

Data Sheet

DS-VA-1350E-eng

March, 2008

Models 1350E and 1355E

Sho-Rate™ "50" Model 1350E and Sho-Rate™ "150" Model 1355E

- Ten-to-one rangeability
- Heavy-wall, precision bore, borosilicate glass metering tubes
- A wide range of scales on the metering tube with contrasting background for easy readability
- Tubes sealed on compression gasket by threaded seal spindle
- Tubes removable without disconnecting instrument
- Integral float stops prevent loss of float during tube removal
- Interchangeable tubes and floats

DESCRIPTION

The Sho-Rate 1350 and 1355 Series of low flow indicators provides a cost-effective means of flow indication for both 5% (Model 1355) and 10% (Model 1350) accuracy requirements. Available options include the Standard or NRS™ integral needle control valves, as well as flow controllers on the inlet or outlet.

SPECIFICATIONS

Capacities

1350 Series: Refer to Tables 1 or 2, or 3 and 4

1355 Series: Refer to Tables 3 and 4, or 5

Accuracy

1350 Series Standard: Accuracy of $\pm 10\%$ of full scale from 100% to 10% of scale reading

1355 Series Standard: $\pm 5\%$ of full scale from 100% to 10% of scale reading

Repeatability

0.5% full scale

Rangeability

10 to 1

Pressure

200 psig at temperatures up to 250°F

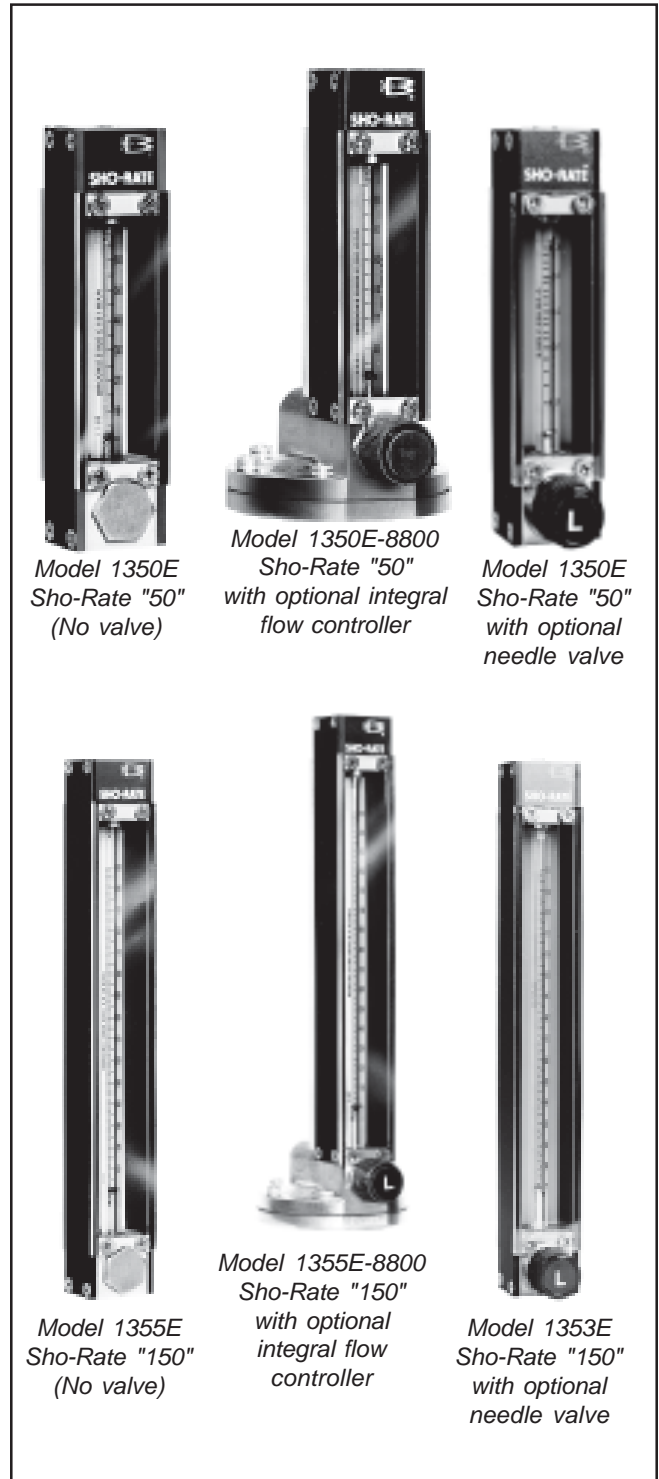
Pressure Drop

Inquire at factory

Flow Meter Assembly

Pressure Equipment Directive (97/23/EC)

Note: Equipment falls under Sound Engineering Practice (SEP) according to the directive.



Model 1350E
Sho-Rate "50"
(No valve)

Model 1350E-8800
Sho-Rate "50"
with optional integral
flow controller

Model 1350E
Sho-Rate "50"
with optional
needle valve

Model 1355E
Sho-Rate "150"
(No valve)

Model 1355E-8800
Sho-Rate "150"
with optional
integral flow
controller

Model 1353E
Sho-Rate "150"
with optional
needle valve

Models 1350E and 1355E

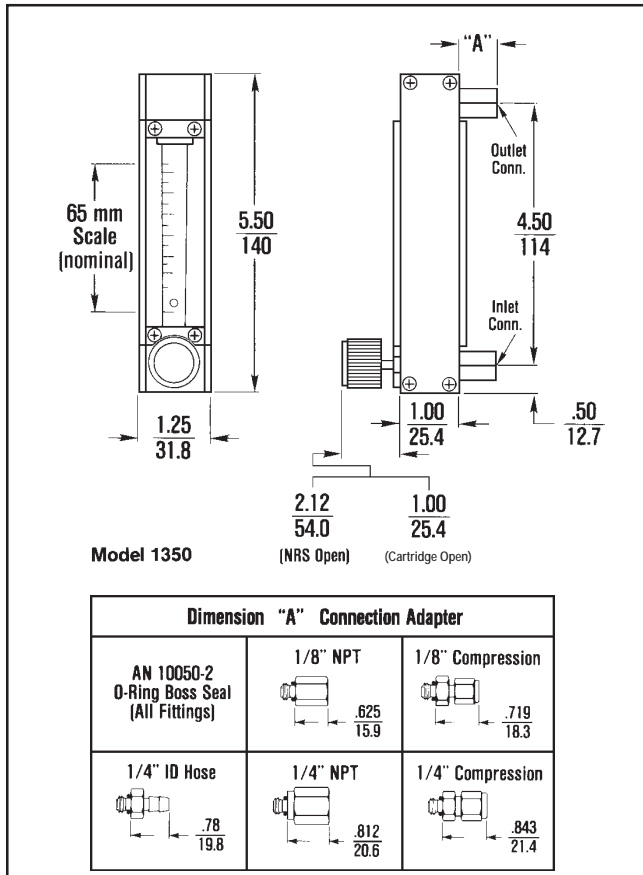


Figure 1 Dimensions - Sho-Rate 1350E

Scales

1350 Series:

Length: 65 mm, nominal
Graduations: Standard: 0-65mm, or 0-100 linear reference scale with air or water calibration table.

1355 Series:

Length: 150mm, nominal
Graduations: Standard: 0-150 mm, or 0-100 linear reference scale with air or water calibration table.
Optional: for either 65 mm or 150 mm direct reading scale, ceramic ink fused on glass tube or metal scale plate mounted beside tube
Type: Standard: Ceramic ink fused on meter tube with contrasting yellow background

Materials of Construction

Metering Tubes: Borosilicate glass

Floats: Glass, 316 stainless steel, sapphire, Carboloy®, tantalum

Structural Members:

End fittings: Chrome plated brass, black anodized aluminum, 316 stainless steel

Side Plates:

Standard: Black anodized aluminum

Optional: 316 stainless steel

Window: Clear polycarbonate; Back Window: Milk white polycarbonate

Float Stops:

Standard: Teflon®

Optional: 316 Stainless Steel

Tube Packing:

Standard: Buna-N (Brass and aluminum meters), Viton-A® fluoroelastomers (316 stainless steel meters)

Optional: Teflon, EPM (also known as EPR)

O-rings:

Standard: Buna-N (Brass and aluminum meters), Viton-A fluoroelastomers (316 stainless steel meters)

Optional: Teflon (not available with needle valves), EPM, Kalrez®

Connections

Standard: Horizontal female 1/8" NPT threaded adapters with locknuts for front of panel mounting

Dimensions

Refer to Figures 1, 2 and 4

OPTIONAL EQUIPMENT

Standard integral flow control valve on inlet or outlet (See DS-VA-CART-eng).

NRS integral flow control valve on inlet or outlet (See DS-VA-8503-eng). These valves are particularly suitable for precise control requirements, and are recommended for flow rates below 500 sccm of Air (@STP) or 10 cc/min water.

Flush mounting bezels in aluminum

Threaded adapters and locknuts for front of panel mounting (standard with 1/8" NPT)

1/8" and 1/4" compression fittings

1/4" female NPT connections

1/4" ID serrated hose connections

Base plates, with or without level

ORDERING INFORMATION (Refer to Table 6)

1. Model
2. Size, connections, type
3. Quantity required
4. Fluid
5. Minimum, normal and maximum operating temperature

Data Sheet

DS-VA-1350E-eng

March, 2008

Models 1350E and 1355E

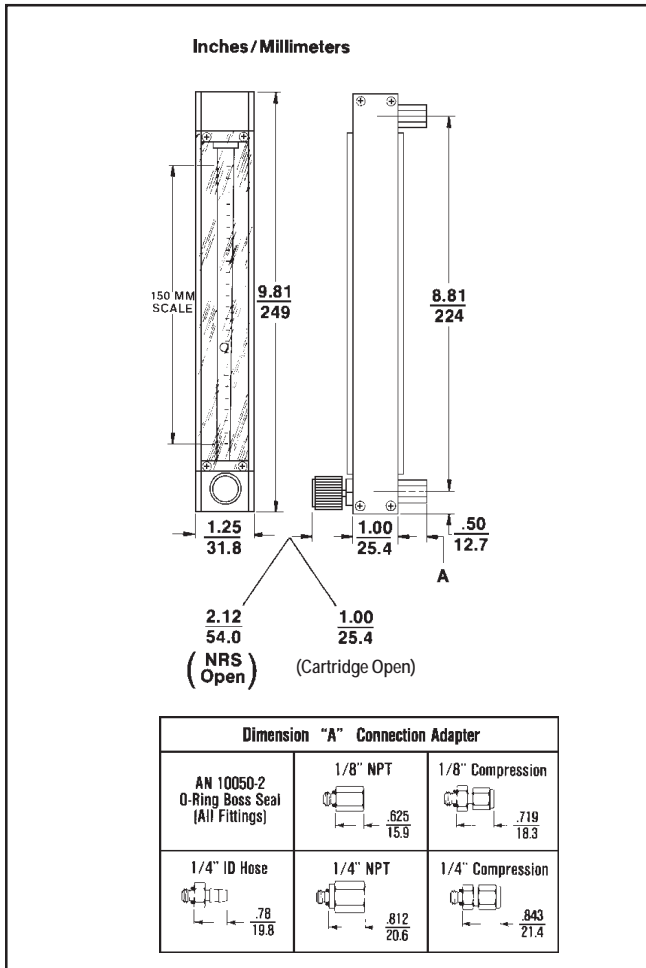


Figure 2 Dimensions - Sho-Rate 1355E

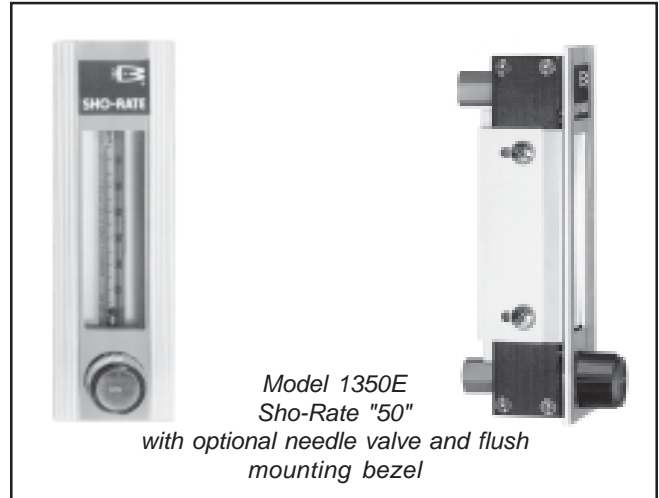


Figure 3 Optional Equipment

6. Minimum, normal and maximum operating pressure (inlet and outlet)
7. Minimum, normal and maximum flow rate
8. Materials of construction
 - a. End fittings
 - b. Side plates
 - c. Bezel
 - d. Elastomers
9. Fluid
10. Fluid specific gravity
11. Fluid viscosity
12. Unusual system conditions (For ranges and pressure drops other than those listed, consult factory).
13. Optional equipment
 - a. Valve type and location
 - b. Flow controller and type

Models 1350E and 1355E

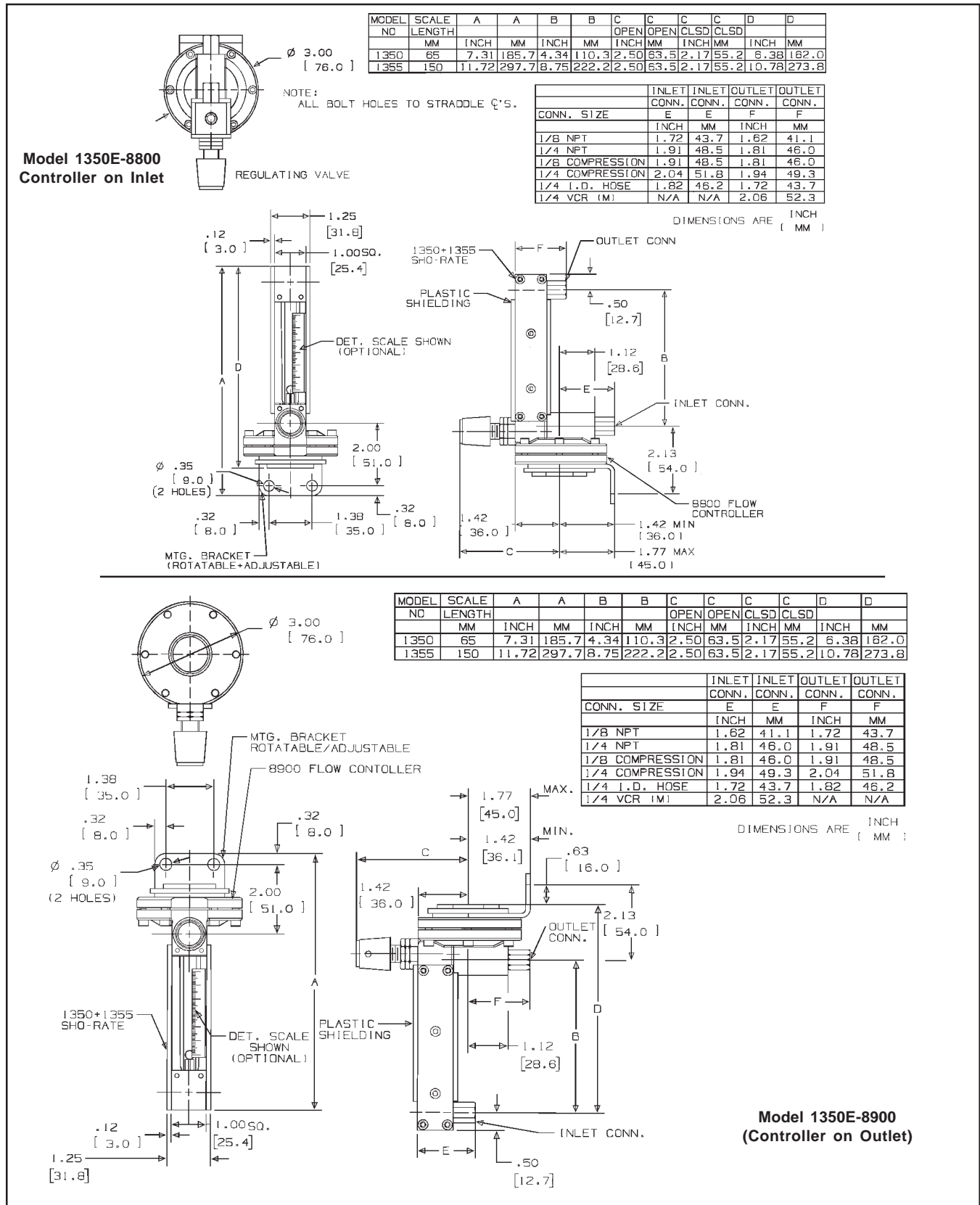


Figure 4 Dimensions - Sho-Rate 1350E & 1355E with Integral Flow Controller

Data Sheet

DS-VA-1350E-eng

March, 2008

Models 1350E and 1355E

Table 1 Capacities for Sho-Rate Model 1350E Rib Guided Tubes, Spherical Floats

METER SIZE	TUBE NO.	FLOAT MATERIAL	RIBBED TUBES, SPHERICAL FLOATS							
			MAXIMUM FLOW RATE							
			WATER				AIR*			
			GPH	CODE	LPH	CODE	SCFH	CODE	NLPH	CODE
2	R-2-65-A	GLASS	0.011	JB6	0.042	JB9	0.13	JB7	3.4	JB8
		SAPPHIRE	0.022	JC4	0.085	JC2	0.18	JC3	5.0	JC1
		STN. STL.	0.046	JC8	0.18	JC5	0.34	JC7	9.0	JC6
		CARBOLOY	0.10	JB4	0.38	JB5	0.65	JB2	17.0	JB3
		TANTALUM	0.11	JD2	0.42	JC9	0.70	JD1	19.0	JD3
	R-2-65-B	GLASS	0.013	KB8	0.048	KB2	0.15	KB7	4.0	KB9
		SAPPHIRE	0.026	KC1	0.10	KD3	0.22	KC2	5.5	KC3
		STN. STL.	0.06	KC5	0.22	KC6	0.42	KC7	11.0	KC8
		CARBOLOY	0.12	KB4	0.48	KB5	0.80	KB3	22.0	KB6
		TANTALUM	0.13	KD2	0.50	KD5	0.85	KD4	22.0	KD1
	R-2-65-C	GLASS	0.11	LB9	0.42	LB7	0.95	LB6	24.0	LB8
		SAPPHIRE	0.15	LC1	0.6	LC2	1.3	LC3	34.0	LC4
		STN. STL.	0.38	LC7	1.4	LC8	2.0	LC9	50.0	LC6
		CARBOLOY	0.65	LB3	2.4	LB2	3.0	LB4	80.0	LB5
		TANTALUM	0.65	LD1	2.6	LD2	3.2	LD3	85.0	LD4
	R-2-65-D	GLASS	0.65	MB9	2.4	MB7	3.8	MB8	100	MC1
		SAPPHIRE	0.95	MC2	3.6	MC3	5.0	MC4	130	MC5
		STN. STL.	1.60	MC7	6.0	MD1	7.5	MC6	200	MC8
		CARBOLOY	2.40	MB5	9.0	MB2	11.0	MB3	280	MB4
		TANTALUM	2.60	MD5	10.0	MD6	12.0	MD2	300	MD4
6	R-6-65-A	GLASS	2.40	NB8	8.5	NB7	13.0	NC1	340	NB9
		SAPPHIRE	3.40	NC4	13.0	NC3	17.0	NC6	460	NC5
		STN. STL.	5.50	ND1	20.0	ND3	26.0	NC9	650	ND2
		CARBOLOY	8.50	NB2	32.0	NB3	36.0	NB5	950	NB6
		TANTALUM	9.0	ND6	34.0	ND5	38.0	ND7	1000	ND4
	R-6-65-B	GLASS	8.0	PB9	30.0	PB8	44.0	PC1	1100	PB7
		SAPPHIRE	12.0	PC5	44.0	PC3	60.0	PC4	1500	PC2
		STN. STL.	19.0	PD1	70.0	PC9	85.0	PC8	2200	PC6
		CARBOLOY	28.0	PB3	100	PB2	130	PB6	3400	PB4
		TANTALUM	30.0	PD7	110	PD6	140	PD5	3600	PD4

* FLOW RATES GIVEN ARE MAXIMUM VALUES. AIR FLOWS ARE AT 14.7 PSIA AND 70 DEGREES F.

Table 2 Capacities for Sho-Rate Model 1350E Plain Tapered Tubes, Spherical Floats

TUBE AND FLOAT	PLAIN TAPER TUBES, SPHERICAL FLOATS			TUBE AND FLOAT	GPH WATER	Press. Drop ** Inches W.C.	CODE
	SCFH AIR*	Press. Drop ** Inches W.C.	CODE				
1-65A GLASS	1.2	1.0	AB4	1-65C GLASS	0.14	1.8	AB5
2-65A GLASS	2.0	2.2	BA7	2-65C STN. STL.	0.5	4.0	DA5
2-65B STN. STL.	5.0	10.8	CA4	2-65D STN. STL.	1.0	19.5	CA8
3-65A GLASS	6.0	12.4	EB4	3-65C GLASS	0.7	22.3	EB9
3-65B STN. STL.	10	10.1	EB8	3-65D STN. STL.	1.6	18.3	EC1
4-65A GLASS	12	10.4	FC3	4-65C GLASS	2.0	18.7	FD3
4-65B STN. STL.	18	25	FC8	4-65D STN. STL.	4.0	45	FD6
5-65A GLASS	45	60	GB6	5-65C GLASS	9.0	109	GC4
5-65B STN. STL.	80	214	GC1	5-65D STN. STL.	17	385	GC5
6-65A GLASS	55	73	HB8	6-65C GLASS	11	132	HC7
6-65B STN. STL.	90	292	HC5	6-65D STN. STL.	20	525	HD1
6-65E CARBOLOY	120	400	HD3	6-65F CARBOLOY	30	890	HD4

* FLOW RATES ARE MAXIMUM VALUES. AIR FLOWS ARE AT 14.7 PSIA AND 70 DEGREES F

** PRESSURE DROPS ARE APPROXIMATE

TRADEMARKS

Carboly General Electric Co.
 Kalrez DuPont Performance Elastomers
 NRS Brooks Instrument, LLC
 Sho-Rate Brooks Instrument, LLC
 Teflon E.I. DuPont de Nemours & Co.
 Viton-A DuPont Performance Elastomers

Models 1350E and 1355E

Table 3 Tube and Float Code,
Detachable Scale Option, 1st Digit

CODE	MODEL 1350 TUBE	MODEL 1355 TUBE
A	1-65	R-2-15-A
B	2-65A	R-2-15-AA
C	2-65B & D	R-2-15-AAA
D	2-65C	R-2-15-B
E	3-65	R-2-15-C
F	4-65	R-2-15-D
G	5-65	R-6-15-A
H	6-65	R-6-15-B
J	R-2-65-A	
K	R-2-65-B	
L	R-2-65-C	
M	R-2-65-D	
N	R-6-65-A	
P	R-6-65-B	
Y	NO TUBE	NO TUBE

Table 4 Tube and Float Code,
Detachable Scale Option, 2nd & 3rd Digits

METER ACCURACY	FLOAT MATERIAL	DETACHABLE SCALE INSCRIPTION				
		MM	0-100 LINEAR	SPECIAL SINGLE SCALE	SPECIAL DUAL SCALE	BLANK SCALE
STANDARD (1350-10%) (1355- 5%)	GLASS	1A	1N	2A	2N	3A
	STN. STL.	1B	1P	2B	2P	3B
	SAPPHIRE	1C	1Q	2C	2Q	3C
	CARBOLOY	1D	1R	2D	2R	3D
	TANTALUM	1E	1S	2E	2S	3E
	*ALUMINUM	1F	1T	2F	2T	3F
CALIBRATED (1350-5%) (1355-2%)	GLASS	1G	1U	2G	2U	
	STN. STL.	1H	1V	2H	2V	
	SAPPHIRE	1J	1W	2J	2W	
	CARBOLOY	1K	1X	2K	2X	
	TANTALUM	1L	1Y	2L	2Y	
	*ALUMINUM	1M	1Z	2M	2Z	
N/A	NONE	9A	9B			9C

*ALUMINUM SPOOL FLOAT FOR 15 CC/MIN AIR AVAILABLE ONLY WITH R-2-15-AAA

Table 5 Capacities for Sho-Rate Model 1355E Rib Guided Tubes, Spherical Floats

CAPACITIES (RIB GUIDE TUBES, SPHERICAL FLOATS) - FOR USE WITH 1355 SERIES ONLY							
METER SIZE	TUBE NO.	FLOAT MATERIAL	MAXIMUM FLOW RATE*		MODEL CODE - SCALE ON TUBE		
			WATER (CC/MIN)	AIR			
					0-150 MM	10-100%	0-100 LINEAR
2	R-2-15-AAA	GLASS	0.524	47.1 SCC/M	CA6		CA1
		SAPPHIRE	1.02	73.3 SCC/M	CA8		CA3
		STN. STL.	2.42	140 SCC/M	CA7		CA2
		CARBOLOY	4.77	238 SCC/M	CA9		CA4
		TANTALUM	5.31	260 SCC/M	CB1		CA5
	R-2-15-AA	GLASS	0.964	83.8 SCC/M	BA6		BA1
		SAPPHIRE	1.86	128 SCC/M	BA8		BA3
		STN. STL.	4.34	245 SCC/M	BA7		BA2
		CARBOLOY	8.37	416 SCC/M	BA9		BA4
		TANTALUM	9.30	454 SCC/M	BB1		BA5
	R-2-15-D	GLASS	5.58	361 SCC/M	FA6		FA1
		SAPPHIRE	10.2	491 SCC/M	FA8		FA3
		STN. STL.	19.8	790 SCC/M	FA7		FA2
		CARBOLOY	31.9	1170 SCC/M	FA9		FA4
		TANTALUM	34.4	1250 SCC/M	FB1	LIQ. GAS	FA5
	R-2-15-A	GLASS	16.1	0.790 SLPM	AA6	AB7 AC3	AA1
		SAPPHIRE	25.2	1.04 SLPM	AA8	AB9 AC4	AA3
		STN. STL.	44.2	1.60 SLPM	AA7	AB8 AC6	AA2
		CARBOLOY	67.7	2.32 SLPM	AA9	AC1 AC5	AA4
		TANTALUM	72.5	2.46 SLPM	AB1	AC2 AC7	AA5
	R-2-15-B	GLASS	50.6	2.25 SLPM	DA6	DB2	DA1
		SAPPHIRE	76.2	2.92 SLPM	DA8	DB4	DA3
		STN. STL.	127	4.42 SLPM	DA7	DB3	DA2
		CARBOLOY	189	6.35 SLPM	DA9	DB5	DA4
TANTALUM		202	6.74 SLPM	DB1	DB6	DA5	
R-2-15-C	GLASS	81.1	3.69 SLPM	EA6	EB2	EA1	
	SAPPHIRE	123	4.81 SLPM	EA8	EB4	EA3	
	STN. STL.	208	7.23 SLPM	EA7	EB3	EA2	
	CARBOLOY	312	10.1 SLPM	EA9	EB5	EA4	
	TANTALUM	333	10.6 SLPM	EB1	EB6	EA5	
6	R-6-15-A	GLASS	191	8.26 SLPM	GA6	GB2	GA1
		SAPPHIRE	284	10.6 SLPM	GA8	GB4	GA3
		STN. STL.	468	15.7 SLPM	GA7	GB3	GA2
		CARBOLOY	690	22.0 SLPM	GA9	GB5	GA4
		TANTALUM	735	23.3 SLPM	GB1	GB6	GA5
	R-6-15-B	GLASS	548	22.6 SLPM	HA6	HB2	HA1
		SAPPHIRE	809	28.6 SLPM	HA8	HB4	HA3
		STN. STL.	1290	41.6 SLPM	HA7	HB3	HA2
		CARBOLOY	1850	58.1 SLPM	HA9	HB5	HA4
		TANTALUM	1960	61.4 SLPM	HB1	HB6	HA5

NOTE: ALL AIR FLOWS ARE AT 14.7 PSIA AND 70 DEGREES F.

* FLOW RATES SHOWN ARE MAXIMUM CAPACITIES. DIRECT READ SCALES MAY END AT SLIGHTLY DIFFERENT MAXIMUM FLOWS.

Data Sheet

DS-VA-1350E-eng

March, 2008

Models 1350E and 1355E

Table 6 Ordering Information and Model Code

PURGE FLOWMETER		DESCRIPTION	
1350E		65 MM TUBE, SIZES 1-6	
1355E		150 MM TUBE, SIZES 2-6	
TUBE, SCALE AND FLOAT			
		MODEL 1350 OR 1355 DETACHABLE SCALE - SEE TABLES 3 & 4	
xxx	} Enter 3 Digit Model Code	MODEL 1350 - SEE TABLE 1 OR 2	
		MODEL 1355 - SEE TABLE 5	
		TUBE PACKING	O-RING MATERIAL (METER/VALVE ASSEMBLY)
A		BUNA -N	BUNA-N (STD FOR ALUMINUM AND BRASS METERS)
B		VITON	BUNA-N
C		VITON	VITON (STD FOR STN. STL. METERS)
D		VITON	TEFLON (NO VALVE)
D		VITON	TEFLON O-RINGS METER/KALREZ O-RINGS VALVE
E		VITON	EPM
F		VITON	KALREZ (NO VALVE)
F		VITON	KALREZ (WITH VALVE)
G		TEFLON	BUNA-N
H		TEFLON	VITON
J		TEFLON	TEFLON (NO VALVE)
J		TEFLON	TEFLON O-RINGS METER/KALREZ O-RINGS VALVE
K		TEFLON	EPM
L		TEFLON	KALREZ
L		TEFLON	KALREZ (WITH VALVE)
M		EPM	EPM
N		BUTYL	BUTYL
P		NO PACKING OR TUBE	BUNA-N
Q		NO PACKING OR TUBE	VITON
R		NO PACKING OR TUBE	TEFLON (NO VALVE)
R		NO PACKING OR TUBE	TEFLON O-RINGS METER/KALREZ O-RINGS VALVE
S		NO PACKING OR TUBE	EPM
T		NO PACKING OR TUBE	KALREZ
U		NO PACKING OR TUBE	BUTYL
FITTING AND ADAPTER MATERIAL/PROCESS CONNECTION SIZE & TYPE			
A		BRASS/ 1/8" NPT	
D		BRASS/ THD 1/8" NPT WITH LOCKNUTS (STANDARD)	
G		BRASS/ 1/4" NPT (STD WITH FLOW CONT.)	
L		BRASS/ THD 1/4" NPT WITH LOCKNUTS	
P		BRASS/ 1/8" COMPRESSION	
S		BRASS/ THD 1/8" COMPRESSION WITH LOCKNUTS	
V		BRASS/ 1/4" COMPRESSION	
Y		BRASS/ THD 1/4" COMPRESSION WITH LOCKNUTS	
2		BRASS/ 1/4" I.D. HOSE	
5		BRASS/ NO ADAPTOR-INTEGRAL 5/16-24 THD	
E		ALUMINUM/ THD 1/8" NPT WITH LOCKNUTS (STANDARD)	
H		ALUMINUM/ 1/4" NPT (STD WITH FLOW CONT.)	
6		ALUMINUM/ NO ADAPTOR-INTEGRAL 5/16-24 THD	
C		316 STAINLESS STEEL/ 1/8" NPT	
F		316 STAINLESS STEEL/ THD 1/8" NPT WITH LOCKNUTS (STANDARD)	
J		316 STAINLESS STEEL/ 1/4" NPT (STD WITH FLOW CONT.)	
N		316 STAINLESS STEEL/ THD 1/4" NPT WITH LOCKNUTS	
R		316 STAINLESS STEEL/ 1/8" COMPRESSION	
U		316 STAINLESS STEEL/ THD 1/8" COMPRESSION WITH LOCKNUTS	
X		316 STAINLESS STEEL/ 1/4" COMPRESSION	
1		316 STAINLESS STEEL/ THD 1/4" COMPRESSION WITH LOCKNUTS	
4		316 STAINLESS STEEL/ 1/4" I.D. HOSE	
7		316 STAINLESS STEEL/ NO ADAPTOR-INTEGRAL 5/16-24 THD	
8		316 STAINLESS STEEL/ 1/4" VCR	
K		KYNAR 1/4" NPT (VALVE SHOULD BE 316 S.S. MATERIAL)	

Models 1350E and 1355E

Table 6 Ordering Information and Model Code Continued

		VALVE TYPE	
A		VALVE PLUG	
B		BRASS - LOW FLOW	
C		BRASS - MEDIUM FLOW	
D		BRASS - HIGH FLOW	
E		316 STAINLESS STEEL - LOW FLOW	
F		316 STAINLESS STEEL - MEDIUM FLOW	
G		316 STAINLESS STEEL - HIGH FLOW	
H		NRS-BRASS #1	
J		NRS-BRASS #2	
K		NRS-BRASS #3	
L		NRS-BRASS #4	
M		NRS-BRASS #5	
N		NRS-BRASS #6	
P		NRS - 316 STAINLESS STEEL #1	
Q		NRS - 316 STAINLESS STEEL #2	
R		NRS - 316 STAINLESS STEEL #3	
S		NRS - 316 STAINLESS STEEL #4	
T		NRS - 316 STAINLESS STEEL #5	
U		NRS - 316 STAINLESS STEEL #6	
V		TO INTEGRALLY MOUNTED FLOW CONTROLLER	
W		STANDARD VALVE CAVITY - NO VALVE ASSEMBLY OR PLUG	
X		NO VALVE CAVITY (MUST USE CODE 9 BELOW FOR VALVE CAVITY LOCATION)	
		VALVE CAVITY LOCATION	CONNECTION ORIENTATION
1		INLET	IN-BACK, OUT-BACK (STANDARD)
2		INLET	IN-BACK, OUT-FRONT
3		INLET	IN-FRONT, OUT-BACK
4		INLET	IN-FRONT, OUT-FRONT
5		OUTLET	IN-BACK, OUT-BACK (STANDARD)
6		OUTLET	IN-BACK, OUT-FRONT
7		OUTLET	IN-FRONT, OUT-BACK
8		OUTLET	IN-FRONT, OUT-FRONT
9		NONE (INLET SIDE) USE WITH CODE X ABOVE	IN-BACK, OUT-BACK
		ACCESSORIES-1,2, OR 3 DIGIT FIELD	
A		NONE	
B		ALUMINUM FLUSH MOUNTING BEZEL	
C		FLUSH PANEL MOUNTING FOR KYNAR METERS	
E		TRIPOD BASE WITHOUT SPIRIT LEVEL	
J		DEGREASE FOR OXYGEN SERVICE	
L		STAINLESS STEEL SIDE PLATES	
M		STAINLESS STEEL SPRING FLOAT STOPS	
N		NIST CERTIFICATION INCLUDES CALIBRATION AND SCALE CHECK (10%, 1350; 5%, 1355)	
Q		NO BROOKS IDENTIFICATION	

Example: 1350JB9 AAA1A

Brooks Instrument
407 West Vine Street
P.O. Box 903
Hatfield, PA 19440-0903 USA
T (215) 362-3700
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E-Mail BrooksAm@EmersonProcess.com
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