

TECHNICAL SPECIFICATION

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Technical Specification for Self Locking Union Nuts (Unified Threads) Manufactured from INCO718 Material.1270 MPa (185000 lbf/in²) Minimum Tensile Strength at Room Temperature

NOTE: The issue status of this document remains unchanged as there have been no changes to the technical content.

SAE INDUSTRY TECHNOLOGIES CONSORTIA AEROSPACE STANDARDS AND PART QUALIFICATION PROGRAM

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TECHNICAL SPECIFICATION

No. 220

**SBAC TECHNICAL SPECIFICATION
FOR
SELF LOCKING UNION NUTS (UNIFIED THREADS) MANUFACTURED
FROM INCO718 MATERIAL.**

**1270 MPa (185000 lbf/in²) MINIMUM TENSILE STRENGTH
AT ROOM TEMPERATURE**

*Issued by: Technical Standards Group
The Society of British Aerospace Companies Ltd
Registered in England and Wales No. 143447*

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Prepared by the Technical Standards Group

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1 Foreword

- 1.1 This specification details the requirements for self locking union nuts with threads to ISO 3161.
- 1.2 SBAC standards have been issued to provide dimensional control.
- 1.3 The heat treatment requirement for the product standards controlled by this specification is given in para. 7.3.2.

2 Scope

2.1 This specification establishes the requirements and the appropriate performance, inspection and production acceptance tests which apply to self locking union nuts. The union nuts will be manufactured with unified threads to ISO 3161 made of corrosion and heat resistant nickel alloy which develops a minimum tensile strength of 1270 MPa at ambient temperature. This specification covers the procedures to be followed by a manufacturer to become qualified to supply self locking union nuts to this specification.

2.2 Construction

2.2.1 The nut element shall be a self-contained 'all metal' unit including the self-locking device. The locking element shall not operate either by means of a separate movement from the installation nor depend upon pressure on the bearing surfaces for locking action. Tool marks resulting from producing the self-locking feature shall blend smoothly without abrupt change and shall not affect the performance or identification of the part.

3 Associated Specifications

3.1 The following specifications form a part of this specification and are referenced within. The documents shown in parenthesis are USA alternatives to the British documents wherever the latter are called out in this specification, however they may be subject to change and their inclusion as such is no guarantee of latest issue and that the specifications still coincide.

ISO 3161 (MIL-S-8879)	- Specification for UNJ threads with controlled root radius, for aerospace: inch series.
BS 1580 (MIL-S-7742)	- Unified Screw Threads.
DEF STAN 91-98/1 - DERD 2487	- Lubricating oil: Aircraft Turbine engines: Synthetic type (OX-38).
DTD5638 or EN2404 or AMS5662	- Inconel 718 material.
BS 1134 (ANSI B46.1)	- Assessment of surface texture.
(ASTM E112)	- Determining Average Grain Size.
BS EN ISO 6508 (ASTM E18)	- Method for Rockwell Hardness test.
BS 6001	- Sampling procedures.
TS 200	- SBAC list of qualified manufacturers.
TS 201	- Method change approval for qualified parts.
TS 202	- SBAC qualification test requirements and procedures for aerospace industry standard parts.
ISO 2859	- Sampling procedures for inspection by attributes.
ISO 9001-2000	- Quality systems, model for quality assurance in design, development, production, installation and servicing.
BS A4-1-	- Specification for test pieces and test methods for metallic materials - Tensile tests.
BS M39	- Penetrant inspection of aerospace materials and components.

4 Definitions

4.1 Authorities

4.1.1 Design Authority

The Design Authority is the SBAC Technical Standards Group (TSG).

4.1.2 Qualification Testing Authority

In accordance with SBAC specification TS202 the qualification testing authority shall be the SBAC Technical Standards Group or other body nominated by the TSG to carry out the testing.

4.2 Production Batch:

Quantity of finished union nuts fabricated by the same process from a single material cast (single heat of alloy), having the same basic part number and diameter, heat treated together to the same specified condition and produced as one continuous run.

4.3 Inspection Lot:

Consists of union nuts from a single production batch of the same part number which completely defines the union nuts.

4.4 Discontinuities:

4.4.1 **Crack:** Rupture in the material which may extend in any direction and which may be intercrystalline or transcrystalline in character.

4.4.2 **Seam:** Longitudinal surface defect in the form of an unwelded open fold in the material.

4.4.3 **Lap:** Surface defect caused by folding over metal fins or sharp corners and then rolling or forging them into the surface.

4.4.4 **Inclusion:** Non-metallic particles originating from the material making process. They may exist as discrete particles or strings of particles extending longitudinally.

4.4.5 **Burr:** A rough edge or ridge left on the metal due to a cutting, grinding, piercing or blanking operation.

4.5 Test Temperature:

Ambient temperature, unless otherwise specified.

4.6 Simple Random Sampling:

The taking of n items from a population of N items in such a way that all possible combinations of n items have the same probability of being chosen.

4.7 **Critical Defect:**

A defect that according to judgement and experience, is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the considered product, or that is likely to prevent performance or the function of major end item.

4.8 **Major Defect:**

A defect other than critical, that is likely to result in a failure or to reduce materially the usability of the considered product for its intended purpose.

4.9 **Minor Defect:**

A defect that is not likely to reduce materially the usability of the considered product for its intended purpose, or that is a departure from established specification having little bearing on the effective use of operation of this product.

4.10 **Sampling Plan:**

A plan according to which one or more samples are taken in order to obtain information and possibly to reach a decision.

4.11 **Limiting Quality LQ₁₀:**

In a sampling plan, a quality level which corresponds to a specified and relatively low probability of acceptance - in this case 10% probability of acceptance.

4.12 **Acceptable Quality Level:**

A quality level which in a sampling plan, corresponds to a specified but relatively high probability of acceptance.

It is the maximum per cent defective (or the maximum number of defects per hundred units) that, for purposes of sampling inspection, can be considered satisfactory as a process average.

4.13 **Finished Union Nut:**

A union nut ready for use, inclusive of any possible treatments and/or surface coatings, as specified in the product standard or definition document.

4.14 **Definition Document:**

Document specifying all the requirements for the finished union nuts, e.g.

- metallurgical
- geometrical and dimensional
- functional (strength and temperature classes)

4.15 **Self-locking Torque:**

The torque to be applied to the union nut to maintain movement of rotation in relation to the threaded male connection (e.g. union adapter), the assembly being under no axial load and the union nut locking system being completely engaged with the male threaded connection (e.g. union adapter).

4.16 Seating Torque:

The tightening torque to be applied to the union nut to introduce or to increase the axial load in the assembly.

4.17 Unseating Torque:

The untightening torque to be applied to the union nut to reduce or remove the axial load in the assembly.

4.18 Breakaway Torque (starting torque):

The torque required to start an installed union nut unscrewing off its threaded male connection (e.g. union adapter). The union nut locking device having been fully engaged onto the threaded male connection (e.g. union adapter), but with no axial load applied.

4.19 Crimp:

A controlled squeeze using suitable hardened jaws (a sudden impact movement is not acceptable).