2-Cx

PTFE LINED BUTTERFLY VALVE

TECHNICAL SALES MANUAL

Cx LINE

Bray®

BRAY.COM

THE HIGH PERFORMANCE COMPANY

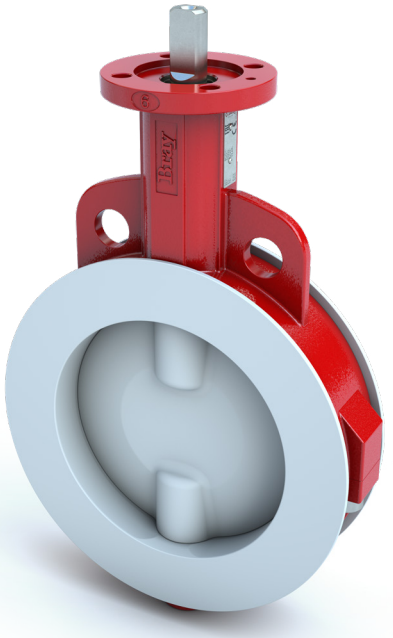
CONTENTS

PTFE LINED BUTTERFLY VALVE

The 2-Cx lined butterfly valve features a state-of-the-art design which provides excellent shutoff protection and high flow rates with an exceptionally long service life. It has been specifically engineered to meet the stringent demands of the Chemical Industry.

MEDIA

- Chlorine
- Chlorine Dioxide
- Hydriodic Acid
- Hydrobromic Acid
- Hydrochloric Acid
- Hydrofluoric Acid
- Hydrofluorsilicic Acid
- Hydrogen Chloride
- Hydrogen Cyanide
- Nitric Acid
- Sodium Chlorate
- Sodium Chlorite
- Sodium Hypochlorite
- Sulfuric Acid



SPECIFICATIONS

Size Range[1]	DN 50 to 600	
	NPS 2 to 24	
Temperature Range	-20°C to 200°C	
	0°F to 392°F	
Maximum Operating Pressure (Bidirectional)	DN 50 to 600:	10 bar
	NPS 2 to 24:	150 psi
Maximum Operating Pressure (Dead End Service[2])	DN 50 to 300:	5 bar
	DN 350 to 600:	3 bar
	NPS 2 to 12:	75 psi
	NPS 14 to 24:	50 psi
Body Style[3]	Series 22-Cx:	Two-piece wafer
	Series 23-Cx:	Two-piece lug
Tightness Test	EN 12266-1 Rate A | API 598	
Velocity Limits (On-Off Service)	Fluids:	9 m/s | 30 ft/s
	Gases:	54 m/s | 180 ft/s

NOTES
1 Other sizes on request.
2 Lug body only.
3 Series 23-Cx DN 600 body style is double flange only.

CERTIFICATIONS & APPROVALS

Certifications	CE: PED 2014/68/EU
	SIL 3 capable
Fugitive Emissions	ISO 15848-1
	TA-Luft 2021
Approvals	ATEX 2014/34/EU
	CRN

MATERIAL OPTIONS[1]

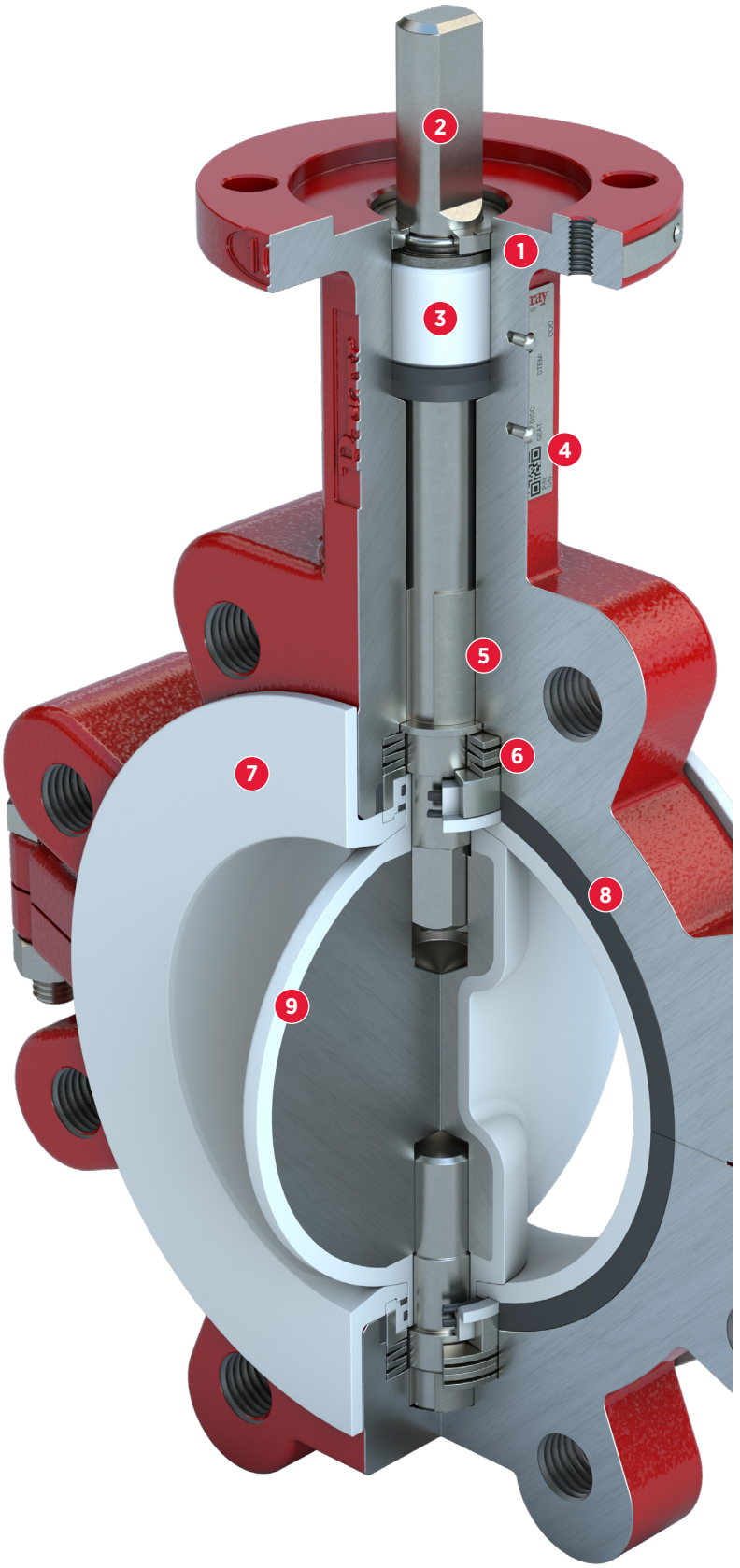
Body	Ductile Iron, Low Temperature (EN 5.3103)
	Ductile Iron (ASTM A395)
Disc	Stainless Steel (PTFE-lined)
	Stainless Steel (MPTFE-lined)
Stem	Stainless Steel
Seat	PTFE
	MPTFE
	Conductive PTFE
Seat Energizer	FKM
Body Fasteners	A4-70
	A193 Gr. B7

NOTES
1 Other materials are available on request.

DESIGN STANDARDS

Valve Design	EN 12569 | EN 593 | NE 167 API 609 | MSS SP-155
Material Standard	EN 16668 | AD2000 W0
Food Contact	EC 1935
Marking	EN 19 | DIN EN IEC 61406 | DIN 91406
Top Flange	ISO 5211
Flange Drilling	EN 1092-1 PN 10 | ASME B16.5 Cl 125/150
Face-to-Face	EN 558 Series 20 | API 609
Testing Standard	EN 12266-1 & 2 | API 598
AutoID/ID Link	DIN 91406/IEC 61406

1. **ANTI-STATIC:** Electrostatic discharge through anti-static design. (Grounding device and top flange drilling only in NE 167 design).
2. **STEM DESIGN:** The high-strength stem design includes blowout-proof functionality for safe operation and exceptional service life.
3. **STEM BUSHING:** Non-corrosive, heavy duty acetal bushing absorbs actuator side thrust.
4. **DIGITAL TAG:** Each valve is uniquely and easily identifiable by simply scanning the QR Code on the product identification tag in accordance to IEC 61406.
5. **BEARINGS:** PTFE impregnated steel bearings precisely align the upper and lower stem.
6. **STEM SEAL SYSTEM:** The live-loaded, self-adjusting packing design features a primary and secondary sealing principle to comply with the most stringent fugitive emission requirements.
7. **SEAT:** The unique virgin-PTFE (minimum 3 mm thick) seat features a geometry that lowers seating and unseating torque while reducing wear on the contacting parts.
8. **SEAT ENERGIZER:** A resilient seat energizer extends completely around the seat, including the disc hub providing uniform force sufficient for zero-leakage.
9. **DISC:** The disc is encapsulated in virgin-PTFE (minimum 3 mm thick) for superior sealing against the most agressive media.



VALVE PART NUMBERING SYSTEM

Select one code from each category to build a complete valve order number.

22C-XXXX-1XXXX-XXX

SERIES
22/23 Cx

Code	Body Style
22C	Wafer
23C	Lug

SIZE
XXXX

Code	DN
M050	50
M080	80
M100	100
M150	150
M200	200
M250	250
M300	300
M350	350
M400	400
M500	500
M600[2]	600

BASE NUMBER
1XXXX

Code	Description
1107V	10 bar rated PN 10 flange drilling NE 167 compliant AD2000 materials

TRIM[1]
XXX

Code	Item	Material
D2C	Body	Ductile Iron - Low Temperature (5.3103)
	Disc	Stainless Steel (EN 1.4408) PTFE lined
	Stem	Stainless Steel (EN 1.4542)
	Seat	PTFE

NOTES
1 Other materials are available on request. Contact Bray for additional information.
2 DN 600 only available as double flange body style.

EXAMPLE

23C-M250-1107V-D2C

> Lug body
> DN 250
> PN 10
> Trim D2C

VALVE PART NUMBERING SYSTEM

Select one code from each category to build a complete valve order number.

22C-XXXX-1XXXX-XXX

SERIES
22/23 Cx

Code	Body Style
22C	Wafer
23C	Lug

SIZE
XXXX

Code	NPS
0200	2
0300	3
0400	4
0600	6
0800	8
1000	10
1200	12
1400	14
1600	16
1800	18
2000	20
2400[2]	24

BASE NUMBER
1XXXX

Code	Description
1101Y	Multi-drilled flanges PN10/ASME 150
1101Z	ASME 125/150 flange drilling

TRIM[1]
XXX

Code[3]	Item	Material
D6H	Body	Ductile Iron (A395)
	Disc	Stainless Steel MPTFE lined
	Stem	17-4 PH Stainless Steel
	Seat	MPTFE
D6J	Body	Ductile Iron (A395)
	Disc	Stainless Steel MPTFE lined
	Stem	17-4 PH Stainless Steel
	Seat	MPTFE
D6K	Body	Ductile Iron (A395)
	Disc	Stainless Steel MPTFE lined
	Stem	17-4 PH Stainless Steel
	Seat	MPTFE

NOTES
1 Other materials are available on request.
Contact Bray for additional information.
2 NPS 24 only available as double flange body style.
3 D6H = NPS 2 to 4; D6J = NPS 6 to 12; D6K = NPS 14 to 24

EXAMPLE

23C-1200-1101Z-D6J

> Lug body
> NPS 12
> ASME 125/150 flange drilling
> Trim D6J

PARTS LIST AND MATERIAL SPECIFICATIONS

ITEM	DESCRIPTION	MATERIAL		
		DN50 to DN100	DN150 to DN300	DN350 to DN600
1	Body	Ductile Iron - Low Temperature (EN 5.3103)	Ductile Iron - Low Temperature (EN 5.3103)	Ductile Iron - Low Temperature (EN 5.3103)
2	Seat	PTFE	PTFE	PTFE
3	Disc	PTFE lined Stainless Steel	PTFE lined Stainless Steel	PTFE lined Stainless Steel
4	Upper stem	Stainless Steel (EN 1.4542)	Stainless Steel (EN 1.4542)	Stainless Steel (EN 1.4542)
5	Lower Stem	Stainless Steel (EN 1.4542)	Stainless Steel (EN 1.4542)	Stainless Steel (EN 1.4542)
6	Disc Spring	Stainless Steel (17-7PH)	Stainless Steel (17-7PH)	Stainless Steel (17-7PH)
7	Thrust Ring	Stainless Steel	Stainless Steel	Stainless Steel
8	PTFE Sleeve	PTFE	PTFE	PTFE
9	O-ring	FKM	FKM	FKM
10	Seat Energizer	FKM	FKM	FKM
11	Upper Bearing	PTFE Lined Stainless Steel	PTFE Lined Stainless Steel	PTFE Lined Stainless Steel
12	Lower Bearing	PTFE Lined Stainless Steel	PTFE Lined Stainless Steel	PTFE Lined Stainless Steel
13	Bottom Plug	—	—	Stainless Steel (EN 1.4401)
14	Bottom Plug O-ring	—	—	FKM
15	Stem Seal	FKM	FKM	FKM
16	Stem Bushing	Acetal	Acetal	Acetal
17	Anti-Static Device	Stainless Steel	Stainless Steel	Stainless Steel
18	Retaining Ring	Stainless Steel	Stainless Steel	Stainless Steel
19	Thrust Washer	Stainless Steel	Stainless Steel	Stainless Steel
20	Retainer Clip	Stainless Steel	Stainless Steel	Stainless Steel
21	Body Bolt/Cap Screw	A4-70	A4-70	A4-70
22	Body Nut	A4-70	A4-70	A4-70
23	Key	—	—	Stainless Steel
24	Identification Tag	Stainless Steel	Stainless Steel	Stainless Steel
25	Certification Tag	Stainless Steel	Stainless Steel	Stainless Steel
26	Torque Tag	Stainless Steel	Stainless Steel	Stainless Steel
27	Drive Screws	Stainless Steel	Stainless Steel	Stainless Steel

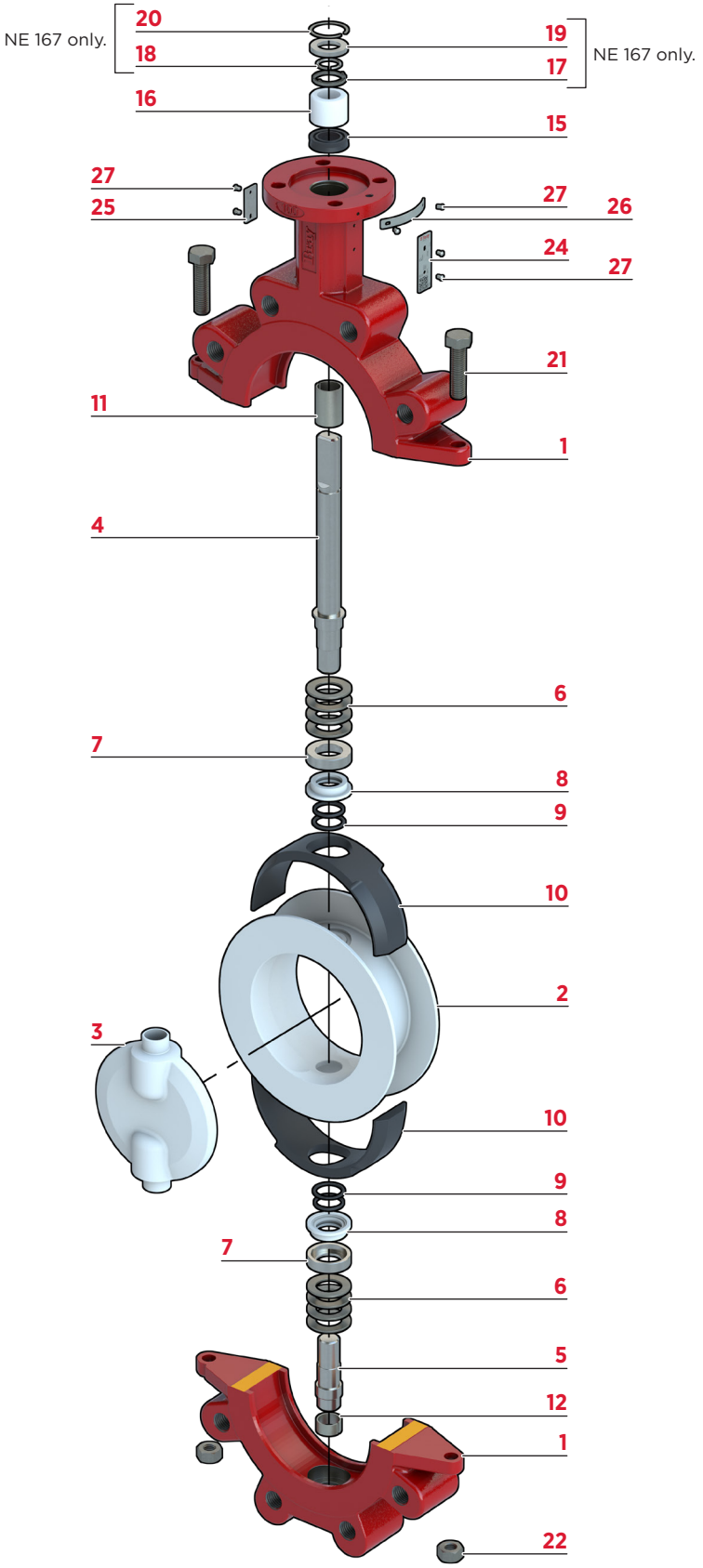
NOTES
1 Material specifications provided for reference only, and are subject to change without notice.
2 Additional materials available upon request.

PARTS LIST AND MATERIAL SPECIFICATIONS

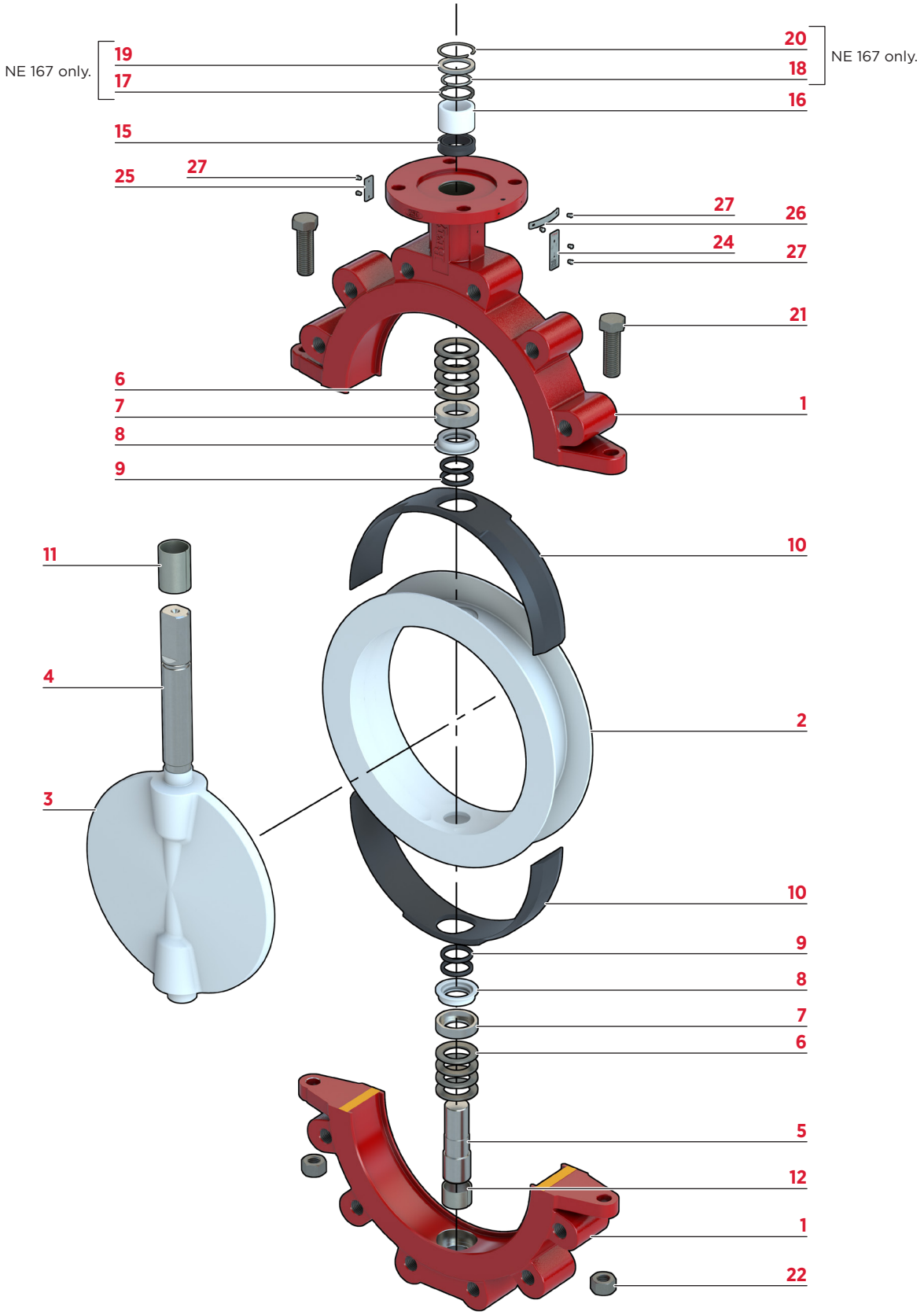
ITEM	DESCRIPTION	MATERIAL		
		NPS 2 to 4	NPS 6 to 12	NPS 14 to 24
1	Body	Ductile Iron (ASTM A395)	Ductile Iron (ASTM A395)	Ductile Iron (ASTM A395)
2	Seat	MPTFE	MPTFE	MPTFE
3	Disc	MPTFE lined Stainless Steel	MPTFE lined Stainless Steel	MPTFE lined Stainless Steel
4	Upper stem	17-4 PH Stainless Steel	17-4 PH Stainless Steel	17-4 PH Stainless Steel
5	Lower Stem	17-4 PH Stainless Steel	17-4 PH Stainless Steel	17-4 PH Stainless Steel
6	Disc Spring	Stainless Steel	Stainless Steel	Stainless Steel
7	Thrust Ring	Stainless Steel	Stainless Steel	Stainless Steel
8	PTFE Sleeve	PTFE	PTFE	PTFE
9	O-ring	FKM	FKM	FKM
10	Seat Energizer	FKM	FKM	FKM
11	Upper Bearing	PTFE Lined Stainless Steel	PTFE Lined Stainless Steel	PTFE Lined Stainless Steel
12	Lower Bearing	PTFE Lined Stainless Steel	PTFE Lined Stainless Steel	PTFE Lined Stainless Steel
13	Bottom Plug	—	—	Stainless Steel
14	Bottom Plug O-ring	—	—	FKM
15	Stem Seal	FKM	FKM	FKM
16	Stem Bushing	Acetal	Acetal	Acetal
21	Body Bolt/Cap Screw	ASTM A193 Gr. B7	ASTM A193 Gr. B7	ASTM A193 Gr. B7
22	Body Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H
23	Key	—	—	Stainless Steel
24	Identification Tag	Stainless Steel	Stainless Steel	Stainless Steel
25	Certification Tag	Stainless Steel	Stainless Steel	Stainless Steel
26	Torque Tag	Stainless Steel	Stainless Steel	Stainless Steel
27	Drive Screws	Stainless Steel	Stainless Steel	Stainless Steel

NOTES
1 Material specifications provided for reference only, and are subject to change without notice.
2 Additional materials available upon request.

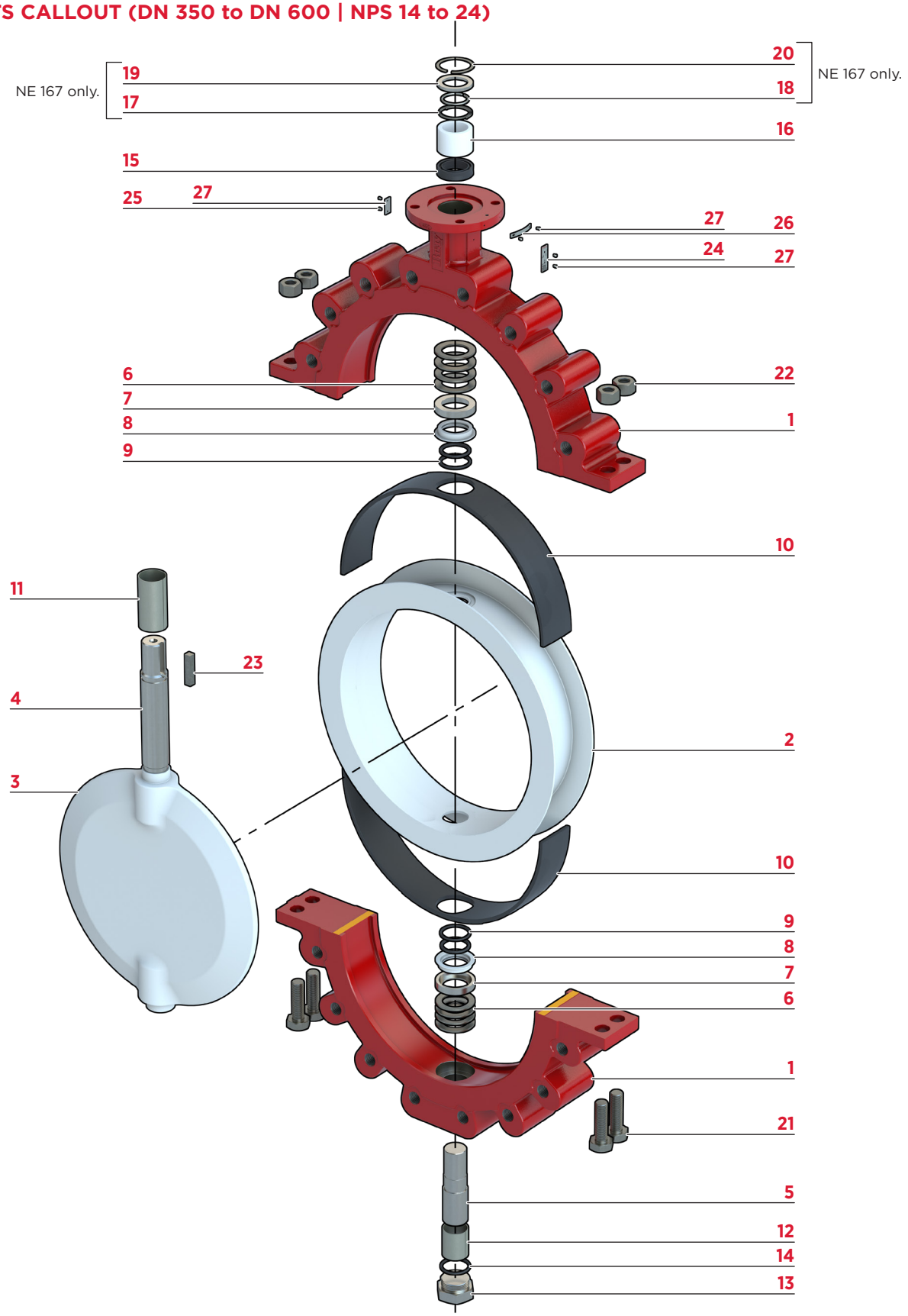
PARTS CALLOUT (DN 50 to DN 100 | NPS 2 to 4)



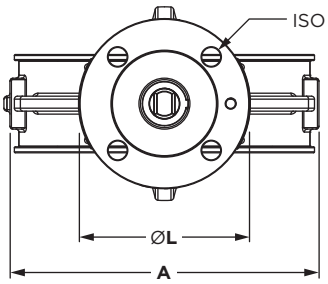
PARTS CALLOUT (DN 150 to DN 300 | NPS 6 to 12)

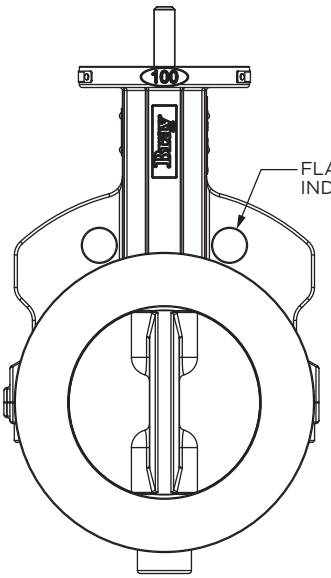


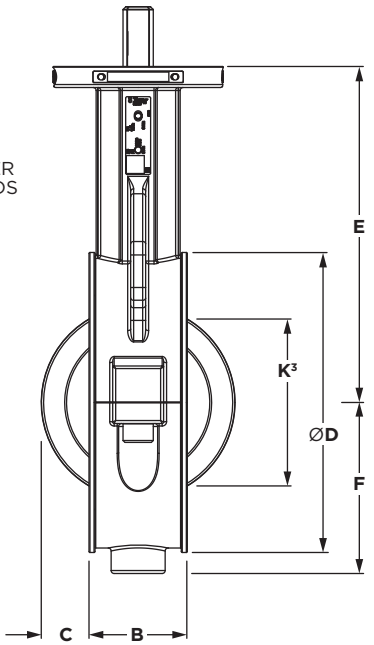
PARTS CALLOUT (DN 350 to DN 600 | NPS 14 to 24)



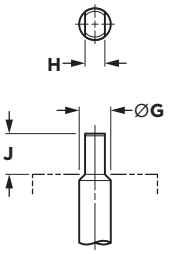
WAFER | PN 10



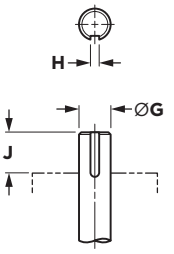




STEM DETAILS



Stem With Flats
≤ DN 300



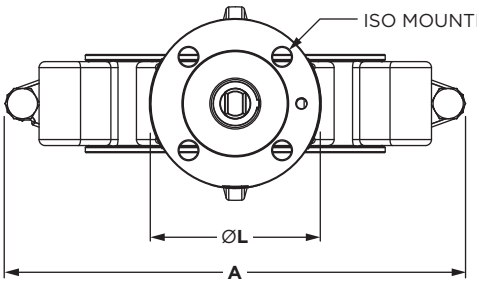
Stem With Keyway
≥ DN 350

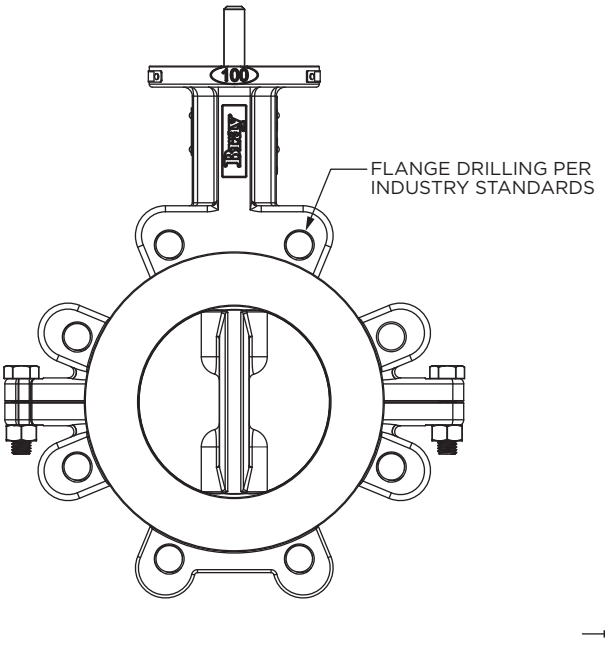
DIMENSIONS (mm)

DN[1]	A	B	C	ØD	E	F	ØG	H	J	K[3]	ØL	Top Plate Drilling				Weight[2] (Kg)
												ISO	Bolt Circle	Hole Qty	Hole Dia.	
50	114	43	6	98	140	56	14	10	32	29	90	F07	70	4	10	2
80	133	46	18	127	159	71	14	10	32	62	90	F07	70	4	10	3
100	163	52	27	159	178	91	16	11	32	88	90	F07	70	4	10	5
150	222	56	47	216	203	121	19	13	32	136	90	F07	70	4	10	8
200	282	60	72	270	241	153	22	16	32	189	150	F12	125	4	15	14
250	341	68	94	324	273	188	30	22	51	240	150	F12	125	4	15	21
300	392	78	114	378	311	214	30	22	51	290	150	F12	125	4	15	30
350	470	78	133	430	346	255	35	10x10	51	327	150	F12	125	4	15	46
400	524	102	147	488	375	305	35	10x10	51	374	150	F12	125	4	15	72
500	642	127	185	590	438	380	50	10x12	64	472	210	F16	165	4	21	141

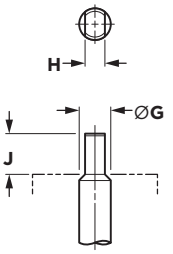
NOTES
1 For sizes not shown, contact Bray for more information.
2 Weights are for ductile iron bodies.
3 K dimension is disc chordal dimension at valve face.

LUG | PN 10

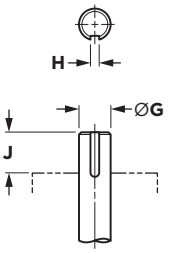




STEM DETAILS



Stem With Flats
≤ DN 300



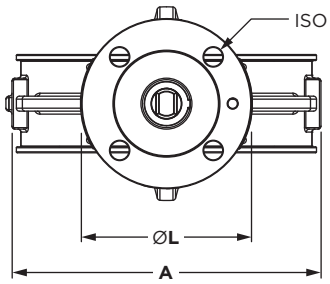
Stem With Keyway
≥ DN 350

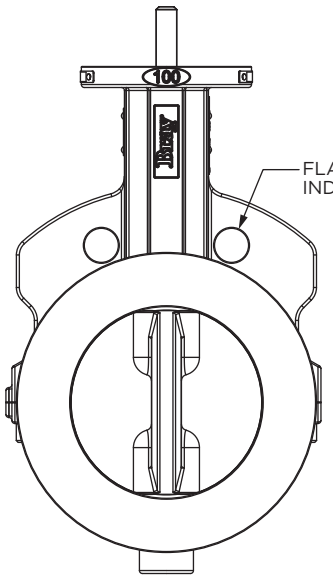
DIMENSIONS (mm)

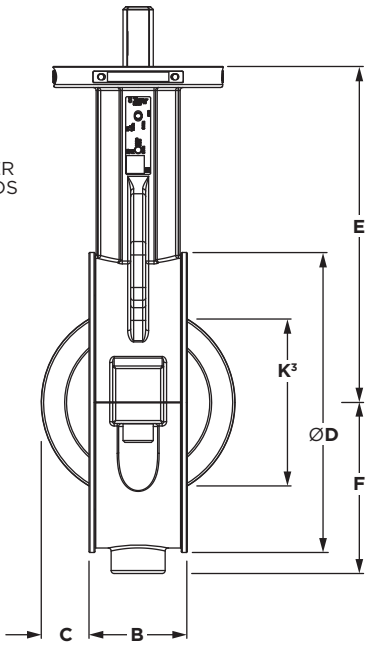
DN[1]	A	B	C	ØD	E	F	ØG	H	J	K[3]	ØL	Top Plate Drilling				Weight[2] (Kg)
												ISO	Bolt Circle	Hole Qty	Hole Dia.	
50	149	43	6	98	140	59	14	10	32	29	90	F07	70	4	10	3
80	213	46	18	127	159	90	14	10	32	62	90	F07	70	4	10	5
100	243	52	27	159	178	104	16	11	32	88	90	F07	70	4	10	8
150	305	56	47	216	203	131	19	13	32	136	90	F07	70	4	10	12
200	359	60	72	270	241	157	22	16	32	189	150	F12	125	4	15	18
250	451	68	94	324	273	195	30	22	51	240	150	F12	125	4	15	29
300	530	78	114	378	311	226	30	22	51	290	150	F12	125	4	15	43
350	610	78	133	430	346	255	35	10x10	51	327	150	F12	125	4	15	59
400	676	102	147	488	375	305	35	10x10	51	374	150	F12	125	4	15	98
500	813	127	185	590	438	380	50	10x12	64	472	210	F16	165	4	21	179
600[4]	940	154	222	838	496	453	64	16x16	102	570	210	F16	165	4	21	311

NOTES
1 For sizes not shown, contact Bray for more information.
2 Weights are for ductile iron bodies.
3 K dimension is disc chordal dimension at valve face.
4 Series 23-Cx DN 600 body style is double flange only.

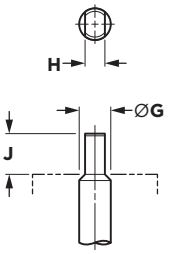
WAFER | ASME 150



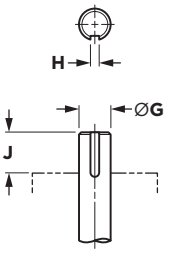




STEM DETAILS



Stem With Flats
≤ NPS 12



Stem With Keyway
≥ NPS 14

DIMENSIONS (inches)

NPS[1]	A	B	C	ØD	E	F	ØG	H	J	K[3]	ØL	Top Plate Drilling				Weight[2] (lbs)
												ISO	Bolt Circle	Hole Qty	Hole Dia.	
2	4.50	1.69	0.18	3.88	5.50	2.30	0.55	0.39	1.25	1.13	3.54	F07	2.76	4	0.39	7
3	5.50	1.81	0.62	5.00	6.25	2.81	0.55	0.39	1.25	2.44	3.54	F07	2.76	4	0.39	9
4	6.56	2.05	1.00	6.25	7.00	4.09	0.63	0.43	1.25	3.48	3.54	F07	2.76	4	0.39	14
6	8.88	2.21	1.80	8.50	8.00	5.06	0.75	0.51	1.25	5.35	3.54	F07	2.76	4	0.39	21
8	11.25	2.36	2.74	10.62	9.50	6.05	0.87	0.63	1.25	7.45	5.91	F12	4.92	4	0.57	39
10	13.56	2.68	3.58	12.75	10.75	7.69	1.18	0.87	2.00	9.45	5.91	F12	4.92	4	0.57	62
12	15.56	3.07	4.38	14.88	12.25	9.02	1.18	0.87	2.00	11.41	5.91	F12	4.92	4	0.57	76
14	18.62	3.07	5.13	17.05	12.62	10.02	1.38	.39x.39	2.00	12.96	5.91	F12	4.92	4	0.57	125
16	20.74	4.02	5.66	19.21	14.75	11.99	1.38	.39x.39	2.00	14.78	5.91	F12	4.92	4	0.57	180
18	23.13	4.49	6.42	21.12	16.00	13.94	1.97	.39x.47	2.50	16.73	8.27	F16	6.50	4	0.81	240
20	25.38	5.00	7.14	23.25	17.25	14.94	1.97	.39x.47	2.50	18.66	8.27	F16	6.50	4	0.81	320

NOTES
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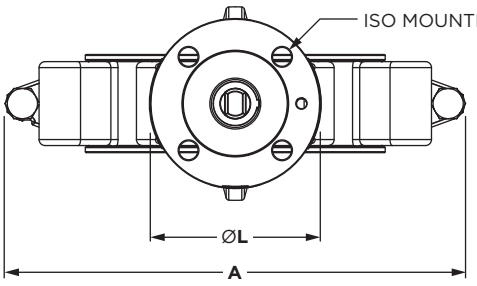
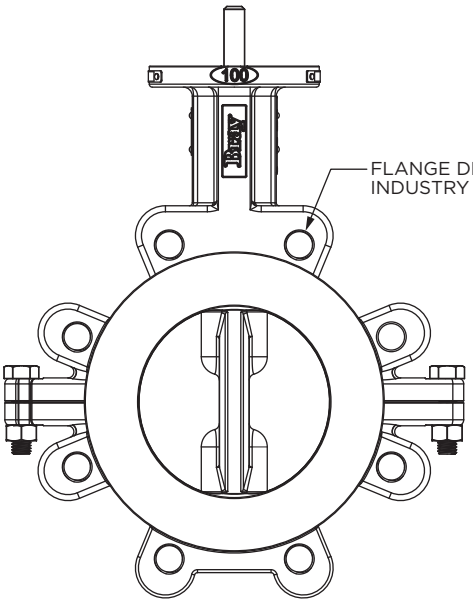
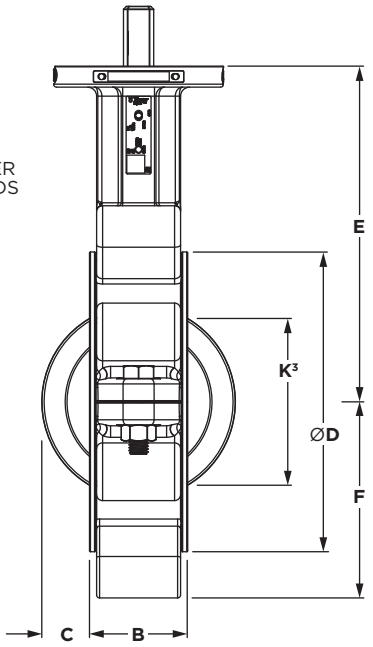
2 Weights are for ductile iron bodies.
3 K dimension is disc chordal dimension at valve face.

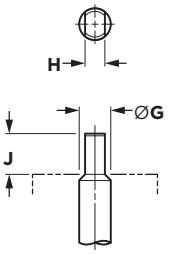
LUG | ASME 150



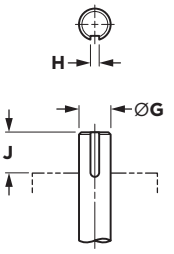




STEM DETAILS



Stem With Flats
≤ NPS 12



Stem With Keyway
≥ NPS 14

DIMENSIONS (inches)

NPS[1]	A	B	C	ØD	E	F	ØG	H	J	K[3]	ØL	Top Plate Drilling				Weight[2] (lbs)
												ISO	Bolt Circle	Hole Qty	Hole Dia.	
2	5.88	1.69	0.18	3.88	5.50	2.30	0.55	0.39	1.25	1.13	3.54	F07	2.76	4	0.39	8
3	6.75	1.81	0.62	5.00	6.25	2.81	0.55	0.39	1.25	2.44	3.54	F07	2.76	4	0.39	11
4	9.88	2.05	1.00	6.25	7.00	4.09	0.63	0.43	1.25	3.48	3.54	F07	2.76	4	0.39	18
6	12.00	2.21	1.80	8.50	8.00	5.06	0.75	0.51	1.25	5.35	3.54	F07	2.76	4	0.39	29
8	14.12	2.36	2.74	10.62	9.50	6.05	0.87	0.63	1.25	7.45	5.91	F12	4.92	4	0.57	52
10	17.75	2.68	3.58	12.75	10.75	7.69	1.18	0.87	2.00	9.45	5.91	F12	4.92	4	0.57	76
12	20.88	3.07	4.38	14.88	12.25	9.02	1.18	0.87	2.00	11.41	5.91	F12	4.92	4	0.57	116
14	24.12	3.07	5.13	17.05	12.62	10.02	1.38	.39x.39	2.00	12.96	5.91	F12	4.92	4	0.57	148
16	26.74	4.02	5.66	19.21	14.75	11.99	1.38	.39x.39	2.00	14.78	5.91	F12	4.92	4	0.57	218
18	29.12	4.49	6.42	21.12	16.00	13.94	1.97	.39x.47	2.50	16.73	8.27	F16	6.50	4	0.81	276
20	32.25	5.00	7.14	23.25	17.25	14.94	1.97	.39x.47	2.50	18.66	8.27	F16	6.50	4	0.81	368
24[4]	37.12	6.06	8.59	26.63	19.50	17.56	2.50	.62x.62	4.00	22.53	8.27	F16	6.50	4	0.81	500

NOTES
1 For sizes not shown, contact Bray for more information.
2 Weights are for ductile iron bodies.
3 K dimension is disc chordal dimension at valve face.
4 Series 23-Cx NPS 24 body style is double flange only.

SEATING/UNSEATING TORQUES

TORQUE VALUES (N m)	
DN	10 bar
50	33
80	59
100	81
150	129
200	215
250	434
300	615
350	904
400	1243
450	1751
500	2181
600	3446

TORQUE VALUES (lbf-in)	
NPS	150 psi
2	288
3	560
4	720
6	1300
8	2402
10	3840
12	5812
14	8000
16	11000
18	15500
20	19300
24	30500

MAXIMUM ALLOWABLE STEM TORQUES

TORQUE VALUES (N m)	
DN	Stainless Steel (EN 1.4542)
50	154
80	154
100	227
150	325
200	539
250	1555
300	1555
350	2609
400	3112
450	8323
500	8323
600	17785

TORQUE VALUES (lbf-in)	
NPS	17-4 PH Stainless Steel
2	1366
3	1366
4	2012
6	2873
8	4772
10	13767
12	13767
14	23096
16	27546
18	73664
20	73664
24	157415

2-Cx | DN 50 to DN 600

VALVE SIZING COEFFICENTS (Kv Values[1])

	Disc Position (Degrees)								
DN[2]	**90°**	**80°**	**70°**	**60°**	**50°**	**40°**	**30°**	**20°**	**10°**
50	126	99	74	54	38	23	14	6	1
80	507	357	247	137	85	53	30	13	2
100	909	702	435	247	153	94	54	23	3
150	1569	1503	907	502	315	195	112	49	5
200	3766	2718	1650	961	604	367	209	90	10
250	5911	4304	2598	1523	956	581	333	143	17
300	8728	6394	3823	2241	1387	843	484	208	25
350	11141	8088	4931	2855	1817	1107	623	260	30
400	14619	10657	6488	3806	2379	1427	735	303	39
450	18684	13494	8503	4931	3114	1817	1038	441	48
500	23788	17214	10553	6142	3875	2336	1341	562	69
600	30102	24653	16349	9775	6055	3979	2119	865	156

NOTES
1 Kv value is the volume of water in cubic meters/hour (m^3/hr) that will flow through a given restriction or valve opening with a pressure drop of one (1) bar at room temperature. (Kv varies with the valve size, angle of opening, and the manufacturer's valve style.)
2 For sizes not shown, contact Bray for more information.

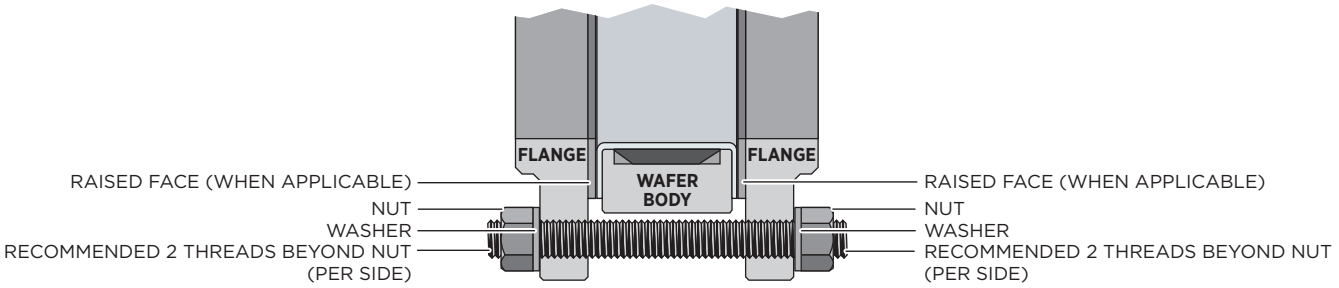
2-Cx | NPS 2 to 24

VALVE SIZING COEFFICENTS (Cv Values[1])

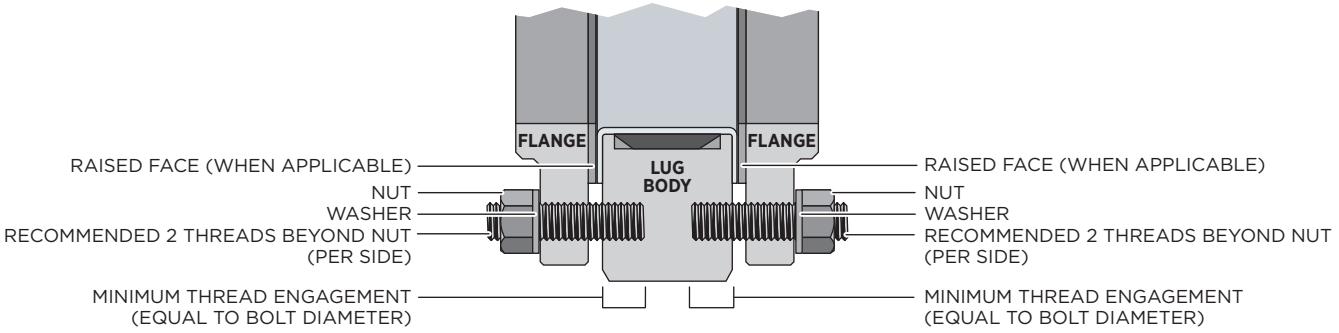
	Disc Position (Degrees)								
NPS[2]	**90°**	**80°**	**70°**	**60°**	**50°**	**40°**	**30°**	**20°**	**10°**
2	146	115	85	62	44	27	16	7	1
3	586	413	286	158	98	61	35	15	2
4	1051	812	503	285	177	109	62	27	3
6	2576	1737	1048	580	364	226	129	57	6
8	4354	3142	1908	1111	698	424	242	104	12
10	6834	4976	3004	1761	1105	672	385	165	20
12	10090	7392	4420	2591	1604	975	559	241	29
14	12880	9350	5700	3300	2100	1280	720	300	35
16	16900	12320	7500	4400	2750	1650	850	350	45
18	21600	15600	9830	5700	3600	2100	1200	510	55
20	27500	19900	12200	7100	4480	2700	1550	650	80
24	34800	28500	18900	11300	7000	4600	2450	1000	180

NOTES
1 Cv value is the volume of water in USGPM that will flow through a given restriction or valve opening with a pressure drop of one (1) psi at room temperature. (Cv varies with the valve size, angle of opening, and the manufacturer's valve style.)
2 For sizes not shown, contact Bray for more information.

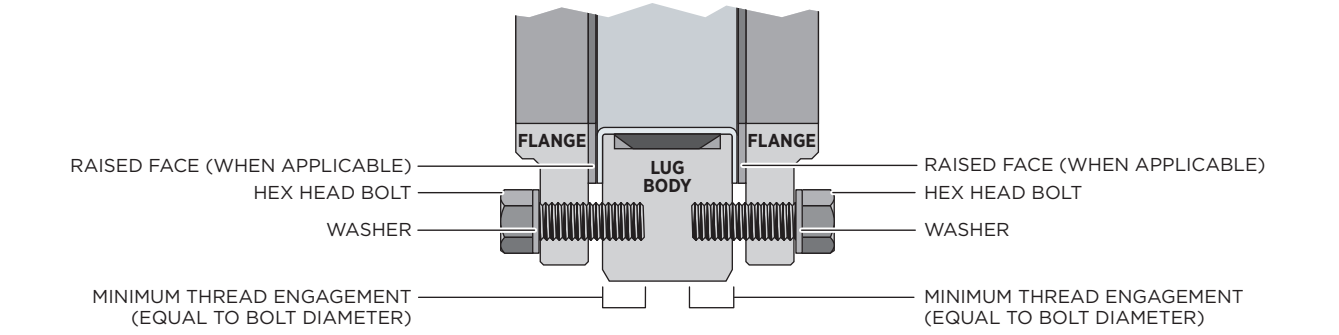
WAFER | THROUGH-STUDS



LUG | STUDS

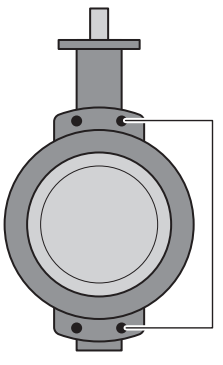


LUG | HEX HEAD BOLTS



IMPORTANT INFORMATION

- Refer to appropriate Bray dimensional drawings for specific valve drilling information.
- Lug threads may be tapped from both sides, and therefore tap may not be continuous.
- Minimum bolt engagement must be equal to the diameter of the bolt. Bray recommends the use of studs to maximize thread engagement.
- When bolting the valve into the line, use standard bolting torque as recommended by applicable piping standards. Additional force from the flange bolts is not required.



CAUTION
Tapped holes at neck locations **do not** permit through-holes.

PN 10 | WAFER | THROUGH-STUD | WITHOUT WASHERS

Valve Size	Fastener Size	Through Stud Length	Through Stud	Washer	Nut
DN	Ø-Thread	mm	Qty	Qty	Qty
50	M16	130	4	—	8
80	M16	140	8	—	16
100	M16	140	8	—	16
150	M20	160	8	—	16
200	M20	170	8	—	16
250	M20	190	12	—	24
300	M20	200	12	—	24
350	M20	220	16	—	32
400	M24	250	16	—	32
500	M24	290	20	—	40

PN 10 | LUG | STUDS | WITHOUT WASHERS

Valve Size	Fastener Size	Stud Length	Stud	Washer	Nut
DN	Ø-Thread	mm	Qty	Qty	Qty
50	M16	65	8	—	8
80	M16	70	16	—	16
100	M16	70	16	—	16
150	M20	80	16	—	16
200	M20	85	16	—	16
250	M20	90	24	—	24
300	M20	95	24	—	24
350	M20	110	32	—	32
400	M24	110	32	—	32
500	M24	140	40	—	40

PN 10 | LUG | BOLTS | WITHOUT WASHERS

Valve Size	Fastener Size	Bolt Length	Hex Head Bolt	Washer	Nut
DN	Ø-Thread	mm	Qty	Qty	Qty
50	M16	35	8	—	—
80	M16	35	16	—	—
100	M16	40	16	—	—
150	M20	45	16	—	—
200	M20	50	16	—	—
250	M20	50	24	—	—
300	M20	55	24	—	—
350	M20	55	32	—	—
400	M24	60	32	—	—
500	M24	70	40	—	—

PN 10 | WAFER | THROUGH-STUD | WITH WASHERS

Valve Size	Fastener Size	Through Stud Length	Through Stud	Washer	Nut
DN	Ø-Thread	mm	Qty	Qty	Qty
50	M16	130	4	8	8
80	M16	150	8	16	16
100	M16	155	8	16	16
150	M20	165	8	16	16
200	M20	180	8	16	16
250	M20	200	12	24	24
300	M20	210	12	24	24
350	M20	230	16	32	32
400	M24	250	16	32	32
500	M24	300	20	40	40

PN 10 | LUG | STUDS | WITH WASHERS

Valve Size	Fastener Size	Stud Length	Stud	Washer	Nut
DN	Ø-Thread	mm	Qty	Qty	Qty
50	M16	70	8	8	8
80	M16	80	16	16	16
100	M16	80	16	16	16
150	M20	85	16	16	16
200	M20	90	16	16	16
250	M20	95	24	24	24
300	M20	95	24	24	24
350	M20	110	32	32	32
400	M24	110	32	32	32
500	M24	140	40	40	40

PN 10 | LUG | BOLTS | WITH WASHERS

Valve Size	Fastener Size	Bolt Length	Hex Head Bolt	Washer	Nut
DN	Ø-Thread	mm	Qty	Qty	Qty
50	M16	40	8	8	—
80	M16	40	16	16	—
100	M16	40	16	16	—
150	M20	45	16	16	—
200	M20	50	16	16	—
250	M20	55	24	24	—
300	M20	60	24	24	—
350	M20	60	32	32	—
400	M24	65	32	32	—
500	M24	70	40	40	—

PN 10 | DOUBLE FLANGE | THROUGH STUDS | WITHOUT WASHERS

Valve Size	Fastener Size	Through Stud Length	Through Stud	Blind Hole Stud Length	Blind Hole Stud	Washer	Nut
DN	Ø-Thread	mm	Qty	mm	Qty	Qty	Qty
600	M27	330	12	130	16	—	40

PN 10 | DOUBLE FLANGE | STUDS | WITHOUT WASHERS

Valve Size	Fastener Size	Stud Length	Stud	Blind Hole Stud Length	Blind Hole Stud	Washer	Nut
DN	Ø-Thread	mm	Qty	mm	Qty	Qty	Qty
600	M27	170	24	130	16	—	64

PN 10 | DOUBLE FLANGE | BOLTS | WITHOUT WASHERS

Valve Size	Fastener Size	Bolt Length	Bolt	Blind Hole Bolt Length	Blind Hole Stud	Washer	Nut
DN	Ø-Thread	mm	Qty	mm	Qty	Qty	Qty
600	M27	100	24	70	16	—	24

PN 10 | DOUBLE FLANGE | THROUGH STUDS | WITH WASHERS

Valve Size	Fastener Size	Through Stud Length	Through Stud	Blind Hole Stud Length	Blind Hole Stud	Washer	Nut
DN	Ø-Thread	mm	Qty	mm	Qty	Qty	Qty
600	M27	340	12	130	16	40	40

PN 10 | DOUBLE FLANGE | STUDS | WITH WASHERS

Valve Size	Fastener Size	Stud Length	Stud	Blind Hole Stud Length	Blind Hole Stud	Washer	Nut
DN	Ø-Thread	mm	Qty	mm	Qty	Qty	Qty
600	M27	180	24	130	16	64	64

PN 10 | DOUBLE FLANGE | BOLTS | WITH WASHERS

Valve Size	Fastener Size	Bolt Length	Bolt	Blind Hole Bolt Length	Blind Hole Bolt	Washer	Nut
DN	Ø-Thread	mm	Qty	mm	Qty	Qty	Qty
600	M27	110	24	89	75	64	24

ASME 125/150 | WAFER | THROUGH-STUD | WITHOUT WASHERS

Valve Size	Fastener Size	Through Stud Length	Through Stud	Washer	Nut
NPS	Ø-Thread	inch	Qty	Qty	Qty
2	5/8 - 11UNC	5.00	4	—	8
3	5/8 - 11UNC	5.50	4	—	8
4	5/8 - 11UNC	5.50	8	—	16
6	3/4 - 10UNC	6.50	8	—	16
8	3/4 - 10UNC	6.50	8	—	16
10	7/8 - 9UNC	8.00	12	—	24
12	7/8 - 9UNC	8.00	12	—	24
14	1 - 8UNC	9.00	12	—	24
16	1 - 8UNC	10.00	16	—	32
18	1 1/8 - 7UNC	11.00	16	—	32
20	1 1/8 - 7UNC	12.00	20	—	40

ASME 125/150 | LUG | STUDS | WITHOUT WASHERS

Valve Size	Fastener Size	Stud Length	Stud	Washer	Nut
NPS	Ø-Thread	inch	Qty	Qty	Qty
2	5/8 - 11UNC	2.50	8	—	8
3	5/8 - 11UNC	2.75	8	—	8
4	5/8 - 11UNC	2.75	16	—	16
6	3/4 - 10UNC	3.00	16	—	16
8	3/4 - 10UNC	3.50	16	—	16
10	7/8 - 9UNC	3.50	24	—	24
12	7/8 - 9UNC	4.00	24	—	24
14	1 - 8UNC	4.00	24	—	24
16	1 - 8UNC	4.50	32	—	32
18	1 1/8 - 7UNC	5.00	32	—	32
20	1 1/8 - 7UNC	5.50	40	—	40

ASME 125/150 | LUG | BOLTS | WITHOUT WASHERS

Valve Size	Fastener Size	Bolt Length	Hex Head Bolt	Washer	Nut
NPS	Ø-Thread	inch	Qty	Qty	Qty
2	5/8 - 11UNC	1.50	8	—	—
3	5/8 - 11UNC	1.75	8	—	—
4	5/8 - 11UNC	1.75	16	—	—
6	3/4 - 10UNC	2.00	16	—	—
8	3/4 - 10UNC	2.25	16	—	—
10	7/8 - 9UNC	2.25	24	—	—
12	7/8 - 9UNC	2.50	24	—	—
14	1 - 8UNC	2.75	24	—	—
16	1 - 8UNC	3.00	32	—	—
18	1 1/8 - 7UNC	3.50	32	—	—
20	1 1/8 - 7UNC	4.00	40	—	—

ASME 125/150 | WAFER | THROUGH-STUD | WITH WASHERS

Valve Size	Fastener Size	Through Stud Length	Through Stud	Washer	Nut
NPS	Ø-Thread	inch	Qty	Qty	Qty
2	5/8 - 11UNC	5.50	4	8	8
3	5/8 - 11UNC	6.00	4	8	8
4	5/8 - 11UNC	6.00	8	16	16
6	3/4 - 10UNC	6.50	8	16	16
8	3/4 - 10UNC	7.00	8	16	16
10	7/8 - 9UNC	8.00	12	24	24
12	7/8 - 9UNC	9.00	12	24	24
14	1 - 8UNC	9.00	12	24	24
16	1 - 8UNC	10.00	16	32	32
18	1 1/8 - 7UNC	11.00	16	32	32
20	1 1/8 - 7UNC	12.00	20	40	40

ASME 125/150 | LUG | STUDS | WITH WASHERS

Valve Size	Fastener Size	Stud Length	Stud	Washer	Nut
NPS	Ø-Thread	inch	Qty	Qty	Qty
2	5/8 - 11UNC	2.75	8	8	8
3	5/8 - 11UNC	3.00	8	8	8
4	5/8 - 11UNC	3.00	16	16	16
6	3/4 - 10UNC	3.50	16	16	16
8	3/4 - 10UNC	3.50	16	16	16
10	7/8 - 9UNC	4.00	24	24	24
12	7/8 - 9UNC	4.00	24	24	24
14	1 - 8UNC	4.50	24	24	24
16	1 - 8UNC	4.50	32	32	32
18	1 1/8 - 7UNC	5.00	32	—	32
20	1 1/8 - 7UNC	5.50	40	40	40

ASME 125/150 | LUG | BOLTS | WITH WASHERS

Valve Size	Fastener Size	Bolt Length	Hex Head Bolt	Washer	Nut
NPS	Ø-Thread	inch	Qty	Qty	Qty
2	5/8 - 11UNC	1.50*	8	8	—
3	5/8 - 11UNC	1.75*	8	8	—
4	5/8 - 11UNC	2.00	16	16	—
6	3/4 - 10UNC	2.00	16	16	—
8	3/4 - 10UNC	2.25	16	16	—
10	7/8 - 9UNC	2.50	24	24	—
12	7/8 - 9UNC	2.75	24	24	—
14	1 - 8UNC	2.75	24	24	—
16	1 - 8UNC	3.25	32	32	—
18	1 1/8 - 7UNC	3.50	32	32	—
20	1 1/8 - 7UNC	4.00	40	40	—

ASME 125/150 | DOUBLE FLANGE | THROUGH STUDS | WITHOUT WASHERS

Valve Size	Fastener Size	Through Stud Length	Through Stud	Blind Hole Stud Length	Blind Hole Stud	Washer	Nut
NPS	Ø-Thread	inch	Qty	inch	Qty	Qty	Qty
24	1 1/4 - 7UNC	13.00	12	5.00	16	—	40

ASME 125/150 | DOUBLE FLANGE | STUDS | WITHOUT WASHERS

Valve Size	Fastener Size	Stud Length	Stud	Blind Hole Stud Length	Blind Hole Stud	Washer	Nut
NPS	Ø-Thread	inch	Qty	inch	Qty	Qty	Qty
24	1 1/4 - 7UNC	6.50	24	5.00	16	—	64

ASME 125/150 | DOUBLE FLANGE | BOLTS | WITHOUT WASHERS

Valve Size	Fastener Size	Bolt Length	Bolt	Blind Hole Bolt Length	Blind Hole Stud	Washer	Nut
NPS	Ø-Thread	inch	Qty	inch	Qty	Qty	Qty
24	1 1/4 - 7UNC	4.75	24	3.50	16	—	24

ASME 125/150 | DOUBLE FLANGE | THROUGH STUDS | WITH WASHERS

Valve Size	Fastener Size	Through Stud Length	Through Stud	Blind Hole Stud Length	Blind Hole Stud	Washer	Nut
NPS	Ø-Thread	inch	Qty	inch	Qty	Qty	Qty
24	1 1/4 - 7UNC	14.00	12	5.00	16	40	40

ASME 125/150 | DOUBLE FLANGE | STUDS | WITH WASHERS

Valve Size	Fastener Size	Stud Length	Stud	Blind Hole Stud Length	Blind Hole Stud	Washer	Nut
NPS	Ø-Thread	inch	Qty	inch	Qty	Qty	Qty
24	1 1/4 - 7UNC	7.00	24	5.00	16	64	64

ASME 125/150 | DOUBLE FLANGE | BOLTS | WITH WASHERS

Valve Size	Fastener Size	Bolt Length	Bolt	Blind Hole Bolt Length	Blind Hole Bolt	Washer	Nut
NPS	Ø-Thread	inch	Qty	inch	Qty	Qty	Qty
24	1 1/4 - 7UNC	5.00	24	3.50	16	64	24

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