

SLOVENSKI STANDARD

SIST EN 3228:2022

01-maj-2022

Nadomešča:
SIST EN 3228:2010

Aeronavtika - Matice, šestrobe, drsne, z normalnim zevom ključa, iz jekla, kadmirane - Klasifikacija: 900 MPa (pri temperaturi okolice)/235 °C

Aerospace series - Nuts, hexagonal, plain, reduced height, normal across flats, in steel, cadmium plated - Classification: 900 MPa (at ambient temperature)/235 °C

Luft- und Raumfahrt - Flache Sechskantmuttern mit reduzierter Höhe, normale Schlüsselweite, aus Stahl, verkadmet - Klasse: 900 MPa (bei Raumtemperatur)/235 °C

Série aérospatiale - Écrous hexagonaux ordinaires, hauteur réduite, surplats normaux, en acier, cadmiés - Classification : 900 MPa (à température ambiante)/235 °C

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Ta slovenski standard je istoveten z: EN 3228:2022

ICS:

21.060.20	Matice	Nuts
49.025.10	Jekla	Steels
49.030.30	Matice	Nuts

SIST EN 3228:2022 en,fr,de

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EUROPEAN STANDARD

EN 3228

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2022

ICS 49.030.30

Supersedes EN 3228:2010

English Version

**Aerospace series - Nuts, hexagonal, plain, reduced height,
normal across flats, in steel, cadmium plated -
Classification: 900 MPa (at ambient temperature)/235 °C**

Série aérospatiale - Écrous hexagonaux ordinaires,
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°C

Luft- und Raumfahrt - Flache Sechskantmuttern mit
reduzierter Höhe, normale Schlüsselweite, aus Stahl,
verkadmet - Klasse: 900 MPa (bei
Raumtemperatur)/235 °C

This European Standard was approved by CEN on 17 January 2022.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European Foreword

This document (EN 3228:2022) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2022 and conflicting national standards shall be withdrawn at the latest by September 2022.

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

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 3228:2022 (E)

1 Scope

This document specifies the characteristics of plain hexagonal nuts, reduced height, normal across flats, in steel, cadmium plated, for aerospace applications.

Classification: 900 MPa/235 °C¹.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 2133, *Aerospace series — Cadmium plating of steels with specified tensile strength $\leq 1\,450$ MPa, copper, copper alloys and nickel alloys*

EN 2205, *Aerospace series — Steel FE-PL1502 (25CrMo4) — $900\text{ MPa} \leq R_m \leq 1\,100\text{ MPa}$ — Bars — $D_e \leq 40\text{ mm}$*

EN 2424, *Aerospace series — Marking of aerospace products*

EN 2438, *Aerospace series — Steel FE-PL2102 (35NiCr6) — $900\text{ MPa} \leq R_m \leq 1\,100\text{ MPa}$ — Bars — $D_e \leq 40\text{ mm}$*

EN 2448, *Aerospace series — Steel FE-PL1503 (35CrMo4) — $900\text{ MPa} \leq R_m \leq 1\,100\text{ MPa}$ — Bars — $D_e \leq 40\text{ mm}$*

EN 3513, *Steel FE-PL711 — Hardened and tempered — $900 \leq R_m \leq 1\,100\text{ MPa}$ — Bar and wire — $D_e \leq 45\text{ mm}^2$*

TR 3823, *Aerospace series — Materials for plain, slotted and self-locking by plastic ring hexagonal nuts³*

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

ISO 8788, *Aerospace — Nuts, metric — Tolerances of form and position*

ISO 9139, *Aerospace — Nuts, plain or slotted (castellated) — Procurement specification*

ISO 9609, *Aerospace — Nuts, hexagonal, plain, reduced height, normal across flats, with MJ threads, classifications: 450 MPa (at ambient temperature)/120 degrees C, 450 MPa (at ambient temperature)/235 degrees C, 600 MPa (at ambient temperature)/425 degrees C, 900 MPa (at ambient temperature)/235 degrees C, 900 MPa (at ambient temperature)/315 degrees C, 900 MPa (at ambient temperature)/650 degrees C, 1 100 MPa (at ambient temperature)/235 degrees C, 1 100 MPa (at ambient temperature)/730 degrees C and 1 250 MPa (at ambient temperature)/600 degrees C — Dimensions*

¹ Maximum temperature that the nut is able to withstand, without permanent alteration to its original characteristics, after ambient temperature has been restored. The maximum temperature is conditioned by the surface treatment.

² Published as ASD-STAN Standard at the date of publication of this document by AeroSpace and Defence Industries Association of Europe – Standardization (ASD-STAN), <http://www.asd-stan.org>.

³ Published as ASD STAN Technical Report at the date of publication of this document by AeroSpace and Defence Industries Association of Europe – Standardization (ASD STAN), <http://www.asd-stan.org>.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Required characteristics

4.1 Configuration — Dimensions — Masses

See Figure 1 and Table 1.

Dimensions and tolerances shall be in accordance with ISO 9609 and apply after surface treatment.

Break sharp edges 0,1 to 0,4.

Details of form not stated are at the manufacturer's option.

Tolerances of form and position shall be according to ISO 8788.

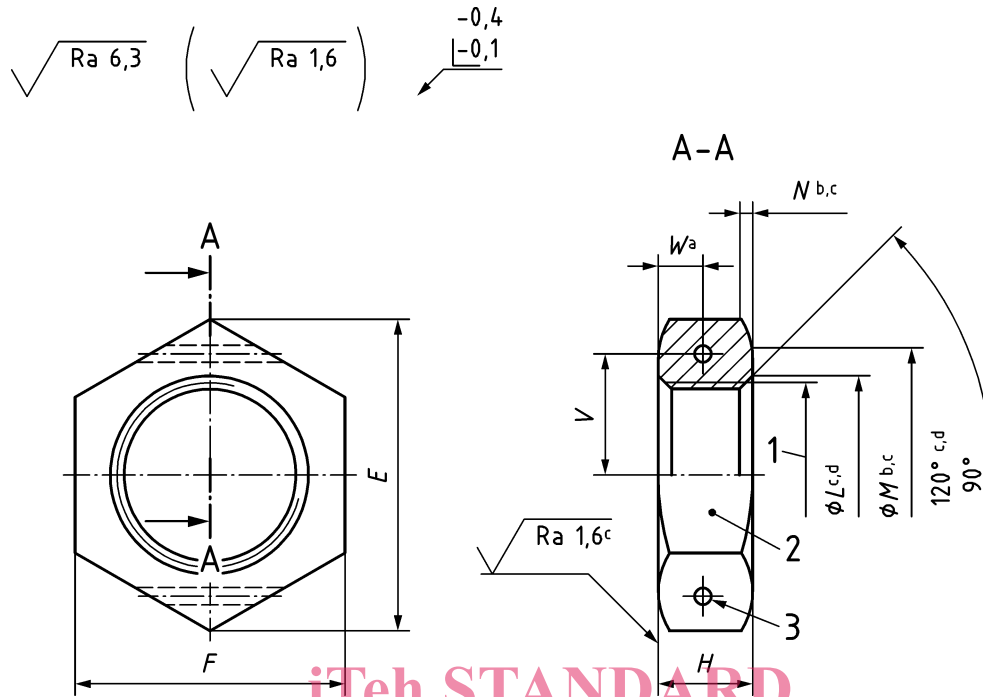
These values in micrometres apply before surface treatment. The values do not apply to threads.

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Dimensions in millimetres

**Key**

- 1 thread
- 2 marking
- 3 two holes ϕU optional

^a from either face

^b Diameter M may be tangential to, but shall not intrude on the flats.

^c Applicable to both faces.

^d All forms of entry (chamfer or radius) option within these limiting dimensions.

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Figure 1 — Hexagonal nut

Table 1 — Dimensions, masses

Dimensions in millimetres

Diameter code	Thread ^a	<i>E</i>	<i>F</i>		<i>H</i>	<i>L</i>		<i>M</i>	<i>N</i>		<i>U</i>	<i>V</i>	<i>W</i>	Mass
		min.			h14			min.	max.	min.	H13	±0,2	min.	kg/1 000 pieces approx.
040	MJ4 × 0,7-4H6H	7,6	7	h12	2,6	4,2	+0,6 0	6,4	0,5	0,2	b	b	b	0,65
050	MJ5 × 0,8-4H6H	8,7	8		3	5,2		7,4						0,9
060	MJ6 × 1-4H5H	10,9	10	h13	3,5	6,3	+0,8 0	9,3	0,6	0,3	1,5	3,9	1,4	1,6
070	MJ7 × 1-4H5H	12	11		4	7,3		10,2						2,1
080	MJ8 × 1-4H5H	14,3	13		5	8,3		12,2						3,1
100	MJ10 × 1,25-4H5H	18,9	17		6	10,3		16						6,9
120	MJ12 × 1,25-4H5H	21,1	19		7	12,3		18						9,7
140	MJ14 × 1,5-4H5H	24,5	22		8	14,4		21						15
160	MJ16 × 1,5-4H5H	26,8	24		9	16,4		23						19,4
180	MJ18 × 1,5-4H5H	30,2	27		10	18,4		26						27
200	MJ20 × 1,5-4H5H	33,6	30		11	20,4		29						37
220	MJ22 × 1,5-4H5H	35,8	32		12	22,4		30,9						49
240	MJ24 × 2-4H5H	40,4	36		24,5	34,9	65							

^a In accordance with ISO 5855-2.

^b Lockwire holes not provided for these diameters.

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4.2 Materials

Materials shall be according to EN 2205, EN 2438, EN 2448, EN 3513 or TR 3823.

4.3 Surface treatment

The surface treatment shall be according to EN 2133, 5 µm minimum on threads and all surfaces which can be contacted by a 20 mm diameter ball. On all other surfaces, a continuous cadmium plating shall be present.

5 Designation

If necessary the originator code I9005 shall be placed between the description block and the identity block.

EXAMPLE

	Description block	Identity block
	NUT	EN3228H060
Number of this standard	_____	
Hole code (see Table 2)	_____	
Diameter code (see Table 1)	_____	

The hole code shall be according to Table 2.

Table 2 — Hole code

Option	Code
Lockwire holes	H
No hole	- (hyphen)

6 Marking

The marking shall be according to Table 3.

Table 3 — Marking

Diameter code	EN 2424 Style
040 to 070	N
080 to 160	C
180 to 240	A