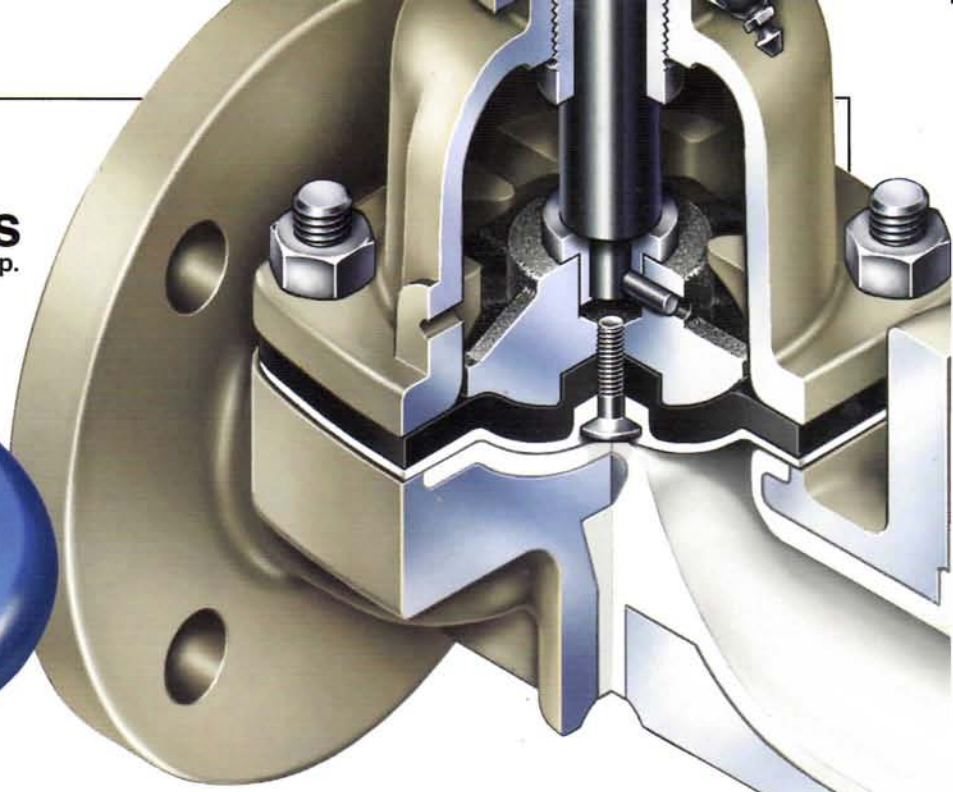
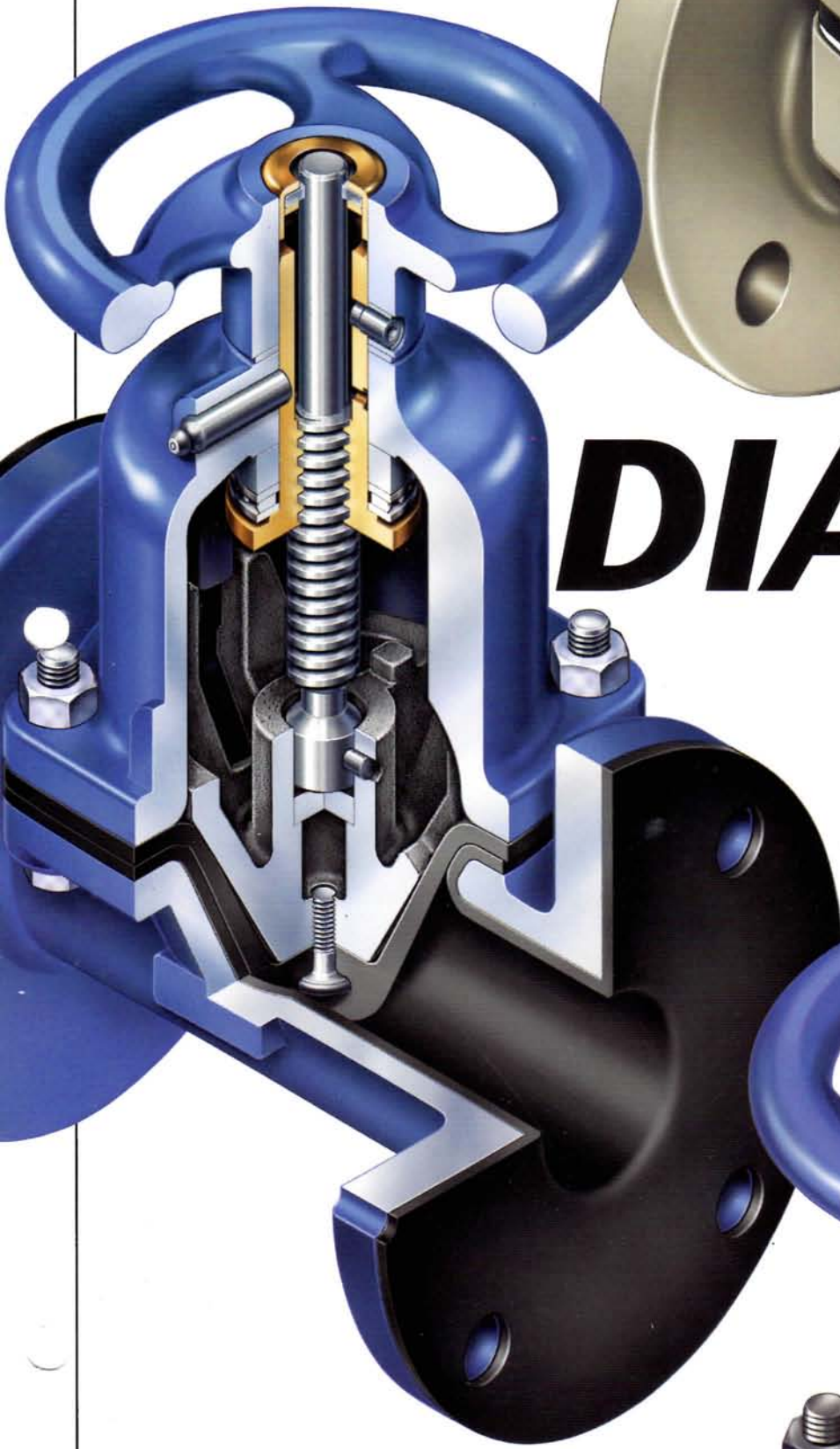
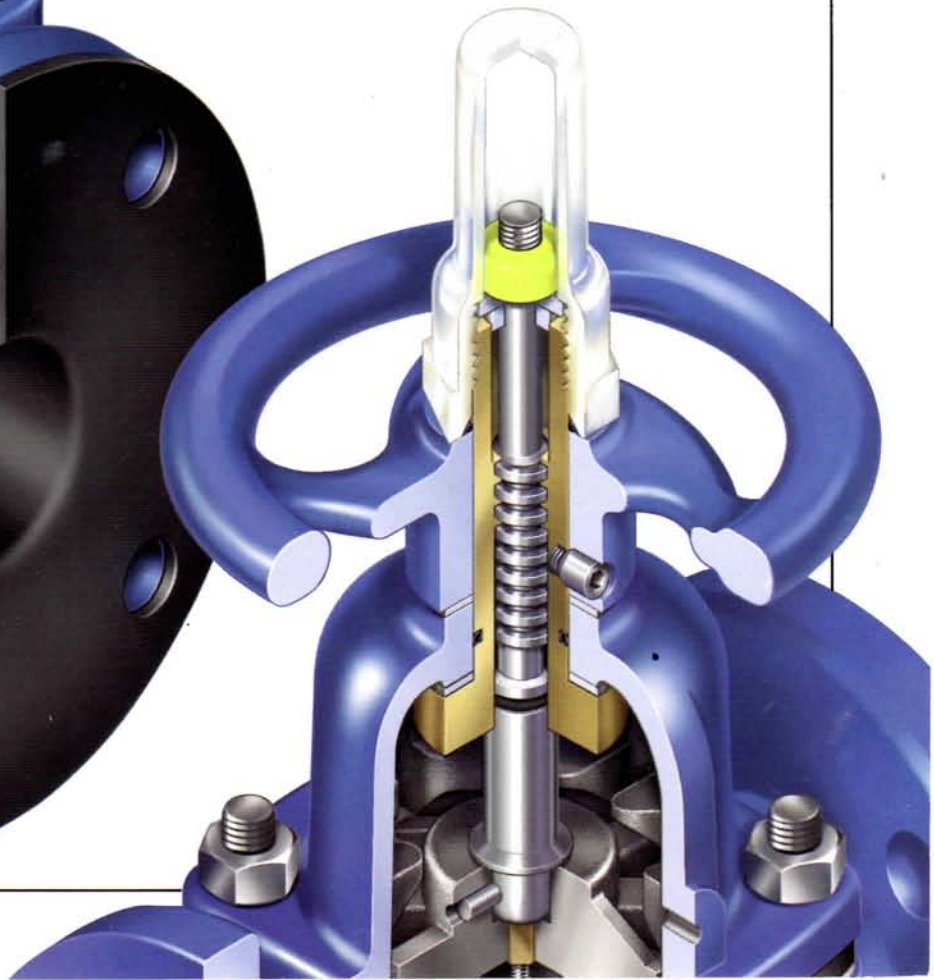


DVC-97

ITT Engineered Valves
ITT Fluid Technology Corp.

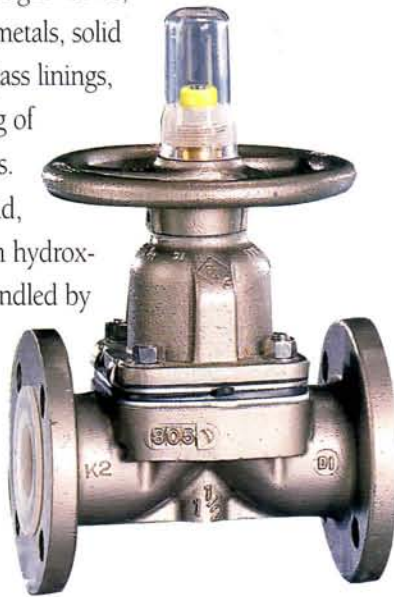


DIA-FLO[®]
Diaphragm Valves



DIA-FLO[®] DIAPHRAGM VALVES

Chemical: Dia-Flo Diaphragm Valves, available in a wide variety of metals, solid plastics, plastic, rubber and glass linings, are well suited to the handling of multiple chemical applications. Sulfuric acid, hydrochloric acid, hydrofluoric acid, and sodium hydroxide are typical applications handled by Dia-Flo Diaphragm Valves. The broad selection of body materials and diaphragms typically provides a chemically compatible and economical solution for almost any process system not exceeding 200 psi (13.8 bar) or 350°F (177°C)¹. Available in weir and straightway designs, both manual or automated, the Dia-Flo Diaphragm Valve is capable of handling clear fluids as well as slurries.



Water Treatment: Dia-Flo Diaphragm Valves, due to their versatility in body and diaphragm materials, provide an economical solution for demineralizers, deionizers, reverse osmosis systems and filtration systems. The typical valves utilized in these systems are Dia-Flo Weir Diaphragm Valves with PP (Polypropylene) or Tefzel[®] ETFE lining, Teflon[®] PTFE or EPDM diaphragms with either manually operated or Dia-Flo pneumatically operated actuators.



Typical accessories include limit switches, adjustable opening stops and handwheel opening devices.

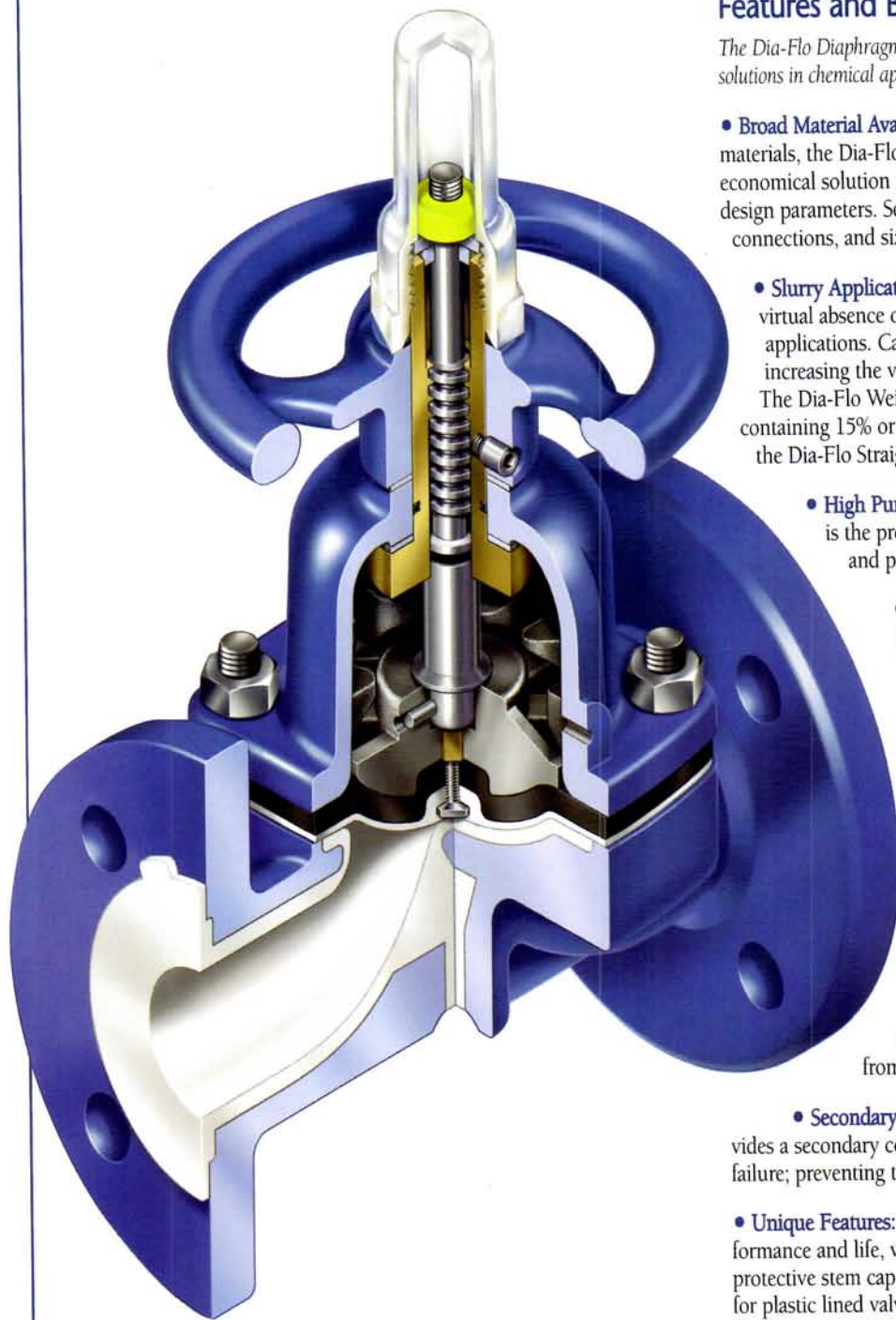
Power: Dia-Flo Diaphragm Valves are used extensively in demineralizer systems, FGD (flue gas desulfurization) systems, chemical systems and radioactive waste handling systems. The typical valve selected by OEMs and end users for demineralizers are Dia-Flo Weir Diaphragm Valves with PP or Tefzel[®] ETFE lining, Teflon[®] PTFE or EPDM diaphragms with Dia-Flo pneumatic actuators and required accessories. FGD systems commonly utilize Dia-Flo Straightway Valves with rubber linings to handle abrasive and corrosive process media. The nuclear industry utilizes the Dia-Flo Diaphragm Valve manufactured in accordance with nuclear standards. ITT Engineered Valves maintains an "N" stamp.



Pulp & Paper: One of the largest industry users of chemicals, pulp and paper plants frequently utilize Dia-Flo Diaphragm Valves in water treatment, chemical, bleaching and coating processes. The Dia-Flo Straightway Valve is utilized for slurry services, such as titanium dioxide and lime mud. The Dia-Flo Weir Valve is utilized in clear fluid services typical of the water treatment, chemical handling and coating processes.



DIA-FLO® WEIR DIAPHRAGM VALVE



Features and Benefits

The Dia-Flo Diaphragm Valve is typically one of the most economical valve solutions in chemical applications due to the wide choice of wetted materials.

- **Broad Material Availability:** Given the various body and diaphragm materials, the Dia-Flo Diaphragm Valve often provides the most economical solution for your process system, within the valve's design parameters. See page 15 for specific materials, end connections, and sizes.

- **Slurry Applications:** Due to the streamlined flow path and virtual absence of cavities, the diaphragm valve is ideal for slurry applications. Cavities within valves tend to entrap solids, either increasing the valve's operational torque or inhibiting operation. The Dia-Flo Weir Diaphragm Valve is recommended for slurries containing 15% or less solids. For slurries exceeding 15% solids, the Dia-Flo Straightway Diaphragm Valve is recommended.

- **High Purity Applications:** The Dia-Flo Diaphragm Valve is the proven selection to minimize particle generation and product entrapment inherent to other valve types.

- **Corrosive Applications:** A broad selection of plastic linings and PTFE diaphragms, coupled with our corrosion resistant coatings, provide an excellent barrier to chemical attack and corrosion. In addition to our standard blue primer coating, PVDF and white epoxy coatings are available.

- **Bubble Tight Shut-off:** Dia-Flo Weir Diaphragm Valves provide bubble tight shut-off from 0.1 micron to 200 psi line in accordance with MSS SP-88 (Manufacturers Standardization Society of the Valves and Fittings Industry, Inc. Standard Practice—Diaphragm Type Valves).

- **Bonnet Isolation:** Working parts are isolated from the process fluid.

- **Secondary Containment:** The optional sealed bonnet provides a secondary containment boundary in the case of diaphragm failure; preventing the process media from entering the atmosphere.

- **Unique Features:** Unique features which optimize the valve performance and life, varying by valve size are: adjustable travel stop, protective stem cap, o-ring sealed stem, bronze bushing, Line-Lok® for plastic lined valves, yellow position indicator, molded closed diaphragms, and PVDF corrosion resistant coating.

- **Vacuum Applications:** The diaphragm valve is capable of bubble-tight shut-off down to 0.1 micron. Elastomer or Teflon® PTFE diaphragms may be used. The in-leakage rate is less than 1×10^{-6} cc-atm/sec for elastomer diaphragms and can be less upon request.

Common Applications

- Acids
- Caustics
- High purity chemicals
- Agricultural chemicals
- Demineralizer systems
- Plastics manufacturing
- Flue Gas Desulfurization (FGD)
 - Mist eliminator
 - Recycled water
- Rubber manufacturing
- Chlorine manufacturing

Mining: Dia-Flo Diaphragm Valves, both weir and straightway, are installed in various process lines within gold, copper, zinc and phosphate mines. Common applications include chemical feed, process feed, metal refinery, and filter press lines. The Dia-Flo Straightway Diaphragm Valve, due to the unobstructed flow path and minimal cavities, is well suited for handling abrasive and corrosive slurry applications in line sizes 1/2" to 12". The chemical feed and process feed areas typically utilize clearer fluids and utilize the Dia-Flo Weir Diaphragm Valve.



with the Dia-Flo solid plastic weir diaphragm valve. Available in four solid plastic materials, including unpigmented grade 720 PVDF, the Dia-Flo Diaphragm Valve with a two-piece Teflon® PTFE diaphragm minimizes particle generation and entrapment.



1 These pressure/temperature limitations are not permissible at the same time. Consult the Dia-Flo Technical Manual for individual P/T limitations.

Pharmaceutical and Bioprocessing: Due to the streamlined flow path and minimal cavities, Pure-Flo® hygienic diaphragm valves minimize contamination and micro-organism growth in high purity water systems. Available in 316L stainless steel forged and cast bodies with either quick disconnect or buttweld end connections, the Pure-Flo diaphragm valve and Pure-Flo fabrications are designed to minimize contact surfaces, hold-up volume and space envelope. All contact materials are FDA compliant. Dia-Flo Weir Diaphragm Valves are commonly utilized on the chemical side of pharmaceutical manufacturing. Similar to the Pure-Flo hygienic diaphragm valve, Dia-Flo Diaphragm Valves are available in FDA compliant body and diaphragm materials. FDA compliant plastic linings, solid plastic and 316 stainless steel body materials are available.



Electronics: The stringent cleanliness requirements of the high purity water and high purity chemical systems in the semiconductor industry may be met

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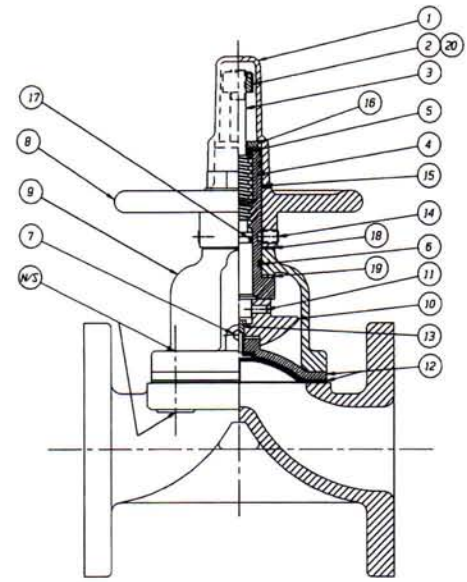
Weir Valves	2
Solid Plastic Valves	4
Straightway Valves	6
Actuated Valves	8
Dualrange® Control Valves	10
Diaphragm Selections	12
Technical Data	13
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"We recently switched to ITT on our supplier's recommendation. We have been really pleased with the valves' performance and the technical support. Harbison Walker produces a highly abrasive chemical, and the valves stand the test day in and day out. Our ITT representative is always there when we need him and open to alternative ideas." **Brian Hitz, Engineer, Harbison Walker**

Materials

PARTS			
Item	Description	Material	Quantity
1	Protective Cap	Acrylic or Polysulfone*	1
2	Adjustable Travel Stop	Steel, Stainless Steel*	1
3	Stem	Steel, Stainless Steel*	1
4	Bushing	Bronze, Stainless Steel*	1
5	Seal, Wiper	Polyolefin Foam, FKM*	1
6	O-Ring**	Buna N, EPDM*, FKM*	1
7	V-Notch Vent Plug	Stainless Steel	AR
8	Handwheel	Cast Iron or PAS, Stainless Steel*, Bronze*, PP†	1
9	Bonnet	Cast Iron, Ductile Iron*, PAS†, PP†, Stainless Steel*, Bronze*	1
10	Compressor	Cast Iron or Zinc, Bronze*, PVDF Coated Cast Iron*	1
11	Spirol Pin	Stainless Steel	1
12	Diaphragm**	Elastomer, PTFE	1
13	Tube Nut	Brass, Stainless Steel*	AR
14	Set Screw	Stainless Steel	SD
15	O-Ring**	Buna N, EPDM*, FKM*	1
16	Thrust Washer	Steel, Stainless Steel*	1
17	O-Ring**	Buna N, EPDM*, FKM*	1
18	Washer, Shim	Polyethylene	AR
19	Bearing, Thrust	Carbon Steel	1
20	Cap, Indicating	Vinyl	1
N/S	Bolting & Nuts	Steel, Stainless Steel*	SD

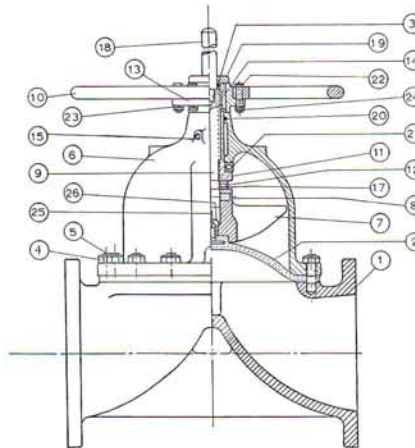
*Optional materials. †Solid plastic body only. AR—As required SD—Size dependent **Recommended spare parts.



1/2" through 4" typical
Consult factory for 6"

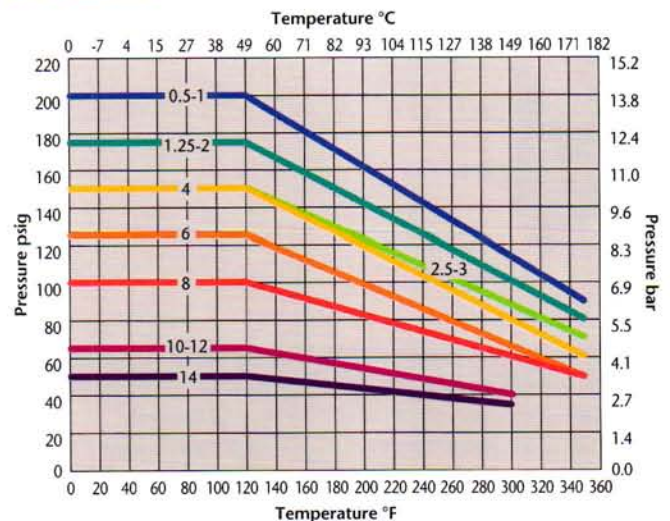
PARTS			
Item	Description	Material	Quantity
1	Body Flange	Various	1
2	Diaphragm**	Elastomer, PTFE	1
3	O-Ring**	Buna N	1
4	Nuts	Steel	14
5	Studs	Steel	14
6	Bonnet	Cast Iron	1
7	Compressor	Cast Iron	1
8	Pin	Stainless Steel	1
9	Spindle	Steel	1
10	Handwheel	Cast Iron	1
11	Bushing	Brass	1
12	Screw, set	Steel	1
13	Hub, Handwheel	Cast Iron	1
14	Key, Handwheel	Steel	1
15	Fitting Lube	Steel	1
17	Collar, Stop	Steel	1
18	Spindle, Extension, Ind.	Stainless Steel	1
19	Nut, Bushing	Brass	1
20	O-Ring**†	Elastomer	1
21	Bearing, Ball Thrust	Steel	1
22	Bolt	Steel	6
23	Lockwasher	Steel	6
24	Nut	Steel	6
25	Key, Tube Nut	Brass	1
26	Nut, Tube	Brass	1

**Recommended spare parts. †For sealed bonnet only.



8" through 12" typical

PT Curve



Cv Values

Item	WEIR VALVE Cv RATINGS (100% OPEN)												
	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12
Flanged Unlined	5.5	22	22	56	56	70	160	190	310	600	1200	1800	2550
Flanged Plastic Lined	—	10	10	38	38	67	100	175	285	690	1070	—	—
Flanged Hard Rubber Lined	4.0	10	10	31	31	55	115	160	260	625	1150	1750	2350
Flanged Soft Rubber Lined	2.0	7.0	7.0	25	25	50	110	155	250	515	1150	1750	2350
Flanged Glass Lined	5.5	22	22	53	53	78	180	250	420	850	1700	—	—
Screwed End	4.4	10	19	48	48	70	95	172	—	—	—	—	—
Butt Weld	3.5	7.5	18.6	—	48	70	95	180	400	600*	1200*	—	—

*Data is based on estimates.

DIA-FLO® SOLID PLASTIC DIAPHRAGM VALVE

Features and Benefits

Dia-Flo Solid Plastic Diaphragm Valves, ideal for solid plastic piping systems in sizes 1/2" - 4", are process proven in chemical and high purity applications.

- **Body Materials:** Available in PVC (polyvinyl chloride), CPVC (chlorinated polyvinyl chloride), PP (polypropylene) and unpigmented PVDF (polyvinylidene fluoride).

- **Diaphragm Materials:** Identical to the Dia-Flo Weir Diaphragm Valve offering, elastomeric and PTFE (polymerized tetrafluoroethylene) diaphragms are available to suit almost any process system.

- **Bonnet Materials:** Two bonnets molded from glass reinforced polymers are available to provide the most economical and temperature resistant solution. PP is the economical solution for line temperatures up to 200°F (93°C). For higher line temperatures up to 275°F (135°C), the thermoplastic material, PAS (polyarylsulfone) is recommended.

- **End Connections:** Available in flanged, threaded, socket and spigot weld end connections. Flanged end connections are compliant with ANSI 150# dimensions. Threaded end connections are compliant with NPT (National Pipe Thread) standards. Socket weld end connections are schedule 80. PVC and CPVC spigot weld end connections are schedule 80. PP and PVDF spigot weld end connections meet DIN 11 dimensions.

- **Increased Flange Strength:** PP and PVDF bodies feature PVDF-coated steel flanges for increased mechanical strength and sealing properties. This is especially advantageous in fiberglass-reinforced plastic piping systems and thermocycling services.

- **Actuation:** The solid plastic Advantage® Actuator and standard Dia-Flo actuator are both available with the solid plastic diaphragm valve. The Advantage Actuator provides a lightweight, compact, durable solution. The 1/2" - 2" actuator is molded from a high-strength, glass-reinforced thermoplastic polymer, PAS (polyarylsulfone) capable of maximum line temperatures up to 275°F (135°C). In sizes 3" - 4", the actuator is molded from a vinylester thermoset plastic capable of maximum line temperatures up to 275°F (135°C).

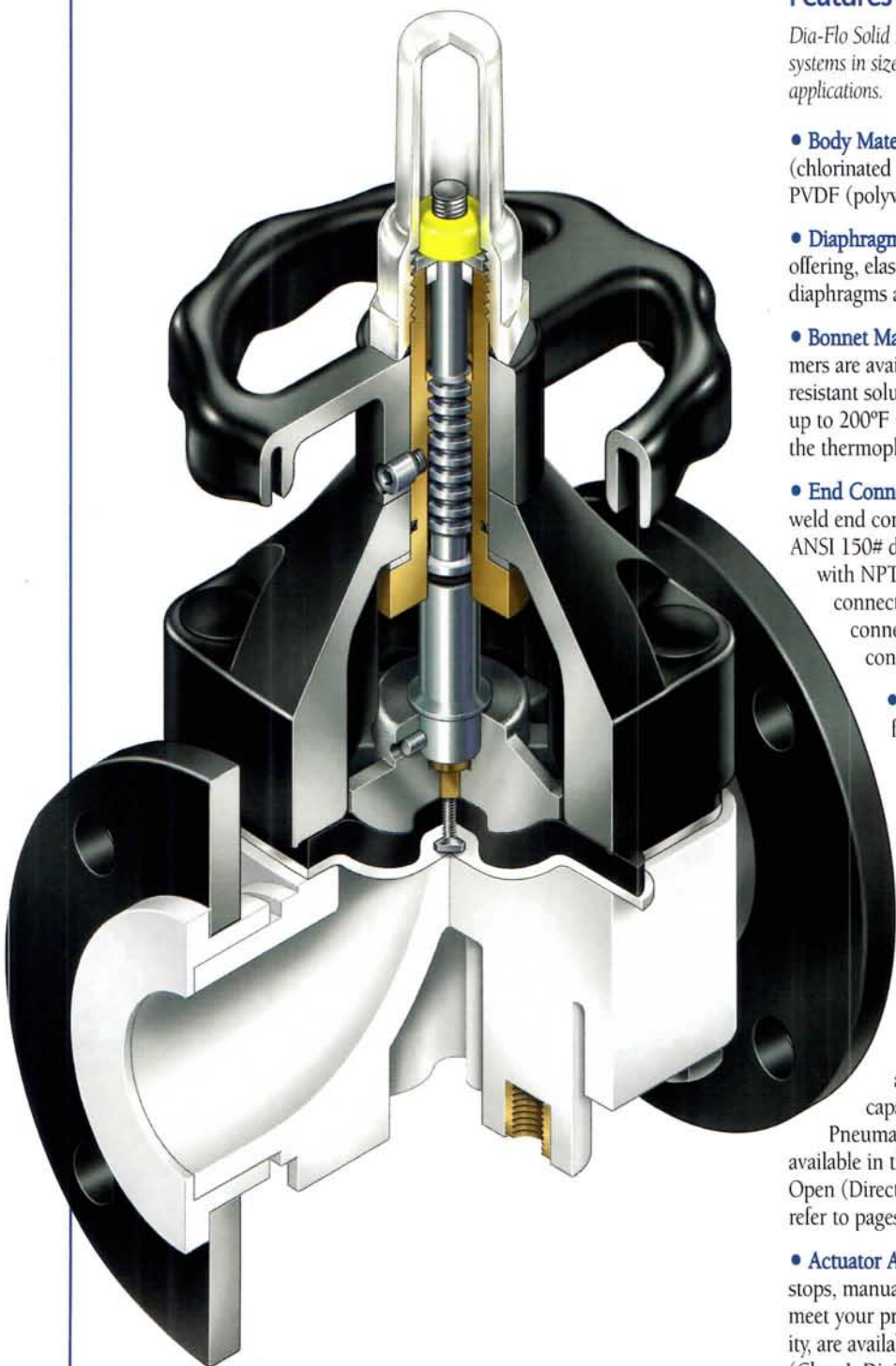
Pneumatically operated and diaphragm driven, the actuators are available in three modes of operation: Failed Closed (Reverse), Fail Open (Direct) and Double Acting. For details on the Dia-Flo Actuator, refer to pages 8 and 9.

- **Actuator Accessories:** Adjustable travel stops, adjustable opening stops, manual overrides, limit switches and positioners are available to meet your process needs. Limit switches, both mechanical and proximity, are available in designs compliant with NEMA (4, 4X, 7, 9), NEC (Class 1, Division 1 and 2) and CENELEC (zones 0,1,2). For control applications, the Advantage Actuator with Moore Products positioner is available in sizes 3/4" through 4".

- **Size:** The Dia-Flo Solid Plastic Diaphragm Valve is available in sizes 1/2" - 4". See page 15 for specific material, end connection and size availability.

Common Applications

- High purity water systems
- High purity chemical systems
- General chemicals
 - Hydrochloric acid
 - Sulfuric acid



Materials

PARTS			
Item	Description	Material	Quantity
1	Bonnet	Polypropylene	1
2	Handwheel	Polypropylene	1
3	Cap	Acrylic, Clear	1
4	Spindle	Carbon Steel	1
5	Bushing	Brass	1
6	Compressor	Cast Iron	1
7	Diaphragm*	As Specified	1
8	Bearing, Thrust	Carbon Steel	1
9	Washer, Shim	Polyethylene	AR
10	Seal, Wiper	Polyolefin Foam	1
11	Pin, Spirol	Stainless Steel	1
12	Scr., Set Hex Sdc.	Stainless Steel	SD
13	Scr., Hex Hd. Cap	Stainless Steel	SD
14	Washer, Plain	Stainless Steel	SD
15	Washer	Stainless Steel	1
16	Adjustable Travel Stop	Stainless Steel	1
17	Nut, Hex	Stainless Steel	SD
18	Cap	Polyarylsulfone	SD
19	O-Ring*, (Spindle)	Buna N	1
20	O-Ring*, (Cap)	Buna N	1
21	O-Ring*, (Bushing)	Buna N	1
22	Body	PP, PVDF, CPVC, & PVC	1

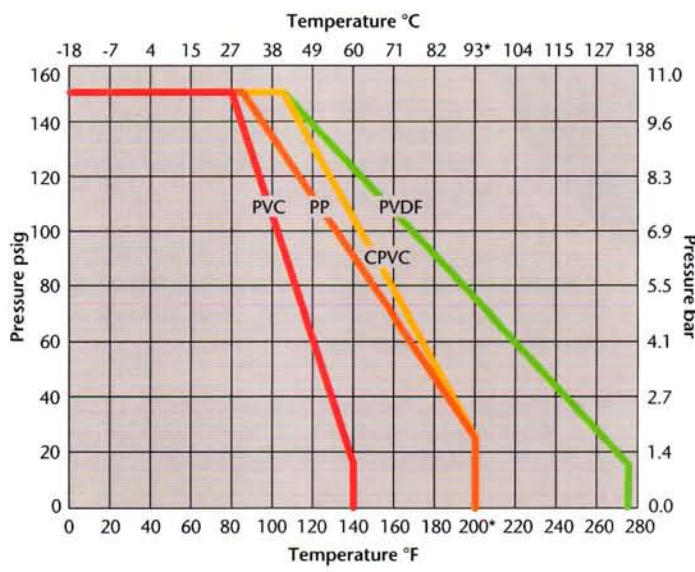
*Recommended spare parts. SD—Size Dependent

BODY MATERIAL SPECIFICATIONS				
Specification	PVC	CPVC	PP	PVDF
ASTM	D1784-81	D1784-81	D4101	D3222
Grade	12454A	23547B	Homopolymer	Homopolymer
FDA CFR Title 21	—	—	177.1520	177.2510

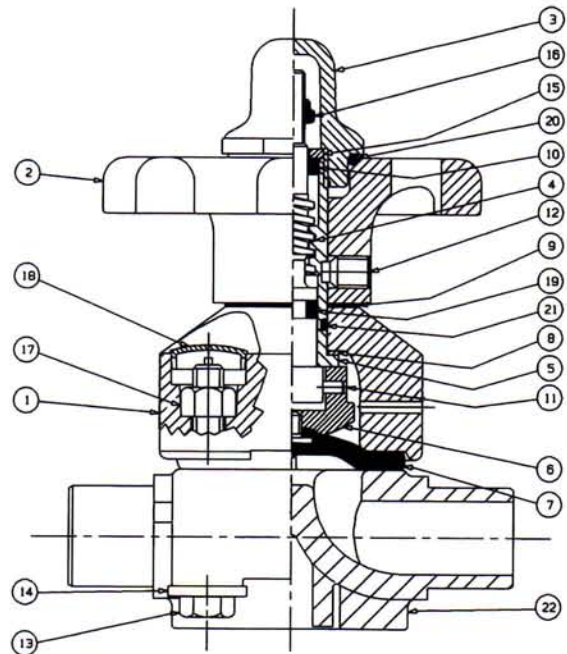
Cv Values

SOLID PLASTIC VALVE Cv RATINGS								
% Open	1/2	3/4	1	1 1/4	1 1/2	2	3	4
100	3.60	8.70	15.80	28.40	31.50	65.50	125	185

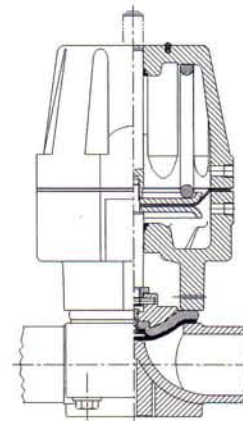
PT Curve



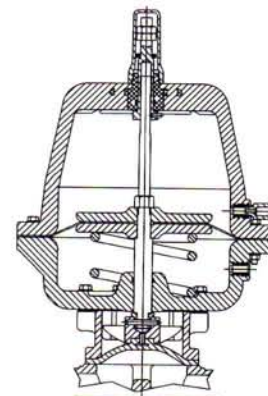
*PAS Bonnet required above 200°F (93°C)



1/2" through 4"

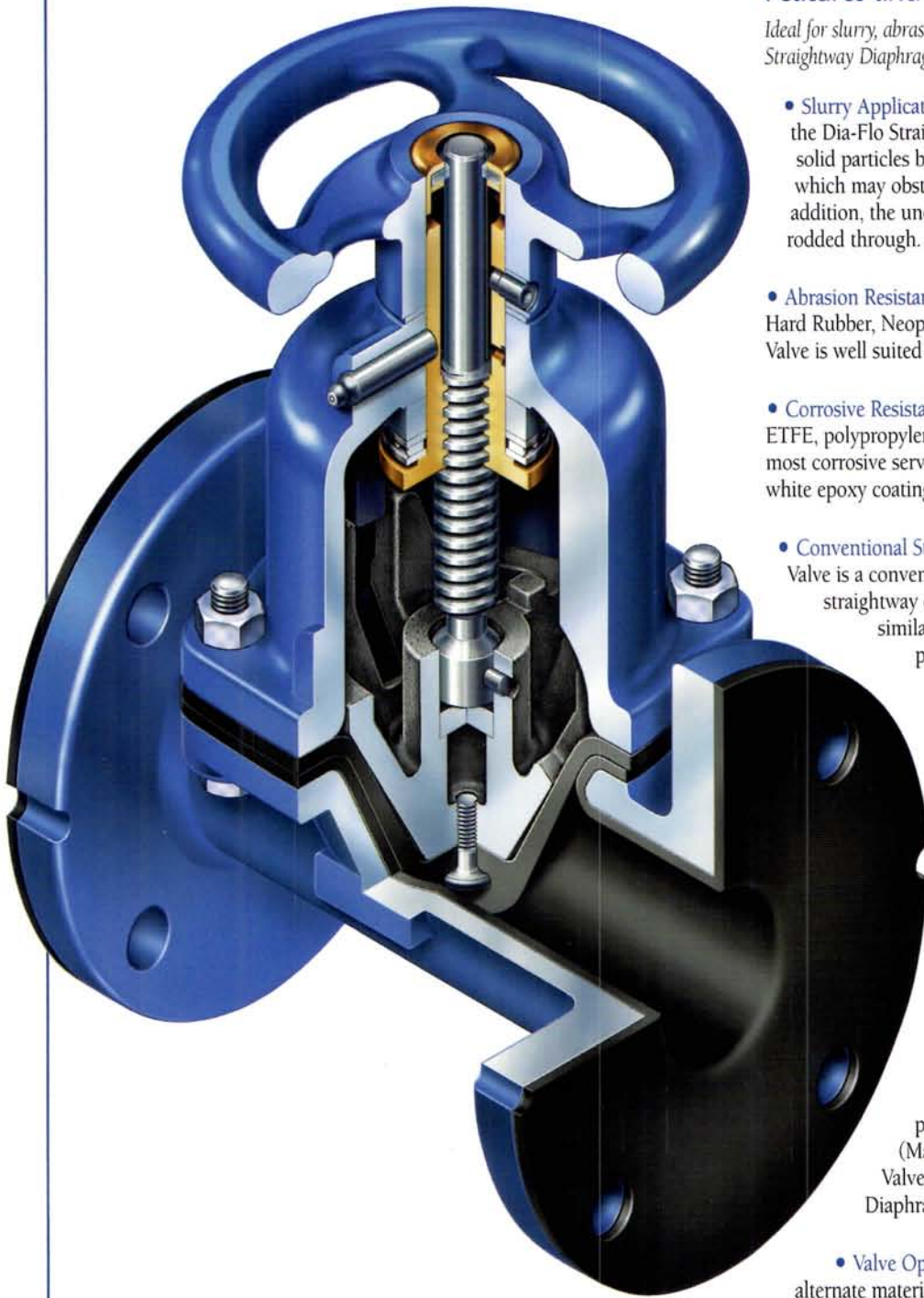


Advantage Actuator 1/2" through 2"
(Fail Closed Shown)



Advantage Actuator 3" and 4"
(Fail Open Shown)

DIA-FLO® STRAIGHTWAY DIAPHRAGM VALVE



Features and Benefits

Ideal for slurry, abrasive and corrosive applications, the Dia-Flo Straightway Diaphragm Valve provides the following benefits:

- **Slurry Applications:** Due to the streamlined fluid passage, the Dia-Flo Straightway Valve can handle slurries, without solid particles becoming entrapped in cavities or crevices which may obstruct the operation of other valve types. In addition, the unobstructed flow path allows the valve to be rodded through.
- **Abrasion Resistant:** Available in five rubber linings: Soft Rubber, Hard Rubber, Neoprene®, Hypalon® and Butyl, the Straightway Valve is well suited to handling corrosive and abrasive services.
- **Corrosive Resistant:** In addition to the rubber linings, Tefzel® ETFE, polypropylene, and glass linings are available to handle the most corrosive services. To protect the valve exterior, PVDF and white epoxy coatings are available.
- **Conventional Straightway Design:** The Dia-Flo Straightway Valve is a conventional design as opposed to a reduced port straightway design. A reduced port straightway design is similar to a pre-pinch pinch valve, in that the flow path cross-sectional area is generally reduced. The reduction in area results in reduced flow capacity (Cv), increased velocity, increased pressure drop and accelerated wear through the valve.
- **Bonnet Isolation:** Similar to the weir valve, the working parts of the bonnet are completely isolated from the process media. Thus, in slurry or corrosive applications, the media can not adversely affect the operation of the valve internals, by either clogging or corroding them.
- **Bubble-Tight Shut-Off:** 100% seat and shell testing is performed on every assembly to verify bubble-tight shut-off. Testing is performed in accordance with MSS SP-88 (Manufacturers Standardization Society of the Valve and Fittings Industry, Inc., Standard Practice - Diaphragm Type Valves).
- **Valve Options:** Adjustable travel stop, sealed bonnet, alternate materials, alternate coatings and chainwheel operated are options that can be specified with a manual valve. For valve automation refer to pages 8 and 9.
- **Sizes:** Rubber-lined bodies are available in sizes 1"–12". Metal flanged end bodies are available in 1/2"–12". Plastic and glass lined bodies are available in 1"–8". Screwed metal bodies are available in 1/2"–2". Refer to page 18 for material details.

Common Applications

- Titanium dioxide (TiO₂)
- Flue Gas Desulfurization (FGD)
- Fly ash
- Limestone slurry
- Fertilizers: phosphate, anhydrous ammonia
- Slurry services
- Abrasive services

Cv Values

STRAIGHTWAY VALVE Cv RATINGS (100% OPEN)											
Item	1/2	1	1 1/2	2	2 1/2	3	4	6	8	10	12
Flanged Unlined	11	60	115	275	450	525	700	2250	4250	5000	5000
Flanged Plastic Lined	—	24	80	209	—	370	569	1400	2644**	—	—
Flanged Hard* Rubber Lined	—	55	130	260	365	460	700	1800	3500	4850	4850
Flanged Soft* Rubber Lined	—	42	79	220	365	460	700	1800	3500	4850	4850
Flanged Glass Lined	—	48	100	270	425	475	700	1950	4400	—	—
Screwed End	15	39	120	265	—	—	—	—	—	—	—

*Note: Flanged Soft Rubber = soft natural rubber, Neoprene®, Hypalon® and Butyl linings.

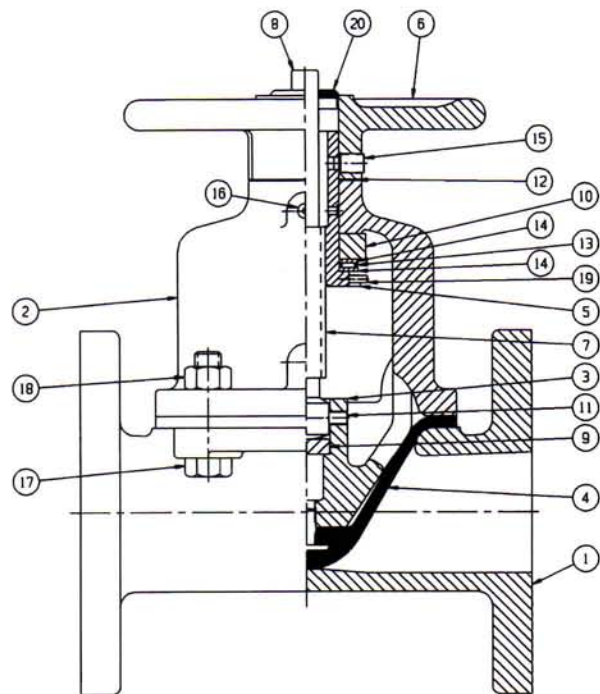
Flanged Hard Rubber = hard natural rubber lining.

**Note: Data is based on estimates.

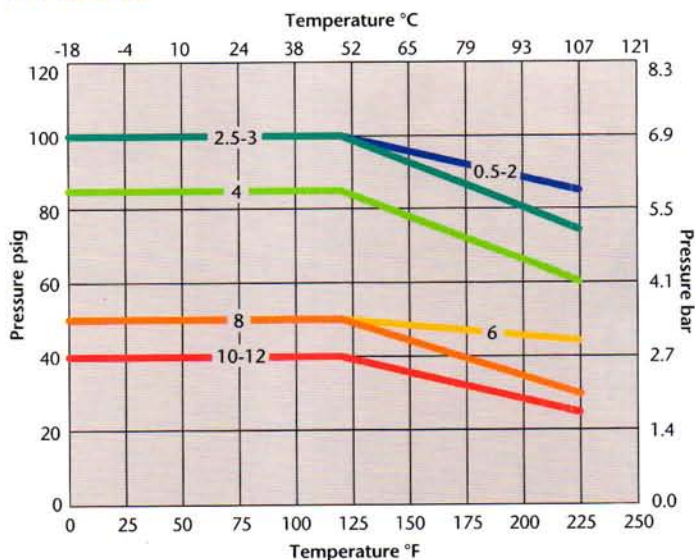
Materials

PARTS			
Item	Description	Material	Quantity
1	Body Flanged	Cast Iron	1
2	Bonnet	Cast Iron	1
3	Compressor	Cast Iron	1
4	Diaphragm	Elastomer	1
5	Bushing	Brass	1
6	Handwheel	Cast Iron	1
7	Spindle	Steel	1
8	Spindle, Extension (indicating)	Stainless Steel	1
9	Insert	Steel	1
10	Spacer	Steel	1
11	Pin, Spirol	Stainless Steel	1
12	Washer, Shim	Polyethylene	AR
13	Bearing, Thrust Needle	Steel	1
14	Bearing, Thrust Race	Steel	2
15	Screw, Set Hex. Soc.	Steel	2
16	Fitting, Lube	Steel	1
17	Screw, Hex, Ho, Cp	Steel	SD
18	Nut, Hex.	Steel	SD
19	Pin, Spirol	Stainless Steel	1
20	Capseal	Brass	1

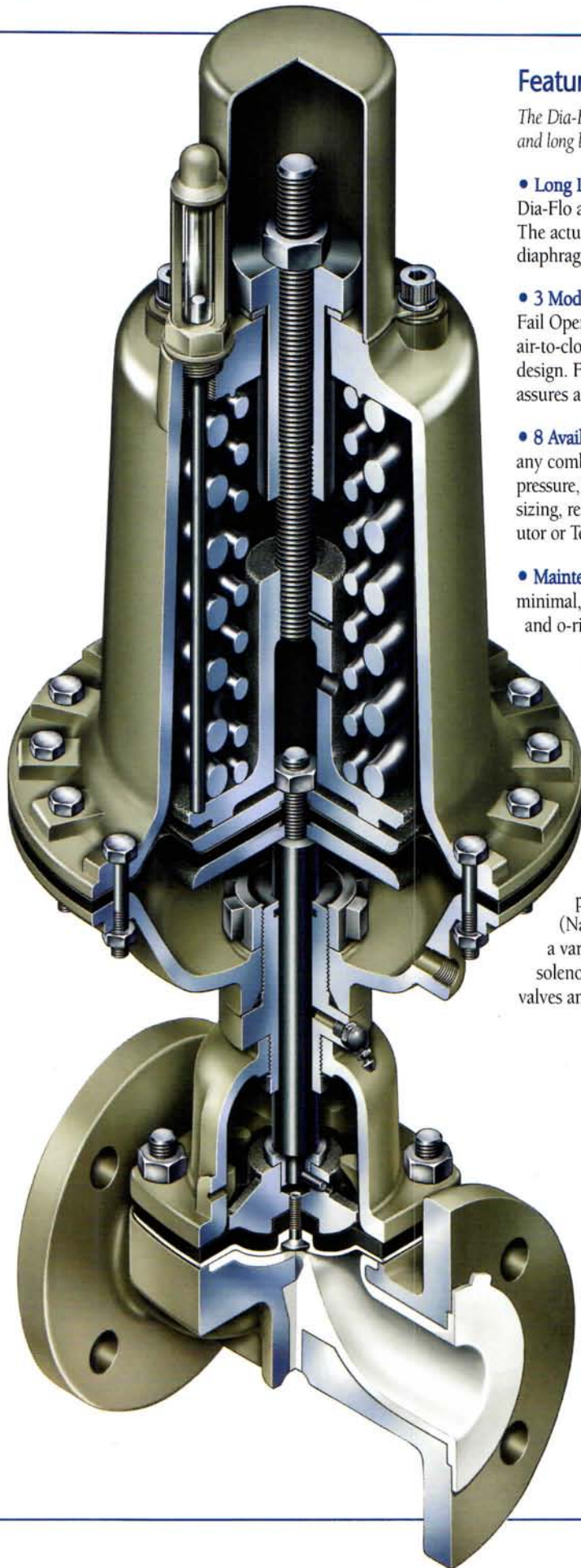
AR—As Required SD—Size Dependent



PT Curve



DIA-FLO[®] ACTUATED DIAPHRAGM VALVE

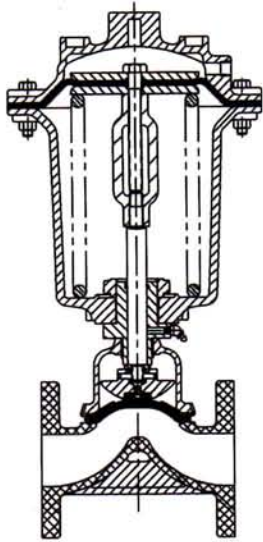


Features and Benefits

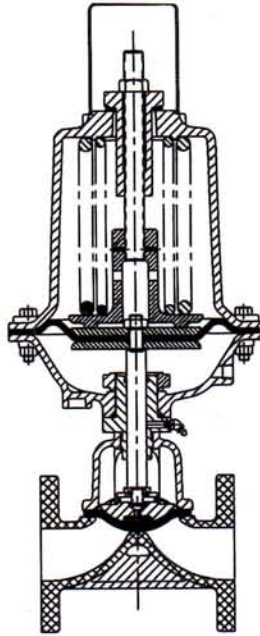
The Dia-Flo Actuator has been field tested and proven to be durable and long lasting. More than 20 years of service is not uncommon.

- Long Lasting:** Pneumatically operated and diaphragm driven, the Dia-Flo actuator provides long service life with minimal maintenance. The actuator wear parts are limited to only the nylon-reinforced Buna N[®] diaphragm and Buna N[®] o-rings which require infrequent replacement.
- 3 Modes of Operation:** Fail Closed (spring-to-close, air-to-open), Fail Open (spring-to-open, air-to-close) and Double Acting (air-to-open, air-to-close) models are available to accommodate almost any system design. Fail Closed, the most frequently ordered mode of operation, assures a bubble-tight shut-off in the case of supply air pressure loss.
- 8 Available Sizes:** The wide selection of sizes accommodates almost any combination of line pressure and supply pressure. Maximum supply pressure, either pneumatic or hydraulic is 85 psig (5.86 bar). For actuator sizing, refer to our Dia-Flo Technical Manual or contact your local distributor or Technical Sales Representative.
- Maintenance:** Maintenance of the Dia-Flo actuator is typically minimal, requiring only periodic lubrication and occasional diaphragm and o-ring replacement.
- Corrosion Resistance:** PVDF and white epoxy coatings are available to protect the actuator and valve assembly from hazardous environments.
- Mechanical Accessories:** Adjustable opening stops, adjustable travel stops, manual overrides, position indicators and yoke mountings are available to meet your processing requirements.
- Instrumentation:** Limit switches, both mechanical and proximity, capable of meeting Nema 4, 4X, 7, 9, 13 and NEC (National Electrical Code) Class I, Division 1 and 2 are available in a variety of choices to meet your system requirements. In addition, solenoids, air filter regulators, transducers, positioners, speed control valves and snap-acting relays may also be factory mounted.

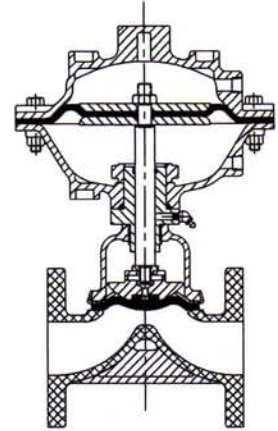
"ITT's Dia-Flo valves are perfect for our uses with caustic solutions, and the service they provide is excellent. For some services, I prefer ITT over other valves, especially in specific applications. In fact, we have replaced other valves with ITT in other corrosive applications. What we get from them is definitely good." Carlo Settimo, Project Engineer, Allied Signal



Direct Acting 3100 Series
Fail Open



Reverse Acting 3200 Series
Fail Closed

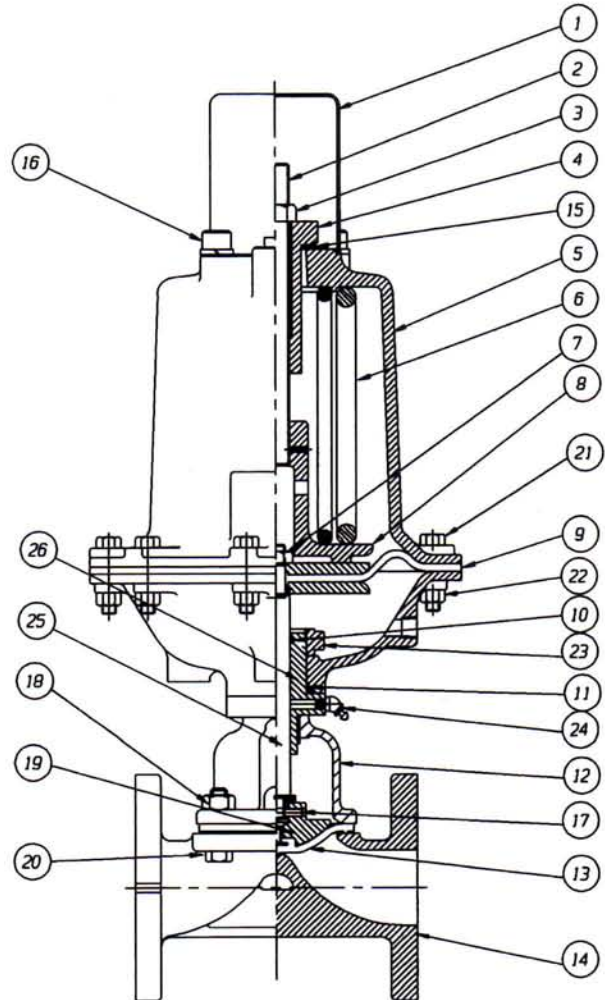


Double Acting 3300 Series

Materials

PARTS			
Item	Description	Material	Quantity
1	Safety Cap	Steel	1
2	Spring Rod	Steel	1
3	Jam Nut	Steel	1
4	Travel Stop	Steel	1
5	Top Cover	Aluminum, Ductile Iron*	1
6	Springs	Steel	AR
7	Spindle Nut	Steel	1
8	Spring Seat	Cast Iron	1
9	Actuator Diaphragm	Buna N	1
10	O-Ring	Buna N, EPDM*, FKM*	1
11	O-Ring	Buna N	1
12	Bonnet Assembly	—	1
13	Diaphragm	Elastomer, FKM*, PTFE*	1
14	Body	Cast Iron, Ductile Iron, Stainless Steel, Steel	1
15	Thrust Washer	Steel	1
16	Cap Screw	Steel	2
17	Spirol Pin	Stainless Steel	1
18	Nut	Steel, Stainless Steel*	SD
19	Compressor	Zinc, Cast Iron, Bronze*	1
20	Bolt	Steel, Stainless Steel*	SD
21	Bolt	Steel, Stainless Steel*	SD
22	Nut	Steel, Stainless Steel*	SD
23	Nut	Steel	1
24	Lube Fitting	Steel	1
25	Spindle	Steel, Stainless Steel*	1
26	Bushing	Steel, Stainless Steel*	1

* Optional material AR—As Required SD—Size Dependent



Cv Values & PT Curve

For Cv Values and P/T limitations, please refer to body types:

- Weir Diaphragm Valve pages 2-3
- Solid Plastic Diaphragm Valve pages 4-5
- Straightway Diaphragm Valve pages 6-7

Maximum housing pressure is 85 psig

DIA-FLO® DUALRANGE® CONTROL VALVE

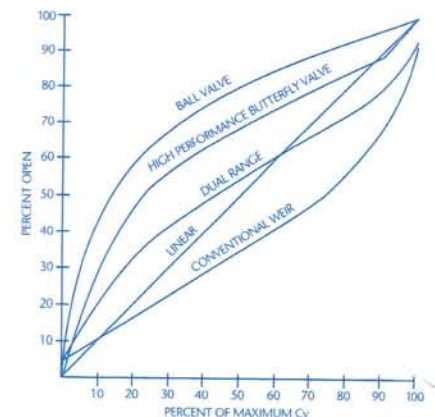
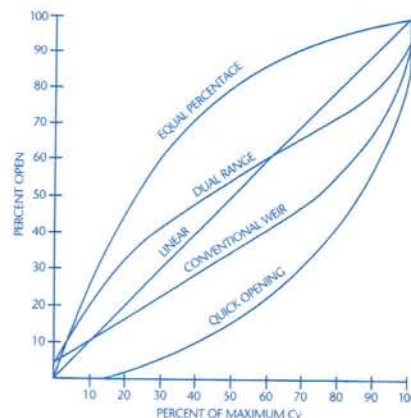


Features and Benefits

The Dualrange Control Valve combines the standard features of the weir diaphragm valve with increased rangeability. Utilizing a unique two-piece compressor design, the Dualrange Control Valve has greater rangeability and controllability than typical diaphragm valves. Notable applications and benefits are as follows:

- **Control:** The unique bonnet design encompasses two nested compressors as opposed to one utilized in conventional diaphragm valves. The individual movement of each compressor allows an increase in rangeability over conventional diaphragm valves. When an increase in flow is desired, the inner compressor moves completely upward, followed by the outer compressor. This dual movement allows greater variance in the flow path cross-sectional area, which directly corresponds to greater variances in flow. Hence increased controllability is achieved.
- **Cleanability:** The streamlined flow path allows the control of high purity services while still maintaining stringent cleanliness requirements.
- **Slurries and Abrasives:** Given the relative absence of cavities and crevices, the Dualrange Control Valve is ideal for controlling slurries up to 15% in solid concentration.
- **Positioners:** The ITT Conoflow and Moore Products positioners are available as standard with the Dualrange Control Valve. Other positioners are available upon request.
- **Maintenance:** The Dualrange utilizes standard Dia-Flo actuators and weir diaphragms. Therefore, part interchangeability and maintenance are standardized. Typically, only periodic lubrication and diaphragm and o-ring replacement are required.
- **Control Valve Sizing:** To optimize the desired control within your system parameters, please contact us to perform sizing calculations and offer valve recommendations.
- **Sizes:** The Dualrange is available with all weir style bodies and diaphragms in sizes 1" - 6".

Valve Flow Characteristics



Cv Values

FLANGED UNLINED							
% open	¾-1	1½	2	2½	3	4	6
10	1.0	2.0	4.0	8.0	14	24	65
20	3.2	8.0	9.0	18	27	47	125
30	5.2	14	14	28	42	70	255
40	7.4	21	19	52	68	130	365
50	9.4	33	33	78	97	185	445
60	13	43	50	105	120	245	515
70	18	50	62	130	145	275	550
80	21	52	69	150	160	295	570
90	22	54	70	160	175	305	590
100	22	56	70	160	190	310	600

FLANGED SOFT RUBBER LINED							
% open	¾-1	1½	2	2½	3	4	6
10	0.5	3.0	3.5	6.0	12	22	65
20	1.6	8.0	10	15	26	41	125
30	3.2	14	17	25	39	60	250
40	5.5	20	23	47	55	105	350
50	6.2	29	33	76	77	155	405
60	6.9	28	47	95	99	195	450
70	7.1	26	54	105	120	220	485
80	7.2	26	54	110	135	240	505
90	7.1	25	52	110	145	245	510
100	7.0	25	50	110	155	250	515

FLANGED PLASTIC LINED							
% open	¾-1	1½	2	2½	3	4	6
10	1.0	3.0	4.5	7.0	16	20	70
20	2.8	8.0	11	17	34	55	145
30	4.7	13	16	28	52	80	280
40	6.6	21	27	50	84	125	430
50	8.2	32	43	75	125	190	540
60	9.5	37	60	88	150	240	610
70	10	38	68	97	160	270	655
80	11	39	69	100	170	285	680
90	10	38	69	100	175	290	690
100	10	38	67	100	175	285	690

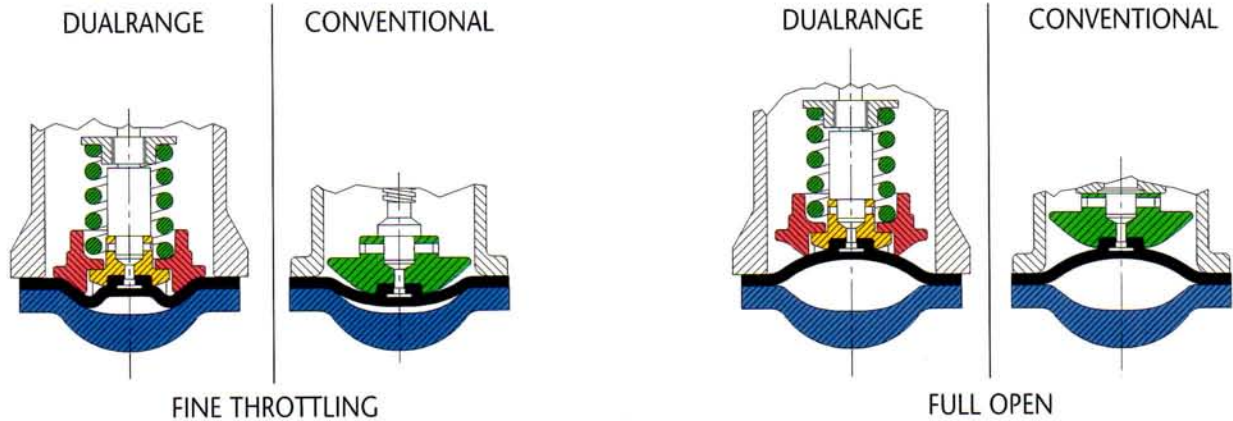
FLANGED GLASS LINED							
% open	¾-1	1½	2	2½	3	4	6
10	1.4	3.0	3.0	8.0	12	24	98
20	3.8	9.0	9.0	18	32	50	190
30	6.2	16	17	28	48	77	370
40	8.6	26	25	56	84	145	520
50	12	40	40	85	135	210	640
60	18	51	62	115	185	270	750
70	22	54	75	140	220	335	805
80	22	55	82	155	240	395	835
90	22	54	82	180	245	415	845
100	22	53	78	180	250	420	850

FLANGED HARD RUBBER LINED							
% open	¾-1	1½	2	2½	3	4	6
10	0.5	3.5	6.0	10	12	25	65
20	3.0	10	12	20	26	50	130
30	5.9	16	17	30	40	71	275
40	8.3	26	22	49	57	130	430
50	10	29	37	65	84	190	530
60	11	29	51	84	110	230	570
70	11	30	60	96	125	245	590
80	11	30	60	105	145	250	620
90	10	31	59	110	155	260	625
100	10	31	55	115	160	260	625

SOLID PLASTIC*							
% open	1	1¼	1½	2	3	4	
10	0.26	0.40	0.60	2.00	7.90	11.10	
20	1.19	1.40	3.22	4.27	17.00	21.90	
30	2.17	3.43	5.60	8.60	29.00	36.90	
40	3.12	6.08	8.28	14.63	44.50	57.50	
50	6.09	12.12	15.78	28.71	75.00	94.30	
60	10.24	20.24	25.20	45.60	102.00	117.00	
70	13.44	24.82	29.61	56.40	117.00	135.00	
80	15.20	27.10	31.50	62.60	125.00	150.50	
90	15.80	27.70	31.50	64.00	126.00	161.00	
100	15.80	28.40	31.50	65.50	126.00	170.00	

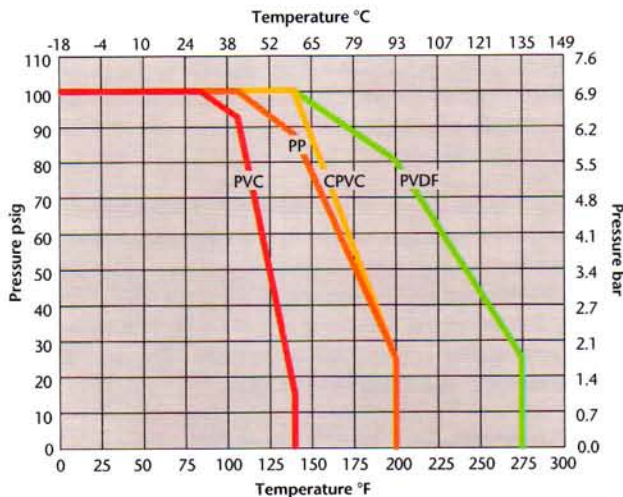
Cv values are expressed in gpm per 1 psi pressure drop.
 *These values, with the exception of the 3" and 4" columns, are based on engineering estimates and not actual test data.

Dualrange® vs Conventional Weir Valve

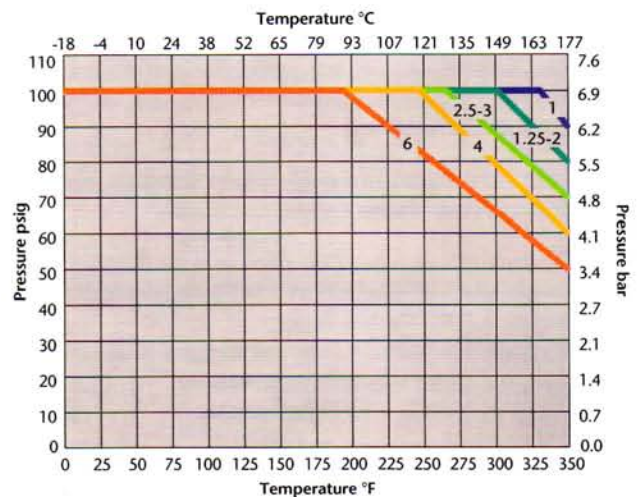


PT Curves

Solid Plastic Body with Dualrange Actuator



Weir Body with Dualrange Actuator



DIA-FLO® DIAPHRAGMS

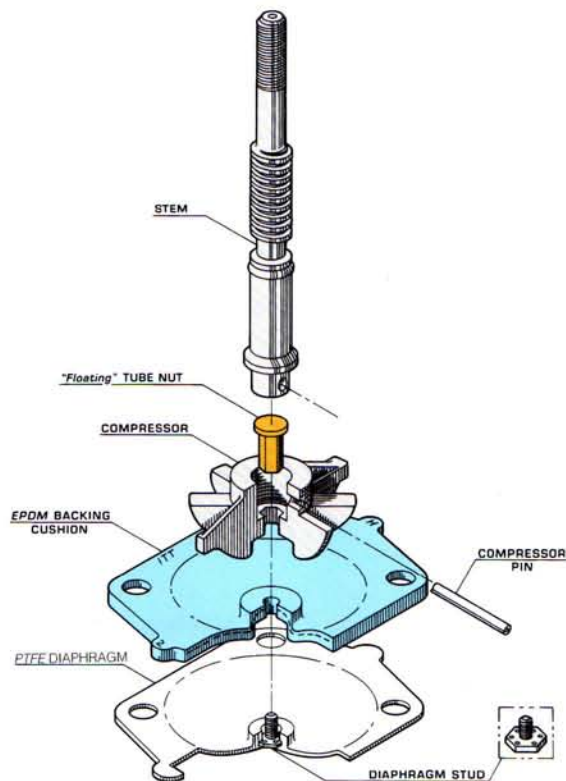
WEIR DIAPHRAGMS

Grade	Material (FDA Compliant)	Size	Temperature
Grade A	Soft Natural Rubber (FDA Compliant)	3/4-4"	-20 to 160°F (-29 to 71°C)
Grade B	Black Butyl (FDA Compliant)	1/2-2"	-20 to 250°F (-29 to 121°C)
Grade WB	White Butyl (FDA Compliant)	1/2-6"	0 to 225°F (-18 to 107°C)
Grade C	Hypalon® CSM	1/2-12"	0 to 225°F (-18 to 107°C)
Grade DP	Buna N® NBR (FDA Compliant) Direct Loaded Valve only	1/2-3"	10 to 180°F (-12 to 82°C)
Grade M	EPDM	1/2-12"	-30 to 300°F (-34 to 149°C)
Grade P	Buna N® NBR (FDA Compliant)	1/2-12"	-10 to 180°F (-12 to 82°C)
Grade R2	Teflon® PTFE (FDA Compliant)	1/2-10"	-30 to 350°F (-34 to 177°C)
Grade S	Natural Rubber	1/2-12"	-30 to 180°F (-34 to 82°C)
Grade T	Neoprene®	1/2-12"	-20 to 200°F (-29 to 93°C)
Grade V	Viton® FKM	1/2-6"	-20 to 325°F (-29 to 163°C)

STRAIGHTWAY DIAPHRAGMS

Grade SB	Black Butyl	1/2-4"	-20 to 200°F (-18 to 93°C)
Grade SC	Hypalon® CSM	1-4"	0 to 180°F (-18 to 82°C)
Grade SM	EPDM	1/2-12"	-20 to 225°F (-29 to 107°C)
Grade SP*	Buna N® NBR (FDA Compliant)	1/2-6"	10 to 180°F (-12 to 82°C)
Grade SS	Natural Rubber	1/2-12"	-20 to 180°F (-29 to 82°C)
Grade ST	Neoprene®	1/2-12"	-10 to 180°F (-23 to 82°C)

*2.5" not available



PTFE Diaphragm Compressor Assembly showing Floating Tube Nut Design

The diaphragm material and design are integral to the successful performance of the diaphragm valve. For that reason, nine weir elastomer diaphragms, a weir Teflon® PTFE diaphragm and six elastomer straightway diaphragms are available to handle a multitude of process fluids and parameters.

Our elastomer diaphragms are available in a variety of materials to address various process characteristics. Some elastomer diaphragms are softer and better suited to abrasive and slurry applications. Others are harder, providing greater chemical resistivity and higher temperature limitations. All elastomer diaphragms in sizes 1" - 8" are molded in the closed position to provide the most effective seal. Each diaphragm contains markings identifying the size, material, mold date and valve supplier.

Our Teflon® PTFE diaphragm is molded closed, fluorlastic, two-piece and utilizes a floating tube nut compressor assembly.

- The fluorlastic process reduces entrained air in the diaphragm. Typical diaphragms have 3-7% entrained air. The fluorlastic process reduces this amount to 0.7%. The benefits are:
 - increased dimensional stability and increased temperature range
 - increased density with reduced permeation
 - increased flexibility with higher cycle life

- The molded closed design increases the sealing properties of the diaphragm. The relaxed position of the diaphragm is contoured to the same shape as the weir, which increases the ability of the diaphragm to provide a bubble-tight shut-off*.
- The two-piece design includes an EPDM elastomer backing cushion and a Teflon® PTFE diaphragm. This design reduces the common problems inherent to laminated PTFE diaphragms, such as delamination, permeation, and cracking.
- The floating tube nut design, shown above, prevents point loading of the Teflon® PTFE diaphragm, which can cause downstream leakage and premature diaphragm failure. The downward force of the stem is transferred to the compressor, bypassing the tube nut. Thus, the forces are evenly distributed over the seating area of the PTFE diaphragm reducing point loading and stud pull-out problems. This same design is used on elastomer diaphragms 6" and larger.

* 1/2" and 3/4" are molded in a flat position, neither open nor closed.

DIA-FLO® TECHNICAL DATA

SEAT & SHELL TEST CRITERIA AS STATED IN MSS SP-88†

Test Durations and Test Pressures Based on Diaphragm Maximum Service Pressure Ratings Shown in Table 1*					
Nominal Valve Size	Maximum Pressure Rating psi (bar)	Shell Test Pressure psi (bar)	Minimum Duration of Shell Test Minutes ⁽¹⁾	Seat Test Pressure psi (bar)	Minimum Duration of Seal Test Minutes ⁽¹⁾
1/2 – 1	200 (13.8)	240 (16.5)	1/4	200 (13.8)	1/4
1-1/2 – 2	175 (12.1)	210 (14.5)	1/4	175 (12.1)	1/4
2-1/2 – 4	150 (10.3)	180 (12.4)	1	150 (10.3)	1/2
5 – 6	125 (8.6)	150 (10.3)	1	125 (8.6)	1/2
8	100 (6.9)	120 (8.3)	1	100 (6.9)	1/2
10 – 12	65 (4.5)	80 (5.5)	3	65 (4.5)	1/2

Seat Tests: No visible leakage is permitted during the seat test (per section 11.7).

Shell Tests: No visible leakage through the pressure boundary of the valve is permitted during the shell test (per section 10.5).

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

* Table 1 values are shown under "Maximum Pressure Rating".

Extracted from MSS SP-88-1993, with permission of the publisher, the Manufacturers Standardization Society. Reproduction prohibited under copyright convention unless written permission is granted by the Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.

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

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 or LCB		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
	Saran®	Black		175 80
	Kynar® PVDF	White with tab	FDA	285 140
	Tefzel® ETFE	White		300 149
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
	Soft Gum Rubber	#11	A 35-40	140 60
	Graphite Loaded Natural	#12	D 72-78	200 93
	Butyl	#16	A 60-65	200 93
Glass Lined	Borosilicate Glass	Blue Glass		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
Plastic Lined	Tefzel® ETFE	White		225 107
	Rubber Lined	Soft Natural	#5	A 55-60
Rubber Lined	Neoprene®	#7	A 60-65	200 93
	Hypalon® CSM	#9	A 60-65	200 93
	Hard Natural	#10	D 40-70	200 93
	Butyl	#16	A 60-65	200 93
Glass Lined	Borosilicate Glass	Blue glass		225 107

*X designates a numerical value

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

RECOMMENDED GUIDELINES

Weir Valves
Maximum Velocity ≤ 25 fps for media with no suspended solids
Maximum Velocity ≤ 10 fps for media with 1-15% solids
Maximum Valve ΔP ≤ 25% P _{inlet} for throttling
Maximum Solids ≤ 15%

These guidelines are recommended to optimize performance and may vary dependent on exact media and conditions. The intent is to help prevent cavitation, choke flow and premature lining and diaphragm wear.

Straightway Valves
Maximum Velocity ≤ 25 fps for media with no suspended solids
Maximum Velocity ≤ 15 fps for media 1-15% solids
Maximum Velocity ≤ 10 fps for media with solids > 15%
Maximum Solids ≤ 50%

These guidelines are recommended to optimize performance and may vary dependent on exact media and conditions. The intent is to help prevent cavitation, choke flow and premature lining and diaphragm wear.

DIA-FLO[®] ORDERING INFORMATION

Fax to: Customer Service, ITT Engineered Valves Fax: 717-291-2025

From: _____

Date: _____

Company: _____

Page: _____ of _____

Phone: _____

P.O.#: _____

WEIR DIAPHRAGM VALVE

FEATURES (BLOCK)	CODE
SIZE (A)	
BODY (B)	
DIAPHRAGM (D)	
BONNET (E)	
BONNET SEAL MATERIAL (F)	
OPTIONAL BONNET INTERNALS (H)	
OPTIONAL BOLTING (G)	
YOKE (K)	
LOCKING DEVICE (L)	
EXTENDED STEM (M)	
CHAIN (CH)	
OPTIONAL COATINGS (N)	
ADAPTED FOR BUT LESS ITT AIRMOTOR (P2)	
NON ITT ACTUATION (R)	
ACTUATOR (S)	
AIR MOTOR (P)	
OPTIONAL AIRMOTOR COVERS (P1)	
ADVANTAGE ACTUATOR (Q)	
POSITION INDICATOR (T)	
MECHANICAL ACCESSORIES FOR ACTUATORS (V)	
ACT. HARDWARE OPTIONS (U)	
SOLENOID VALVE (W)	
SOLENOID VOLTAGE (X)	
ADAPTED FOR BUT LESS SWITCHES (Y3)	
LIMIT SWITCHES (Y)	
OPTIONAL LIMIT SWITCH POSITION (Y1)	
LIMIT SWITCHES, YOKE MOUNTED (Y2)	
ADV. SWITCH PACK SP-2 (Z)	
ADV. SWITCH PACK SP-2.5 (Z5)	
ADV. SWITCH PACK SP-3 (Z3)	
POSITIONER (AA)	
SIGNAL RANGE (AB)	
FILTER REGULATOR (AC)	
TRANSDUCER (AD)	
SPEED CONTROL (AE)	
JUNCTION BOX (AF)	
SPECIAL END PREPARATION (BB)	
DRAINS PORTS (C)	
CUSTOMER HOLD POINTS (CHP)	
SPECIAL QUALITY DOCUMENTATION (SQD)	
SPECIAL SERVICE/PREPARATION (SPSERV)	

STRAIGHTWAY DIAPHRAGM VALVE

FEATURES (BLOCK)	CODE
SIZE (A)	
BODY (B)	
SPECIAL END PREPARATION (BB)	
DIAPHRAGM (D)	
BONNET (E)	
OPTIONAL BONNET SEALS (F)	
CHAIN (CH)	
OPTIONAL BONNET INTERNALS (H)	
OPTIONAL BOLTING (G)	
YOKE (K)	
LOCKING DEVICE (L)	
EXTENDED STEM (M)	
OPTIONAL COATINGS (N)	
ADAPTED FOR BUT LESS ITT AIRMOTOR (P2)	
NON ITT ACTUATION (R)	
ACTUATOR (S)	
AIR MOTOR (P)	
OPTIONAL AIRMOTOR COVERS (P1)	
POSITION INDICATOR (T)	
MECHANICAL ACCESSORIES FOR ACTUATORS (V)	
ACT. HARDWARE OPTIONS (U)	
SOLENOID VALVE (W)	
SOLENOID VOLTAGE (X)	
ADAPTED FOR BUT LESS SWITCHES (Y3)	
LIMIT SWITCHES (Y)	
OPTIONAL LIMIT SWITCH POSITION (Y1)	
LIMIT SWITCHES, YOKE MOUNTED (Y2)	
POSITIONER (AA)	
SIGNAL RANGE (AB)	
FILTER REGULATOR (AC)	
TRANSDUCER (AD)	
SPEED CONTROL (AE)	
JUNCTION BOX (AF)	
CUSTOMER HOLD POINTS (CHP)	
SPECIAL QUALITY DOCUMENTATION (SQD)	
SPECIAL SERVICE/PREPARATION (SPSERV)	

For features not detailed on the following pages, contact the ITT Engineered Valves Customer Service Department at 800-366-1111 or (717) 291-1901.

DIA-FLO® DIAPHRAGM VALVES

WEIR DIAPHRAGM VALVES

Weir Bodies, Unlined (Block B)

Code	Body Material	Size
SCREWED		
2401	Iron	1/2-3"
2402	Bronze	1/2-3"
2403	Stainless Steel (316L)	1/2-3"
2405	Steel (WCB)	1-3"
2406	PVC	1/2-3"
2407	CN7M	1/2-3"
2408	Monel	1/2-3"
2410	Hastelloy	1/2-3"
2412	Ductile iron	1-3"
2414	PP (FDA)	1/2-3"
2416	CPVC	1/2-2"
2417**	PVDF (FDA)	1/2-2"

FLANGED

2431	Cast Iron	1/2-12"
2432	Bronze	1/2-6"
2433	Stainless Steel (316)	1/2-8"
2433R	Stainless Steel (316)	1/2-8"
2435	Cast Steel	1/2-8"
2435R	Cast Steel	1/2-8"
2436	Solid PVC	1/2-4"
2437	CN7M	1/2-8"
2437R	CN7M	1/2-8"
2438	Monel	1/2-8"
2438R	Monel	1/2-8"
2440	Hastelloy	1/2-8"
2440R	Hastelloy	1/2-8"
2441	Ductile Iron	1/2-8"
2442	Solid CPVC	1/2-2"
2444	Solid PP (FDA)	1/2-4"
2447**	Solid PVDF (FDA)	1/2-4"

SOCKET SOLDER

2456	Bronze	1/2-2"
------	--------	--------

SOCKETWELD

2424	Solid PP (FDA)	1/2-2"
2427**	Solid PVDF (FDA)	1/2-2"
2451	Solid PVC	1/2-2"
2463	Solid CPVC	1/2-2"
2470	Stainless Steel (316L)	1/2-3"
2472	Cast Steel	1/2-3"
2474	CN7M	1/2-3"

BUTTWELD (316L)

2464	Stainless Steel Sch. 5	1/2-8"
2465	Stainless Steel Sch. 10	1/2-8"
2466	Stainless Steel Sch. 40	1/2-8"

SPIGOTWELD

2443	CPVC (IPS)	1/2-2"
2484	Solid PP (FDA, DIN)	1/2-2"
2486	PVC (IPS)	1/2-2"
2487**	Solid PVDF (FDA, DIN)	1/2-2"

Weir Bodies, Lined (Block B)

Code	Lining Material	Size
FLANGED CAST IRON		
2501	Neoprene No. 7	1/2-12"
2511	Glass Lined (FDA)	1/2-8"
2516	Soft Rubber No. 5	1/2-12"
2521	Hard Rubber No. 10	1/2-12"

2522	Butyl Lined No. 16	1/2-12"
2523	Hypalon Lined No. 9	1/2-12"
2536	PVC Lined	3/4-6"
2537	Saran Lined	3/4-8"
2538	PP Lined (FDA)	3/4-8"
2539**	PP Lined (FDA)	3/4-8"
2529	Tefzel Lined	3/4-8"
2530	Hard Rubber No. 12	1/2-12"
2575**	PVDF Lined (FDA)	3/4-8"

FLANGED DUCTILE IRON

2544	Glass Lined (FDA)	1/2-8"
2550	Neoprene No. 7	1/2-8"
2551	Soft Rubber No. 5	1/2-8"
2552	Hard Rubber No. 10	1/2-8"
2555**	PVDF Lined (FDA)	3/4-8"
2557	Saran Lined	3/4-8"
2558	PP Lined (FDA)	3/4-8"
2559	Tefzel Lined	3/4-8"

FLANGED CAST STEEL

2545	Tefzel Lined	3/4-8"
2546	PP Lined (FDA)	3/4-8"
2547	Saran Lined	3/4-8"
2548	PVDF Lined (FDA)	3/4-8"
2563	Hard Rubber No. 10	1/2-8"
2564	Hard Rubber No. 12	1/2-8"

Angle Bodies, Unlined (Block B)

Code	Body Material	Size
FLANGED		
2611	Cast Iron	1/2-8"
2612	Bronze	1/2-4"
2613	Stainless Steel (316)	1/2-4"

Angle Bodies, Lined (Block B)

Code	Lining Material	Size
FLANGED		
2621	Neoprene No. 7	1/2-8"
2622	Glass Lined (FDA)	1/2-8"
2623	Soft Rubber No. 5	1/2-8"
2624	Hard Rubber No. 10	1/2-8"

Diaphragms (Block D)

WEIR TYPE

Code	Material	Size
A	Soft Natural Rubber (FDA)	3/4-4"
B	Black Butyl (FDA)	1/2-12"
C	Hypalon	1/2-12"
M	EPDM	1/2-12"
P	BUNA N (FDA)	1/2-12"
S	Natural Rubber	1/2-12"
T	Neoprene	1/2-12"
WB	White Butyl (FDA)	1/2-6"
DP	BUNA N	
	Direct Loaded (FDA)	1/2-3"
V	Viton	1/2-6"
R2	PTFE (FDA)	1/2-10"

Bonnets, Handwheel (Block E)

Code	Bonnet Description
CAST IRON	
902	Indicating (6" - 12")
902S	Indicating - Sealed (6" - 12")

903	Indicating with Travel Stop (1/2" - 12")
903S	Indicating with Travel Stop - Sealed (1/2" - 12")

STAINLESS STEEL (316)

912	Indicating (6" - 12")
912S	Indicating - Sealed (6" - 12")
913	Indicating with Travel Stop (1/2" - 12")
913S	Indicating with Travel Stop - Sealed (1/2" - 12")

POLYPROPYLENE (PP)

923	Indicating with Travel Stop (1/2" - 4")
923S	Indicating with Travel Stop - Sealed (1/2" - 4")

BRONZE

933	Indicating with Travel Stop (1/2" - 4")
933S	Indicating with Travel Stop - Sealed (1/2" - 4")

DUCTILE IRON

942	Indicating (6" - 8")
942S	Indicating - Sealed (6" - 8")
943	Indicating with Travel Stop (1/2" - 8)
943S	Indicating with Travel Stop - Sealed (1/2" - 8")

POLYARYLSULFONE (PAS)

963	Indicating with Travel Stop (1/2" - 4")
963S	Indicating with Travel Stop - Sealed (1/2" - 4")

Bonnets, Chainwheel (Block E)

Code	Bonnet Description
CAST IRON	
905	Indicating with Travel Stop (1/2" - 12")
905S	Indicating with Travel Stop - Sealed (1/2" - 12")
STAINLESS STEEL (316)	
915	Indicating with Travel Stop (1/2" - 12")
915S	Indicating with Travel Stop - Sealed (1/2" - 12")
BRONZE	
935	Indicating with Travel Stop (1/2" - 4")
935S	Indicating with Travel Stop - Sealed (1/2" - 4")

DUCTILE IRON

945	Indicating with Travel Stop (1/2" - 6")
945S	Indicating with Travel Stop - Sealed (1/2" - 6")

* R - Raised Face

** Unpigmented

DIA-FLO® DIAPHRAGM VALVES

WEIR DIAPHRAGM VALVES

Actuated Bonnets (Block E)

Code	Bonnet Description
STAINLESS STEEL	
(Option for Dia-Flo® Actuator & Non-ITT Actuator)	
31	Actuated
31S	Actuated - Sealed

BRONZE

(Option for Dia-Flo® Actuator & Non-ITT Actuator)	
33	Actuated
33S	Actuated - Sealed

DUCTILE IRON

(Standard for Dia-Flo® Actuator, Non-ITT Actuator and 3" - 4" Advantage® Actuator)	
34	Actuated (1/2" - 10")
34S	Actuated - Sealed (1/2" - 10")

PLASTIC PAS

(Standard for Advantage® Actuator)	
36	Actuated (1/2" - 2")
36S	Actuated - Sealed (1/2" - 2")

CAST IRON

40	Direct Load (1/2" - 3")
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DUALRANGE® CONTROL

(Option for Dia-Flo® Actuator)	
84	Dualrange (1" - 6")
84S	Dualrange - Sealed (1" - 6")

Bonnet Seal Materials (Block F)

Code	Seal Material
S1	EPDM
S2	FKM

Optional Bonnet Internals (Block H)

Code	Description
M5	Stainless Steel Stem
M6	Cast Iron Compressor
M7	Bronze Compressor
M8	PVDF Coated Cast Iron Compressor
M9	Stainless Steel Bushing
M10	Stainless Steel Tube Nut
M14	Clear Cap (6" only)

Optional Bolting (Block G)

Code	Description
B1	Stainless Steel
B316	Stainless Steel (316)

Yoke (Block K)

Code	Description
Y	Yoke Supplied

Locking Device (Block L)

Code	Description
LD	Locking Device

Extended Stem (Block M)

Code	Description
EXTSTEM	Extended Stem*

Optional Coatings (Block N)

Code	Description
C1	PVDF Coated Topworks
C2	PVDF Coated Body
C3	PVDF Coated Body & Topworks
C4	White Epoxy Coated Topworks
C5	White Epoxy Coated Body
C6	White Epoxy Coated Body & Topworks
C7	Nylon Coated Topworks**
C10	Black Epoxy**

Adapted for but less ITT Actuation (Block P2)

Code	Description
Y	Adapted for but less ITT Actuator

Non ITT Actuation (Block R & S)

Code	Description
POF	Mounted Non-ITT Customer Supplied Actuator
POA	Adapted For But Less Customer Supplied Actuator
POM	Mounted Non-ITT Actuator Supplied by ITT

Dia-Flo® Actuators Fail Open (Block P)

(Spring-to-Open - Air-to-Close)

Code	Actuator Size
3112	#12
3125	#25
3150	#50
3175	#75
31101	#101
31130	#130
31250	#250

Dia-Flo® Actuators Fail Closed (Block P)

(Air-to-Open - Spring-to-Close)

Code	Spring Description
SIZE #12	
3213	88 Spring
3214	88 & 89 Springs
3215	88 & Raymond Springs
3216	89 Spring

SIZE #25

3226	101 Spring
3227	101 & 102A Springs
3228	102A Spring

SIZE #50

3251	101 Spring
3252	101 & 102A Springs
3253	97 Spring
3254	96 Spring
3255	96 & 97 Springs
3256	102A Spring

SIZE #75

3274	96 Spring
3276	96 & 97 Springs
3277	97 & 98 Springs
3278	96 & 98 Springs
3279	96, 97 & 98 Springs

SIZE #101

32102	96 Spring
32103	98 Spring
32104	96 & 97 Springs
32105	96 & 98 Springs
32106	97 & 98 Springs
32107	96, 97, & 98 Springs
32108	130 Spring
32109	97 Spring

SIZE #130

32131	97 Spring
32132	96 Spring
32133	98 Spring
32134	96 & 97 Springs
32135	96 & 98 Springs
32136	97 & 98 Springs
32137	96, 97, & 98 Springs
32138	130 Spring

SIZE #250

32251	129 & 130 Springs
32252	129 Spring
32253	130 Spring

Dia-Flo® Actuators Double Acting (Block P)

(Air-to-Open - Air-to-Close)

Code	Actuator Size
3312	#12
3325	#25
3350	#50
3375	#75
33101	#101
33130	#130
33250	#250

Optional Air Motor Covers (Block P1)

Code	Description
DICVR	Ductile Iron

Advantage® Actuators Fail Open (Block Q)

Code	Actuator Size	Valve Size
A105	# 5	1/2"
A108	# 8	3/4", 1"
A116	# 16	1 1/4", 1 1/2", 2"
A133	# 33	3", 4"
A147	# 47	3", 4"

* Specify valve centerline to top of handwheel distance

** Available on bonnet for 3" & 4" Advantage® only

WEIR DIAPHRAGM VALVES

Advantage® Actuators Fail Closed (Block Q)

Code	Actuator Size/Spring	Valve Size
A205	# 5 with 60# Spring	1/2"
A206	# 5 with 90# Spring	1/2"
A208	# 8 with 60# Spring	3/4", 1"
A209	# 8 with 90# Spring	3/4", 1"
A216	# 16 with 60# Spring	1 1/4", 1 1/2", 2"
A217	# 16 with 90# Spring	1 1/4", 1 1/2", 2"
A233	# 33 with 60# Spring	3", 4"
A234	# 34 with 90# Spring	3", 4"
A247	# 47 with 60# Spring	3", 4"
A248	# 47 with 80# Spring	3", 4"

Advantage® Actuators Double Acting (Block Q)

Code	Actuator Size	Valve Size
A305	# 5	1/2"
A308	# 8	3/4", 1"
A316	# 16	1 1/4", 1 1/2", 2"
A333	# 33	3", 4"
A347	# 47	3", 4"

Dia-Flo® Actuator Accessories Position Indicator (Block T)

Code	Description
P1	Position Indicator

Mechanical Accessories (Block V)

Code	Description
	See Cross Reference Table on page 20

Actuator Hardware Options (Block U)

Code	Description
HW1	SS Airmotor Bolts
HW2	SS Accessory Brackets
HW3	SS Tubing and Fittings
HW4	Plastic Tubing / Brass Fittings
HW5	PVC Coated Tubing / Brass Fittings
HW6	PVC Coated Tubing / SS Fittings

Solenoid Valve (Block W)

Code	Description
SV1	Asco 8320G184, 3 Way
SV2	Asco EF8320G184, 3 Way
SV3	Asco 8345G1, 4 Way
SV4	Asco EF8345G1, 4 Way
SV5	Burkert 300-C-1/16-F-R-1/8-VOL (Recommended for Advantage)
SV6	Burkert 311-C-5/64-F-BR-1/8-VOL (Recommended for Advantage)
SV7	Asco 8320G202
SV8	Asco 8320G174

Solenoid Voltage (Block X)

Code	Description
V1	120V / 60HZ
V2	24VDC
V3	240V / 60HZ

Dia-Flo® Actuator Limit Switches (Block Y)

Code	Description
LS1	Micro BZE6 - 2RN
LS2	Micro BAF1 - 2RN
LS3	Micro DTE6 - 2RN
LS4	Micro DTF2 - 2RN
LS5	Micro EXQ
LS6	Micro EXDQ
LS7	Micro LSA1A
LS8	Westlock 3479 Model 3
LS9	GO 74-13528-A1
LS10	Namco EA700-80100
LS11	Westlock E3479 Model 3
LS12	Namco EA170-34100 / 35100

Optional Limit Switch Position (Block Y1)

Code	Description
LSO	Limit Switch - Open Only
LSC	Limit Switch - Closed Only

Advantage® Actuator Switch Pack SP-2 (Block Z)

Code	Description	1/2" - 4"
SP2S	Silver Contacts	
SP2G	Gold Contacts	
SP2Z	2-Wire Proximity	
SP2N	NAMUR Proximity	
SP2P	3-Wire PNP Proximity	
SP2NP	3 Wire NPN Proximity	

Adv. Switch Pack SP-2.5 (Block Z5)

Code	Description	1/2" - 1"
SP5S	Silver Contacts	
SP5G	Gold Contacts	
SP5Z	2-Wire Proximity	
SP5N	NAMUR Proximity	
SP5P	3-Wire PNP Proximity	
SP5NP	3 Wire NPN Proximity	

Adv. Switch Pack SP-3 (Block Z3)

Code	Description	1/2" - 2"
SP3S48	Silver Contacts 48V	
SP3S110	Silver Contacts 110V	
SP3G48	Gold Contacts 30V	
SP3Z	2-Wire Proximity	
SP3N	NAMUR Proximity	
SP3P	3-Wire PNP Proximity	
SP3NP	3 Wire NPN Proximity	

Positioners (Block AA)

Code	Description	Size
PR1 ¹	Conoflow Model 31	1 1/2" - 12"
PR2 ²	Conoflow Model 33	1 1/2" - 12"
PR3 ¹	Moore 73 NF	1/2" - 6"
PR4 ²	Moore 73 NB	1/2" - 6"
PR5	Moore 73 NR	1/2" - 6"
PR6 ³	Conoflow P50	1 1/2" - 12"
PR7 ³	Conoflow P51	1 1/2" - 12"
PR8 ³	Conoflow P52	1 1/2" - 12"

Only PR3-5 are available on the Advantage®.

Signal Ranges (Block AB)

Code	Description
SR1	3-15 PSI
SR2	6-30 PSI
SR3	3-9 PSI
SR4	9-15 PSI

Filter Regulators (Block AC)

Code	Description
FR1	Conoflow GFH60XTKEG3G
FR2	Fisher 67FR

Transducer (Block AD)

Code	Description
TR1	Conoflow GT2108ED

Speed Controllers (Block AE)

Code	Description
SC	Schrader 337-1001

Drain Ports (Block C)

Code	Description	Unlined Bodies Only
D1	1/4" NPT Drain Port	
D2	Two 1/4" NPT Drain Ports	
D3	3/8" NPT Drain Port	
D4	Two 3/8" NPT Drain Ports	

Special Service/Preparation (Block SPSEV)

Code	Description
SPEC	Special Service per Cust. Spec.
VAC	Vacuum
OXY	Oxygen
TOB	Tobacco
WCL2	Wet Chlorine

1 Fail Open and Double Acting Actuators
2 Fail Closed Actuators
3 Requires yoke mounted actuator

DIA-FLO® DIAPHRAGM VALVES

STRAIGHTWAY DIAPHRAGM VALVES

Straightway Bodies, Unlined (Block B)

Code	Body Material	Size
SCREWED		
2801	Iron	1/2-2"
2803	Stainless Steel (316)	1/2-2"
FLANGED *		
2811	Iron	1/2-12"
2813	Stainless Steel (316)	1/2-8"
2813R	Stainless Steel (316)	1/2-8"
2815	Cast Steel	1/2-8"
2815R	Cast Steel	1/2-8"

Straightway Bodies, Lined (Block B)

Code	Lining Material	Size
FLANGED CAST IRON		
2829	Tefzel	1-8"
2831	Neoprene No.7	1-12"
2832	Glass	1-8"
2833	Soft Rubber No. 5	1-12"
2834	Hard Rubber No.10	1-12"
2835	Hypalon No. 9	1-12"
2836	Butyl No. 16	1-12"
2838	Polypropylene (FDA)	1-8"
FLANGED CAST STEEL		
2863	Hard Rubber No. 10	
FLANGED DUCTILE IRON		
2840	Neoprene No. 7	1-12"
2841	Soft Rubber No. 5	1-12"
2842	Hard Rubber No 10	1-12"
2859	Tefzel	1-12"

Diaphragms (Block D) Straightway Type

Code	Material	Size
SB	Black Butyl (FDA)	1/2-4"
SS	Natural Rubber	1/2-12"
ST	Neoprene	1/2-12"
SM	EPDM	1/2-12"
SC	Hypalon	1-4"
SP*	BUNA - N (FDA)	1/2-6"

*2.5 not available.

Bonnets, Handwheel (Block E)

Code	Bonnet Description
CAST IRON	
902	Indicating
902S	Indicating - Sealed
903	Indicating with Travel Stop
903S	Indicating with Travel Stop - Sealed
DUCTILE IRON	
942	Indicating
942S	Indicating - Sealed
943	Indicating with Travel Stop
943S	Indicating with Travel Stop - Sealed

Bonnets, Chainwheel (Block E)

Code	Bonnet Description
CAST IRON	
905	Indicating with Travel Stop
905S	Indicating with Travel Stop - Sealed

Bonnets, Actuated (Block E)

Code	Bonnet Description
DUCTILE IRON	
34	Actuated
34S	Actuated - Sealed

Optional Bonnet Seal Material (Block F)

Code	Seal Material
S1	EPDM
S2	Viton

Optional Bonnet Internals (Block H)

Code	Description
M5	Stainless Steel Stem
M8	PVDF Coated Cast Iron Compressor
M9	Stainless Steel Bushing

Optional Bolting (Block G)

Code	Description
B1	Stainless Steel

Yoke (Block K)

Code	Description
Y	Yoke Supplied

Locking Device (Block L)

Code	Description
LD	Locking Device

Extended Stem (Block M)

Code	Description
EXTSTEM	Extended Stem

Optional Coatings (Block N)

Code	Description
C1	PVDF Coated Topworks
C2	PVDF Coated Body
C3	PVDF Coated Body & Topworks
C4	White Epoxy Coated Topworks
C5	White Epoxy Coated Body
C6	White Epoxy Coated Body & Topworks

Adapted for but less ITT Actuation (Block P2)

Code	Description
Y	Adapted for but less ITT Actuator

Non ITT Actuation (Block R & S)

Code	Description
POF	Mounted Non-ITT Customer Supplied Actuator
POA	Adapted For But Less Customer Supplied Actuator
POM	Mounted Non-ITT Actuator Supplied by ITT

Dia-Flo® Actuators

Fail Open (Block P) (Spring-to-Open - Air-to-Close)

Code	Actuator Size
3112	#12
3125	#25
3150	#50
3175	#75
31101	#101
31130	#130
31250	#250

* R - Raised Face

STRAIGHTWAY DIAPHRAGM VALVES

Dia-Flo® Actuators Fail Closed (Block P) (Air-to-Open - Spring-to-Close)

Code	Spring Description
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SIZE #25

3226	101 Spring
3227	101 & 102A Springs
3228	102A Spring

SIZE #50

3251	101 Spring
3252	101 & 102A Springs
3253	97 Spring
3254	96 Spring
3255	96 & 97 Springs
3256	102A Spring

SIZE #75

3273	98 Spring
3274	96 Spring
3276	96 & 97 Springs
3277	97 & 98 Springs
3278	96 & 98 Springs
3279	96, 97 & 98 Springs

SIZE #101

32102	96 Spring
32103	98 Spring
32104	96 & 97 Springs
32105	96 & 98 Springs
32106	97 & 98 Springs
32107	96, 97, & 98 Springs
32108	130 Spring
32109	97 Spring

SIZE #130

32131	97 Spring
32132	96 Spring
32133	98 Spring
32134	96 & 97 Springs
32135	96 & 98 Springs
32136	97 & 98 Springs
32137	96, 97, & 98 Springs
32138	130 Spring

SIZE #250

32251	129 & 130 Springs
32252	129 Spring
32253	130 Spring

Dia-Flo® Actuators Double Acting (Block P) (Air-to-Open - Air-to-Close)

Code	Actuator Size
------	---------------

3312	#12
3325	#25
3350	#50
3375	#75
33101	#101
33130	#130
33250	#250

Optional Air Motor Covers (Block P1)

Code	Description
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DICVR	Ductile Iron
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Actuator Accessories Position Indicator (Block T)

Code	Description
------	-------------

PI	Position Indicator
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Mechanical Accessories (Block V)

Code	Description
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See Cross Reference Table on page 20

Actuator Hardware Options (Block U)

Code	Description
------	-------------

HW1	SS Airmotor Bolts
HW2	SS Accessory Brackets
HW3	SS Tubing and Fittings
HW4	Plastic Tubing / Brass Fittings
HW5	PVC Coated Tubing / Brass Fittings
HW6	PVC Coated Tubing / SS Fittings

Solenoid Valve (Block W)

Code	Description
------	-------------

SV1	Asco 8320G184
SV2	Asco EF8320G184
SV3	Asco 8345G1
SV4	Asco EF8345G1

Solenoid Voltage (Block X)

Code	Description
------	-------------

V1	120V / 60HZ
V2	24VDC
V3	240V / 60HZ

Limit Switches (Block Y)

Code	Description
------	-------------

LS1	Micro BZE6 - 2RN
LS2	Micro BAF1 - 2RN
LS3	Micro DTE6 - 2RN
LS4	Micro DTF2 - 2RN
LS5	Micro EXQ
LS6	Micro EXDQ
LS7	Micro LSA1A
LS8	Westlock 3479 Model 3
LS9	GO 74-13528-A1
LS10	Namco EA700-80100
LS12	Namco EA170-34100 / 35100

Positioners (Block AA)

Code	Description
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PR1 ¹	Conoflow Model 31
PR2 ²	Conoflow Model 33
PR3 ¹	Moore 73NF
PR4 ²	Moore 73 NB
PR5	Moore 73 NR
PR6	Conoflow P50
PR7	Conoflow P51
PR8	Conoflow P52

Signal Range (Block AB)

Code	Description
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SR1	3-15 PSI
SR2	6-30 PSI
SR3	3-9 PSI
SR4	9-15 PSI

Filter Regulator (Block AC)

Code	Description
------	-------------

FR1	Conoflow GFH60XTKEG3G
FR2	Fisher 67FR

Transducer (Block AD)

Code	Description
------	-------------

TR1	Conoflow GT2108ED
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Speed Control (Block AE)

Code	Description
------	-------------

SC	Schrader 337-1001
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¹ Fail Open and Double Acting Actuators
² Fail Closed Actuators

DIA-FLO® DIAPHRAGM VALVES

CROSS REFERENCE CHART - BODIES, BONNETS & ACTUATORS

Only those figure numbers that have changed are listed below.

Bodies	
Old	New
4250	2464
4260	2465
4270	2466

Bonnetts (cont.)	
Old	New
963	963
964	963S
974	903S-C1

31101	31101
32101 (96)	32102
32101 (98)	32103
32101 (96&97)	32104
32101 (96&98)	32105
32101 (97&98)	32106
32101 (96, 97&98)	32107
32101 (130)	32108
32101 (97)	32109
33101	33101
31130	31130
32130 (97)	32131
32130 (96)	32132
32130 (98)	32133
32130 (96&97)	32134
32130 (96&98)	32135
32130 (97&98)	32136
32130 (96, 97&98)	32137
32130 (130)	32138
33130	33130
31250	31250
32250 (129&130)	32251
32250 (129)	32252
32250 (130)	32253
33250	33250

Bonnetts	
Old	New
2	902
3	903
4	905
6	932
7	933
9	912
10	913
25	942
26	943
30	POA
854	902 - C4
855	902S - C4
872	902S - C1
873	903S - C1
874	903S - C1
903	903
904	903S
907	933
910	913
913	913S
923	923
924	923S
926	943
927	943S
955	903 - C4
956	903S- C4

DIA-FLO Actuators	
Old (spring#)	New
3112	3112
3212 (88)	3213
3212 (88&89)	3214
3212 (88&Raymond)	3215
3212 (89)	3216
3312	3312
3125	3125
3225 (101)	3226
3225 (101&102A)	3227
3225 (102A)	3228
3325	3325
3150	3150
3250 (101)	3251
3250 (101&102A)	3252
3250 (97)	3253
3250 (96)	3254
3250 (96&97)	3255
3250 (102A)	3256
3350	3350
3175	3175
3275 (96)	3274
3275 (96&97)	3276
3275 (97&98)	3277
3275 (96&98)	3278
3275 (96, 97&98)	3279
3375	3375

Switches	
Old	New
R, S, T	LS1-LS10

Positioners		
Old		New
YC	Conoflow	PR1-PR2
YM	Moore	PR3-PR4

CROSS REFERENCE TABLE FOR DIA-FLO ACTUATOR ACCESSORIES:

Description	Old Code	New Code Size #12 Actuators		New Code Size #25-250 Actuators	
		Fail Open & Double Acting 3100 & 3300	Fail Closed 3200	Fail Open & Double Acting 3100 & 3300	Fail Closed 3200
Position Indicator	Z	P1	P1	P1	P1
Adjustable Travel Stop	X	ATS	ATS	ATS	Standard
Adjustable Opening Stop	W	TOHC	TOWO	AO	AO
Adjustable Opening & Travel Stop	Q	TOHC	TOWO	TO	AO
Handwheel Closing Device	V	TOHC	Not Available	HWC	Not Available
Handwheel Opening Device	JH	Not Available	HWO	Not Available	HWO
Wrench Opening Device	JW	Not Available	WO	Not Available	WO
Adjustable Opening & Travel Stop + Handwheel Closing Device	Q + V	TOHC	Not Available	THC	Not Available
Adjustable Travel Stop + Handwheel Closing Device	X + V	TOHC	Not Available	THC	Not Available
Adjustable Opening Stop + Handwheel Closing Device	W + V	TOHC	Not Available	HWC	Not Available
Adjustable Opening Stop + Handwheel Opening Device	W + JH	Not Available	TOHO	Not Available	TOHO
Adjustable Opening Stop + Handwheel Opening Device	W + JW	Not Available	TOWO	Not Available	TOWO

CONDITIONS & TERMS OF SALE

OF ITT ENGINEERED VALVES

(Hereinafter referred to as Seller)

- 1. CONTROLLING PROVISIONS:** These terms and conditions shall control with respect to any purchase order or sale of Seller's products. No waiver, alteration or modification of these terms and conditions, whether on Buyer's purchase order or otherwise, shall be valid unless the waiver, alteration or modification is specifically accepted in writing and signed by an authorized representative of Seller.
- 2. DELIVERY:** Seller will make every effort to complete delivery of products as indicated on Seller's acceptance of an order, but Seller assumes no liability, and will accept no backcharge for loss or damage due to delay in ability to deliver caused by acts of God, war, labor difficulties, accident, delays of carriers, by contractors or suppliers, inability to obtain materials, shortages of fuel and energy or any other causes of any kind whatever beyond the control of Seller. Seller may terminate any contract of sale of its products without liability of any nature, by written notice to Buyer, in the event that the delay in delivery or performance resulting from any of the aforesaid causes shall continue for a period of sixty (60) days. Under no circumstances shall Seller be liable for any special or consequential damages or for loss, damage or expense (whether or not based on negligence) directly or indirectly arising from delays or failure to give notice of delay.
- 3. WARRANTY:** Seller warrants for one year from the date of shipment Seller's manufactured products to the extent that Seller will replace those having defects in material workmanship when used for the purpose and in the manner which Seller recommends. If Seller's examination shall disclose to its satisfaction that the products are defective, and an adjustment is required, the amount of such adjustment shall not exceed the net sales price of the defective products only and no allowance will be made for labor or expense of repairing or replacing defective products or workmanship or damage resulting from the same. Seller warrants the products which it sells of other manufacturers to the extent of the warranties of their respective makers. Where engineering design or fabrication work is supplied, Buyer's acceptance of Seller's design or of delivery of work shall relieve Seller of all further obligation, other than as expressed in Seller's product warranty. THIS IS SELLER'S SOLE WARRANTY. SELLER MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED SELLER'S AFORESTATED OBLIGATION ARE HEREBY DISCLAIMED BY SELLER AND EXCLUDED FROM THIS WARRANTY. Seller neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of its engineering designs or products. This warranty shall not apply to any products or parts of products which (a) have been repaired or altered outside of Seller's factory, in any manner; or (b) have been subjected to misuse, negligence, or accidents; or (c) have been used in a manner contrary to Seller's instructions or recommendations. Seller shall not be responsible for design errors due to inaccurate or incomplete information supplied by Buyer or its representatives.
- 4. SELLER'S LIABILITY:** Seller will not be liable for any loss, damage, cost of repairs, incidental or consequential damages of any kind, whether based upon warranty (except for the obligation accepted by Seller under "Warranty" above), contract or negligence, arising in connection with the design, manufacture, sale, use or repair of the products or of the engineering designs supplied to Buyer.
- 5. RETURNS:** Seller cannot accept return of any products unless its written permission has been first obtained, in which case same will be credited subject to the following: (a) All material returned must, on its arrival at Seller's plant, be found to be in first-class condition; if not, cost of putting into saleable condition will be deducted from credit memoranda; (b) A handling charge will be made from all credit memoranda issued for material returned; (c) Transportation charges, if not prepaid, will be deducted from credit memoranda.
- 6. SHIPMENTS:** All products sent out will be carefully examined, counted and packed. The cost of any special packing or special handling caused by BUYER'S requirements or requests shall be added to the amount of the order. No claim for shortages will be allowed unless made in writing within ten (10) days of receipt of a shipment. Claims for products damaged or lost in transit should be made on the carrier, as Seller's responsibility ceases, and title passes, on delivery to the carrier.

- 7. SPECIAL PRODUCTS:** Orders covering special or non-standard products are not subject to cancellation except on such terms as Seller may specify on application.
- 8. PRICES AND DESIGNS:** Prices and designs are subject to change without notice. All prices are F.O.B. Point of Shipment, unless otherwise stated.
- 9. TAXES:** The amount of any sales, excise or other taxes, if any, applicable to the products covered by this order, shall be added to the purchase price and shall be paid by Buyer unless Buyer provides Seller with an exemption certificate acceptable to the taxing authorities.
- 10. MINIMUM INVOICE:**
 - \$200.00 plus transportation on complete valve assemblies.
 - \$100.00 plus transportation on replacement parts.
- 11. TERMS:** Cash, net 30 days unless otherwise specified.

WARNING

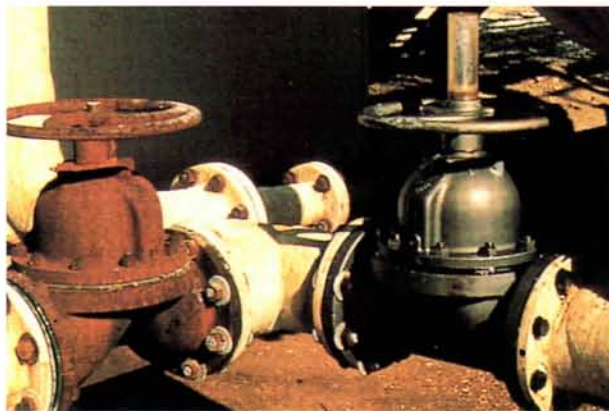
ITT ENGINEERED VALVES AND VALVE ACTUATORS ARE DESIGNED AND MANUFACTURED USING GOOD WORKMANSHIP AND MATERIALS, AND THEY MEET ALL APPLICABLE INDUSTRY STANDARDS. THESE VALVES ARE AVAILABLE WITH COMPONENTS OF VARIOUS MATERIALS, AND THEY SHOULD BE USED ONLY IN SERVICES RECOMMENDED IN THIS PRODUCT CATALOG OR BY A COMPANY VALVE ENGINEER.

MISAPPLICATION OF THE PRODUCT MAY RESULT IN INJURIES (INCLUDING DEATH) OR PROPERTY DAMAGE. A SELECTION OF VALVE COMPONENTS OF THE PROPER MATERIAL CONSISTENT WITH THE PARTICULAR PERFORMANCE REQUIREMENT, IS IMPORTANT FOR PROPER APPLICATION.

EXAMPLES OF THE MISAPPLICATION OR MISUSE OF A DIA-FLO® VALVE INCLUDE USE IN AN APPLICATION IN WHICH THE PRESSURE/TEMPERATURE RATING IS EXCEEDED OR FAILURE TO MAINTAIN THE VALVE AS RECOMMENDED.

IF A VALVE EXHIBITS ANY INDICATION OF LEAKAGE, DO NOT OPERATE. ISOLATE VALVE AND EITHER REPAIR OR REPLACE.

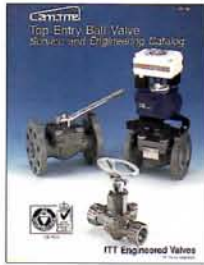
Tefzel, Teflon, Hypalon, Neoprene, Nylon and Viton are registered trademarks of DuPont. Kynar is a registered trademark of Elf Atochem. Saran is a registered trademark of Dow.



The corrosion resistance of our PVDF coating shown on the right is evident in this photograph taken six months after installation at a Houston, Texas chemical plant.

ITT ENGINEERED VALVES

For additional information on ITT ENGINEERED VALVES products as referenced, call 1-800-2ITT-FTC, (1-800-248-8382) or contact the nearest regional office listed below. Or visit us on the Web at www.engvalves.com



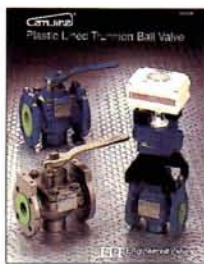
CAM-TITE®
Metal Ball Valves



RICHTER®
Lined Valves For
Corrosive Applications



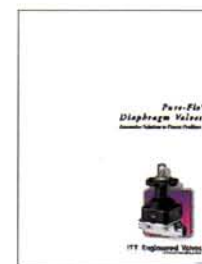
SKOTCH®
Burner Shut-Off Valves



CAM-LINE®
Lined Ball Valves



FABRI-VALVE®
Knife Gate and Special
Fabricated Valves



PURE-FLO®
Hygienic
Diaphragm Valves

REGIONAL OFFICES

For more information write to:
ITT Engineered Valves
33 Centerville Road, P.O. Box 6164,
Lancaster, PA 17603-2064 USA

or call: (800) 366-1111
(717) 291-1901
Fax: (717) 291-2025
www.engvalves.com



ISO 9001
CERTIFIED
FM33515

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33 Centerville Road,
P.O. Box 6164
Lancaster, PA 17603
Phone (800) 231-0328
Fax (800) 231-0330

WESTERN – USA
725 Cochran Street, Unit E
Simi Valley, CA 93065
Phone (805) 520-7200
Fax (805) 520-7205

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1010 Jorie Blvd., Suite 370
Oak Brook, IL 60521-2285
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Fax (630) 990-1037

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Singapore 638034
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Fax 65-8633012

ITT Engineered Valves

A Unit of ITT Industries Inc.

BAY ORTHOPEDICS
2943 HWY 77
PANAMA CITY, FL. 32405
PHONE (850)914-7060 FAX (850)914-7065

PATIENT INFORMATION

Date 2017-09-13

Name COPE ROBERT L Maiden Name _____
Last First MI

Sex: M F _____ Age 64 Birthdate 07-24-1953 SSN _____ - 5561 Martial Status MARRIED

Address P.O. Box 223

City LYNN HAVEN State FL Zip 32444 Home Phone 850-265-5253

Cell Phone _____ Email Address _____ Contact preference: _____

Race CAUCASIAN Preferred Language ENGLISH Hispanic Non-Hispanic Other

Smoker: Yes No Student Status: Full Time Part Time Not A Student Veteran: Yes No

Patient Employed by BOOZ ALLEN HAMILTON Occupation SR DESIGNER

Business Address 1300 THOMAS DRIVE, PCB, FL 32408 Business Phone 850 636 7434

In case of emergency who should be notified? SUSAN COPE Relationship WIFE Phone SAME

How did you hear about us? _____

PERSON RESPONSIBLE FOR ACCOUNT

Name SAME _____
Last First MI

Relationship to Patient _____ Birthdate _____ Soc. Sec. # _____

Address (if different from patient's) _____ Phone _____

City _____ State _____ Zip _____

Person Responsible Employed by _____ Occupation _____

Business Address _____ Business Phone _____

PRIMARY INSURANCE

Insurance Company AETNA Policy # W1984 1579 Group# 800105-041-0001

Policy Holder's Name SAME Relation to Patient _____ Birthdate _____ SS# _____

Policy Holder Employed by _____ Business Phone _____

ADDITIONAL INSURANCE

Insurance Company NONE Policy # _____ Group# _____

Policy Holder's Name _____ Relation to Patient _____ Birthdate _____ SS# _____

Policy Holder Employed by _____ Business Phone _____

ASSIGNMENT AND RELEASE

I the undersigned, certify that I (or my dependent) have insurance coverage with _____ and assign directly to Bay County Health System, insurance benefits, if any, otherwise payable to me for services rendered. I understand that I am financially responsible for all charges whether or not paid by insurance. I hereby authorize the doctor to release all information necessary to secure the payment of benefits. I authorize the use of this signature on all insurance submissions.

 SAME 2017-09-13
Responsible Party Signature Patient Signature Date

Patient Name ROBERT COPE Date 2017-09-13

Patient Medical and Social History Questionnaire

What doctors have you seen in the past 3 years (list name – specialty)?
DR NGUYEN

Medical History: Please mark next to any medical conditions or symptoms that you have now or have had in the past (use the space provided for details: how long, etc.):

Heart Disease (if yes, explain below):

- No Yes Abnormal EKG _____
 - No Yes Chest Pain or Angina _____
 - No Yes Heart Attack or positive stress test _____
 - No Yes Angioplasty _____
 - No Yes Heart or Valve Surgery _____
 - No Yes Rheumatic/Scarlet Fever _____
 - No Yes Palpitations _____
 - No Yes Congestive Heart Failure or swelling of legs _____
 - No Yes Heart Murmur _____
 - No Yes High Blood Pressure DIABETIC
 - No Yes High Cholesterol DIABETIC
- Other _____

Respiratory Disease (if yes, explain below):

- No Yes Asthma _____
 - No Yes Bronchitis _____
 - No Yes Pneumonia _____
 - No Yes Emphysema/COPD _____
 - No Yes TB /Tuberculosis _____
 - No Yes Sleep Apnea and CPAP _____
 - No Yes Shortness of Breath at rest or on exertion (Circle one if applies to you) _____
- Other _____

Patient Name ROBERT COPE

Date 2017-09-13

Gastrointestinal or Kidney (if yes, explain below):

- No Yes Acid Reflux/Heartburn _____
- No Yes Gallbladder Disease or removed _____
- No Yes Hiatal Hernia _____
- No Yes Stomach Ulcers _____
- No Yes Pain or trouble swallowing _____
- No Yes Change in appetite _____
- No Yes Weight loss or gain _____
- No Yes Chronic Diarrhea or Constipation (Circle ones that apply) _____
- No Yes Hepatitis or Liver Disease _____
- No Yes Urinary track, Kidney infections, Kidney stones (Circle ones that apply) _____
- No Yes BPH (enlarged prostate) or Trouble urinating _____
- No Yes Urinary frequency, hesitancy, urgency, incontinence (Circle ones that apply) _____
- No Yes Dialysis or Chronic renal insufficiency _____

Other _____

Neurological or Musculoskeletal Disease (if yes, please explain below):

- No Yes Stroke/TIA/Paralysis _____
- No Yes Seizures or Epilepsy _____
- No Yes Tremors _____
- No Yes Carpal Tunnel Syndrome _____
- No Yes Chronic Headaches or Migraines (if yes, frequency) _____
- No Yes Vision problems _____
- No Yes Neuropathy _____
- No Yes Fainting Spells _____
- No Yes Loss of Memory _____
- No Yes Speech Disorder _____
- No Yes Arthritis _____
- No Yes Gout _____
- No Yes Lupus _____
- No Yes Muscular dystrophy _____

Other _____

Miscellaneous

- No Yes **Diabetic** (if yes, controlled with) _____ A. Diet B. Insulin C. Oral Medication
- No Yes **Thyroid Disorder** (if yes, what type) _____
- No Yes **Glaucoma or Cataracts** (Circle ones that apply) _____
- No Yes **Bleeding disorder** (if yes, please explain) _____
- No Yes **Blood Clots** (if yes, please explain) _____
- No Yes **Alcohol Use** (if yes, frequency) _____ A. Daily _____ B. Sometimes _____ C. Rarely
- No Yes **Use of any recreational drugs?** (if yes, what type) _____
- No Yes **Mental Health Disorder** (if yes, explain) _____
- No Yes **Could you be pregnant?** (*Women only*) _____
- No Yes **Reactions to Anesthesia** (please describe) _____

BAY ORTHOPEDICS
2943 HWY 77
PANAMA CITY, FL. 32405
PHONE (850)914-7060 FAX (850)914-7065

Patient Name ROBERT COLE

Date 2017-09-13

Current Medications: List medications and dose that you take.
Please list prescription as well as Over-The-Counter (OTC) medications, vitamins, supplements and herbs.

Name of current Medication	How much? (dose)	How often? (frequency)	For treatment of:	Prescribed by:
1. Atorvastatin	40 mg	1x day	Cholesterol	Nguyen
2. Fenofibrate	145 mg	1x day	Cholesterol TRIGLYCERIDES	"
3. Glipizide	10 mg	1x day	DIABETES	"
4. Lisinopril	40 mg	1x day	High BP	"
5. Januvia	10 mg	1x day	DIABETES	"
6. Basaglar	75 Units	day	DIABETES	"
7.				
8.				
9.				
10.				
11.				
12.				

Medication Allergies: I do not have any known allergies to medication
 Codeine Penicillin Sulfa Other _____

Surgical History:
Please list any surgery you have had in the past and the approximate date of your surgery.

Surgery	Date	Physician	Facility
Remove COT	2005?		GULF COAST

Preventative Health Maintenance:

Screening	Date	Result
Pap		
Mammogram		
Colonoscopy		
PSA		

N/A

Patient Name ROBERT COLE

Date 2017-09-13

Family History: Please check any medical illness or history that runs in your family:

- Headaches/Migraines
- Bleeding disorder
- Pain disorder
- Thyroid disorder
- Diabetes
- Seizures
- Emphysema / COPD
- Asthma
- Stroke
- Heart Disease
- High Cholesterol
- High/low Blood Pressure
- Kidney problems
- Nervous system disorder
- Cancer (type): _____
- Other medical illness (describe): _____
- I do not know my family history
- None of these run in my family

Social History:

- No Yes I **never smoked cigarettes** or used any tobacco products.
- No Yes I smoke cigarettes, cigars, or chew tobacco. (Circle one if applies to you)
- No Yes I currently smoke _____ packs a day for _____ years.
- No Yes I quit smoking 24 years ago and used to smoke _____ packs a day for _____ years

How Often Do You Consume Alcohol: NONE

What is /was your occupation? SE DESIGNER

- I am currently working: Full time part time limited duty I am unable to work
- I have been on disability since _____

Marital status: Single Married Divorced Separated Widowed

Pharmacy Name: CVS **Phone** _____

Please mark your highest level of education:

- Did **not** complete high school (HS)
- Completed HS
- Some college
- Bachelor's degree
- Advanced degree
- Other _____

CONSENT FOR TREATMENT

I consent to treatment ordered and performed by these physicians and/or their practitioners under the physician's direction within this office. I understand that treatment will be explained fully to me before the treatment is performed. This consent shall be in effect until I notify NP-C of its cancellation.

Patient's or Authorized Person's Signature

Date



Baldwin Plaza
2943 Hwy 77
Panama City, FL 32405
Phone: (850)914-7060
Fax: (850)914-7065

Bay Medical At The Beach
11111 Panama City Beach Pkwy
Panama City Beach, FL 32407
Phone: (850)914-7050
Fax: (850)914-7045

PAIN MEDICATION & PRESCRIPTION POLICY

Bay Orthopedics only provides pain medication for patients who require a surgical procedure or who have had a surgical procedure or a condition, such as a fracture, the physician deems necessary. The following outlines our pain medication policy:

- In the event surgery is necessary, pain medication may be prescribed prior to surgery. Pain medication may also be prescribed for a predetermined period, not to exceed six (6) weeks, after the procedure has been performed.
- Pain medication is to be taken as prescribed. Patients are not to increase medication dosage without consulting a nurse or physician of Bay Orthopedics.
- Improper use of medications will lead to the termination of the physician-patient relationship.
- So that we may carefully review all patient records, we require 72 business hours advance notice for prescription refills.
- Requests for prescription refills will only be accepted during regular office hours.
- If long-term pain management is required, the patient will be referred to a pain clinic and/or to his or her primary care physician.

I have read and understand the above stated pain medication and prescription policy for Bay Orthopedics.

A handwritten signature in blue ink, appearing to be "D. Miller", written over a horizontal line.

Signature of patient or responsible party

2017-09-13

Date