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APPENDIX A – RECOMMENDED TORQUE VALUES

NOTE: THE FOLLOWING CHARTS ARE ONLY VALID FOR CARBON STEEL (A105), LOW CHROME (9% Cr OR LESS), or STAINLESS STEEL FLANGES UTILIZING B7 OR B16 BOLTING. **CONSULT ENGINEERING** FOR OTHER TYPES OF BOLTING (B7M, B8, ETC) OR OTHER FLANGE MATERIALS OR TYPES (LINED PIPE FLANGES, VANSTONE, PLASTIC, ETC)

PART 1: 24" and UNDER RAISED FACE FLANGES

Torque Values for 150# Raised Face Flanges w/ B7 or B16 Bolting					
NPS (in.)	Bolt Size	# Bolts	Recommended Torque Increments (Ft-Lbs) (* indicates target for stainless steel flanges)		
			1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
1/2	1/2	4	15	25	40
3/4	1/2	4	15	25	40
1	1/2	4	15	30	50
1 1/2	1/2	4	20	40	60
2	5/8	4	40	80	130
3	5/8	4	40	80	130
4	5/8	8	40	80	120 (105*)
6	3/4	8	70	140	220
8	3/4	8	70	140	220
10	7/8	12	110	220	350
12	7/8	12	110	220	350
14	1	12	160	320	530
16	1	16	150	300	480 (430*)
18	1 1/8	16	230	460	750 (680*)
20	1 1/8	20	230	460	750 (630*)
24	1 1/4	20	340	680	1130 (880*)
Notes: *Indicates reduced target value for stainless steel flanges 1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress 2) Values assume a well lubricated new stud and nut 3) Min. Torque was set at 35 KSI					

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Torque Values for 300# Raised Face Flanges w/ B7 or B16 Bolting					
NPS (in.)	Bolt Size	# Bolts	Recommended Torque Increments (Ft-Lbs)		
			1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
1/2	1/2	4	20	40	60
3/4	5/8	4	25	50	70
1	5/8	4	25	50	70
1 1/2	3/4	4	40	80	130
2	5/8	8	25	50	70
3	3/4	8	50	100	140
4	3/4	8	70	140	220
6	3/4	12	60	120	200
8	7/8	12	100	200	330
10	1	16	130	260	420
12	1 1/8	16	190	380	630
14	1 1/8	20	150	300	500
16	1 1/4	20	220	440	710
18	1 1/4	24	270	540	880
20	1 1/4	24	270	540	880
24	1 1/2	24	400	800	1310
Notes: 1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress 2) Values assume a well lubricated new stud and nut 3) Min. Torque was set at 35 KSI					

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Torque Values for 600# Raised Face Flanges w/ B7 or B16 Bolting					
NPS (in.)	Bolt Size	# Bolts	Recommended Torque Increments (Ft-Lbs)		
			1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
1/2	1/2	4	20	40	60
3/4	5/8	4	25	50	70
1	5/8	4	25	50	70
1 1/2	3/4	4	40	80	130
2	5/8	8	25	50	80
3	3/4	8	50	100	150
4	7/8	8	100	200	330
6	1	12	150	300	470
8	1 1/8	12	210	420	700
10	1 1/4	16	260	520	840
12	1 1/4	20	260	520	840
14	1 3/8	20	290	580	940
16	1 1/2	20	390	780	1290
18	1 5/8	20	600	1200	1990
20	1 5/8	24	600	1200	1970
24	1 7/8	24	790	1580	2630
Notes: 1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress 2) Values assume a well lubricated new stud and nut 3) Min. Torque was set at 35 KSI					

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Torque Values for 900# Raised Face Flanges w/ B7 or B16 Bolting					
NPS (in.)	Bolt Size	# Bolts	Recommended Torque Increments (Ft-Lbs)		
			1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
3/4	Not Made - See 1500# Class Information				
1					
1 1/2					
2					
3	7/8	8	75	150	250
4	1 1/8	8	140	280	450
6	1 1/8	12	160	320	530
8	1 3/8	12	250	500	840
10	1 3/8	16	250	500	840
12	1 3/8	20	300	600	990
14	1 1/2	20	390	780	1280
16	1 5/8	20	480	960	1580
18	1 7/8	20	780	1560	2590
20	2	20	860	1720	2850
24	2 1/2	20	1550	3100	5150
Notes:					
1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress					
2) Values assume a well lubricated new stud and nut					
3) Min. Torque was set at 35 KSI					

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Torque Values for 1500# Raised Face Flanges w/ B7 or B16 Bolting					
NPS (in.)	Bolt Size	# Bolts	Recommended Torque Increments (Ft-Lbs)		
			1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
3/4	3/4	4	40	80	120
1	7/8	4	60	120	190
1 1/2	1	4	90	180	290
2	7/8	8	60	120	190
3	1 1/8	8	130	260	420
4	1 1/4	8	180	360	600
6	1 3/8	12	240	480	800
8	1 5/8	12	390	780	1290
10	1 7/8	12	700	1400	2340
12	2	16	780	1560	2580
14	2 1/4	16	1120	2240	3720
16	2 1/2	16	1550	3100	5150
18	2 3/4	16	2080	4160	6930
20	3	16	2720	5440	9040
24	3 1/2	16	3900	7800	13000
Notes: 1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress 2) Values assume a well lubricated new stud and nut 3) Min. Torque was set at 35 KSI					

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PART 2: RING JOINT FLANGES

Torque Values for 300# RING JOINT Flanges w/ B7 or B16 Bolting						
NPS (in.)	Bolt Size	# Bolts	Ring #	Recommended Torque Increments (Ft-Lbs)		
				1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
1/2	1/2	4	R-11	20	40	60
3/4	5/8	4	R-13	25	50	80
1	5/8	4	R-16	25	50	80
1 1/2	3/4	4	R-20	40	80	130
2	5/8	8	R-23	30	60	90
3	3/4	8	R-31	50	100	160
4	3/4	8	R-37	60	120	200
6	3/4	12	R-45	60	120	200
8	7/8	12	R-49	90	180	300
10	1	16	R-53	90	180	300
12	1 1/8	16	R-57	130	260	430
14	1 1/8	20	R-61	130	260	430
16	1 1/4	20	R-65	180	360	590
18	1 1/4	24	R-69	180	360	590
20	1 1/4	24	R-73	200	400	640
24	1 1/2	24	R-77	360	720	1200

Notes:

- 1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress
- 2) Values assume a well lubricated new stud and nut
- 3) Min. Torque was set at 35 KSI

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Torque Values for 600# RING JOINT Flanges w/ B7 or B16 Bolting						
NPS (in.)	Bolt Size	# Bolts	Ring #	Recommended Torque Increments (Ft-Lbs)		
				1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
1/2	1/2	4	R-11	20	40	60
3/4	5/8	4	R-13	25	50	80
1	5/8	4	R-16	30	60	90
1 1/2	3/4	4	R-20	40	80	140
2	5/8	8	R-23	30	60	90
3	3/4	8	R-31	50	100	160
4	7/8	8	R-37	75	150	240
6	1	12	R-45	90	180	290
8	1 1/8	12	R-49	130	260	420
10	1 1/4	16	R-53	180	360	590
12	1 1/4	20	R-57	180	360	590
14	1 3/8	20	R-61	240	480	800
16	1 1/2	20	R-65	290	580	940
18	1 5/8	20	R-69	390	780	1290
20	1 5/8	24	R-73	390	780	1290
24	1 7/8	24	R-77	700	1400	2340

Notes:

- 1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress
- 2) Values assume a well lubricated new stud and nut
- 3) Min. Torque was set at 35 KSI

General Flanged Joint Assembly & Bolting Guidelines

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Torque Values for 900# RING JOINT Flanges w/ B7 or B16 Bolting						
NPS (in.)	Bolt Size	# Bolts	Ring #	Recommended Torque Increments (Ft-Lbs)		
				1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
3/4	Not Made - See 1500# Class Information					
1						
1 1/2						
2						
3	7/8	8	R-31	60	120	200
4	1 1/8	8	R-37	130	260	420
6	1 1/8	12	R-45	130	260	420
8	1 3/8	12	R-49	240	480	800
10	1 3/8	16	R-53	240	480	800
12	1 3/8	20	R-57	240	480	800
14	1 1/2	20	R-62	300	600	970
16	1 5/8	20	R-66	390	780	1290
18	1 7/8	20	R-70	700	1400	2340
20	2	20	R-74	780	1560	2580
24	2 1/2	20	R-78	1550	3100	5150

Notes:

- 1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress
- 2) Values assume a well lubricated new stud and nut
- 3) Min. Torque was set at 35 KSI

General Flanged Joint Assembly & Bolting Guidelines

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Torque Values for 1500# RING JOINT Flanges w/ B7 or B16 Bolting						
NPS (in.)	Bolt Size	# Bolts	Ring #	Recommended Torque Increments (Ft-Lbs)		
				1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
3/4	3/4	4	R-14	40	80	120
1	7/8	4	R-16	60	120	190
1 1/2	1	4	R-20	90	180	290
2	7/8	8	R-24	60	120	190
3	1 1/8	8	R-35	130	260	420
4	1 1/4	8	R-39	180	360	590
6	1 3/8	12	R-46	240	480	800
8	1 5/8	12	R-50	390	780	1290
10	1 7/8	12	R-54	700	1400	2340
12	2	16	R-58	780	1560	2580
14	2 1/4	16	R-63	1120	2240	3720
16	2 1/2	16	R-67	1550	3100	5150
18	2 3/4	16	R-71	2080	4160	6930
20	3	16	R-75	2720	5440	9040
24	3 1/2	16	R-79	3900	7800	13000

Notes:

- 1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress
- 2) Values assume a well lubricated new stud and nut
- 3) Min. Torque was set at 35 KSI



Torque Values for 2500# RING JOINT Flanges w/ B7 or B16 Bolting						
NPS (in.)	Bolt Size	# Bolts	Ring #	Recommended Torque Increments (Ft-Lbs)		
				1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
3/4	3/4	4	R-16	40	80	120
1	7/8	4	R-18	60	120	190
1 1/2	1 1/8	4	R-23	130	260	420
2	1	8	R-26	90	180	290
3	1 1/4	8	R-32	180	360	590
4	1 1/2	8	R-38	280	560	940
6	2	8	R-47	780	1560	2580
8	2	12	R-51	780	1560	2580
10	2 1/2	12	R-55	1550	3100	5150
12	2 3/4	12	R-60	2080	4160	6930

Notes:

1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress

2) Values assume a well lubricated new stud and nut

3) Min. Torque was set at 35 KSI

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PART 3: FLAT FACE FLANGES

Torque Values for 125#/150# FLAT FACE Flanges w/ B7 Bolting					
NPS (in.)	Bolt Size	# Bolts	Recommended Torque Increments (Ft-Lbs)		
			1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
1/2	1/2	4	10	20	40
3/4	1/2	4	20	40	70
1	1/2	4	20	40	70
1 1/2	1/2	4	20	40	70
2	5/8	4	40	80	130
3	5/8	4	40	80	130
4	5/8	8	40	80	130
6	3/4	8	70	140	230
8	3/4	8	70	140	230
10	7/8	12	110	220	380
12	7/8	12	110	220	380
14	1	12	170	340	570
16	1	16	170	340	570
18	1 1/8	16	250	500	830
20	1 1/8	20	250	500	830
24	1 1/4	20	350	700	1160
ONLY USE FULL FACE GASKETS ON FLAT FACED CAST IRON / 125# FLANGES 1) Recommended Torque Values are based on Advanced Sealing's Calculated Torque Values to obtain proper gasket seating stress 2) Values assume a well lubricated new stud and nut					

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PART 4: LARGE BORE FLANGES

Torque Values for LARGE BORE 150# Flanges w/ B7 or B16 Bolting					
NPS (in.)	Bolt Size	# Bolts	Recommended Torque Increments (Ft-Lbs)		
			1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
26 (Series A)	1 1/4	24	190	380	620
26 (Series B)	3/4	36	60	120	200
28 (Series A)	1 1/4	28	180	360	590
28 (Series B)	3/4	40	60	120	200
30 (Series A)	1 1/4	28	190	380	620
30 (Series B)	3/4	44	60	120	200
36 (Series A)	1 1/2	32	280	560	940
36 (Series B)	7/8	44	96	192	320
42 (Series A)	1 1/2	36	300	600	990
42 (Series B)	1	48	147	294	490
48 (Series A)	1 1/2	44	300	600	990
48 (Series B)	1 1/8	44	213	426	710
Notes: 1) Series B was perviously called API 605 2) Recommended Torque Values are based on PCC-1 Table O-8 for Series A and Garlock Recommendations for Series B					

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Torque Values for LARGE BORE 300# Flanges w/ B7 or B16 Bolting					
NPS (in.)	Bolt Size	# Bolts	Recommended Torque Increments (Ft-Lbs)		
			1st Pass (~30%)	2nd Pass (~60%)	TARGET TORQUE (100%)
26 (Series A)	1 5/8	28	410	820	1360
26 (Series B)	1 1/4	32	300	600	1000
28 (Series A)	1 5/8	28	410	820	1360
28 (Series B)	1 1/4	36	300	600	1000
30 (Series A)	1 3/4	28	630	1260	2110
30 (Series B)	1 3/8	36	363	726	1210
36 (Series A)	2	32	820	1640	2730
36 (Series B)	1 5/8	32	540	1080	1800
42 (Series A)	1 5/8	32	790	1580	2610
42 (Series B)	1 3/4	36	663	1326	2210
48 (Series A)	1 7/8	32	1260	2520	4210
48 (Series B)	1 7/8	40	972	1944	3240
Notes: 1) Series B was perviously called API 605 2) Recommended Torque Values are based on PCC-1 Table O-8 for Series A and Garlock Recommendations for Series B					