UDC 621.882.31 DEUTSCHE NORM October 1987

# Hexagon nuts with metric coarse and fine pitch thread

Product classes A and B

DIN 934

Sechskantmuttern; Metrisches Regel- und Feingewinde; Produktklassen A und B

Supersedes July 1982 edition.

*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 should be used together with ISO 4032, ISO 8673, and ISO 8674. For details, see Explanatory notes. It is intended to withdraw the present standard by 1 July 1992 at the latest.

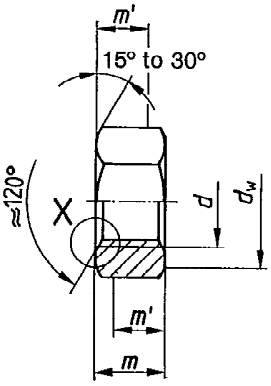
Since the revised property classes as covered in ISO 898 Part 2 can only be applied to hexagon nuts complying with the present standard for sizes between M 5 and M 39 in conjunction with the proof loads hitherto specified in DIN 267 Part 4, it is recommended that only hexagon nuts complying with ISO 4032 (coarse pitch thread) or ISO 8673 and ISO 8674 (fine pitch thread) be used, the corresponding proof loads being specified in ISO 898 Part 2 and DIN 267 Part 23. To distinguish between types of nut, the symbol identifying nuts as complying with the present standard nuts will in future have to be amended by the code number denoting the property class being set off by two permanent vertical lines, e.g. |8| (see DIN 267 Part 4).

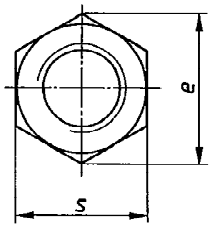
Dimensions in mm

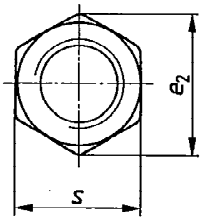
## 1 Field of application

This standard specifies requirements for M 1 to M 160 hexagon nuts, assigned to product grade A (up to size M 16) or product grade B (for sizes above M 16). If, in special cases, nuts are to comply with specifications other than those given in this standard, e.g. regarding property class, they shall be selected in accordance with the relevant standards.

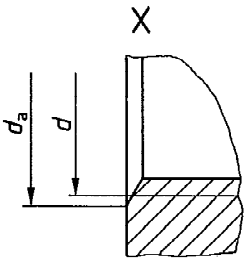
## 2 Dimensions




In the case of sizes of M 110 or more, the hexagon edges may be radiused (Gr).




$m'$ = minimum wrenching height (0,8 $m$ minimum).
For designation, see clause 4.

Continued on pages 2 to 7



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*DIN 934 Engl. Price group 7*
Sales No. 0107

Table 1.

| Thread size ($d$) | | M 1 | M 1,2 | M 1,4 | M 1,6 | M 2 | M 2,5 | M 3 | (M 3,5) | M 4 | M 5 | M 6 | (M 7) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $P$ [1] | | 0,25 | 0,25 | 0,3 | 0,35 | 0,4 | 0,45 | 0,5 | 0,6 | 0,7 | 0,8 | 1 | 1 |
| $d_a$ | min. | 1 | 1,2 | 1,4 | 1,6 | 2 | 2,5 | 3 | 3,5 | 4 | 5 | 6 | 7 |
| | max. | 1,15 | 1,4 | 1,6 | 1,84 | 2,3 | 2,9 | 3,45 | 4 | 4,6 | 5,75 | 6,75 | 7,75 |
| $d_w$ | min. | 2 | 2,1 | 2,1 | 2,4 | 3,2 | 4,1 | 4,5 | 5 | 5,8 | 6,8 | 8,8 | 9,5 |
| $e$ | min. | 2,71 | 3,28 | 3,28 | 3,41 | 4,32 | 5,45 | 6,01 | 6,58 | 7,66 | 8,79 | 11,05 | 12,12 |
| $m$ | max. = nominal size | 0,8 | 1 | 1,2 | 1,3 | 1,6 | 2 | 2,4 | 2,8 | 3,2 | 4 | 5 | 5,5 |
| | min. | 0,55 | 0,75 | 0,95 | 1,05 | 1,35 | 1,75 | 2,15 | 2,55 | 2,9 | 3,7 | 4,7 | 5,2 |
| $m'$ | min. | 0,44 | 0,6 | 0,76 | 0,84 | 1,08 | 1,4 | 1,72 | 2,04 | 2,32 | 2,96 | 3,76 | 4,16 |
| $s$ [2] | max. = nominal size | 2,5 | 3 | 3 | 3,2 | 4 | 5 | 5,5 | 6 | 7 | 8 | 10 | 11 |
| | min. | 2,4 | 2,9 | 2,9 | 3,02 | 3,82 | 4,82 | 5,32 | 5,82 | 6,78 | 7,78 | 9,78 | 10,73 |

| Thread size ($d$) | | M 8 | M 10 | M 12 | (M 14) | M 16 | (M 18) | M 20 |
|---|---|---|---|---|---|---|---|---|
| | | M 8 x 1 | M 10 x 1 | M 12 x 1,5 | (M 14 x 1,5) | M 16 x 1,5 | (M 18 x 1,5) | M 20 x 2 |
| | | – | M 10 x 1,25 | M 12 x 1,25 | – | – | (M 18 x 2) | M 20 x 1,5 |
| $P$ [1] | | 1,25 | 1,5 | 1,75 | 2 | 2 | 2,5 | 2,5 |
| $d_a$ | min. | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| | max. | 8,75 | 10,8 | 13 | 15,1 | 17,3 | 19,5 | 21,6 |
| $d_w$ | min. | 11,3 | 15,3 | 17,2 | 20,2 | 22,2 | 25,3 | 28,2 |
| $e$ | min. | 14,38 | 18,9 | 21,1 | 24,49 | 26,75 | 29,56 | 32,95 |
| $m$ | max. = nominal size | 6,5 | 8 | 10 | 11 | 13 | 15 | 16 |
| | min. | 6,14 | 7,64 | 9,64 | 10,3 | 12,3 | 14,3 | 14,9 |
| $m'$ | min. | 4,91 | 6,11 | 7,71 | 8,24 | 9,84 | 11,44 | 11,92 |
| $s$ [2] | max. = nominal size | 13 | 17 | 19 | 22 | 24 | 27 | 30 |
| | min. | 12,73 | 16,73 | 18,67 | 21,67 | 23,67 | 26,16 | 29,16 |

| Thread size ($d$) | | (M 22) | M 24 | (M 27) | M 30 | (M 33) | M 36 | (M 39) |
|---|---|---|---|---|---|---|---|---|
| | | (M 22 x 1,5) | M 24 x 2 | (M 27 x 2) | M 30 x 2 | (M 33 x 2) | M 36 x 3 | (M 39 x 3) |
| | | (M 22 x 2) | – | – | – | – | – | – |
| $P$ [1] | | 2,5 | 3 | 3 | 3,5 | 3,5 | 4 | 4 |
| $d_a$ | min. | 22 | 24 | 27 | 30 | 33 | 36 | 39 |
| | max. | 23,7 | 25,9 | 29,1 | 32,4 | 35,6 | 38,9 | 42,1 |
| $d_w$ | min. | 29,5 | 33,2 | 38 | 42,7 | 46,6 | 51,1 | 55,9 |
| $e$ | min. | 35,03 | 39,55 | 45,2 | 50,85 | 55,37 | 60,79 | 66,44 |
| $m$ | max. = nominal size | 18 | 19 | 22 | 24 | 26 | 29 | 31 |
| | min. | 16,9 | 17,7 | 20,7 | 22,7 | 24,7 | 27,4 | 29,4 |
| $m'$ | min. | 13,52 | 14,16 | 16,56 | 18,16 | 19,76 | 21,92 | 23,52 |
| $s$ | max. = nominal size | 32 | 36 | 41 | 46 | 50 | 55 | 60 |
| | min. | 31 | 35 | 40 | 45 | 49 | 53,8 | 58,8 |

For [1] and [2], see page 4.

Table 1. (continued)

| Thread size ($d$) | | M 42 | (M 45) | M 48 | (M 52) | M 56 | (M 60) | M 64 |
|---|---|---|---|---|---|---|---|---|
| | | M 42 x 3 | (M 45 x 3) | M 48 x 3 | (M 52 x 3) | M 56 x 4 | (M 60 x 4) | M 64 x 4 |
| $P$ [1] | | 4,5 | 4,5 | 5 | 5 | 5,5 | 5,5 | 6 |
| $d_a$ | min. | 42 | 45 | 48 | 52 | 56 | 60 | 64 |
| | max. | 45,4 | 48,6 | 51,8 | 56,2 | 60,5 | 64,8 | 69,1 |
| $d_w$ | min. | 60,6 | 64,7 | 69,4 | 74,2 | 78,7 | 83,4 | 88,2 |
| $e$ | min. | 71,3 | 76,95 | 82,6 | 88,25 | 93,56 | 99,21 | 104,86 |
| $m$ | max. = nominal size | 34 | 36 | 38 | 42 | 45 | 48 | 51 |
| | min. | 32,4 | 34,4 | 36,4 | 40,4 | 43,4 | 46,4 | 49,1 |
| $m'$ | min. | 25,9 | 27,5 | 29,1 | 32,3 | 34,7 | 37,1 | 39,3 |
| $s$ | max. = nominal size | 65 | 70 | 75 | 80 | 85 | 90 | 95 |
| | min. | 63,1 | 68,1 | 73,1 | 78,1 | 82,8 | 87,8 | 92,8 |

| Thread size ($d$) | | (M 68) | M 72 x 6 | (M 76 x 6) | M 80 x 6 | (M 85 x 6) | M 90 x 6 | M 100 x 6 |
|---|---|---|---|---|---|---|---|---|
| | | (M 68 x 4) | M 72 x 4 | (M 76 x 4) | M 80 x 4 | (M 85 x 4) | M 90 x 4 | M 100 x 4 |
| $P$ [1] | | 6 | – | – | – | – | – | – |
| $d_a$ | min. | 68 | 72 | 76 | 80 | 85 | 90 | 100 |
| | max. | 73,4 | 77,8 | 82,1 | 86,4 | 91,8 | 97,2 | 108 |
| $d_w$ | min. | 92,9 | 97,7 | 102,4 | 107,2 | 111,9 | 121,1 | 135,4 |
| $e$ | min. | 110,51 | 116,16 | 121,81 | 127,46 | 133,11 | 144,08 | 161,02 |
| $m$ | max. = nominal size | 54 | 58 | 61 | 64 | 68 | 72 | 80 |
| | min. | 52,1 | 56,1 | 59,1 | 62,1 | 66,1 | 70,1 | 78,1 |
| $m'$ | min. | 41,7 | 44,9 | 47,3 | 49,7 | 52,9 | 56,1 | 62,5 |
| $s$ | max. = nominal size | 100 | 105 | 110 | 115 | 120 | 130 | 145 |
| | min. | 97,8 | 102,8 | 107,8 | 112,8 | 117,8 | 127,5 | 142,5 |

For [1], see page 4.

Table 1. (concluded)

| Thread size ($d$) | | M 110 x 6 | M 125 x 6 | M 140 x 6 | M 160 x 6 |
|---|---|---|---|---|---|
| | | M 110 x 4 | M 125 x 4 | – | – |
| $d_a$ | min. | 110 | 125 | 140 | 160 |
| | max. | 119 | 135 | 151 | 171 |
| $d_w$ | min. | 144,9 | 168,6 | 185,6 | 214,1 |
| $e$ | min. | 172,32 | 200,57 | 220,80 | 254,70 |
| $e_2$ | | 170 | 196 | 216 | 248 |
| $m$ | max. = nominal size | 88 | 100 | 112 | 128 |
| | min. | 85,8 | 97,8 | 109,8 | 125,5 |
| $m'$ | min. | 68,6 | 78,2 | 87,8 | 100 |
| $s$ | max. = nominal size | 155 | 180 | 200 | 230 |
| | min. | 152,5 | 177,5 | 195,4 | 225,4 |

Sizes in brackets should be avoided if possible.

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

[2]) As a deviation from ISO 4759 Part 1, tolerance zone h12 instead of h13 shall apply for widths across flats up to and including 4 mm. Minimum dimensions corresponding to tolerance zone h14 instead of h13 shall be permissible for M 5 to M 16 hot dip galvanized nuts.

## 3 Technical delivery conditions

| Material | | Steel | Stainless steel | Non-ferrous metals |
|---|---|---|---|---|
| General requirements | | As specified in DIN 267 Part 1. | | |
| Thread | Tolerance | 6H [1]) | | |
| | As specified in | DIN 13 Parts 12 and 15. | | |
| Mechanical properties | Property class (material) | For size M 2,5 or less: 6; for sizes between M 3 and M 39: 6, 8 or 10; for sizes above M 39: subject to agreement. | For sizes up to M 39: A 2-70 or A 4-70; for sizes above M 39: subject to agreement. | Subject to agreement. |
| | As specified in | DIN 267 Part 4 | DIN 267 Part 11 | DIN 267 Part 18 |
| Limit deviations, geometrical tolerances | Product grade | For sizes up to M 16: A; for larger sizes: B. | | |
| | As specified in | ISO 4759 Part 1. | | |
| Surface finish | | As processed. | Bright. | Bright. |
| | | DIN 267 Part 2 shall apply with regard to surface roughness.<br>DIN 267 Part 20 shall apply with regard to permissible surface discontinuities.<br>DIN 267 Part 21 shall apply with regard to the widening test.<br>DIN 267 Part 9 shall apply with regard to electroplating.[1])<br>DIN 267 Part 10 shall apply with regard to hot dip galvanizing. | | |
| Acceptance inspection | | DIN 267 Part 5 shall apply with regard to acceptance inspection. | | |

[1]) Where a protective coating is applied, e.g. an electroplated coating complying with DIN 267 Part 9, depending on the coating thickness required, it may be necessary, particularly in the case of tolerance class 6H nuts, to select a larger fundamental deviation than that assigned to the H position (see DIN 267 Part 9). This, however, might impair the resistance of the bolt/nut assembly to stripping.

## 4 Designation

Designation of an M12 chamfered hexagon nut assigned to property class 8:

Hexagon nut DIN 943 — M12 — 8

If product grade A is required for size M16 or more, the product grade shall be included in the designation, e.g.:

**Hexagon nut DIN 934 – M20 – 8 – A**

If hexagon nuts shall be supplied with radiused edges (Gr), the designation shall read:

**Hexagon nut DIN 934 – M110 × 6 – 8 – Gr**

Hexagon nuts as specified in this standard may be supplied in free cutting steel if, in the order details, symbol AU has been added to the symbol denoting the property class, e.g.:

**Hexagon nut DIN 934 – M12 – 6AU**

DIN 962 shall apply with regard to the designation of designs and types, with additional details to be given when ordering.

The DIN 4000–2–7 tabular layout of article characteristics shall apply for nuts covered in this standard.

## 5 Mass

The values of mass given for steel nuts are for guidance only.

Table 3.

| Thread size ($d$) | M 1 | M 1,2 | M 1,4 | M 1,6 | M 2 | M 2,5 | M 3 | M 3,5 |
|---|---|---|---|---|---|---|---|---|
| Mass (7,85 kg/dm$^3$), for 1000 units, in kg ≈ | 0,03 | 0,054 | 0,063 | 0,076 | 0,142 | 0,28 | 0,384 | 0,514 |

| Thread size ($d$) | M 4 | M 5 | M 6 | M 7 | M 8 | M 10 | M 12 | M 14 |
|---|---|---|---|---|---|---|---|---|
| Mass (7,85 kg/dm$^3$), for 1000 units, in kg ≈ | 0,81 | 1,23 | 2,5 | 3,12 | 5,2 | 11,6 | 17,3 | 25 |

| Thread size ($d$) | M 16 | M 18 | M 20 | M 22 | M 24 | M 27 | M 30 | M 33 |
|---|---|---|---|---|---|---|---|---|
| Mass (7,85 kg/dm$^3$), for 1000 units, in kg ≈ | 33,3 | 49,4 | 64,4 | 79 | 110 | 165 | 223 | 288 |

| Thread size ($d$) | M 36 | M 39 | M 42 | M 45 | M 48 | M 52 | M 56 | M 60 |
|---|---|---|---|---|---|---|---|---|
| Mass (7,85 kg/dm$^3$), for 1000 units, in kg ≈ | 393 | 502 | 652 | 800 | 977 | 1220 | 1420 | 1690 |

| Thread size ($d$) | M 64 | M 68 | M 72 x 6 | M 76 x 6 | M 80 x 6 | M 85 x 6 | M 90 x 6 | M 100 x 6 |
|---|---|---|---|---|---|---|---|---|
| Mass (7,85 kg/dm$^3$), for 1000 units, in kg ≈ | 1980 | 2300 | 2670 | 3040 | 3440 | 3930 | 4930 | 6820 |

| Thread size ($d$) | M 110 x 6 | M 125 x 6 | M 140 x 6 | M 160 x 6 |
|---|---|---|---|---|
| Mass (7,85 kg/dm$^3$), for 1000 units, in kg ≈ | 8200 | 13 000 | 17 500 | 26 500 |

Approximately the same values of mass may be assumed for fine pitch nuts.

## 6 Marking

The specifications given in DIN 267 Parts 4, 11 and 18 shall apply for the marking of nuts.

Nuts manufactured by machining, of property classes above 6 as specified in DIN 267 Part 4, shall only be marked subject to particular agreement.

## Appendix A

### Additional thread sizes for spare parts

The previous thread sizes M 1,7, M 2,3 and M 2,6, which are not included in the international selection of screw threads for bolts, screws and nuts, shall no longer be used. Should these sizes, however, be required for spare parts, they may be ordered in accordance with DIN 934, April 1968 edition[3]). The table below specifies dimensions of such nuts, DIN 13 Parts 1 and 15 applying for the screw thread.

Table 4.

| Thread size ($d$) | | | M 1,7 | M 2,3 | M 2,6 |
|---|---|---|---|---|---|
| $P$ | | | 0,35 | 0,45 | 0,45 |
| $d_a$ | | min. | 1,7 | 2,3 | 2,6 |
| | | max. | 1,95 | 2,64 | 3 |
| $e$ | | min. | 3,82 | 4,88 | 5,45 |
| $d_w$ | | min. | 2,7 | 3,6 | 4,1 |
| $m$ | max. = nominal size | | 1,4 | 1,8 | 2 |
| | | min. | 1,15 | 1,55 | 1,75 |
| $m'$ | | | 0,92 | 1,24 | 1,4 |
| $s$ | max. = nominal size | | 3,5 | 4,5 | 5 |
| | | min. | 3,38 | 4,32 | 4,82 |
| Mass (7,85 kg/dm$^3$), for 1000 units, in kg ≈ | | | 0,10 | 0,20 | 0,72 |

## Standards referred to

| | |
|---|---|
| DIN 13 Part 1 | ISO metric screw threads; 1 mm to 68 mm diameter coarse pitch threads; nominal sizes |
| DIN 13 Part 12 | ISO metric screw threads; coarse and fine pitch threads with diameters from 1 to 300 mm; selection for diameters and pitches |
| DIN 13 Part 15 | ISO metric screw threads; fundamental deviations and tolerances for screw threads of 1 mm diameter and larger |
| DIN 267 Part 1 | Fasteners; technical delivery conditions; general requirements |
| DIN 267 Part 2 | Fasteners; technical delivery conditions; types of finish and dimensional accuracy |
| DIN 267 Part 4 | Fasteners; technical delivery conditions; property classes for nuts (previous classes) |
| DIN 267 Part 5 | Fasteners; technical delivery conditions; acceptance inspection (modified version of ISO 3269, 1984 edition) |
| DIN 267 Part 9 | Fasteners; technical delivery conditions; electroplated components |
| DIN 267 Part 10 | Fasteners; technical delivery conditions; hot dip galvanized components |
| DIN 267 Part 11 | Fasteners; technical delivery conditions, with addenda to ISO 3506; corrosion-resistant stainless steel components |
| DIN 267 Part 18 | Fasteners; technical delivery conditions; non-ferrous metal components |
| DIN 267 Part 20 | Fasteners; technical delivery conditions; surface discontinuities on nuts |
| DIN 267 Part 21 | Fasteners; technical delivery conditions; widening test for nuts |
| DIN 267 Part 23 | Fasteners; technical delivery conditions; property classes for nuts with fine pitch thread (ISO classes) |
| DIN 962 | Bolts, screws, studs and nuts; designations, types and finishes |
| DIN 4000 Part 2 | Tabular layout of article characteristics for bolts, screws and nuts |
| ISO 4759 Part 1 | Tolerances for fasteners; bolts, screws and nuts with thread diameters ≥ 1,6 and ≤ 150 mm and product grades A, B and C |

## Previous editions

DIN 89 Part 1: 12.20, 12.21, 10.25; DIN 89 Part 2: 10.22; DIN 429: 12.20, 12.21; DIN 554: 10.29x; DIN KrK 113: 07.28, 07.29; DIN Kr 751: 12.34; DIN 934 Part 1: 01.26, 04.29, 10.34, 06.37, 04.42, 06.53, 03.61, 06.63; DIN 934: 04.68, 07.82.

## Amendments

The following amendments have been made to the July 1982 edition.

a) A note on the period of validity of this standard has been included.

b) The standard has been editorially revised.

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[3]) Withdrawn in 1982.

## Explanatory notes

For more than 20 years efforts have been directed towards the achievement of the international interchangeability of fasteners by preparing international standards for the product concerned. ISO Standards have now been published for the most important types of fasteners (see ISO Standards Handbook 18).

However, international efforts only serve a useful purpose if national standards are adapted as far as possible to international standards, or, ideally, replaced by them. Current DIN Standards already agree in substance with the relevant ISO Standards, but still differ in some respects, as for instance in the widths across flats for hexagon products.

The Federal Republic of Germany adopted International Standard ISO 272 on widths across flats as national standard DIN ISO 272 in October 1979. Nevertheless, widths across flats deviating from DIN ISO 272 are still being used in Germany for nominal sizes M 10, M 12, M 14 and M 22. The table below compares the previous widths across flats with the new ones specified for the four nominal sizes referred to.

| Thread size | M 10 | M 12 | M 14 | M 22 |
|---|---|---|---|---|
| Previous width across flats, in mm | 17 | 19 | 22 | 32 |
| New width across flats as in ISO 272, in mm | 16 | 18 | 21 | 34 |

The manufacturers and users of hexagon products participating in the work of the *Normenausschuß Mechanische Verbindungselemente* (Fasteners Standards Committee), together with representatives of the dealers in fasteners, have decided to introduce the new widths across flats in all relevant product standards. Since experience has shown, that the introduction of the new widths across flats has not been advanced by their inclusion in DIN Standards merely as preferred alternatives to the previous widths across flats, the following decisions have been reached to accelerate the changeover procedure.

Supplementary to current DIN Standards specifying the previous widths across flats, DIN ISO Standards dealing with the same products will, wherever ISO Standards are available, be published which, besides introducing a number of other minor amendments, will specify the new widths across flats conforming to ISO 272. In both DIN and DIN ISO Standards attention will be drawn to the fact that the relevant ISO Standards are to be preferred and that the DIN Standard is to be replaced after a transition period of five years.

If no relevant ISO Standard is available, the DIN Standard will contain a foreword stating that the previous width across flats specifications are to be withdrawn after a transition period of five years and replaced by those specified in ISO 272.

This sets a time limit for both manufacturer and user of hexagon products by which the changeover to the new widths across flats must be effected. The responsible committee is of the opinion, that it will still be possible after this period to obtain fasteners complying with the superseded specifications as spare parts.

In some cases, the replacement of the previous DIN Standards by the relevant ISO Standards will have further consequences, besides the changeover to the new widths across flats, attention being drawn to this circumstance in the national foreword of the relevant DIN ISO Standards. These consequences result from the fact that the ISO Standards have not yet reached the same level of completeness as the DIN Standards. Thus a number of nominal sizes, as well as several product specifications for fine pitch threads are not found in the ISO product standards. Furthermore, ISO Standards on technical delivery conditions are still in the initial stages, so that specific requirements are still subject to separate agreement when ordering products in accordance with ISO Standards, as they are not included in the designation for order purposes.

Besides these consequences, which are of importance when applying the new ISO Standards, amending the widths across flats also has a number of consequences as regards the use of the new products which the designer must take into consideration. Besides the amended assembly sizes, this applies above all to the different surface pressure for the bearing area of the nut or the heads of the bolts. These difficulties are discussed in Recommendation VDA 262*) published by the *Verband der Automobilindustrie e.V.* (German Automobile Manufacturers Association).

## International Patent Classification

F 16 B 37/00

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