

International Standard

ISO 965-2

**Fourth edition
2024-11**

ISO general purpose metric screw threads — Tolerances —

Part 2: Limits of sizes for internal and external threads (tolerance classes 6H and 6g for M1,6 to M100 and 5H and 6h for M1 to M1,4)

*Filetages métriques ISO pour usages généraux—Tolérances —
Partie 2: Dimensions limites pour filetages intérieurs et extérieurs
(classes de tolérance 6H et 6g pour M1,6 à M100 et 5H et 6h pour
M1 à M1,4)*



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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 document 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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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC1, Screw threads.

This fourth edition cancels and replaces the third edition (ISO 965-2:1998), which has been technically revised. It also incorporates the Amendment ISO 965-2:1998/Amd.1:2021.

The main changes are as follows:

- in [Tables 1](#) and [2](#), the large nominal diameters (from 68 mm to 100 mm) have been added;
- in [Tables 1](#) and [2](#), the normal lengths of thread engagement have been updated for M10×1, M12×1,5, M18×2, M20×2 and M22×2 (in [Tables 3](#) and [4](#) in the previous edition).

A list of all parts in the ISO 965 series can be found on the ISO website.

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

ISO general purpose metric screw threads —Tolerances —

Part 2: Limits of sizes for internal and external threads (tolerance classes 6H and 6g for M1,6 to M100 and 5H and 6h for M1 to M1,4)

1 Scope

This document specifies the limits of sizes for pitch and crest diameters of ISO general purpose metric screw threads(M)conforming to ISO 262 having basic and design profiles according to ISO 68-1.

This document is applicable to the metric fastening screw threads with tolerance classes 6H and 6g for M1,6 to M100 and 5H and 6h for M1 to M1,4.

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 ofthe referenced document (including any amendments)applies.

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

ISO 5408,Screw threads—Vocabulary

3 Terms and definitions

For the purposes of this document,the terms and definitions given in ISO 5408 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

—ISO Online browsing platform:available at <https://www.iso.org/obp>

— IEElectropedia :available at<https://www.electropedia.org/>

4 Designation

A screw thread in conformity with this document shall be designated in accordance with ISO 965-1.

5 Limits of sizes

5.1 General

The limits of sizes specified shall be derived from the fundamental deviations and tolerances specified in ISO965-1.

For coated threads,the tolerance classes shall apply to the parts before coating,unless otherwise stated.

Aftercoating,the actual screw thread profile shall not,at any point,transgress the maximum material limit for the tolerance position Hor h.A maximum torque can be given in the relevant coating product standards.

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Table 1 (continued)

| Nominal diameter D | Pitch P | Length of thread engagement | | Pitch diameter D ₂ | | Minor diameter D ₁ | |
|-----------------------|------------|-----------------------------|---------------------|----------------------------------|--------|----------------------------------|--------|
| | | over | up to and including | max. | min. | max. | min. |
| 18 | 1,5 | 5,6 | 16 | 17,216 | 17,026 | 16,676 | 16,376 |
| 18 | 2 | 8 | 24 | 16,913 | 16,701 | 16,210 | 15,835 |
| 18 | 2,5 | 10 | 30 | 16,600 | 16,376 | 15,744 | 15,294 |
| 20 | 1,5 | 5,6 | 16 | 19,216 | 19,026 | 18,676 | 18,376 |
| 20 | 2 | 8 | 24 | 18,913 | 18,701 | 18,210 | 17,835 |
| 20 | 2,5 | 10 | 30 | 18,600 | 18,376 | 17,744 | 17,294 |
| 22 | 1,5 | 5,6 | 16 | 21,216 | 21,026 | 20,676 | 20,376 |
| 22 | 2 | 8 | 24 | 20,913 | 20,701 | 20,210 | 19,835 |
| 22 | 2,5 | 10 | 30 | 20,600 | 20,376 | 19,744 | 19,294 |
| 24 | 2 | 8,5 | 25 | 22,925 | 22,701 | 22,210 | 21,835 |
| 24 | 3 | 12 | 36 | 22,316 | 22,051 | 21,252 | 20,752 |
| 27 | 2 | 8,5 | 25 | 25,925 | 25,701 | 25,210 | 24,835 |
| 27 | 3 | 12 | 36 | 25,316 | 25,051 | 24,252 | 23,752 |
| 30 | 2 | 8,5 | 25 | 28,925 | 28,701 | 28,210 | 27,835 |
| 30 | 3,5 | 15 | 45 | 28,007 | 27,727 | 26,771 | 26,211 |
| 33 | 2 | 8,5 | 25 | 31,925 | 31,701 | 31,210 | 30,835 |
| 33 | 3,5 | 15 | 45 | 31,007 | 30,727 | 29,771 | 29,211 |
| 36 | 3 | 12 | 36 | 34,316 | 34,051 | 33,252 | 32,752 |
| 36 | 4 | 18 | 53 | 33,702 | 33,402 | 32,270 | 31,670 |
| 39 | 3 | 12 | 36 | 37,316 | 37,051 | 36,252 | 35,752 |
| 39 | 4 | 18 | 53 | 36,702 | 36,402 | 35,270 | 34,670 |
| 42 | 3 | 12 | 36 | 40,316 | 40,051 | 39,252 | 38,752 |
| 42 | 4,5 | 21 | 63 | 39,392 | 39,077 | 37,799 | 37,129 |
| 45 | 3 | 12 | 36 | 43,316 | 43,051 | 42,252 | 41,752 |
| 45 | 4,5 | 21 | 63 | 42,392 | 42,077 | 40,799 | 40,129 |
| 48 | 3 | 15 | 45 | 46,331 | 46,051 | 45,252 | 44,752 |
| 48 | 5 | 24 | 71 | 45,087 | 44,752 | 43,297 | 42,587 |
| 52 | 4 | 19 | 56 | 49,717 | 49,402 | 48,270 | 47,670 |
| 52 | 5 | 24 | 71 | 49,087 | 48,752 | 47,297 | 46,587 |
| 56 | 4 | 19 | 56 | 53,717 | 53,402 | 52,270 | 51,670 |
| 56 | 5,5 | 28 | 85 | 52,783 | 52,428 | 50,796 | 50,046 |
| 60 | 4 | 19 | 56 | 57,717 | 57,402 | 56,270 | 55,670 |
| 60 | 5,5 | 28 | 85 | 56,783 | 56,428 | 54,796 | 54,046 |
| 64 | 4 | 19 | 56 | 61,717 | 61,402 | 60,270 | 59,670 |
| 64 | 6 | 32 | 95 | 60,478 | 60,103 | 58,305 | 57,505 |
| 68 | 4 | 19 | 56 | 65,717 | 65,402 | 64,270 | 63,670 |
| 68 | 6 | 32 | 95 | 64,478 | 64,103 | 62,305 | 61,505 |
| 72 | 4 | 19 | 56 | 69,717 | 69,402 | 68,270 | 67,670 |
| 72 | 6 | 32 | 95 | 68,478 | 68,103 | 66,305 | 65,505 |
| 76 | 4 | 19 | 56 | 73,717 | 73,402 | 72,270 | 71,670 |
| 76 | 6 | 32 | 95 | 72,478 | 72,103 | 70,305 | 69,505 |
| 80 | 4 | 19 | 56 | 77,717 | 77,402 | 76,270 | 75,670 |

Table 1 (continued)

| Nominal diameter D | Pitch P | Length of thread engagement | | Pitch diameter D ₂ | | Minor diameter D ₁ | |
|-----------------------|------------|-----------------------------|---------------------|----------------------------------|--------|----------------------------------|--------|
| | | over | up to and including | max. | min. | max. | min. |
| 80 | 6 | 32 | 95 | 76,478 | 76,103 | 74,305 | 73,505 |
| 85 | 4 | 19 | 56 | 82,717 | 82,402 | 81,270 | 80,670 |
| 85 | 6 | 32 | 95 | 81,478 | 81,103 | 79,305 | 78,505 |
| 90 | 4 | 19 | 56 | 87,717 | 87,402 | 86,270 | 85,670 |
| 90 | 6 | 32 | 95 | 86,478 | 86,103 | 84,305 | 83,505 |
| 95 | 4 | 24 | 71 | 92,737 | 92,402 | 91,270 | 90,670 |
| 95 | 6 | 36 | 106 | 91,503 | 91,103 | 89,305 | 88,505 |
| 100 | 4 | 24 | 71 | 97,737 | 97,402 | 96,270 | 95,670 |
| 100 | 6 | 36 | 106 | 96,503 | 96,103 | 94,305 | 93,505 |

5.3 External threads

Tolerance quality:Medium

Length group of thread engagement:Normal

Tolerance class:

- 6h for screw threads with nominal diameters up to and including 1,4 mm;
- 6g for screw threads with nominal diameters over 1,4 mm.

The limits of sizes for external threads with the tolerance classes above shall be as specified in [Table 2](#).

Table 2—Limits of sizes for external threads

Dimensions in millimetres

| Nominal diameter d | Pitch P | Length of thread engagement | | Major diameter d | | Pitch diameter d ₂ | |
|-----------------------|------------|-----------------------------|---------------------|---------------------|-------|----------------------------------|-------|
| | | over | up to and including | max. | min. | max. | min. |
| 1 | 0,25 | 0,6 | 1,7 | 1,000 | 0,933 | 0,838 | 0,785 |
| 1,2 | 0,25 | 0,6 | 1,7 | 1,200 | 1,133 | 1,038 | 0,985 |
| 1,4 | 0,3 | 0,7 | 2 | 1,400 | 1,325 | 1,205 | 1,149 |
| 1,6 | 0,35 | 0,8 | 2,6 | 1,581 | 1,496 | 1,354 | 1,291 |
| 1,8 | 0,35 | 0,8 | 2,6 | 1,781 | 1,696 | 1,554 | 1,491 |
| 2 | 0,4 | 1 | 3 | 1,981 | 1,886 | 1,721 | 1,654 |
| 2,5 | 0,45 | 1,3 | 3,8 | 2,480 | 2,380 | 2,188 | 2,117 |
| 3 | 0,5 | 1,5 | 4,5 | 2,980 | 2,874 | 2,655 | 2,580 |
| 3,5 | 0,6 | 1,7 | 5 | 3,479 | 3,354 | 3,089 | 3,004 |
| 4 | 0,7 | 2 | 6 | 3,978 | 3,838 | 3,523 | 3,433 |
| 5 | 0,8 | 2,5 | 7,5 | 4,976 | 4,826 | 4,456 | 4,361 |
| 6 | 1 | 3 | 9 | 5,974 | 5,794 | 5,324 | 5,212 |
| 7 | 1 | 3 | 9 | 6,974 | 6,794 | 6,324 | 6,212 |
| 8 | 1 | 3 | 9 | 7,974 | 7,794 | 7,324 | 7,212 |
| 8 | 1,25 | 4 | 12 | 7,972 | 7,760 | 7,160 | 7,042 |

NOTE For the minimum root radius, see ISO965-1.

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Table 2 (continued)

| Nominal diameter d | Pitch P | Length of thread engagement | | Major diameter d | | Pitch diameter d ₂ | |
|-----------------------|------------|-----------------------------|---------------------|---------------------|--------|----------------------------------|--------|
| | | over | up to and including | max. | min. | max. | min. |
| 10 | 1 | 3 | 9 | 9,974 | 9,794 | 9,324 | 9,212 |
| 10 | 1,25 | 4 | 12 | 9,972 | 9,760 | 9,160 | 9,042 |
| 10 | 1,5 | 5 | 15 | 9,968 | 9,732 | 8,994 | 8,862 |
| 12 | 1,25 | 4,5 | 13 | 11,972 | 11,760 | 11,160 | 11,028 |
| 12 | 1,5 | 5,6 | 16 | 11,968 | 11,732 | 10,994 | 10,854 |
| 12 | 1,75 | 6 | 18 | 11,966 | 11,701 | 10,829 | 10,679 |
| 14 | 1,5 | 5,6 | 16 | 13,968 | 13,732 | 12,994 | 12,854 |
| 14 | 2 | 8 | 24 | 13,962 | 13,682 | 12,663 | 12,503 |
| 16 | 1,5 | 5,6 | 16 | 15,968 | 15,732 | 14,994 | 14,854 |
| 16 | 2 | 8 | 24 | 15,962 | 15,682 | 14,663 | 14,503 |
| 18 | 1,5 | 5,6 | 16 | 17,968 | 17,732 | 16,994 | 16,854 |
| 18 | 2 | 8 | 24 | 17,962 | 17,682 | 16,663 | 16,503 |
| 18 | 2,5 | 10 | 30 | 17,958 | 17,623 | 16,334 | 16,164 |
| 20 | 1,5 | 5,6 | 16 | 19,968 | 19,732 | 18,994 | 18,854 |
| 20 | 2 | 8 | 24 | 19,962 | 19,682 | 18,663 | 18,503 |
| 20 | 2,5 | 10 | 30 | 19,958 | 19,623 | 18,334 | 18,164 |
| 22 | 1,5 | 5,6 | 16 | 21,968 | 21,732 | 20,994 | 20,854 |
| 22 | 2 | 8 | 24 | 21,962 | 21,682 | 20,663 | 20,503 |
| 22 | 2,5 | 10 | 30 | 21,958 | 21,623 | 20,334 | 20,164 |
| 24 | 2 | 8,5 | 25 | 23,962 | 23,682 | 22,663 | 22,493 |
| 24 | 3 | 12 | 36 | 23,952 | 23,577 | 22,003 | 21,803 |
| 27 | 2 | 8,5 | 25 | 26,962 | 26,682 | 25,663 | 25,493 |
| 27 | 3 | 12 | 36 | 26,952 | 26,577 | 25,003 | 24,803 |
| 30 | 2 | 8,5 | 25 | 29,962 | 29,682 | 28,663 | 28,493 |
| 30 | 3,5 | 15 | 45 | 29,947 | 29,522 | 27,674 | 27,462 |
| 33 | 2 | 8,5 | 25 | 32,962 | 32,682 | 31,663 | 31,493 |
| 33 | 3,5 | 15 | 45 | 32,947 | 32,522 | 30,674 | 30,462 |
| 36 | 3 | 12 | 36 | 35,952 | 35,577 | 34,003 | 33,803 |
| 36 | 4 | 18 | 53 | 35,940 | 35,465 | 33,342 | 33,118 |
| 39 | 3 | 12 | 36 | 38,952 | 38,577 | 37,003 | 36,803 |
| 39 | 4 | 18 | 53 | 38,940 | 38,465 | 36,342 | 36,118 |
| 42 | 3 | 12 | 36 | 41,952 | 41,577 | 40,003 | 39,803 |
| 42 | 4,5 | 21 | 63 | 41,937 | 41,437 | 39,014 | 38,778 |
| 45 | 3 | 12 | 36 | 44,952 | 44,577 | 43,003 | 42,803 |
| 45 | 4,5 | 21 | 63 | 44,937 | 44,437 | 42,014 | 41,778 |
| 48 | 3 | 15 | 45 | 47,952 | 47,577 | 46,003 | 45,791 |
| 48 | 5 | 24 | 71 | 47,929 | 47,399 | 44,681 | 44,431 |
| 52 | 4 | 19 | 56 | 51,940 | 51,465 | 49,342 | 49,106 |
| 52 | 5 | 24 | 71 | 51,929 | 51,399 | 48,681 | 48,431 |
| 56 | 4 | 19 | 56 | 55,940 | 55,465 | 53,342 | 53,106 |
| 56 | 5,5 | 28 | 85 | 55,925 | 55,365 | 52,353 | 52,088 |

NOTE For the minimum root radius, see ISO965-1.

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Table 2 (continued)

| Nominal diameter d | Pitch P | Length of thread engagement | | Major diameter d | | Pitch diameter d ₂ | |
|-----------------------|------------|-----------------------------|---------------------|---------------------|--------|----------------------------------|--------|
| | | over | up to and including | max. | min. | max. | min. |
| 60 | 4 | 19 | 56 | 59,940 | 59,465 | 57,342 | 57,106 |
| 60 | 5,5 | 28 | 85 | 59,925 | 59,365 | 56,353 | 56,088 |
| 64 | 4 | 19 | 56 | 63,940 | 63,465 | 61,342 | 61,106 |
| 64 | 6 | 32 | 95 | 63,920 | 63,320 | 60,023 | 59,743 |
| 68 | 4 | 19 | 56 | 67,940 | 67,465 | 65,342 | 65,106 |
| 68 | 6 | 32 | 95 | 67,920 | 67,320 | 64,023 | 63,743 |
| 72 | 4 | 19 | 56 | 71,940 | 71,465 | 69,342 | 69,106 |
| 72 | 6 | 32 | 95 | 71,920 | 71,320 | 68,023 | 67,743 |
| 76 | 4 | 19 | 56 | 75,940 | 75,465 | 73,342 | 73,106 |
| 76 | 6 | 32 | 95 | 75,920 | 75,320 | 72,023 | 71,743 |
| 80 | 4 | 19 | 56 | 79,940 | 79,465 | 77,342 | 77,106 |
| 80 | 6 | 32 | 95 | 79,920 | 79,320 | 76,023 | 75,743 |
| 85 | 4 | 19 | 56 | 84,940 | 84,465 | 82,342 | 82,106 |
| 85 | 6 | 32 | 95 | 84,920 | 84,320 | 81,023 | 80,743 |
| 90 | 4 | 19 | 56 | 89,940 | 89,465 | 87,342 | 87,106 |
| 90 | 6 | 32 | 95 | 89,920 | 89,320 | 86,023 | 85,743 |
| 95 | 4 | 24 | 71 | 94,940 | 94,465 | 92,342 | 92,092 |
| 95 | 6 | 36 | 106 | 94,920 | 94,320 | 91,023 | 90,723 |
| 100 | 4 | 24 | 71 | 99,940 | 99,465 | 97,342 | 97,092 |
| 100 | 6 | 36 | 106 | 99,920 | 99,320 | 96,023 | 95,723 |

NOTE For the minimum root radius, see ISO 965-1.

Bibliography

- [1] *ISO68-1,ISO general purpose screw threads—Basic and design profiles—Part 1:Metric screw threads*
- [2] *ISO 262,ISO general purpose metric screw threads—Selected sizes for bolts,screws, studs and nuts*

