

Aerospace — Self-locking nuts with maximum operating temperature greater than 425 degrees C — Test methods

ICS 49.030.30

National foreword

This British Standard is the UK implementation of ISO 8642:2008. It supersedes BS A 298:1988 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ACE/12, Aerospace fasteners and fastening systems.

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

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*Aéronautique et espace — Écrous à freinage interne dont la
température maximale d'utilisation est supérieure à 425 °C — Méthodes
d'essai*



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8642 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 8642:1986) which has been technically revised.

Aerospace — Self-locking nuts with maximum operating temperature greater than 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 temperature greater than 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.

Other test devices or test methods than those specified in this International Standard may be used, but, in the event of a dispute, the requirements laid down in this International Standard shall take precedence.

This International Standard shall be used in conjunction with ISO 8641.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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

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

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

ISO 8641, *Aerospace — Self-locking nuts with maximum operating temperature greater than 425 °C — Procurement specification*

3 Inspections and tests

3.1 Hardness test

3.1.1 Procedure

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 6508-1;
- microhardness.

It is strongly recommended to use the method corresponding to the hardness unit indicated. Should this not be possible, the use of conversion charts is allowed, but, given their inaccuracy, the results obtained shall be used warily. In the event of a dispute, the results obtained using the method corresponding to the hardness unit indicated shall take precedence.

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 satisfy the following conditions:

- a) thickness at least equal to $10 \times$ the penetration depth;
- b) parallelism with respect to bearing surface no greater than 3° .

Should this not be possible, carry out this test on a cut section after moulding the nut into a resin capable of maintaining it in the correct position.

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 and 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, III and VI nuts in Figure 2 and equal to reference dimension A for type II, IV and V nuts in Figure 2;
- c) an appropriate feeler gauge.

3.2.2 Method

The test shall be carried out at ambient temperature.

For floating nuts, extract the nut from the cage or channel.

Lubricate the mandrel and nut threads (or threaded part) as stated in Table 1 (if necessary). Screw, with or without using a spanner, the threaded mandrel into the nut or threaded part until it engages with the self-locking zone.

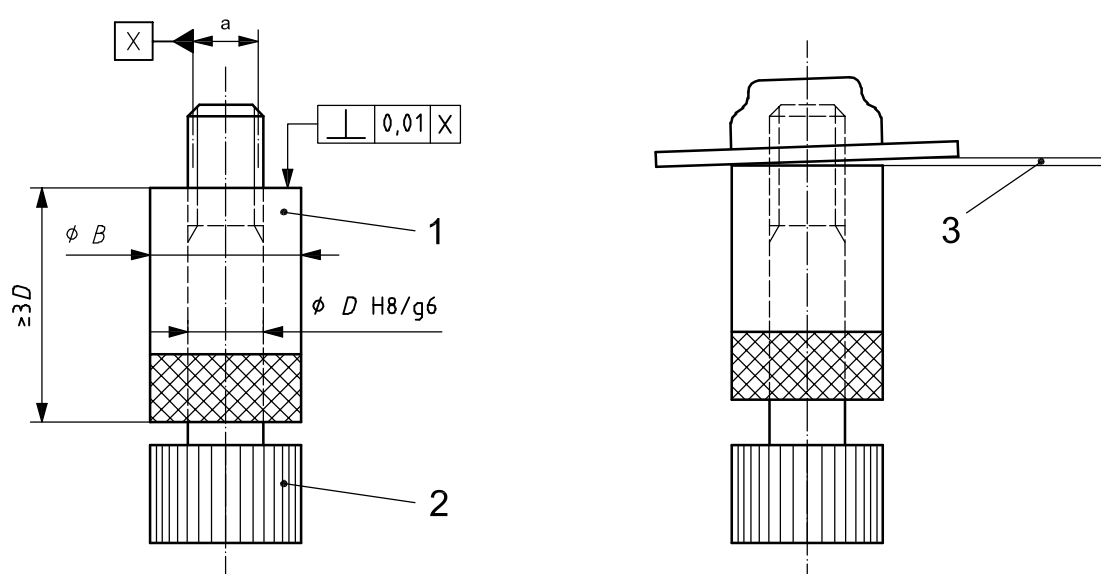
Move the collar into contact with the bearing surface.

Evaluate the out-of-squareness by means of a feeler gauge whose thickness corresponds to the permissible squareness error permitted by the dimensional standard, the drawing or the procurement specification.

For clinch nuts, the sliding collar shall have a counterbore to accommodate the shank.

Table 1 — Test bolt and lubrication

Nut to be tested		Test bolt		Additional lubrication
Material	Coating	Material	Coating	
Steel or alloy steel	Any	Alloy steel	None	
Stainless steel	Silver or MoS ₂	Stainless steel	None	Synthetic oil
	None		Silver	



Key

- 1 sliding collar
- 2 threaded mandrel
- 3 feeler gauge
- a Pitch diameter.

Figure 1

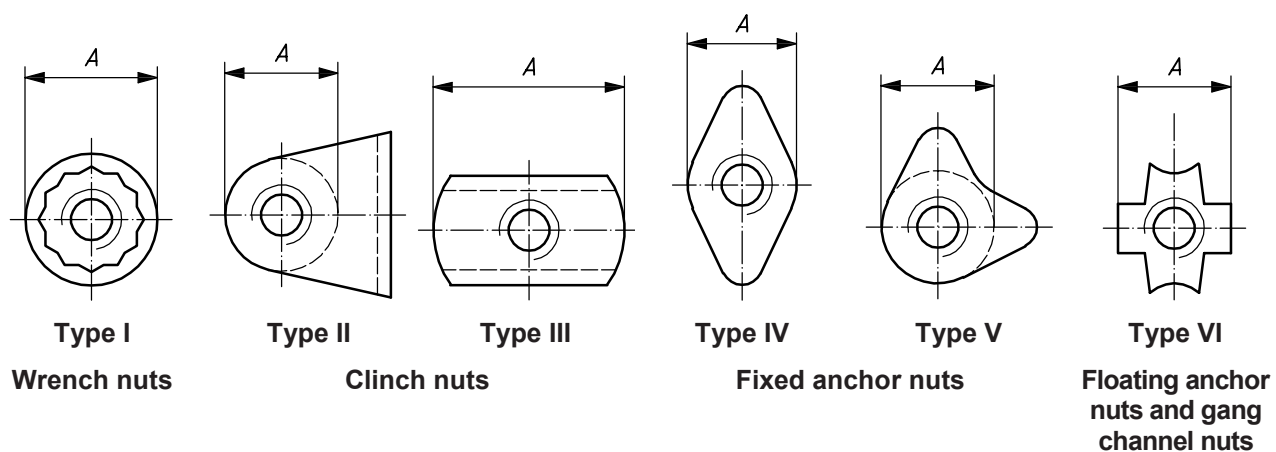


Figure 2