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Fasteners — Hexagon regular nuts (style 1)

Fixations — Écrous hexagonaux normaux (style 1)

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ISO/FDIS 4032

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 2, *Fasteners*, Subcommittee SC 12, *Fasteners with metric internal thread*.

This fifth edition cancels and replaces the fourth edition (ISO 4032:2012).

The main changes compared to the previous edition are as follows:

- nuts with $D < M5$ and $D > M39$ (with $m_{\min} < 0,8D$ not conforming to ISO 898-2) have been shifted to informative [Annex A](#); reference to ISO/TR 16224 for appropriate nut design has been added;
- M7 has been added;
- values of c_{\max} for sizes M1,6 to M2,5 have been amended in accordance with ISO 4759-1;
- $d_{a,\max}$, $d_{w,\min}$ and $m_{w,\min}$ have been specified with two decimal places;
- $d_{w,\min}$ for sizes $D \leq M5$ has been changed from $s_{\min} - IT16$ to $s_{\min} - IT15$ in order to have a larger bearing surface area and thus less contact pressure;
- for steel nuts, quenching and tempering condition has been specified in accordance with ISO 898-2, and property classes 5 and 12 have been added;
- for stainless steel nuts, grades D4 and D6 and property class 80 have been added;
- non-ferrous metal nuts have been cancelled (as a consequence of the cancellation of ISO 8839);
- specifications for marking and labelling have been added as [Clause 6](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Fasteners — Hexagon regular nuts (style 1)

1 Scope

This document specifies the characteristics of hexagon regular nuts (style 1), in steel and stainless steel, with metric coarse pitch thread M5 to M39, and with product grades A and B.

NOTE For nuts with sizes $D < M5$ and $D > M39$, see [Annex A](#) (informative).

If in certain cases other specifications are requested, property classes and stainless steel grades can be selected from ISO 898-2 or ISO 3506-2.

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.

ISO 225, *Fasteners — Bolts, screws, studs and nuts — Symbols and descriptions of dimensions*

ISO 898-2, *Fasteners — Mechanical properties of fasteners made of carbon steel and alloy steel — Part 2: Nuts with specified property classes*

ISO 965-1, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data*

ISO 1891-4, *Fasteners — Vocabulary — Part 4: Control, inspection, delivery, acceptance and quality*

ISO 3269, *Fasteners — Acceptance inspection*

ISO 3506-2, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 2: Nuts with specified grades and property classes*

ISO 4042, *Fasteners — Electroplated coating systems*

ISO 4759-1, *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C*

ISO 6157-2, *Fasteners — Surface discontinuities — Part 2: Nuts*

ISO 8991, *Designation system for fasteners*

ISO 8992, *Fasteners — General requirements for bolts, screws, studs and nuts*

ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coating systems*

ISO 10684, *Fasteners — Hot dip galvanized coatings*

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 Dimensions

Dimensions for nuts M5 to M39 shall be in accordance with [Figures 1](#) and [2](#), and with [Tables 1](#) and [2](#). Unless otherwise specified at the time of the order, the nuts are delivered without washer-face.

NOTE For nuts with sizes $D < M5$ and $D > M39$, see [Annex A](#).

Symbols and descriptions of dimensions are defined in ISO 225.

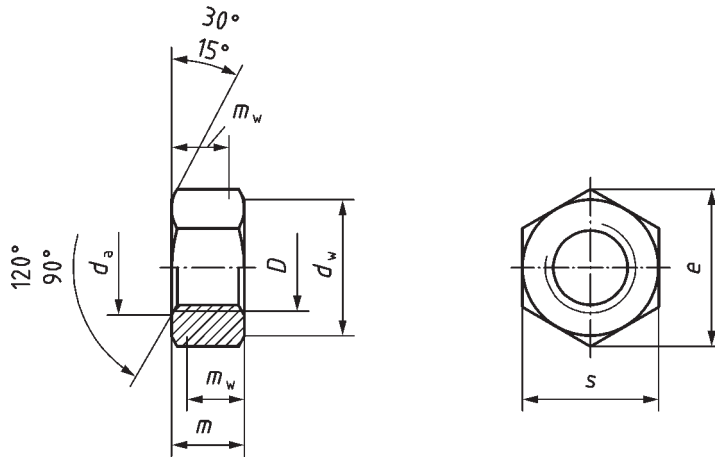
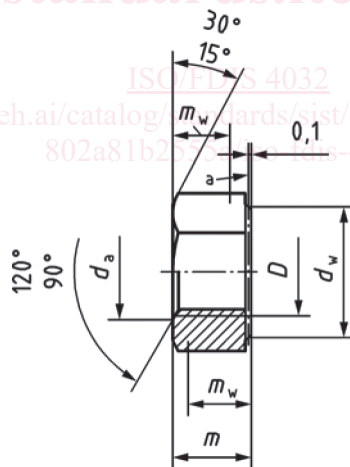


Figure 1 — Nut without washer-face

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Dimensions in millimetres

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^a Reference datum for d_w .

Figure 2 — Nut with optional washer-face

Table 1 — Dimensions for nuts M5 to M18

Dimensions in millimetres

Thread, D		M5	M6	(M7)	M8	M10	M12	(M14)	M16	(M18)
P^a		0,8	1	1	1,25	1,5	1,75	2	2	2,5
c^b	max.	0,50	0,50	0,60	0,60	0,60	0,60	0,60	0,80	0,80
	min.	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,20	0,20
d_a	max.	5,75	6,75	7,75	8,75	10,80	12,96	15,12	17,28	19,44
	min.	5,00	6,00	7,00	8,00	10,00	12,00	14,00	16,00	18,00
d_w	min.	7,20	8,88	9,63	11,63	14,63	16,63	19,64	22,49	24,85
e	min.	8,79	11,05	12,12	14,38	17,77	20,03	23,36	26,75	29,56
m	max.	4,70	5,20	6,50	6,80	8,40	10,80	12,80	14,80	15,80
	min.	4,40	4,90	6,14	6,44	8,04	10,37	12,10	14,10	15,10
m_w	min.	3,52	3,92	4,91	5,15	6,43	8,30	9,68	11,28	12,08
s	nom. = max.	8,00	10,00	11,00	13,00	16,00	18,00	21,00	24,00	27,00
	min.	7,78	9,78	10,73	12,73	15,73	17,73	20,67	23,67	26,16

NOTE Sizes shown in brackets are non-preferred dimensions.

^a P is the pitch of the thread.^b c only applies if a washer-face is present.

Table 2 — Dimensions for nuts M20 to M39

Dimensions in millimetres

Thread, D		M20	(M22)	M24	(M27)	M30	(M33)	M36	(M39)
P^a		2,5	2,5	3	3	3,5	3,5	4	4
c^b	max.	0,80	0,80	0,80	0,80	0,80	0,80	0,80	1,00
	min.	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,30
d_a	max.	21,60	23,76	25,92	29,16	32,40	35,64	38,88	42,12
	min.	20,00	22,00	24,00	27,00	30,00	33,00	36,00	39,00
d_w	min.	27,70	31,35	33,25	38,00	42,75	46,55	51,11	55,86
e	min.	32,95	37,29	39,55	45,20	50,85	55,37	60,79	66,44
m	max.	18,00	19,40	21,50	23,80	25,60	28,70	31,00	33,40
	min.	16,90	18,10	20,20	22,50	24,30	27,40	29,40	31,80
m_w	min.	13,52	14,48	16,16	18,00	19,44	21,92	23,52	25,44
s	nom. = max.	30,00	34,00	36,00	41,00	46,00	50,00	55,00	60,00
	min.	29,16	33,00	35,00	40,00	45,00	49,00	53,80	58,80

NOTE Sizes shown in brackets are non-preferred dimensions.

^a P is the pitch of the thread.^b c only applies if a washer-face is present.

5 Requirements and reference International Standards

The requirements specified in the International Standards referenced in [Table 3](#) shall apply for nuts M5 to M39 only.

NOTE For nuts with $D < M5$ and $D > M39$, see [Annex A](#).

Table 3 — Requirements and reference International Standards

Material		Steel	Stainless steel		
General requirements	International Standard	ISO 8992			
Thread	Tolerance class	6H ^a			
	International Standard	ISO 965-1			
Mechanical properties	Style	1			
	Property class and symbol	M5 ≤ D ≤ M16	5 ^b , 6 ^b , 8 ^c , 10 ^d , 12 ^d	—	
		M16 < D ≤ M39	5 ^b , 6 ^b , 8 ^d , 10 ^d		
	Grade ^e and property class and symbol	—		M5 ≤ d ≤ M24	A2-70, A4-70, A4-80, D4-80, D6-80
		—		M24 < d ≤ M39	A2-50, A2-70, A4-50, A4-70, D4-70, D6-70
International Standard	ISO 898-2	ISO 3506-2			
Tolerances	Product grade	D ≤ M16: A (except for M5 where $d_{w,min} = s_{min} - IT15$) D > M16: B			
	International Standard	ISO 4759-1			
Finish – Coating	As processed (no coating) Electroplated coatings as specified in ISO 4042 Non-electrolytically applied zinc flake coatings as specified in ISO 10683 Hot dip galvanized coatings as specified in ISO 10684	Clean and bright and/or Passivated ^f			
		Other finishes, coatings and/or additional requirements shall be agreed between the purchaser and the supplier			
Surface integrity	Limits for surface discontinuities as specified in ISO 6157-2	As agreed ^g			
Acceptability	Acceptance inspection as specified in ISO 3269				

^a Depending on the type of coating to be applied, another tolerance position of the thread may be specified for the uncoated nuts in accordance with the relevant coating standard.

^b Shall not be quenched and tempered in accordance with ISO 898-2 (NQT nuts).

^c May be quenched and tempered at the manufacturer's discretion, in accordance with ISO 898-2 (NQT or QT nuts).

^d Shall be quenched and tempered in accordance with ISO 898-2 (QT nuts).

^e The most common stainless steel grades are A2 and A4; however, depending on the application, it can be necessary to select other grades in ISO 3506-2 suitable for the service corrosive environment. For use at high temperatures (up to 800 °C), mechanical properties are specified in ISO/FDIS 3506-5. See also ISO 3506-6 for the selection of suitable stainless steel grades.

^f See e.g. ISO 16048.

^g See e.g. ISO 6157-2.

6 Marking and labelling

6.1 Marking on product

Marking shall be:

- for steel nuts, as specified in ISO 898-2,
- for stainless steel nuts, as specified in ISO 3506-2.

6.2 Labelling on package

Labelling on the package shall be in accordance with ISO 898-2 or ISO 3506-2, and shall include at least:

- the reference to this document, i.e. ISO 4032,
- the thread size D ,
- for steel nuts with sizes $M5 \leq D \leq M39$, the symbol of the property class,
- for stainless steel nuts with sizes $M5 \leq D \leq M39$, the grade and symbol of the property class,
- the type of "Finish – Coating",
- the manufacturer's and/or distributor's identification and/or name,
- the manufacturing lot number as specified in ISO 1891-4,
- the quantity of pieces in the package.

7 Designation

The designation requirements as specified in ISO 8991 shall apply with:

- for steel nuts with sizes $M5 \leq D \leq M39$, the symbol of the property class as specified in ISO 898-2,
- for stainless steel nuts with sizes $M5 \leq D \leq M39$, the grade and symbol of the property class as specified in ISO 3506-2.

When no specific "Finish – Coating" is specified in the designation, steel fasteners are delivered in the "as processed" condition and stainless steel fasteners in the "clean and bright" condition.

EXAMPLE A hexagon regular nut (style 1) in accordance with this document, with thread size M12, product grade A, property class 8, as processed, is designated as follows:

Hexagon regular nut ISO 4032 – M12 – 8

Annex A (informative)

Nuts with $D < M5$ and $D > M39$, not conforming to ISO 898-2

WARNING — These nuts should not be used for new applications: they are only included for referral to existing documents.

Hexagon nuts have been designed by using the Alexander theory for sizes M5 to M39 only, and therefore:

- nuts included in this Annex with $D < M5$ and $D > M39$ have a minimum height m_{\min} less than $0,8D$ ¹⁾, they have not been resized adequately;
- mechanical properties are not specified in ISO 898-2 for nuts with $D < M5$ and $D > M39$;
- property classes specified in ISO 898-2 cannot be used for these nuts which are not conforming to the requirements of ISO 898-2.

This means that such nuts would need a higher hardness and/or a greater minimum height to meet the requirements specified for property classes in ISO 898-2, but increased hardness alone may not compensate insufficient height to avoid the thread stripping failure mode at unexpected low loads in a bolt and nut assemblies.

For adequate nut design, see ISO/TR 16224.

Nevertheless, if the use of such nuts is considered, the mechanical properties and related tests to be performed as well as the relevant marking and labelling are to be defined by agreement between the purchaser and the supplier at the time of the order.

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1) Nut heights m of this Annex are coming from former DIN 934 which has been withdrawn in 1994.