

Blind rivets with break mandrel —

Part 2: Specification for open end blind rivets

Committees responsible for this British Standard

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- British Friction Materials Council
- British Industrial Fasteners Federation
- British Railways Board
- British Steel Industry
- British Steel Industry (Wire Section)
- Institution of Structural Engineers
- Ministry of Defence
- National Association of Fastener Stockholders
- Society of Motor Manufacturers and Traders Limited

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Foreword

This Part of BS 7349 has been prepared under the direction of the General Mechanical Engineering Standards Policy Committee, to provide a series of metric break mandrel open end blind rivets for general engineering purposes.

BS 7349 is published in two Parts:

- *Part 1: Specification for closed end blind rivets;*
- *Part 2: Specification for open end blind rivets.*

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Part of BS 7349 specifies the dimensions, materials and performance requirements for break mandrel open end blind rivets with nominal diameters from 2.4 mm up to and including 6.4 mm and with protruding and countersunk head styles.

Annex A describes the methods of test to determine the shear and tensile strengths.

Annex B and Annex C contain recommendations for the selection and application of blind rivets.

2 Normative references

This Part of BS 7349 incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on the inside back cover. Subsequent amendments to, or revisions of, any of these publications apply to this Part of BS 7349 only when incorporated in it by updating or revision.

3 Definitions

For the purposes of this Part of BS 7349 the following definitions apply.

3.1

blind rivet with break mandrel

a mechanical fastener capable of joining workpieces together from one side of the assembly only

NOTE The break mandrel which is pre-assembled to the rivet body, when gripped and pulled by a setting tool causes an expansion of the body on the blind side of the workpieces to be joined. It incorporates a predetermined break point which dependent upon design, permits the hollow rivet body, after setting, to be partly filled or to remain hollow. The rivet sub-types in these cases are known respectively as semi-filled core and hollow core.

3.2

open end blind rivet

a blind rivet having a hole completely through the full length of the rivet body

3.3

semi-filled core

during rivet setting, the mandrel breaks within the rivet body so that a short length of the mandrel is retained within the rivet body

3.4

hollow core

after rivet setting the bore of the rivet body is completely empty

3.5

break stem mandrel

a mandrel which on setting a rivet, breaks in such a way that the head of the mandrel and a small portion of the length remains within the set rivet body

NOTE See also 3.3, semi-filled core type.

3.6

break head mandrel

a mandrel which on setting a rivet, breaks in such a way that the head of the mandrel falls from the assembly leaving the set rivet body free from obstruction

NOTE See also 3.4, hollow core type.

3.7

rivet length

the distance measured parallel to the axis of the rivet, from the largest diameter of the bearing surface of the head to the extreme end of the mandrel head

3.8

blind side clearance

the minimum distance measured normal to the surface of the work piece material most remote from the head of the rivet to the extreme head of the mandrel which is required to permit rivets to be located and properly set (see l_a in Annex B)

3.9

grip range

the maximum and minimum total thickness of workpieces to be joined by a particular type and length of blind rivet

3.10

tensile load

the load which the rivet is capable of withstanding prior to failure when measured under test conditions

3.11

shear load

the load which the rivet is capable of withstanding prior to failure when measured under test conditions

3.12

mandrel retention

the ability for break stem mandrel rivets to retain within the rivet body the entrapped length of mandrel after setting

3.13

hole size

the diameter of the hole in the workpieces to be joined (see Annex C)

3.14

hole filling

the ability of a blind rivet body to be expanded radially to fill the workpiece holes during setting

3.15

setting

the operation of inserting the rivet into the workpiece and causing its actuation so that an assembly is made

3.16**setting tool**

a specialized piece of equipment used to set blind rivets which may be powered manually, pneumatically, hydraulically, electrically, or by a combination of power sources and may be portable or in fixed positions

4 Materials

Rivet bodies and mandrels shall be manufactured from the materials listed in Table 1. The materials shall be identified by the designation of the appropriate combination of rivet body/mandrel material required (see clause 9).

5 Dimensions**5.1 Open end blind rivets**

The dimensions of open end blind rivets shall be as given in Table 2 and Figure 1.

5.2 Mandrel diameter

The mandrel diameters shall be as given in Table 3 and Figure 1.

6 Finish**6.1 Rivet bodies**

Aluminium and aluminium alloy bodies shall be self finish with material designations 00, 10, 11, 12, 14, 14A, 15, 16, 17, 18, 18A, 19 and 19A. Copper bodies with material designations 20 and 22 shall be self finish. Carbon steel bodies, with material designation 30, shall be zinc electroplated with a nominal thickness of 5 μm , with a yellow chromate conversion coating.

Nickel copper bodies, with material designations of 40 and 42, shall be zinc electroplated with a nominal thickness of 3.0 μm , with a yellow chromate conversion coating.

Stainless steel bodies with material designations 50 and 51 shall be self finish.

NOTE If finishes other than those specified above are required then they should be agreed between the purchaser and manufacturer.

6.2 Mandrels

Steel mandrels for break stem rivets shall have either a phosphate coat and oil or a zinc coating. Steel mandrels for break head rivets shall be self finish. Mandrels in aluminium alloy, bronze and stainless steel shall be self finish.

7 Performance**7.1 Shear and tensile loads**

Rivets shall have shear and tensile loads not less than those values given in Table 4, when tested in accordance with Annex A.

7.2 Mandrel break loads

While setting the rivet, the axially applied load necessary to break the mandrel shall be within the limits specified in Table 5.

7.3 Break stem mandrel retention after setting

The entrapped part of the mandrel shall withstand an axial load of 10 N without ejection.

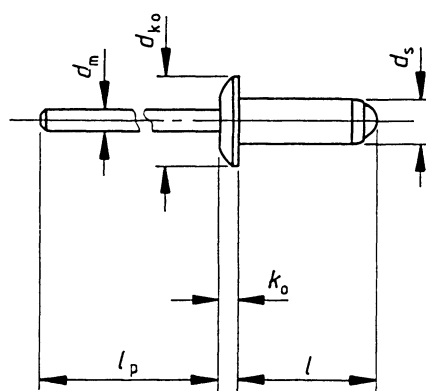
Table 1 — Rivet body/mandrel material combinations

Body material	Mandrel material	Material designation
Aluminium commercially pure	Aluminium alloy	00
Aluminium Al MgSi, grade 6101A	Steel	12
Aluminium 2.5 % Mg, grade 5052	Aluminium alloy	11
Aluminium 2.5 % Mg, grade 5052	Stainless steel	14
Aluminium 2.0 % Mg BS 1475:1972, grade 5251	Stainless steel	14A
Aluminium 2.5 % Mg, grade 5052	Steel	18
Aluminium 2.0 % Mg BS 1475:1972, grade 5251	Steel	18A
Aluminium 3.0 % Mg, grade 5754	Steel	10
Aluminium 3.5 % Mg BS 1473:1972, grade 5154A	Stainless steel	16
Aluminium 3.5 % Mg BS 1473:1972, grade 5154A	Steel	17
Aluminium 5.0 % Mg BS 1473:1972, grade 5056A	Stainless steel	15
Aluminium 5.0 % Mg BS 1473:1972, grade 5056A	Steel	19
Aluminium 5.0 % Mg BS3 L58:1971	Steel	19A
Copper BS 2873:1969, grade C101	Steel	20
Copper BS 2873:1969, grade C101	Bronze	22
Steel, carbon 0.25 % max.	Steel	30
Nickel copper alloy BS 3075:1976, grade NA13	Steel	40
Nickel copper alloy BS 3073:1976, grade NA13	Stainless steel	42
Stainless steel, 300 series	Steel	50
Stainless steel, 300 series	Stainless steel	51

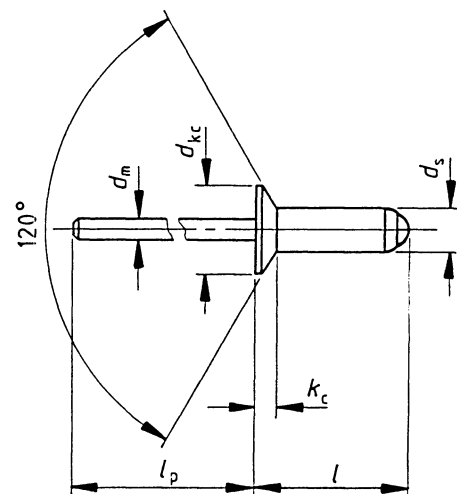
Table 2 — Dimensions of open end blind rivets

Dimensions in millimetres

Nominal rivet body diameter	Actual rivet body diameter		Rivet head configuration						Mandrel protrusion
			Protruding			Countersunk			
	d_s		d_{k0}		k_o	d_{kc}		k_c	l_p
	max.	min.	max.	min.	max.	max.	min.	max.	min.
2.4	2.44	2.29	5.03	4.50	0.81	4.90	4.09	0.95	25.0
3.0	3.08	2.90	6.6	5.80	1.00	6.0	5.60	0.90	25.0
3.2	3.27	3.05	7.55	6.05	1.20	6.55	5.20	1.20	25.0
4.0	4.10	3.80	8.44	7.52	1.32	8.15	6.15	1.55	27.0
4.8	4.85	4.65	10.10	9.00	1.88	9.80	8.43	1.95	27.0
5.0	5.05	4.85	10.20	9.00	1.90	9.80	8.50	1.20	27.0
6.0	6.08	5.85	12.00	10.50	1.90	11.00	10.30	1.50	31.0
6.4	6.50	6.20	13.33	12.07	2.20	11.20	10.55	1.80	31.0



a) Protruding head type



b) Countersunk head type

NOTE 1 For mandrel diameter, d_m , see Table 3.NOTE 2 For rivet length l of protruding head type, see Table B.1 to Table B.6, inclusive.NOTE 3 For rivet length l of countersunk head type, see Table B.7 to Table B.8 inclusive.

Figure 1 — Dimensions of open end blind rivets