

# The New Standard...Squirter® DTIs for Flange Splice Bolts In Wind Turbine Towers



## Squirter® DTIs for Flange Splice Bolts In Wind Turbine Towers

If the bolt Preloads in Table 1  
are what your design calls for:

And if you have been using a Torque  
Value to try to get the right Preload:

\*The middle value is sometimes thought to be correct, but individual bolts may vary widely

**Table 1**

**Torque\* Nm**

| Size $\phi$           | Preload              | Min  | Average | Max        |
|-----------------------|----------------------|------|---------|------------|
| <b>M36 8.8 (H8)</b>   | 458 kN <sup>N1</sup> | 2000 | 2700    | 3300 Nm    |
|                       | 103 kips             | 1400 | 1900    | 2400 ft-lb |
| <b>M36 EURO</b>       | 510 kN <sup>N2</sup> | 2200 | 3000    | 3600 Nm    |
|                       | 114 kips             | 1600 | 2200    | 2700 ft-lb |
| <b>M36 10.9 (H10)</b> | 572 kN <sup>N3</sup> | 2500 | 3300    | 4100 Nm    |
|                       | 129 kips             | 1800 | 2400    | 3000 ft-lb |
| <b>M42 10.9</b>       | 710 kN <sup>N4</sup> | 3500 | 4500    | 6000 Nm    |
|                       | 160 kips             | 2600 | 3300    | 4400 ft-lb |
| <b>M48 10.9</b>       | 930 kN <sup>N4</sup> | 5000 | 6500    | 9000Nm     |
|                       | 209 kips             | 3700 | 4800    | 6600 ft-lb |

**Note 1:** Minimum preload as given in EN14399-9 for M36 designation H8

**Note 2:** From DIN 18800-7, approximately equal to 70% nominal yield strength of M36 Property Class 10.9

**Note 3:** Minimum preload as given in EN14399-9 for M36 designation H10

**Note 4:** DAST Richtlinie 021

Applied Bolting has 5  
Squirter® DTIs that can  
get you the following  
Preloads with a 97.7%  
confidence factor.

applied  
**bolting**  
TECHNOLOGY

Certified by:



73638

**Table 2**

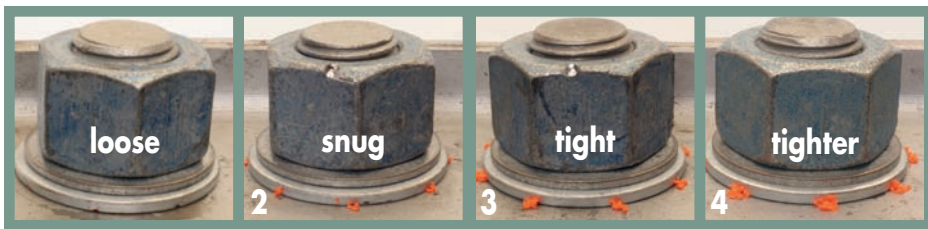
| Size $\phi$           | Min | Target | Max      |
|-----------------------|-----|--------|----------|
| <b>M36 8.8 (H8)</b>   | 458 | 507    | 552 kN   |
|                       | 103 | 114    | 124 kips |
| <b>M36 EURO</b>       | 507 | 552    | 596 kN   |
|                       | 114 | 124    | 134 kips |
| <b>M36 10.9 (H10)</b> | 572 | 632    | 689 kN   |
|                       | 129 | 142    | 155 kips |
| <b>M42 10.9</b>       | 712 | 778    | 845 kN   |
|                       | 160 | 175    | 190 kips |
| <b>M48 10.9</b>       | 930 | 1023   | 1090 kN  |
|                       | 209 | 230    | 245 kips |

### Product Performance Clarifications

Squirter® DTIs shown on this sheet are specifically designed and approved for use on the nut end of bolts under hardened flat washers as shown in Figure 1. When calibrated and installed as directed, they will produce a bolt preload within the range shown in Table 2, with a 97.7% confidence level.

Bolt specifications anticipated for use with these Squirter® DTIs are EN 14399HV • EN14399HR • 898-1 • DAST Richtlinie 021.

Other bolt specifications with similar strength may also produce similar results.



## Proper Calibration of Squirter® DTIs

Before starting installation, Squirter® DTIs MUST be calibrated by the following procedure in a Bolt Tension Calibrator to determine how much squirted silicone is correct:

- Insert a bolt in Calibrator, place Squirter® DTI with the DTI on the nut end separated by a flat washer. See Figure 1
- Tighten the assembly to the Target load as shown in Table 2, with any wrench, just as the bolt would be tightened in the tower flanges.
- Once tightened, note the appearance, flow volume, and number of squirts emanating from under the DTI at that tension. The squirt should look similar to photo #3. The number of squirts should be AT LEAST equal to the number of bumps on the DTI less one: for instance, a 10 bump DTI should squirt in at least 9 places.
- Repeat this test five times and get a visual impression of how much squirt is necessary.
- Then cover the dial of the Calibrator. Using new Squirter® DTIs, see how close to the target tension you can get by judging when to stop by the squirt appearance alone.

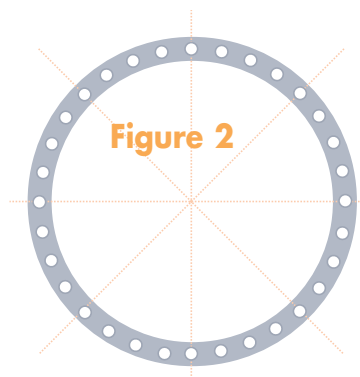
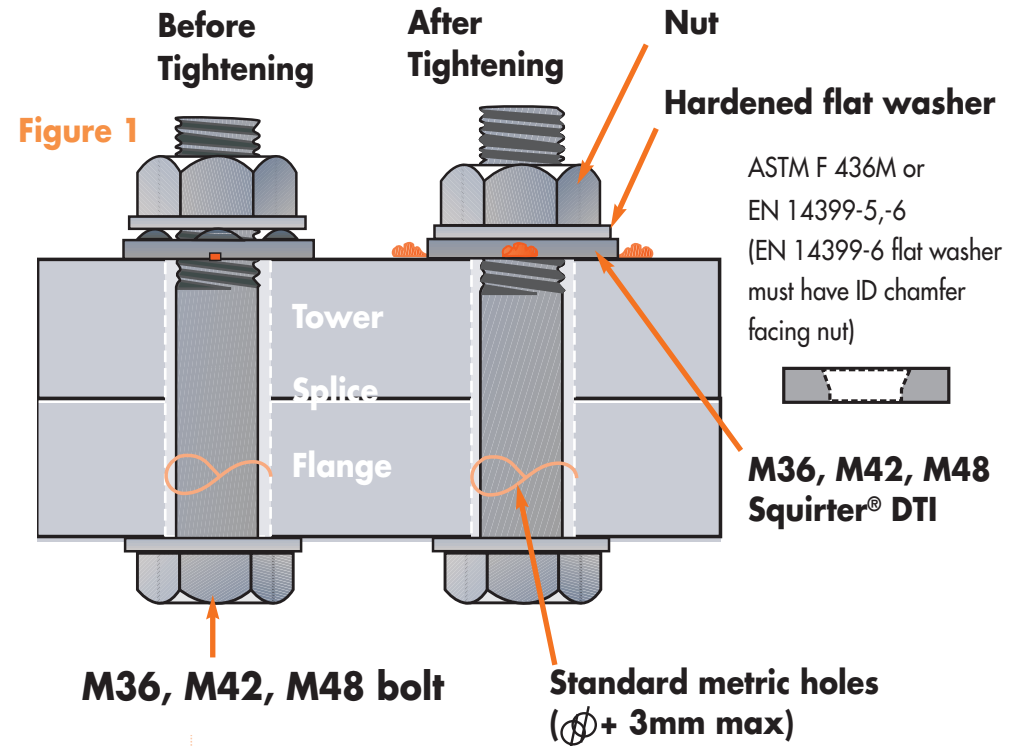
### 3 Step Process

1. Calibrate bolt assembly in a Bolt Tension Calibrator.
2. Assemble and tighten in star pattern sequentially. See Figure 2
3. Make all squirted DTIs look the same as the ones tightened in the Bolt Tension Calibrator at the correct tension.

## Caution For Installers

- 1 Make sure the corrosion protection coating on the bolt, nut, flat washer and Squirter® DTI are compatible.
- 2 Make sure the hole size is no more than 3mm larger than the bolt
- 3 Make sure the flange surface under the Squirter® DTI is clean, flat, and within 4 degrees of perpendicular to the bolt.
- 4 Flat washers under the nuts used to compress Squirter® DTI bumps must be from the list of three specifications: EN 14399-5, EN 14399-6 (with ID Chamfer facing nut) and/or ASTM F436M.
- 5 Squirter® DTIs are intended to be fitted on the nut end of the bolt. The DTI can be installed under bolt head- for more information please call Applied Bolting.

## Squirter DTI® Assembly in Bolt Tension Calibrator and as installed in Wind Tower Flange



### Install by tightening sequentially in a star pattern.

- First pass snug only
- 2nd pass small squirt
- 3rd pass full squirt

- 6 Make sure the flanges are brought into firm contact before final tightening.
- 7 Applied Bolting technical representatives should be present at site to instruct any crew new to using Squirter® DTIs. Please call ahead for booking.

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