

Applications Laboratory Testing



Our state-of-the-art laboratories verify the integrity of our products and predict the performance of our customers' completed assemblies. Our labs generate real test data that suggest proper assembly techniques and assist us in designing the optimal solution for our customer's application. It is this engineering expertise and unmatched industry experience that is the ultimate value for our customers.

Torque Studies

Drive and Strip Torque & Torque-Tension Measurements

Especially important in thread-forming fasteners, data collected from these tests help to determine the optimal driver torque settings to be used for assembly. Clamp Load can also be monitored throughout the tightening process to generate a distinct Torque-Tension profile that aids in determining the optimal installation torque for assembly.

Tightening Torque Verification

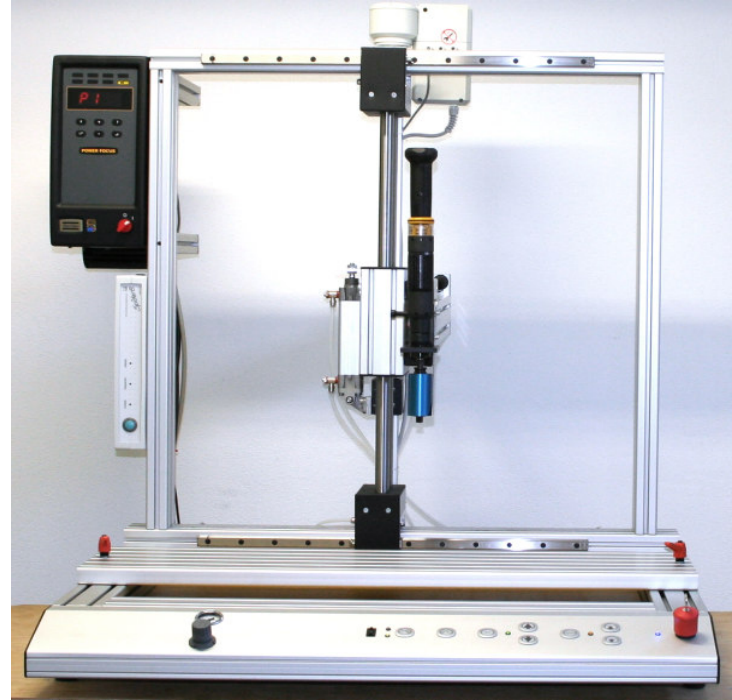
Based on data collected from the Drive and Strip Torque measurements, a tightening torque can be calculated. It should be sufficiently high so as to fully drive the screw and generate clamp load, yet low enough to avoid stripping and long term joint damage. Parts are then assembled with the intended driver settings to assure the validity of these results.

Break-loose Torque Measurements

One important aspect in the long-term stability of a joint is the fastener's resistance to loosening. This can be evaluated through break-loose torque measurements conducted after assembly and exposure to thermal stress.

Repeat Assembly

Common applications require servicing of the joint—the ability to remove and reinstall fasteners through several repetitions without damage to the joint components is critical. A fairly simple test, we install, remove, and reinstall the fasteners for 10x, 25x, even 100x to assure that customer requirements are met.



Material Tensile Testing

Automotive Specifications including (but not limited to):

- ISO 898-1
- SAE J429
- SAE J1199
- GMW25
- WA950
- MS-6149

We can also conduct Pull-Out Force Testing on joints to measure the maximum axial load that can be withstood prior to joint separation.

We can also work with customers on designing special fixtures/testing as needed.

Environmental Testing

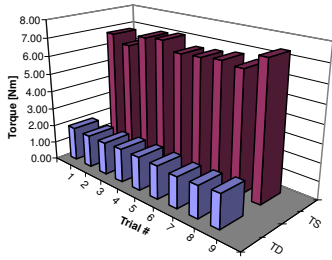
Our labs are equipped with 2 environmental test chambers that can apply cyclic thermal stress from -40°C to 200°C to closely monitor joint behavior under controlled conditions.



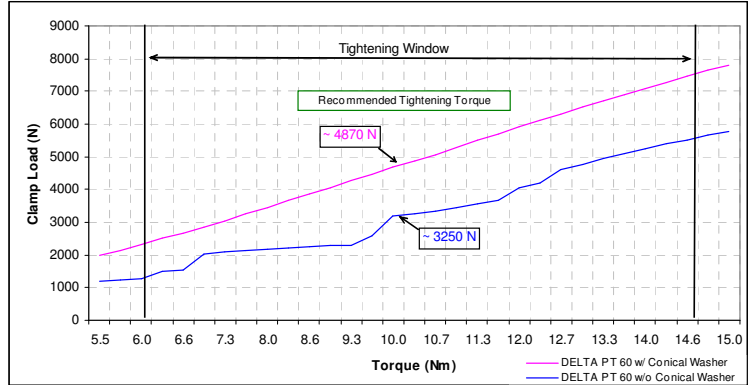
Applications Laboratory Sample Test Data

Drive and Strip Torque

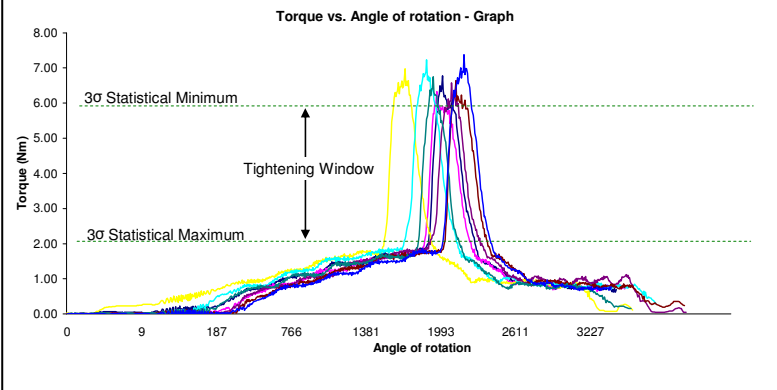
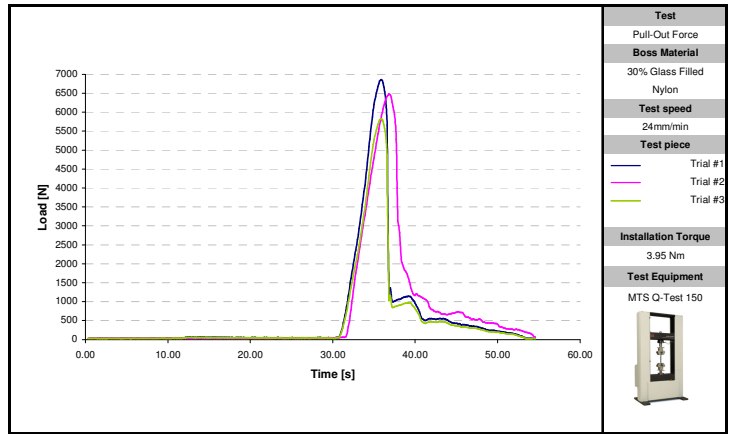
Test Piece: Plastic Test Bosses		Attached Component: Plastic Plate		
Boss Material:	30% Glass Filled Nylon	Material:	30% Glass Filled Nylon	
Counterbore-Ø:	N/A	Hole Diameter:	5.20 mm	
Counterbore-depth:	N/A	Thickness:	6.0 mm	
Average Hole Diameter:	4.00 mm (drilled)			
Average Thread Engagement:	10 mm			
Fastener: DELTA PT® 50 x 1.80 x 16 Torx® Round Washer Head (ATF p/n: P2358358)				
	Trial#	FM	T_D [Nm]	T_S [Nm]
	1	S	1.90	6.77
	2	S	1.82	6.33
	3	S	1.81	6.98
	4	S	1.86	7.08
	5	S	1.85	6.58
	6	S	1.82	6.64
	7	S	1.70	6.75
	8	S	1.75	6.61
	9	S	1.84	7.38
	Average		1.82	6.79
T_D =Driving Torque	3σ Statistical Maximum		2.00	7.73
T_S =Stripping Torque	3σ Statistical Minimum		1.64	5.85
FM =Failure Mode	Standard Deviation		0.06	0.31
3σ Statistical Minimum Strip-to-Drive Ratio: 2.93				



Torque-Tension Profile



Pull-out Force



Clamp Load Under Thermal Stress

Test Piece: 30% Glass Filled Nylon Test Bosses	Attached Component: Plastic Plate
Average Hole Diameter: 4.00 mm (drilled)	Material: 30% Glass Filled Nylon
Average Thread Engagement: 10 mm	Thickness: 6.0 mm

	Thread Type
	DELTA PT® 50
	Installation Torque
	3.95 Nm
	Temperature Conditions
	1 hr @ 25 °C
	4 hrs @ -40 °C
	4 hrs @ 150 °C
	4 hrs @ -40 °C
	4 hrs @ 150 °C
	4 hrs @ -40 °C
	4 hrs @ 150 °C
2 hrs @ 25 °C	
Initial Clamp Load: 1923 N Final Clamp Load: 809 N Clamp Load Retention: 42%	



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