

AEROSPACE RECOMMENDED PRACTICE

ARP 698

THE PROCESS OF LUBRICATING AND TORQUING THREADED ASSEMBLIES RECOMMENDATIONS FOR CIVIL AIRCRAFT APPLICATIONS

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Revised

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1. PURPOSE: To recommend, for design purposes, requirements for the lubrication of parts and the application of torque to threaded assemblies where lubricated torquing is specified.
2. SCOPE: This aerospace recommended practice includes the type of lubricant to be used, conditions of lubrication, and torque-tension relationship of lock nut and bolts as required for desired preload.
3. DEFINITION: Lubricated torquing, as described herein, is the process of lubricating and torquing threaded assemblies in which MIL-T-5544 Anti-Seize Compound is applied to the bolt threads and bearing surfaces of nuts, bolt head, and washers.
4. LUBRICANT: Only lubricant manufactured to Specification MIL-T-5544 shall be used for lubrication of threaded assemblies when lubricated torquing is specified.
5. LUBRICATION: Lubricant MIL-T-5544 must be applied to every friction surface of a bolt assembly. This includes threads and all bearing surfaces of nut, washers, and bolt head. Lubricant MIL-T-5544 must be re-applied to all surfaces before each subsequent tightening of the assembly.
6. TORQUE WRENCH: Accurate, reliable torque wrenches and a constant, smooth torquing action shall be used.
7. TORQUE-TENSION RELATIONSHIP: The optimum performance of a threaded assembly is dependent upon specifying the correct preload for the bolt and achieving this preload consistently in practice. When threaded assemblies are torqued dry, the variation in bolt tension may be as wide as two to one; that is, some bolts may be stressed twice as highly as other bolts of the same size. When lubricated torquing is applied as recommended herein, the variation in bolt tension is reduced to approximately 20%. This greater uniformity of tension operates advantageously in extending the fatigue life of the threaded assembly.

Figures 1 and 2 show the recommended torque-tension relationship under the following conditions:

 - 7.1 Self-locking nuts shall conform to MIL-N-25027.
 - 7.2 AN bolts (125,000 psi) shall conform to MIL-B-6812.
 - 7.3 NAS bolts (160,000 psi) shall conform to Specification NAS 159.

- * Bolts and nuts of corrosion-resistant steel (CRES), aluminum alloy, and copper-base alloy are excluded.

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- 7.4 MS bolts (160,000 psi) shall conform to MIL-B-7838.
- 7.5 Self-locking nuts shall be discarded if the torque required to turn the nut or bolt head before its face comes into bearing contact exceeds 20% of the final desired torque.
- 7.6 For 3/8 inch self-locking nuts and under, the nuts shall be run over the bolt threads once and removed prior to re-lubrication and final torquing.

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