3.3	0.83
	GLASS	160	10	1.8	0.45	1.0	7.3	0.4	2.0	0.5
SIZE 6	SAPPHIRE	240	14	2.9	0.72	1.0	9.4	0.52	3.2	8.0
R-6-127-AT	316 SS	410	24	6.1	1.53	1.0	14	0.78	6.8	1.7
	CARBOLOY	610	36	10.5	2.61	1.0	19	1.1	11.6	2.9
	GLASS	450	27	9.4	2.34	1.0	19	1.0	10.4	2.6
SIZE 6	SAPPHIRE	660	40	14.9	3.7	1.0	24	1.3	16.5	4.1
R-6-127-BT	316 SS	1000	65	30.1	7.5	1.0	35	1.9	33.3	8.3
	CARBOLOY	1500	95	57.8	14.4	1.0	49	2.7	64.2	16
Note: 216 SS an	-l Ol l fl	4 141 -	- 11-4-4 -1-		4		41411	!	4 1	

Note: 316 SS and Carboloy float capacities listed above can be used to size meters with optional inductance-type alarms

^(*) Air flow rates in standard units are at 70'F and 14.7 PSIA, air flow rates in normal units are at 1.013 bar & 20'C

^(**) When the viscosity of the fluid exceeds the viscosity immunity ceiling (VIC), a calculated correction is applied to account for the difference between factory calibration fluid and process fluid.

Product Specifications - Capacities and Pressure Drop (continued)

Meter Sizes 7, 8, 9, 10, 12 &13: 200mm, 250mm Scale, Rib Guided Tubes, Standard Floats

				Water					Air***	**		
		Flow	Rate	Pressur	re Drop	V. I. C.**	Flow	Rate	Pressure	Drop	REQ.	REQ.
TUBE	FLOAT	GPM	l/h	INCHES W.C.	kPa	cSt	SCFM	m3n/h	INCHES W.C.	kPa	psi (*)	bar(*)
Size 7	GLASS	0.15	34	2.0	0.5	1.0	0.83	1.3	2.0	0.5	0	0
R-7M-25-1FT	316 SS	0.35	81	3.0	0.75	1.0	1.6	2.5	4.0	1	0	0
	8-RV-3	0.77	170	3.0	0.75	2.0	3.1	5.0	3.0	0.75	0	0
	8-RV-8	1.0	240	5.0	1.3	3.7	4.4	7.0	5.0	1.3	0	0
Size 8	8-RS-8	1.3	310	6.0	1.5	1.8	5.8	9.2	6.0	1.5	0	0
8-8M-25-4FT	8-RS-14	1.8	410	10	2.5	1.9	7.5	11	11	2.8	0	0
•	8-RV-14	1.4	320	8.0	2	5.4	5.8	9.2	8.0	2	0	0
	8-RV-31	2.0	460	16	4	7.0	8.3	13	17	4.3	30	2
•	8-RS-31	2.5	580	20	5	3.1	10	16	22	5.5	30	2
•	8-LJ-48 ****	4.8	1100	52	13	1.0	20	33	57	14	30	2
	9-RV-33	2.5	570	6.0	1.5	11	10	16	7.0	1.8	0	0
Size 9	9-RS-33	3.2	730	4.0	1	2.4	13	21	8.0	2.0	0	0
R-9M-25-3FT	9-RV-87	3.9	890	14	3.5	17	16	26	16	4.0	30	2
•	9-RS-87	5.1	1100	18	4.5	3.5	21	35	19	4.8	30	2
	10-RV-64	6.2	1400	12	3	15	25	40	14	3.5	0	0
Size 10	10-RS-64	7.8	1700	16	4	3.7	32	50	18	4.5	0	0
R-10M-25-3FT	10-RS-138	10	2400	30	7.5	5.5	46	76	36	9	30	2
	10-LJ-238 ****	20	4600	104	26	1.0	92	150	16	4	30	2
	12-RV-119	13	2900	4.0	1	30	56	88	4.0	1	0	0
Size 12	12-RV-221	17	3900	10	2.5	32	70	110	12	3	0	0
R-12M-20-5FT	12-RV-343	20	4700	16	4	24	86	140	20	5	30	2
	12-RS-343	26	6100	20	5	10	110	180	24	6	30	2
	12-HF-455 ****	42	9700	30	7.5	10	170	280	32	8	30	2
	13-RV-510	31	7200	26	6.5	40	130	200	28	7	0	0
Size 13	13-RS-510	42	9600	36	9	20	170	270	40	10	0	0
R-13M-20-3FT	13-HF-758 ****	62	14000	40	10	12	270	440	44	11	30	2
	13-LJ-1394 ****	98	22000	200	50	1.0		NOT	INTENDED FOR	R GAS SER	VICE	

^(*) Minimum operating downstream pressure for gas service in PSIG.

Meter Sizes 2 thru 13: 127mm, 200mm, 250mm Scale, Rib Guided Tubes, Alarm Floats

				Water				Air***				
		Flow	Rate	Pressure	Drop	V. I. C.**	Flow Rate		Pressure Drop		REQ.	REQ.
TUBE	FLOAT	GPM	l/h	INCHES W.C.	kPa	cSt	SCFM	m3n/h	INCHES W.C.	kPa	psi(*)	bar(*)
Size 2			Refer to Capacity Table for Sizes 2 & 6***									
Size 6					Refe	r to Capaci	ty Table fo	r Sizes 2 8	6***			
Size 7 R-7M-25-1FT	7-XV-11A	0.48	100	8.0	2.0	3.0	1.9	3.0	10	2.5	0	0
Size 8	8-XV-14	1.4	320	8.0	2.0	5.4	6	9.2	8.0	2.0	0	0
R-8M-25-4FT	8-XS-14	1.8	410	10	2.5	1.9	8	11	11	2.8	0	0
Size 9	9-XV-40	2.8	630	6.0	1.5	11	10	18	7.0	1.8	0	0
R-9M-25-3FT	9-XS-40	3.5	810	4.0	1.0	2.4	13	22	8.0	2.0	0	0
Size 10	10-XV-64	6.2	1400	11	2.8	15	25	40	13	3.3	0	0
R-10M-25-3FT	10-XS-138	10	2400	30	7.5	5.5	45	75	36	9.0	30	2
Size 12	12-XV-221	17	3900	10	2.5	29	70	110	12	3.0	0	0
R-12M-20-5FT	12-XV-343	20	4700	16	4.0	36	94	150	18	4.5	30	2
Size 13	13-XV-510	31	7200	26	6.5	42	130	200	28	7.0	0	0
R-13M-20-3FT	13-XS-510	42	9600	36	9.0	7.6	170	270	40	10	0	0
	13-XHF-758	62.00	14000	40	10	1.0	270	450	44	11	30	2

^(*) Minimum operating downstream pressure for gas service (psig)

Float Types READ HERE Type LJ Type RV (rib guided) Type RS (rib guided) Spherical Highest immunity to viscous High flow capacity with Maximum flowmeter Lowest meter capacity or fluids with medium meter some immunity to medium capacity with low capacity with limited viscosity fluids. capacity. (most stable) viscous fluids. (Descriptions refer to floats used in the same size tube)

^(**) Viscosity immunity ceiling listed is for stainless steel float, fluid specific gravity 1.0. When the viscosity of the fluid exceeds the viscosity immunity ceiling (VIC), a calculated correction is applied to account for the difference between factory calibration fluid and process fluid.

^(****) Extended range - nonviscosity compensating floats.

^(*****) Air flow rates in standard units are at 70'F and 14.7 PSIA, air flow rates in normal units are at 1.013 bar & 20'C

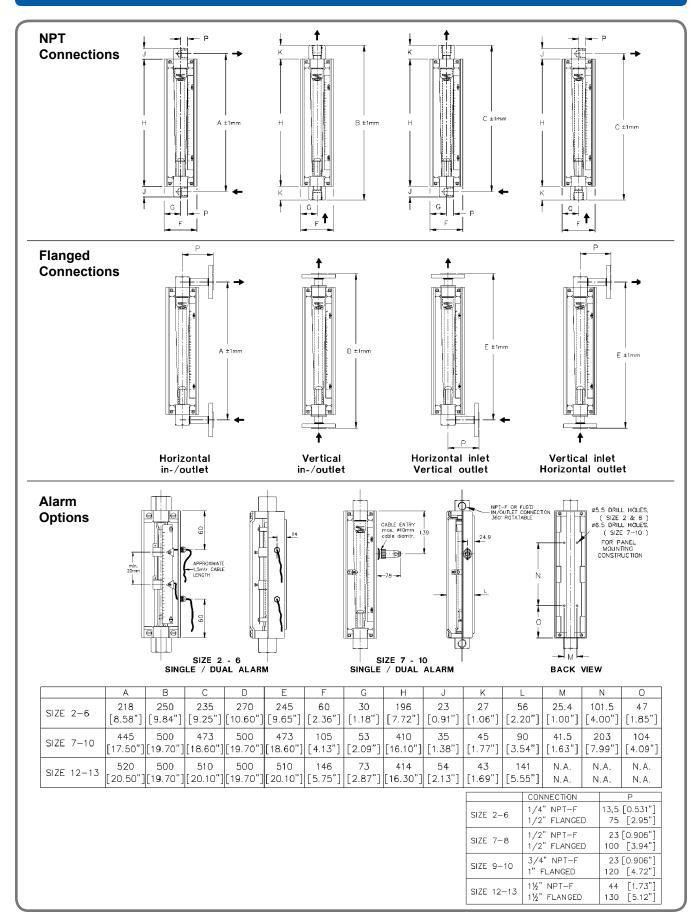
^(**) Viscosity immunity ceiling listed is for stainless steel float, fluid specific gravity 1.0. When the viscosity of the fluid exceeds the viscosity immunity ceiling (VIC), a calculated correction is applied to account for the difference between factory calibration fluid and process fluid.

Note 1: All size 8-13 floats listed are 316 SS with integral magnet for use with reed switch alarm.

^(***) Alarm option for sizes 2 and 6 requires metallic float (SS or carboloy) for use with inductive type alarm.

^(****) Air flow rates in standard units are at 70'F and 14.7 PSIA, air flow rates in normal units are at 1.013 bar & 20'C

Product Dimensions - GT1000 Family: NPT, Flanged and w/Alarm Options



GT1000 Optional Equipment - Alarms & Valves

GT1000 Alarm Contacts Meter Sizes 7 to 13

The Brooks reed switch alarm is a normally open, latching switch used in conjunction with the GT1000 glass tube flow meter for signaling high and/or low flow or a deviation from a flow setting.

A magnet embedded and sealed in the float actuates the alarm switch. The reed switch is mounted adjacent to the flow tube and is easily adjustable over the entire flow range of the instrument.

The sealed reed switch consists of a biasing magnet and hermetically sealed reed switch, which is insulated to prevent damage from mild shock and normal pipe vibration. The contact rating of the switch is very low. An external relay is recommended for secure operation. Plus the external relay can be configured to operate as a normally open or normally closed state which provides totally flexibilty of operation.

Alarm Certifications Data Reed Switch

Maximum Voltage* 175 Vdc, 124 Vac
Maximum Current* 250 mA
Maximum Contact Rating* 3 Watts

*(Maximum Switch Specifications)

Electrical Classification Non Incendive:

Maximum Voltage 30 Vdc
Maximum Current 250 mA
Maximum Contact Rating 3 Watts



US and Canada E73889

NI Class I, Div 2, Groups A, B, C and D: Class II, Groups F and G, T6. per UL 1604, Third Edition

Environmental rating: Type 4X

Intrinsically Safe:

Entity parameters:

Vmax = Ui = 30 Vdc, Imax = 100 mA, Ci = 0, Li = 0



US and Canada E73889

IS Class I, II, III, Div 1, Groups A, thru G, T6 per UL 913: Sixth Edition

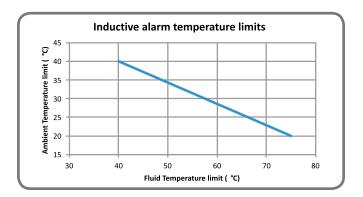
Environmental rating: Type 4X

Inductive Alarms,

Alarm Contacts Meter Sizes 2 and 6 Inductive coils for high and/or low flow alarm may be mounted to the instrument to create a highly sensitive, stable and accurate device for signaling high or low flows or deviations from a controlled flow. The inductive alarm can only be used in combination with 316 ss or Carboloy® ball floats. The alarm points may be adjusted over the entire flowmeter range and be set so that any two contacts may be made to operate simultaneously. For hazardous area applications Brooks can supply an approved Namur power supply/amplifier/relay unit to obtain an intrinsically safe current circuit.

Data 10&15-14-N3 Inductive Coils

Power Supply	8 volt nominal (max. 15.5 Vdc)
Current Consumption	Active area clear: > 3 mA
Current Consumption	Active area obscured: < 1 mA
Self Inductance	70 μH
Self Capacitance	90 nF
Max. Temperature	Refer to chart
Electrical Classification	
Intrinsically Safe:	
⟨x⟩ATEX:	PTB99ATEX2128X
	Ex II 2 G
	EEx ia IIC T6
Enclosure Type:	IP67
EMC Directive:	EN 60947-5-2 DIN EN 60947-5-6 (Namur)



Alarm Hysteresis

8mm typical (0.32 in)

Alarm Accessories

Remotely mounted, switch isolator/power supplies are required for inductive alarms and recommended for reed switch alarms. One or two single-pole, double-throw (SPDT) relays are available with either 110 or 220 AC volt units.

Optional Needle Valves

For flow rate control, needle valves are externally piped to either the inlet or outlet connection of the meter. Valves are available with threaded or flanged connections. Note, solenoid valves should not be used because this type of valve can cause pressure shocks which can damage the glass tube.

Note: Valves are supplied separately.

Model Code

Code I	Description	Code Option	Option De	scription										
I.	Base Model Numbers	1020N	Horizontal	Inlet and O	utlet									
		1024N	Vertical Inle	et and Outl	et									
		1026N	Horizontal	Inlet and Ve	ertical Outle	t								
		1027N			zontal Outle									
		102/14			zontai Outie									
II.	Size and Tube Designator		Size	Tube										
		Q	Size 2	R-2-127-	AAAAT									
		С	Size 2	R-2-127-	DT									
		E	Size 2	R-2-127-	BT									
		G	Size 6	R-6-127-										
		H	Size 6	R-6-127-										
			-											
		J	Size 7	R-7M-25										
		K	Size 8	R-8M-25										
		L	Size 9	R-9M-25	-3FT									
		M	Size 10	R-10M-2	5-3FT									
		N	Size 12	R-12M-2	:0-5FT (Not	t available ir	ı EU)							
		Р	Size 13		0-3FT (Not									
		•	3126 10	IN TOWN 2	.0011 (140	avanable n	1 207							
III.	Alarms		Switch		Relay									
		0	None		None									
		1	1 Switch/S	ensor	No Relay									
		2	2 Switches		No Relay									
		3	1 Switch/S			Dual Relay	(CDDT)							
		4	2 Switches			Dual Relay								
		5	1 Switch/S			Dual Relay	. ,							
		6	2 Switches	/Sensors	110 Vac IS	Dual Relay	(SPDT)							
IV.	Floats		Size 2	Size 6	Size 7	Size 8	Size 9	Size 10	Size 12	Size 13				
	Standard Floats Size 2, 6 & 7	1	Glass	Glass	Glass	-	-	_	-	-				
		2	Sapphire	Sapphire	_	_	-	_	-	_				
	Alarm Floats Size 2, 6 & 7	3	316 SS	316 SS	316 SS	-	-	1_	-	_				
	Adminitious size 2, 0 & 7	4	Carboloy	Carboloy	310 33	1-			_					
	Standard Floats Size 8-13		Carboloy	Carboloy	ļ-		- 0 DV 22	10 D)///		12 DV E10				
	Standard Floats Size 8-13	A	-		-	-	9-RV-33	10-RV-64		13-RV-510				
		В	-	-	-	8-RV-3	9-RS-33	10-RS-64		13-RS-510				
		С	-	-	-	8-RV-8	9-RV-87	-	12-RV-343					
		D	-	-	-	8-RS-8	9-RS-87	10-RS-138	12-RS-343	-				
		E	-	-	-	8-RV-14	-	10-LJ-238	12-HF-455	13-HF-758				
		F	_	-	_	8-RS-14	-	_	-	13-LJ-1394				
		G	_	_	_	8-RV-31	_	_	_	_				
		H	_	l _		8-RS-31	_		_					
					-		+	-	_	_				
	AL EL . C: 7.40	J	-	-	7 10/444	8-LJ-48	-	10.00777	10.10/001	12 10 1512				
	Alarm Floats Size 7-13	N -	-	-	7-XV-11A	8-XV-14	9-XV-40	10-XV-64		13-XV-510				
		Р	-	-	-	8-XS-14	9-XS-40	-		13-XS-510				
		R	-	-	-	-	-	10-XS-138	-	-				
		S	-	-	-	-	-	-	-	13-XHF-758				
V.	End Fitting Material	1	Brass											
٧.				occ Stool										
	and Certification	2	316 Stainle				1							
		4	316 Stainle	ess Steel wit	th Material C	ertificate 3.	I							
VI	O-ring Material	Α	Viton											
	g	В	Buna											
		C	Kalrez											
		D	EPDM											
VII.	Connection Type	Α	NPT-F Threaded											
		В	RC (BSP) Threaded											
			ANSI 150# RF Flange											
		С	ANSI 150#	KF Flange										
VIII	Connection Size	1	1/4"											
¥ 111.	COMMICCUOTI SIZE	2	1/2"											
		3	3/4"											
		4	1"											
		5	1-1/2"											

Model Code (continued)

Code Description	Code Option	Option Description
IX. Right Side Scale Inscription	9	No scale required at this location
(When facing meter)	Α	No inscription (blank scale)
	В	MM scale
	С	PERCENT scale - fluid GAS
	D	PERCENT scale - fluid LIQUID
	E	Direct Reading scale - fluid LIQUID
	F	Direct Reading scale - fluid GAS
	G	Direct Reading scale - fluid HIGH VISCOSITY
X. Left Side Scale Inscription	9	No scale required at this location
(When facing meter)	A	No inscription (blank scale)
(gg	В	MM scale
	C	PERCENT scale - fluid GAS
	D	PERCENT scale - fluid LIQUID
	Е	Direct Reading scale - fluid LIQUID
	F	Direct Reading scale - fluid GAS
	G	Direct Reading scale - fluid HIGH VISCOSITY
XI. Meter Accuracy	С	2% Full Scale
7 Meter Accuracy	D	2% Full Scale and Certification to ICC
	E	1% Full Scale
	F	1% Full Scale and Certification to ICC
	J	2.5 VDI
	L	1.6 VDI
XII. Needle Valve/Flow Controller	0	None
All. Needle valve/1 low controller	A	Valve on Inlet
	В	Valve on Outlet
XIII. Panel Mounting	0	None
Am. I allel Mounting	1	Front Panel Mounting
	2	Back Panel Mounting
XIV. Processes with Certificates	0	None
	Α	Declaration of Compliance 2.1 Oxygen Service
XV. Additional Certificate	0	None
Requirements	В	International Calibration Certificate
XVI. OEM	1	Standard
AVI. OLIVI	2	No Brooks Identification
		140 DIOOKS IGENUIICAUOTI

Sample Standard Model Code

I	II	II	IV	V	VI	VII	VIII	IX	Х	ΧI	XII	XIII	XIV	XV	XVI
1020N	К	0	В	2	Α	Α	3	Е	9	С	0	0	0	0	1

GT1000 - Approximate Shipping Weights

	NPT CONNECTIONS	FLANGED CONNECTIONS				
METER SIZE	SHIPPING WEIGHT	SHIPPING WEIGHT				
2 TO 6	7 / 3.2	10 / 4.5				
7 AND 8	12 / 5.5	13 / 5.9				
9	18 / 6.2	20 / 9				
10	25 / 11.4	29 / 13.2				
12	39 / 17.7	49 / 22.3				
13	40 / 18.2	52 / 23.6				

Brooks Service and Support

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit www.BrooksInstrument.com to locate the service location nearest to you.

START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required. For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

CUSTOMER SEMINARS AND TRAINING

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users, and maintenance persons. Please contact your nearest sales representative for more details.

Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

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Global Headquarters Brooks Instrument 407 West Vine Street Hatfield, PA 19440-0903 USA Toll-Free (USA): 888-554-FLOW T: 215-362-3500 F: 215-362-3745 BrooksAM@BrooksInstrument.com

A list of all Brooks Instrument locations and contact details can be found at www.BrooksInstrument.com

INSTRUMENT