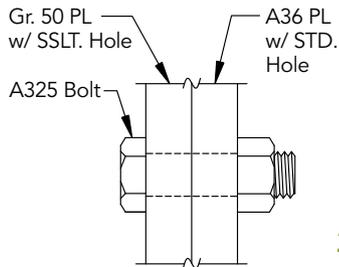


steel quiz

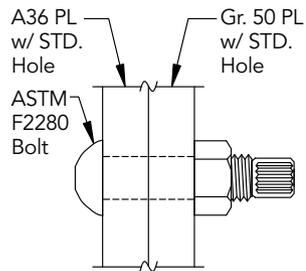
This month's Steel Quiz looks at the proper use of washers.

Use the 2014 RCSC *Specification* to correctly determine the placement of any required washers in the figures below. (You can download the RCSC *Specification* for free at www.boltcouncil.org.)

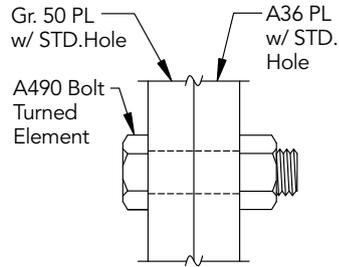
1 Snug-Tightened Joint



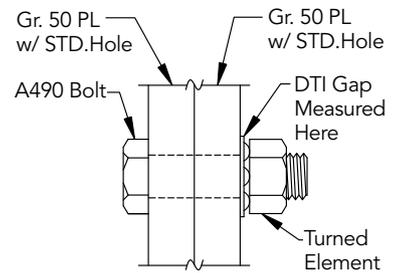
2 Tension-Control Bolt Pretensioned Joint



3 Calibrated Wrench Pretensioned Joint



4 Direct-Tension-Indicator Pretensioned Joint

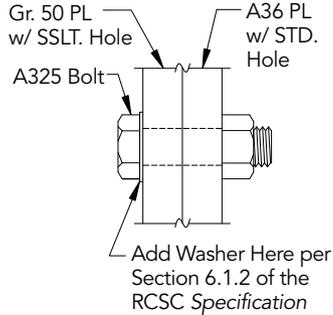


TURN PAGE FOR ANSWERS

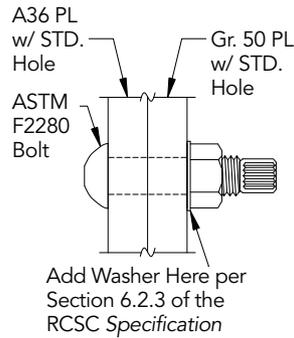
steel quiz

ANSWERS

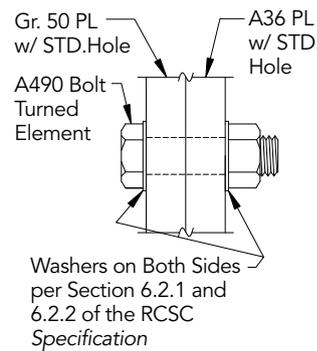
1 Snug-Tightened Joint



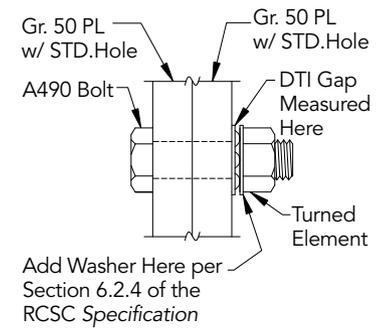
2 Thesion-Control Bolt Pretensioned Joint



3 Calibrated Wrench Pretensioned Joint



4 Direct-Tension-Indicator Pretensioned Joint



Notes:

- Though the joint is not pre-tensioned, a washer is required to completely cover the slotted hole.
- The round head of the ASTM F2280 bolt provides a bearing area similar to a standard washer, hence the explicit exception provided in RCSC Specification Section 6.2.1.
- One washer is required under the turned element and another to account for the A490 bearing on A36 material.
- The direct-tension indicator (DTI) bumps must bear against a hardened surface (a washer, the nut or the bolt head) but cannot bear directly against the turned element (the nut in this case).