INTERNATIONAL STANDARD

ISO 965-5

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ISO general purpose metric screw threads — Tolerances —

Part 5:
Limits of sizes for internal screw threads to mate with hot-dip galvanized external screw threads with maximum size of tolerance position h before galvanizing

Filetages métriques ISO pour usages généraux — Tolérances —

Partie 5: Dimensions limites pour filetages intérieurs pour assemblages avec des filetages extérieurs galvanisés à chaud de position de tolérance maximale h avant galvanisation

Reference number
ISO 965-5:1998(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 965-5 was prepared by Technical Committee ISO/TC 1, *Screw threads*, Subcommittee SC 2, *Tolerances*.

ISO 965 consists of the following parts, under the general title *ISO general purpose metric screw threads – Tolerances*

— *Part 1: Principles and basic data*

— *Part 2: Limits of sizes for general purpose bolt and nut threads – Medium quality*

— *Part 3: Deviations for constructional screw threads*

— *Part 4: Limits of sizes for hot-dip galvanized external threads to mate with internal threads tapped with tolerance position H or G after galvanizing*

— *Part 5: Limits of sizes for internal screw threads to mate with hot-dip galvanized external screw threads with maximum size of tolerance position h before galvanizing*

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Part 5:
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1 Scope

This part of ISO 965 specifies deviations and limits of sizes for pitch and crest diameters for ISO general purpose metric internal screw threads conforming to ISO 262 having basic profile according to ISO 68-1.

Internal screw threads according to this part of ISO 965 are intended to mate with external screw threads with maximum size of tolerance position h before hot-dip galvanizing.

The limits of sizes for the tolerance quality specified are derived from tolerances specified in ISO 965-1.

The fundamental deviations for internal screw threads with a tolerance position AZ have been calculated according to the following formula:

$$EI_{AZ} = + (300 + 20P)$$

where

EI is expressed in micrometres;

P is expressed in millimetres.

The fundamental deviations for internal screw threads with a tolerance position AX have been calculated according to the following formula:

$$EI_{AX} = + (220P - 20)$$

where

EI is expressed in micrometres;

P is expressed in millimetres.

Products made with thread tolerances according to this part of ISO 965 may show load failure when tested in accordance with ISO 898-2 without adjustment of the other mechanical properties.

Internal screw threads with thread tolerances according to this part of ISO 965 must not be mated with external screw threads having thread tolerances according to ISO 965-4 because such combinations will create severe risk of thread stripping.

NOTE Internal screw threads with tolerance class 6AZ are primarily intended to mate with external screw threads centrifuged after hot-dip galvanizing.

Internal screw threads with tolerance class 6AX are primarily intended to mate with hot-dip galvanized external screw threads with heavy coating not centrifuged.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 965. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 965 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 68-1:1998, *ISO general purpose screw threads — Basic profile — Part 1: Metric screw threads.*

ISO 262:1998, *ISO general purpose metric screw threads — Selected sizes for screw, bolts and nuts.*

ISO 898-2:1992, *Mechanical properties of fasteners — Part 2: Nuts with specified proof load values — Coarse thread.*

ISO 965-1:1998, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data.*

ISO 965-4:1998, *ISO general purpose metric screw threads — Tolerances — Part 4: Limits of sizes for hot-dip galvanized external screw threads to mate with internal screw threads tapped with tolerance position H or G after galvanizing.*

ISO 5408:1983, *Cylindrical screw threads — Vocabulary.*

3 Definitions

For the purpose of this part of ISO 965 the definitions given in ISO 5408 apply.

4 Designation

Tolerance designation for internal screw threads is

6AZ

or

6AX

Example:

M12 - 6AZ

or

M12 - 6AX

5 Deviations

The deviations for internal screw threads as specified in table 1 are derived from the formulae for fundamental deviations below and from tolerances specified in ISO 965-1.

The fundamental deviations, EI_{AZ} and EI_{AX}, have been calculated according to the following formulae:

$$EI_{AZ} = + (300 + 20P)$$

and

$$EI_{AX} = + (220P - 20)$$

where

EI is expressed in micrometres;

P is expressed in millimetres

Table 1 — Deviations

Thread	Pitch	Internal thread			
		Tolerance class	Pitch diameter		Minor diameter	
	P		ES	EI	ES	EI
	mm		µm	µm	µm	µm
M10	1,5	6AZ 6AX	+ 510 + 490	+ 330 + 310	+ 630 + 610	+ 330 + 310
M12	1,75	6AZ 6AX	+ 535 + 565	+ 335 + 365	+ 670 + 700	+ 335 + 365
M14, M16	2	6AZ 6AX	+ 552 + 632	+ 340 + 420	+ 715 + 795	+ 340 + 420
M18, M20, M22	2,5	6AZ 6AX	+ 574 + 754	+ 350 + 530	+ 800 + 980	+ 350 + 530
M24, M27	3	6AZ 6AX	+ 625 + 905	+ 360 + 640	+ 860 + 1 140	+ 360 + 640
M30, M33	3,5	6AZ 6AX	+ 650 + 1 030	+ 370 + 750	+ 930 + 1 310	+ 370 + 750
M36, M39	4	6AZ 6AX	+ 680 + 1 160	+ 380 + 860	+ 980 + 1 460	+ 380 + 860
M42, M45	4,5	6AZ 6AX	+ 705 + 1 285	+ 390 + 970	+ 1 060 + 1 640	+ 390 + 970
M48, M52	5	6AZ 6AX	+ 735 + 1 415	+ 400 + 1 080	+ 1 110 + 1 790	+ 400 + 1 080
M56, M60	5,5	6AZ 6AX	+ 765 + 1 545	+ 410 + 1 190	+ 1 160 + 1 940	+ 410 + 1 190
M64	6	6AZ 6AX	+ 795 + 1675	+ 420 + 1 300	+ 1 220 + 2 100	+ 420 + 1 300

6 Limits of sizes — Internal screw threads — Coarse thread series

Tolerance quality: medium

Thread engagement: normal

Tolerance classes: 6AZ and 6AX

Table 2 — Internal screw thread limits for tolerance class 6AZ

Dimensions in millimetres

Thread	Length of thread engagement		Major diameter[a]	Pitch diameter[a]		Minor diameter[c]	
	over	up to and including	min.[b]	max.	min.	max.	min.
M10	5	15	10,330	9,536	9,356	9,006	8,706
M12	6	18	12,335	11,398	11,198	10,776	10,441
M14	8	24	14,340	13,253	13,041	12,550	12,175
M16	8	24	16,340	15,253	15,041	14,550	14,175
M18	10	30	18,350	16,950	16,726	16,094	15,644
M20	10	30	20,350	18,950	18,726	18,094	17,644
M22	10	30	22,350	20,950	20,726	20,094	19,644
M24	12	36	24,360	22,676	22,411	21,612	21,112
M27	12	36	27,360	25,676	25,411	24,612	24,112
M30	15	45	30,370	28,377	28,097	27,141	26,581
M33	15	45	33,370	31,377	31,097	30,141	29,581
M36	18	53	36,380	34,082	33,782	32,650	32,050
M39	18	53	39,380	37,082	36,782	35,650	35,050
M42	21	63	42,390	39,782	39,467	38,189	37,519
M45	21	63	45,390	42,782	42,467	41,189	40,519
M48	24	71	48,400	45,487	45,152	43,697	42,987
M52	24	71	52,400	49,487	49,152	46,697	46,987
M56	28	85	56,410	53,193	52,838	51,206	50,456
M60	28	85	60,410	57,193	56,838	55,206	54,456
M64	32	95	64,420	60,898	60,523	58,725	57,925

[a] Dimensions apply to internal screw threads after galvanizing and tapping oversize.

[b] Refers to the imaginary coaxial cylinder through the points where the requirement with regard to straightness of flank ceases.

[c] Dimensions apply to internal screw threads before galvanizing or after galvanizing and removal of zinc fragments.