

Tensioner Typical Operating Pressures

Required to achieve a 45000lb/in² residual bolt stress, assuming the following criteria –

- a Calculated load transfer factor of 1.3
- b 1.15 cross loading factor
- c fully threaded bolts
- d 50% Bolt / Tool ratio

Always apply a checking pass = pressure B

Thread Size (in)	Stud Area (in ²)	Hydraulic Tool Ref	Pressure Area (in ²)	Pressure A (PSI)	Pressure B (PSI)
1	0.563	1	2.35	16117	14015
1 1/8	0.741	1	2.35	21213	18446
1 1/4	0.944	2	4.58	13868	12058
1 3/8	1.172	2	4.58	17215	14970
1 1/2	1.424	3	8.38	11432	9941
1 5/8	1.7	3	8.38	13648	11868
1 3/4	2	3	8.38	16056	13962
1 7/8	2.33	3	8.38	18705	16266
2	2.68	3	8.38	21515	18709
2 1/4	3.45	4	13.16	17637	15336
2 1/2	4.32	4	13.16	20121	17497
2 3/4	5.3	5	18.9	18865	16405
3	6.36	5	18.9	20626	17936
3 1/4	7.53	6	27.35	18522	16106
3 1/2	8.8	6	27.35	21646	18823

50% BOLT to TOOL Ratio

- I Set up hydraulic tools on first set of alternate flange bolts, which shall be positioned equi-spaced around the flange.
- II Apply pressure **A** and tighten nuts with a tommy bar.
- III Repeat step II.
- IV Transfer hydraulic tools to second set of alternate flange bolts.
- V Apply pressure **B** and tighten nuts with a tommy bar, release pressure
- VI Repeat step V.
- VII Transfer four hydraulic tools back to the first half set of flange bolts.
- VIII Conduct a Break Loose check.

BREAK LOOSE CHECK

Apply pressure and increase slowly whilst holding the tommy bar in the 'socket' and applying pressure in the loosening direction.

At the moment the nut becomes loose, stop the pump and note the pressure. This is termed the 'Break Loose Pressure'.

If this is equal to or greater than pressure **B** then the tightening is complete.

If this pressure is less than pressure **B** then repeat steps I through VIII.