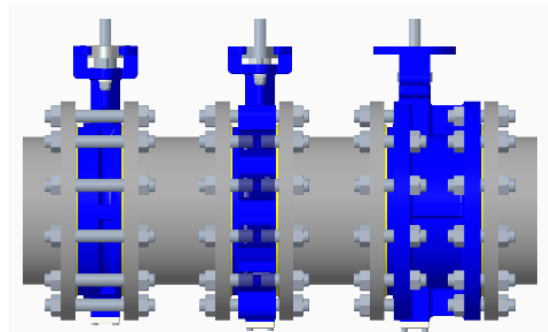
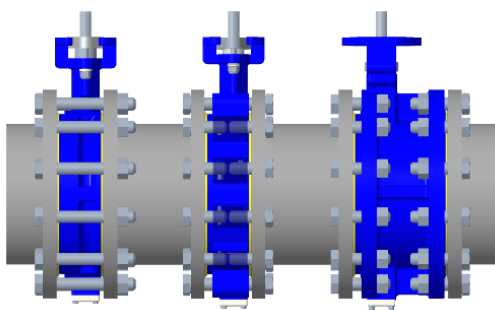


End Flange Bolting – Double Eccentric Butterfly Valves



End Flange Bolting with Hex Head Screws and Studs



- Remove end caps / Flange protectors from valves and ensure that the serrations on sealing faces are clean and not damaged.
- The fastener length is not same for both sides in all cases and vary for the retainer side and stem side, refer the recommended length in the table
- Tapped holes near the stem axis may have blind holes, appropriate fastener length shall be used as recommended in the table
- Fasteners shall be lubricated for ease of installation
- Align the bolt holes of the valve with the bolt holes of the end flange
- Place gasket between the flanges and hand tighten the fasteners
- The fasteners shall be torqued in 3 sets, 50%, 75% and 100 % of the recommended tightening torque in the sequence as shown using the torque wrench.

Considerations

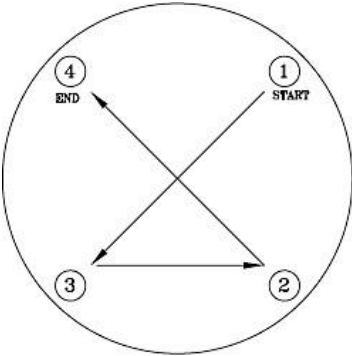
The flange drilling and dimensions as per ASME B16.5 & ASME B16.47

Spiral wound gaskets dimensions as per ASME B16.20

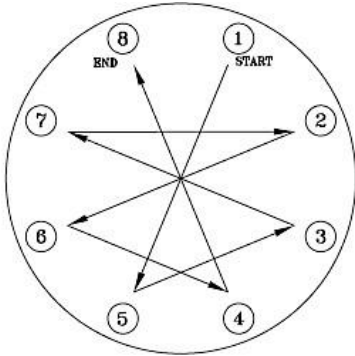
Nut thickness (If applicable) as per ASME B18.2.2 (Heavy Hex)

Lengths rounded off to 1/4"

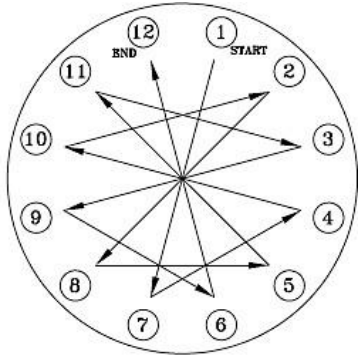
Fasteners tightening sequence



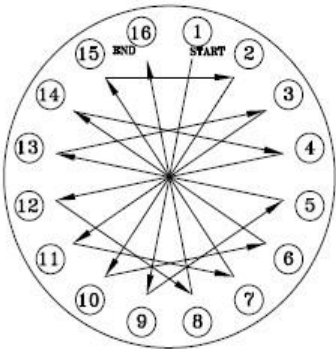
NO. OF BOLTS = 4
 1-3-2-4



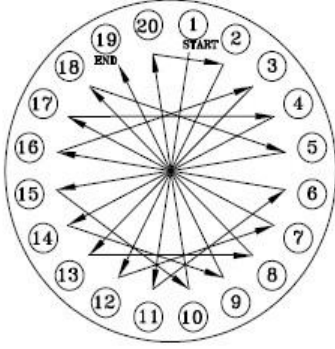
NO. OF BOLTS = 8
 1-5-3-7 → 2-6-4-8



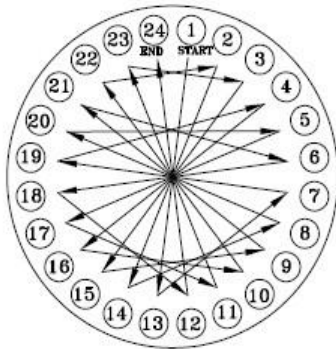
NO. OF BOLTS = 12
 1-7-4-10 → 2-8-5-11 → 3-9-6-12



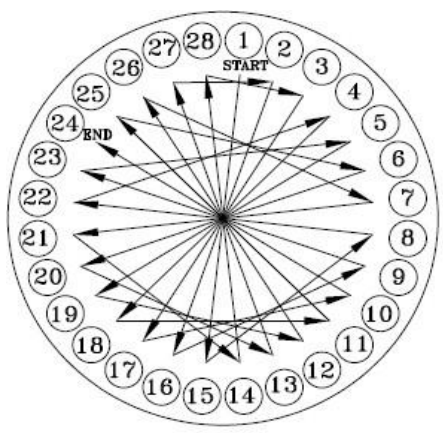
NO. OF BOLTS = 16
 1-9-5-13 → 3-11-7-15 → 2-10-6-14 → 4-12-8-16



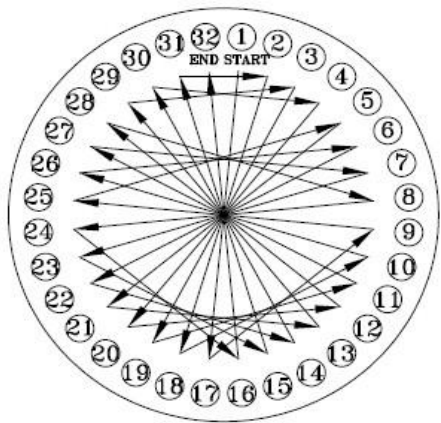
NO. OF BOLTS = 20
 1-11-6-16 → 3-13-8-18 → 5-15-10-20 → 2-12-7-17
 → 4-14-9-19



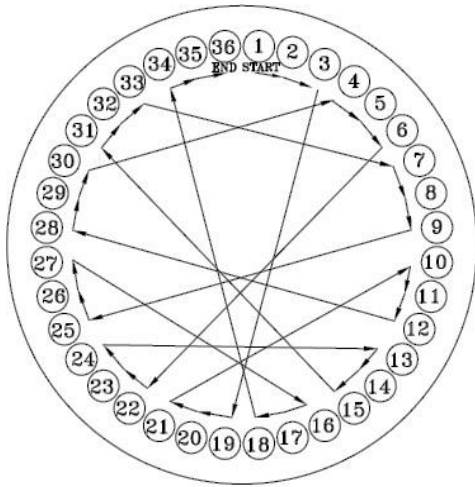
NO. OF BOLTS = 24
 1-13-7-19 → 4-16-10-22 → 2-14-8-20 → 5-17-11-23
 → 3-15-9-21 → 6-18-12-24



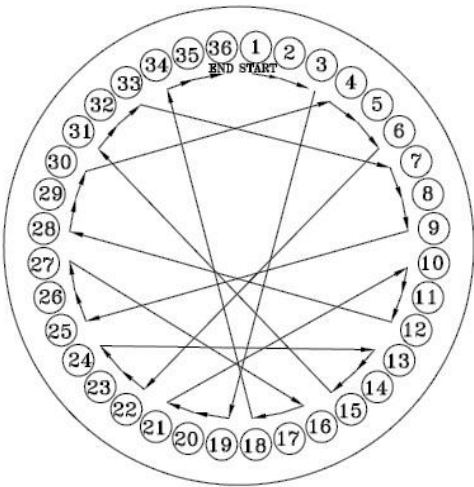
NO.OF BOLTS = 28
1-15-8-22 — 4-18-11-25 — 6-20-13-27 — 2-16-9-23
— 5-19-12-26 — 7-21-14-28 — 3-17-10-24



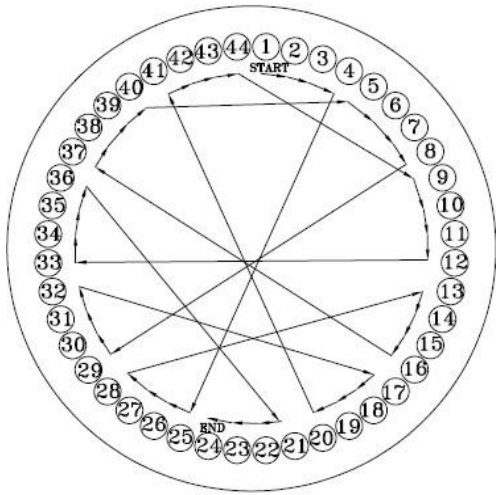
NO.OF BOLTS = 32
1-17-9-25 — 5-21-13-29 — 3-19-11-27 — 7-23-15-31
— 2-18-10-26 — 6-22-14-30 — 4-20-12-28 — 8-24-16-32



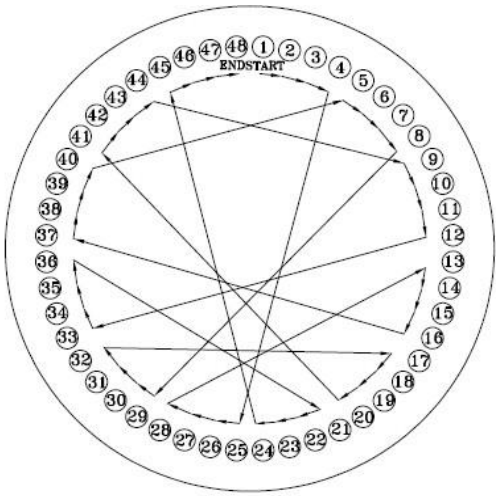
NO.OF BOLTS = 36
1-2-3 — 19-20-21 — 10-11-12 — 28-29-30 — 4-5-6 — 22-23-24
— 13-14-15 — 31-32-33 — 7-8-9 — 25-26-27 — 16-17-18
— 34-35-36



NO.OF BOLTS = 40
1-2-3-4 — 21-22-23-24 — 13-14-15-16 — 33-34-35-36
— 5-6-7-8 — 25-26-27-28 — 17-18-19-20 — 37-38-39-40
— 9-10-11-12 — 29-30-31-32



NO.OF BOLTS = 44
 1-2-3-4— 25-26-27-28— 13-14-15-16— 37-38-39-40
 — 5-6-7-8— 29-30-31-32— 17-18-19-20— 41-42-43-44
 — 9-10-11-12— 33-34-35-36— 21-22-23-24



NO.OF BOLTS = 48
 1-2-3-4— 25-26-27-28— 13-14-15-16— 37-38-39-40
 — 5-6-7-8— 29-30-31-32— 17-18-19-20— 41-42-43-44
 — 9-10-11-12— 33-34-35-36— 21-22-23-24— 45-46-47-48

Recommended tightening torque

Fastener Size	Tightening Torque, Nm	Tightening Torque, lbf.in
5 / 8 – 11 UNC	170-190	1504 - 1681
3 / 4 – 10 UNC	252-280	2230-2478
7 / 8 – 9 UNC	342-380	3026-3363
1 – 8 UN	460-508	4071-4496
1 - 1 / 8 – 8 UN	594-660	5257-5841
1 - 1 / 4 – 8 UN	756-840	6691-7434
1 - 1 / 2 – 8 UN	1125-1250	9957-11063



Series 44 – Double offset - Wafer - Class 150 (with Hex head Screws)

Valve Size		Thread	Ends	Through Screws			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)			Heavy Hex Nut
Inch	DN			Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Qty
				Inch	mm		Inch	mm		N/A	mm		
2	50	5/8 – 11 UNC	B16.5	4.75	121	4	N/A	N/A	N/A	N/A	N/A	N/A	4
2.5	65	5/8 – 11 UNC	B16.5	5.00	127	4	N/A	N/A	N/A	N/A	N/A	N/A	4
3	80	5/8 – 11 UNC	B16.5	5.25	133	4	N/A	N/A	N/A	N/A	N/A	N/A	4
4	100	5/8 – 11 UNC	B16.5	5.50	140	8	N/A	N/A	N/A	N/A	N/A	N/A	8
5	125	3/4 – 10 UNC	B16.5	5.75	146	8	N/A	N/A	N/A	N/A	N/A	N/A	8
6	150	3/4 – 10 UNC	B16.5	6.00	152	8	N/A	N/A	N/A	N/A	N/A	N/A	8
8	200	3/4 – 10 UNC	B16.5	6.50	165	8	N/A	N/A	N/A	N/A	N/A	N/A	8
10	250	7/8 – 9 UNC	B16.5	7.00	178	12	N/A	N/A	N/A	N/A	N/A	N/A	12
12	300	7/8 – 9 UNC	B16.5	7.50	191	12	N/A	N/A	N/A	N/A	N/A	N/A	12
14	350	1 – 8 UNC	B16.5	8.50	216	12	N/A	N/A	N/A	N/A	N/A	N/A	12
16	400	1 – 8 UNC	B16.5	9.00	229	16	N/A	N/A	N/A	N/A	N/A	N/A	16
18	450	1 1/8 – 8 UN	B16.5	9.75	248	16	N/A	N/A	N/A	N/A	N/A	N/A	16
20	500	1 1/8 – 8 UN	B16.5	10.75	273	16	3.25	83	4	2.75	70	4	16
24	600	1 1/4 – 8 UN	B16.5	12.25	311	16	3.50	89	4	3.00	76	4	16
28	700	1 1/4 – 8 UN	B16.47 Ser.A	14.25	360	24	4.00	100	4	4.00	100	4	24
30	750	1 1/4 – 8 UN	B16.47 Ser.A	15.50	390	22	4.25	110	6	4.25	110	6	22
32	800	1 1/2-8 UN	B16.47 Ser.A	16.10	410	24	5.00	125	4	4.50	115	4	24
36	900	1 1/2-8 UN	B16.47 Ser.A	17.35	440	26	5.25	135	6	5.00	125	6	26
40	1000	1 1/2-8 UN	B16.47 Ser.A	19.25	490	30	5.50	140	6	5.00	125	6	30
42	1050	1 1/2-8 UN	B16.47 Ser.A	20.00	510	30	5.75	145	6	5.25	135	6	30
48	1200	1 1/2-8 UN	B16.47 Ser.A	21.75	550	38	6.00	150	6	6.00	150	6	38



Series 44 – Double offset - Wafer - Class 150 (with Studs)

Valve Size		Thread	Ends	Through Studs			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)			Heavy Hex Nut
Inch	DN			Stud Length		Qty	Stud Length		Qty	Stud Length		Qty	Qty
				Inch	mm		Inch	mm		N/A	mm		
2	50	5/8 – 11 UNC	B16.5	5.50	140	4	N/A	N/A	N/A	N/A	N/A	N/A	8
2.5	65	5/8 – 11 UNC	B16.5	5.75	146	4	N/A	N/A	N/A	N/A	N/A	N/A	8
3	80	5/8 – 11 UNC	B16.5	6.00	152	4	N/A	N/A	N/A	N/A	N/A	N/A	8
4	100	5/8 – 11 UNC	B16.5	6.25	159	8	N/A	N/A	N/A	N/A	N/A	N/A	16
5	125	3/4 – 10 UNC	B16.5	6.75	171	8	N/A	N/A	N/A	N/A	N/A	N/A	16
6	150	3/4 – 10 UNC	B16.5	7.00	178	8	N/A	N/A	N/A	N/A	N/A	N/A	16
8	200	3/4 – 10 UNC	B16.5	7.50	191	8	N/A	N/A	N/A	N/A	N/A	N/A	16
10	250	7/8 – 9 UNC	B16.5	8.00	203	12	N/A	N/A	N/A	N/A	N/A	N/A	24
12	300	7/8 – 9 UNC	B16.5	8.50	216	12	N/A	N/A	N/A	N/A	N/A	N/A	24
14	350	1 – 8 UNC	B16.5	9.50	241	12	N/A	N/A	N/A	N/A	N/A	N/A	24
16	400	1 – 8 UNC	B16.5	10.00	254	16	N/A	N/A	N/A	N/A	N/A	N/A	32
18	450	1 1/8 – 8 UN	B16.5	11.00	279	16	N/A	N/A	N/A	N/A	N/A	N/A	32
20	500	1 1/8 – 8 UN	B16.5	12.00	305	16	4.75	121	4	4.25	108	4	40
24	600	1 1/4 – 8 UN	B16.5	13.75	349	16	5.25	133	4	4.75	121	4	40
28	700	1 1/4 – 8 UN	B16.47 Ser.A	15.75	400	24	5.75	145	4	5.75	145	4	56
30	750	1 1/4 – 8 UN	B16.47 Ser.A	17.00	435	22	6.00	155	6	6.00	155	6	56
32	800	1 1/2-8 UN	B16.47 Ser.A	18.00	460	24	6.75	175	4	6.50	165	4	56
36	900	1 1/2-8 UN	B16.47 Ser.A	19.25	490	26	7.25	175	6	7.00	175	6	64
40	1000	1 1/2-8 UN	B16.47 Ser.A	21.25	540	30	7.50	190	6	7.00	175	6	72
42	1050	1 1/2-8 UN	B16.47 Ser.A	21.75	550	30	7.75	195	6	7.25	185	6	72
48	1200	1 1/2-8 UN	B16.47 Ser.A	23.50	600	38	8.00	200	6	8.00	200	6	88



Series 45 – Double offset - Lugged - Class 150 (with Hex head Screws)

Valve Size		Thread	Ends	Retainer Side			Stem Side			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)		
Inch	DN			Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Hex Head Screw Length		Qty
				Inch	mm		Inch	mm		Inch	mm		Inch	mm	
2	50	5/8 – 11 UNC	B16.5	1.75	44	4	1.50	38	4	N/A	N/A	N/A	N/A	N/A	N/A
2.5	65	5/8 – 11 UNC	B16.5	2.00	51	4	1.75	44	4	N/A	N/A	N/A	N/A	N/A	N/A
3	80	5/8 – 11 UNC	B16.5	2.00	51	4	1.75	44	4	N/A	N/A	N/A	N/A	N/A	N/A
4	100	5/8 – 11 UNC	B16.5	2.00	51	8	2.00	51	8	N/A	N/A	N/A	N/A	N/A	N/A
5	125	3/4 – 10 UNC	B16.5	2.25	57	8	2.00	51	8	N/A	N/A	N/A	N/A	N/A	N/A
6	150	3/4 – 10 UNC	B16.5	2.25	57	8	2.00	51	8	N/A	N/A	N/A	N/A	N/A	N/A
8	200	3/4 – 10 UNC	B16.5	2.50	64	8	2.25	57	8	N/A	N/A	N/A	N/A	N/A	N/A
10	250	7/8 – 9 UNC	B16.5	2.50	64	12	2.50	64	12	N/A	N/A	N/A	N/A	N/A	N/A
12	300	7/8 – 9 UNC	B16.5	2.75	70	12	2.75	70	12	N/A	N/A	N/A	N/A	N/A	N/A
14	350	1 – 8 UNC	B16.5	3.00	76	12	3.00	76	12	N/A	N/A	N/A	N/A	N/A	N/A
16	400	1 – 8 UNC	B16.5	3.25	83	12	3.25	83	12	2.75	70	4	2.25	57	4
18	450	1 1/8 – 8 UN	B16.5	3.75	95	16	3.75	95	16	N/A	N/A	N/A	N/A	N/A	N/A
20	500	1 1/8 – 8 UN	B16.5	4.00	102	16	4.00	102	16	3.25	83	4	2.75	70	4
24	600	1 1/4 – 8 UN	B16.5	4.75	121	16	4.75	121	16	3.75	95	4	3.00	76	4
28	700	1 1/4 – 8 UN	B16.47 Ser.A	6.25	155	24	6.25	155	24	4.25	100	4	4.25	100	4
30	750	1 1/4-8 UN	B16.47 Ser.A	6.50	165	22	6.25	160	22	4.25	110	6	4.25	110	6
32	800	1 1/2-8 UN	B16.47 Ser.A	7.00	175	22	7.00	175	22	4.75	125	6	4.50	115	6
36	900	1 1/2-8 UN	B16.47 Ser.A	6.50	165	24	6.50	165	24	5.25	135	8	5.00	125	8
40	1000	1 1/2-8 UN	B16.47 Ser.A	9.00	230	30	8.00	200	30	5.50	140	6	5.00	125	6
42	1050	1 1/2-8 UN	B16.47 Ser.A	8.75	220	30	8.75	220	30	5.75	145	6	5.25	135	6
48	1200	1 1/2-8 UN	B16.47 Ser.A	9.75	245	38	9.75	245	38	6.00	155	6	4.00	155	6

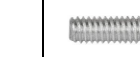


Series 45 – Double offset - Lugged - Class 150 (with Studs)

Valve Size		Thread	Ends	Retainer Side			Stem Side			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)			Heavy Hex Nut
Inch	DN			Stud Length		Qty	Stud Length		Qty	Stud Length		Qty	Stud Length		Qty	
				Inch	mm		Inch	mm		Inch	mm		Inch	mm		
2	50	5/8 – 11 UNC	B16.5	2.75	70	4	2.50	64	4	N/A	N/A	N/A	N/A	N/A	N/A	8
2.5	65	5/8 – 11 UNC	B16.5	3.00	76	4	2.50	64	4	N/A	N/A	N/A	N/A	N/A	N/A	8
3	80	5/8 – 11 UNC	B16.5	3.00	76	4	2.75	70	4	N/A	N/A	N/A	N/A	N/A	N/A	8
4	100	5/8 – 11 UNC	B16.5	3.00	76	8	3.00	76	8	N/A	N/A	N/A	N/A	N/A	N/A	16
5	125	3/4 – 10 UNC	B16.5	3.25	83	8	3.00	76	8	N/A	N/A	N/A	N/A	N/A	N/A	16
6	150	3/4 – 10 UNC	B16.5	3.25	83	8	3.25	83	8	N/A	N/A	N/A	N/A	N/A	N/A	16
8	200	3/4 – 10 UNC	B16.5	3.50	89	8	3.25	83	8	N/A	N/A	N/A	N/A	N/A	N/A	16
10	250	7/8 – 9 UNC	B16.5	4.00	102	12	3.50	89	12	N/A	N/A	N/A	N/A	N/A	N/A	24
12	300	7/8 – 9 UNC	B16.5	4.25	108	12	3.75	95	12	N/A	N/A	N/A	N/A	N/A	N/A	24
14	350	1 – 8 UNC	B16.5	4.50	114	12	4.50	114	12	N/A	N/A	N/A	N/A	N/A	N/A	24
16	400	1 – 8 UNC	B16.5	5.00	127	12	4.75	121	12	4.25	108	4	3.75	95	4	32
18	450	1 1/8 – 8 UN	B16.5	5.50	140	16	5.25	133	16	N/A	N/A	N/A	N/A	N/A	N/A	32
20	500	1 1/8 – 8 UN	B16.5	6.00	152	16	5.50	140	16	4.75	121	4	4.25	108	4	40
24	600	1 1/4 – 8 UN	B16.5	6.75	170	16	6.25	160	16	5.25	135	4	4.75	120	4	40
28	700	1 1/4 – 8 UN	B16.47 Ser.A	7.75	200	24	7.75	200	24	5.75	145	4	5.70	145	4	56
30	750	1 1/4-8 UN	B16.47 Ser.A	8.00	205	22	8.00	205	22	6.00	155	6	6.00	155	6	56
32	800	1 1/2-8 UN	B16.47 Ser.A	9.00	225	22	9.00	225	22	7.00	175	6	6.50	165	6	56
36	900	1 1/2-8 UN	B16.47 Ser.A	8.50	215	24	8.54	217	24	7.25	185	8	7.00	175	8	64
40	1000	1 1/2-8 UN	B16.47 Ser.A	11.00	280	30	10.00	250	30	7.50	190	6	7.00	175	6	72
42	1050	1 1/2-8 UN	B16.47 Ser.A	10.50	265	30	10.32	262	30	7.76	197	6	7.33	186	6	72
48	1200	1 1/2-8 UN	B16.47 Ser.A	11.50	295	38	11.50	295	38	8.00	205	6	8.00	205	6	88



Series 46 – Double offset – Double Flanged - Class 150 (with Hex head Screws)

Valve Size		Thread	Ends													
Inch	DN			Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Qty
				Inch	mm		Inch	mm		Inch	mm		Inch	mm		
2	50	5/8 – 11 UNC	B16.5	2.75	70	4	2.75	70	4	N/A	N/A	N/A	N/A	N/A	N/A	8
2.5	65	5/8 – 11 UNC	B16.5	3.00	75	4	3.00	75	4	N/A	N/A	N/A	N/A	N/A	N/A	8
3	80	5/8 – 11 UNC	B16.5	3.00	76	4	3.00	76	4	N/A	N/A	N/A	N/A	N/A	N/A	8
4	100	5/8 – 11 UNC	B16.5	3.00	76	4	3.00	76	4	1.50	38	4	1.50	38	4	8
5	125	3/4 – 10 UNC	B16.5	3.00	76	8	3.00	76	8	N/A	N/A	N/A	N/A	N/A	N/A	16
6	150	3/4 – 10 UNC	B16.5	3.25	83	8	3.25	83	8	N/A	N/A	N/A	N/A	N/A	N/A	16
8	200	3/4 – 10 UNC	B16.5	3.50	89	8	3.50	89	8	N/A	N/A	N/A	N/A	N/A	N/A	16
10	250	7/8 – 9 UNC	B16.5	3.75	95	8	3.75	95	12	2.00	51	4	N/A	N/A	N/A	20
12	300	7/8 – 9 UNC	B16.5	3.75	95	8	3.75	95	12	2.00	51	4	N/A	N/A	N/A	20
14	350	1 – 8 UNC	B16.5	4.25	108	8	4.25	108	12	2.25	57	4	N/A	N/A	N/A	20
16	400	1 – 8 UNC	B16.5	4.25	108	12	4.25	108	12	2.25	57	4	2.25	57	4	24
18	450	1 1/8 – 8 UN	B16.5	4.50	115	12	4.50	115	12	2.50	64	4	2.50	64	4	24
20	500	1 1/8 – 8 UN	B16.5	5.00	127	16	5.00	127	16	2.50	64	4	N/A	N/A	N/A	32
24	600	1 1/4 – 8 UN	B16.5	5.50	140	16	5.50	140	16	3.00	76	4	3.00	76	4	32
28	700	1 1/4 – 8 UN	B16.47 Ser.A	7.51	191	24	7.51	191	24	4.19	106	4	4.19	106	4	48
30	750	1 1/4 – 8 UN	B16.47 Ser.A	7.76	197	24	7.76	197	24	4.31	110	4	4.31	110	4	48
32	800	1 1/2 – 8 UN	B16.47 Ser.A	5.73	146	36	5.73	146	36	2.99	76	12	2.99	76	12	72



Series 46 – Double offset – Double Flanged - Class 150 (with Studs)

Valve Size		Thread	Ends	Retainer Side			Stem Side			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)			Heavy Hex Nut
Inch	DN			Stud Length		Qty	Stud Length		Qty	Stud Length		Qty	Stud Length		Qty	Qty
				Inch	mm		Inch	mm		Inch	mm		Inch	mm		
2	50	5/8 – 11 UNC	B16.5	3.50	89	4	3.50	89	4	N/A	N/A	N/A	N/A	N/A	N/A	16
2.5	65	5/8 – 11 UNC	B16.5	3.75	95	4	3.75	95	4	N/A	N/A	N/A	N/A	N/A	N/A	16
3	80	5/8 – 11 UNC	B16.5	3.75	95	4	3.75	95	4	N/A	N/A	N/A	N/A	N/A	N/A	16
4	100	5/8 – 11 UNC	B16.5	3.75	95	4	3.75	95	4	2.50	64	4	2.50	64	4	24
5	125	3/4 – 10 UNC	B16.5	4.00	102	8	4.00	102	8	N/A	N/A	N/A	N/A	N/A	N/A	32
6	150	3/4 – 10 UNC	B16.5	4.25	108	8	4.25	108	8	N/A	N/A	N/A	N/A	N/A	N/A	32
8	200	3/4 – 10 UNC	B16.5	4.50	114	8	4.50	114	8	N/A	N/A	N/A	N/A	N/A	N/A	32
10	250	7/8 – 9 UNC	B16.5	4.75	121	8	4.75	121	12	3.25	83	4	N/A	N/A	N/A	44
12	300	7/8 – 9 UNC	B16.5	5.00	127	8	5.00	127	12	3.50	89	4	N/A	N/A	N/A	44
14	350	1 – 8 UNC	B16.5	5.50	140	8	5.50	140	12	3.75	95	4	N/A	N/A	N/A	44
16	400	1 – 8 UNC	B16.5	5.50	140	12	5.50	140	12	3.75	95	4	3.75	95	4	56
18	450	1 1/8 – 8 UN	B16.5	6.25	155	12	6.25	155	12	4.00	100	4	4.00	100	4	56
20	500	1 1/8 – 8 UN	B16.5	6.50	165	16	6.50	165	16	4.00	102	4	N/A	N/A	N/A	76
24	600	1 1/4 – 8 UN	B16.5	7.00	178	16	7.00	178	16	4.75	121	4	4.75	121	4	72
28	700	1 1/4 – 8 UN	B16.47 Ser.A	9.17	233	24	9.17	233	24	5.92	150	4	5.92	150	4	104
30	750	1 1/4 – 8 UN	B16.47 Ser.A	9.41	239	24	9.41	239	24	6.04	154	4	6.04	154	4	104
32	800	1 1/2 – 8 UN	B16.47 Ser.A	7.62	194	36	7.62	194	36	4.96	126	12	4.96	126	12	168



Series 47 – Double offset - Wafer - Class 300 (with Hex head Screws)

Valve Size		Thread	Ends	Through Screws			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)			Heavy Hex Nut
Inch	DN			Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Qty
				Inch	mm		Inch	mm		N/A	mm		
2	50	5/8 – 11 UNC	B16.5	5.00	127	8	N/A	N/A	N/A	N/A	N/A	N/A	8
2.5	65	3/4 – 10 UNC	B16.5	5.50	138	8	N/A	N/A	N/A	N/A	N/A	N/A	8
3	80	3/4 – 10 UNC	B16.5	5.75	146	8	N/A	N/A	N/A	N/A	N/A	N/A	8
4	100	3/4 – 10 UNC	B16.5	6.25	159	8	N/A	N/A	N/A	N/A	N/A	N/A	8
5	125	3/4 – 10 UNC	B16.5	6.75	171	8	N/A	N/A	N/A	N/A	N/A	N/A	8
6	150	3/4 – 10 UNC	B16.5	7.00	178	12	N/A	N/A	N/A	N/A	N/A	N/A	12
8	200	7/8 – 9 UNC	B16.5	8.00	203	12	N/A	N/A	N/A	N/A	N/A	N/A	12
10	250	1 – 8 UNC	B16.5	9.00	229	12	3.00	76	4	2.75	70	4	12
12	300	1 1/8 – 8 UN	B16.5	9.75	248	16	N/A	N/A	N/A	N/A	N/A	N/A	16
14	350	1 1/8 – 8 UN	B16.5	11.00	279	16	3.50	89	4	3.00	76	4	16
16	400	1 1/4 – 8 UN	B16.5	12.00	305	16	4.00	102	4	3.25	83	4	16
18	450	1 1/4 – 8 UN	B16.5	12.75	324	20	3.25	83	4	3.25	83	4	20
20	500	1 1/4 – 8 UN	B16.5	13.75	349	18	3.75	95	6	3.25	83	6	18
24	600	1 1/2 – 8 UN	B16.5	15.25	387	20	3.75	95	4	3.75	95	4	20



Series 47 – Double offset - Wafer - Class 300 (with Studs)

Valve Size		Thread	Ends	Through Screws			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)			Heavy Hex Nut
Inch	DN			Stud Length		Qty	Stud Length		Qty	Stud Length		Qty	Qty
				Inch	mm		Inch	mm		N/A	mm		
2	50	5/8 – 11 UNC	B16.5	5.75	146	8	N/A	N/A	N/A	N/A	N/A	N/A	16
2.5	65	3/4 – 10 UNC	B16.5	6.50	165	8	N/A	N/A	N/A	N/A	N/A	N/A	16
3	80	3/4 – 10 UNC	B16.5	6.75	171	8	N/A	N/A	N/A	N/A	N/A	N/A	16
4	100	3/4 – 10 UNC	B16.5	7.25	184	8	N/A	N/A	N/A	N/A	N/A	N/A	16
5	125	3/4 – 10 UNC	B16.5	7.75	197	8	N/A	N/A	N/A	N/A	N/A	N/A	16
6	150	3/4 – 10 UNC	B16.5	7.75	197	12	N/A	N/A	N/A	N/A	N/A	N/A	24
8	200	7/8 – 9 UNC	B16.5	9.00	229	12	N/A	N/A	N/A	N/A	N/A	N/A	24
10	250	1 – 8 UNC	B16.5	10.25	260	12	4.50	114	4	4.25	108	4	32
12	300	1 1/8 – 8 UN	B16.5	11.00	279	16	N/A	N/A	N/A	N/A	N/A	N/A	32
14	350	1 1/8 – 8 UN	B16.5	12.25	311	16	5.00	127	4	4.50	114	4	40
16	400	1 1/4 – 8 UN	B16.5	13.50	343	16	5.50	140	4	5.00	127	4	40
18	450	1 1/4 – 8 UN	B16.5	14.25	362	20	5.00	127	4	5.00	127	4	48
20	500	1 1/4 – 8 UN	B16.5	15.00	381	18	5.25	133	6	5.00	127	6	48
24	600	1 1/2 – 8 UN	B16.5	17.00	432	20	5.75	146	4	5.75	146	4	48



Series 48 – Double offset - Lugged - Class 300 (with Hex head Screws)

Valve Size		Thread	Ends	Retainer Side			Stem Side			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)		
Inch	DN			Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Hex Head Screw Length		Qty
				Inch	mm		Inch	mm		Inch	mm		Inch	mm	
2	50	5/8 – 11 UNC	B16.5	1.75	44	8	1.75	44	8	N/A	N/A	N/A	N/A	N/A	N/A
2.5	65	3/4 – 10 UNC	B16.5	2.00	50	8	2.00	50	8	N/A	N/A	N/A	N/A	N/A	N/A
3	80	3/4 – 10 UNC	B16.5	2.25	57	8	2.00	51	8	N/A	N/A	N/A	N/A	N/A	N/A
4	100	3/4 – 10 UNC	B16.5	2.50	64	8	2.25	57	8	N/A	N/A	N/A	N/A	N/A	N/A
5	125	3/4 – 10 UNC	B16.5	2.50	64	8	2.50	64	8	N/A	N/A	N/A	N/A	N/A	N/A
6	150	3/4 – 10 UNC	B16.5	2.75	70	12	2.50	64	12	N/A	N/A	N/A	N/A	N/A	N/A
8	200	7/8 – 9 UNC	B16.5	3.25	83	12	3.00	76	12	N/A	N/A	N/A	N/A	N/A	N/A
10	250	1 – 8 UNC	B16.5	3.75	95	12	3.25	83	12	3.00	76	4	2.75	70	4
12	300	1 1/8 – 8 UN	B16.5	4.00	102	16	3.50	89	16	N/A	N/A	N/A	N/A	N/A	N/A
14	350	1 1/8 – 8 UN	B16.5	4.50	114	16	4.25	108	16	3.50	89	4	3.00	76	4
16	400	1 1/4 – 8 UN	B16.5	5.00	127	16	4.50	114	16	4.00	102	4	3.25	83	4
18	450	1 1/4 – 8 UN	B16.5	5.50	140	20	4.50	114	20	3.25	83	4	3.25	83	4
20	500	1 1/4 – 8 UN	B16.5	6.25	159	18	5.00	127	18	3.75	95	6	3.25	83	6
24	600	1 1/2 – 8 UN	B16.5	6.25	159	20	6.25	159	20	3.75	95	4	3.75	95	4



Series 48 – Double offset - Lugged - Class 300 (with Studs)

Valve Size		Thread	Ends	Retainer Side			Stem Side			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)			Heavy Hex Nut
Inch	DN			Stud Length		Qty	Stud Length		Qty	Stud Length		Qty	Stud Length		Qty	Qty
				Inch	mm		Inch	mm		Inch	mm		Inch	mm		
2	50	5/8 – 11 UNC	B16.5	2.75	70	8	2.75	70	8	N/A	N/A	N/A	N/A	N/A	N/A	16
2.5	65	3/4 – 10 UNC	B16.5	3.00	80	8	3.00	80	8	N/A	N/A	N/A	N/A	N/A	N/A	16
3	80	3/4 – 10 UNC	B16.5	3.25	83	8	3.00	76	8	N/A	N/A	N/A	N/A	N/A	N/A	16
4	100	3/4 – 10 UNC	B16.5	3.50	89	8	3.25	83	8	N/A	N/A	N/A	N/A	N/A	N/A	16
5	125	3/4 – 10 UNC	B16.5	3.75	95	8	3.50	89	8	N/A	N/A	N/A	N/A	N/A	N/A	16
6	150	3/4 – 10 UNC	B16.5	4.00	102	12	3.50	89	12	N/A	N/A	N/A	N/A	N/A	N/A	24
8	200	7/8 – 9 UNC	B16.5	4.50	114	12	4.25	108	12	N/A	N/A	N/A	N/A	N/A	N/A	24
10	250	1 – 8 UNC	B16.5	5.25	133	12	4.75	121	12	4.50	114	4	4.25	108	4	32
12	300	1 1/8 – 8 UN	B16.5	5.75	146	16	5.25	133	16	N/A	N/A	N/A	N/A	N/A	N/A	32
14	350	1 1/8 – 8 UN	B16.5	6.25	159	16	5.75	146	16	5.00	127	4	4.50	114	4	40
16	400	1 1/4 – 8 UN	B16.5	6.75	171	16	6.25	159	16	5.50	140	4	5.00	127	4	40
18	450	1 1/4 – 8 UN	B16.5	7.50	191	20	6.50	165	20	5.00	127	4	5.00	127	4	48
20	500	1 1/4 – 8 UN	B16.5	8.00	203	18	6.75	171	18	5.50	140	6	5.00	127	6	48
24	600	1 1/2 – 8 UN	B16.5	8.25	210	20	8.25	210	20	5.75	146	4	5.75	146	4	48



Series 49 – Double offset – Double Flanged - Class 300 (with Hex head Screws)

Valve Size		Thread	Ends	Retainer Side			Stem Side			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)			Heavy Hex Nut
Inch	DN			Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Hex Head Screw Length		Qty	Qty
				Inch	mm		Inch	mm		Inch	mm		Inch	mm		
2	50	5/8 – 11 UNC	B16.5	3.00	75	4	3.00	75	4	1.5	40	4	1.5	40	4	8
2.5	65	3/4 – 10 UNC	B16.5	3.15	80	4	3.15	80	4	1.75	45	4	1.75	45	4	8
3	80	3/4 – 10 UNC	B16.5	3.40	86	4	3.40	86	4	1.90	50	4	1.90	50	4	8
4	100	3/4 – 10 UNC	B16.5	3.75	96	4	3.75	96	4	2.00	55	4	2.00	55	4	8
5	125	3/4 – 10 UNC	B16.5	4.15	105	4	4.15	105	4	2.00	55	4	2.00	55	4	8
6	150	3/4 – 10 UNC	B16.5	4.00	102	8	4.00	102	8	2.25	57	4	2.25	57	4	16
8	200	7/8 – 9 UNC	B16.5	4.50	114	8	4.50	114	8	2.50	64	4	2.50	64	4	16
10	250	1 – 8 UNC	B16.5	5.25	133	12	5.25	133	12	2.75	70	4	2.75	70	4	24
12	300	1 1/8 – 8 UN	B16.5	5.50	140	12	5.50	140	12	3.25	83	4	3.25	83	4	24
14	350	1 1/8 – 8 UN	B16.5	5.75	146	16	5.75	146	16	3.25	83	4	3.25	83	4	32
16	400	1 1/4 – 8 UN	B16.5	6.25	159	16	6.25	159	16	3.50	89	4	3.50	89	4	32
18	450	1 1/4 – 8 UN	B16.5	6.50	165	16	6.50	165	16	3.50	89	8	3.50	89	8	32
20	500	1 1/4 – 8 UN	B16.5	6.75	171	20	6.75	171	20	3.50	89	4	3.50	89	4	40
24	600	1 1/2 – 8 UN	B16.5	7.50	191	20	7.50	191	20	4.25	108	4	4.25	108	4	40



Series 49 – Double offset – Double Flanged - Class 300 (with Studs)

Valve Size		Thread	Ends	Retainer Side			Stem Side			Retainer Side (Blind tap near Neck)			Stem Side (Blind tap near Neck)			Heavy Hex Nut
Inch	DN			Stud Length		Qty	Stud Length		Qty	Stud Length		Qty	Stud Length		Qty	Qty
				Inch	mm		Inch	mm		Inch	mm		Inch	mm		
2	50	5/8 – 11 UNC	B16.5	3.75	95	4	3.75	95	4	2.50	65	4	2.50	65	4	24
2.5	65	3/4 – 10 UNC	B16.5	4.15	105	4	4.15	105	4	2.75	70	4	2.75	70	4	24
3	80	3/4 – 10 UNC	B16.5	4.25	110	4	4.25	110	4	3.00	75	4	3.00	75	4	24
4	100	3/4 – 10 UNC	B16.5	5.00	125	4	5.00	125	4	3.25	80	4	3.25	75	4	24
5	125	3/4 – 10 UNC	B16.5	5.00	125	4	5.00	125	4	3.25	80	4	3.25	80	4	24
6	150	3/4 – 10 UNC	B16.5	5.00	127	8	5.00	127	8	3.50	89	4	3.50	89	4	40
8	200	7/8 – 9 UNC	B16.5	5.75	146	8	5.75	146	8	3.75	95	4	3.75	95	4	40
10	250	1 – 8 UNC	B16.5	6.50	165	12	6.50	165	12	4.25	108	4	4.25	108	4	56
12	300	1 1/8 – 8 UN	B16.5	7.00	178	12	7.00	178	12	4.75	121	4	4.75	121	4	56
14	350	1 1/8 – 8 UN	B16.5	7.25	184	16	7.25	184	16	4.75	121	4	4.75	121	4	72
16	400	1 1/4 – 8 UN	B16.5	7.75	197	16	7.75	197	16	5.25	133	4	5.25	133	4	72
18	450	1 1/4 – 8 UN	B16.5	7.75	210	16	7.75	210	16	5.25	133	8	5.25	133	8	80
20	500	1 1/4 – 8 UN	B16.5	8.25	210	20	8.25	210	20	5.25	133	4	5.25	133	4	88
24	600	1 1/2 – 8 UN	B16.5	9.25	235	20	9.25	235	20	6.25	159	4	6.25	159	4	88