

Torque-Tension Testing and Evaluation of Fastener Finishes

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1. INTRODUCTION:

On some applications of threaded fasteners, it is desirable to control the amount of developed tension when a specified range of torque has been applied or the torque required to develop a specified range of tension. Accurate torque-tension relationships can be achieved only by uniquely defining and controlling the many related assembly parameters. One of the more significant parameters is the frictional characteristic of the selected fastener finish.

2. SCOPE:

This standard provides a test method for determining the torque-tension relationship of a fastener finish as applied to a surrogate screw for the purpose of measuring the frictional characteristic of the fastener finish. The results obtained by this test shall be used as a process control attribute of the fastener finish and shall not be utilized for specific applications.

3. TEST MATERIAL:

3.1 Surrogate Screw:

M10 X 1.5 6e6g surrogate screws conforming to the general requirements of ASME 18.2.3.1M (ISO 4014), except underhead fillet designed such that fillet does not interfere with test washer hole diameter, and heat treated in accordance with ASTM F568 (ISO 898-1), Property Class 10.9, shall be used to evaluate applicable fastener finishes. Decarburization of the screw threads shall be within the limits defined in SAE J121M (ISO 898-1), Class 3/4 H.

Threads shall conform to ASME B1.13M (ISO 965/1), class 6e6g tolerances and confirmed by ASME B1.3M, System 22 before coating; and class 6h tolerances and confirmed by ASME B1.3M, System 21 after coating. Threads on all surrogate screws shall be rolled. The thread surface shall be free of burrs or other contamination that might affect an accurate determination of the frictional performance of the finish.

The screw length shall be such that a minimum of two full form threads protrude through the test nut when the screw is fully seated against the test washer. The thread length shall be such that a minimum of two full form threads are exposed within the grip length after the bolt is fully seated. Refer to Figure 1 of SAE/USCAR-10, Test for Evaluating the Torque-Tension Relationship of Both External and Internal Metric Threaded Fasteners.