

Open end blind rivets with break pull mandrel and protruding head — AIA/AIA

The European Standard EN ISO 15981:2002 has the status of a
British Standard

ICS 21.060.40

National foreword

This British Standard is the official English language version of EN ISO 15981:2002. It is identical with ISO 15981:2002.

BS EN ISO 15981:2002, together with BS EN ISO 15980:2002, BS EN ISO 15982:2002, BS EN ISO 15983:2002, BS EN ISO 15984:2002, BS EN ISO 16582:2002, BS EN ISO 16583:2002, BS EN ISO 16584:2002 and BS EN ISO 16585:2002, supersedes BS 7349-2:1993 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee FME/6, Rivets, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

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Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii and iii, a blank page, pages 1 to 6, the Annex ZA page and a back cover.

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This British Standard, having been prepared under the direction of the Engineering Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 20 November 2002

Amendments issued since publication

Amd. No.	Date	Comments
14323 Corrigendum No. 1	23 January 2003	Replacing the EN ISO foreword page and incorporating the Annex ZA page
15349 Corrigendum No. 2	23 November 2004	Addition of supersession details

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English version

Open end blind rivets with break pull mandrel and protruding head - AIA/AIA (ISO 15981:2002)

Rivets aveugles à rupture de tige à corps ouvert, à tête bombée - AIA/AIA (ISO 15981:2002)

Offene Blindniete mit Sollbruchdorn und Flachkopf - AIA/AIA (ISO 15981:2002)

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Foreword

This document (EN ISO 15981:2002) has been prepared by Technical Committee ISO/TC 2 "Fasteners" in collaboration with Technical Committee CEN/TC 185 "Threaded and non-threaded mechanical fasteners and accessories", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2003, and conflicting national standards shall be withdrawn at the latest by May 2003.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 15981:2002 has been approved by CEN as EN ISO 15981:2002 without any modifications.

NOTE Normative references to International Standards are listed in Annex ZA (normative).

INTERNATIONAL
STANDARD

ISO
15981

First edition
2002-11-01

**Open end blind rivets with break pull
mandrel and protruding head — AIA/AIA**

Rivets aveugles à rupture de tige à corps ouvert, à tête bombée — AIA/AIA



Reference number
ISO 15981:2002(E)

Foreword

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The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15981 was prepared by Technical Committee ISO/TC 2, *Fasteners*.

Annex A of this International Standard is for information only.

Open end blind rivets with break pull mandrel and protruding head — AIA/AIA

1 Scope

This International Standard specifies dimensional and mechanical characteristics and application data for open end blind rivets with break pull mandrel and protruding head, with an aluminium alloy body (AIA) and an aluminium alloy mandrel (AIA) and with nominal diameters, d , from 2,4 mm up to and including 6,4 mm.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3269:2000, *Fasteners — Acceptance inspection*

ISO 14588:2000, *Blind rivets — Terminology and definitions*

ISO 14589:2000, *Blind rivets — Mechanical testing*

3 Dimensions

3.1 General

Symbols and designations of dimensions are specified in ISO 14588.

3.2 Rivet dimensions

See Figure 1 and Table 1.

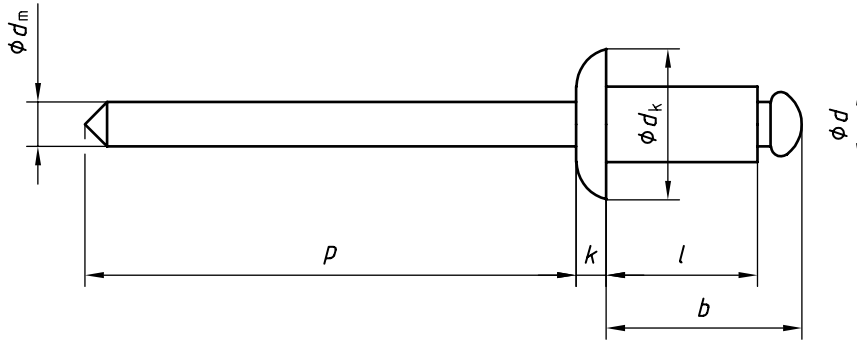


Figure 1 — Rivet dimensions

Table 1 — Rivet dimensions

Dimensions in millimetres

		Dimensions in millimetres					
		nom.	2,4	3,2	4	4,8	6,4
Rivet body	d	max.	2,48	3,28	4,08	4,88	6,48
		min.	2,25	3,05	3,85	4,65	6,25
	d_k	max.	5,0	6,7	8,4	10,1	13,4
		min.	4,2	5,8	6,9	8,3	11,6
	k	max.	1	1,3	1,7	2	2,7
Mandrel	d_m	max.	1,6	2,1	2,55	3,05	4
	p	min.	25	25	25	27	27
Blind length	b	max.	$l_{max} + 3$	$l_{max} + 3$	$l_{max} + 3,5$	$l_{max} + 4$	$l_{max} + 5,5$
Rivet length		Recommended grip ranges ^a					
l							
nom. = min.		max.					
5	6	—	0,5 to 1,5	—	—	—	
6	7	0,5 to 3,0	1,5 to 3,5	1 to 3	1,5 to 2,5	—	
8	9	—	3,5 to 5,0	3 to 5	2,5 to 4,0	—	
9	10	3 to 6	—	—	—	—	
10	11	—	5 to 7	5,0 to 6,5	4 to 6	—	
12	13	6 to 9	7 to 9	6,5 to 8,5	6 to 8	3 to 6	
16	17	—	9 to 13	8,5 to 12,5	8 to 12	6 to 10	
20	21	—	13 to 17	12,5 to 16,5	12 to 15	10 to 14	
25	26	—	17 to 22	16,5 to 21,0	15 to 20	14 to 18	
30	31	—	—	—	20 to 25	18 to 23	

NOTE The rivet body dimensions are generated from the design formulae specified in annex A.

^a The grip ranges of rivets with dimensions as given in Table 1, with the material combination as given in clause 4 are specified by the minimum and maximum grip lengths. The minimum grip lengths are given as a recommendation only. It may be possible to go into individual cases below the minimum values.

3.3 Clearance hole diameters

The diameters of the clearance holes, d_{h1} , to accommodate the rivet in the components to be fastened are given in Table 2.

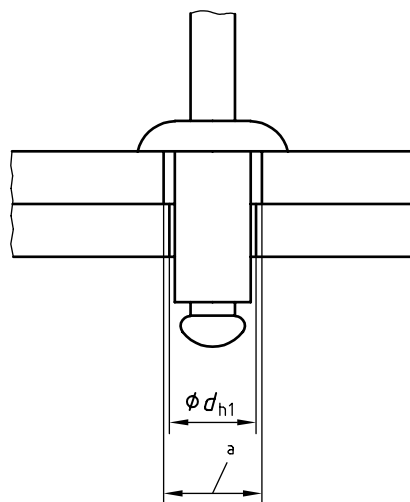
Table 2 — Clearance hole diameters

Dimensions in millimetres

d nom.	d_{h1}	
	min.	max.
2,4	2,5	2,6
3,2	3,3	3,4
4,0	4,1	4,2
4,8	4,9	5,0
6,4	6,5	6,6

Non-conformance to the values listed in Table 2 may result in assembly difficulties and/or reduction in the shear and tensile loads specified in Table 3.

When necessary, to facilitate alignment, only the component on the access side may have a clearance hole larger than specified in Table 2 (see Figure 2). This may also result in a reduction of the shear and tensile loads specified in Table 3.



^a Enlarged clearance hole

Figure 2 — Enlarged clearance hole to facilitate alignment

4 Material and finish

Blind rivets in accordance with this International Standard shall have a rivet body made of aluminium alloy (AIA) and a mandrel made of aluminium alloy (AIA) and shall have mechanical properties as specified in clause 5.

Material specification is at the discretion of the manufacturer.

The surface of rivet body and mandrel shall be plain, i.e. in natural finish.

5 Mechanical properties

The minimum shear load, minimum tensile load and maximum mandrel break load shall be as specified in Table 3 when tested in accordance with ISO 14589.

Table 3 — Mechanical properties

<i>d</i> nom. mm	Shear load min. N	Tensile load min. N	Mandrel break load max. N
2,4	250	350	1 100
3,2	500	670	1 800
4	850	1 020	2 700
4,8	1 160	1 420	3 700
6,4	2 050	2 490	6 300

6 Mandrel push-out resistance

The load to push out the mandrel shall exceed 10 N when tested in accordance with ISO 14589.

7 Mandrel head retention capability

The portion of the mandrel remaining in the set rivet shall not be ejected by the application of the head retention test load specified in Table 4 when tested in accordance with ISO 14589.

Table 4 — Mandrel head retention test loads

<i>d</i> nom. mm	Head retention test load N
2,4	10
3,2	15
4	20
4,8	25
6,4	50

8 Workmanship

Rivets shall be free from burrs and harmful defects and shall have well-formed heads and shanks.

After setting, rivets shall not show evidence of cracking when viewed at 5 × magnification.

9 Acceptance testing

If there is no other agreement, acceptance inspection in accordance with ISO 3269 applies.

10 Designation

EXAMPLE A open end blind rivet, with break pull mandrel and protruding head, with nominal diameter $d = 4$ mm and nominal length $l = 12$ mm with an aluminium body (AIA) and an aluminium alloy mandrel (AIA) is designated as follows:

Blind rivet ISO 15981 - 4 × 12 - AIA/AIA

Annex A (informative)

Design formulae

A.1 General

Blind rivets in accordance with this International Standard comply with the following design formulae and tolerances.

A.2 Shank diameter

The maximum shank diameter complies with the formula:

$$d_{\max} = d_{\text{nom}} + 0,08 \text{ mm}$$

The minimum shank diameter complies with the formula:

$$d_{\min} = d_{\text{nom}} - 0,15 \text{ mm}$$

A.3 Head diameter

The maximum head diameter complies with the formula:

$$d_{k \max} = 2,1 d_{\text{nom}}$$

rounded to one decimal place.

A.4 Head diameter tolerance

The head diameter tolerance is h16 for $d_{\text{nom}} \leq 3,2 \text{ mm}$ and h17 for $d_{\text{nom}} > 3,2 \text{ mm}$.

A.5 Head height

The maximum head height complies with the formula:

$$k_{\max} = 0,415 d_{\text{nom}}$$

rounded to one decimal place.

A.6 Clearance hole diameter

The clearance hole diameter for blind rivet application complies with the formulae:

$$d_{h1 \max} = d_{\text{nom}} + 0,2 \text{ mm}$$

$$d_{h1 \min} = d_{\text{nom}} + 0,1 \text{ mm}$$

Annex ZA
(normative)

**Normative references to international publications
with their relevant European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE Where an International Publication has been modified by common modifications, indicated by (mod.), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN</u>	<u>Year</u>
ISO 3269	2000	Fasteners - Acceptance inspection	EN ISO 3269	2000
ISO 14588	2000	Blind rivets - Terminology and definitions	EN ISO 14588	2000
ISO 14589	2000	Blind rivets - Mechanical testing	EN ISO 14589	2000

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