

REQUIREMENTS:

SELF-LOCKING NUTS SHALL BE SUBJECT TO THE FOLLOWING LIMITATIONS:

1. SELF-LOCKING NUTS SHALL NOT BE USED AS FOLLOWS:

- a. AT JOINTS IN CONTROL SYSTEMS AT SINGLE ATTACHMENTS, OR WHERE LOSS OF THE BOLT WOULD AFFECT SAFETY OF FLIGHT UNLESS THE THREADED PARTS ARE HELD BY A POSITIVE LOCKING DEVICE THAT REQUIRES SHEARING OR RUPTURE OF MATERIALS BEFORE TORSIONAL LOADS WOULD RELIEVE THE INITIAL STRESSES OF THE ASSEMBLY.
- b. ON ANY EXTERNALLY THREADED PART THAT SERVES AS AN AXIS OF ROTATION FOR ANOTHER PART UNLESS THERE ARE NO POSSIBLE TORSIONAL LOADS WHICH CAN BE APPLIED TO EITHER THE EXTERNALLY OR INTERNALLY THREADED PART IN SUCH A MANNER AS TO RELIEVE THE INITIAL STRESSES OF THE ASSEMBLY, OR UNLESS THE THREADED PARTS ARE HELD BY A POSITIVE LOCKING DEVICE THAT REQUIRES SHEARING OR RUPTURE OF MATERIAL BEFORE TORSIONAL LOADS WOULD RELIEVE THE INITIAL STRESSES OF THE ASSEMBLY, EXAMPLE: PULLEYS, CRANKS, LEVERS, LINKAGES, HINGE PIN AND CAM FOLLOWERS.
- c. WITH BOLTS OR SCREWS ON JET ENGINE AIRCRAFT IN LOCATIONS WHERE A LOOSE NUT, BOLT OR SCREW COULD FALL OR BE DRAWN INTO THE ENGINE AIR INTAKE DUCT.
- d. WITH BOLTS, SCREWS, OR STUDS TO ATTACH ACCESS PANELS, DOORS OR TO ASSEMBLE ANY PARTS THAT ARE ROUTINELY DISASSEMBLED PRIOR TO OR AFTER EACH FLIGHT FOR ACCESS OR SERVICING.

2. BOLTS, STUDS OR SCREWS MUST EXTEND THRU THE SELF-LOCKING NUT FOR A MINIMUM LENGTH EQUIVALENT TO TWO THREADED PITCHES. THIS LENGTH INCLUDES THE CHAMFER.

3. SELF-LOCKING PLATE NUTS SHALL BE ATTACHED TO THE STRUCTURE IN A POSITIVE MANNER TO ELIMINATE THE POSSIBILITY OF THEIR ROTATING OR MISALIGNING DURING INSTALLATION AND REMOVAL OF THE BOLTS OR SCREWS. THE MANNER OF ATTACHMENT SHALL PERMIT REMOVAL WITHOUT DAMAGE TO THE STRUCTURE AND PERMIT REPLACEMENT OF THE NUTS. WHEN PROJECTION SPOT-WELDING IS USED FOR ATTACHING PLATE NUTS, CONTROL SHALL BE MAINTAINED IN ORDER THAT REMOVAL, BY DRILLING OUT THE WELDS, PERMITS REPLACEMENT WITH DRILLED PLATE NUTS.

4. SELF-LOCKING NUTS THAT ARE PRESSED INTO A HOLE IN A STRUCTURAL PIECE SHALL EMBODY THE FOLLOWING:

- a. THE NUTS SHALL ACCOMPLISH TORSIONAL RIGIDITY (ANTI-ROTATION) BY ENGAGEMENT IN THE HOLE BY LOBES OR FLAT SURFACES OF THE NUT. THE NUT'S LOBES OR FLAT SURFACES SHALL BE OF A CONTINUOUS AND SMOOTH FORM (WITH NO SHARP OR POINTED EDGES) AND WITH THE RADIUS OF CURVATURES GREATER THAN 5% OF THE NOMINAL THREAD DIAMETER. THE NUT WHEN INSTALLED IN THE STRUCTURAL MATERIAL SHALL NOT ROTATE WHEN SUBJECT TO THE MAXIMUM TORQUE OUT VALUES OF MIL-N-25027. ANCHORAGE RIGIDITY ALONG THE THREADS LONGITUDINAL AXIS SHALL BE BY A FLARED SLEEVE FORMED PERPENDICULAR TO THE THREADS LONGITUDINAL AXIS OR BY FORMING THE STRUCTURAL MATERIAL INTO A CONTINUOUS AND SMOOTH CURVED GROOVE ON THE NUT WITH THE RADII OF CURVATURES GREATER THAN 5% OF THE NOMINAL THREAD DIAMETER. THERE SHALL BE NO CRACKS IN THE NUT OR STRUCTURAL MATERIAL AFTER INSTALLATION.

5. SELF-LOCKING NUTS THAT HAVE BEEN REWORKED OR REPROCESSED SHALL NOT BE USED.

6. THE FOLLOWING NUT TYPES, AS DESCRIBED AND ILLUSTRATED BELOW, ARE NOT ACCEPTABLE FOR USE IN AIRCRAFT STRUCTURAL APPLICATIONS:

- a. NUT TYPES WHICH DEPEND UPON FRICTION FOR ANCHORAGE AND TORSIONAL RIGIDITY SUCH AS SINGLE RIVET PLATE NUTS.
- b. NUT TYPES WHICH REQUIRE EMBEDDING THE NON-APPROVED SHARP SHAPES (SUCH AS POLYGONS, TEETH, KNURLS ETC.) FOR THEIR ANCHORAGE AND TORSIONAL RIGIDITY.

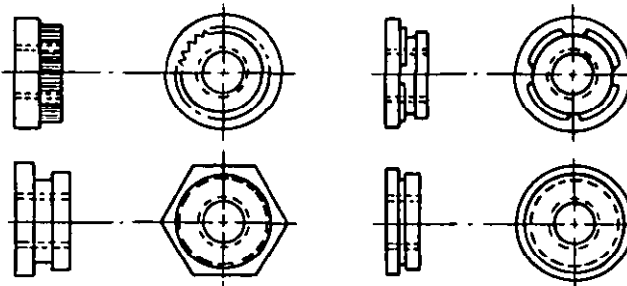


FIGURE 1. NON-APPROVED SHARP SHAPES

7. THE NUTS ILLUSTRATED ABOVE MAY BE USED ON EQUIPMENT SUCH AS INSTRUMENT MOUNTINGS AND ELECTRICAL EQUIPMENT.

USER SYMBOLS:

REVISION SYMBOLS:

U, F - 99  
AR, Y - AR

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This military standard is approved for use by all Departments & Agencies of the Department of Defense. Selection for all new engineering and design applications and for repetitive use shall be made from this document.

(E) STANDARD REWRITTEN

P.A. NAVY - AS Other Cust USAF - 11 ARMY - AV	TITLE	MILITARY STANDARD
	NUTS, SELF-LOCKING, AIRCRAFT, RELIABILITY AND MAINTAINABILITY USAGE REQUIREMENTS FOR	<b>MS 33588</b>
PROCUREMENT SPECIFICATION	SUPERSEDES: AND10068	SHEET 1 OF 2

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USER SYMBOLS:

- 8. CADMIUM PLATED SELF-LOCKING NUTS SHALL NOT BE USED IN CONTACT WITH TITANIUM AND TITANIUM ALLOY BOLTS, SCREWS OR STUDS.
- 9. CADMIUM PLATED NUTS SHALL NOT BE USED IN APPLICATIONS WHERE THE OPERATING TEMPERATURES EXCEED 450° F
- 10. SILVER PLATED SELF-LOCKING NUTS SHALL NOT BE USED IN CONTACT WITH TITANIUM AND TITANIUM ALLOY BOLTS, SCREWS OR STUDS IN APPLICATIONS WHERE THE OPERATING TEMPERATURES EXCEED 600° F.
- 11. SILVER PLATED SELF-LOCKING NUTS SHALL NOT BE USED WITH SILVER PLATED BOLTS.

REVIEWER SYMBOLS:

USAF - 99  
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