McCANNALOK SERIES

CRYOGENIC HIGH PERFORMANCE BUTTERFLY VALVES

TECHNICAL SALES MANUAL

Bray®

BRAY.COM

THE HIGH PERFORMANCE COMPANY

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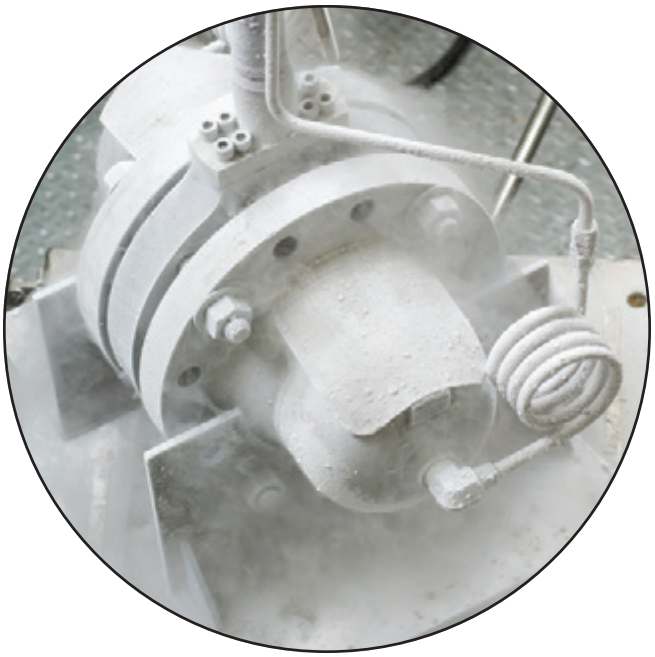
RAISING THE PERFORMANCE BAR

The McCannalok Cryogenic high performance butterfly valve provides industry leading cryogenic sealing technology and performance while being produced to the highest quality standards. The valve is designed to handle the most difficult medias in today's industrial environments — liquid oxygen, liquid natural gas, and other cryogenic liquids.



McCANNALOK CRYOGENIC FEATURES

- The advanced Polar® Seat provides strength, flexibility, and unparalleled performance at cryogenic temperatures.
- Industry leading leakage performance, with high cycle capability, at cryogenic temperatures.
- Material compatibility with liquid and gaseous oxygen, certified by third party testing laboratory.
- One-piece, high-strength, low temperature impact resistant stem.
- Contoured disc to maximize flow.

CRYOGENIC TESTING

Bray operates world class cryogenic testing facilities in the USA, China, and India dedicated for research & development validation and customer specific testing. Run by trained and experienced cryogenic valve specialists, our Raymond Technical Center in Houston utilizes:

- Cryogenic test pit for safe testing of large valves.
- 6,000 gallon liquid nitrogen tank.
- Mass spectrometers.

INDUSTRIES AND APPLICATIONS

- Aerospace
- Air Separation
- Beverage Processing
- Ethylene
- Food Processing
- Gas to Liquids
- Liquid Nitrogen
- Liquid Oxygen
- LNG Liquefaction
- LNG Receiving Terminals
- LPG Handling
- Petroleum
- Refrigeration
- Steel Production

Bray operates three precision cleaning facilities around the world to meet customer's oxygen cleaning needs.

SPECIFICATIONS

Size Range	NPS 3 to 24	
	DN 80 to 600	
Body Style	Wafer | Lug	
Temperature Range	Standard	-320°F to +250°F
		-196°C to +121°C
Pressure Ratings	ASME Class 150 | 300	
	PN 10 | 16 | 25 | 40	
Shutoff Rating	Zero Leakage (at ambient temperatures)	
	BS 6364 (at cryogenic temperatures)	
	ISO 28921 (at cryogenic temperatures)	

MATERIAL OPTIONS

Body	316 Stainless Steel
Stem	XM-19
Packing	PTFE
	Graphite
Bearing	Teflon Lined Stainless Steel
	Nitride Hardened Stainless Steel
Disc	316 Stainless Steel
Seat	Polar® Seat
Extended Bonnet	316 Stainless Steel

NOTE
> Other materials are available on request. Contact Bray for more information.

DESIGN STANDARDS

Valve Design	ASME B16.34
	ASME BPVC VIII
	EN 593
	EN 12516
Actuator Mounting	ISO 5211
Flange Drilling[1]	ASME B16.5
	EN 1092-1

NOTE
1 Additional flange drilling options available.

Seat Testing	BS 6364
	ISO 28921
	ISO 5208
	MSS SP 61
	EN 12266
Face-to-Face	ASME B16.10
	API 609
	EN 558
	ISO 5752

CERTIFICATIONS & APPROVALS

Certifications	CE/PED
Approvals	ABS Type
	Bureau Veritas Type
	DNV
	China Classification Society (CCS) Type

DESIGN FEATURES

1 **STEM DESIGN:** High-strength, one-piece stem design is standardized for interchangeability of Bray actuators.

2 **BLOWOUT-PROOF STEM:** The stem retention design does not rely on actuation components to prevent stem blowout. Designed to provide safe operation for cryogenic conditions.

3 **ADJUSTABLE STEM PACKING:** Easy access allows simple quarter-turn field adjustments without actuator removal.

4 **STEM SEAL SYSTEM:** Packing rings, compresssed by the packing gland, provide a positive seal around the stem. Certified compatibility with liquid and gaseous oxygen service (tested by third party).

5 **STEM BEARINGS:** Top and bottom bearings securely support the stem, provide excellent corrosion resistance, and minimize deflection from mechanical loading forces.

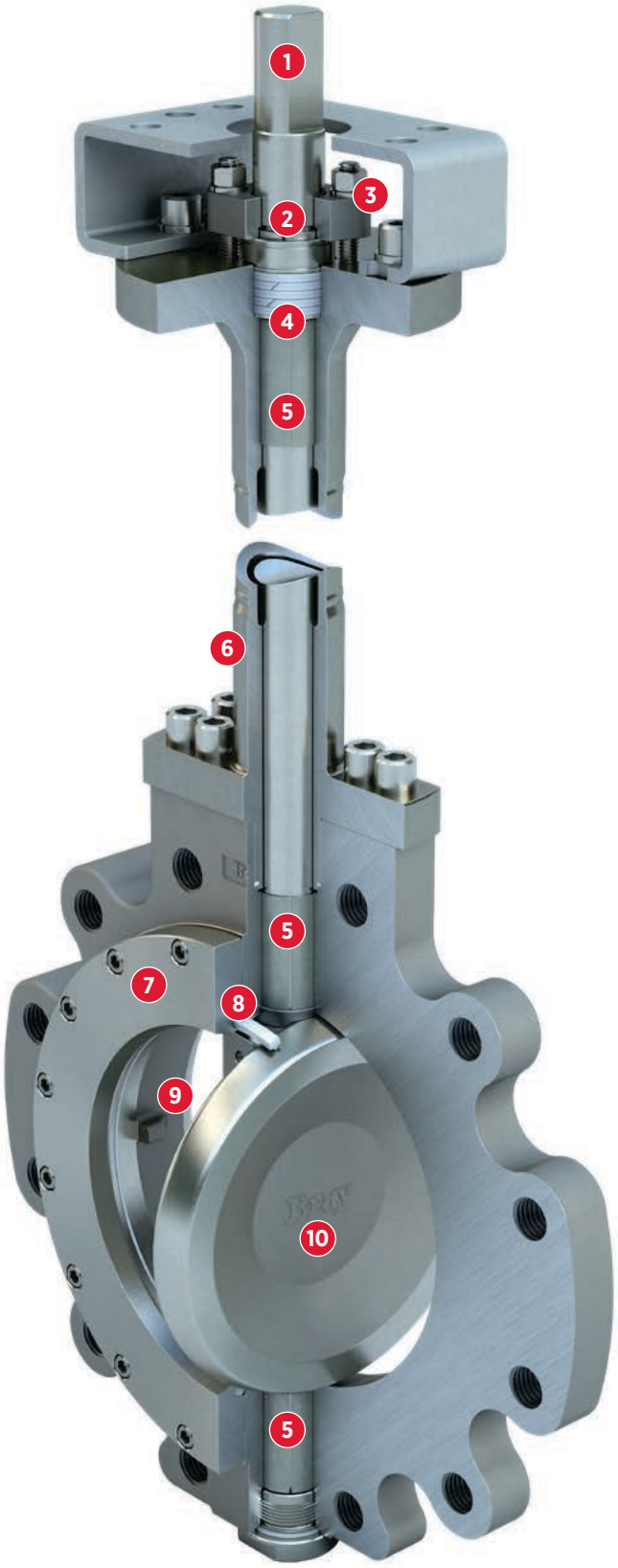
6 **BOLTED BONNET:** Connection prevents internal stress during valve cool-down. Extended neck protects stem packing from extreme temperatures, and allows access for stem packing adjustments and actuator mounting.

7 **FULL-FACED SEAT RETAINER:** Utilizes cap screws located outside the flange gasket sealing area — improving flange gasket sealing and allowing simple seat replacement.

8 **POLAR® SEAT:** Jacket and energizer maintain consistent sealing performance during process thermal cycling and extend valve cycle life by reducing seat wear. Provides sealing at temperatures as low as -320°F (-196°C).

9 **INTERNAL TRAVEL STOP:** Minimizes possible seat damage and extends the service life of the seat.

10 **DISC:** The disc is engineered to maximize flow and minimize resistance, for optimal Cv / Kv values.



VALVE PART NUMBERING SYSTEM

Select one code from each category to build a complete valve order number. **4X-XXXX-110XX-XXX**

SERIES 4X

Code	Body Style	ASME Class
40	Wafer	150
41	Lug	150
42	Wafer	300
43	Lug	300

SIZE XXXX

Code	NPS	DN
0300	3	80
0400	4	100
0600	6	150
0800	8	200
1000	10	250
1200	12	300
1400	14	350
1600	16	400
1800	18	450
2000	20	500
2400	24	600

BASE NUMBER 110XX

Code	Description
110LQ	Cryogenic, Full ASME Class Pressure Rated

TRIM XXX

Code	Item	Material
0YT	Body	Stainless Steel CF8M
	Disc	Stainless Steel CF8M
	Stem	XM-19
	Stem Seal	PTFE (Oxygen Compatible)
	Seat	Polar® Seat
0YB	Body	Stainless Steel CF8M
	Disc	Stainless Steel CF8M
	Stem	XM-19
	Stem Seal	Graphite (Oxygen Compatible)
	Seat	Polar® Seat
0YC	Body	Stainless Steel CF8M
	Disc	Stainless Steel CF8M
	Stem	XM-19
	Stem Seal	PTFE (Non-Oxygen Service)
	Seat	Polar® Seat

EXAMPLE

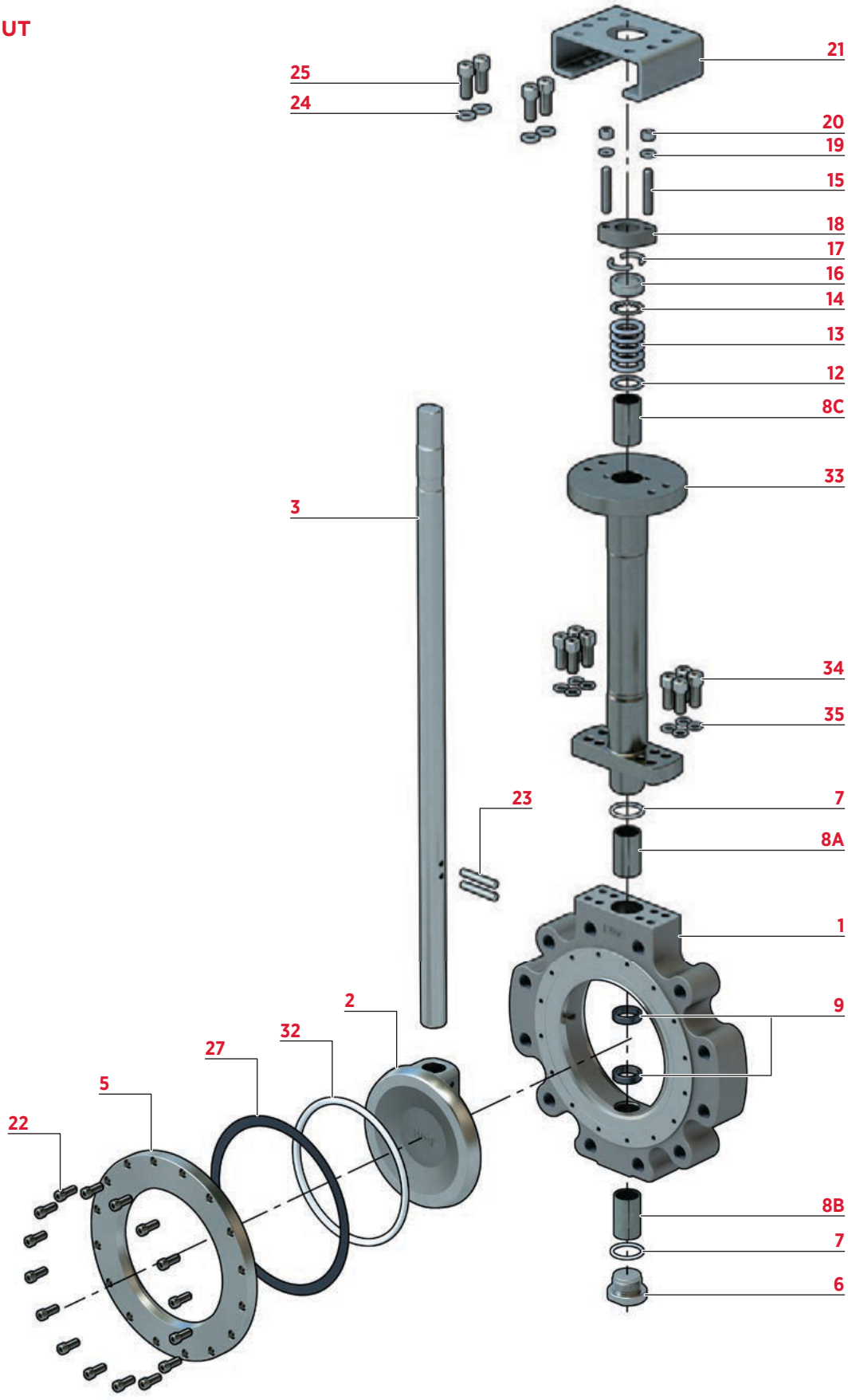
41-1200-110LQ-0YT

- Lug Body, ASME Class 150
- Size NPS 12 inch (DN 300)
- Cryogenic, Full ASME Class Pressure Rated McCannalok Valve
- 0YT Trim

NOTE

- Other materials are available on request. Contact Bray for additional information.

PARTS CALLOUT

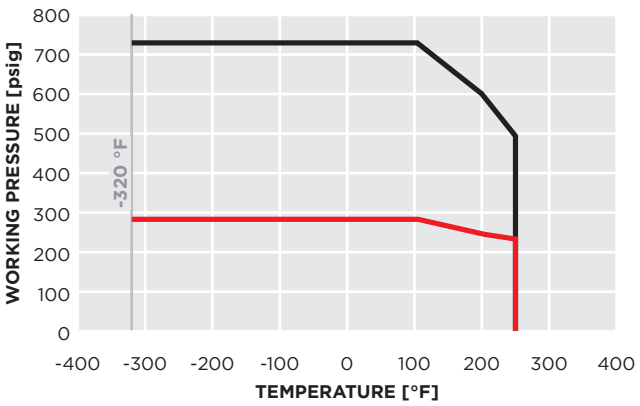


MATERIAL SPECIFICATIONS AND PARTS LIST

ITEM	DESCRIPTION	MATERIAL	
		Standard	Optional
1	Body	316 Stainless Steel, ASTM A351 Gr. CF8M	
2	Disc	316 Stainless Steel, ASTM A351 Gr. CF8M	
3	Stem	ASTM A479 XM-19	
5	Seat Retainer	316 Stainless Steel, ASTM A240 Type 316	
6	Locating Plug	316 Stainless Steel	
7A	Gasket, Locating Plug	PCTFE	
7B	Gasket, Bonnet	PCTFE	
8A	Bearing, Upper Body	316 Stainless Steel with Glass Fiber Reinforced PTFE Liner	Nitride Hardened Stainless Steel
8B	Bearing, Lower Body	316 Stainless Steel with Glass Fiber Reinforced PTFE Liner	Nitride Hardened Stainless Steel
8C	Bearing, Bonnet	316 Stainless Steel with Glass Fiber Reinforced PTFE Liner	Nitride Hardened Stainless Steel
9	Disc Spacer	ASTM A479 XM-19	
12	Thrust Washer	316 Stainless Steel	
13	Stem Seal Set	PTFE (Oxygen Compatible)	Graphite (Oxygen Compatible)
14	Grounding Washer	316 Stainless Steel	
15	Stud	Dual certified to ASTM A193 Gr. B8M CL2 and ASTM A320 Gr. B8M CL2	
16	Gland Ring	316 Stainless Steel	
17	Retaining Ring	18-8 Stainless Steel	
18	Gland Retainer	316 Stainless Steel, ASTM A 351 CF8M	
19	Lock Washer, Gland Retainer	316 Stainless Steel	
20	Hex Nut	316 Stainless Steel	
21	Mounting Bracket	316 Stainless Steel	
22	Socket Head Cap Screw, Seat Retainer	Dual certified to ASTM A193 Gr. B8M CL2 and ASTM A320 Gr. B8M CL2	
23	Taper Pin	ASTM A479 XM-19	
24	Lock Washer, Mounting Bracket	316 Stainless Steel	
25	Socket Head Cap Screw, Mounting Bracket	Dual certified to ASTM A193 Gr. B8M CL2 and ASTM A320 Gr. B8M CL2	
27	Retainer Gasket	Graphite	
32	Seat	Polar® Seat	
33	Bonnet	316 Stainless Steel	
34	Socket Head Cap Screw, Bonnet	Dual certified to ASTM A193 Gr. B8M CL2 and ASTM A320 Gr. B8M CL2	
35	Lock Washer, Bonnet	316 Stainless Steel	
36	ID Tag (not shown)	18-8 Stainless Steel	
37	Drive Screw (not shown)	18-8 Stainless Steel	

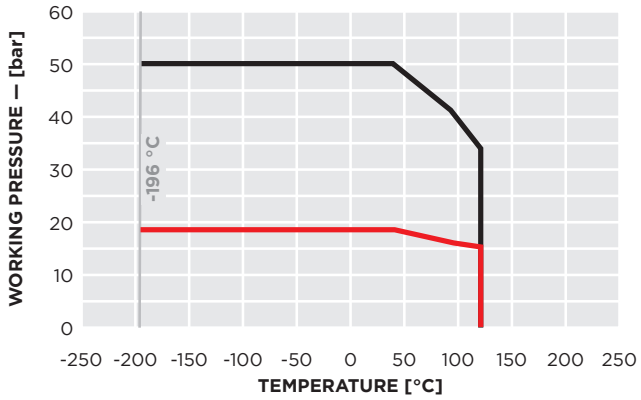
NOTES
> Material specifications provided for reference only, and are subject to change without notice.
> Additional materials available upon request.

ASME CLASS 150/300 — STAINLESS STEEL BODY / POLAR SEAT



LEGEND (psig/°F)

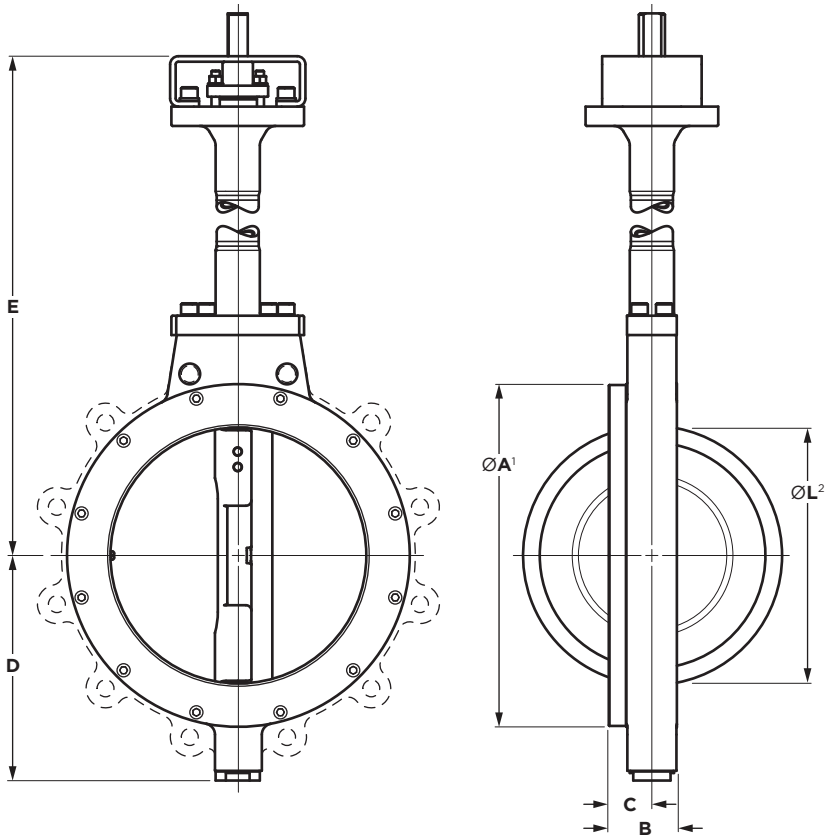
- ASME Class 150 — Series 40/41
- ASME Class 300 — Series 42/43



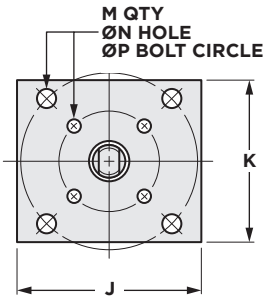
LEGEND (bar/°C)

- ASME Class 150 — Series 40/41
- ASME Class 300 — Series 42/43

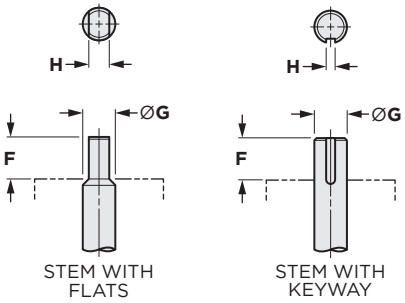
ASME CLASS 150 — SERIES 40 WAFER/41 LUG



MOUNTING DETAILS



STEM DETAILS

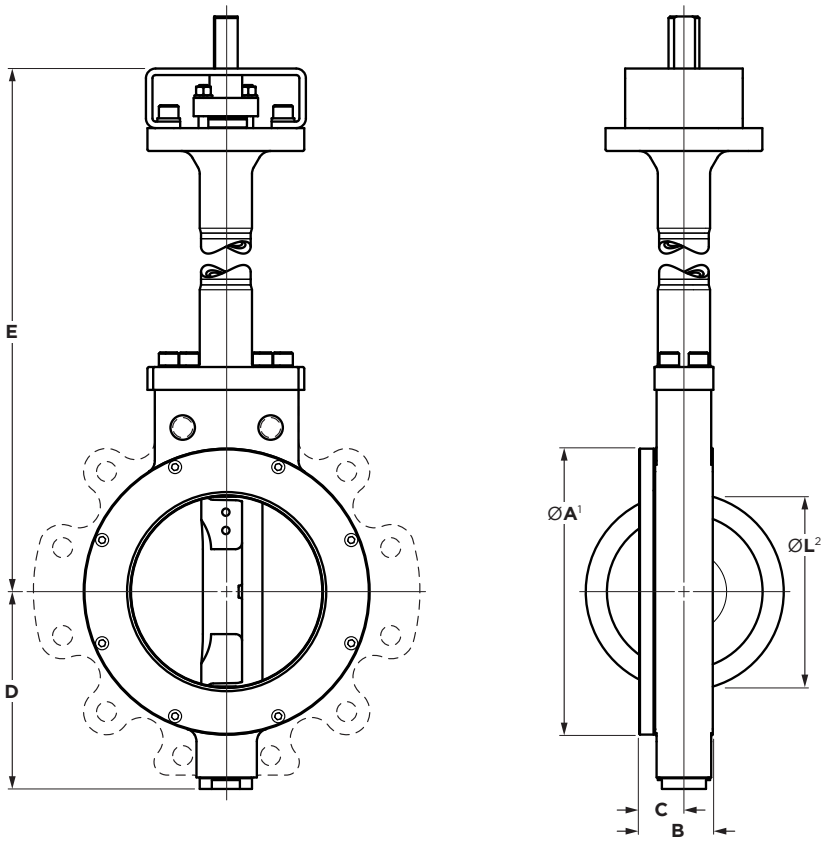


DIMENSIONS (inches)																WEIGHT (lbs)	
NPS	ØA[1]	B	C	D	E	F	ØG	H	J	K	ØL[2]	Mounting Data				Wafer	Lug
												M	ØN	ØP	ISO		
3	5.25	1.87	1.10	4.21	18.63	1.19	0.63	0.43	2.50	4.36	3.00	4	0.38	2.76	F07	22	23
4	6.72	2.03	1.28	4.83	18.97	1.19	0.63	0.43	2.50	4.36	3.87	4	0.38	2.76	F07	27	31
6	8.62	2.23	1.29	5.68	22.00	1.25	0.75	0.51	4.50	5.12	6.05	4 4	0.53 0.38	4.92 2.76	F12 F07	47	51
8	10.81	2.40	1.46	7.06	23.5	1.19	0.88	0.63	4.50	5.12	7.96	4 4	0.53 0.38	4.92 2.76	F12 F07	65	70
10	13.06	2.75	1.69	8.56	26.75	1.94	1.18	0.87	4.50	5.12	9.93	4	0.53	4.92	F12	101	116
12	15.42	3.08	1.95	10.18	28.25	1.94	1.18	0.87	4.50	5.12	11.89	4	0.53	4.92	F12	143	159

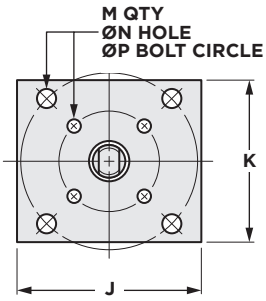
DIMENSIONS (mm)																WEIGHT (kg)	
DN	ØA[1]	B	C	D	E	F	ØG	H	J	K	ØL[2]	Mounting Data				Wafer	Lug
												M	ØN	ØP	ISO		
80	133	47	28	107	473	30	16	11	64	111	76	4	10	70	F07	10	11
100	171	52	33	123	482	30	16	11	64	111	98	4	10	70	F07	12	14
150	219	57	33	144	559	32	19	13	114	130	154	4 4	14 10	125 70	F12 F07	21	23
200	275	61	37	179	597	30	19	16	114	130	202	4 4	14 10	125 70	F12 F07	29	32
250	332	70	43	217	680	49	30	22	114	155	252	4	14	125	F12	46	52
300	392	78	50	259	718	49	30	22	114	155	302	4	14	125	F12	65	72

NOTES
> Consult Bray factory for sizes not shown.
> Additional flange drilling options available.
> Weights are for cast steel bodies, except when noted.
1 Dimension A is diameter of raised face flange.
2 Dimension L is absolute minimum pipe ID at valve face (without gasket).

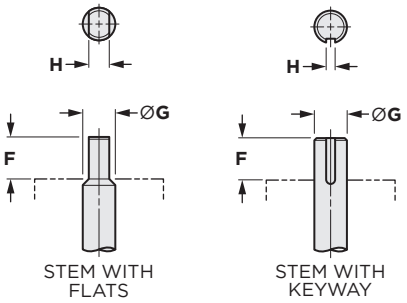
ASME CLASS 300 — SERIES 42 WAFER/43 LUG



MOUNTING DETAILS



STEM DETAILS



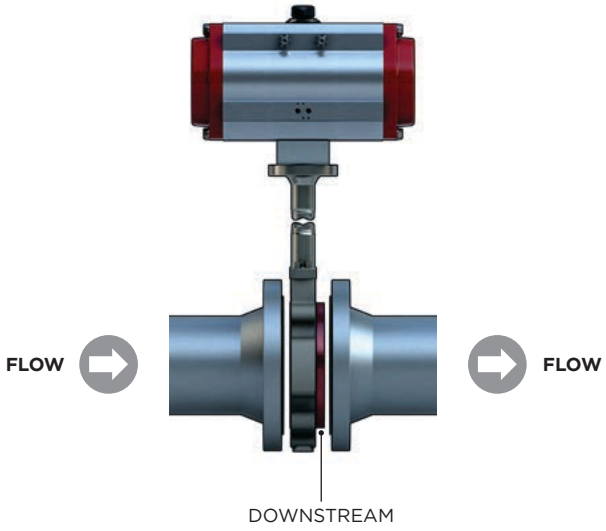
DIMENSIONS (inches)																WEIGHT (lbs)	
NPS	ØA[1]	B	C	D	E	F	ØG	H	J	K	ØL[2]	Mounting Data				Wafer	Lug
												M	ØN	ØP	ISO		
3	5.25	1.87	1.10	4.21	18.63	1.19	0.63	0.43	2.50	4.36	3.00	4	0.38	2.76	F07	22	27
4	6.72	2.03	1.28	4.83	18.97	1.19	0.63	0.43	2.50	4.36	3.87	4	0.38	2.76	F07	27	36
6	8.88	2.42	1.45	6.31	22.75	1.13	0.87	0.63	5.12	4.50	5.83	4 4	0.53 0.38	4.92 2.76	F12 F07	56	56
8	10.94	2.85	1.75	7.55	26.00	1.19	1.18	0.87	6.12	4.50	7.62	4	0.53	4.92	F12	93	115
10	13.26	3.28	2.0	9.36	27.31	2.07	1.38	.390×.390	6.12	4.50	9.51	4	0.53	4.92	F12	168	196
12	15.42	3.62	2.21	10.89	30.50	2.00	1.75	.625×.625	7.00	6.00	11.37	4	0.81	6.50	F16	222	270

DIMENSIONS (mm)																WEIGHT (kg)	
DN	ØA[1]	B	C	D	E	F	ØG	H	J	K	ØL[2]	Mounting Data				Wafer	Lug
												M	ØN	ØP	ISO		
80	133	48	28	107	473	30	16	11	64	111	76	4	10	70	F07	10	15
100	171	52	33	123	482	30	16	11	64	111	98	4	10	70	F07	12	19
150	226	62	37	160	578	29	22	16	130	114	148	4 4	14 10	125 70	F12 F07	25	36
200	278	73	44	192	660	51	30	22	155	114	193	4	14	125	F12	42	61
250	337	84	51	238	694	54	35	10×10	155	114	241	4	14	125	F12	76	99
300	392	92	56	277	775	51	44	16×16	178	152	289	4	20	165	F16	101	137

NOTES
> Consult Bray factory for sizes not shown.
> Additional flange drilling options available.
> Weights are for cast steel bodies, except when noted.
1 Dimension A is diameter of raised face flange.
2 Dimension L is absolute minimum pipe ID at valve face (without gasket).

SEAT RETAINER POSITION

NOTE
> Check the media flow direction and ensure the valve is installed with the retainer downstream.
> For additional sizes, contact Bray for more information.



ASME CLASS 150 — SERIES 40/41

CRYOGENIC VALVE — TORQUE VALUES (Lb-in)				
	Valve Differential Pressure (psig)			
NPS	<150	>150 to 200	>200 to 250	>250 to 275
3	397	441	485	507
4	685	756	827	863
6	2288	2599	2911	3067
8	3181	3960	4738	5127
10	5467	6573	7679	8231
12	6431	7794	9156	9837

ASME CLASS 300 — SERIES 42/43

CRYOGENIC VALVE — TORQUE VALUES (Lb-in)				
	Valve Differential Pressure (psig)			
NPS	<150	>150 to 350	>350 to 550	>550 to 720
3	397	573	749	899
4	685	969	1253	1494
6	1864	2872	3879	4735
8	2668	4108	5549	6774
10	3669	6661	9653	12196
12	6968	12595	18221	23004

ASME CLASS 150 — SERIES 40/41

CRYOGENIC VALVE — TORQUE VALUES (Nm)				
	Valve Differential Pressure (bar)			
DN	<10.3	>10.3 to 14	>14 to 17.2	>17.2 to 19
80	45	50	55	57
100	78	86	94	98
150	259	294	330	347
200	360	448	537	581
250	619	744	870	932
300	728	883	1037	1114

ASME CLASS 300 — SERIES 42/43

CRYOGENIC VALVE — TORQUE VALUES (Nm)				
	Valve Differential Pressure (bar)			
DN	<10.3	>10.3 to 24	>24 to 38	>38 to 49.6
80	45	65	85	102
100	78	110	142	169
150	211	325	439	536
200	302	465	628	767
250	416	754	1093	1381
300	789	1426	2064	2605

NOTES
> Consult Bray factory for sizes not shown.

ASME CLASS 150 — SERIES 40/41

CRYOGENIC VALVE — Cv VALUES									
	DISC POSITION (Degrees)								
NPS	90°	80°	70°	60°	50°	40°	30°	20°	10°
3	185	178	155	123	87	56	32	14	5
4	375	365	315	250	175	115	63	31	10
6	1350	1070	750	510	330	218	140	81	35
8	2800	2230	1590	1060	685	456	280	165	65
10	4300	3450	2430	1630	1050	700	450	250	100
12	6650	5330	3750	2530	1630	1080	700	390	155

ASME CLASS 300 — SERIES 42/43

CRYOGENIC VALVE — Cv VALUES									
	DISC POSITION (Degrees)								
NPS	90°	80°	70°	60°	50°	40°	30°	20°	10°
3	185	178	155	123	87	56	32	14	5
4	375	365	315	250	175	115	63	31	10
6	1000	875	710	530	370	240	138	79	26
8	2000	1720	1360	950	630	405	240	121	47
10	2650	2250	1740	1200	780	510	295	150	61
12	4000	3400	2500	1690	1100	710	430	220	92

ASME CLASS 150 — SERIES 40/41

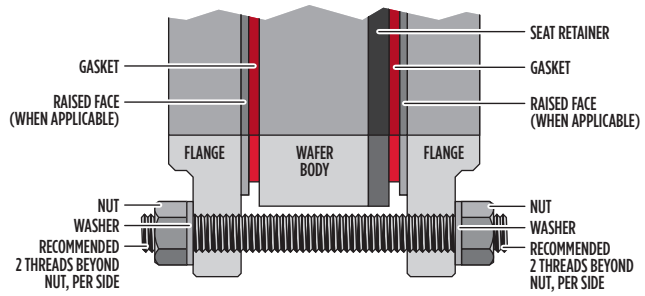
CROYOGENIC VALVE — Kv VALUES									
	DISC POSITION (Degrees)								
DN	90°	80°	70°	60°	50°	40°	30°	20°	10°
80	158	152	132	105	74	48	27	12	4
100	320	311	269	213	149	98	54	26	9
150	1152	913	640	435	281	186	119	69	30
200	2388	1902	1356	904	584	389	239	141	55
250	3668	2943	2073	1390	896	597	384	213	85
300	5672	4546	3199	2158	1390	921	597	333	132

ASME CLASS 300 — SERIES 42/43

CROYOGENIC VALVE — Kv VALUES									
	DISC POSITION (Degrees)								
DN	90°	80°	70°	60°	50°	40°	30°	20°	10°
80	158	152	132	105	74	48	27	12	4
100	320	311	269	213	149	98	54	26	9
150	853	746	606	452	316	205	118	67	22
200	1706	1467	1160	810	537	345	205	103	40
250	2260	1919	1484	1024	665	435	252	128	52
300	3412	2900	2133	1442	938	606	367	188	78

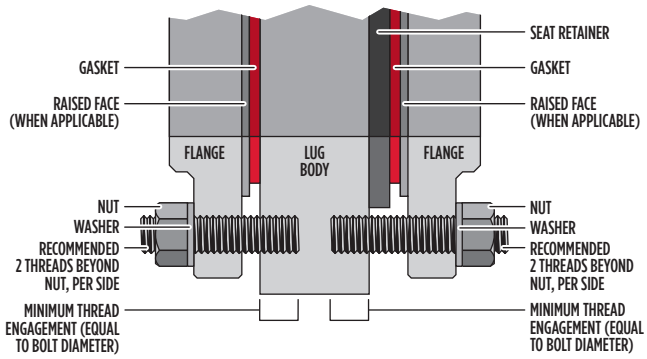
NOTES
> Cv / Kv varies with the valve size, angle of opening and the manufacturer's valve style.
> Cv value is the volume of water in USGPM that will flow through a given restriction or valve opening with a pressure drop of one (1) psi at room temperature.
> Kv value is the volume of water in cubic meters/hour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

WAFER VALVE WITH THRU STUDS



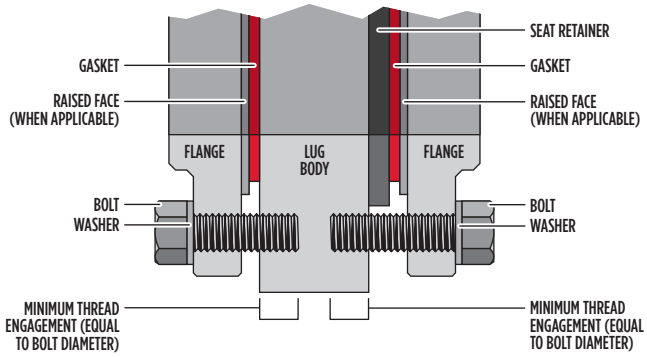
THRU STUD LENGTH						
Nut Thickness (X2)	+ Washer Thickness (X2)	+ Flange Thickness (X2)	+ Gasket Thickness (X2)	+ Valve Face to Face	=	**Length of Stud**
PLUS 2 THREADS PER NUT		INCLUDE RAISED FACE, IF APPLICABLE		INCLUDE SEAT RETAINER		

LUG VALVE WITH STUDS



STUD LENGTH							
Nut Thickness	+ Washer Thickness	+ Flange Thickness	+ Gasket Thickness	+ Seat Retainer Ring Raised Face	+ Minimum Thread Engagement	=	**Length of Stud**
PLUS 2 THREADS PER NUT		INCLUDE RAISED FACE, IF APPLICABLE		SEAT RETAINER SIDE ONLY	ONE BOLT DIAMETER		

LUG VALVE WITH HEX HEAD BOLTS



HEX HEAD BOLT LENGTH						
Washer Thickness	+ Flange Thickness	+ Gasket Thickness	+ Seat Retainer Ring Raised Face	+ Minimum Thread Engagement	=	**Length of Bolt**
	INCLUDE RAISED FACE, IF APPLICABLE		SEAT RETAINER SIDE ONLY	ONE BOLT DIAMETER		

IMPORTANT INFORMATION

NOTES

> 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.
> 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.

ASSUMPTIONS MADE IN CALCULATIONS

> Lengths rounded to the nearest 1/4 inch for maximum thread engagement.
> Nut thickness as per ASME B18.2.2 Heavy Hex.
> Washer thickness as per ASME B18.22.1 Type A.
> Flange thickness as per ASME B16.5 or ASME B16.47 Series A.
> Gasket thickness = .175 inch.
> Raised face = .06 inch.

ASME CLASS 150 | SERIES 40 WAFER STYLE | THRU STUD LENGTH

Valve Size		Fastener Size	Thru Stud		
NPS	DN	Ø-Thread	in	mm	Qty
3	80	5/8-11 UNC	6.00	152	4
4	100	5/8-11 UNC	6.25	159	8
5	125	3/4-10 UNC	6.75	171	8
6	150	3/4-10 UNC	7.00	178	8
8	200	3/4-10 UNC	7.50	191	8
10	250	7/8-9 UNC	8.25	210	12
12	300	7/8-9 UNC	8.50	216	12

ASME CLASS 150 | SERIES 41 LUG STYLE | STUD LENGTH

Valve Size		Fastener Size	Retainer Side Stud			Back Side Stud		
NPS	DN	Ø-Thread	in	mm	Qty	in	mm	Qty
3	80	5/8-11 UNC	3.00	76	4	2.75	70	4
4	100	5/8-11 UNC	3.25	83	8	2.75	70	8
5	125	3/4-10 UNC	3.25	83	8	2.75	70	8
6	150	3/4-10 UNC	3.50	89	8	3.25	83	8
8	200	3/4-10 UNC	3.75	95	8	3.25	83	8
10	250	7/8-9 UNC	4.00	102	12	3.75	95	12
12	300	7/8-9 UNC	4.25	108	12	4.00	102	12

ASME CLASS 150 | SERIES 41 LUG STYLE | BOLT LENGTH

Valve Size		Fastener Size	Retainer Side Hex Head Bolt			Back Side Hex Head Bolt		
NPS	DN	Ø-Thread	in	mm	Qty	in	mm	Qty
3	80	5/8-11 UNC	2.25	57	4	2.00	51	4
4	100	5/8-11 UNC	2.25	57	8	2.00	51	8
5	125	3/4-10 UNC	2.25	57	8	2.25	57	8
6	150	3/4-10 UNC	2.50	64	8	2.00	51	8
8	200	3/4-10 UNC	2.50	64	8	2.50	64	8
10	250	7/8-9 UNC	2.75	70	12	2.75	70	12
12	300	7/8-9 UNC	3.00	76	12	3.00	76	12

NOTES
> Consult Bray factory for sizes not shown.

ASME CLASS 300 | SERIES 42 WAFER STYLE | THRU STUD LENGTH

Valve Size		Fastener Size	Thru Stud		
NPS	DN	Ø-Thread	in	mm	Qty
3	80	3/4-10 UNC	6.50	165	8
4	100	3/4-10 UNC	7.00	178	8
5	125	3/4-10 UNC	7.50	191	8
6	150	3/4-10 UNC	7.75	197	12
8	200	7/8-9 UNC	8.75	222	12
10	250	1-8 UNC	10.00	254	16
12	300	1 1/8-8 UN	10.75	273	16

ASME CLASS 300 | SERIES 43 LUG STYLE | STUD LENGTH

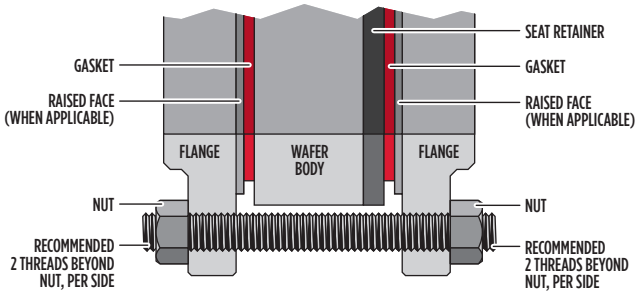
Valve Size		Fastener Size	Retainer Side Stud			Back Side Stud		
NPS	DN	Ø-Thread	in	mm	Qty	in	mm	Qty
3	80	3/4-10 UNC	3.25	83	8	3.00	76	8
4	100	3/4-10 UNC	3.25	83	8	3.25	83	8
5	125	3/4-10 UNC	3.75	95	8	3.25	83	8
6	150	3/4-10 UNC	3.75	95	12	3.50	89	12
8	200	7/8-9 UNC	4.25	108	12	4.00	102	12
10	250	1-8 UNC	5.00	127	16	4.25	108	16
12	300	1 1/8-8 UN	5.50	140	16	4.75	121	16

ASME CLASS 300 | SERIES 43 LUG STYLE | BOLT LENGTH

Valve Size		Fastener Size	Retainer Side Hex Head Bolt			Back Side Hex Head Bolt		
NPS	DN	Ø-Thread	in	mm	Qty	in	mm	Qty
3	80	3/4-10 UNC	2.25	57	8	2.25	57	8
4	100	3/4-10 UNC	2.50	64	8	2.25	57	8
5	125	3/4-10 UNC	2.75	70	8	2.50	64	8
6	150	3/4-10 UNC	3.00	76	12	2.75	70	12
8	200	7/8-9 UNC	3.25	83	12	3.00	76	12
10	250	1-8 UNC	4.00	102	16	3.25	83	16
12	300	1 1/8-8 UN	4.25	108	16	3.50	89	16

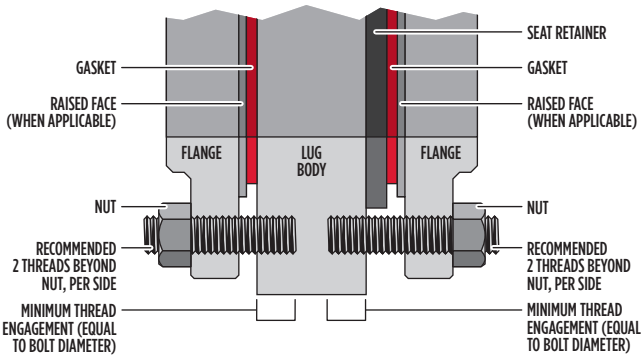
NOTES
> Consult Bray factory for sizes not shown.

WAFER VALVE WITH THRU STUDS



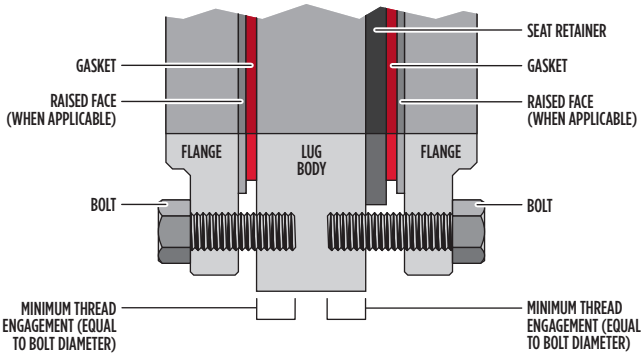
THRU STUD LENGTH					
Nut Thickness (X2)	+ Flange Thickness (X2)	+ Gasket Thickness (X2)	+ Valve Face to Face	=	**Length of Stud**
PLUS 2 THREADS PER NUT	INCLUDE RAISED FACE, IF APPLICABLE		INCLUDE SEAT RETAINER		

LUG VALVE WITH STUDS



STUD LENGTH						
Nut Thickness	+ Flange Thickness	+ Gasket Thickness	+ Seat Retainer Ring Raised Face	+ Minimum Thread Engagement	=	**Length of Stud**
PLUS 2 THREADS PER NUT	INCLUDE RAISED FACE, IF APPLICABLE		SEAT RETAINER SIDE ONLY	ONE BOLT DIAMETER		

LUG VALVE WITH HEX HEAD BOLTS



HEX HEAD BOLT LENGTH					
Flange Thickness	+ Gasket Thickness	+ Seat Retainer Ring Raised Face	+ Minimum Thread Engagement	=	**Length of Bolt**
INCLUDE RAISED FACE, IF APPLICABLE		SEAT RETAINER SIDE ONLY	ONE BOLT DIAMETER		

IMPORTANT INFORMATION

NOTES

> 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.
> 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.

ASSUMPTIONS MADE IN CALCULATIONS

> Lengths rounded to the nearest 1/4 inch for maximum thread engagement.
> Nut thickness as per ASME B18.2.2 Heavy Hex.
> Flange thickness as per ASME B16.5 or ASME B16.47 Series A.
> Gasket thickness = .175 inch.
> Raised face = .06 inch.

ASME CLASS 150 | SERIES 40 WAFER STYLE | THRU STUD LENGTH

Valve Size		Fastener Size	Thru Stud		
NPS	DN	Ø-Thread	in	mm	Qty
3	80	5/8-11 UNC	5.75	146	4
4	100	5/8-11 UNC	6.00	152	8
5	125	3/4-10 UNC	6.50	165	8
6	150	3/4-10 UNC	6.50	165	8
8	200	3/4-10 UNC	7.00	178	8
10	250	7/8-9 UNC	7.75	197	12
12	300	7/8-9 UNC	8.25	210	12

ASME CLASS 150 | SERIES 41 LUG STYLE | STUD LENGTH

Valve Size		Fastener Size	Retainer Side Stud			Back Side Stud		
NPS	DN	Ø-Thread	in	mm	Qty	in	mm	Qty
3	80	5/8-11 UNC	2.75	70	4	2.50	64	4
4	100	5/8-11 UNC	3.00	76	8	2.50	64	8
5	125	3/4-10 UNC	3.00	76	8	2.75	70	8
6	150	3/4-10 UNC	3.25	83	8	2.75	70	8
8	200	3/4-10 UNC	3.50	89	8	3.00	76	8
10	250	7/8-9 UNC	3.75	95	12	3.50	89	12
12	300	7/8-9 UNC	4.00	102	12	3.75	95	12

ASME CLASS 150 | SERIES 41 LUG STYLE | BOLT LENGTH

Valve Size		Fastener Size	Retainer Side Hex Head Bolt			Back Side Hex Head Bolt		
NPS	DN	Ø-Thread	in	mm	Qty	in	mm	Qty
3	80	5/8-11 UNC	2.00	51	4	1.75	44	4
4	100	5/8-11 UNC	2.25	57	8	1.75	44	8
5	125	3/4-10 UNC	2.25	57	8	2.00	51	8
6	150	3/4-10 UNC	2.25	57	8	2.00	51	8
8	200	3/4-10 UNC	2.50	64	8	2.25	57	8
10	250	7/8-9 UNC	2.75	70	12	2.50	64	12
12	300	7/8-9 UNC	3.00	76	12	2.75	70	12

NOTES
> Consult Bray factory for sizes not shown.

ASME CLASS 300 | SERIES 42 WAFER STYLE | THRU STUD LENGTH

Valve Size		Fastener Size	Thru Stud		
NPS	DN	Ø-Thread	in	mm	Qty
3	80	3/4-10 UNC	6.25	159	8
4	100	3/4-10 UNC	6.75	171	8
5	125	3/4-10 UNC	7.25	184	8
6	150	3/4-10 UNC	7.50	191	12
8	200	7/8-9 UNC	8.50	216	12
10	250	1-8 UNC	9.75	248	16
12	300	1 1/8-8 UN	10.50	267	16

ASME CLASS 300 | SERIES 43 LUG STYLE | STUD LENGTH

Valve Size		Fastener Size	Retainer Side Stud			Back Side Stud		
NPS	DN	Ø-Thread	in	mm	Qty	in	mm	Qty
3	80	3/4-10 UNC	3.25	83	8	3.00	76	8
4	100	3/4-10 UNC	3.25	83	8	3.00	76	8
5	125	3/4-10 UNC	3.50	89	8	3.25	83	8
6	150	3/4-10 UNC	3.75	95	12	3.50	89	12
8	200	7/8-9 UNC	4.25	108	12	3.75	95	12
10	250	1-8 UNC	4.75	121	16	4.25	108	16
12	300	1 1/8-8 UN	5.25	133	16	4.50	114	16

ASME CLASS 300 | SERIES 43 LUG STYLE | BOLT LENGTH

Valve Size		Fastener Size	Retainer Side Hex Head Bolt			Back Side Hex Head Bolt		
NPS	DN	Ø-Thread	in	mm	Qty	in	mm	Qty
3	80	3/4-10 UNC	2.25	57	8	2.00	51	8
4	100	3/4-10 UNC	2.25	57	8	2.25	57	8
5	125	3/4-10 UNC	2.75	70	8	2.25	57	8
6	150	3/4-10 UNC	2.75	70	12	2.50	64	12
8	200	7/8-9 UNC	3.25	83	12	2.75	70	12
10	250	1-8 UNC	3.75	95	16	3.25	83	16
12	300	1 1/8-8 UN	4.25	108	16	3.50	89	16

NOTES
> Consult Bray factory for sizes not shown.

SINCE 1986, BRAY HAS PROVIDED FLOW CONTROL SOLUTIONS FOR A VARIETY OF INDUSTRIES AROUND THE WORLD.

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