

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 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 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 O	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					

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	Flow Rate		Drop	V. I. C.**	Flow	Rate	Pressure	e 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	8.0	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	0.8	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	0.8	
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: 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	Pressu	re Drop	V. I. C.**	Flow	Rate	Pressure	e 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	0.16	36	2.0	0.5	1.0	0.88	1.4	2.0	0.5	0	0	
R-7M-25-1FT	316 SS	0.38	86	3.0	0.75	1.0	1.6	2.6	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-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 FO	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	Pressure Drop		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					Refe	r to Capaci	ty Table fo	r Sizes 2 &	6***			
Size 6					Refe	r to Capaci	ty Table fo	r Sizes 2 &	6***			
Size 7 R-7M-25-1FT	7-XV-11A	0.48	18 100 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)

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

Float Types READ HERE Spherical Type LJ Type RV (rib guided) Type RS (rib guided) Maximum flowmeter Highest immunity to viscous High flow capacity with 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.

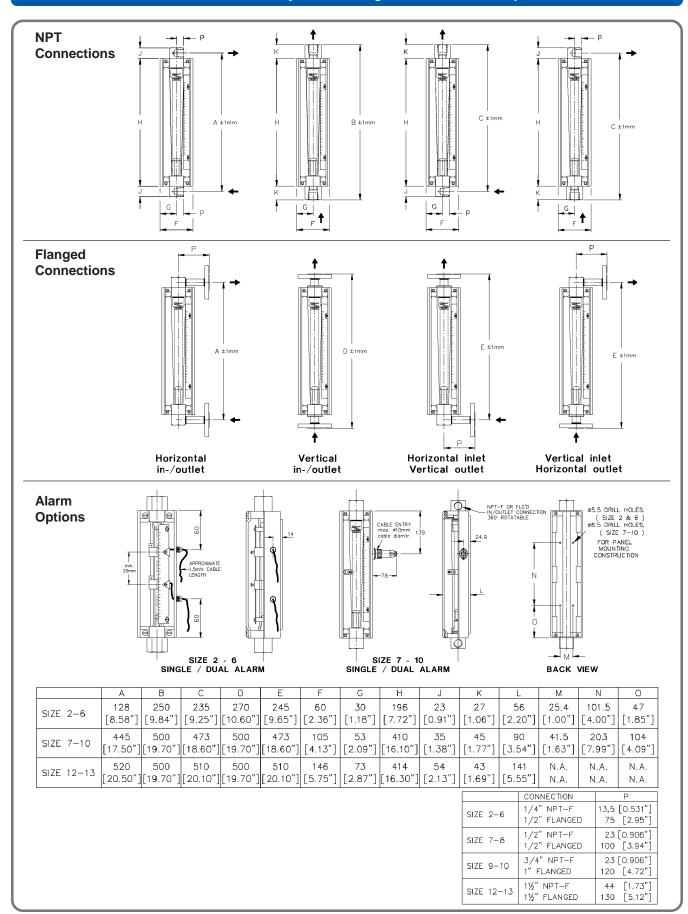
^(*****) Air flow rates in standard units are at 70'F and 14.7 PSIA, air flow rates in normal units are at 1.013 bar & 20'C

^(**) 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.

^(***) 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	75°C
Electrical Classification	
Intrinsically Safe:	
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 [Description	Code Option	Option De	scription						
I.	Base Model Numbers	1020N		Inlet and Ou	ıtlet					
		1024N	Vertical Inl	et and Outle	et					
		1026N	Horizontal	Inlet and Ve	rtical Outlet					
		1027N	Vertical Inl	et and Horiz	ontal Outlet					
	6: 17.1.5		l c:	1-1						
II.	Size and Tube Designator		Size	Tube						
		Q	Size 2	R-2-127						
		C	Size 2	R-2-127						
		E	Size 2	R-2-127-						
		G	Size 6	R-6-127						
		Н	Size 6	R-6-127-	-BT					
]	Size 7	R-7M-25	-1FT					
		K	Size 8	R-8M-25	-4FT					
		L	Size 9	R-9M-25	-3FT					
		M	Size 10	R-10M-2						
		N	Size 12	R-12M-2	0-5FT (Not	available in	EU)			
		Р	Size 13		0-3FT (Not					
III.	Alarms		Switch		Relay					
		0	None		None					
		1	1 Switch/Se		No Relay					
		2	2 Switches/		No Relay					
		3	1 Switch/Se			Dual Relay (
		4	2 Switches/	/Sensors	220 Vac IS	Dual Relay (SPDT)			
		5	1 Switch/Se			Dual Relay (
		6	2 Switches/	/Sensors	110 Vac IS	Dual Relay (SPDT)			
13.4	El .		6: 3	l c:	Tc: 7	T c: 0] c: 0	l c: 40	6: 43	C: 43
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	-	-	-	-	-
	<u>-, </u>	2	Sapphire	Sapphire	-	-	-	-	-	-
	Alarm Floats Size 2, 6 & 7	3	316 SS	316 SS	316 SS	-	-	-	-	-
		4	Carboloy	Carboloy	-	-	-	-	-	-
	Standard Floats Size 8-13	Α	-	-	-	-	9-RV-33	10-RV-64		13-RV-510
		В	-	-	-	8-RV-3	9-RS-33	10-RS-64		13-RS-510
		C	-	-	-	8-RV-8	9-RV-87	-	12-RV-343	-
		D	-	-	-	8-RS-8	9-RS-87	10-RS-138		-
		E	-	-	-	8-RV-14	-	10-LJ-238	12-HF-455	13-HF-758
		F	-	-	-	8-RS-14	-	-	-	13-LJ-1394
		G	-	-	-	8-RV-31	-	-	-	-
		Н	-	-	-	8-RS-31	-	-	-	-
		1	-	-	-	8-L]-48	-	-	-	-
	Alarm Floats Size 7-13	Ň	-	-	7-XV-11A	8-XV-14	9-XV-40	10-XV-64	12-XV-221	13-XV-510
		P	-	-	-	8-XS-14	9-XS-40	-		13-XS-510
		R	-	-	-		-	10-XS-138		-
		 S	-	1-	-	-	-	-	-	13-XHF-758
		_			1		1			, 750
٧.	End Fitting Material	1	Brass							
	and Certification	2	316 Stainle							
		4	316 Stainle	ess Steel with	n Material Cer	tificate 3.1				
14	O vina Material		Vitar							
VI.	O-ring Material	A	Viton							
		B	Buna							
		<u> </u>	Kalrez							
		D	EPDM							
VII	Connection Type	Α	NPT-F Thre	aded						
VIII.	connection type	B	RC (BSP) TI							
		C	ANSI 150#							
			HUCI ICKIN	KE FLAIIYE						
VIII	Connection Size	1	1/4"							
		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	
7.0	(When facing meter)	A	No inscription (blank scale)	
	(When racing meter)	В	MM scale	
		C	PERCENT scale - fluid GAS	
		D	PERCENT scale - fluid LIOUID	
		E	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	
		D	2% Full Scale and Certification to ICC	
		E	1% Full Scale	
		F	1% Full Scale and Certification to ICC	
		ļ j	2.5 VDI	
		L L	1.6 VDI	
XII.	Needle Valve/Flow Controller	0	None	
		Α	Valve on Inlet	
		В	Valve on Outlet	
XIII	Panel Mounting	0	None	
******	. and mounting	1	Front Panel Mounting	
		2	Back Panel Mounting	
VIV	Processes with Certificates	0	None	
AIV.	Trocesses with Certificates	A	Declaration of Compliance 2.1 Oxygen Service	
XV.	Additional Certificate	0	None	
	Requirements	В	International Calibration Certificate	
XVI.	OEM	1	Standard	
		2	No Brooks Identification	

Sample Standard Model Code

1	II	II	IV	٧	VI	VII	VIII	IX	Х	XI	XII	XIII	XIV	XV	XVI
1020N	K	0	В	2	Α	Α	3	E	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.

HELP DESK

In case you need technical assistance:

Americas 7 1 888 554 FLOW **7** +31 (0) 318 549 290 Europe Asia **7** +81 3 (0) 5633 7100

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

TRADEMARKS

Brooks	Brooks Instrument, LLC
Carboloy	General Electric Co.
Kalrez	DuPont Dow Elastomers
Teflon	E.I. DuPont de Nemours & Co.
Viton	DuPont Performance Flastomers





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