BRITISH STANDARD

BS EN 6069:2009

Aerospace series — Rivet, 100° reduced flush head, close tolerance — Inch series

ICS 49.030.60

National foreword

This British Standard is the UK implementation of EN 6069:2009.

The UK participation in its preparation was entrusted to Technical Committee ACE/12, Aerospace fasteners and fastening systems.

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

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English Version

Aerospace series - Rivet, 100° reduced flush head, close tolerance - Inch series

Série aérospatiale - Rivets de précision, 100° tête fraisée - Série en inches

Luft- und Raumfahrt - Vollniet, 100° Reduzierter Senkkopf, enge Toleranz - Zoll-Reihe

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Foreword

This document (EN 6069:2009) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

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1 Scope

This European Standard specifies the dimensions, tolerances and mass of rivets with 100° reduced flush head, close tolerance, inch series, for aerospace application.

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.

EN 2115, *Aerospace series — Aluminium alloy 2117-T42 — Wire for solid rivets — D ≤ 10 mm*

EN 2116, *Aerospace series — Aluminium alloy 2017A-T42 — Wire for solid rivets — D ≤ 10 mm*

EN 2117, *Aerospace series — Aluminium alloy AL-P5056A (5056A)-H32 — Wire for solid rivets — D ≤ 10 mm*

EN 2424:2008, *Aerospace series — Marking of aerospace products*

EN 2941, *Aerospace series — Nickel alloy rivets — Technical specification*

EN 3115, *Aerospace series — Aluminium alloy 7050- T73 — Wire for solid rivets — D ≤ 10mm*

EN 4372, *Aerospace series — Heat resisting nickel alloy with copper NI-PD9001 (NiCu31) — Wire for solid rivets — D ≤ 10 mm*

EN 6104, *Aerospace series — Rivets, solid, in aluminium or aluminium alloy — Inch series — Technical specification*[1)]

EN 6118, *Aerospace series — Process specification — Aluminium base protection for fasteners*[1)]

ISO 8080, *Aerospace — Anodic treatment of titanium and titanium alloys — Sulfuric acid process*

AMS 4982, *Titanium alloy wire 44.5 Cb*[2)]

MIL-DTL-5541, *Military specification, Chemical conversion coatings on aluminium and aluminium alloys*[3)]

MIL-A-8625, *Military specification, Anodic coatings for aluminium and aluminium alloys*[3)]

NASM5674, *Rivets, structural, aluminium alloy, titanium columbium alloy, general specification for*[4)]

NAS9800, *Head protrusion gaging, 100° flush head fasteners, gage block, gage diameters and stylus*[4)]

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1) Published as ASD-STAN Prestandard at the date of publication of this standard by Aerospace and Defence Industries Association of Europe-Standardization (ASD-STAN), (www.asd-stan.org).

2) Published by: Society of Automotive Engineers (SAE), (www.sae.org).

3) Published by: American Society for Testing and Materials (ASTM), (www.astm.org).

4) Published by: Aerospace Industries Association/ National Aerospace Standards (AIA/NAS), (www.aia.aerospace.org).

3 Requirements

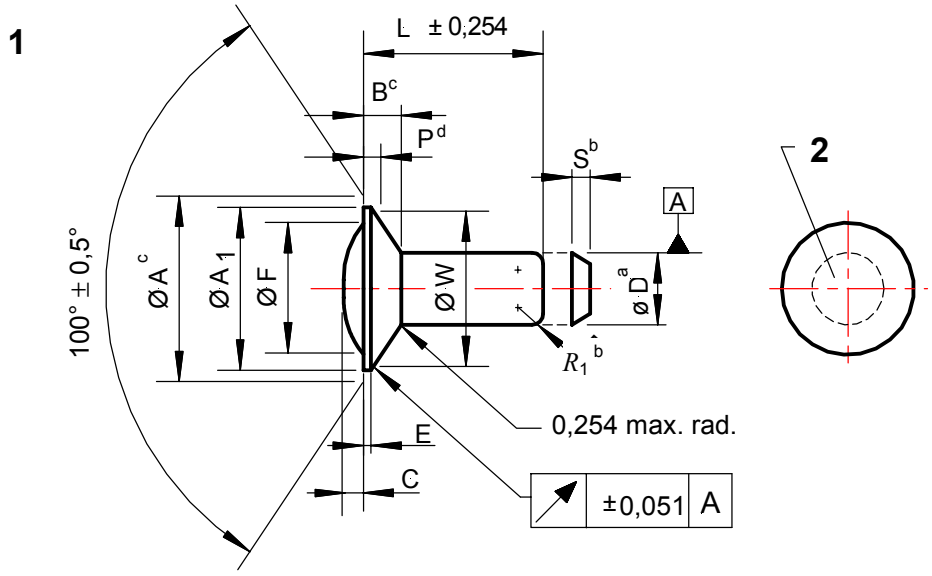
3.1 Configuration, dimensions, tolerances and mass

The configuration shall conform to Figure 1.

The dimensions, tolerances and mass shall conform to Figure 1 and Tables 1 and 3.

Dimensions and tolerances of oversizes (for repair purposes only) shall conform to Figure 1 and Tables 2 and 3.

Dimensions and tolerances are expressed in millimetres.



Key

1 Angular misalignment of rivet head to rivet shank axis 0,5° max.

2 Marking (see Clause 5).

[a] 0,025 mm shank diameter increase is permissible within 2,54 mm of the based of the head.

[b] Chamfered ends with radius to the R_1 dimensions or a 20° chamfer to dimension "S".

[c] Maximum head diameters are to theoretical sharp corners as measured by projection.

[d] Measurement method for inspection of head characteristics in accordance with NAS9800.

Figure 1 — Configuration

Table 1 — Dimensions and tolerances

Diameter code	D Nominal diameter	A		A_1	B	C	E	F	P		R_1	S	W	
	± 0,03	max.	min.	min.	Ref.	+ 0,05 0		± 0,13	max.	min.	± 0,25	± 0,25	max.	min.
3	2,38	3,709	3,623	3,263	0,54	0,08	0,08 to 0,15	2,31	0,291	0,248	0,74	0,58	3,028	3,023
4	3,18	4,923	4,835	4,475	0,71			3,53	0,336	0,291	0,99	0,79	4,135	4,130
5	3,97	6,226	6,141	5,781	0,93			4,83	0,457	0,412	1,24	0,99	5,151	5,146
6	4,76	7,635	7,543	7,183	1,19	0,10		5,15	0,610	0,559	1,50	1,19	6,200	6,195
7	5,56	8,880	8,790	8,430	1,38			7,00	0,670	0,612	1,75	1,37	7,310	7,305
8	6,36	10,014	9,907	9,547	1,51			8,15	0,677	0,618	1,98	1,57	8,420	8,415

Table 2 — Dimensions and tolerances for oversize rivets

Diameter code	D	A		A_1	B	C	E	F	P		R_1	S	W	
	± 0,03	max.	min.	min.	Ref.	+ 0,05 0		± 0,13	max.	min.	± 0,25	± 0,25	max.	min.
5X	4,37	6,630	6,540	6,18	0,93	0,08	0,08 to 0,15	5,10	0,628	0,578	1,24	0,99	5,151	5,146
6X	5,16	8,040	7,950	7,59	1,19	0,10		6,25	0,781	0,728	1,50	1,19	6,200	6,195
7X	5,96	9,280	9,190	8,83	1,38			7,25	0,836	0,782	1,75	1,37	7,310	7,305

Table 3 — Length code and mass

Length [a, b]		Diameter code					
		3	4	5	6	7	8
code	$L \pm 0{,}254$	Mass [c] kg/ 1 000 parts					
03	4,76	0,06	0,11	–	–	–	–
04	6,35	0,08	0,15	0,24	–	–	–
05	7,94	0,10	0,18	0,29	0,43	–	–
06	9,52	0,12	0,22	0,35	0,51	0,71	–
07	11,11	0,14	0,25	0,40	0,59	0,81	1,07
08	12,70	0,16	0,29	0,46	0,67	0,92	1,21
09	14,29	0,18	0,32	0,51	0,75	1,03	1,35
10	15,87	0,20	0,36	0,57	0,83	1,14	1,49
11	17,46	0,22	0,40	0,62	0,90	1,24	1,63
12	19,05	0,24	0,43	0,68	0,98	1,35	1,77
13	20,64	0,26	0,47	0,73	1,06	1,46	1,91
14	22,22	0,28	0,50	0,79	1,14	1,57	2,05
15	23,81	0,30	0,54	0,84	1,22	1,67	2,19
16	25,40	0,32	0,57	0,90	1,30	1,78	2,34
17	26,99	–	0,61	0,95	1,38	1,89	2,48
18	28,57	–	0,64	1,01	1,46	2,00	2,62
20	31,75	–	0,71	1,11	1,61	2,21	2,90
22	34,92	–	0,78	1,22	1,77	2,43	3,18
24	38,10	–	0,85	1,33	1,93	2,64	3,46
28	44,45	–	–	1,55	2,24	3,07	4,02
32	50,80	–	–	1,77	2,56	3,50	4,59
40	63,50	–	–	–	–	4,36	5,71

[a] Length missing in table can be created in 1/16 inch (1,59 mm) steps, e.g. length code 19 corresponds to: 19/16 inch (30,16 mm).

[b] 1/32 inch (0,79 mm) length increments may be obtained by adding code 5 after the last digit of part number, e.g. length code 06-5 corresponds to: 6/16 inch (9,53 mm) + 1/32 inch (0,79 mm) = 13/32 inch (10,32 mm).

[c] Mass based on aluminium alloy with a density of 2,79 kg/dm^3, refer to Table 4 for conversion factors.

3.2 Material and surface treatment

See Table 4.

Table 4 — Material code

Material code	Diameter code						Surface treatment (code see Clause 4)		Density kg/dm³	Multiplicator of mass (see Table 3)
	3	4	5 5X	6 6X	7 7X	8				
AD	Aluminium alloy 2117-T42 per EN 2115						Yellow chromated per MIL-DTL-5541, class 1A	Anodized per MIL-A-8625, type II, class 1, clear [a]	2,75	0,98
D	Aluminium alloy 2017A-T42 per EN 2116								2,79	1
B [a]	Aluminium alloy AL-P5056A (5056A)-H32 per EN 2117								2,64	0,95
KE	Aluminium alloy 7050-T73 per EN 3115								2,82	1,01
N	Heat resisting nickel alloy NI-PD9001 (NiCu31) per EN 4372, annealed						None		8,85	3,17
T	Titanium alloy 44.5 Cb, heat treat: annealed per AMS 4982						Anodized per ISO 8080		5,8	2,08
V							IVD per EN 6118			

[a] Not for new design.

4 Designation

EXAMPLE

Description block | **Identity block**

RIVET | **EN6069D6X06A5**

Number of this standard

Material code (see Table 4)

Diameter code (see Tables 1 and 2)

Length code in 1/16 inch* (see Table 3).
When the diameter code has no letter add between diameter code and length code a dash "-".

Surface treatment for Al alloy (see Table 4):
- No code indicates yellow chromate;
- Code "A" indicates anodized (not for new design).

Additional length code (see Table 3)
(1/16 of an inch plus 1/32 inch)*.
When surface treatment has no letter code add between length code and additional length code a dash "-".

* For supplying purpose only, see footnotes [a] and [b] in Table 3.

5 Marking

5.1 Material identification

Symbol on head, see Figure 2.

Dimensions in millimetres

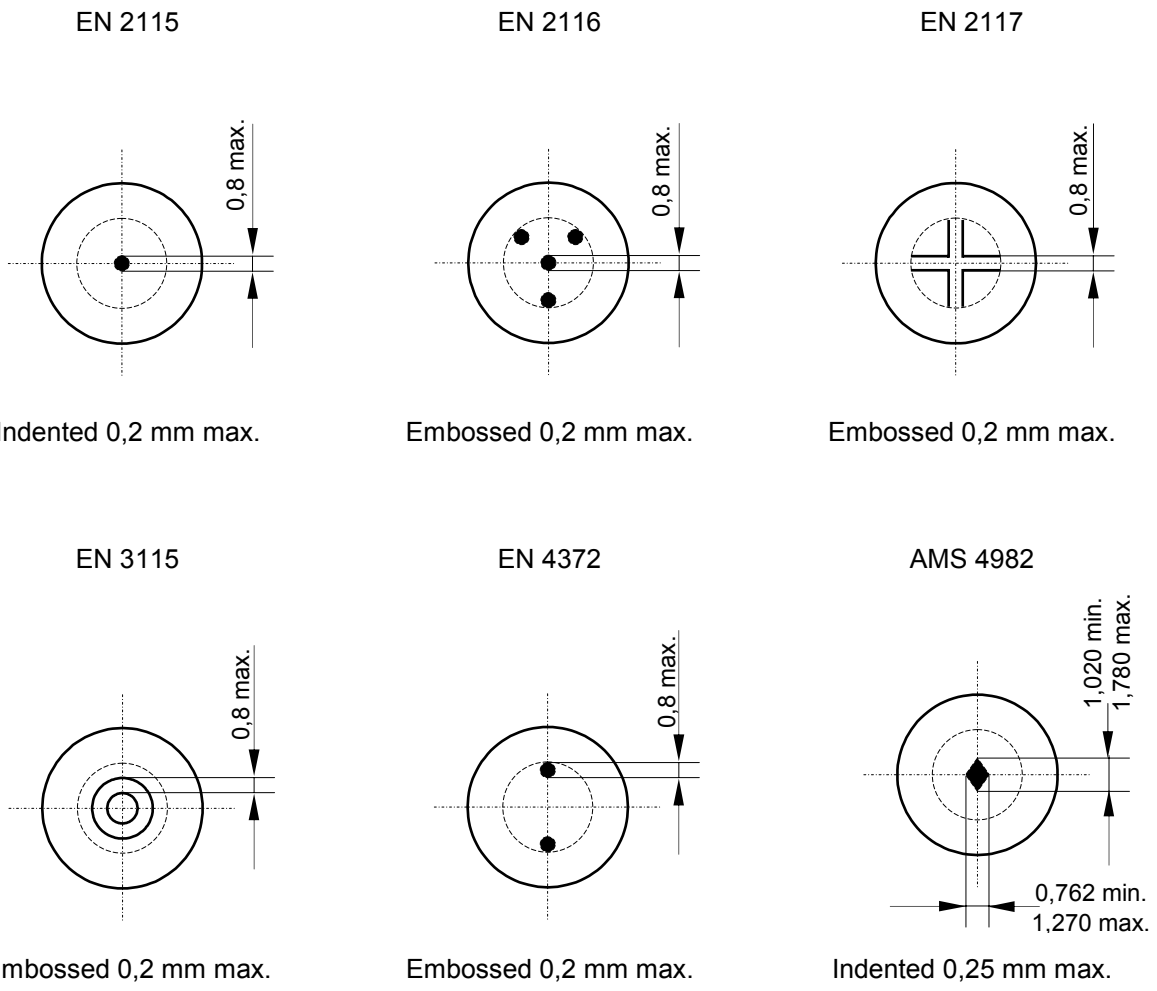


Figure 2 — Material identification

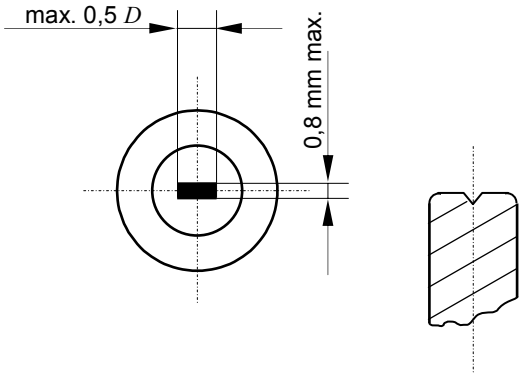
5.2 Manufacturers identification

EN 2424:2008, style F to be embossed or indented on rivet head.

Manufacturer's identification is required on rivet heads for diameter code 4 and larger.

5.3 Identification of oversize rivets

Symbol on rivet shank end, see Figure 3.



Triangular shape indented 0,2 mm max.

Figure 3 — Identification of oversize rivets (the criteria being legibility)

6 Technical specification

6.1 Aluminium alloy rivets

Aluminium alloy rivets shall conform with the requirements of EN 6104.

6.2 Heat resting nickel alloy NI-PD9001 (NiCu31) rivets

NI-PD9001 (NiCu31) rivets shall conform with the requirements of EN 2941.

Shear strength R_c = 340 MPa to 407 MPa.

NOTE Rivets manufactured prior to 1 August 2005 with a maximum shear strength of 450 MPa may be procured and used until stocks are depleted.

6.3 Titanium alloy rivets

Titanium alloy 44.5 Cb rivets shall conform with the requirements of NASM5674 except for the finish as stated.

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