

Assembly Instructions for Bondstrand fiberglass flanges

Scope

These instructions present Ameron's recommendations for the proper use of Bondstrand fiberglass flanges in the following pipe series:

Series	2000	2000M	2000MP	2000MFP
	4000	5000	7000	7000M

The mounting of flanges on pipe and fittings is addressed by the assembly instructions for the particular Bondstrand adhesive used.

Gaskets

Use full-face gaskets of an elastomer suitable for the service pressure and temperature and fluids in the system. Gaskets should be $\frac{1}{8}$ inch thick (3 mm) thick with a Shore durometer hardness between 55 and 65. Refer to ASTM D1330 Specification for Sheet Rubber Gaskets, Grade I or II, to establish minimum physical property requirements for use with water, except specify a Shore A durometer hardness of 60 ± 5 . For dimensions other than thickness, refer to Table 5 of ANSI B16.21-1978 for Class 150 full-face gaskets.

Assembly

First, finger tighten all nuts. Bolt threads must be clean and lubricated to attain proper torque. Use lubricated washers under both nuts and bolt heads to protect flange back-facing.

Tighten all nuts following the sequences shown under TIGHTENING SEQUENCE. Do not exceed the torque increments given in RECOMMENDED BOLT TORQUES. After all bolts have been tightened to the recommended torque, recheck the torque on each bolt in the same sequence, since previously tightened bolts may have relaxed.

Caution: Excess torque can prevent sealing and can damage flanges.

Sealing against valves and other flanges

Always follow these instructions carefully when joining Bondstrand flanges to raised-face steel flanges, flanges on lined pipe and fittings, and wafer valves of all types. Molded flanges should not be connected to wafer valves or raised-face steel flanges. Valves are frequently supplied with sealing details built into the flange facing. Unless these details are known to seal against Bondstrand flanges, use the usual full-face, $\frac{1}{8}$ inch thick elastomeric gasket.

Safety factors

Standard black or solid gray molded flanges in 4 through 12-inch sizes have a safety factor to failure torque of 1.5 or greater when joined to another Bondstrand flange or any flat-face flange in accordance with these instructions. All other Bondstrand flanges have a safety factor to failure of 1.5 or greater when joined to a raised-face steel flange or a valve in accordance with these instructions.

Nuts and washers

Flange Size		Nut Thickness		Plain Washer			
(in)	(mm)	(in)	(mm)	OD		Thickness	
(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)
1-1½	25-40	.44	11	1.06	30	.12	3
2-4	50-100	.55	14	1.31	33	.12	3
6-8	150-200	.64	15	1.47	37	.16	4
10-12	250-300	.75	19	1.75	44	.16	4
14-16	350-400	1.00	25	2.00	51	.16	4
18-20	450-500	1.00	25	2.25	57	.16	4
24-30	600-750	1.06	27	2.50	64	.16	4
32-36	800-900	1.28	33	3.00	76	.16	4

- 1) Nuts and washers should conform to requirements of ANSI B18.2.2-1972 (R1983) Regular Hex Nuts and ANSI B18.22.1-1966 (R1981) Type A, Plain, Narrow Series, respectively. Washer dimensions agree with "SAE Standard" and ANSI/ASTM Specification F436.
- 2) Consult Ameron Applications Engineering for availability of flanges in 22, 26, 28, 34, 40 and 48-inch sizes.

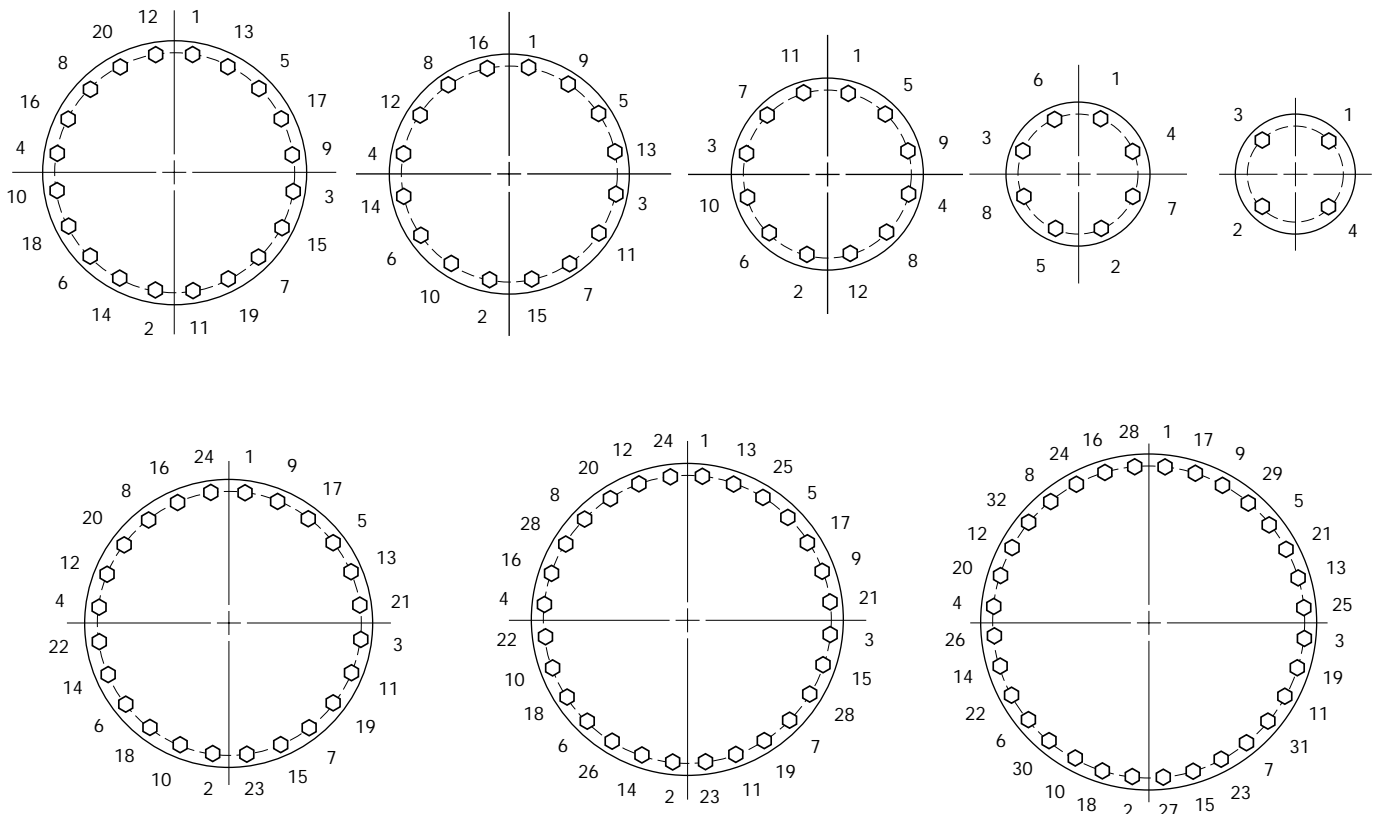
Recommended bolt torques

Flange Size		Torque Increments		Recommended Torque for Full Pressure Seal	
(in)	(mm)	(ft·lb)	(N·m)	(ft·lb)	(N·m)
1-4	25-100	5	7	20	27
6-12	150-300	10	14	30	41
14-16	350-400	10	14	50	68
18-20	450-500	20	27	60	81
24-36	600-900	25	34	75	102

- 1) All flanges for the Bondstrand pipe series listed above in Scope mate with other Bondstrand flanges or with flat-face steel flanges using these bolt torques.
- 2) Consult Ameron Applications Engineering for availability of flanges in 22, 26, 28, 34, 40 and 48-inch sizes.

Tightening sequence

Prevent unnecessary stresses on fiberglass flanges by tightening the bolts in a staggered sequence as indicated below. Bring the bolts down in steps.



Bolt lengths

Recommended hex head bolt lengths for flanges with ANSI B16.5 Cl. 150 drilling are tabulated below. Stud bolt lengths may be determined by adding the thickness of a nut plus three threads to the tabulated lengths. For orifice flange assemblies, add an additional 1 1/2 inches (40 mm). ALWAYS use washers under both nuts and bolts to protect the back-facing of fiberglass flanges.

Filament-wound flanges

Flange Size	Bolt Diameter	Bolt Count	Flange Combination ¹									
			FW x FW		FW x S		HDFW x HDFW		HDFW x S			
(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	
1	25	0.500	13	4	—	—	—	—	3.50	89	3.00	76
1 1/2	40	0.500	13	4	—	—	—	—	4.00	102	3.50	89
2	50	0.625	16	4	3.25	83	3.00	76	5.25	133	4.00	102
3	80 ²	0.625	16	4	3.50	89	3.25	83	5.25	133	4.25	108
4	100 ²	0.625	16	8	3.75	95	3.50	89	5.25	133	4.25	108
6	150 ²	0.750	19	8	5.00	127	4.25	108	6.50	165	5.00	127
8	200	0.750	19	8	5.50	140	4.50	114	7.00	178	5.50	140
10	250	0.875	22	12	5.50	140	4.75	121	7.50	191	5.50	140
12	300	0.875	22	12	5.75	146	5.00	127	8.00	203	6.00	152
14	350	1.000	25	12	7.25	184	5.75	146	9.50	241	7.00	178
16	400	1.000	25	16	8.00	203	6.25	159	10.00	254	7.50	191
18	450	1.125	29	16	9.00	229	7.00	178	11.00	279	8.00	203
20	500	1.125	29	20	9.50	242	7.50	191	11.50	292	8.50	216
24	600	1.250	32	20	11.00	279	8.50	216	13.00	330	9.50	242
30	750	1.250	32	28	11.50	292	9.50	242	16.00	406	12.00	305
32	800	1.500	38	28	13.00	330	10.50	267	18.00	457	13.00	330
36	900	1.500	38	32	14.00	356	11.50	292	20.00	508	15.00	381

1) Consult Ameron Applications Engineering for availability of flanges in 22, 26, 28, 34, 40 and 48-inch sizes.

Molded flanges

Flange Size	Bolt Diameter	Bolt Count	Flange Combination ¹					
			M x M		M x S ³			
(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	
1 1/2	40 ⁴	0.500	13	4	—	—	4.50	114
2	50	0.625	16	4	3.25	83	—	—
3	80	0.625	16	4	3.75	95	—	—
4	100	0.625	16	8	4.25	108	—	—
6	150	0.750	19	8	5.00	127	4.25	108
8	200	0.750	19	8	5.50	140	4.50	114
10	250	0.875	22	12	5.50	140	4.75	121
12	300	0.875	22	12	5.75	146	5.00	127

1) FW = Filament-wound

S = Steel

M = Molded

HDFW = Heavy-duty filament-wound

Bolt lengths are determined using ASTM Standard Practice F704 and Annex "F" of ANSI Standard B16.5-1981 and include provision for washer under bolt heads and nuts abutting filament-wound or molded flanges. Bolts should conform to requirements of ANSI B18.2.1-1972 Regular Hex Head Bolts.

2) Maintain bolt end point clearance on inside radius of 2 through 4-inch flanged ANSI 45° Bondstrand elbows by using additional washers or shims under bolt heads as required.

3) Flat-face steel flanges.

4) Available only in 2 x 1 1/2-inch reducing configuration. Connect only to 1 1/2-inch steel flanges.

Trouble shooting

If assembled joint leaks, loosen and remove all bolts, nuts, washers and gaskets.

Check for alignment of assembly. Rebuild to correct alignment as required.

Check the gasket for damage. If damaged, discard and replace with new, undamaged gasket.

Check flanges for seal ring damage. In particular, check the condition of the inner seal rings. Flanges with damaged inner seal rings must be removed and new, undamaged flanges installed.

If leaks occur as a result of deficiencies in non-fiberglass components of the piping system, consult the manufacturer of the defective components for recommended corrective procedures.

Clean and lubricate old threads and washers before rejoining. Repeat the joining procedure outlined above.

After corrective action has been taken, retest the joint to see if a seal has been made.

Important notice

This literature and the information and recommendations it contains are based on data reasonably believed to be reliable. However, such factors as variations in environment, application or installation, changes in operating procedures, or extrapolation of data may cause different results. Ameron makes no representation or warranty, express or implied, including warranties of merchantability or fitness for purpose, as to the accuracy, adequacy or completeness of the recommendations or information contained herein. Ameron assumes no liability whatsoever in connection with this literature or the information or recommendations it contains.

Written comments regarding this document are invited. Please write Engineering Manager, Ameron Fiberglass Pipe Division.



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Manufacturing plants: Burkburnett, Texas; Spartanburg, South Carolina; Geldermalsen, The Netherlands and Singapore. Bondstrand pipe is also manufactured in Japan and Saudi Arabia.