SAE Aerospace
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# AEROSPACE STANDARD

SAE AS5133

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## Nut, Floating, Attached Retention Element (A.R.E.) - Hole Dimensions and Installation Requirements

RATIONALE

AS5133 has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE:

1.1 Type:

This specification establishes the procedure for installing self-locking, floating, attached retention element (A.R.E.) nut assemblies and defines the necessary hole preparation.

2. REFERENCES:

2.1 Applicable Documents:

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AS3601 Nut, Floating, Self-Locking, Attached Retention Element, 450 °F, 125 ksi Ftu, UNS S66286

3. REQUIREMENTS:

3.1 Hole Preparation:

Holes (see Figure 1) shall be drilled to the dimensions shown in Table 1. Holes should be fully dimensioned on the detail part drawing.





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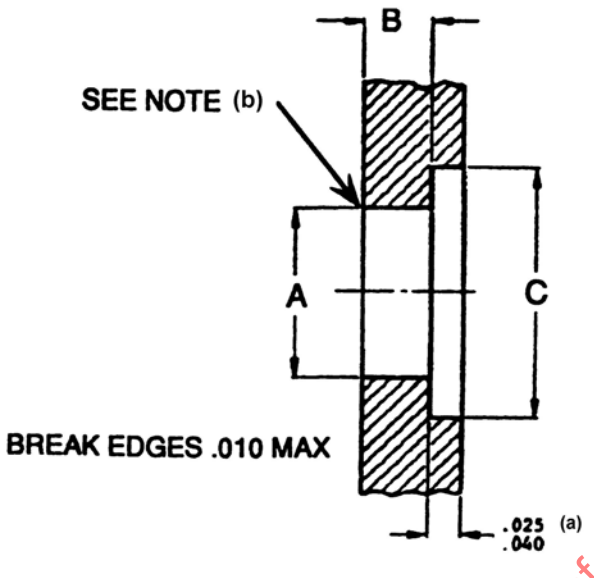


NOTES:

(a) Depth of counterbore for general applications is .025-.040 for minimum grip thickness (Dimension B). The counterbore depth minimum can be increased to .030 in to insure flushness after flaring sleeve. The counterbore depth maximum can be increased to .075. Deeper counterbores will not permit full entry of installation tooling. Proper grip range should always be maintained.

(b) For materials with hardness not exceeding 110 BHN or 62 HRB, do not break edges.

FIGURE 1 - Installation Hole Requirements

TABLE 1 - Installation Hole Requirements

| Part Number | ØA (a) | B Grip Range | ØC | Torque Out lb-in | Push Out lbf |
|---|---|---|---|---|---|
| AS3601-01 | .280-.285 | .031-.062 | .370-.395 | 60 | 100 |
| AS3601-02 | .280-.285 | .063-.094 | .370-.395 | 60 | 100 |
| AS3601-03 | .347-.352 | .031-.062 | .510-.535 | 100 | 125 |
| AS3601-04 | .347-.352 | .063-.094 | .510-.535 | 100 | 125 |

NOTES:
(a) A dimension can be reduced by .009 in for installations in soft material, including aluminum with hardness not exceeding 110 BHN or 62 HRB.

3.1.1 Applications: The dimensions in Table 1 shall be used to prepare holes for A.R.E. nuts conforming to AS3601.

3.2 Installation Procedure:

Install the nut into the non-counterbored side of the hole using the manufacturer's recommended tooling or any device capable of seating the cage flush with the mating surface. Flare the sleeve end into the counterbore. No portion of the flared sleeve may protrude above the parent material surface.

3.2.1 Harder Parent Materials: It may be necessary to alter installation procedures when installing nuts into materials with hardnesses in excess of 98 HRB. Seating the nut may require tooling other than standard manufacturer's hand tooling or mating parts may need to be prebroached with a lobe pattern corresponding to the nut assembly.

3.3 Inspection:

3.3.1 Proof Loads: Axial and torsional proof loads shall be applied to the assembly in any manner that assures that the load is being applied directly to the nut element. Torque out and push out proof load requirements are given in Figure 1.

3.3.2 Visual Inspection:

3.3.2.1 Flared Sleeve: Lopsided or folded areas in the flared sleeves are not acceptable. Light cracks on the periphery of the sleeve and closed at the periphery are allowed. No open cracks are allowed.

3.3.2.2 Flushness: The flared sleeve shall be flush or below with the surface of the mating part.

3.3.2.3 Cage Seating: The cage must be seated flat against the mating part so that a .002 in shim cannot be freely inserted between the cage and the mating part. Since the cage is a sheet metal stamping, it is not always perfectly flat and may not contact the mating part all around. Installation is acceptable as long as the shim is tight on part of the cage. See Figure 2.