General Torque Specifications

Torque and tension for ASTM A193 Grade B7 bolts and studs

Match the stud diameter and threads per inch (TPI), then use the torque column for the specified nut factor K. The tabulated clamp load is approximately 75% of the minimum yield load.

Stud size		Load (lbf)				Tightening torque (ft·lbf)		
Dia. (in.)	TPI	Clamp	Min. tensile	Est. shear	Min. yield	K = 0.15	K = 0.12	K = 0.20
1/4	20	2,506	3,978	2,016	3,341	8	6	10
1/4	28	2,864	4,547	2,441	3,819	9	7	12
5/16	18	4,129	6,554	3,401	5,505	16	13	22
5/16	24	4,573	7,258	3,931	6,097	18	14	24
3/8	16	6,102	9,686	5,083	8,136	29	23	38
3/8	24	6,916	10,979	6,063	9,222	32	26	43
7/16	14	8,372	13,289	6,997	11,162	46	37	61
7/16	20	9,349	14,840	8,173	12,465	51	41	68
1/2	13	11,175	17,737	9,425	14,899	70	56	93
1/2	20	12,596	19,994	11,146	16,795	79	63	105
9/16	12	14,328	22,743	12,150	19,104	101	81	134
9/16	18	15,985	25,373	14,159	21,313	112	90	150
5/8	11	17,798	28,250	15,131	23,730	139	111	185
5/8	18	20,157	31,995	17,999	26,876	157	126	210
3/4	10	26,339	41,808	22,643	35,118	247	198	329
3/4	16	29,371	46,620	26,344	39,161	275	220	367
7/8	9	36,362	57,717	31,438	48,482	398	318	530
7/8	14	40,121	63,684	36,035	53,495	439	351	585
1	8	47,702	75,718	41,316	63,603	596	477	795
1	14	53,541	84,986	48,473	71,388	669	535	892
1-1/8	7	60,108	95,409	51,969	80,144	845	676	1,127
1-1/8	8	62,248	98,807	54,570	82,998	875	700	1,167
1-1/4	7	76,318	121,139	66,722	101,757	1,192	954	1,590
1-1/4	8	78,727	124,963	69,664	104,969	1,230	984	1,640
1-1/2	6	110,664	175,657	97,013	147,551	2,075	1,660	2,767
1-1/2	8	117,483	186,480	105,376	156,644	2,203	1,762	2,937
1-5/8	8	139,760	221,841	125,992	186,346	2,839	2,271	3,785
1-3/4	8	163,970	260,269	148,450	218,626	3,587	2,869	4,782
1-7/8	8	190,112	301,766	172,748	253,483	4,456	3,565	5,941
2	8	218,188	346,330	198,887	290,917	5,455	4,364	7,273
2-1/4	8	280,138	444,663	256,688	373,517	7,879	6,303	10,505
2-1/2	8	349,819	555,267	321,851	466,425	10,932	8,745	14,576

Regal Sales Corporation, ASTM A193 B7 Bolt Torque Chart, printed pp. 2–3.

The 1-1/8 in., 7 TPI designation and estimated shear loads agree with Fastenal’s B7 torque–tension chart. Confirm the applicable nut factor and allowable torque in the joint assembly procedure.

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Tightening record

Record the settings from the approved joint procedure. Use one torque unit throughout.

Serial number	Interior flange identification	Instruction / revision

Stud size, pitch and grade	Stud count	Gasket	Finish / lubricant

Wrench ID	Technician	Date

Pass 1	Pass 2	Pass 3	Pass 4	Pass 5	Pass 6	Torque units
Snug						

Interior flange reassembly

1 **Isolate and refit the element.**
Follow site lockout procedures. Verify zero pressure, let the unit cool, and purge and test as required. Support the piping and element. Refit the inspected element or its replacement on the specified new gaskets. Align E1, E2 and the 12 o’clock witness marks. Check seating on the centering lugs, where fitted.

2 **Prepare the studs and snug by hand.**
Check that studs and nuts are clean, undamaged and match the joint procedure. Verify stud clearance. Apply the specified lubricant to the threads and nut bearing faces. Keep lubricant off the gasket faces. Start the outer nuts by hand with similar stud projection at both ends. Back off the jacking nuts until clear.

3 **Follow the numbered pattern on every pass.**
Mark the nuts using the diagram on page 3. Use a calibrated wrench and correctly sized socket. Complete each circuit before advancing. Stop if the element shifts, the gap closes unevenly or a nut binds.

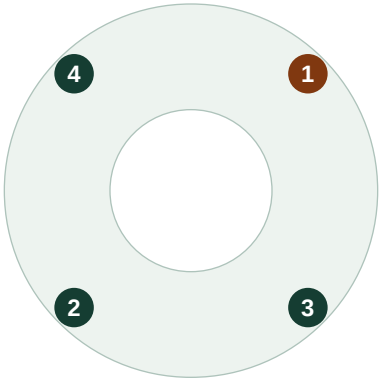
4 **Check seating and record the results.**
Complete the specified final torque and leak checks. Record the passes, units, wrench ID and technician. Keep the unit isolated if it leaks or fails inspection.

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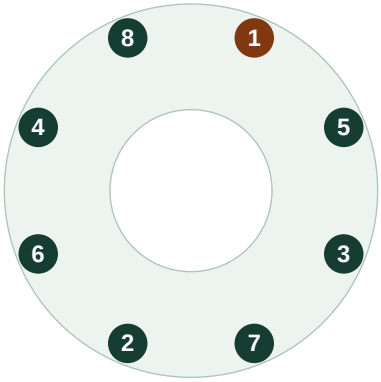
Tightening patterns

Looking at the flange face, select the diagram for the installed stud count. Mark the nuts as shown and tighten in numerical order on each pass. Each odd-numbered stud is paired with the one opposite it.

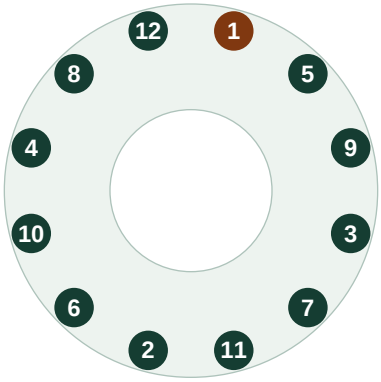
4 studs



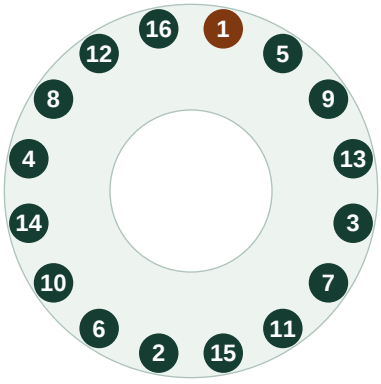
8 studs



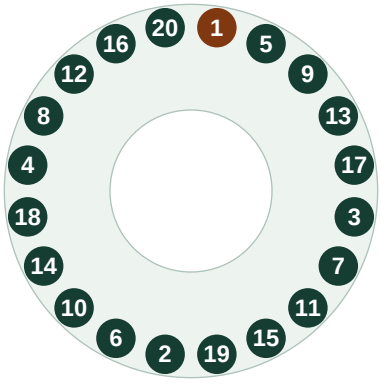
12 studs



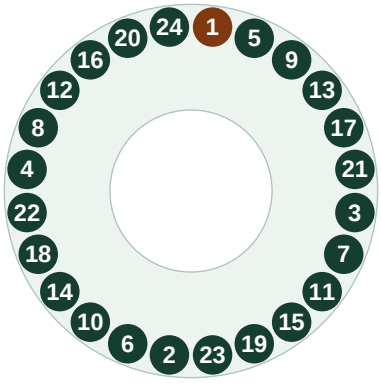
16 studs



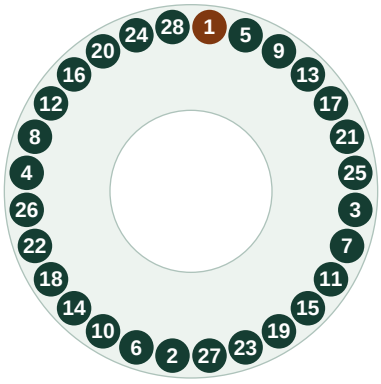
20 studs



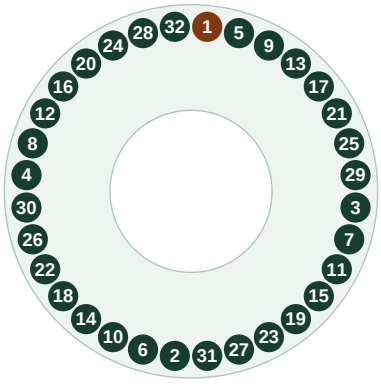
24 studs



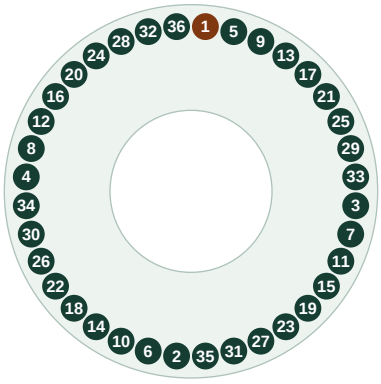
28 studs



32 studs



36 studs



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