

UDC 621.882.31

June 1983

Hexagon nuts with flange

DIN
6923

Sechskantmuttern mit Flansch

In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.

This standard incorporates all the essential specifications of International Standard ISO 4161 (see Explanatory notes), with national addenda.

Dimensions in mm

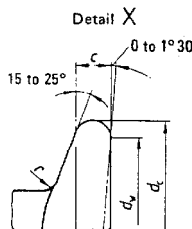
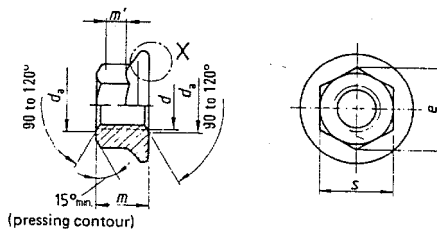
1 Field of application

This standard gives specifications for hexagon nuts with flange, with metric coarse or fine thread with diameters from 5 to 20 mm, assigned to product grade A. If, in special cases, nuts are to comply with specifications other than those given in this standard, e.g. regarding property classes, these shall be selected in accordance with the appropriate standards.

2 Reference to other standards

See the list of standards referred to on page 3.

3 Dimensions



m' = minimum wrenching height. For this zone at least e shall be maintained.
For designation see clause 5.

Continued on pages 2 to 4

Table 1.

| Thread size <i>d</i> | M 5 | M 6 | M 8 | M 10 | M 12 | M 14 | M 16 | M 20 | |
|-----------------------------------|------|-------|---------|-------------|---------------|------------|------------|------------|-------|
| | — | — | M 8 X 1 | M 10 X 1,25 | M 12 X 1,5 | M 14 X 1,5 | M 16 X 1,5 | M 20 X 1,5 | |
| | — | — | — | (M 10 X 1) | (M 12 X 1,25) | — | — | — | |
| <i>P</i> 1) | 0,8 | 1 | 1,25 | 1,5 | 1,75 | 2 | 2 | 2,5 | |
| <i>c</i> min. | 1 | 1,1 | 1,2 | 1,5 | 1,8 | 2,1 | 2,4 | 3 | |
| <i>d_a</i> | min. | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 20 |
| | max. | 5,75 | 6,75 | 8,75 | 10,8 | 13 | 15,1 | 17,3 | 21,6 |
| <i>d_c</i> max. | 11,8 | 14,2 | 17,9 | 21,8 | 26 | 29,9 | 34,5 | 42,8 | |
| <i>d_w</i> min. | 9,8 | 12,2 | 15,8 | 19,6 | 23,8 | 27,6 | 31,9 | 39,9 | |
| <i>e</i> min. | 8,79 | 11,05 | 14,38 | 16,64 | 20,03 | 23,36 | 26,75 | 32,95 | |
| <i>m</i> | max. | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 20 |
| | min. | 4,7 | 5,7 | 7,6 | 9,6 | 11,6 | 13,3 | 15,3 | 18,9 |
| <i>m'</i> min. | 2,2 | 3,1 | 4,5 | 5,5 | 6,7 | 7,8 | 9 | 11,1 | |
| <i>s</i> Nominal dimension = max. | max. | 8 | 10 | 13 | 15 | 18 | 21 | 24 | 30 |
| | min. | 7,78 | 9,78 | 12,73 | 14,73 | 17,73 | 20,67 | 23,67 | 29,67 |
| <i>r</i> 2) max. | 0,3 | 0,36 | 0,48 | 0,6 | 0,72 | 0,88 | 0,96 | 1,2 | |

e min. = 1,13 *s* min.

The sizes in brackets should be avoided for functional reasons, if possible.

1) *P* = pitch of coarse thread as specified in DIN 13 Part 12.

2) Radius *r* shall apply both for the edges of adjoining flats and for the transition between hexagon corners and flange.

4 Technical delivery conditions

| Material | | Steel | Stainless steel |
|---|---|--|-----------------|
| General requirements | | In accordance with DIN 267 Part 1. | |
| Thread | Tolerance | 6g | |
| | Standard | DIN 13 Part 12 and Part 15 | |
| Mechanical properties | Property class ¹⁾ (material) | 8, 10, 12 | A2-70 |
| | Standard | DIN ISO 898 Part 2 DIN 267 Part 23 (at present at the stage of draft) | DIN 267 Part 11 |
| Permissible dimensional deviations and deviations of form | Product grade | A | |
| | Standard | DIN ISO 4759 Part 1 2) | |
| Surface | As processed. | Bright. | |
| | | DIN 267 Part 2 (at present at the stage of draft) shall apply with regard to the peak-to-valley heights of the surfaces. DIN 267 Part 20 shall apply with regard to permissible surface irregularities. DIN 267 Part 9 shall apply with regard to electroplating. DIN 267 Part 10 shall apply with regard to hot-dip galvanizing. | |
| Acceptance testing | | DIN 267 Part 5 (at present at the stage of draft) shall apply with regard to acceptance testing. | |

¹⁾ Other property classes or materials shall be subject to agreement. ²⁾ As a deviation from DIN ISO 4759 Part 1, May 1980 edition, subclass 11.3, the parallelism of the flats may lie within the tolerance class h13 for the width across flats.

5 Designation

Designation of an M 12 hexagon nut with flange, assigned to property class 8:

Hexagon nut DIN 6923 — M 12 — 8

The DIN 4000 — 2 — 7 tabular layout of article characteristics shall apply for nuts complying with this standard.

Standards referred to

| | |
|---------------------|---|
| DIN 13 Part 12 | ISO metric screw threads; coarse and fine threads from 1 to 300 mm diameter, selection of diameters and pitches |
| DIN 13 Part 15 | ISO metric screw threads; fundamental deviations and tolerances for screw threads from 1 mm diameter |
| DIN 267 Part 1 | Fasteners; technical delivery conditions; general requirements |
| DIN 267 Part 2 | (at present at the stage of draft) Fasteners; technical delivery conditions; types of finish and dimensional accuracy |
| DIN 267 Part 5 | (at present at the stage of draft) Fasteners; technical delivery conditions; acceptance testing |
| DIN 267 Part 9 | Fasteners; technical delivery conditions; electroplated components |
| DIN 267 Part 10 | Fasteners; technical delivery conditions; hot-dip galvanized parts |
| DIN 267 Part 11 | Fasteners; technical delivery conditions with addenda to ISO 3506, stainless and acid resistant steel components |
| DIN 267 Part 20 | Fasteners; technical delivery conditions; surface irregularities on nuts |
| DIN 267 Part 23 | Fasteners; technical delivery conditions; property classes for nuts with fine thread (ISO classes) |
| DIN ISO 898 Part 2 | Mechanical properties of fasteners; nuts with specified proof load values |
| DIN ISO 4759 Part 1 | Tolerances for fasteners; bolts, screws and nuts with thread diameters $\geq 1,6$ and ≤ 150 mm and product grades A, B and C |

Other relevant standards

| | |
|----------|---|
| DIN 6921 | Hexagon bolts with flange |
| DIN 6922 | Hexagon bolts with flange and reduced shank |

Explanatory notes

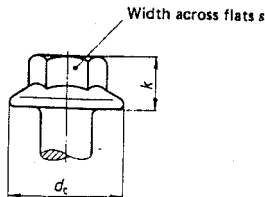
Draft Standards DIN 6921, DIN 6922 and DIN ISO 4161 dealing with hexagon flange bolts and nuts were published in August and September 1981, draft DIN ISO 4161 being the German version of draft International Standard ISO/DIS 4161 dealing with hexagon flange nuts. This draft International Standard which was approved by a large majority of ISO member bodies has been published recently.

Originally it was intended to adopt the international standard in full as a national standard and draft Standard DIN ISO 4161 was prepared. Then the competent technical committee of the *Normenausschuss Mechanische Verbindungselemente* (Fasteners Standards Committee) decided, however, to issue a DIN Standard as the international standard was not considered to be sufficiently comprehensive. There are no international reference standards for technical delivery conditions, for example, which are therefore to be dealt with in national standards (see e.g. acceptance testing as specified in DIN 267 Part 5 (at present at the stage of draft)). Given this fact, ISO 4161 has been incorporated in DIN 6923 without alterations in its material content, though with national addenda.

During the international work considerable difficulties arose with respect to the standardization of hexagon flange bolts, especially with regard to the installation conditions and the resulting head dimensions. The German position was defined in draft Standards DIN 6921 and DIN 6922 (September 1981 editions). Though these drafts took the results of international standardization so far achieved into account, they specified head sizes which, to a certain extent, ran counter to the views held by other countries.

The content of draft Standards DIN 6921 and DIN 6922 was given due consideration in the continuing international work and especially approved of by various European manufacturers and consumers. The discussions eventually concluded in a compromise, resulting in four types with varying head sizes in two product grades and each with two different types of shank. The compromise resulted in eight draft International Standards which are at present in preparation. Only two of them the contents of which have been incorporated in DIN 6921 and DIN 6922 are needed for national purposes. The following table summarizes the position.

Head sizes of hexagon bolts with flange



| Thread size | M 5 | M 6 | M 8 | M 10 | M 12 | M 14 | M 16 | M 20 | Product grade | Standard | | |
|------------------------|--------------|------|------|------|------|------|------|------|---------------|----------|----------------------|------------------------------|
| | | | | | | | | | | national | international | |
| Width across flats s | Small series | 7 | 8 | 10 | 13 | 15 | 18 | 21 | — | A | — | ISO/DIS 8104 ISO/DIS 8105 |
| | | 7 | 8 | 10 | 13 | 15 | 18 | 21 | — | B | — | ISO/DIS 4160 ISO/DIS 4162 |
| | Heavy series | 8 | 10 | 13 | 15 | 16 | 18 | 21 | 27 | A | DIN 6921 DIN 6922 | ISO/DIS 8100 ISO/DIS 8101 |
| | | 8 | 10 | 13 | 15 | 18 | 21 | 24 | 30 | B | — | ISO/DIS 8102 ISO/DIS 8103 |
| Flange diameter d_c | Small series | 11,4 | 13,6 | 17 | 20,8 | 24,7 | 28,6 | 32,8 | — | A | — | ISO/DIS 8104 ISO/DIS 8105 |
| | | 11,4 | 13,6 | 17 | 20,8 | 24,7 | 28,6 | 32,8 | — | B | — | ISO/DIS 4160 ISO 4161 |
| | Heavy series | 11,8 | 14,2 | 18 | 22,3 | 26,6 | 30,5 | 35 | 43 | A | DIN 6921 DIN 6922 | ISO/DIS 8100 ISO/DIS 8101 |
| | | 11,8 | 14,2 | 18 | 22,3 | 26,6 | 30,5 | 35 | 43 | B | — | ISO/DIS 8102 ISO/DIS 8103 |
| Head height k | Small series | 5,6 | 6,8 | 8,5 | 9,7 | 11,9 | 12,9 | 15,1 | — | A | — | ISO/DIS 8104 ISO/DIS 8105 |
| | | 5,6 | 6,8 | 8,5 | 9,7 | 11,9 | 12,9 | 15,1 | — | B | — | ISO/DIS 4160 ISO/DIS 4162 |
| | Heavy series | 5,4 | 6,6 | 8,1 | 9,2 | 11,5 | 12,8 | 14,4 | 17,1 | A | DIN 6921 DIN 6922 | ISO/DIS 8100 ISO/DIS 8101 |
| | | 5,4 | 6,6 | 8,1 | 8,6 | 10,4 | 12,4 | 14,1 | 17,7 | B | — | ISO/DIS 8102 ISO/DIS 8103 |

Dimensions of hexagon flange nuts (for comparison)

| Width across flats s | 8 | 10 | 13 | 15 | 18 | 21 | 24 | 30 | A | DIN 6923 | ISO 4161 |
|------------------------|------|------|------|------|----|------|------|------|---|----------|----------|
| Flange diameter d_c | 11,8 | 14,2 | 17,9 | 21,8 | 26 | 29,9 | 34,5 | 42,8 | | | |
| Nut height m | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 20 | | | |

As can be seen from the table, for product grade A only the "heavy series" has been incorporated in DIN 6921 and DIN 6922. Identical widths across flats are specified for bolts and nuts of product grade B, heavy series. This corresponds to USA requirements for which no demand could be established in Germany, neither for manufacturing reasons nor as a result of tightening requirements.

For product grades A and B, the small series provides for equal widths across flats. Differences in the tightening conditions are allowed for in the dimensional tolerances. Adoption of the small series was not approved of at the national level because experience has shown that, even for product grade A, the head dimensions of this series do not satisfy all possible installation requirements, especially in cases where locking elements, such as bonding agents are used, requiring a higher loosening torque.

The relevant international standards work has not yet been finalized and so the above table is for information purposes only. The draft International Standards (ISO/DIS) given in the table have not yet been published.