

Squirter[®] not Squirting Trouble Shooting Guide

GABRIEL TERS *B.Eng (Structural) UTS*

Squirter[®] DTIs: are an innovative Direct Tension Indication (DTI) device. Making bolting easy and reliable.

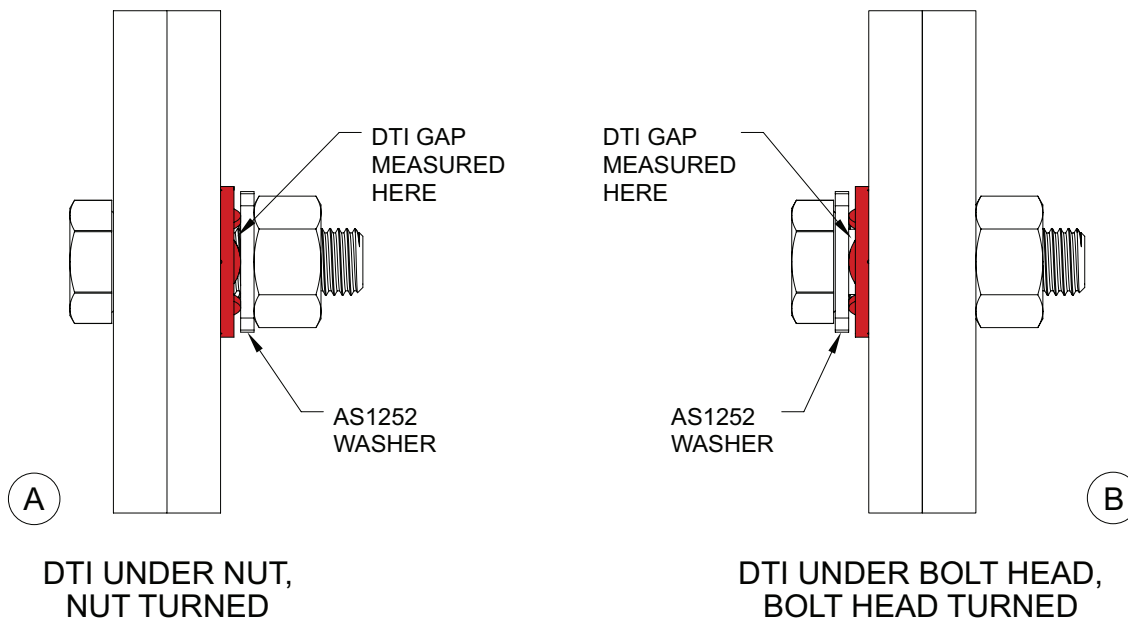
DTIs are very simple to use and require no expertise. DTIs are a mechanical load cell which correctly indicate bolt tension, and are not affected by poor torque tension correlation factors such as weathering, poor lubrication and damaged threads.

Squirter[®] DTIs give a clear visual indication when the bolt assembly is tensioned correctly by “squirting” a bright orange indicator. By using Squirter[®] DTI washers the installer is alerted to poor quality AS1252

assemblies. The bolt assembly is guaranteed to be tensioned correctly and any non-conforming assemblies or issues with the connection will be highlighted.

We often get inquiries from customers concerned with why the DTIs don't work...but that's when they work best!

If the DTI's not squirting properly then it is indicating that something is going wrong. On the following page is a table showing why no squirt is seen and solutions to overcome this.



Correct installation is the most important aspect of using a Squirter[®] DTI washer.

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REASON FOR NO VISUAL SQUIRT	SOLUTION
<p>1</p> <p>Incorrect hole size (as per AS4100) or slotted holes in steel plate.</p>	<p>The squirt material will move inwards into the larger hole and therefore show no indication externally.</p> <p>The Squirter® DTIs can be used in conjunction with oversized, short-slotted and long-slotted holes. An additional round or square washer must be used over the large or slotted hole to provide the correct hole size. The final bolt length must be reviewed to allow for the additional washer.</p> <p>M12-M24 should be no greater than 2mm larger of the nominal bolt diameter.</p> <p>>M24 should be no greater than 3mm larger of the nominal bolt diameter.</p> <p>Be aware of chamfered holes, a chamfered edge makes the hole bigger.</p>
<p>2</p> <p>Paint on steel surface.</p>	<p>Paint may get into the channels of the washer preventing it from indicating. If thick paint is identified an additional washer can be used between the steelwork and DTI washer.</p>
<p>3</p> <p>Incorrect hardness of flat washer.</p>	<p>See AS1252.1 Section 4.4</p> <p>The flat washer must be hardened and tempered.</p> <p>Hardness to be a minimum 320 HV (35 HRC).</p> <p>If the structural washer is too soft the bumps on the Squirter® DTI simply dig into the soft flat washer and there is no squirt feature. Note: The gap between the hardened washer and the DTI appears closed but is a false sign as there has been no squirt.</p>
<p>4</p> <p>Plate and beams may be out of square or have welding deformation.</p>	<p>Curvature of steel plates should be assessed prior to assembly. Plates must be in full contact prior to starting the tensioning process. Note: All bolt assemblies must be snugged in the connection and then tensioned from the stiffest part of the connections towards the free edges.</p>
<p>5</p> <p>Bolts breaking in torsion and lube has dried out (possibly from poor storage assemblies).</p>	<p>Apply additional lube to the male thread prior to installation.</p> <p>HOBSON part: XXWSC (Stick Wax).</p>
<p>6</p> <p>Bolt Assemblies exposed to dirt, heat and moisture. The drier and rustier the bolt, means more energy is required to achieve full tension.</p>	<p>Keep assemblies properly stored, away from dirt, heat and moisture.</p> <p>Note: Covering bolt assemblies with a tarp in humid conditions keeps them dry but leads to sweating and direct corrosion.</p>
<p>7</p> <p>Orientation of the bumps in the wrong direction.</p>	<p>Easy rule of thumb...bumps of the Squirter® DTI washer always face away (face out) from the structural steel. Never have a turning element directly against the bumps. Turning will grind the bumps off, rather than compress them.</p> <p>Always use a structural washer on the Squirter® DTI washer, never directly against the moving part.</p>
<p>8</p> <p>Squirter® DTI isn't squirting at the expected tension.</p>	<p>Calibrate the Squirter® DTI in a skidmore before installation. Check the Squirter® DTI gap with a feeler gauge after tightening the assembly to the correct number of squirts.</p> <p>In solid steel - Duplicate the above test in a solid connection, tightening the bolt assembly until the Squirter® DTI has been sufficiently compressed. Repeat this test twice and get a visual impression of how much squirt is necessary. Then check the gap with a feeler gauge.</p>

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REASON FOR NO VISUAL SQUIRT		SOLUTION
9	Squirter® DTI's in a connection are not evenly compressed.	Snug the Array - Always snug an array of bolts to bring the plates into firm contact before final tightening. Make sure you don't fully compress the Squirter® DTI on the snug (first) pass. On the final pass, compress the Squirter® DTIs from the most rigid point outward. Please refer to the Structural Bolts Installation article: https://www.hobson.com.au/hobsonarticles
10	Squirter® DTI spinning during installation.	Do not allow the bumps to spin against the hardened washer during installation. If the Squirter® DTI spins it will wear away the orange indicator and the squirt feature will not be seen.
11	Bolts are breaking prior to minimum tension.	Friction between the threads of the nut and bolt, along with the nut grinding on the flat washer is most likely the problem. You are fighting friction so use a stick wax on the washer face of the nut and the threads of your bolt, this will cut down the friction of the assembly pieces allowing you to achieve bolt tension before the bolts twist in two. If an assembly locks up it can actually fail by excessive twisting (torque failure) before reaching its full tensile capacity. Lubricate the bolts prior to assembly.
12	Powered torque tool is stalling before bump compression or the Squirt event.	By adding stick wax to your bolt assembly (bolt threads and washer face of the nut) you can decrease the amount of friction. By doing this it takes less torque, or power, to properly tension the bolt assembly. Potentially making the same tool that didn't work, then have the capacity to do the job. How is your bolt storage? Hopefully it's dry storage. The worse the condition of your bolt, the more torque you will need to install it. White rust on galvanised bolts creates more friction which means more torque is needed to advance the nut.

Note: The most common method of installation is using the Squirter® DTI at the nut end.

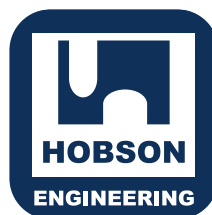
Remember:

TORQUE IS NOT TENSION.

Torque is measured in Newton metres (Nm). Tension is measured in kilo Newton (kN). Nm and kN may sound similar but they are very different. Just as km and kg mean two different things, so to does Nm and kN.

Torque values are not published for structural assemblies as torque cannot be used for installation. Refer to AS4100. The Squirter® DTI is the preferred option for installation by many project managers and engineers as it visually indicates correct tension and alerts problems when there is no squirt.

Each Hobson branch has a Skidmore and is available to do demonstrations and training with installers, project managers, sales people – anyone!



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