

# Nuts, self-locking, with maximum operating temperature less than or equal to 425 °C — Test methods

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# National foreword

This British Standard reproduces verbatim ISO 7481:2000 and implements it as the UK national standard. It supersedes BS A 295:1985 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee ACE/12, Aerospace fasteners and fastening systems, to Subcommittee ACE/12/1, Aerospace fasteners and fastening systems (international), which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

## Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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## Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii to iv, pages 1 to 19 and a back cover.

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## **Aerospace — Nuts, self-locking, with maximum operating temperature less than or equal to 425 °C — Test methods**

*Aéronautique et espace — Écrous à freinage interne dont la température  
maximale d'utilisation est inférieure ou égale à 425 °C — Méthodes de  
contrôle et d'essai*



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## **Foreword**

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 7481 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 4, *Aerospace fastener systems*.

This second edition cancels and replaces the first edition (ISO 7481:1984), which has been technically revised. Notably, a test for no rotation of the captive washer was added.

# Aerospace — Nuts, self-locking, with maximum operating temperature less than or equal to 425 °C — Test methods

## 1 Scope

This International Standard specifies test methods for metric self-locking nuts with MJ threads intended for use in aerospace construction at maximum operating temperatures less than or equal to 425 °C. It describes the test device and the method for each test.

It applies to self-locking nuts as defined above, provided that the relevant documents (dimensional standard, drawing, procurement specification, etc.) refer to this International Standard.

This International Standard shall be used in conjunction with ISO 5858.

**NOTE** This International Standard only specifies tests for ambient and elevated temperature applications. Tests for applications at less than ambient temperatures, for example cryogenic, shall be as agreed upon between seller and purchaser.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 691:1997, *Assembly tools for screws and nuts — Wrench and socket openings — Tolerances for general use.*

ISO 1024:1989, *Metallic materials — Hardness test — Rockwell superficial test (scales 15N, 30N, 45N, 15T, 30T and 45T).*

ISO 5855-2:1999, *Aerospace — MJ threads — Part 2: Limit dimensions for bolts and nuts.*

ISO 5858:1999, *Aerospace — Nuts, self-locking, with maximum operating temperature less than or equal to 425 °C — Procurement specification.*

ISO 6507-1:1997, *Metallic materials — Vickers hardness test — Part 1: Test method.*

ISO 6508-1:1999, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T).*

ISO 7403:1998, *Aerospace — Spline drives — Wrenching configuration — Metric series.*

### 3 Inspections and tests

#### 3.1 Hardness test

##### 3.1.1 Procedure

The choice depends on the configuration of the nut and available equipment. The authorized procedures are:

- Rockwell hardness in accordance with ISO 6508-1;
- Vickers hardness HV 5 to HV 100 in accordance with ISO 6507-1;
- Rockwell superficial hardness in accordance with ISO 1024;
- microhardness.

##### 3.1.2 Method

This test shall be carried out at ambient temperature.

The measurement zone (bearing surface, across flats, underside of anchor nut lugs, etc.) shall correspond to the following conditions:

- a) thickness at least equal to 10 times the penetration depth;
- b) parallelism with respect to bearing surface not greater than 3°.

Should this not be possible, carry out this test on a cut section after moulding the nut into thermosetting resin.

Remove all possible coating (protection, lubrication, paint, etc.) in the measurement zone. Align the bearing surface to obtain the required relationship. These two operations shall not generate any heat liable to modify the characteristics of the material constituting the nut being tested.

Carry out the test and then check conformity with the requirements of the dimensional standard or drawing.

Nuts subjected to this test shall not be used again.

#### 3.2 Bearing surface squareness test

##### 3.2.1 Test device

The test device is illustrated in Figure 1.

The test device includes the following elements:

- a) a threaded mandrel with end in accordance with ISO 5855-2, with the exception of the pitch diameter which shall be in accordance with the values specified in Table 5 for the maximum mandrel;
- b) a collar sliding on the plain portion of the threaded mandrel whose external diameter  $B$  is at least equal to reference dimension  $A$  for type I, II and V nuts in Figure 2 and equal to reference dimension  $A$  for type III and IV nuts in Figure 2;
- c) an appropriate feeler gauge.