



# Squirter Washers

## Direct Tension Indicator (DTI)

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Two recent failures of high strength bolts continue to demonstrate that using Torque (Nm) to measure bolt tension (Nm) is inaccurate.

Bolt over-tensioning is the likely cause of fracture in two critical fastener applications, where M36 10.9 and M22 8.8 Property Class bolts were installed.

Hobson Engineering recommended Direct Tension Indicator (DTI) compression Squirter Washers, manufactured to ASTM F969, in both applications.

Investigation revealed installation Torque (Nm) varied by 50% (+/- 25%) depending upon how much or how little lubrication was used.

It is the variation in friction when bolting a joint that causes the variation in Torque (Nm). The relationship between Torque (Nm) and tension (kN) uses the formula:

$$T = P \times k \times D$$

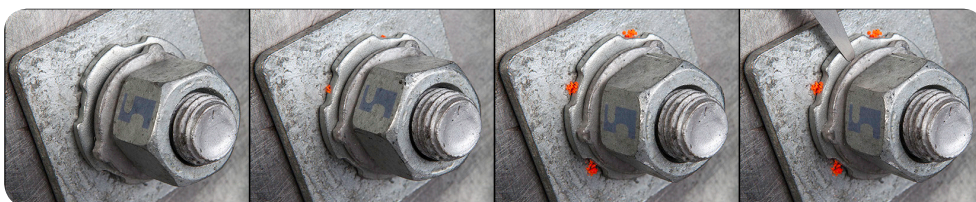
'k' means friction and it is not constant, (as the symbol 'k' is typically represented in most equations), in most real world applications.

The new draft of AS1252, High strength steel bolt assemblies comprising bolts, nuts and washers for structural engineering, reminds readers that critical k-class K1 and K2 "... bolt assemblies cannot be tensioned by torque controlled methods but may be tensioned by the part turn method or direct tension indicator (DTI) method detailed in AS 4100 and NZS 3404."

Only 10% of Torque (Nm) goes towards tensioning (kN) and stretching the bolt, which is required to satisfactorily clamp and tighten the joint.

ASTM F959 Type 8.8 and 10.9 compression Squirter washers measure direct tension to an accuracy better than +/-10%.

**Contact Hobson if you would like to see a demonstration of the accuracy of Squirter Washers, over using torque or part turn methods to install bolt assemblies.**



*Squirter Washers in action.*