DUCTILE IRON D SERIES
STAINLESS STEEL S SERIES
BUTTERFLY VALVES

1½"–12" 200 PSI Bi-Directional Service
14"–24" 150 PSI Bi-Directional Service
Up to 48" Available

NSF/ANSI 61 NSF/ANSI 372

M. A. Stewart & Sons Ltd.™

3 Year Limited Warranty

MAS-BFV-17.02

Contents

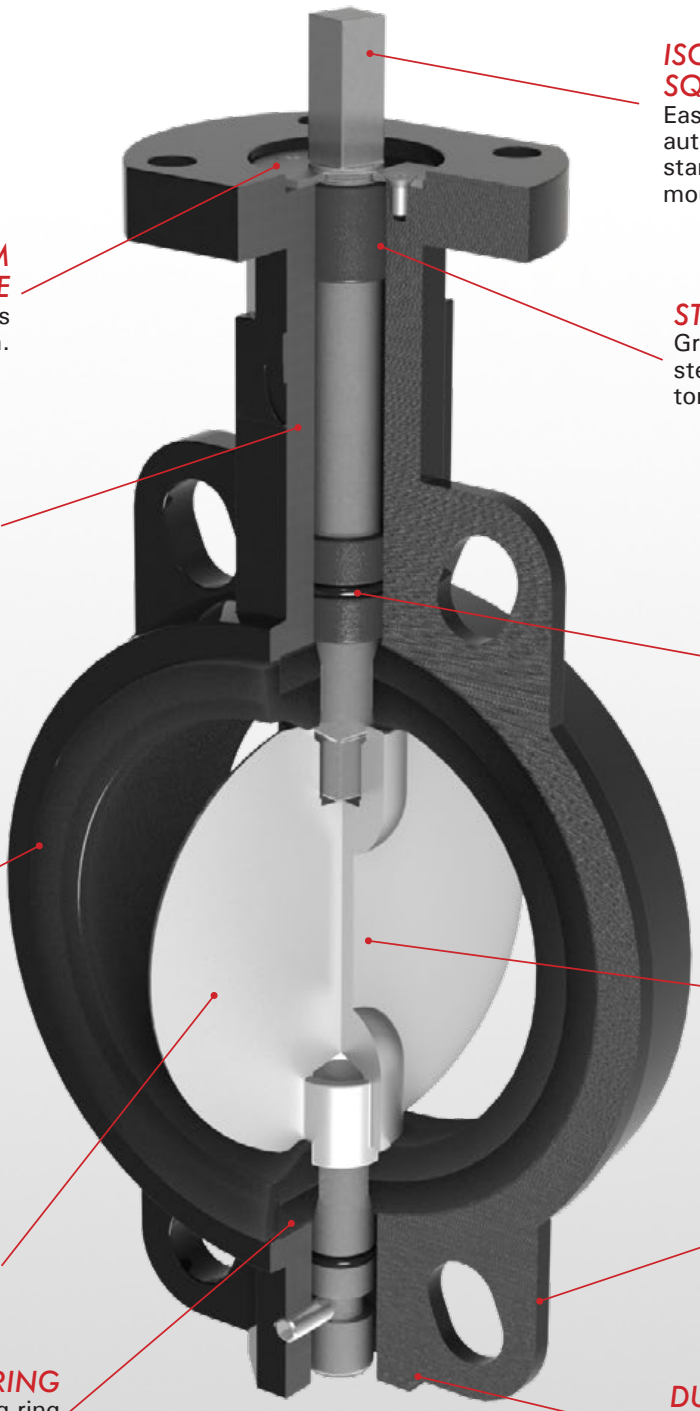
D & S SERIES Ordering Guidelines

Nominal Size	Flange Style	Body Material	Stem Material	Disc Material	Seat Material	Operator Type	Additional *(if required)*
4	– L	– D	– 4	– DI	– E	– LH	–
D Series Lug 1½" – 48"	**L** = Lug	**D** = Ductile Iron (Optional)	**4** = 416 SS (Standard "D")	**A** = Aluminum Bronze	**B** = BUNA-N	**BS** = Bare Stem	**U** = Under Cut Disc
D Series Wafer 1½" – 48"	**W** = Wafer	**S** = CF8M (Standard)	**5** = 431 SS (Standard "S")	**DI** = Nickel Plated Ductile Iron	**E** = EPDM	**G** = Gear Operator	**LO** = Lock Out
S Series 2" – 24"		**C** = Cast Iron	**3** = 316 SS (Optional)	**N** = Nylon 11 Coated DI	**V** = FKM (Viton)	**ILP** = Infinite Lever Plate	
				S = A351 CF8M	**PE** = PTFE over EPDM	**LH** = Lever Handle	
				T = 6 mil PTFE coating over SS316	**BEF** = Black EPDM Food Grade		
				PS = Polished A351 CF8M	**WE** = White EPDM Food Grade		
					HT = High Temp. EPDM		
					SR = Synthetic Rubber		
					SL = Silicone		
					WR = Wear Resistant EPDM		
					NP = Neoprene		

Example Above: *4" L-D-4-DI-E-LH is 4-inch Lug-Style, DI Body, 416SS Stem, Nickel-Plated DI Disc, EPDM Seat, Lever Operated.*

D Series Butterfly Valves
Features & Benefits

Ductile Iron Body - Lug & Wafer Styles



ISO 5211 SQUARE STEM
Easy direct-mount automation with ISO 5211 standard drive stem and mounting flange.

STEM RETAINER PLATE
Stem retainer plate ensures blowout protection.

STEM BUSHINGS
Graphite-reinforced PTFE stem bushings provide for low torque and long cycle life.

EXTENDED NECK
Allows use with insulated pipe.

SECONDARY PROTECTION
Secondary o-ring stem seal protection.

SEAT
Cartridge-style seat allows field replacement.

NO TAPER PINS
No taper pins on disc ensures trouble-free service and better flow performance.

EPOXY POWDER COATING
as standard

UNDERCUT DISC AVAILABLE
for low pressure media.

BACKING RING
Rigid backing ring allows for dead-end service.

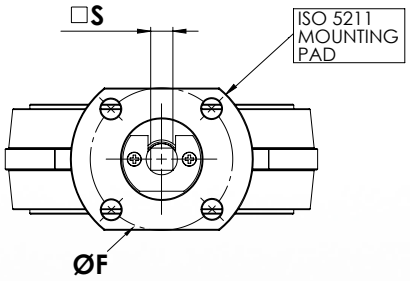
**For sizes larger than 24", please consult factory*

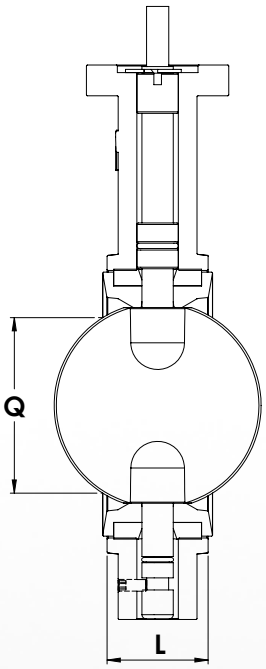
DUCTILE IRON BODY
Durable and economical.

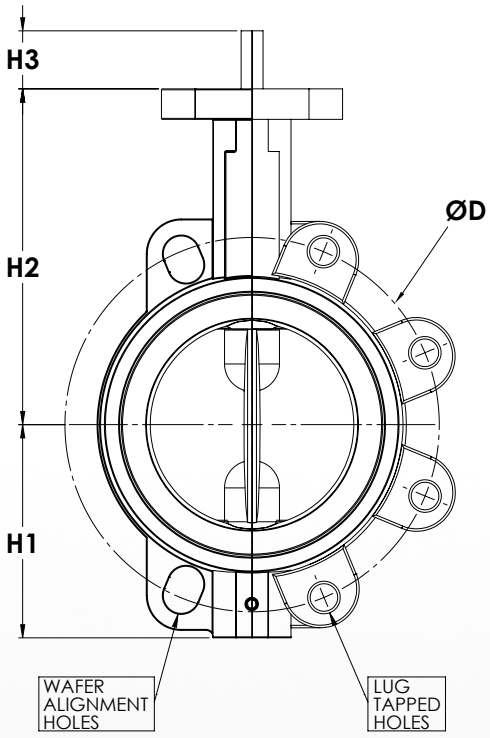
D Series Butterfly Valves

- Wafer Ductile Iron Body sizes 1.5″ - 48″
- Lug Ductile Iron Body sizes 1.5″ - 48″
- Lug-style dead end service capabilities through 12″:
  200 PSI uni-directional (Designated with flow arrow)
  100 PSI bi-directional
- Install between Standard ANSI class 125/150 flanges
- Wafer also compatible with PN10/PN16 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 1.5″–12″
- Field repairable
- Vacuum service capable 1.5″–12″ to below 10 microns
- Malleable Iron Handles available
- Cast Iron Gear Operators available

D Series Butterfly Valves
Dimensions







Ductile Iron Butterfly Valves

Size		L		Q		ØD		Lug Taps	Wafer Holes		H1		H2		H3		□ S		ØF		ISO
in	mm	in	mm	in	mm	in	mm	SAE Thread	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	
1½	DN40	1.3	33	0.8	21	3.88	98.5	1/2"- 13 UNC	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	1.1	29	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
2½	DN65	1.8	46	1.8	45	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
3	DN75	1.8	46	2.5	62	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
4	DN100	2.0	52	3.5	89	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
5	DN125	2.2	56	4.6	116	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
6	DN150	2.2	56	5.7	145	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
8	DN200	2.4	60	7.8	197	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
10	DN250	2.7	68	9.8	248	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
12	DN300	3.1	78	11.7	298	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
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
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
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
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
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

Optional Infinite Locking Plates

Valve Sizes		ILP Plate	ILP Arm
in	mm		
1.5-3	DN40-75	01	01
4	DN100	02	03
5-6	DN125-150	02	04
8*	DN200*	03	05
10-12*	DN250-300*	03	06

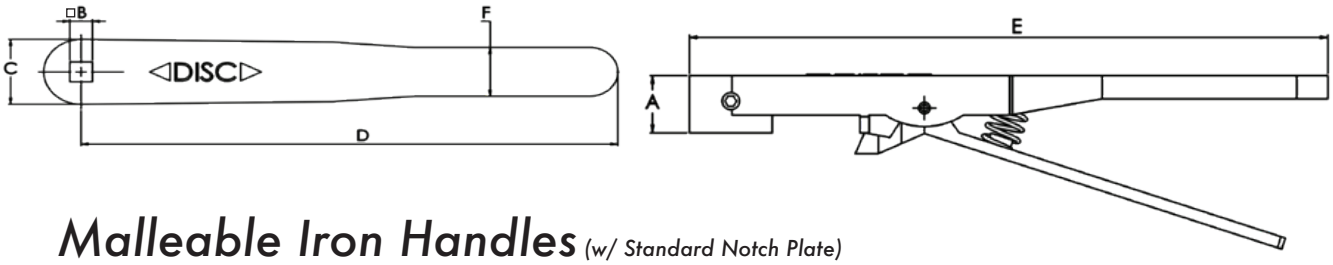
Recommended operation with a gear operator or an actuator for sizes 8"–12"

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

Locking Arm (Included w/ Plate)

*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 only, to prevent tampering or accidental operation.*



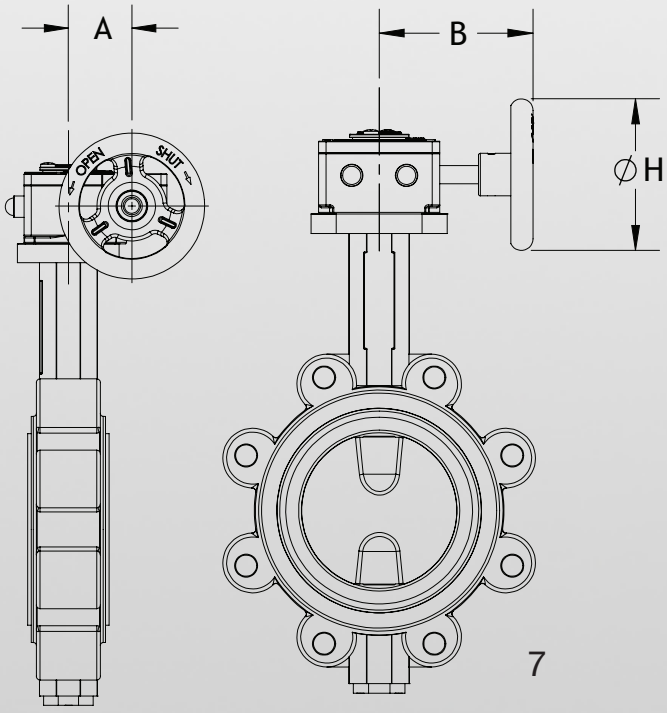
Malleable Iron Handles *(w/ Standard Notch Plate)*

Handle Part #	Valve Sizes		A		□B		C		D		E		F		Weight	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg
HND-M01	1.5-3	DN50-75	1.0	26	0.35	9.0	1.3	33	8.9	225	9.4	240	1.1	28	2.4	1.1
HND-M02	4	DN100	1.0	26	0.43	11.0	1.4	35	10.2	260	11.0	280	1.1	28	2.6	1.2
HND-M03	5-6	DN125-150	1.0	26	0.55	14.0	1.4	35	10.2	260	11.0	280	1.1	28	2.9	1.3
HND-M04	8*	DN200*	1.2	30	0.67	17.0	1.9	49	14.0	355	15.2	385	1.3	32	5.7	2.6
HND-M05	10-12*	DN250-300*	1.2	30	0.87	22.0	1.9	49	14.0	355	15.2	385	1.3	32	5.7	2.6

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

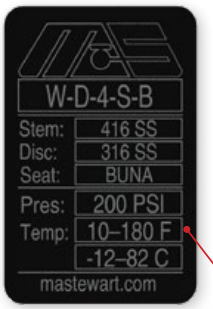
Cast Iron Gear Operators

Valve Sizes		Gear Operator	A		B		ØH		Weight		Max Torque		Rim Pull	
in	mm		in	mm	in	mm	in	mm	lbs	kg	in-lbs	Nm	lbf	N
1.5–3	DN50–75	MA-GO-01A-ISO	1.7	43	3.2	81	6	152	2.8	1.3	1330	150	27	120
4	DN100	MA-GO-01B-ISO	2.5	43	3.2	81	6	152	2.8	1.3	1330	150	27	120
5–6	DN125–150	MA-GO-02-ISO	2.5	64	3.6	91	6	152	5.6	2.5	2200	250	33	147
8	DN200	MA-GO-03A-ISO	2.4	61	4.7	119	10	254	11.5	5.2	4425	500	40	178
10	DN250	MA-GO-03B-ISO	2.4	61	4.7	119	10	254	11.5	5.2	4425	500	40	178
12–14	DN300–350	MA-GO-04-ISO	2.6	66	6.5	165	12	305	22.2	10.1	8850	1000	67	298
16–18	DN400–450	MA-GO-05-ISO	3.5	89	7.9	201	16	406	40.8	18.5	15900	1800	61	271
20	DN500	MA-GO-06-ISO	5.0	127	10.1	257	16	406	78.1	35.4	30090	3400	91	405
24	DN600	MA-GO-07-ISO	6.1	155	12.4	315	16	406	101	45.8	39825	4500	91	405

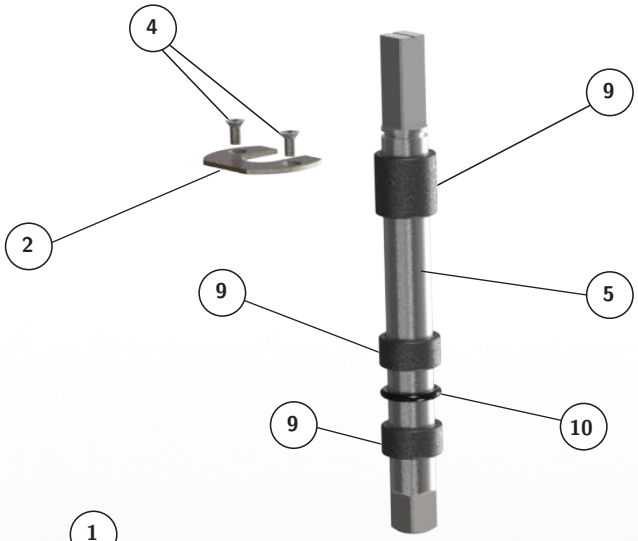


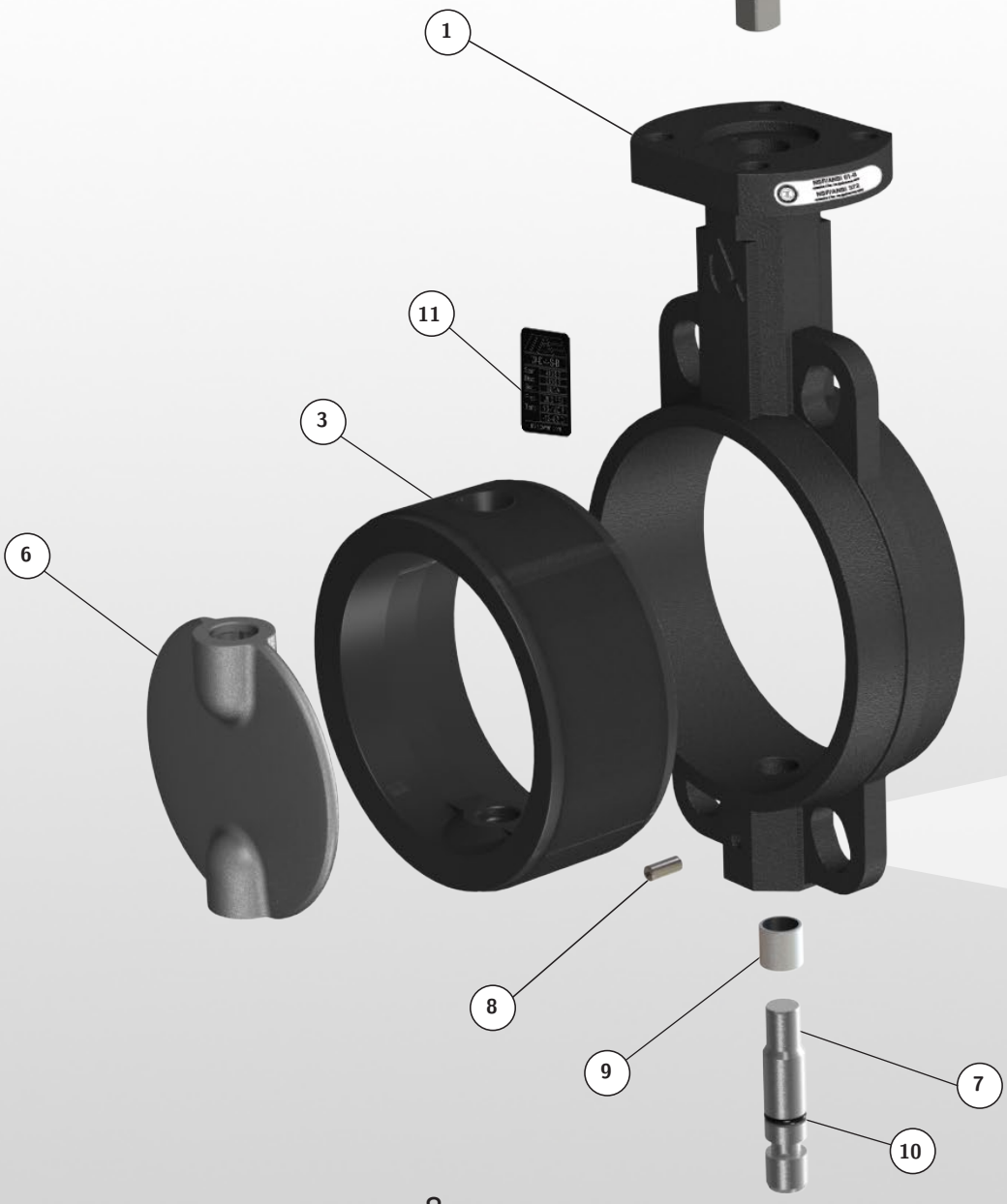
D Series Butterfly Valves (1.5"-12")

Exploded View



ALUMINUM TAG DETAIL

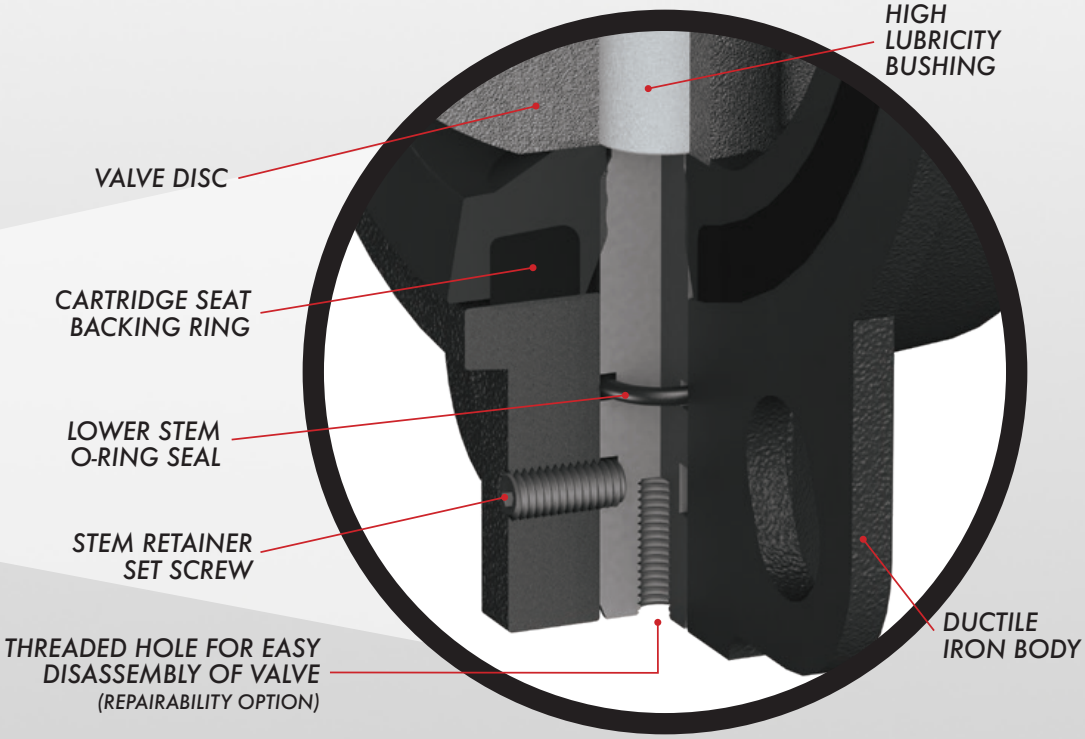




Bill of Materials

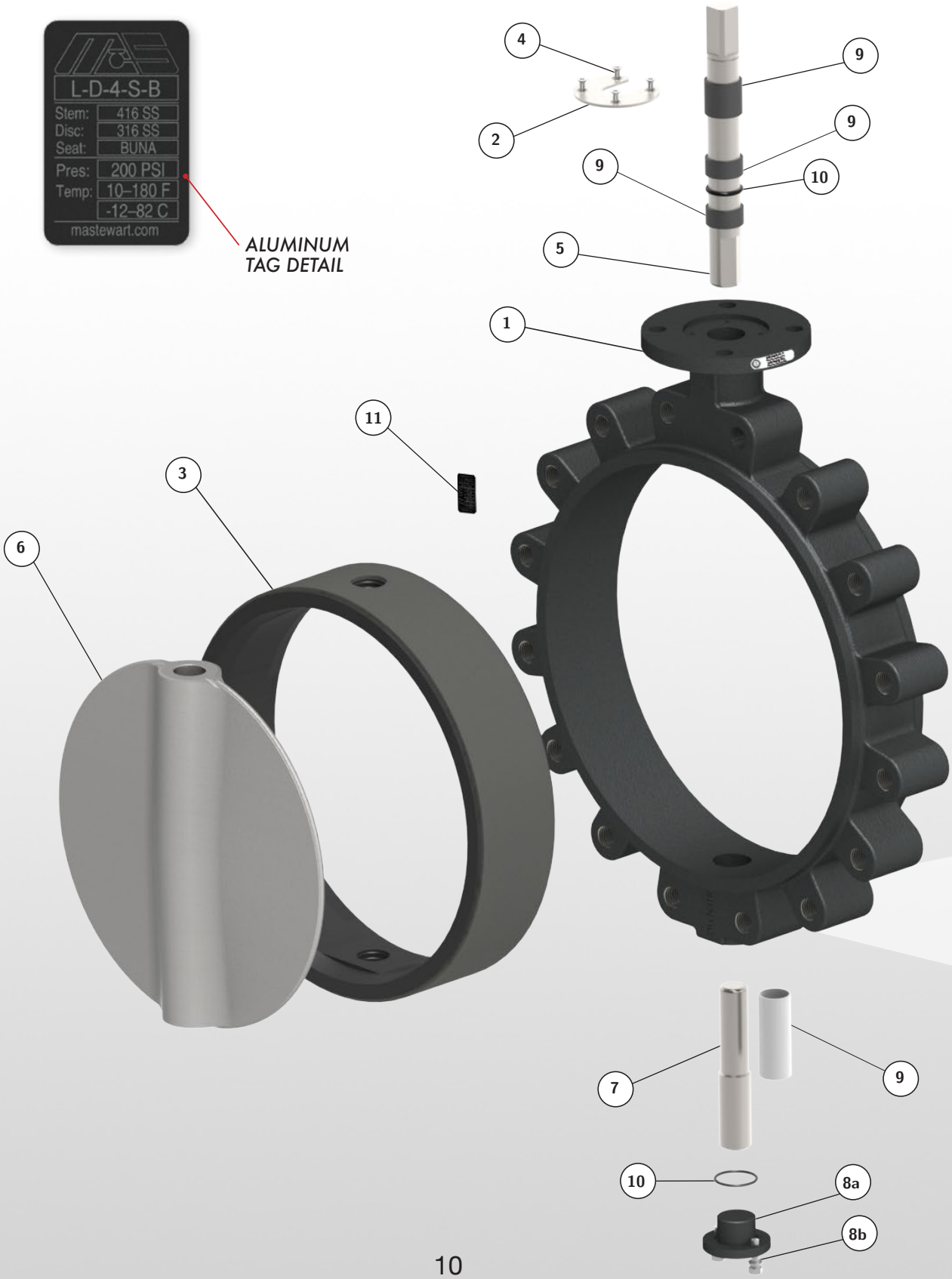
Item	Description	Materials
1	Body	Ductile Iron ASTM A536
2	Stem Retainer	Carbon Steel, Plated
3	Seat	See Pg 24 or 25
4	Stem Retainer Screws	Carbon Steel, Plated
5	Upper Stem	Stainless Steel ASTM A582, Alloy 416, 316SS Option
6	Disc	See Pg 26 or 27
7	Lower Stem	Stainless Steel ASTM A582, Alloy 416, 316SS Option
8	Lower Stem Retainer	Carbon Steel, Plated
9	Bushing	PTFE/Graphite
10	O-Ring	EPDM, BUNA-N, Fluoroelastomer
11	Nameplate Tag	Aluminum (see detail)

Lower Stem Detail



D Series Butterfly Valves (14"-24")

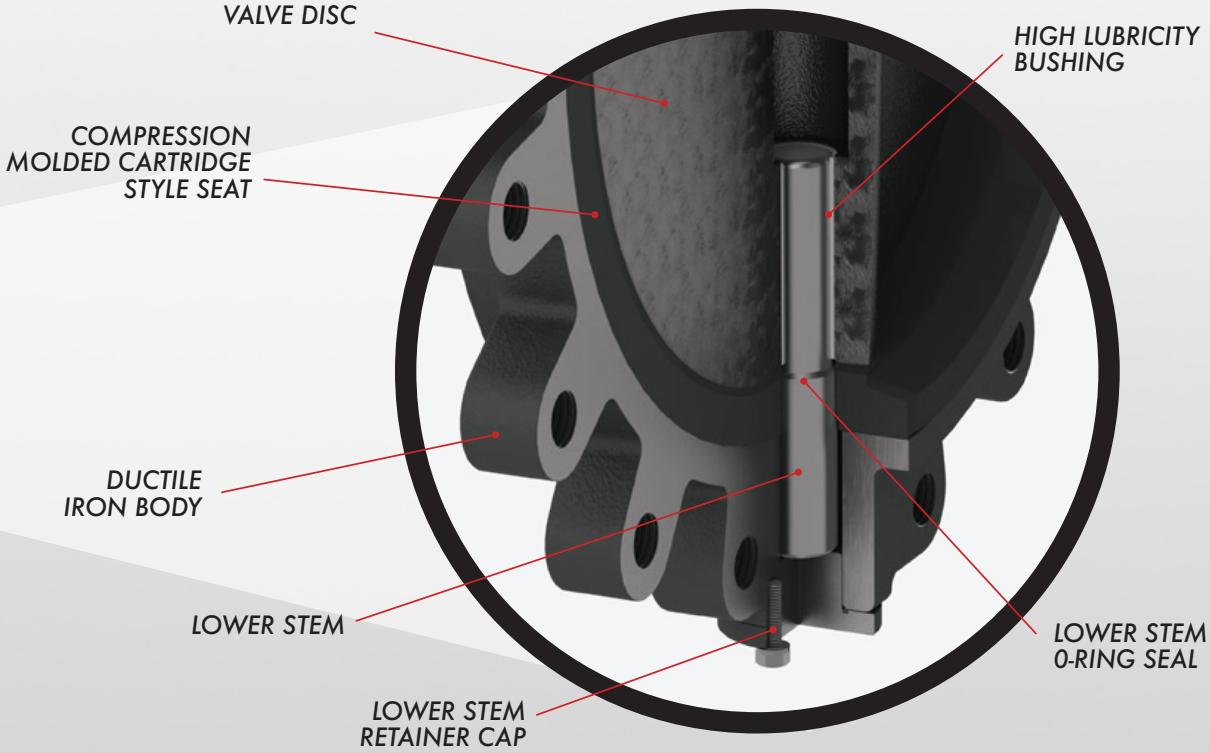
Exploded View



Bill of Materials

Item	Description	Materials
1	Body	Ductile Iron ASTM A536
2	Stem Retainer	Carbon Steel, Plated
3	Seat	See Pg 24 or 25
4	Stem Retainer Screws	Carbon Steel, Plated
5	Upper Stem	Stainless Steel ASTM A582, Alloy 416 or 410, 316SS Option
6	Disc	See Pg 26 or 27
7	Lower Stem	Stainless Steel ASTM A582, Alloy 416 or 410, 316SS Option
8a	Lower Stem Retainer	Ductile Iron ASTM A536
8b	Lower Stem Retainer Bolts and Washers	Carbon Steel, Plated
9	Bushing	PTFE/Graphite
10	O-Ring	EPDM, BUNA-N, Fluoroelastomer
11	Nameplate Tag	Aluminum (see detail)

Lower Stem Detail



Seating Torques *(in-lbs)*

Size (in)	STANDARD SEAT				UNDERCUT DISC	PTFE SEAT		
	Pressure Differential *(ΔP in PSI)*							
	50 ΔP	100 ΔP	150 ΔP	200 ΔP	50 ΔP	50 ΔP	100 ΔP	150 ΔP
1½	105	111	117	124	—	—	—	—
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	200	392	409	425
5	428	479	540	631	330	771	793	814
6	636	720	799	909	440	1074	1113	1151
8	1239	1273	1411	1505	820	2106	2177	2257
10	2567	2710	2832	3105	1150	3151	3301	3452
12	3153	3307	3671	4305	2400	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	—				

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 on next page.

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.

Pressure Rating

	D SERIES		
Nominal Size	1.5"–12"	14"–24"	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
Dead-End Bi-Directional	100 PSI	N/A	100 PSI
Dead-End Uni-Directional	200 PSI	N/A	150 PSI

**PTFE seats are rated to 150 PSI*

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

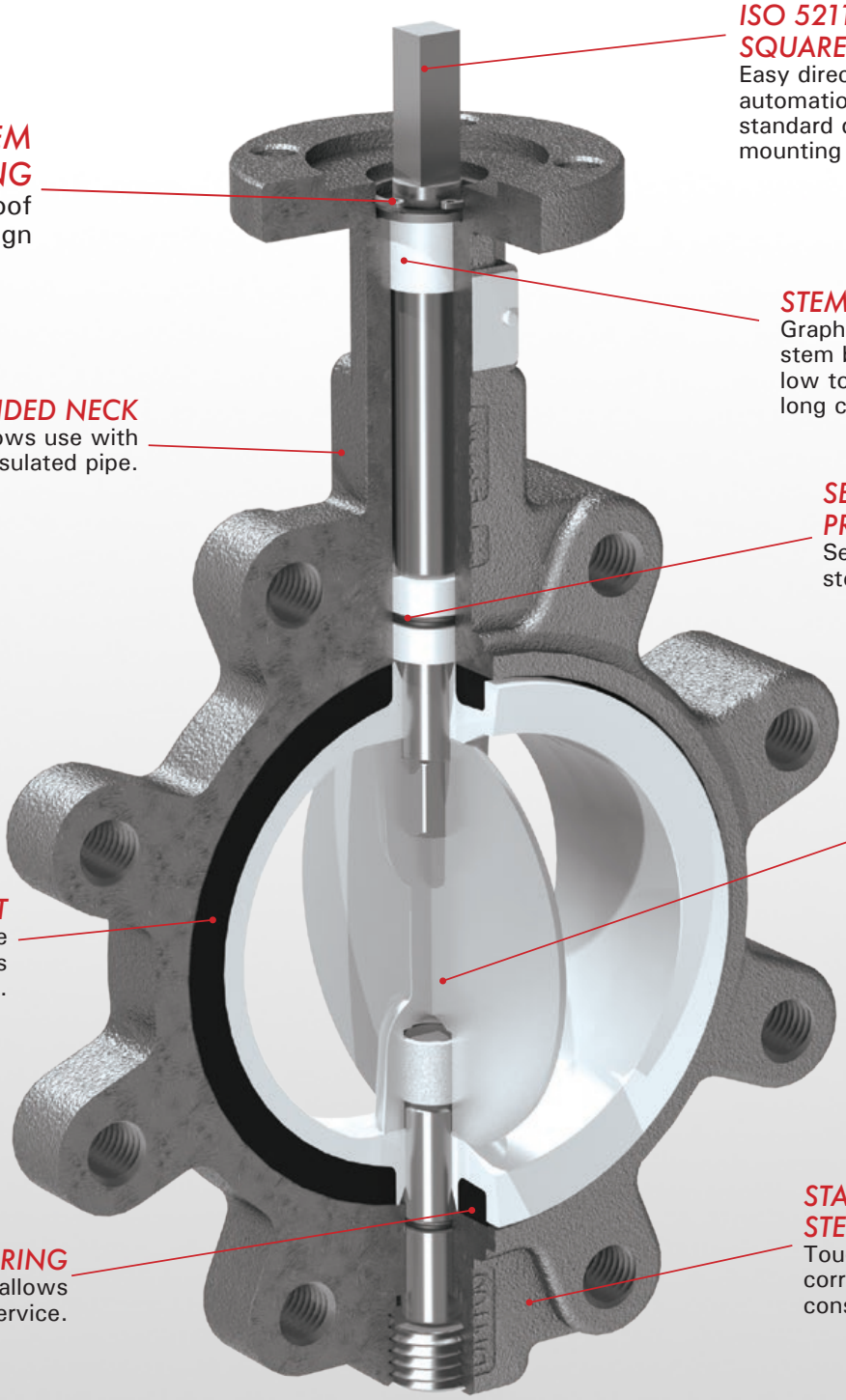
The valve sizing coefficient is referred to as "Cv" and is the rate of water flow in gallons per minute (GPM) through a given opening at a pressure drop (ΔP) of 1 PSI at standard room temperature. The recommended angle of opening for valve sizing is between 50° and 70° open.

Weights

Size		Wafer		Lug		Individual Handle		Individual Gear Operator	
in	*mm*	lbs	kg	lbs	kg	lbs	kg	lbs	kg
1½	DN40	4.2	1.9	—	—	2.4	1.1	2.8	1.3
2	DN50	4.2	1.9	5.2	2.4	2.4	1.1	2.8	1.3
2½	DN65	5.5	2.5	6.5	3.0	2.4	1.1	2.8	1.3
3	DN75	6.1	2.8	7.3	3.3	2.4	1.1	2.8	1.3
4	DN100	9.0	4.1	12.5	5.7	2.6	1.3	2.8	1.3
5	DN125	12.6	5.7	16.9	7.7	2.9	1.3	5.6	2.5
6	DN150	15.1	6.9	20.4	9.3	2.9	1.3	5.6	2.5
8	DN200	27.0	12.3	33.3	15.1	5.7	2.6	11.5	5.2
10	DN250	40.8	18.5	54.5	24.7	5.7	2.6	11.5	5.2
12	DN300	60.7	27.6	76.2	34.6	5.7	2.6	22.2	10.1
14	DN350	86.9	39.4	131.5	59.7	—	—	22.2	10.1
16	DN400	121.4	55.1	194.8	88.4	—	—	40.8	18.5
18	DN450	154.2	69.9	235.5	106.8	—	—	40.8	18.5
20	DN500	208.5	94.6	340.5	154.4	—	—	78.1	35.4
24	DN600	387.9	176.0	503.0	228.2	—	—	101	45.8

S Series Butterfly Valves
Features & Benefits

Stainless Steel Body - Lug & Wafer Styles



ISO 5211 SQUARE STEM
Easy direct-mount automation with ISO 5211 standard drive stem and mounting flange.

STEM RETAINER RING
Blowout-proof stem design

STEM BUSHINGS
Graphite-reinforced PTFE stem bushings provide for low torque and incredibly long cycle life!

EXTENDED NECK
Allows use with insulated pipe.

SECONDARY PROTECTION
Secondary o-ring stem seal protection.

NO TAPER PINS
No taper pins on disc ensures trouble-free service and better flow performance.

SEAT
Cartridge-style seat allows field replacement.

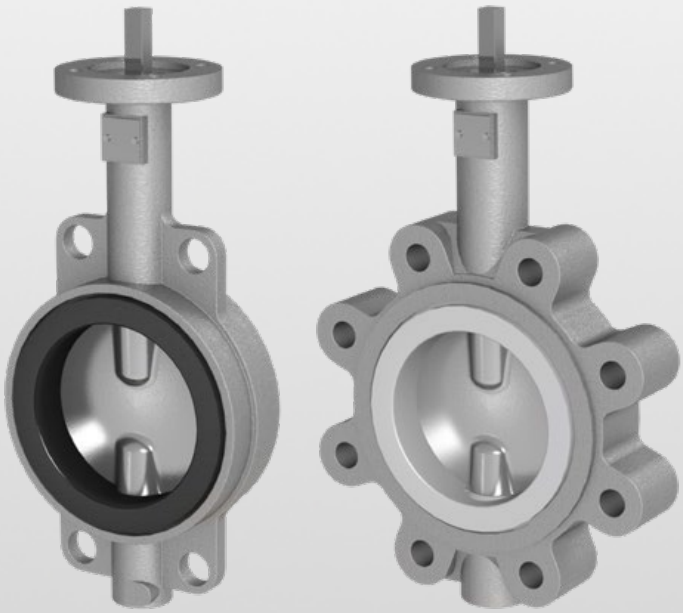
STAINLESS STEEL BODY
Tough and corrosion-resistant construction.

BACKING RING
Rigid backing ring allows for dead-end service.

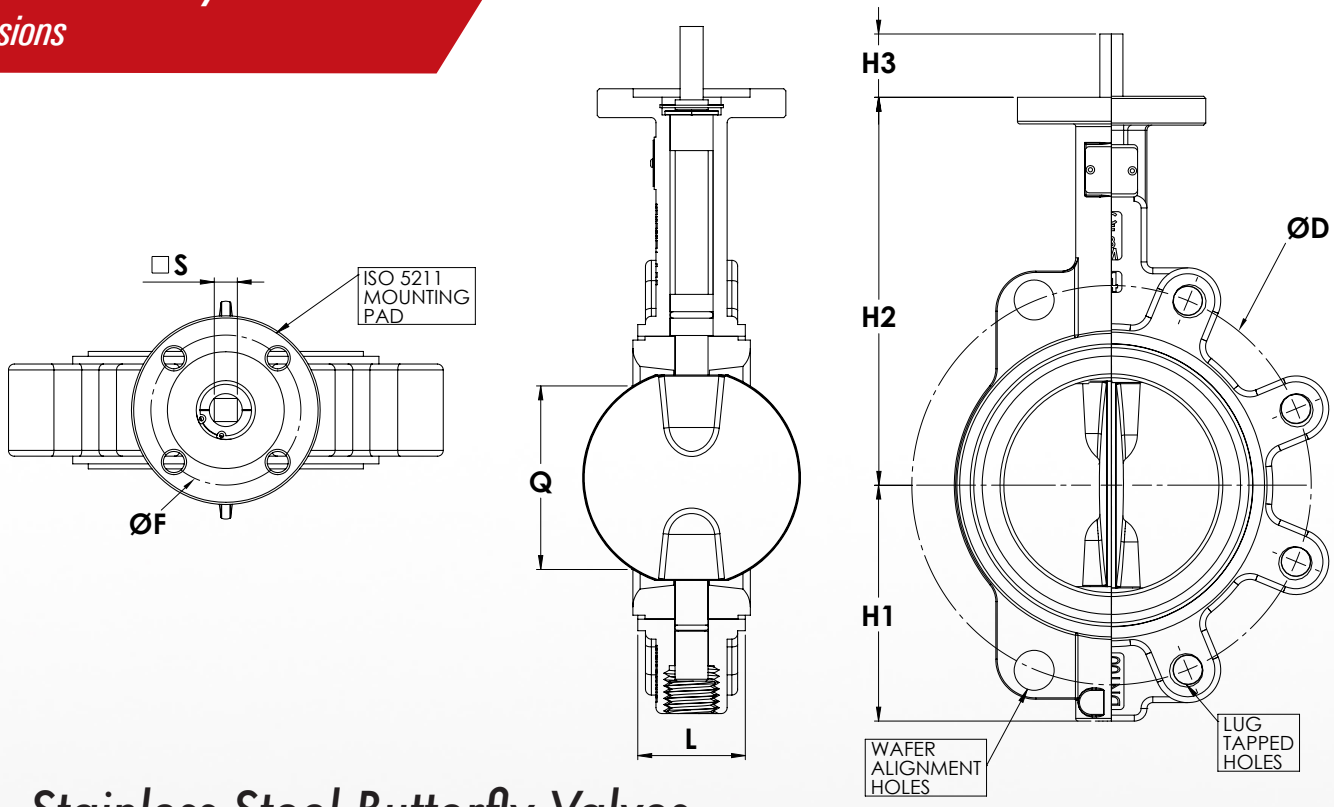
**For sizes larger than 24", please consult factory*

S Series Butterfly

- Wafer Stainless Steel Body sizes 2″ - 24″
- Lug Stainless Steel Body sizes 2″ - 24″
- Lug-style dead end service capabilities through 12″: 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
- 304 SS Handles available
- Cast Iron Gear Operators available



S Series Butterfly Valves
Dimensions



Stainless Steel Butterfly Valves

Size		L		Q		ØD		Lug Taps	Wafer Holes		H1		H2		H3		□ S		ØF		ISO
in	mm	in	mm	in	mm	in	mm	SAE Thread	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	
2	DN50	1.7	43	1.1	29	4.75	120.7	4 x ⅝"-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
2½	DN65	1.8	46	1.8	45	5.50	139.7	4 x ⅝"-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
3	DN75	1.8	46	2.5	62	6.00	152.4	4 x ⅝" -11 UNC	4 x 0.7	4 x 18	3.5	89	5.8	147	1.18	30	0.433	11	1.969	50	F05
4	DN100	2.0	52	3.5	89	7.50	190.5	8 x ⅝"-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
5	DN125	2.2	56	4.6	116	8.50	215.9	8 x ¾"-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
6	DN150	2.2	56	5.7	145	9.50	241.3	8 x ¾" -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
8	DN200	2.4	60	7.8	197	11.75	298.5	8 x ¾"-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
10	DN250	2.7	68	9.8	248	14.25	362.0	12 x ⅞"-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
12	DN300	3.1	78	11.7	298	17.00	431.8	12 x ⅞"-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
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
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
18	DN450	4.5	114	—	—	22.75	577.9	16 x 1 ⅛"-7 UNC	—	—	12.8	325	15.6	396	2.00	51	1.063	27	5.512	140	F14
20	DN500	5.0	127	—	—	25.00	635.0	20 x 1 ⅛"-7 UNC	—	—	14.2	361	17.3	439	2.52	64	1.063	27	6.496	165	F16
24	DN600	6.1	154	—	—	29.50	749.3	20 x 1 ¼"-7 UNC	—	—	16.5	419	19.7	500	2.76	70	1.417	36	6.496	165	F16

Optional Infinite Locking Plates

Valve Sizes		ILP Plate	ILP Arm
in	mm		
2-2.5	DN50-65	01	01
3	DN75	01	03
4	DN100	02	03
5-6	DN125-150	02	04
8	DN200*	03	05
10-12	DN250-300*	03	06

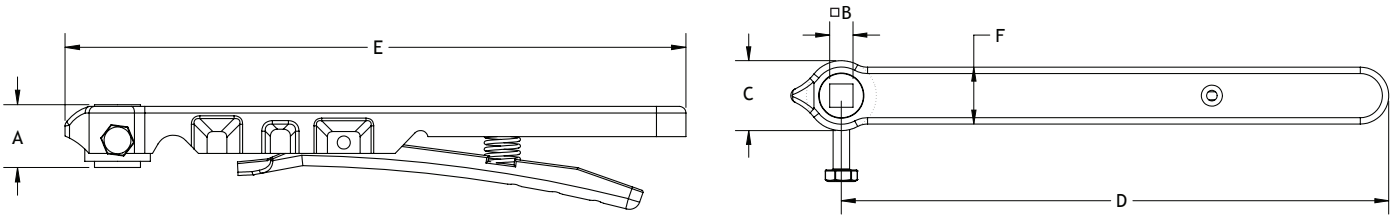
Recommended operation with a gear operator or an actuator for sizes 8"–12"

Optional Infinite Lever Plate

Locking Arm (Included w/ Plate)

*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 only, to prevent tampering or accidental operation.*



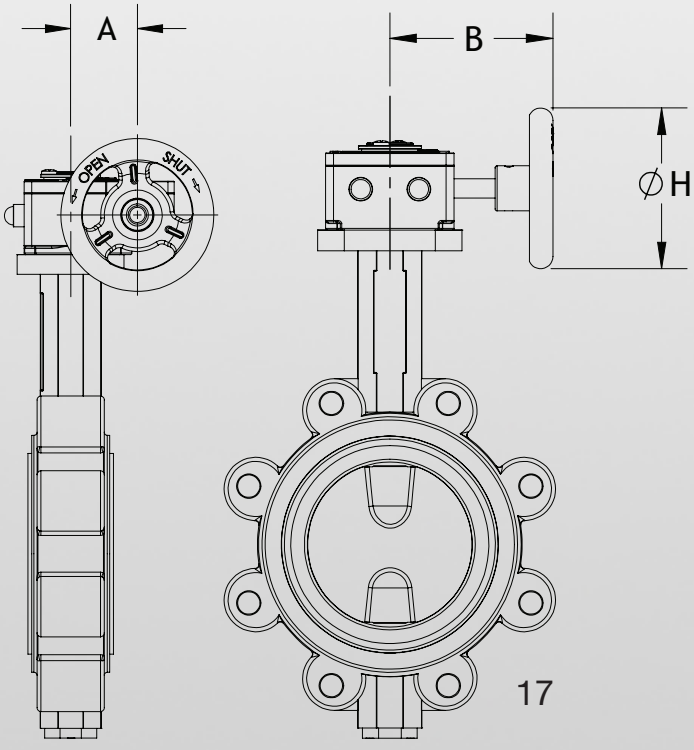
Stainless Steel Handles *(w/ Standard Notch Plate)*

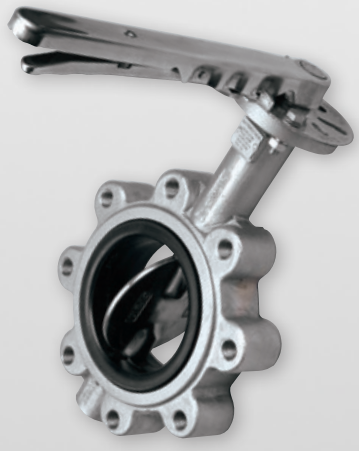
Handle Part #	Valve Sizes		A		□B		C		D		E		F		Weight	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg
HND-S01	2-2.5	DN50-75	1.1	28	0.35	9.0	1.3	34	10.2	260	11.2	285	1.1	27	2.2	1.0
HND-S02	3-4	DN100	1.1	28	0.43	11.0	1.3	34	10.2	260	11.2	285	1.1	27	2.2	1.0
HND-S03	5-6	DN125-150	1.1	28	0.55	14.0	1.3	34	10.2	260	11.2	285	1.1	27	2.2	1.0
HND-S04	8*	DN200*	1.2	30	0.67	17.0	1.9	49	14.7	373	15.7	400	1.3	33	5.5	2.5
HND-S05	10-12*	DN250-300*	1.2	30	0.87	22.0	1.9	49	14.7	373	15.7	400	1.3	33	5.5	2.5

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

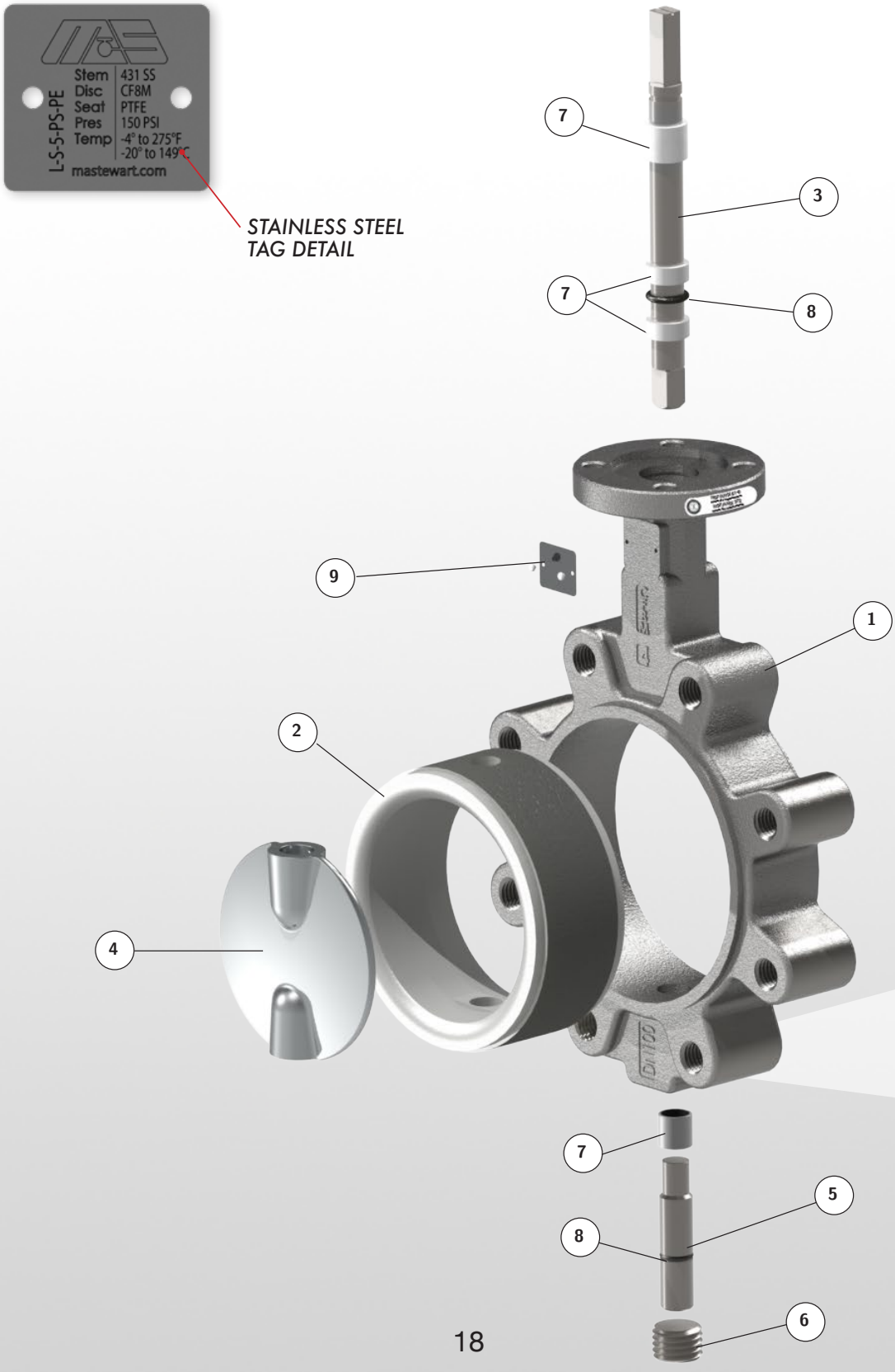
Cast Iron Gear Operators

Valve Sizes		Gear Operator	A		B		ØH		Weight		Max Torque		Rim Pull	
in	mm		in	mm	in	mm	in	mm	lbs	kg	in-lbs	Nm	lbf	N
1.5–3	DN50–75	MA-GO-01A-ISO	1.7	43	3.2	81	6	152	2.8	1.3	1330	150	27	120
4	DN100	MA-GO-01B-ISO	2.5	43	3.2	81	6	152	2.8	1.3	1330	150	27	120
5–6	DN125–150	MA-GO-02-ISO	2.5	64	3.6	91	6	152	5.6	2.5	2200	250	33	147
8	DN200	MA-GO-03A-ISO	2.4	61	4.7	119	10	254	11.5	5.2	4425	500	40	178
10	DN250	MA-GO-03B-ISO	2.4	61	4.7	119	10	254	11.5	5.2	4425	500	40	178
12–14	DN300–350	MA-GO-04A-ISO	2.6	66	6.5	165	12	305	22.2	10.1	8850	1000	67	298
16–18	DN400–450	MA-GO-05B-ISO	3.5	89	7.9	201	16	406	40.8	18.5	15900	1800	61	271
20	DN500	MA-GO-06B-ISO	5.0	127	10.1	257	16	406	78.1	35.4	30090	3400	91	405
24	DN600	MA-GO-07-ISO	6.1	155	12.4	315	16	406	101	45.8	39825	4500	91	405





S Series Butterfly Valves (2"-12")
Exploded View

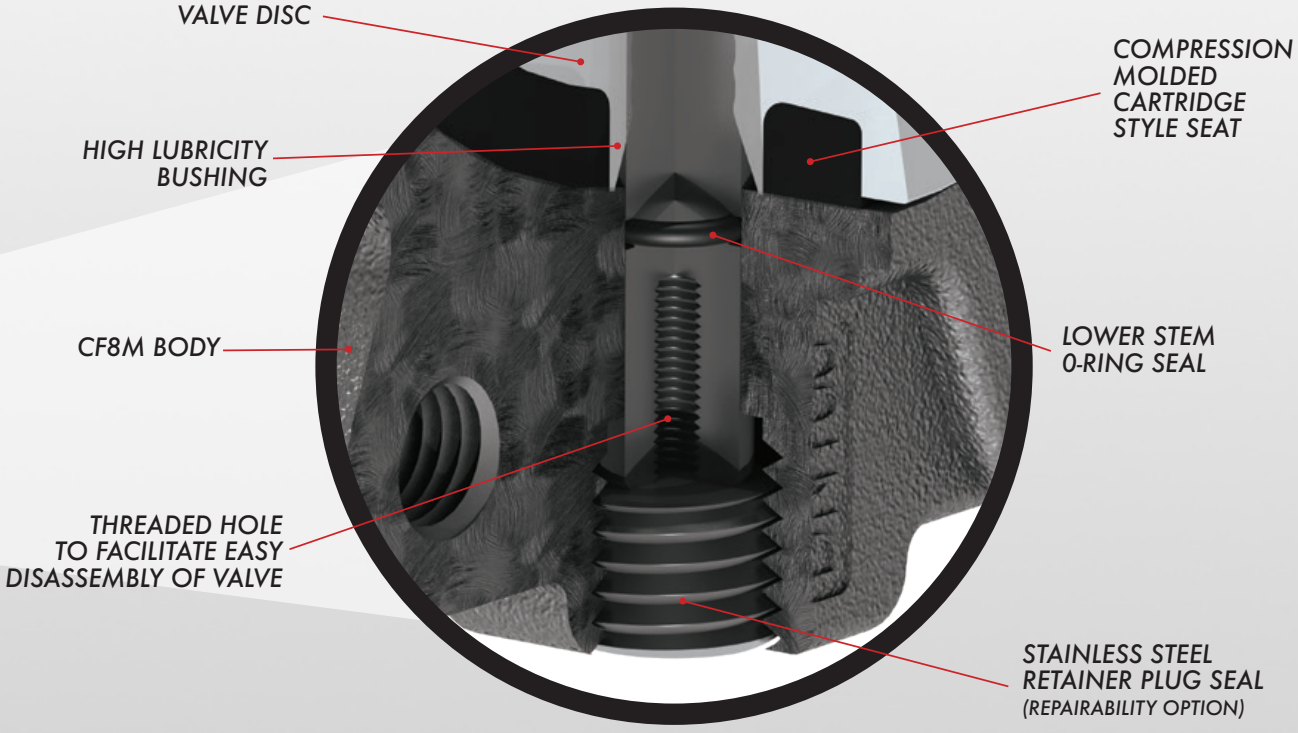


STAINLESS STEEL TAG DETAIL

Bill of Materials

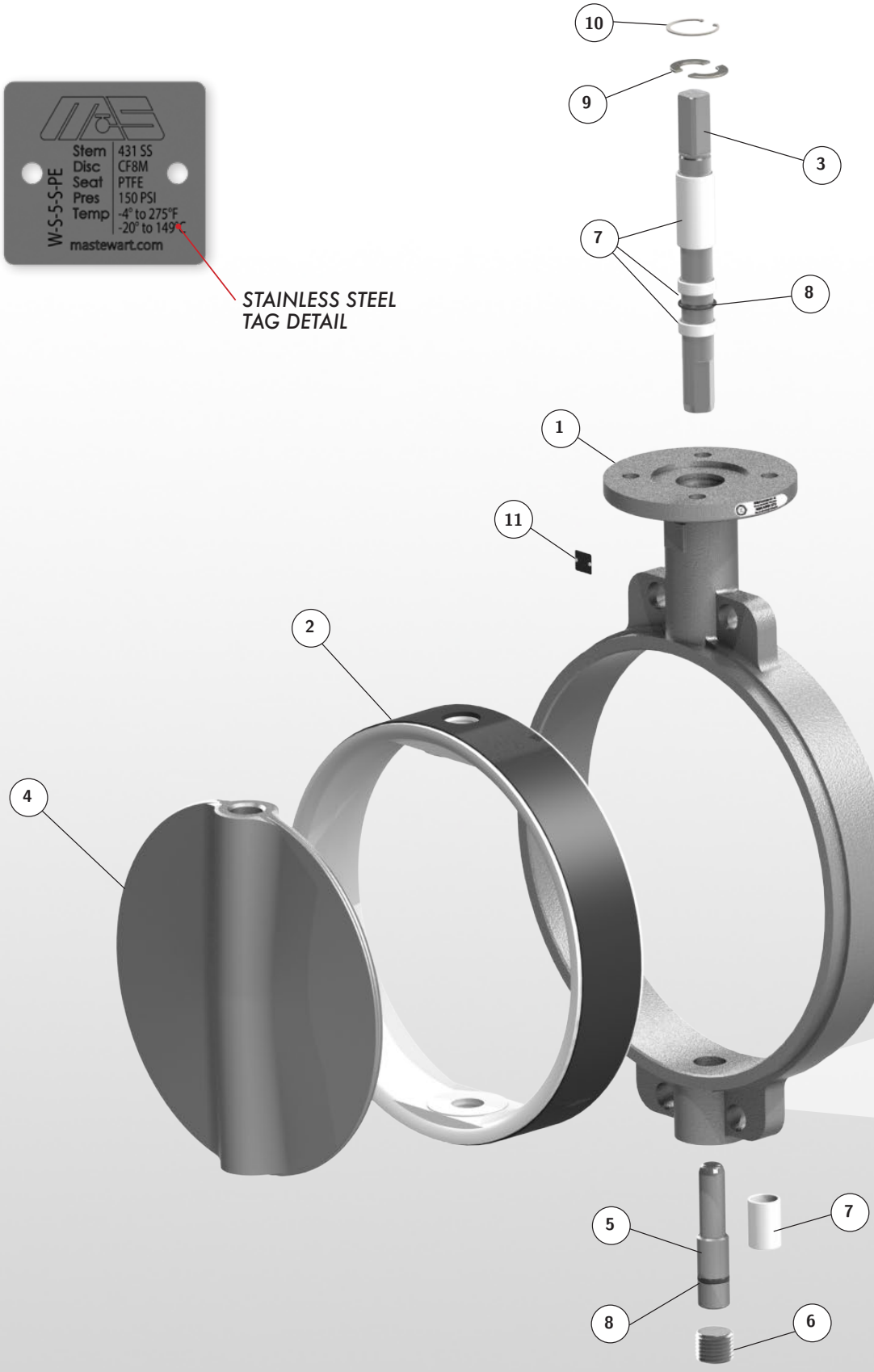
Item	Description	Materials
1	Body	ASTM A351 grade CF8M
2	Seat	See Pg 24 or 25
3	Upper Stem	ASTM A276 431, 316SS Option
4	Disc	See Pg 26 or 27
5	Lower Stem	ASTM A276 431, 316SS Option
6	Lower Stem Retainer	304 SS
7	Stem Bushing	PTFE lined fiberglass
8	O-ring	Fluoroelastomer
9	Nameplate Tag	Stainless Steel (see detail)
10	Split Washer	1Cr13
11	Snap Ring	304 SS

Lower Stem Detail



S Series Butterfly Valves (14"-24")

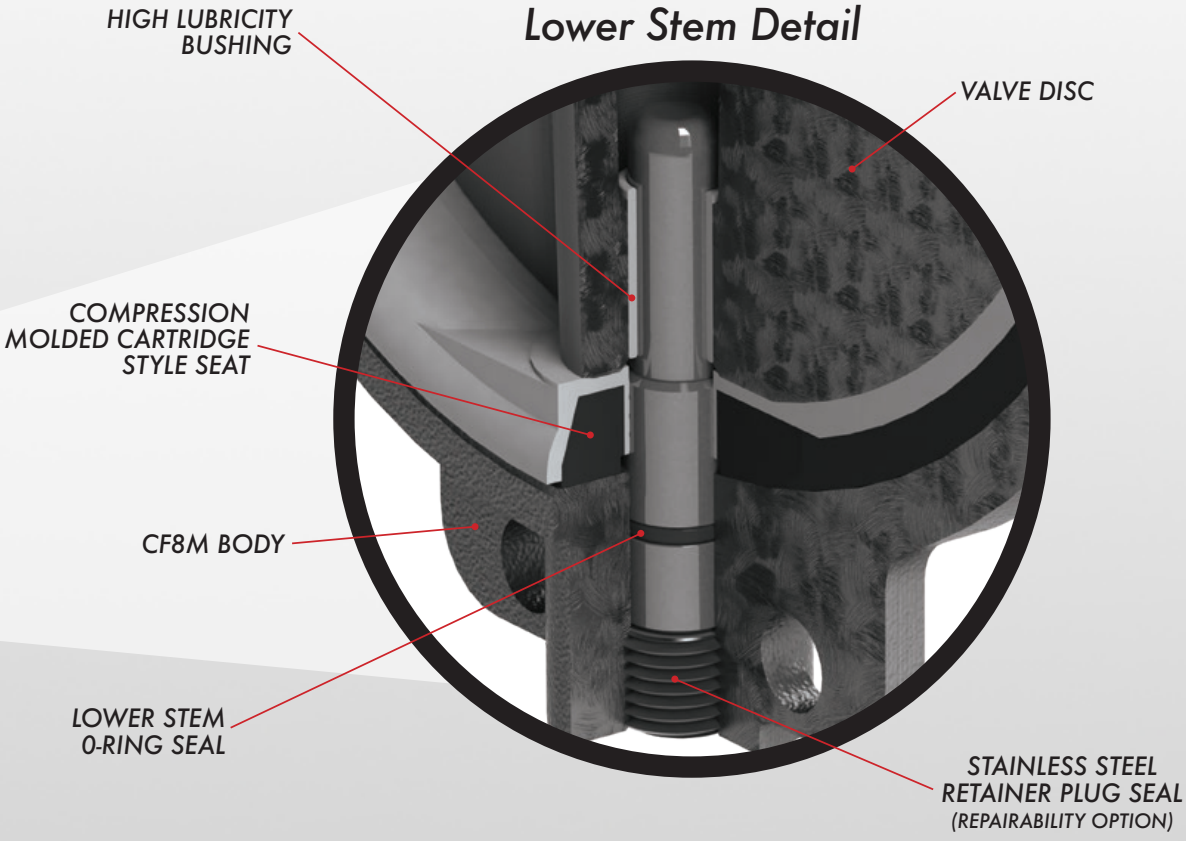
Exploded View



Bill of Materials

Item	Description	Materials
1	Body	ASTM A351 grade CF8M
2	Seat	See Pg 24 or 25
3	Upper Stem	ASTM A276 431, 316SS Option
4	Disc	See Pg 26 or 27
5	Lower Stem	ASTM A276 431, 316SS Option
6	Lower Stem Retainer	304 SS
7	Stem Bushing	PTFE lined fiberglass
8	O-ring	Fluoroelastomer
9	Split Washer	1Cr13
10	Snap Ring	304 SS
11	Nameplate Tag	Stainless Steel (see detail)

Lower Stem Detail



Seating Torques *(in-lbs)*

Size (in)	STANDARD SEAT				UNDERCUT DISC	PTFE SEAT		
	Pressure Differential *(ΔP in PSI)*							
	50 ΔP	100 ΔP	150 ΔP	200 ΔP	50 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	200	392	409	425
5	428	479	540	631	330	771	793	814
6	636	720	799	909	440	1074	1113	1151
8	1239	1273	1411	1505	820	2106	2177	2257
10	2567	2710	2832	3105	1150	3151	3301	3452
12	3153	3307	3671	4305	2400	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	—				

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 on next page.

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.

Pressure Rating

	S SERIES		
Nominal Size	2"–12"	14"–24"	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
Dead-End Bi-Directional	100 PSI	N/A	100 PSI

**PTFE seats are rated to 150 PSI*

Cv Values

Valve Sizing Coefficients *(US-GPM/ΔP)*

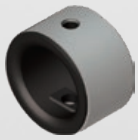
Size (in)	Disc Position								
	90°	80°	70°	60°	50°	40°	30°	20°	10°
2	132	120	86	58	42	22	11	2	0.1
2½	256	202	142	98	65	37	20	4	0.2
3	505	392	198	125	86	38	21	8	0.3
4	936	702	401	232	140	77	35	14	0.4
5	1109	922	625	392	232	132	62	29	0.9
6	2531	2009	1105	611	372	203	96	42	2.1
8	4812	3555	1901	1211	726	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.

Weights

Size		Wafer Weight		Lug Weight		Individual Handle		Individual Gear Operator	
in	*mm*	lbs	kg	lbs	kg	lbs	kg	lbs	kg
2	DN50	6.0	2.7	10.4	4.7	2.4	1.0	2.8	1.3
2½	DN65	7.5	3.4	11.2	5.1	2.4	1.0	2.8	1.3
3	DN75	8.4	3.8	19.0	8.6	2.4	.9	2.8	1.3
4	DN100	11.5	5.2	21.6	9.8	2.6	.9	2.8	1.3
5	DN125	16.1	7.3	28.4	12.9	2.9	.9	5.6	2.5
6	DN150	18.3	8.3	31.3	14.2	2.9	.9	5.6	2.5
8	DN200	30.4	13.8	45.6	20.7	5.7	2.5	11.5	5.2
10	DN250	44.1	20.0	69.4	31.5	5.7	2.5	11.5	5.2
12	DN300	75.4	34.2	115.3	52.3	5.7	2.5	22.2	10.1
14	DN350	99.0	44.9	170.4	77.3	—	—	22.2	10.1
16	DN400	121.3	55.0	213.2	96.7	—	—	40.8	18.5
18	DN450	202.8	92.0	262.8	119.2	—	—	40.8	18.5
20	DN500	—	—	—	—	—	—	78.1	35.4
24	DN600	—	—	—	—	—	—	101	45.8

D & S Series Butterfly Valves
Seat Material Guide

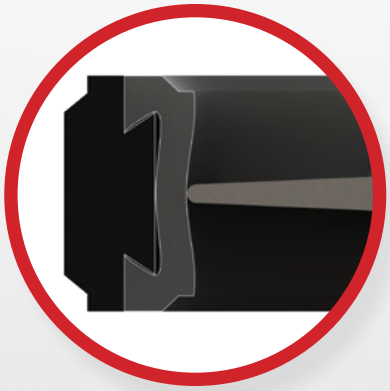
	Seat Material (Backing Material)	Code	NSF	General Application	Temperature Range at Full Rated Pressure	*NOT* Recommended For
	***EPDM (Phenolic)***	***EPDM***	NSF 61	H20, Air, Brine, Abrasives, Phosphates, Esters Ketones, Alkali, Food Compounds, Liquids and Solids, Diluite Inorganic Acids, Caustic Soda	-40°F to 275°F (-40°C to 135°C)	Hydrocarbons, Oils, Fats, Dry Air
	***White EPDM Food Grade (Phenolic)***	***WEF***	NSF 61		-40°F to 212°F (-40°C to 100°C)	
	***Black EPDM Food Grade (Phenolic)***	***BEF***	NSF 61		-40°F to 230°F (-40°C to 110°C)	
	***High Temp EPDM (Phenolic)***	***HT-EPDM***	NSF 61	Standard EPDM + Low Pressure Saturated Steam	-4°F to 302°F (-20°C to 150°C)	
	***Wear Resistant EPDM (Phenolic)***	***WR-EPDM***	NSF 61	Standard EPDM + Abrasive Products	14°F to 250°F (-40°C to 121°C)	
	***BUNA-N (NBR) (Phenolic)***	***BUNA***	NSF 61	Hydrocarbons with less than 40% of aromatics, Natural Gas, Air, H20, Sea Water, Brine, Alcohols, Glycols	10°F to 180°F (-12°C to 82°C)	Solvents, Benzene, Xylene
	***White BUNA Food Grade (Phenolic)***	***WBF***	NSF 61		-30°F to 230°F (-30°C to 110°C)	
	***High Temp BUNA (Hydrogenated NBR) (Phenolic)***	***HT-BUNA***	NSF 61	Standard BUNA + Low Pressure Saturated Steam	-30°F to 330°F (-34°C to 165°C)	
	***VITON (FKM) (Aluminum)***	***VITON***	NSF 372	Hydrocarbons wth high concentration of aromatics, Mineral and Halogenated Acids, Phorforic Acid, Alphatic and Aromatic Ethers	0°F to 300°F (-18°C to 149°C)	Steam, Ketones, Amines, Esters, Alkali
	***PTFE over EPDM (Phenolic)***	***PTFE/E***	NSF 61	Corrosive Products - Solvents	-4°F to 275°F (-20°C to 135°C)	Abrasive products, Fluorine Gases, Alkaline Metals
	***PTFE over VITON (Aluminum)***	***PTFE/V***	NSF 61		-4°F to 300°F (-20°C to 149°C)	

**Material guidelines for reference only. Actual suitability can depend on a combination of temperature, pressure, chemical concentration and other variables.*

Seat Material (Backing Material)	Code	NSF	General Application	Temperature Range at Full Rated Pressure	*NOT* Recommended For
Natural Rubber (Phenolic)	***NR***	NSF 61	Abrasive Products	-55°F to 210°F (-48°C to 99°C)	Strong Acids and Bases, Hydrocarbons, Elevate Temperature Applications
Silicone (Phenolic)	***SIL***	NSF 61	Beverages, Food	-40°F to 400°F (-40°C to 204°C)	Hydrocarbons, Solvents, Steam
Chlorosulfonated Synthetic Rubber (Phenolic)	***CSM***	NSF 61	Oxidizing Acids, Chromic Acid, Hydrofluoric Acid, Sulphur Based Acids, Sodium Hypoclonte, ozone	0°F to 275°F (-18°C to 135°C)	Steam, Ketones, Hot Air, Nitric Acid
Neoprene (Phenolic)	***NP***	NSF 61	Oils, Dilute Mineral Acids, Alkali, Fats	20°F to 200°F (-7°C to 93°C)	Ketones, Concentrated Acids, Solvents for Paint

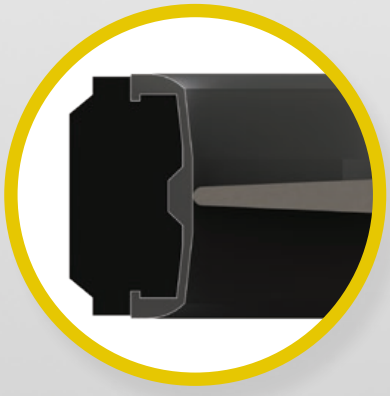
Superior Cartridge Seat Design
Why a Cartridge Seat Is the Preferred Choice:

Booted



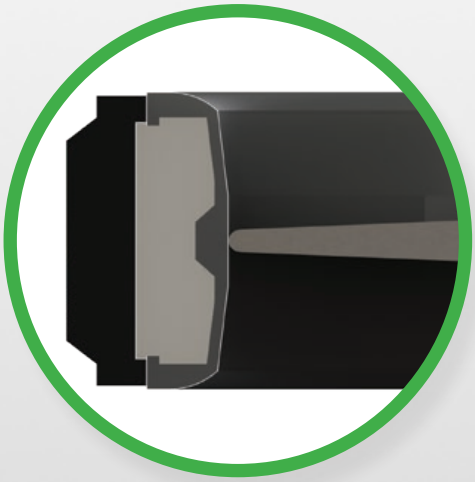
Booted seat bulging around disc contact points

Molded



Molded seat permanently bonded to valve body

Cartridge



Cartridge seat with rigid phenolic backing ring

Feature	Cartridge Seat	Molded Seat	Booted Seat
Replaceable	YES	NO	YES
Ideal for Vacuum Service	YES	YES	NO
Dead End Service Capable	YES	YES	NO
Deformation Resistant	YES	YES	NO
Flange Type Independent	YES	YES	NO

D & S Series Butterfly Valves
Disc Material Guide

NSF372 ONLY

DI-NP
Nickel Plated Ductile Iron

Ductile iron disc for strength, coated with Nickel Plating for corrosion resistance and increased abrasion resistance.

Recommend Applications:
Air, Kerosene, Oils, Ketones, Hydrocarbons, Solvents, Detergents, Salts, Concentrated Organic Acids

Not Recommended For:
Inorganic Acids, Diluted Organic Acids

NSF61

CF8M
316 Stainless Steel

Stainless steel disc is inherently strong for industrial use and corrosion resistant for a wide range of chemical and environmental applications.

Recommended Applications:
Acetic Acids, Air, Automotive Oils & Fuels, Beer, Freon, Gasoline, Ketones, Oils, Oxygen, Steam, Sea Water, Potable Water

Not Recommended For:
Acids

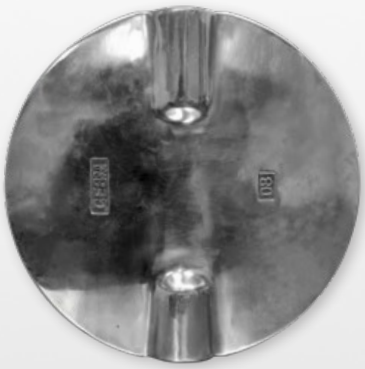
NSF61

AL-BZ
Aluminum Bronze

Strength similar to carbon steel, but with an aluminum oxide layer on the surface for excellent corrosion resistance.

Recommended Applications:
Sea Water, Brine, Detergents, Gasoline, Alcohols, Esters, Ketones, Potable Water

Not Recommended For:
Acids



NSF61

Polished
Polished 316 Stainless Steel

All the benefits of stainless steel strength and corrosion resistance, plus a highly polished surface for sanitary applications.

Recommended Applications:
Sanitary Applications, Potable Water

Not Recommended For:
Acids

NSF61

NY11
Nylon 11 Coated Ductile Iron

Ductile iron disc for strength, coated with Nylon 11 for corrosion resistance and excellent abrasion resistance.

Recommended Applications:
Inorganic Salts, Alkalis, Most Solvents, Most Organic Acids, Hydrocarbons, Oils, Kerosene, Ketones, Esters, Detergents, Sea Water, Abrasives

Not Recommended For:
Inorganic Acids, Phenols, Chlorinated Solvents

NSF61

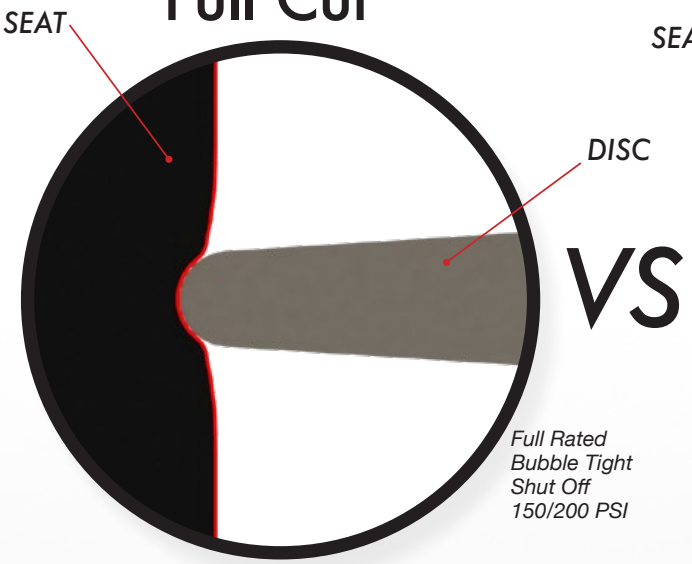
PTFE
PTFE Coated 316 Stainless Steel

Recommended Applications:
Acids, Alcohols, Solvents, Oils, Potable Water

Not Recommended For:
Fluorine

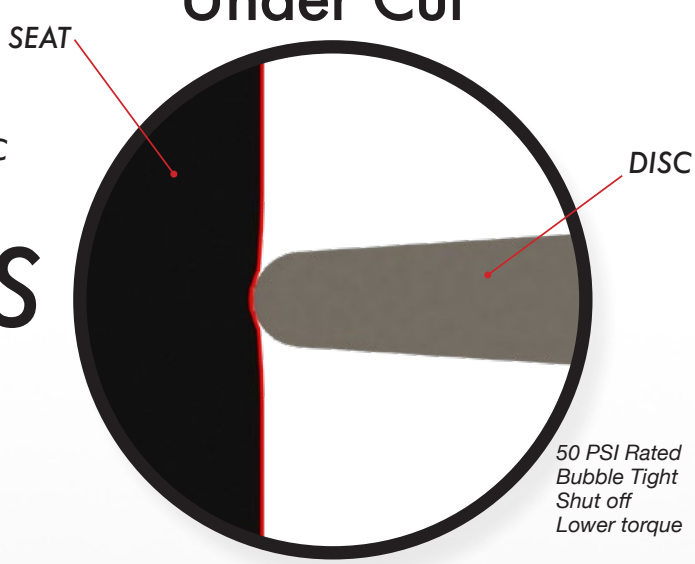
**Material guidelines for reference only. Actual suitability can depend on a combination of temperature, pressure, chemical concentration and other variables.*

Full Cut



Why Full Cut?
Full cut discs provide bubble tight shut off at 150/200 PSI for a wide variety of applications, such as liquid or gas media.

Under Cut



Why Under Cut?
Under cut discs require less torque to operate but are only rated to 50 PSI bubble tight shutoff. common applications are solids dispensing or conveying, or any low pressure process.

Valve & Disc Treatment Options

Passivation

Why passivation treatment?
Passivation is a process by which the inherent corrosion resistance of stainless steel is maximized through a two step process of cleaning and subsequent immersion in an acid bath thereby creating a uniform oxidation layer that optimizes the corrosion resistance.

What's treated?
Disc only

Silicone Free

Why silicone free treatment?
Silicone Free cleaning is conducted on valves in order to prevent silicone contamination within processes (such as automotive painting) that are sensitive to silicone. The valves are subsequently sealed within polyethylene bags to prevent recontamination prior to installation.

What's treated?
Total Valve

Oxygen Clean

Why oxygen clean treatment?
Oxygen cleaning is conducted on valves to prevent the potentially violent oxidation (fire or explosion) of contaminants (most often hydrocarbons) on the surfaces exposed to oxygen within a process. The valves are subsequently sealed within polyethylene bags to prevent recontamination prior to installation.

What's treated?
Total Valve

Slim Disc Design

What is the advantage of the Slim Disc design?
MA Stewart and Sons' slim disc design minimizes the disc profile to maximize flow. This is especially important for smaller butterfly valves where the disc takes up proportunionally more of the flow path. Slim disc design is standard up to 12" sizes.

Standard Disc Design 14" and up

Slim Disc High Cv Design Up to 12"

D & S Series Butterfly Valves
Chemical Compatibility Chart

Legend	
Excellent	●
Good	●
Unsatisfactory	●
Not Tested (blank)	

Material	Acetic Acid – Pure	Acetone	Air (Dry)	Alcohol – Butyl	Alcohol – Ethyl	Alcohol – Methyl	Amines	ASTM Oil #1	ASTM Oil #3	Asphalt	Beer (Beverage)	Benzene (Benzol) 70°F	Bleaching Powder – Wet	Brine – Chlorinated	Butane – Butylene	Butyl Alcohol	Calcium Carbonate 60°F	Calcium Hydroxide 50% 175°F	Carbon Dioxide	Castor Oil	Chlorine Gas – Dry 70°F	Chlorine, Liquid	Chlorobenzene 90% 70°F	Citric Acid 5% 150°F	Coal Slurry	Coconut Oil (Food)	Coffee (Food)	Cottonseed Oil	Detergents	Diesel Fuels	Epsom Salt	Ethane	Ethylene Glycol (Anti-Freeze)	Ethylene Oxide	Formaldehyde 70°F	Fuel Oil	Gelatin (Food)
316 SS	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●		●	●	●	●	●		●	●	●	●	●			●	●	●	●	●	●
416 SS	●	●	●	●			●	●	●	●	●	●	●		●			●	●	●	●	●		●	●	●		●			●	●	●	●	●	●
EPDM	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
ALUMINUM BRONZE	●	●	●	●	●	●		●	●	●	●	●	●		●			●	●	●	●	●		●	●	●		●			●		●	●	●	●
NICKEL PLATED D.I.	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●		●	●	●		●			●	●	●	●	●	●
BUNA-N	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
VITON	●	●		●	●	●					●	●			●	●	●	●	●	●	●	●		●	●	●		●			●	●	●	●		●
TEFLON	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Legend	
Excellent	●
Good	●
Unsatisfactory	●
Not Tested (blank)	

Material	Glycols 70°F	Green Sulfate Liquor	Hydrochloric Acid 35% 60°F	Hydrogen Peroxide 90%	Isobutyl Alcohol	Isopropyl Alcohol	Jet Fuel JP-6	Lubricating Oil	Methyl Ethyl Ketone	Milk (Food)	Monochlorobenzene	Natural Gas	Olive Oil	Oxygen	Perchlorethylene	Phosphoric Acid 10% 70°F	Phosphoric Acid 25% 70°F	Potassium Carbonate	Potassium Chloride	Propane	Propyl Alcohol	Propylene Glycol 70°F	Sea Water 70°F	Sewage	Silicone Greases	Silicone Oils	Soap Solution (Stearate) 70°F	Sodium Bicarbonate	Sodium Bisulfate	Sodium Chlorate	Sodium Hydroxide 50%	Sodium Hypochlorite 5% 60°F	Steam 225°F	Steam 300°F	Sulphur Dioxide 60°F	Sulphur Trioxide	Sulfuric Acid 0-7% 70°F
316 SS		●	●	●		●		●	●	●		●		●	●	●	●	●	●	●		●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
416 SS		●	●	●		●		●	●	●		●		●	●	●	●			●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
EPDM		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
ALUMINUM BRONZE		●	●	●		●		●	●	●		●		●		●	●	●	●			●		●	●	●	●	●	●	●	●	●	●	●		●	●
NICKEL PLATED D.I.		●	●	●		●		●	●	●		●		●	●	●	●		●			●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
BUNA-N	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
VITON	●		●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TEFLON	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Legend	
Excellent	●
Good	●
Unsatisfactory	●
Not Tested (blank)	

Material	Sulfuric Acid 7-40% 70°F	Sulfuric Acid 40-75% 70°F	Sulfuric Acid 75-95%	Sulfuric Acid 95-100%	Sulphurous Acid 80% 100°F	Tall Oil	Tannic Acid 150°F	Tar	Tartaric Acid 150°F	Tetraethyl Lead	Tetrahydrofuran	Toluol and Toluolene	Transformer Oil	Tributyl Phosphate	Trichloroacetic Acid	Trichloroethylene	Triethanolamine	Triethylamine	Trisodium Phosphate	Tung Oil	Turpentine	UREA	Varnish	Vinegar 70°F	Water, Acid – Mine	Water – Demineralized	Water – Fresh 180°F	Water – Fresh 225°F	Water – Salt 180°F	Water – Sewage 80°F	Whiskey and wines	White Liquor	Xylene, Xylol	Zinc Acetate	Zinc Chloride 5% 160°F	Zinc Sulphate 25% 180°F
316 SS	●	●	●	●	●	●	●	●		●	●	●	●		●				●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●
416 SS	●	●	●	●	●	●	●	●			●	●	●	●	●	●		●	●	●	●				●	●	●	●	●	●		●		●	●	●
EPDM	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●		●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
ALUMINUM BRONZE	●	●	●	●	●		●	●			●		●	●					●	●					●	●	●	●	●	●		●		●		●
NICKEL PLATED D.I.	●	●	●	●	●	●	●	●			●	●	●	●	●	●		●	●	●	●		●	●	●	●	●	●	●	●		●		●	●	●
BUNA-N	●	●	●	●	●	●		●	●	●	●	●	●		●		●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
VITON	●	●	●	●	●		●	●	●	●		●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●		●	●	●
TEFLON	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

M.A. Stewart & Sons has provided the above chemical compatibility information as a convenience to our customer partners. This information is compiled from a number of reputable sources and is ONLY intended to provide very general material selection guidance. M.A. Stewart & Sons will assume no liability from its use as there are a multitude of variations in application details. Factors such as pressure, temperature, chemical concentrations and the like play very critical factors in material compatibility. All of them cannot be considered here. In critical applications, materials experts should be consulted or testing should be conducted in order to determine proper materials selection, particularly where dangerous and/or toxic materials are a factor. M.A. Stewart & Sons does not provide any express or implied warranty regarding this information.

Crossover Guide

Body	Ductile Iron						Valve Type
Disc	Ductile Iron-Nickel Plated		Aluminum-Bronze		316 Stainless Steel		
Seat	EPDM	BUNA	EPDM	BUNA	EPDM	BUNA	
M.A. Stewart & Sons Ltd. VALVES AND FITTINGS	W-D-4-DI-E	W-D-4-DI-B	W-D-4-A-E	W-D-4-A-B	W-D-4-S-E	W-D-4-S-B	*Wafer*
	L-D-4-DI-E	L-D-4-DI-B	L-D-4-A-E	L-D-4-A-B	L-D-4-S-E	L-D-4-S-B	*Lug*
Bray	30-11010-119	30-11010-713	30-11010-120	30-11010-684	30-11010-124	30-11010-125	*Wafer*
	31-11010-119	31-11010-713	31-11010-120	31-11010-684	31-11010-124	31-11010-125	*Lug*
Centerline	A2-021-05	A2-021-01	A2-061-05	A2-061-01	A2-044-05	A2-044-01	*Wafer*
	B2-021-05	B2-021-01	B2-061-05	B2-061-01	B2-044-05	B2-044-01	*Lug*
Demco	NE-C111535_	NE-C111531_	NE-C111435_	NE-C111431_	NE-C112235_	NE-C112231_	*Wafer*
	NE-C511535_	NE-C511531_	NE-C511435_	NE-C511431_	NE-C512235_	NE-C512231_	*Lug*
Grinnell	WD-820_-3	WD-810_-3	WD-828_-3	WD-818_-3	WD-827_-4	WD-817_-4	*Wafer*
	LD-820_-3	LD-810_-3	LD-828_-3	LD-818_-3	LD-827_-4	LD-817_-4	*Lug*
Keystone	AR1-323	AR1-285	AR1-061	AR1-064	AR1-805	AR1-723	*Wafer*
	AR2-323	AR2-285	AR2-061	AR2-064	AR2-805	AR2-723	*Lug*
Kitz	5112E	5112B	5122E	5122B	5141E	5141B	*Wafer*
	6112E	6112B	6122E	6122B	6141E	6141B	*Lug*
Mueller Steam	SERIES 51	SERIES 51	87-INB6	87-INB3	87-INH6	87-INH3	*Wafer*
	SERIES 52	SERIES 52	88-INB6	88-INB3	88-INH6	88-INH3	*Lug*
NIBCO	WD-2010	WD-2110	WD-2000	WD-2100	WD-3022	WD-3122	*Wafer*
	LD-2010	LD-2110	LD-2000	LD-2100	LD-3022	LD-3122	*Lug*

Handles & Throttle Plates

M.A. Stewart & Sons butterfly valves can be readily equipped with lever handles for easy manual operation, which come standard with a 10 position notch plate for quick open/close and throttling. Ductile iron valves are available with malleable iron handles and standard plated carbon steel notch plate. Stainless steel valves are available with 304 SS handles and matching 304 SS notch plates. Lever handles and notch plates are available up through 12" sizes. See pages 9 & 19 for more handle details.

Infinite Locking Plates & Arms

For more adjustable throttling and lockout capability on lever handle operated valves, M.A. Stewart & Sons "ILP" series infinite locking plates are designed to directly replace the standard notch plates. ILP kits come with a 304 SS base plate and arm to allow throttling positions at any angle and lockout at full open or closed. M.A. Stewart & Sons infinite locking plates can be used on either ductile iron or stainless steel butterfly valves up through 12" sizes. See pages 8 & 18 for more details.

Manual Gear Operators

All butterfly valve sizes can be outfitted with a manual gear operator for low-torque operation. M.A. Stewart & Sons' GO Series gear operators are made to direct mount to keep a low profile and simplify installation. Epoxy coated ductile iron housings and malleable iron hand wheels make these gear operators very robust for industrial applications. Chain wheels can be furnished upon request. See pages 9 & 19 for more details.

*Watertight/Submersible gear operators available call for details

Declutch-able Gear Operators

For automated butterfly valves, declutch-able sandwich style gear operators allow for hand wheel operated manual override for maintenance or emergency situations. PV01 series declutch-able gear operators direct mount to ISO 5211 standard actuators and to all M.A. Stewart & Sons butterfly valves. Contact factory for more details.

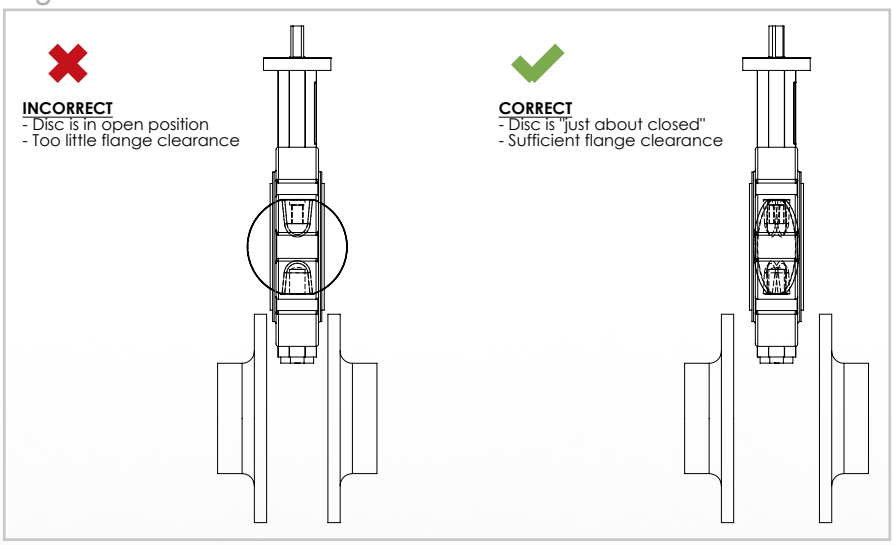
Gear Operator Padlocked Closed

Lockout Devices

All M.A. Stewart & Sons butterfly valves can be equipped with lockout devices, either handle operated or gear operated. Lockout kits come in plated carbon steel or 304 SS. Contact factory for more details.

Installation Guidelines
Please Contact Factory for Full Installation and Operation Manual

Figure 1



Bolting Requirements:

The required bolting information is listed on page 61 (see Table 1), and is designed to provide information regarding size, type, and quantity of bolting recommended for installation of the MA Stewart & Sons Series resilient seated butterfly valves. All recommendations are in accordance with ASME 125/150 specifications. Please note flange bolting is not included with shipment of any valve.

NOTE: For schedule 10 and/or thin wall pipe, extra care must be taken to align seat on flange face to avoid valve damage.

Pre-installation Checklist:

1. Remove any protective flange covers from the valve
2. Inspect the valve to ensure the flow path is free from dirt and debris
3. Be careful that the mating pipeline is also free from dirt and debris, such as rust, pipe scale, welding slag and debris, which can easily damage the seat and disc surfaces
4. Any operators, either manual or automated, should be installed PRIOR to installation, to ensure proper alignment of all connecting hardware, and also proper alignment of the disc and valve seat
5. Double check the valve identification tag to ensure that the valve materials meet the intended operating conditions. It is always critically important to double check all factors during the installation process

Valve Alignment and Flanging:

Do not install flange gaskets – the butterfly valve seat is designed to mate directly to the flange and provides the seal. Leave the disc in the "just about closed" position and center the disc with the pipeline (See Figure 3 on the right). The next step is to insert all necessary bolts to attach the valve to the flanges, which varies depending on wafer or lug style.

For wafer style valves, loosely install the four bolts that pass through the upper and lower body alignment holes as shown in Figure 4 on the right. Next, insert the remaining flange bolts until all bolts are in position, then hand tighten all bolts. For lug valves, loosely install all bolts between the flanges and the lugs and hand tighten when complete if using style C as shown in Figure 4. If using lug style B, first insert threaded studs, then hand tighten the nuts on each side.

Before tightening the bolts, the valve needs to be positioned so that disc movement is free and unobstructed. Carefully open the disc to the fully open position and verify that there is no interference between the disc and the flanges. In addition, ensure that the flanges are properly aligned during tightening to minimize uneven stress or damage on the valve body or seat (See Figure 5 on the right). It is recommended to follow the Bolt Tightening Procedure on the next page.

WARNING: PERSONAL INJURY OR PROPERTY DAMAGE MAY RESULT IF THE VALVE IS INSTALLED WHERE SERVICE CONDITIONS EXCEED VALVE RATINGS. PLEASE TAKE SPECIAL CARE TO DOUBLE CHECK ALL FACTORS DURING THE INSTALLATION PROCESS.

Initial Valve Positioning:

Before valve installation, it is important to properly align the mating pipe flanges. To install the valve, create enough space between the two flanges so that the valve body will fit without contact and carefully move the valve into position. Make sure the valve disc is in the "just about closed" position before insertion (See Figure 2 on the right).

Figure 2

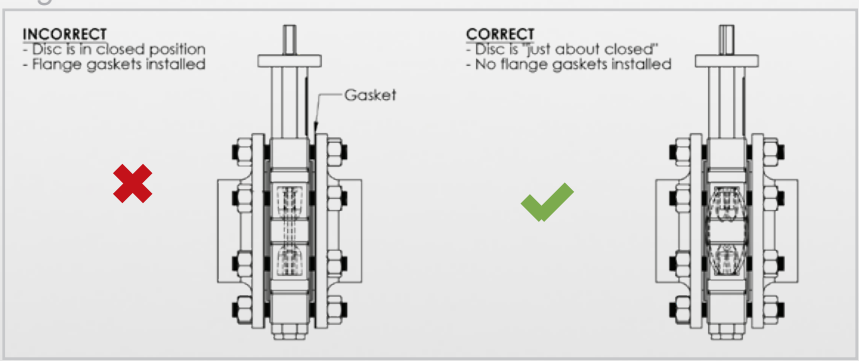


Figure 3

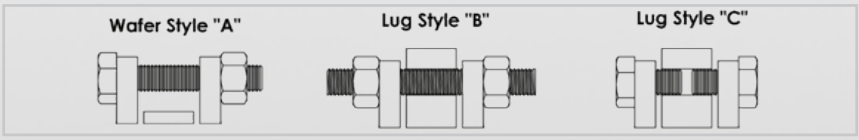
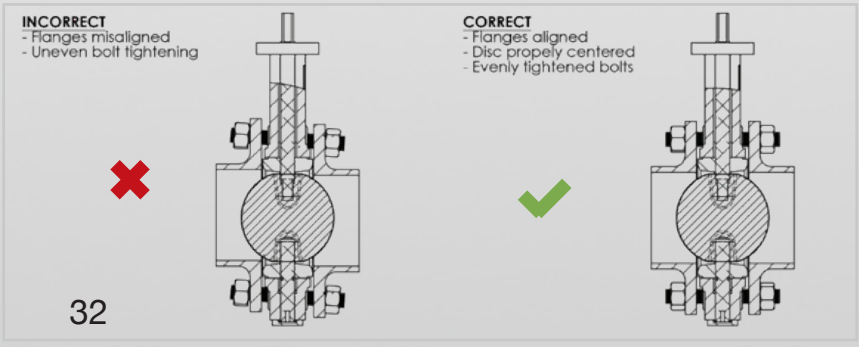


Figure 4

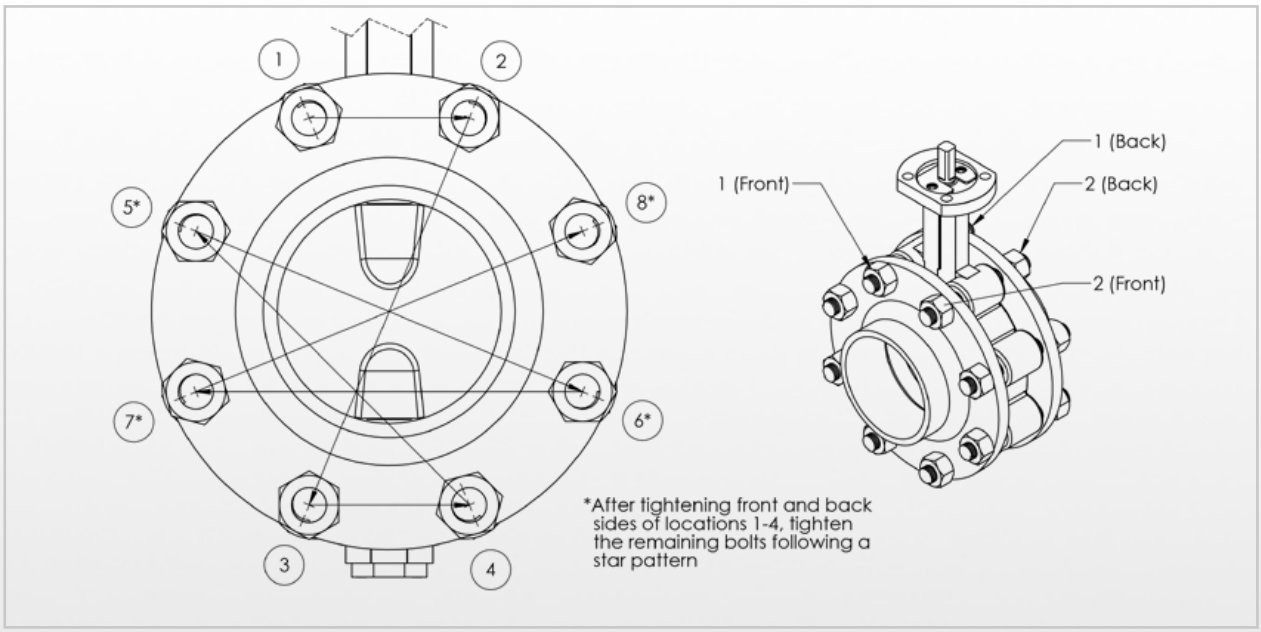


Bolt Tightening Sequence:

For lugged style valves (particularly important for PTFE seated valves), it is essential to tighten the flange bolting uniformly on both sides of the valve to assure that the cartridge seat is not forced out of position. Improper tightening can result in leakage through the stem seals. The proper tightening procedure is as follows (See Figure 6 on the right):

1. If using a long stud and nuts as in style “B”, after positioning the valve between the mating flanges, install the nuts in all positions to hand tight or just until they contact the flange face only. If using bolts as in style “C”, tighten the bolts on both sides of the valve until they are hand tight or just contacting the flange face.
2. The nuts or bolts immediately on either side of the upper stem (position 1 & 2) should be tightened first. Start with position 1 and tighten bolts/nuts in ½ turn increments, alternating between the front and back flanges.
3. Once that position is tight, proceed to tighten the bolt/nut pair opposite from the pair that was just tightened and tighten in the same fashion (position 2).
4. Follow the same sequence as in steps 2 and 3 above on the opposite end of the valve near the lower stem (positions 3 & 4).
5. Tighten the remaining bolts (if any) in a star pattern around the valve and then re-check all bolts/nuts for tightness in a star pattern for all bolts/nuts (position 5, 6, 7, 8, etc). Make sure to alternate sides and tighten in 1/2 turn increments.

Figure 5



Flange Bolting Requirements:

Table 1

Valve Size	Diameter	Machine & Stud #	Cap Screw #	Bolt Length A	Stud Length B	Cap Screw Length C	Thread Size	Recommended Torque in-lbs
1.5”	0.500	4	8	3.25”	3.75”	1.25	1/2”-13 UNC	20-30
2”	0.625	4	8	4.00	5.00	1.25	5/8” - 11 UNC	30
2.5”	0.625	4	8	4.25	5.25	1.50	5/8” - 11 UNC	30
3”	0.625	4	8	4.50	5.25	1.50	5/8” - 11 UNC	35
4”	0.625	8	16	5.00	6.00	1.75	5/8” - 11 UNC	35-40
5”	0.750	8	16	5.50	6.50	1.75	3/4” - 10 UNC	35-45
6”	0.750	8	16	5.50	6.75	2.00	3/4” - 10 UNC	35-50
8”	0.750	8	16	6.00	7.00	2.25	3/4” - 10 UNC	45-55
10”	0.875	12	24	6.75	8.00	2.25	7/8” - 9 UNC	55-75
12”	0.875	12	24	7.00	8.25	2.50	7/8” - 9 UNC	65-110

NOTE: These torque values are a general recommendation ONLY for minimum tightening torques. Many factors affect tightening requirements including bolt grade, pipe alignment, flange material and others. Field engineering personnel must make final torque value decisions. Call factory for flange bolting requirements up to 48” size.

CE Marking

is a mandatory conformity marking for certain products sold within the European Economic Area (EEA) since 1985. The CE marking is also found on products sold outside the EEA that are manufactured in, or designed to be sold in, the EEA. This makes the CE marking recognizable worldwide even to people who are not familiar with the European Economic Area. It is in that sense similar to the FCC Declaration of Conformity used on certain electronic devices sold in the United States.

The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EC directives.

ISO 5211:

This standard defines a standardized interface system between industrial valves and the part turn actuators used operate them. It details the dimensional requirements for both the mounting flanges on both devices as well as the driving and driven components. This standardization simplifies the design of or eliminates the need for interface components between part turn valves and actuators.

NSF/ANSI 372

NSF/ANSI 372

is essentially equivalent to Annex G of NSF/ANSI Standard 61 and assures that the materials used in the water contact components of a water system component do not exceed 0.25% lead content. Some trims excluded. See pg. 4-5

The Canadian Registration Number

is a number issued by each province or territory of Canada to the design of a boiler, pressure vessel or fitting. The CRN identifies the design has been accepted and registered for use in that province or territory.

NSF/ANSI 61

NSF/ANSI Standard 61

NSF/ANSI 61 sets health effects criteria for many water system components including:

- Protective barrier materials (cements, paints, coatings)
- Joining and sealing materials (gaskets, adhesives, lubricants)
- Mechanical devices (water meters, valves, filters)
- Pipes and related products (pipe, hose, fittings)
- Plumbing devices (faucets, drinking fountains)
- Process media (filter media, ion exchange resins)
- Non-metallic potable water materials

As it relates to valves specifically, it assures that the materials in contact with the flow stream do not introduce toxins into the water in amounts that exceed allowable exposure limits. Some trims excluded. See pg. 4-5

API 609

API standard covering the design, materials, face-to-face dimensions, pressure-temperature ratings, and examination, inspection and test requirements for gray iron, ductile iron, bronze, steel, nickel-based alloy, or special alloy butterfly valves.

MSS SP-67

Industry standard covering the dimensions, design, testing, and marking requirements for butterfly valves.

3-Year Limited Warranty

M.A. Stewart & Sons Ltd., hereinafter referred to as “MAS”, provides the following limited 3 year manufacturer’s warranty regarding all quarter turn valve products manufactured by MAS. This warranty includes all valves which are manufactured by MAS and only applies to those items which are clearly identified as M.A. Stewart & Sons brand labeled products. The warranty stated herein is expressly in lieu of all other warranties and representations, expressed or implied, or statutory, including, without limitation, the implied warranty of fitness for a particular purpose.

MAS warrants it products to be free from defects in materials and workmanship when these products are used for the purpose for which they were designed and manufactured. MAS does not warrant its products against chemical or stress corrosion or against any other failure other than from defects in materials or workmanship. The warranty period is for thirty-six months from the delivery date by MAS to its customers. Any claims regarding this warranty must be in writing and received by MAS before the last effective date of the warranty period.

Upon receipt of a warranty claim, MAS reserves the right to inspect the product(s) in question at either the field location or at a MAS designated facility. If, after the inspection of the product(s) in question, MAS determines that the purchaser’s claim is covered by this warranty, MAS’ sole liability and the purchaser’s sole remedy under this warranty is limited to the refunding of the purchase price or repair or replacement thereof, at the sole discretion of MAS.

MAS will not be liable for any repairs, labor, material, or other expenses that are not specifically authorized in writing by MAS, and in no event shall
MAS be liable for any direct or consequential damages arising out of any defect from any cause whatsoever. If any MAS products are modified or altered in any way, without the expressed written consent of MAS, the products will not be covered by this warranty.

MAS shall not be liable for any incidental, consequential or other damages, costs, or economic losses, including, without limitation, any resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material damage from adverse flow conditions, chemicals, or acts of God, or circumstances that are not controllable or reasonably foreseeable by MAS.

This warranty shall be invalidated in all circumstances where MAS, acting reasonably, determines that the product(s) was subject to abuse, misuse, neglect, or improper application, installation, alteration or modification not authorized in writing by MAS. All claims received by MAS beyond the warranty period are invalid and shall not be accepted.

Except for the express written warranty contained herein, MAS does not make any other warranty, condition, guarantee, or indemnity, express or implied, statutory or otherwise, regarding the products including without limitation, to the extent permitted by law, any warranty or merchantability or fitness for a particular purpose. All other warranties, conditions guarantees and indemnities regarding any products are hereby disclaimed, excluded and overwritten.

M. A. Stewart & Sons Ltd.
VALVES AND FITTINGS

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