

Weights, Manual Valves

Weir Valve Weights

All weights are approximate, given in pounds and are for manual valve assemblies.

Handwheel operated

Valve size (inches)	½	¾	1	1¼ & 1½	2	2½	3	4	6	8	10	12
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Weir bodies: of metal

Screwed:	Iron; St. Steel	1½	3	4	9½	15	26	39	–	–	–	–
	Bronze	1¾	3¾	4¾	10¼	15	28	39	–	–	–	–
Flanged: (unlined)	Iron; St. Steel	3¾	5¾	6¾	14½	21	33	47	81	147	330	510
	Bronze	4½	6½	7¾	16¼	24	37	53	92	164	–	–
Buttweld:	Steel; St. Steel	2½	2½	4	11	13	23½	34	59	150	–	–

Weir bodies: solid plastic

Screwed	PVC, CPVC	0.9	1.3	2.0	5.0	7.0	–	–	–	–	–	–
Socket weld	PP	0.8	1.1	1.6	4.5	6.0	–	–	–	–	–	–
	PVDF	0.9	1.3	1.8	5.4	7.4	–	–	–	–	–	–
Spigot Weld	PVC, CPVC	0.8	1.2	1.8	4.7	6.4	–	–	–	–	–	–
	PP	0.7	1.0	1.6	4.2	5.7	–	–	–	–	–	–
	PVDF	0.8	1.2	1.8	4.7	6.5	–	–	–	–	–	–
Flanged	PVC, CPVC	1.2	1.7	2.5	5.7	8.0	–	18.20	29.00	–	–	–
	PP	2.0	2.6	3.7	6.8	10.1	–	20.00	31.00	–	–	–
	PVDF	2.1	2.8	3.8	7.5	11.2	–	22.70	35.50	–	–	–

Straightway Valve Weights (approx. lbs. each)

Body type	1	1½	2	2½	3	4	6	8	10	12
Flanged	8	17	24	38	49	82	178	340	500	590

Weights, Actuators

Dia-Flo® Actuator Weights*

Double acting diaphragm type (including adapter bushing)		Fail Close (including adapter bushing)	Fail Open (including adapter bushing)
#3312	5½ lbs.	#3213 – 3216	5½ lbs.
#3325	13½ lbs.	#3226 – 3228	32½ lbs.
#3350	33½ lbs.	#3251, 52, 56	55 lbs.
#3375	42 lbs.	#3253 – 3255	73 lbs.
#33101	71 lbs.	#3274 – 3279	78 lbs.
#33130	88 lbs.	#32102 – 32109	186 lbs.
#33250	140 lbs.	#32101	176 lbs.
		Special Spring Combination	
		#32131 – 32138	207 lbs.
		#32130	200 lbs.
		Special Spring Combination	
		#32252 – 32253	270 lbs.
		#32251	405 lbs.

Advantage® Actuator Weights*

#A305	1.03	#A205, A206	1.37	#A105	1.12
#A308	1.95	#A208, A209	2.62	#A108	2.06
#A316	4.90	#A215, A216, A217	9.24	#A116	5.40
#A333	39.00	#A232, A233, A234, A235	58.00	#A133	42.30
#A347	44.00	#A247, A248	63.00	#A147	47.30

*Add to manual valve weights for approximate weight of complete actuated valve.

Actuator Internal dimensions

Dia-Flo

Actuator Size	Actuator Stroke	Air Connection	Effective Diaphragm Area (Sq. in.)	Actuator Volume (cu. in.)					
				Bottom Chamber		Upper Chamber			
				Double & Fail Closed		Double Acting		Fail Open	
				Open	Closed*	Open	Closed*	Open	Closed*
12 – 16	⅜"	¼"	11.5	13.25	6.8	6.1	12.5	6.1	12.5
25 – 28	2"	¼"	22.5	90.3	21.7	13.4	85.1	13.4	85.1
50 – 56	3"	¼"	50	321.0	63.4	43.8	329.0	364	622
75 – 79	3"	¼"	75	374.7	128.1	80.9	422.0	–	–
101 – 109	3⅞"	½"	100	528.0	174.0	144.0	498.0	579	933
130 – 138	3½"	½"	130	698.7	202.9	212.0	710.9	647	1146
250 – 253	4⅞"	½"	250	1650.0	750.0	675.0	1760.0	1110	2195

NOTE: * Using stroke of largest valve for which actuator is suitable

Advantage

Actuator Series	Actuator Stroke	Air Connection	Effective Diaphragm Area (Sq. in.)	Actuator Volume (cu. in.)	
				Bottom Chamber Maximum	Upper Chamber Maximum
05	¼"	⅜"	5	4.27	5.49
08	½"	⅜"	8	7.63	12.51
16	1⅞"	⅜"	16	38.75	71.00
47	1⅞"	¼"	47	250.20	463.80

Material Specifications & Industry Standards

Bodies (weir/straightway)

- Cast Iron ASTM A-126 Class B
- Ductile Iron ASTM A-395 Grade 60-40-18
- Cast Steel ASTM A-216 Grade WCB
- 316 Stainless Steel ASTM A-351 Grade CF8M
- 316L Stainless Steel ASTM A-351 Grade CF3M
- Bronze ASTM B62 Alloy 836
- Alloy 20 ASTM A-351 Grade CN7M
- Hastelloy C ASTM A-494 Grade CW-6M
- Monel ASTM A-494 Grade M-35-1
- PVC & CPVC ASTM D1784
- PVDF ASTM D3222
- Polypropylene ASTM D4101
- And more

Bonnets (weir/straightway)

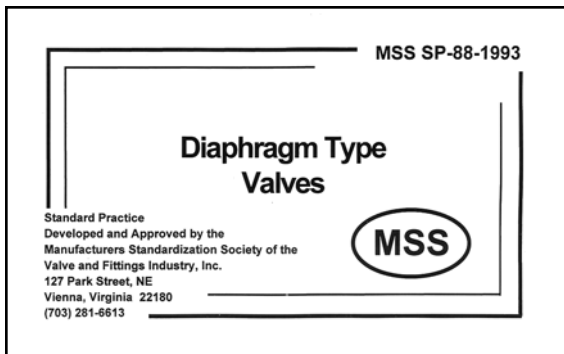
- Cast Iron ASTM A-126 Class B
- Ductile Iron ASTM A-395 Grade 60-40-18
- Stainless Steel ASTM A-351 Grade CF8 (weir)
- Bronze ASTM B62 Alloy 836 (weir)
- Polypropylene (weir only 1/2" - 4")
- PAS (weir only 1/2" - 4")

Dia-Flo® Diaphragm Valves are manufactured to the following industry standards (where applicable):

ANSI/ASME B1.20.1	Pipe Threads	ASME B16.34	Steel Valves*
ASME B16.5	Flanged Valves	ASME B16.4	Cast Iron Threaded Fittings
ASME/ANSI B16.1	Cast Iron Flanged Fittings	ASME B31.1	Power Piping*
ASME B16.11	Socketweld Fittings	ASME B31.3	Petro/Chem Piping
ASME/ANSI B16.15	Bronze Threaded Fittings	MSS SP-88	Diaphragm Valves (Design & Manufacture Standard Practice)
ASME B16.24	Bronze Flanges	ASME B16.25	Buttweld Ends
ASME/ANSI B16.42	Ductile Iron Flanges		

*May require special construction and testing. Consult factory for details.

In addition ITT has complete capabilities for CMTR (Certified Materials Test Reports) and NDE (Non-destructive Examinations) which include dye-penetrant, x-ray, alloy analyzer, etc.



SEP Compliance for CE

Certification of SEP Compliance, Pressure Equipment Directive 97/23/EC

Dia-Flo Weir Diaphragm Valve Application Restrictions per size:

Size	Max Pressure	Fluid Classification
½" - 1"	13.8 Bar / 200 PSI	Grps 1 & 2 Liquids, Gases
1¼" - 2"	12.1 Bar / 175 PSI	Grps 1 & 2 Liquids, Gases (not suitable for Unstable Gas use)
2½" - 3"	10.3 Bar / 150 PSI	Grps 1 & 2 Liquids, Grp 2 Gases (not suitable for Grp 1 or Unstable Gas use)
4"	10.0 Bar / 145 PSI	Grps 1 & 2 Liquids, Grp 2 Gases (not suitable for Grp 1 or Unstable Gas use)
6"	8.6 Bar / 125 PSI	Grps 1 & 2 Liquids (not suitable for Grps 1 & 2 Gases or Unstable Gas use)
8"	6.9 Bar / 100 PSI	Grps 1 & 2 Liquids (not suitable for Grps 1 & 2 Gases or Unstable Gas use)
10" - 12"	4.5 Bar / 65 PSI	Grps 1 & 2 Liquids (not suitable for Grps 1 & 2 Gases or Unstable Gas use)

Dia-Flo Straightway Diaphragm Valve Application Restrictions per size:

Size	Max Pressure	Fluid Classification
½" - 1"	6.9 Bar / 100 PSI	Grps 1 & 2 Liquids, Gases
1½" - 3"	6.9 Bar / 100 PSI	Grps 1 & 2 Liquids, Grp 2 Gases (not suitable for Grp 1 or Unstable Gas use)
4"	5.9 Bar / 85 PSI	Grps 1 & 2 Liquids, Grp 2 Gases (not suitable for Grp 1 or Unstable Gas use)
6" - 8"	3.4 Bar / 50 PSI	Grps 1 & 2 Liquids, Grp 2 Gases (not suitable for Grp 1 or Unstable Gas use)
10" - 12"	2.8 Bar / 40 PSI	Grps 1 & 2 Liquids, Grp 2 Gases (not suitable for Grp 1 or Unstable Gas use)

This Certification of SEP Compliance is expressly reserved for product that by definition the Pressure Equipment Directive may not be CE Marked. Product supplied with this certificate has been manufactured to sound engineering practices (as per PED Assessment Category "Sound Engineering Practices", Article 3 Para. 3).

Valve Linings & Solid Plastic Materials Specifications

The economies and conveniences resulting from the use of lined valves are well recognized. Engineers concerned with corrosion and abrasion resistant piping systems specify valves lined with plastic, rubber and glass. The unique design of the Dia-Flo diaphragm valve lends itself admirably to this concept.

Plastic linings do not bond to the metal castings. To provide a mechanical bond while insuring a full thick lining, the end flanges, the bonnet flange and the entire casting interior is recessed. In addition, a unique Line-Lok feature in the weir area, which locks the plastic lining to the casting thus preventing movement, collapse or flexural stresses, is incorporated.

Below is a listing of the standard lining materials available with a brief description of each material.

PFA

PFA (perfluoroalkoxy) is especially useful to designers and end users who require a thermoplastic with excellent chemical stability, electrical properties and mechanical use in low and high temperature environments. PFA lined valves are available in sizes 1"-6" sizes for temperatures up to 350°F.

Tefzel® (ETFE)

Tefzel® (ETFE) is a tough modified copolymer of ethylene and tetrafluoroethylene (TFE). It offers outstanding resistance to chemicals at high temperatures and is especially resistant to solvents when compared to other fluoropolymers. The resin is unaffected by strong and weak acids, gases and solvents and below 392°F (200°C) has no known solvent. Cast Iron, ductile iron or cast steel flanged end bodies lined with Tefzel® ($\frac{3}{16}$ " thick) (4.76 mm) are available in weir valve sizes $\frac{3}{4}$ " through 8" and cast iron lined straightway valve sizes 1" through 8".

Continuous use temperature is 300°F (149°C). Color coded white.

Polypropylene (PP)

Polypropylene is an inexpensive thermoplastic with good chemical and temperature resistance. Weir valves sizes $\frac{3}{4}$ " through 8" are cast iron, ductile iron or cast steel valves and straightway valve sizes 1" through 8" cast iron lined with blue polypropylene. This blue polypropylene complies with FDA requirements for food service. Code of Federal Regulations, GFR 21 Section 177.1520.

Because the polypropylene is completely supported by metal, these flanged polypropylene lined valves can be used at temperatures to 200°F (93°C). Color coded blue. Also available in solid polypropylene weir bodies are valve sizes $\frac{1}{2}$ " through 4". Maximum continuous use temperature is 200°F (93°C).

PVDF

PVDF is a high molecular weight polymer of vinylidene fluoride. It is mechanically strong, thermally stable and resistant to most chemicals and solvents. Valve bodies of solid PVDF are available with threaded ends in sizes $\frac{1}{2}$ " – 2". Cast iron, ductile iron or cast steel flanged valves lined with PVDF ($\frac{3}{16}$ " thick) which complies with FDA requirements Code of Federal Regulations 177.2510 are available in weir valve sizes $\frac{3}{4}$ " through 8". Continuous use temperature is 285°F (140°C) for lined valves. Color coded white with tab marked PVDF. Also available in solid PVDF weir bodies are valve sizes $\frac{1}{2}$ " to 4". Maximum continuous use temperature is 275°F (135°C).

PVC (Polyvinyl Chloride) and CPVC (Chlorinated Polyvinyl Chloride)

Rigid unplasticized PVC is a tough, chemically resistant thermoplastic that has gained wide acceptance in handling a broad range of corrosive chemicals. PVC piping systems can be threaded, flanged or solvent welded and Dia-Flo diaphragm valves with solid PVC bodies are available with all three end connections in sizes $\frac{1}{2}$ " through 2" as well as 3 and 4" flanged end connections. We also furnish cast iron valves lined with PVC in weir valve sizes $\frac{3}{4}$ " through 8", color coded dark gray. Maximum service temperature for PVC is 140°F (60°C), but solid CPVC valves are available in sizes $\frac{1}{2}$ " through 2" for temperatures to 200°F (93°C). Color coded light gray.

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Valve Linings & Solid Plastic Materials Specifications (cont.)

Glass

Dia-Flo® weir diaphragm valves are available lined with glass in sizes 1/2" through 8" with cast iron or ductile iron bodies. The glass lining is a borosilicate glass containing not less than 60% silicon dioxide which is both acid and alkali resistant. Cast iron glass lined valves are capable of withstanding a thermal shock of 100°F (38°C) within the range of 0° to 350°F (-17 to 177°C) and ductile iron glass lined valves, a thermal shock of 180°F (82°C) between 0° to

350°F (-17 to 177°C). Glass lined valves are fully resistant to all concentrations of most acids, except hydrofluoric (HF), fluosilicic acid (H₂SiF₆), and related fluorine compounds at temperatures to 212°F (100°C). For specific recommendations, refer to the Service Guide or contact your local ITT sales representative. At higher temperatures the acid concentration and the water content are important considerations because steam is frequently more corrosive to glass than acids. Color coded blue.

Rubber

Rubber linings can be applied to Dia-Flo diaphragm valves in weir valve sizes 1/2" through 12" and straightway valve sizes 1" through 12". These linings are 1/8" thick through 4" valves and 3/16" thick in valve sizes over 4". Rubber linings cover the interior of the valve body as well as the bonnet flange and both end flanges. Standard linings include hard and soft rubber, neoprene, butyl, and hypalon. Others can be furnished on special order.

NOTE: Storage Recommendations

Lined piping should be stored away from direct sunlight, heat or outdoor seasonal weathering between the time of delivery and use. Flexible type lining may be stored outdoors, providing the piping is covered with protective tarpaulins and not subjected to extreme temperature conditions, such as below 32°F or above 120°F. Avoid sudden changes in temperature.

Semi-hard and especially bone hard type lined equipment must be protected and stored, preferably indoors, and should never be subjected to extreme cold climatic conditions because thermal stress and expansion may introduce cracking.

Body Materials Available

Weir Bodies					
Body Type	Material	Identification*	Durometer/ FDA Compliant	Maximum Temperature**	
				°F	°C
Metal	Iron	CI or GXXX		350	177
	Ductile Iron	DI or DXXX		350	177
	Carbon Steel	WCB		350	177
	Bronze	B61 or B62		350	177
	Stainless Steel 316	CF8M	FDA	350	177
	CN7M	CN7M		350	177
	Monel	M35		350	177
	Hastelloy	CWXM		350	177
Plastic Lined	PP	Blue	FDA	200	93
	PVC	Grey		140	60
	Kynar® PVDF	White with tab	FDA	285	140
	Tefzel® ETFE	White		300	149
	PFA	Translucent	FDA	350	177
Rubber Lined	Soft Natural	#5	A 55-60	180	82
	Neoprene®	#7	A 60-65	200	93
	Hypalon® CSM	#9	A 60-65	200	93
	Hard Natural	#10	D 40-70	200	93
	Chlorobutyl	#16	A 60-65	200	93
Glass Lined	Borosilicate Glass	Blue Glass	FDA	350	177

Straightway Bodies					
Body Type	Material	Identification*	Durometer/ FDA Compliant	Maximum Temperature**	
				°F	°C
Metal	Iron	CI or GXXX		225	107
	Carbon Steel	WCB		225	107
	Stainless Steel 316	CF8M	FDA	225	107
Plastic Lined	PP	Blue	FDA	200	93
	Tefzel® ETFE	White		225	107
Rubber Lined	Soft Natural	#5	A 55-60	180	82
	Neoprene®	#7	A 60-65	200	93
	Hypalon® CSM	#9	A 60-65	200	93
	Hard Natural	#10	D 40-70	200	93
	Chlorobutyl	#16	A 60-65	200	93

*X designates a numerical value

**Temperature may decrease dependent on media, pressure and valve size.

Body Specifications for Lined Valves

Most lined diaphragm valves can be furnished with valve bodies of cast iron, ductile iron or carbon steel. Cast iron is the most economical and is frequently specified for handling low pressure, low temperature corrosive fluids. Ductile iron castings may be specified for more severe conditions or where there is concern about possible breakage of cast iron. Carbon steel may also be specified for more severe operating conditions but ductile iron is normally acceptable as an alternate to carbon steel.

	DUCTILE IRON	CARBON STEEL	CAST IRON
ASTM Designation	A-395	A-216 WCB	A-126
Tensile strength, psi	60,000	70,000	31,000
Tensile yield, psi	40,000	36,000	None
% elongation before fracture	18	22	None
Max. pressure rating, -20 to 100 deg. F. (-28 to 38 deg. C.)			
psi	250	285	200
kPa	1724	1965	1379

Weir Valve Seat & Shell Test Criteria as stated in MSS SP-88†

Test Durations and Test Pressures Based on Diaphragm Maximum Service Pressure Ratings					
Nominal Valve Size	Maximum Pressure Rating psi (bar)	Shell Test Pressure psi (bar)	Minimum Duration of Shell Test Seconds ⁽¹⁾	Seat Test Pressure psi (bar)	Minimum Duration of Seal Test Seconds ⁽¹⁾
1/2 – 1	200 (13.8)	240 (16.5)	15	200 (13.8)	15
1-1/4 – 1-1/2 – 2	175 (12.1)	210 (14.5)	15	175 (12.1)	15
2-1/2 – 4	150 (10.3)	180 (12.4)	60	150 (10.3)	30
6	125 (8.6)	150 (10.3)	60	125 (8.6)	30
8	100 (6.9)	120 (8.3)	60	100 (6.9)	30
10 – 12	65 (4.5)	80 (5.5)	180	65 (4.5)	30

(1)The minimum duration is the period of inspection after the valve is fully prepared and under full test pressure.

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† Valves with solid plastic bodies, plastic bonnets and/or plastic actuators are limited to 150 psi (10.3 bar) maximum.