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**Aerospace — Bolts, normal hexagonal head, normal shank, short or medium length MJ threads, metallic material, coated or uncoated, strength classes less than or equal to 1 100 MPa — Dimensions**

*Aéronautique et espace — Vis à tête hexagonale normale, avec tige normale et filetages MJ courts ou de longueur moyenne, en matériau métallique, revêtues ou non revêtues, des classes de résistance inférieures ou égales à 1 100 MPa — Dimensions*



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Fax + 41 22 749 09 47  
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## Foreword

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ISO 3193 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 4, *Aerospace fastener systems*.

This second edition cancels and replaces the first edition (ISO 3193:1991) and Technical Corrigendum 1 (1992), which have been technically revised.

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# Aerospace — Bolts, normal hexagonal head, normal shank, short or medium length MJ threads, metallic material, coated or uncoated, strength classes less than or equal to 1 100 MPa — Dimensions

## 1 Scope

This International Standard specifies the dimensions of normal hexagonal head bolts, with close or large tolerance normal shank and short or medium length MJ threads, in metallic material, coated or uncoated, with strength classes less than or equal to 1 100 MPa.

This International Standard is applicable to the compilation of aerospace product standards.

## 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.

ISO 286-2, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*

ISO 3353-1, *Aerospace — Lead and runout threads — Part 1: Rolled external threads*

ISO 5855-2, *Aerospace — MJ threads — Part 2: Limit dimensions for bolts and nuts*

ISO 7913, *Aerospace — Bolts and screws, metric — Tolerances of form and position*

## 3 Configuration and dimensions

See Figure 1 and Table 1.

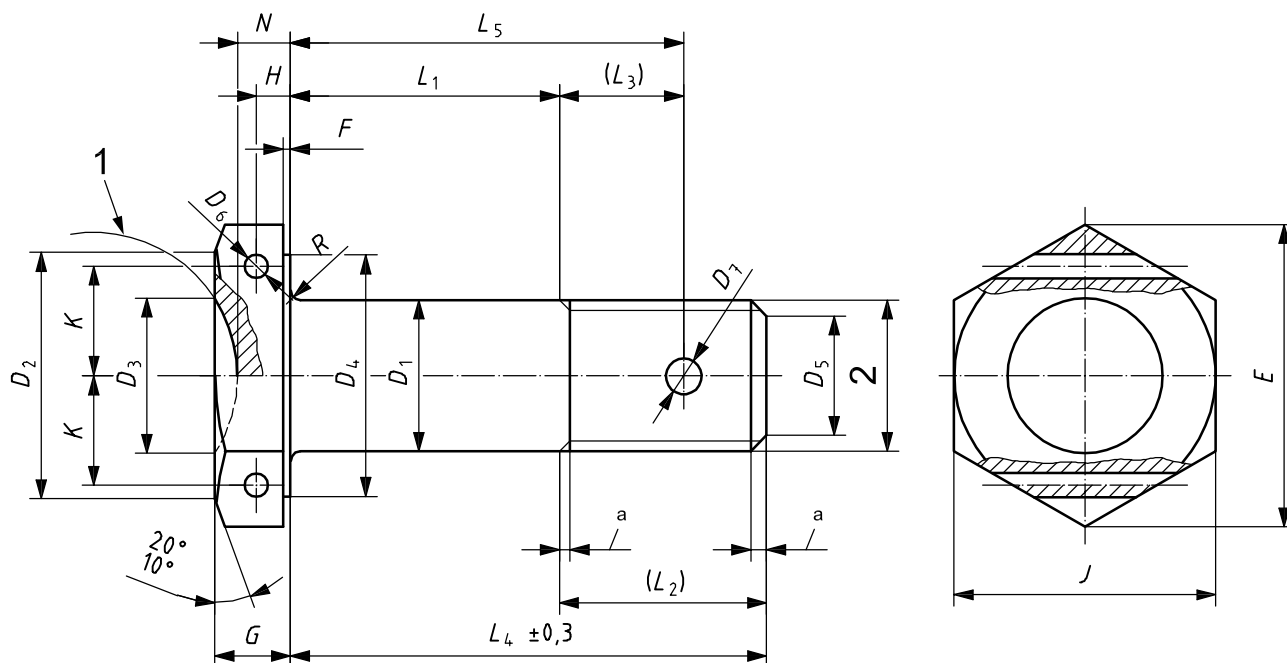
Dimensions and tolerances are expressed in millimetres. They are applicable after any coating (tolerance on shank diameter before coating is also specified for heat cured matrix coatings), but before the application of any lubricant.

Details of form not stated are left to the manufacturer's discretion.

Tolerances of form and position shall be as specified in ISO 7913 if not otherwise stated on product standard.

Dimensions in millimetres

Break sharp edges 0,1 to 0,4



**Key**

- 1 continuous surface
- 2 thread
- a In accordance with ISO 3353-1.

**Figure 1**

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Table 1

| Diameter code | Thread <sup>a</sup> | nom. | <i>D</i> <sub>1</sub>       |                  |                  |                 |                  | <i>D</i> <sub>2</sub> | <i>D</i> <sub>3</sub> | <i>D</i> <sub>4</sub> <sup>d</sup> | <i>D</i> <sub>5</sub> |           | <i>D</i> <sub>6</sub><br>Two holes, optional<br>H13 <sup>c</sup> | <i>D</i> <sub>7</sub><br>One hole, optional<br>H13 <sup>c</sup> |      |
|---------------|---------------------|------|-----------------------------|------------------|------------------|-----------------|------------------|-----------------------|-----------------------|------------------------------------|-----------------------|-----------|--|---|------|
|               |                     |      | Coated bolts                |                  |                  | Uncoated bolts  |                  |                       |                       |                                    | min.                  | nom.      |  |   | Tol. |
|               |                     |      | before coating <sup>b</sup> | Tol.             |                  | Tol.            |                  |                       |                       |                                    |                       |           |  |   |      |
| 030           | MJ3<br>× 0,5-4h6h   | 3    | -0,026<br>-0,041            | -0,006<br>-0,031 |                  |                 |                  | 5,5                   | —                     | 5,4                                | 2,3                   | 0<br>-0,5 | —  | —   |      |
| 040           | MJ4<br>× 0,7-4h6h   | 4    |                             |                  |                  |                 | 6,4              | —                     | 6,4                   | 3                                  |                       |           | —  | 1,1   |      |
| 050           | MJ5<br>× 0,8-4h6h   | 5    | -0,030<br>-0,045            | -0,010<br>-0,035 |                  |                 | 7,4              | 5,25                  | 7,4                   | 3,4                                |                       | 1         | 1,5  |   |      |
| 060           | MJ6 × 1-4h6h        | 6    |                             |                  |                  |                 | 9,4              | 6,25                  | 9,3                   | 4,2                                |                       |           |  |   |      |
| 070           | MJ7 × 1-4h6h        | 7    |                             |                  |                  |                 | 10,3             | 7,25                  | 10,2                  | 5,2                                |                       | 1,4       | 1,9  |   |      |
| 080           | MJ8 × 1-4h6h        | 8    | -0,033<br>-0,048            | -0,013<br>-0,038 |                  |                 | 12,3             | 8,25                  | 12,2                  | 6,2                                |                       |           |  |   |      |
| 100           | MJ10<br>× 1,25-4h6h | 10   |                             |                  | h12 <sup>c</sup> | f7 <sup>c</sup> | h12 <sup>c</sup> | 16,3                  | 10,25                 | 16                                 | 7,9                   | ± 0,5     | 2,4  |   |      |
| 120           | MJ12<br>× 1,25-4h6h | 12   |                             |                  |                  |                 | 18,3             | 12,25                 | 18                    | 9,8                                |                       |           |  |   |      |
| 140           | MJ14<br>× 1,5-4h6h  | 14   | -0,036<br>-0,051            | -0,016<br>-0,041 |                  |                 | 21,3             | 14,25                 | 21                    | 11,5                               |                       | 1,6       | 3  |   |      |
| 160           | MJ16<br>× 1,5-4h6h  | 16   |                             |                  |                  |                 | 23,3             | 16,25                 | 23                    | 13,5                               |                       |           |  |   |      |
| 180           | MJ18<br>× 1,5-4h6h  | 18   |                             |                  |                  |                 | 26,3             | 18,25                 | 26                    | 15,5                               |                       | 3,8       |  |   |      |
| 200           | MJ20<br>× 1,5-4h6h  | 20   | -0,040<br>-0,055            | -0,020<br>-0,045 |                  |                 | 29,3             | 20,25                 | 29                    | 17,5                               |                       |           |  |   |      |



Table 1 (continued)

| E    | F    |      | G    | H    | J    |   | K         | $L_1 \pm 0,2^e$ | $L_2$   |         | $L_3$ |        | N   | R     |        |   |      |
|------|------|------|------|------|------|---|-----------|-----------------|---------|---------|-------|--------|-----|-------|--------|---|------|
|      | min. | max. |      |      | min. | $\begin{matrix} 0 \\ -0,3 \end{matrix}$ |           |                 | nom.    | Tol.    | short | medium |     | short | medium | $\begin{matrix} 0 \\ -0,3 \end{matrix}$ | nom. |
| 6,5  | 0,4  | 0,5  | 0,2  | 2    | –    | 6                                       | h12       | –               | 2 to 30 | 6       | 7,5   | –      | –   | –     | 0,4    | $\begin{matrix} 0 \\ -0,2 \end{matrix}$ |      |
| 7,6  |      |      |      | 2,5  | –    | 7                                       |           | –               | 2 to 40 | 7,5     | 10    | 5      | 6   | –     |        |   |      |
| 8,7  |      |      |      | 3    | 1,35 | 8                                       |           | 3,25            | 3 to 50 | 9       | 12    | 6      | 7,5 | 2     |        |   | 0,5  |
| 10,9 |      |      |      | 3,5  | 1,6  | 10                                      |           | h13             | 4,1     | 3 to 60 | 10    | 14     | 7   | 8,5   | 2,3    |   | 0,7  |
| 12   |      |      |      | 4    | 1,85 | 11                                      |           |                 | 4,5     | 4 to 70 | 11    | 15     |     | 9,5   | 2,7    |   |      |
| 14,3 |      |      |      | 4,5  | 2,1  | 13                                      |           |                 | 5,35    | 4 to 80 | 11,5  | 16,5   | 7,5 | 10,5  | 3      |   |      |
| 18,9 |      | 5    | 2,35 | 17   | 7,1  | 5 to 100                                | 14,5      |                 | 20,5    | 9       | 13    | 3,4    | 0,8 |       |        |   |      |
| 21,1 |      | 6    | 2,85 | 19   | 7,9  | 6 to 120                                | 16        |                 | 22,5    | 10      | 14,5  | 4      | 0,9 |       |        |   |      |
| 24,5 | 0,6  | 0,3  | 7    | 3,35 | 22   | 9,2                                     | 7 to 140  |                 | 19      | 26      | 12    | 17     | 4,7 | 1,1   |        |   |      |
| 26,8 |      |      | 8    | 3,85 | 24   | 10,05                                   | 8 to 160  | 20,5            | 28,5    | 12,5    | 18,5  | 5,4    |     |       |        |   |      |
| 30,2 |      |      | 9    | 4,35 | 27   | 11,3                                    | 9 to 180  | 22,5            | 31      | 14,5    | 21    | 6      | 1,3 |       |        |   |      |
| 33,6 |      |      | 10   | 4,85 | 30   | 12,6                                    | 10 to 200 | 24,5            | 33,5    | 15      | 22,5  | 6,7    |     |       |        |   |      |

a In conformity with ISO 5855-2, except for the maximum thread major diameter,  $d_{max}$ , of bolts with a close tolerance on  $D_1$ , which shall be equal to  $(D_{1,min} - 0,025)$ .

b Heat cured organic matrix coatings for close tolerance normal shanks.

c See ISO 286-2.

d  $D_{4,max}$  shall be less than  $J$ .

e Increments: 1 for  $L_1 \leq 30$ ;  
 2 for  $30 < L_1 \leq 100$ ;  
 4 for  $L_1 > 100$ .

If greater lengths are required, they shall be chosen using these increments.

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