



Installation Instructions

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INSTALLATION PROCEDURE FOR AC BACKING FLANGE

Installation

1. Inspect box for damage from shipping. Notify carrier of any damage and make claims as required.
2. After removing the AC Backing Flange from the box, inspect the beveled surface between the AC Backing Flange inside diameter (ID) for any sharp protrusion which could come into contact with the flange adapter. Any sharp edge in this area is cause for rejection.
3. When installation is required, verify that each AC Backing Flange is the proper size, flange type, and coating for the given application.
4. If AC Backing Flange is rejected due to a surface deformation in the above noted area, set aside for return and specify reason for rejection.
5. Slip AC Backing Flange over flange adapter and rotate ring to confirm correct fit and size.

Note: Beveled surface on AC Backing Flange faces flange adapter; washers, bolts, and nuts go on flat surface of AC Backing Flange. As with any flange made to ANSI drilling, optimal distribution of clamping force is obtained through the use of heavy-duty washers.

6. Select one AC Backing Flange on each joint for determining the flange tightening sequence, and follow the "star" pattern for all tightening passes on that joint.
7. Install all AC Backing Flanges using a calibrated torque wrench or a KC Multi-Ring® SmartBox™. Whenever possible, apply the torque to the nut. All passes are to be made following the tightening sequence described above. For pass 1, torque each nut to 33% of the desired torque value. For pass 2, re-torque each nut to 66% of the desired torque value. For pass 3, re-torque each nut to 100% of the desired torque value. Wait two minutes and re-torque to 100% value. *(Note that for speed and ease of installation, the KC Multi-Ring® SmartBox™ is calibrated to the recommended bolt torque for each pipe size using KC Multi-Ring® gaskets, allowing the use of an electric impact wrench for the first 3 passes - a calibrated torque wrench is always used for the final Quality Control pass.)*

Note: Optimal results are obtained when used in conjunction with KC Multi-Ring® reduced surface area low-torque gaskets.



INSTALLATION PROCEDURE FOR ULTRAPURE GASKET

The gaskets will arrive cleaned and individually packaged in sealed bags. Each bag will be labeled with a part number which will correlate with pipe type(s) and dimension. Gaskets of similar size and type will be aggregated and packaged in a larger sealed bag, typically in groups of ten (10).

Installation

1. When installation is required, verify that the gasket is the proper size and flange type. When installing the gasket, installer shall wear appropriate garments to meet the appropriate clean zone protocol in effect at the time. Specifically, clean room gloves are to be worn at all times while handling gaskets.
2. While gasket is in the individually sealed bag, inspect for any surface deformations such as tears, rips, or non-uniform cuts. Any material defect of the inner surface is cause for rejection.
3. If a gasket is rejected due to a surface deformation, place aside for return and specify reason for rejection.
4. **Great care should be taken to protect the gasket surface from exposure to oil or other contaminants.**
5. Remove gasket from bag.
6. Immediately prior to installing, pay particular attention to the inner surface. **Do not wipe the surface with or expose the surface to IPA (Isopropyl Alcohol).**
7. Pay particular attention to keeping the gasket and flange adapters on the same axis (that is, geometrically centered).
8. Install all flanges using a calibrated torque wrench, or a KC Multi-Ring® SmartBox™. Whenever possible, apply the torque to the nut. Tighten the flanges in a star pattern to the following torque values using progressive 4-pass tightening. (Note that the pipe size and tightening sequence is cast into the face of the AC Backing Flange.) Following the star pattern, torque each nut to 33% of the desired torque value. Then re-torque to 66% of the desired torque value. Re-torque to 100% of the desired torque value. **Wait two minutes and re-torque to 100% value.** (Note for speed and ease of installation, the KC Multi-Ring® SmartBox™ is calibrated to the recommended bolt torque for each pipe size, allowing the use of an electric impact wrench for the first 3 passes - a calibrated torque wrench is always used for the final Quality Control pass.)

Note: Optimal results are obtained when KC Multi-Ring® gaskets are used in conjunction with KC Multi-Ring® AC backing flanges.



MINIMUM AND OPTIMUM TORQUE REQUIREMENTS FOR FLANGES WITH KC MULTI-RING® ULTRAPURE GASKETS

(33% - 66% - 100% values shown in parentheses)

NON-METALLIC METRIC (PVDF, POLYPROPYLENE, ETC.) PIPE FLANGES USING KC MULTI-RING® BACKING FLANGES AND CADNIUM-PLATED FASTENERS, WITH HARDENED FLAT WASHERS ON BOTH SIDES; BELLEVILLE WASHERS CAN BE USED WITH, BUT DO NOT REPLACE FLAT HARDENED WASHERS

SIZE	Bolt Size	Number of Bolts	Torque (in foot-pounds)	
			Torque (in newton-meters)	
			Optimum Torque	Minimum Torque
20mm	1/2"	4	7 (2.3/4.6/7) 9.5 (3.2/6.4/9.5)	5 (1.7/3.4/5) 6.8 (2.3/4.6/6.8)
25mm	1/2"	4	9 (3/6/9) 12.2 (4.1/8.2/12.2)	7 (2.3/4.6/7) 9.5 (3.2/6.4/9.5)
32mm	1/2"	4	12 (4/8/12) 16.3 (5.4/10.8/16.3)	9 (3/6/9) 12.2 (4.1/8.2/12.2)
40mm	1/2"	4	20 (6.7/13.4/20) 27 (9/18/27)	15 (5/10/15) 20.4 (6.8/13.6/20.4)
50mm	1/2"	4	24 (8/16/24) 32.5 (10.8/21.6/32.5)	18 (6/12/18) 24.3 (8.1/16.2/24.3)
63mm	5/8"	4	30 (10/20/30) 40.6 (13.5/27.1/40.6)	22 (7.3/14.7/22) 29.7 (9.9/19.8/29.7)
75mm	5/8"	4	35 (11.7/23.4/35) 47.4 (15.8/31.6/47.4)	26 (8.6/17.3/26) 35.1 (11.7/23.4/35.1)
90mm	5/8"	4	40 (13.3/26.7/40) 54.3 (18.1/36.2/54.3)	30 (10/20/30) 40.6 (13.5/27.1/40.6)
110mm	5/8"	8	38 (12.6/25.3/38) 51.6 (17.2/34.4/51.6)	33 (11/22/33) 44.7 (14.9/29.8/44.7)
160mm	3/4"	8	65 (21.8/43.7/65) 88.2 (29.4/58.8/88.2)	44 (14.7/29.5/44) 59.7 (19.9/39.8/59.7)
225mm	3/4"	8	80 (26.7/53.4/80) 108.3 (36.1/72.2/108.3)	56 (18.7/37.4/56) 75.9 (25.3/50.6/75.9)
250mm	7/8"	12	131 (43.7/87.4/131) 177.6 (59.2/108.4/177.6)	100 (33.3/67.7/100) 135.6 (45.2/90.4/135.6)

NOTE: For speed and ease of installation, the KC Multi-Ring® SmartBox™ is calibrated to the recommended bolt torque for each pipe size, allowing the use of an electric impact wrench for the first 3 passes (a calibrated torque wrench is always used for the final Quality Control pass.)



INSTALLATION PROCEDURE FOR “BLIND” KC MULTI-RING® ULTRAPURE GASKETS

The gaskets will arrive cleaned and individually packaged in sealed bags. Each bag will be labeled with a part number which will correlate with pipe type(s) and dimension. Gaskets of similar size and type will be aggregated and packaged in a larger sealed bag, typically in groups of ten (10).

Installation

1. When installation is required, verify that the gasket is the proper size and flange type. When installing the gasket, installer shall wear appropriate garments to meet the appropriate clean zone protocol in effect at the time. Specifically, clean room gloves are to be worn at all times while handling gaskets.
2. While gasket is in the individually sealed bag, inspect for any surface deformations such as tears, rips, or non-uniform cuts. Any material defect of the inner surface is cause for rejection.
3. If a gasket is rejected due to a surface deformation, place aside for return and specify reason for rejection.
4. **Great care should be taken to protect the gasket surface from exposure to oil or other contaminants.**
5. Remove gasket from bag.
6. Immediately prior to installing, pay particular attention to the inner surface. **Do not wipe the surface with or expose the surface to IPA (Isopropyl Alcohol).**
7. Pay particular attention to keeping the gasket and flange adapters on the same axis (that is, geometrically centered).
8. Install all flanges using a calibrated torque wrench, or a KC Multi-Ring® SmartBox™. Whenever possible, apply the torque to the nut. Tighten the flanges in a star pattern to the following torque values using progressive 4-pass tightening. (Note that the pipe size and tightening sequence is cast into the face of the AC Backing Flange.) Following the star pattern, torque each nut to 33% of the desired torque value. Then re-torque to 66% of the desired torque value. Re-torque to 100% of the desired torque value. **Wait two minutes and re-torque to 100% value.** (Note for speed and ease of installation, the KC Multi-Ring® SmartBox™ is calibrated to the recommended bolt torque for each pipe size, allowing the use of an electric impact wrench for the first 3 passes - a calibrated torque wrench is always used for the final Quality Control pass.)

Special Note: If the gasket is to be installed on a plastic “blind” flange, install a KC Multi-Ring® AC backing flange behind the “blind” flange; this will prevent “dishing” of the plastic “blind” flange and subsequent leakage.



FASTENER LENGTH FOR ANSI PVDF FLANGES

IPS	mm	AC Backing Flange I.D.	AC Backing Flange O.D.	Bolt Circle	Bolt Hole Diameter	AC Backing Flange Thickness	KC Multi-Ring® Gasket Thickness	Typical PVDF Flange Adapter Thickness
1/2	20	1.172	3.500	2.375	0.625	0.3850	0.125	0.236
3/4	25	1.409	3.875	2.750	0.625	0.3850	0.125	0.276
1	32	1.724	4.250	3.125	0.625	0.3850	0.125	0.276
1 1/4	40	2.078	4.625	3.500	0.625	0.3850	0.125	0.315
1 1/2	50	2.511	5.000	3.875	0.625	0.6000	0.125	0.315
2	63	3.141	6.000	4.750	0.750	0.6250	0.125	0.354
2 1/2	75	3.692	7.000	5.500	0.750	0.6250	0.125	0.393
3	90	4.401	7.500	6.000	0.750	0.6250	0.125	0.433
4	110	5.306	9.000	7.500	0.750	0.7000	0.125	0.472
6	160	7.120	11.000	9.500	0.875	0.7500	0.125	0.629
8	200	9.370	13.500	11.750	0.875	0.8500	0.125	0.708
9	225	9.490	13.500	11.750	0.875	0.8500	0.125	0.787
10	250	11.165	16.000	14.250	1.000	0.8750	0.125	1.321

IPS	mm	Finished Hex Nut Thickness	Heavy Hex Nut Thickness	USS Flat Washer Thickness	Bolt Hole Diameter	# Bolts	Bolt Length w/Finish Nut per Joint	Bolt Length w/Heavy Nut per Joint	Single Flange + Gasket & Washer Thickness
1/2	20	0.4375	0.4844	0.1094	0.500	4	2.250	2.250	0.855
3/4	25	0.4375	0.4844	0.1094	0.500	4	2.250	2.250	0.895
1	32	0.4375	0.4844	0.1094	0.500	4	2.250	2.250	0.895
1 1/4	40	0.4375	0.4844	0.1094	0.500	4	2.250	2.250	0.934
1 1/2	50	0.4375	0.4844	0.1094	0.500	4	2.750	2.750	1.149
2	63	0.5469	0.6094	0.1406	0.625	4	3.000	3.000	1.245
2 1/2	75	0.5469	0.6094	0.1406	0.625	4	3.000	3.250	1.284
3	90	0.5469	0.6094	0.1406	0.625	4	3.250	3.250	1.324
4	110	0.5469	0.6094	0.1406	0.625	8	3.500	3.500	1.438
6	160	0.6406	0.7344	0.1563	0.750	8	4.000	4.000	1.660
8	200	0.6406	0.7344	0.1563	0.750	8	4.250	4.500	1.839
9	225	0.6406	0.7344	0.1563	0.750	8	4.500	4.500	1.918
10	250	0.7500	0.8594	0.1719	0.875	12	5.750	5.750	2.493



FASTENER LENGTH FOR ANSI POLYPROPYLENE FLANGES

IPS	mm	AC Backing Flange I.D.	AC Backing Flange O.D.	Bolt Circle	Bolt Hole Diameter	AC Backing Flange Thickness	KC Multi-Ring® Gasket Thickness	Typical POLYPRO Adapter Thickness
1/2	20	1.172	3.500	2.375	0.625	0.485	0.125	0.270
3/4	25	1.409	3.875	2.750	0.625	0.485	0.125	0.350
1	32	1.724	4.250	3.125	0.625	0.485	0.125	0.390
1 1/4	40	2.078	4.625	3.500	0.625	0.485	0.125	0.430
1 1/2	50	2.511	5.000	3.875	0.625	0.600	0.125	0.470
2	63	3.141	6.000	4.750	0.750	0.625	0.125	0.550
2 1/2	75	3.692	7.000	5.500	0.750	0.625	0.125	0.620
3	90	4.401	7.500	6.000	0.750	0.625	0.125	0.660
4	110	5.306	9.000	7.500	0.750	0.700	0.125	0.700
6	160	7.120	11.000	9.500	0.875	0.750	0.125	0.980
8	200	9.370	13.500	11.750	0.875	0.850	0.125	1.250
9	225	9.490	13.500	11.750	0.875	0.850	0.125	1.250
10	250	11.165	16.000	14.250	1.000	0.875	0.125	1.321

IPS	mm	Finished Hex Nut Thickness	Heavy Hex Nut Thickness	USS Flat Washer Thickness	Bolt Hole Diameter	# Bolts	Bolt Length w/Finish Nut per Joint	Bolt Length w/Heavy Nut per Joint	Single Flange + Gasket & Washer Thickness
1/2	20	0.4375	0.4844	0.1094	0.500	4	2.500	2.500	0.989
3/4	25	0.4375	0.4844	0.1094	0.500	4	2.500	2.500	1.069
1	32	0.4375	0.4844	0.1094	0.500	4	2.750	2.750	1.109
1 1/4	40	0.4375	0.4844	0.1094	0.500	4	2.750	2.750	1.149
1 1/2	50	0.4375	0.4844	0.1094	0.500	4	3.000	3.000	1.304
2	63	0.5469	0.6094	0.1406	0.625	4	3.500	3.500	1.441
2 1/2	75	0.5469	0.6094	0.1406	0.625	4	3.500	3.750	1.511
3	90	0.5469	0.6094	0.1406	0.625	4	3.750	3.750	1.551
4	110	0.5469	0.6094	0.1406	0.625	8	4.000	4.000	1.666
6	160	0.6406	0.7344	0.1563	0.750	8	4.750	4.750	2.011
8	200	0.6406	0.7344	0.1563	0.750	8	5.500	5.500	2.381
9	225	0.6406	0.7344	0.1563	0.750	8	5.500	5.500	2.381
10	250	0.7500	0.8594	0.1719	0.875	12	5.750	5.750	2.493