BS EN 3228:2010

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

ICS 49.030.30

National foreword

This British Standard is the UK implementation of EN 3228:2010.

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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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 February 2010

ISBN 978 0 580 70525 0

Amendments/corrigenda issued since publication

Date	Comments

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 3228

January 2010

ICS 49.030.30

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

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

This European Standard was approved by CEN on 11 December 2009.

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Ref. No. EN 3228:2010: E

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Foreword

This document (EN 3228:2010) 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of an identical text or by endorsement, at the latest by July 2010, and conflicting national standards shall be withdrawn at the latest by July 2010.

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1 Scope

This standard specifies the characteristics of plain, hexagonal nuts, reduced height, normal across flats, in steel, cadmium plated.

Classification: 900 MPa[1)] / 235 °C[2)].

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.

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

EN 2205, *Aerospace series — Steel FE-PL1502 (25CrMo4) — 900 MPa ≤ R_m ≤ 1 100 MPa — Bars — D_e ≤ 40 mm*

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

EN 2438, *Aerospace series — Steel FE-PL2102 (35NiCr6) — 900 MPa ≤ R_m ≤ 1 100 MPa — Bars — D_e ≤ 40 mm*

EN 2448, *Aerospace series — Steel FE-PL1503 (35CrMo4) — 900 MPa ≤ R_m ≤ 1 100 MPa — Bars — D_e ≤ 40 mm*

EN 3513, *Aerospace series — Steel FE-PL711 — Hardened and tempered — 900 ≤ R_m ≤ 1 100 MPa — Bar and wire — D_e ≤ 45 mm*[3)]

EN 9100, *Quality Management Systems — Requirements for Aviation, Space and Defense Organizations*

TR 3823, *Aerospace series — Materials for plain, slotted and self-locking by plastic ring hexagonal nuts*[4)]

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 °C, 450 MPa (at ambient temperature) /235 °C, 600 MPa (at ambient temperature) /425 °C, 900 MPa (at ambient temperature) /235 °C, 900 MPa (at ambient temperature) /315 °C, 900 MPa (at ambient temperature) /650 °C, 1 100 MPa (at ambient temperature) /235 °C, 1 100 MPa (at ambient temperature) /730 °C and 1 250 MPa (at ambient temperature)/600 °C — Dimensions*

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1) Corresponds to strength class of the associated bolt, the 100 % load of which it is able to withstand, when tested at ambient temperature, without breaking or cracking.

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

3) Published as ASD-STAN Prestandard at the date of publication of this standard.

4) Published as ASD-STAN Technical Report at the date of publication of this standard.

3 Required characteristics

3.1 Configuration — Dimensions — Masses

See Figure 1 and Table 1.

Dimensions and tolerances are in conformity with ISO 9609, expressed in millimetres and apply after surface treatment.

3.2 Materials

EN 2205, EN 2438, EN 2448, EN 3513 or TR 3823.

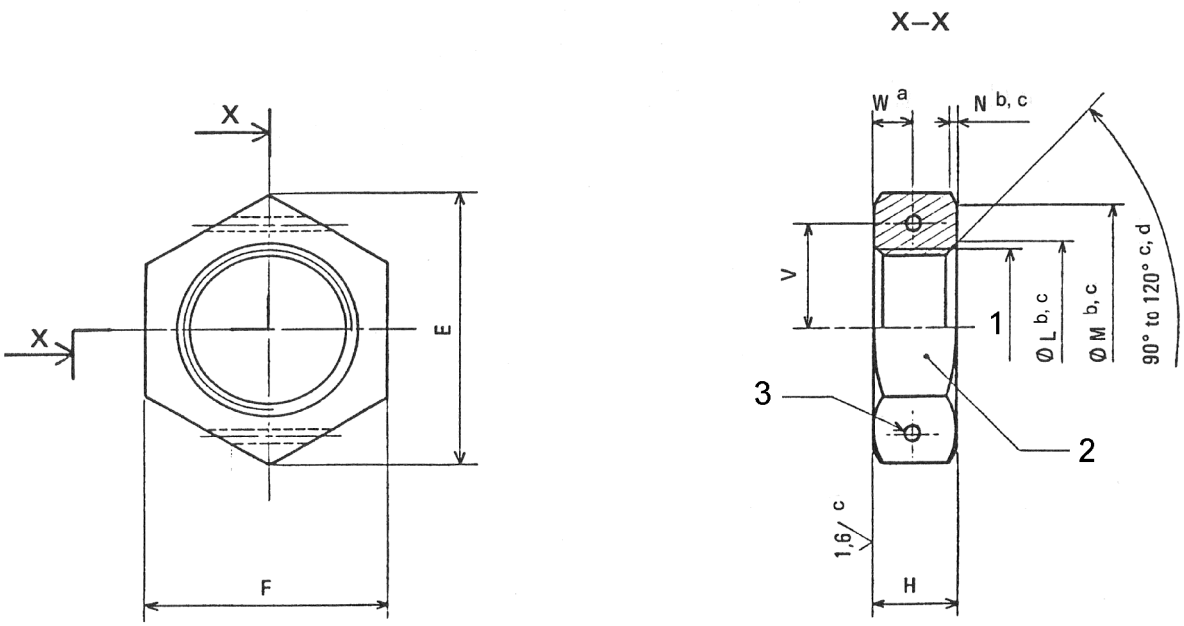
3.3 Surface treatment

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.

6,3 [1,6] These values in micrometres apply before surface treatment. The values do not apply to threads the surface texture of which will be achieved by usual manufacturing methods.

Break sharp edges 0,1 to 0,4.

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



Key

1 Thread
2 Marking
3 Two holes $\varnothing U$ optional

a From either face
b Diameter M may be tangential to, but shall not intrude on the flats.
c Applicable to both face
d All forms of entry (chamfer or radius) option within these limiting dimensions

Tolerances of form and position shall be in conformity with ISO 8788.

Figure 1

Table 1

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

[a] In accordance with ISO 5855-2.

[b] Lockwire holes not provided for these diameters.

4 Designation

EXAMPLE

Description block | **Identity block**

NUT | **EN3228H060**

Number of this standard

Holes code (see Table 2)

Diameter code (see Table 1)

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

Table 2

Option	**Code**
Lockwire holes	H
No hole	— (hyphen)

5 Marking

See Table 3.

Table 3

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

6 Technical specification

ISO 9139, except for approval of manufacturers: see EN 9100.

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