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BSI Standards Publication

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

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National foreword

This British Standard is the UK implementation of EN 3228:2022. It supersedes BS EN 3228:2010, which is withdrawn.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 committee manager.

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

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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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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>.