

MAS D & S SERIES Butterfly Valves

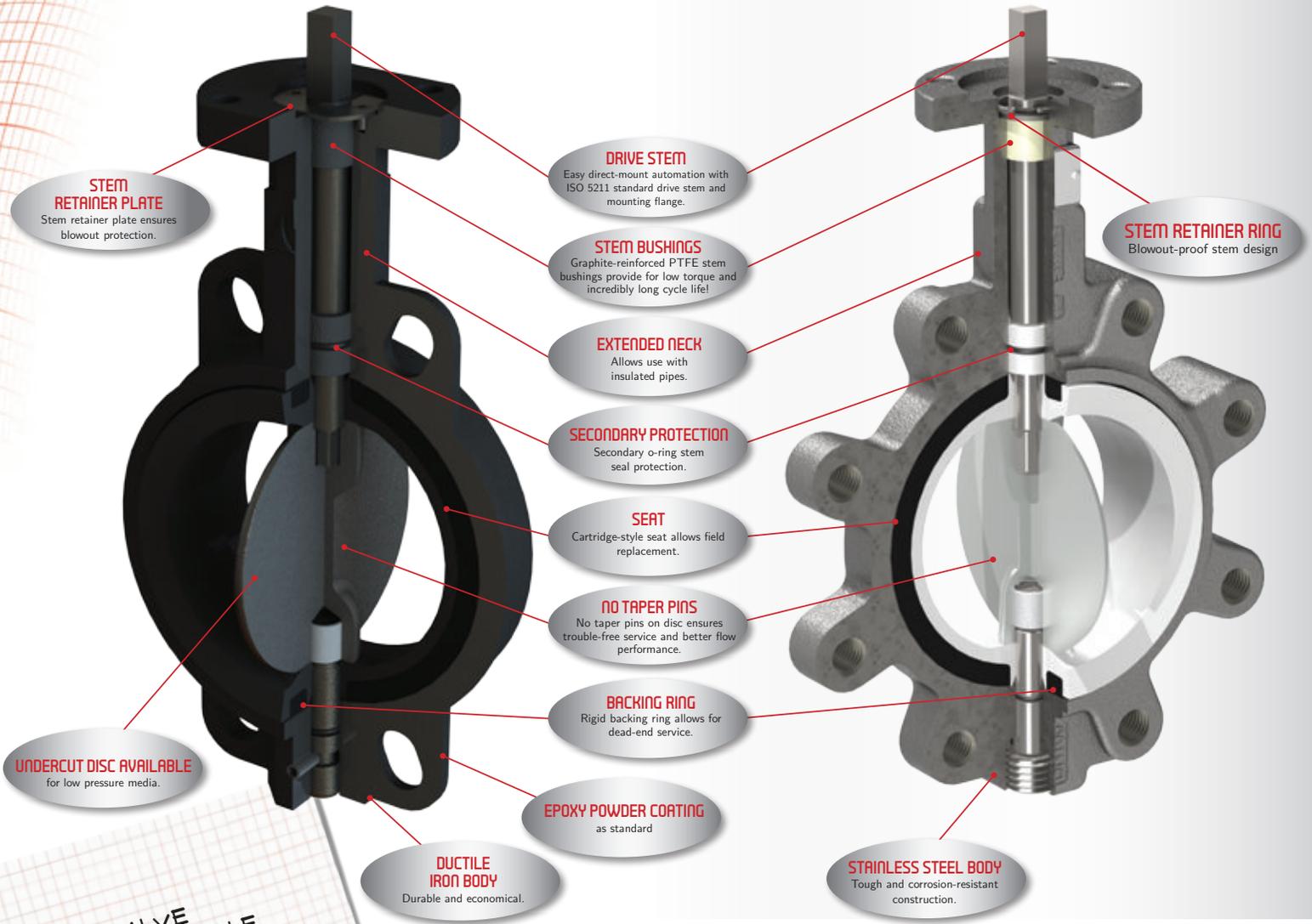
Features & Benefits

D Series

Lug/Wafer-Style Ductile Iron Body

S Series

Lug/Wafer-Style Stainless Steel Body



2" VALVE BODIES AVAILABLE WITH 1/2" CLASS 150 WAFER-STYLE FLANGE

D SERIES SIZES AVAILABLE WAFER 1/2" - 48"* LUG 2" - 48"*

Features & Benefits

- Sizes 2" through 24" available from stock, wafer or lug
- Lug-style dead end service capabilities through 12":
 - 200 PSI uni-directional
 - 100 PSI bi-directional
- Install between Standard ANSI class 125/150 flanges
- ISO 5211 square drive shaft for easy automation
- Conforms to MSS-SP-67, MSS-SP-25, API-609
- Designed for blowout-proof service
- High-Cv slim disc & 2-piece stem design 2"-12"
- Field repairable
- Vacuum service capable 2" thru 12" to 10 microns
- Dead end service for S-Series coming in 2014

S SERIES: SIZES AVAILABLE WAFER & LUG 2" - 24"

*For sizes larger than 24", please consult MAS



MAS D SERIES Butterfly Valves 2"-12"
D Series Exploded View



MAS D SERIES Butterfly Valves 2" -12" D Series Materials and Stem Details

D Series

Item	Description	Materials
1	Body	Ductile Iron ASTM A536
2	Stem Retainer	Carbon Steel, Plated
3	Seat	See Pg 3 or 18
4	Stem Retainer Screws	Carbon Steel, Plated
5	Upper Stem	Stainless Steel ASTM A582, Alloy 416
6	Disc	See Pg 3
7	Lower Stem	Stainless Steel ASTM A582, Alloy 416
8	Lower Stem Retainer	Carbon Steel, Plated
9	Bushing	PTFE/Graphite
10	O-Ring	EPDM, BUNA-N, Fluoroelastomer
11*	Locking Arm*	Carbon Steel, Plated
12*	Infinite Lever* Plate	Carbon Steel, Plated
13	Lever Handle	Stamped Steel, Epoxy Coated (Standard)
14	Throttle Plate	Carbon Steel, Plated (Standard)
15	Bolt	Carbon Steel, Plated
16	Nameplate Tag	Aluminum

**Optional accessory. It is important to note that the infinite lever plate and locking arm is only lockable in the full open or full closed positions.*



Lower Stem Detail



MAS D & S SERIES Butterfly Valves Torque & Service Factor Ratings

D SERIES Valve Seating Torques (in-lbs)

Size (in)	Standard Disc & Seat (not PTFE) @ Pressure Differential (ΔP in PSI)				
	Fullcut				Undercut
	50 ΔP	100 ΔP	150 ΔP	200 ΔP	50 ΔP
2	105	111	117	124	—
2½	133	143	159	184	—
3	191	203	218	247	—
4	283	316	343	373	200
5	428	479	540	631	330
6	636	720	799	909	440
8	1239	1273	1411	1505	820
10	2567	2710	2832	3105	1150
12	3153	3307	3671	4305	2400
14	3858	4138	4337	—	Consult Manufacturer
16	5413	6027	7466	—	
18	6833	8121	10089	—	
20	9820	10527	13367	—	
24	15909	17005	21041	—	

The torque values listed above do not include a safety factor. It is recommended that a safety factor of 20% be added to these numbers for standard self-lubricating service. For water, dry air, solvents, abrasives, powder, and dust service, see service factor guide chart below.



Cartridge-style seats provide superior performance to booted or molded seats.

2" Thru 12" Full Vacuum to 10 Microns



For PE Seats (PTFE over EPDM) used in D Series, follow torques as shown in S Series.

S SERIES Valve Seating Torques (in-lbs)

Size (in)	STANDARD SEAT (code B,E,V, etc)				PTFE SEAT (code PE)		
	Pressure Differential (ΔP in PSI)				Pressure Differential (ΔP in PSI)		
	50 ΔP	100 ΔP	150 ΔP	200 ΔP	50 ΔP	100 ΔP	150 ΔP
2	105	111	117	124	144	148	150
2½	133	143	159	184	161	165	168
3	191	203	218	247	299	304	310
4	283	316	343	373	392	409	425
5	428	479	540	631	771	793	814
6	636	720	799	909	1074	1113	1151
8	1239	1273	1411	1505	2106	2177	2257
10	2567	2710	2832	3105	3151	3301	3452
12	3153	3307	3671	4305	4186	4443	4691
14	3858	4138	4337	—	Consult Manufacturer		
16	5413	6027	7466	—			
18	6833	8121	10090	—			
20	9820	10527	13367	—			
24	15909	17005	21041	—			

Service Factor Rating

Service Condition	Service Type	Media Type	Safety Factor	Multiplier
1	Ideal	Lubricating Oil	20%	1.20
2	Normal	Water	30%	1.30
3	Severe	Dry Air, Solvents	50%	1.50
4	Extreme	Abrasives	100%	2.00

This service factor chart is a suggested guide only. Actual service conditions will vary due to dynamic flow conditions and may require adjustments to the applied safety factor.

D SERIES & S SERIES Cv Values

Valve Sizing Coefficients (US-GPM/ ΔP)

Size (in)	Disc Position								
	90°	80°	70°	60°	50°	40°	30°	20°	10°
1½	99	76	59	41	32	16	7	1.8	0.1
2	132	120	86	58	42	22	11	2	0.1
2½	256	202	142	98	65	37	20	4	0.2
3	505	392	198	125	86	38	21	8	0.3
4	936	702	401	232	140	77	35	14	0.4
5	1109	922	625	392	232	132	62	29	0.9
6	2531	2009	1105	611	372	203	96	42	2.1
8	4812	3555	1901	1211	726	401	191	65	3.2
10	7498	6183	3740	2065	1232	695	321	151	3.9
12	9928	8805	5905	3178	1909	1065	495	234	5
14	12915	10854	7220	4560	2771	1554	712	338	5.8
16	16626	14961	9909	6289	3780	2133	980	460	8
18	23705	19743	13178	8325	5029	2822	1301	613	10
20	27915	25396	16928	10698	6468	3623	1678	790	12
24	43212	39206	26128	16550	9807	5567	2521	860	21

The valve sizing coefficient is referred to as "Cv" and is the rate of water flow in gallons per minute (GPM) through a given opening at a pressure drop (ΔP) of 1 PSI at standard room temperature. The recommended angle of opening for valve sizing is between 50° and 70° open.

Standard 10-Position
Throttle Plate Shown



D SERIES & S SERIES Testing Specifications

Nominal Size	D & S SERIES		
	2"-12" (EPDM)	14"-24" (EPDM)	2"-12" (PTFE)
Nominal Pressure	200 PSI*	150 PSI	150 PSI
Body Test Pressure	300 PSI	225 PSI	225 PSI
Sealing Test Pressure	220 PSI	165 PSI	165 PSI

*PTFE seats are rated to 150 PSI

MAS D SERIES Butterfly Valves

D Series Dimensions

MAS D SERIES—Ductile Iron

Size		L		Q		ØD1		n - Th	n - Øh	H1		H2		H3		S		ØF		ISO	Wafer Weight		Lug Weight		
in	mm	in	mm	in	mm	in	mm	SAE Thread	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm		lbs	kg	lbs	kg
1½	DN35	1.3	33	1.4	36	4.3	110.0	—	4 x 0.7	4 x 18	2.5	64	4.9	124	1.18	30	0.354	9	1.969	50	F05	—	—	—	—
2	DN50	1.7	43	1.8	46	4.75	120.7	4 x 5/8-11 UNC	4 x 0.9	4 x 22	2.6	66	5.1	130	1.18	30	0.354	9	1.969	50	F05	4.2	1.9	5.2	2.4
2½	DN65	1.8	46	2.3	58	5.50	139.7	4 x 5/8-11 UNC	4 x 0.7	4 x 18	3.2	81	5.6	142	1.18	30	0.354	9	1.969	50	F05	5.5	2.5	6.5	3.0
3	DN75	1.8	46	2.9	74	6.00	152.4	4 x 5/8-11 UNC	4 x 0.7	4 x 18	3.5	89	5.8	147	1.18	30	0.354	9	1.969	50	F05	6.1	2.8	7.3	3.3
4	DN100	2.0	52	3.8	98	7.50	190.5	8 x 5/8-11 UNC	4 x 0.7	4 x 18	4.3	109	6.7	170	1.18	30	0.433	11	2.756	70	F07	9.0	4.1	12.5	5.7
5	DN125	2.2	56	4.5	115	8.50	215.9	8 x 3/4-10 UNC	4 x 0.9	4 x 22	4.8	122	7.4	188	1.18	30	0.551	14	2.756	70	F07	12.6	5.7	16.9	7.7
6	DN150	2.2	56	5.8	148	9.50	241.3	8 x 3/4-10 UNC	4 x 0.9	4 x 22	5.4	137	8.0	203	1.18	30	0.551	14	2.756	70	F07	15.1	6.9	20.4	9.3
8	DN200	2.4	60	7.7	195	11.75	298.5	8 x 3/4-10 UNC	4 x 1.0	4 x 26	6.7	170	9.4	239	1.57	40	0.669	17	4.016	102	F10	27.0	12.3	33.3	15.1
10	DN250	2.7	68	9.5	242	14.25	362.0	12 x 7/8-9 UNC	4 x 1.0	4 x 26	7.9	201	10.7	272	1.57	40	0.866	22	4.016	102	F10	40.8	18.5	54.5	24.7
12	DN300	3.1	78	11.7	297	17.00	431.8	12 x 7/8-9 UNC	4 x 1.0	4 x 26	9.3	236	12.0	305	1.57	40	0.866	22	4.016	102	F10	60.7	27.6	76.2	34.6
14	DN350	3.1	78	—	—	18.75	476.3	12 x 1 -8 UNC	—	—	10.3	262	13.0	330	1.57	40	0.866	22	4.016	102	F10	86.9	39.4	131.5	59.7
16	DN400	4.0	102	—	—	21.25	539.8	16 x 1 -8 UNC	—	—	11.8	300	14.2	361	2.00	51	1.063	27	5.512	140	F14	121.4	55.1	194.8	88.4
18	DN450	4.5	114	—	—	22.75	577.9	16 x 1 1/8 -7 UNC	—	—	12.8	325	15.6	396	2.00	51	1.063	27	5.512	140	F14	154.2	69.9	235.5	106.8
20	DN500	5.0	127	—	—	25.00	635.0	20 x 1 1/8 -7 UNC	—	—	14.2	361	17.3	439	2.52	64	1.063	27	6.496	165	F16	208.5	94.6	340.5	154.4
24	DN600	6.1	154	—	—	29.50	749.3	20 x 1 1/4 -7 UNC	—	—	16.5	419	19.7	500	2.76	70	1.417	36	6.496	165	F16	387.9	176.0	503.0	228.2

Standard 10-Position Throttle Plate

ISO Mounting Pad

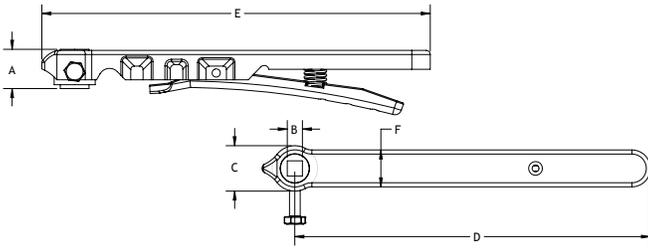
Mounting Flange Dimensions

Size	Bolt Circle Diameter (in)	Hole Size (mm)
F05	1.97	4x7
F07	2.76	4x10
F10	4.02	4x12
F14	5.51	4x18
F16	6.50	4x22

BFV STANDARDS

- VALVES DESIGNED TO
 - API-609
 - MSS-SP-25
 - MSS-SP-67
- INSTALL BETWEEN STANDARD ANSI CLASS 125/150 FLANGES
- TOP WORKS DESIGNED TO ISO 5211

MAS D SERIES Butterfly Valves Gear and Handle Options



D SERIES Handle Dimensions

Handle Code	Valve Handle Assembly		A		B		C		D		E		F		Weight	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg
HANDLE 220-01	2"-3"	DN50-75	0.88	22.4	0.354	9.0	1.25	31.8	8.7	220	9	229	1.0	25.4	1.0	0.5
HANDLE 260-01	4"	DN100	1.00	25.4	0.433	11.0	1.38	35.1	10.2	260	12	305	1.1	27.9	2.0	0.9
HANDLE 260-02	5"-6"	DN125-150	1.00	25.4	0.433	14.0	1.38	35.1	10.2	260	12	305	1.1	27.9	2.0	0.9
HANDLE 360-01	8"*	DN200*	1.25	31.8	0.669	17.0	1.75	44.5	14.2	360	14	356	1.4	35.6	3.0	1.4
HANDLE 360-02	10"-12"*	DN250-300*	1.25	31.8	0.669	22.0	1.75	44.5	14.2	360	14	356	1.4	35.6	3.0	1.4

*Recommended operation with a gear operator or an actuator for sizes 8"-12"

Locking arm

Infinite Lever Plate

Over-Travel on
Infinite 2-Position
Lock Option
Allows Disc to
Wipe Seat

The **standard** 10-position throttle plate has grooves that allow the handle to snap in place for repeatability and to prevent unintentional movement of the disc.

For even more control, **Infinite Lever Plates (ILP)** and arms are available, which allow the valve to be fixed in place with a bolt at any position. It is important to note that the ILP plates and locking arms can be padlocked in the full open and full closed positions, to prevent tampering or accidental operation.

Gear Operator
Padlocked Closed

ILP Shown
Bolted in an
Intermediate
Position

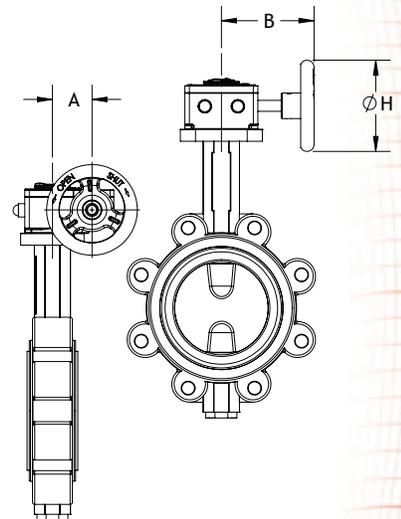
ILP Shown
Padlocked in
the Fully
Closed Position

Infinite Lever Details

Valve Size		Infinite Lever Plate	Infinite Lever Arm
in	mm		
2-2½	DN50-65	01	01
3	DN75	01	02
4	DN100	02	03
5-6	DN125-150	02	04
8*	DN200*	03	05
10-12*	DN250-300*	03	06

Gear Operator Dimensions

Valve Size		Gear Operator	A		B		ØH		Weight		Output Torque	
in	mm		in	mm	in	mm	in	mm	lbs	kg	in-lbs	Nm
1.5-3	DN50-75	MA-GO-01A-ISO	1.7	43	3.2	81	6	152	2.8	1.3	1330	150
4	DN100	MA-GO-01B-ISO	1.7	43	3.2	81	6	152	2.8	1.3	1330	150
5-6	DN125-150	MAS-GO-02-ISO	2.5	64	3.6	91	6	152	5.6	2.5	2200	250
8	DN200	MAS-GO-03A-ISO	2.4	61	4.7	119	10	254	11.5	5.2	4425	500
10	DN250	MAS-GO-03B-ISO	2.4	61	4.7	119	10	254	11.5	5.2	4425	500
12-14	DN300-350	MAS-GO-04-ISO	2.6	66	6.5	165	12	305	22.2	10.1	8850	1000
16-18	DN400-450	MAS-GO-05-ISO	3.5	89	7.9	201	16	406	40.8	18.5	15900	1800
20	DN500	MAS-GO-06-ISO	5.0	127	10.1	257	16	406	78.1	35.4	30090	3400
24	DN600	MAS-GO-07-ISO	6.1	155	12.4	315	16	406	101	45.8	39825	4500



MAS D & S SERIES Butterfly Valves

Seat Material Guide



Seat Material (Backing Material)	Code	General Application	Temperature Range at Full Rated Pressure	Not Recommended For
Nitrile Buna-N (NBR) (Phenolic Backing)	Black BUNA (Code B)	Hydrocarbons with less than 40% of aromatics, Natural Gas, Air, H ₂ O, Sea Water, Brine, Alcohols, Glycols	10°F to 180°F	Solvents, Benzene, Xylene
			-12°C to 82°C	
EPDM (Phenolic Backing)	Black EPDM (Code E)	H ₂ O, Saturated Steam*, Air, Brine, Abrasives, Phosphates, Esters, Ketones, Alkali, Food Compounds, Liquids and Solids, Dilute Inorganic Acids, Caustic Soda	-4°F to 275°F	Hydrocarbons, Oils, Fats, Dry Air
	White EPDM Food Grade (Code WEF)		-20°C to 135°C	
	Black EPDM Food Grade (Code BEF)			
High Temperature EPDM (Phenolic Backing)	High Temp EPDM (Code HT)	(*low pressure saturated steam only. Please consult MAS for details.)	-4°F to 302°F	
			-20°C to 150°C	
Chlorosulfonated Synthetic Rubber (CSM) (Phenolic Backing)	(Code SR)	Oxidizing Acids, Chromic Acid, Hydrofluoric Acid, Sulphur Based Acids, Sodium Hypochlorite, Ozone	0°F to 275°F	Steam, Ketones, Hot Air, Nitric Acid
			-18°C to 135°C	
Silicone (Phenolic Backing)	(Code SL)	Beverages, Food	-22°F to 400°F	Hydrocarbons, Solvents, Steam
			-30°C to 204°C	
Fluoroelastomer (FKM-VITON) (Aluminum Backing)	(Code V)	Hydrocarbons with high concentration of aromatics, Mineral and Halogenated Acids, Phosphoric Acid, Aliphatic and Aromatic Ethers	0°F to 392°F	Steam, Ketones, Amines, Esters, Alkali
			-18°C to 200°C	
Neoprene (CR) (Phenolic Backing)	(Code NP)	Oils, Dilute Mineral Acids, Alkali, Fats	20°F to 200°F	Ketones, Concentrated Acids, Solvents for Paint
			-7°C to 93°C	
Wear Resistant EPDM (Phenolic Backing)	(Code WR)	Abrasive Products	14°F to 250°F	Steam, Hydrocarbons, Oils
			-10°C to 120°C	
PTFE Over EPDM (Phenolic Backing) <i>Rated to 150 PSI</i>	(Code PE)	Corrosive Products, Solvents	-4°F to 250°F	Abrasive Products, Fluorine Gases, Alkaline Metals
			-20°C to 120°C	