

Body-to-Bonnet Torque Values for Fluorocarbon-Coated Fasteners

Fastening studs and nuts with a fluorocarbon coating needs to be done with extreme caution. The amount of torque needed to apply the correct force between the body and bonnet is approximately half of what is needed for lubricated fasteners. In order to make it easier to identify, these studs and nuts have been painted blue or green, unless otherwise specified by the customer. This coating is known by several names. Some of these names include FCC,

fluoropolymer, fluorocarbon or Xylan coating. Tables 1 through 5 give the torque values for body-to-bonnet bolting with the fluorocarbon coating applied. These values can be applied to any Fisher® valve except the EH/EHA with fluorocarbon-coated studs and nuts. Tables 6 and 7 provide torque values for the EH/EHA product line.



Bolt Torque Values for Bolt Materials with Yield Strength 6895 bar (100,000 psi) and Above

Bolt Materials:

SA 193-B7, SA 564-630 (H1150), SA 193-B16, SA 564-630 (H1150 DBL and FGS 20B7), SA 354-BD, SA 193-B8 Class 2 sizes up thru 3/4 inch, SA 564-630 (H1100) SA 637 (N07718)

Table 1. Bolt Torque Values for Bolt Materials with Yield Strength 100,000 psi and Above

BOLT TORQUE NOMINAL VALUES					
Bolt Size	Studs with Heavy Hex Nuts Heavy Hex Head Cap Screws		Studs with Standard Hex Nuts Standard Hex Head Cap Screws		Tolerances
	FFS3C3 or FFS3C6		FFS3C3 or FFS3C6		
	N•m	Lbf•ft	N•m	Lbf•ft	
1/4 - 20	6.51	4.8	6.24	4.6	± 15%
5/16 - 18	12.7	9.4	12.1	8.9	
3/8 - 16	22.1	16.3	21.0	15.5	
7/16 - 14	35.3	26	33.9	25	
1/2 - 13	50.2	37	47.5	35	
9/16 - 12	66.4	49	65.1	48	
5/8 - 11	86.8	64	84.1	62	
3/4 - 10	137	101	134	99	
7/8 - 9	202	149	197	145	+15% / -10%
1 - 8	285	210	271	200	+15% / -5%
1 1/8 - 8	380	280	366	270	
1 1/4 - 8	502	370	488	360	
1 3/8 - 8	664	490	651	480	
1 1/2 - 8	854	630	854	630	
1 5/8 - 8	1100	810	1100	810	
1 3/4 - 8	1370	1010	1370	1010	
1 7/8 - 8	1680	1240	1680	1240	
2 - 8	2050	1510	2050	1510	
2 1/4 - 8	2930	2160	2930	2160	
2 1/2 - 8	4010	2960	4010	2960	
3 - 8	6940	5120	6940	5120	

Bolt Torque Values for Bolt Materials with Yield Strength from 92,000 to 100,000 psi

Bolt Materials:

SA 564-630 (H1150 DBL), SA 449 (Grade 5) sizes up thru 1 inch, SA 193-B8M Class 2 sizes up thru 3/4 inch

Table 2. Bolt Torque Values for Bolt Materials with Yield Strength from 92,000 to 100,000 psi

BOLT TORQUE NOMINAL VALUES					
Bolt Size	Studs with Heavy Hex Nuts Heavy Hex Head Cap Screws		Studs with Standard Hex Nuts Standard Hex Head Cap Screws		Tolerances
	FFS3C3 or FFS3C6		FFS3C3 or FFS3C6		
	N•m	Lbf•ft	N•m	Lbf•ft	
1/4 – 20	6.37	4.7	6.10	4.5	+5% / -15%
5/16 – 18	12.7	9.4	12.1	8.9	
3/8 – 16	22.1	16.3	21.0	15.5	
7/16 – 14	35.3	26	33.9	25	
1/2 – 13	50.2	37	47.5	35	
9/16 – 12	66.4	49	65.1	48	
5/8 – 11	86.8	64	84.1	62	
3/4 – 10	137	101	134	99	± 15%

Bolt Torque Values for Bolt Materials with Yield Strength from 80,000 to 92,000 psi

Bolt Materials:

SA 449 (Grade 5) sizes above 1 inch thru 1-1/2 inch, SA 193-B7M, SA 320-L7M, SA 453-660 A and B, SA 193-B8 Class 2 sizes above 3/4 inch thru 1 inch. SA 193-B8M Class 2 sizes above 3/4 inch thru 1 inch

Table 3. Bolt Torque Values for Bolt Materials with Yield Strength from 80,000 to 92,000 psi

BOLT TORQUE NOMINAL VALUES					
Bolt Size	Studs with Heavy Hex Nuts Heavy Hex Head Cap Screws		Studs with Standard Hex Nuts Standard Hex Head Cap Screws		Tolerances
	FFS3C3 or FFS3C6		FFS3C3 or FFS3C6		
	N•m	Lbf•ft	N•m	Lbf•ft	
1/4 – 20	5.56	4.1	5.29	3.9	+5% / -15%
5/16 – 18	11.1	8.2	10.4	7.7	
3/8 – 16	19.5	14.4	18.6	13.7	
7/16 – 14	31.2	23	29.8	22	
1/2 – 13	46.1	34	44.7	33	
9/16 – 12	66.4	49	65.1	48	
5/8 – 11	86.8	64	84.1	62	
3/4 – 10	137	101	134	99	+10% / -15%
7/8 – 9	202	149	197	145	

Bolt Torque Values for Bolt Materials with Yield Strength from 50,000 to 65,000 psi

Bolt Materials:

SA 193-B8 Class 2 sizes above 1 inch thru 1-1/2 inch, SA 193-B8M Class 2 sizes above 1 inch thru 1-1/2 inch, SA 479 XM-19

Table 4. Bolt Torque Values for Bolt Materials with Yield Strength from 50,000 to 65,000 psi

BOLT TORQUE NOMINAL VALUES					Tolerances
Bolt Size	Studs with Heavy Hex Nuts Heavy Hex Head Cap Screws		Studs with Standard Hex Nuts Standard Hex Head Cap Screws		
	FFS3C3 or FFS3C6		FFS3C3 or FFS3C6		
	N•m	Lbf•ft	N•m	Lbf•ft	
1/4 – 20	4.07	3.0	3.93	2.9	±5%
5/16 – 18	8.00	5.9	7.59	5.6	
3/8 – 16	13.8	10.2	13.2	9.7	
7/16 – 14	21.7	16	20.0	15	
1/2 – 13	32.5	24	31.2	23	
9/16 – 12	46.1	34	44.7	33	
5/8 – 11	63.7	47	62.4	46	
3/4 – 10	111	82	108	80	
7/8 – 9	176	130	172	127	
1 – 8	258	190	258	190	
1 1/8 – 8	380	280	366	270	
1 1/4 – 8	502	370	488	360	
1 3/8 – 8	664	490	651	480	
1 1/2 – 8	854	630	854	630	
1 5/8 – 8	1100	810	1100	810	
1 3/4 – 8	1370	1010	1370	1010	
1 7/8 – 8	1680	1240	1680	1240	
2 – 8	2050	1510	2050	1510	
2 1/4 – 8	2930	2160	2930	2160	
2 1/2 – 8	4010	2960	4010	2960	
3 – 8	6940	5120	6940	5120	

Bolt Torque Values for Bolt Materials with Yield Strength 30,000 psi

Bolt Materials:
SA 193-B8 Class 1 (Annealed), SA 193-B8M Class 1 (annealed)

Table 5. Bolt Torque Values for Bolt Materials with Yield Strength 30,000 psi

BOLT TORQUE NOMINAL VALUES					
Bolt Size	Studs with Heavy Hex Nuts Heavy Hex Head Cap Screws		Studs with Standard Hex Nuts Standard Hex Head Cap Screws		Tolerances
	FFS3C3 or FFS3C6		FFS3C3 or FFS3C6		
	N•m	Lbf•ft	N•m	Lbf•ft	
1/4 – 20	2.85	2.1	2.85	2.1	± 5%
5/16 – 18	5.69	4.2	5.42	4.0	
3/8 – 16	9.90	7.3	9.36	6.9	
7/16 – 14	15.7	11.6	15.0	11.1	
1/2 – 13	23.5	17.3	22.5	16.6	
9/16 – 12	33.9	25	32.5	24	
5/8 – 11	46.1	34	44.7	33	
3/4 – 10	80.0	59	77.3	57	
7/8 – 9	126	93	123	91	
1 – 8	188	139	184	136	
1 1/8 – 8	270	199	264	195	
1 1/4 – 8	366	270	366	270	
1 3/8 – 8	502	370	488	360	
1 1/2 – 8	651	480	637	470	
1 5/8 – 8	827	610	827	610	
1 3/4 – 8	1030	760	1030	760	
1 7/8 – 8	1260	930	1260	930	
2 – 8	1530	1130	1530	1130	
2 1/4 – 8	2200	1620	2200	1620	
2 1/2 – 8	3010	2220	3010	2220	
3 – 8	5210	3840	5210	3840	

Bolt Torque Values for Fisher EH and EHA Valves

Table 6. Fisher EH Body-to-Bonnet Bolting

VALVE SIZE, NPS	VALVE BODY CLASS	B7, B16, BD AND 660 STUDS		B8 AND B8M STUDS	
		N•m	Lbf•Ft	N•m	Lbf•Ft
1, 1-1/2x1, 2x1	2500	136	100	99	73
2, 3x2	2500	197	145	146	108
3, 4x3	2500	407	300	318	234
4, 6x4	2500	543	400	419	309
6, 8x6	2500	1426	1052	1068	788
8, 10	1500	1369	1010	1369	1010
	2500	2047	1510	2047	1510
12, 16	1500	4013	2960	4013	2960
	2500	2929	2160	2929	2160

Table 7. Fisher EHA Body-to-Bonnet Bolting

VALVE SIZE, NPS	VALVE BODY CLASS	B7, B16, BD AND 660 STUDS		B8 AND B8M STUDS	
		N•m	Lbf•Ft	N•m	Lbf•Ft
3	1500	140	103	113	83
4	1500	296	219	224	165
6	1500	419	309	318	234
8	1500	714	527	539	398

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