

BS EN 6080:2016



BSI Standards Publication

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

National foreword

This British Standard is the UK implementation of EN 6080:2016.

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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2016.
Published by BSI Standards Limited 2016

ISBN 978 0 580 92079 0

ICS 49.030.60

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 September 2016.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

EUROPEAN STANDARD

EN 6080

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2016

ICS 49.030.60

English Version

Aerospace series - Rivet, 100° normal flush head, close tolerance - Inch seriesSérie aérospatiale - Rivets de précision, 100° tête
fraisée normale - Série en inchesLuft- und Raumfahrt - Vollniet, 100° Normaler
Senkkopf, enge Toleranz - Zoll-Reihe

This European Standard was approved by CEN on 2 January 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

Contents		Page
European foreword		3
1	Scope	4
2	Normative references	4
3	Requirements	5
3.1	Configuration, dimensions, tolerances and masses	5
3.2	Material and surface treatment	5
4	Designation	8
5	Marking	8
5.1	Material identification	8
5.2	Manufacturer`s identification	9
6	Technical specification	10
6.1	Aluminium alloy rivet	10
6.2	Heat resisting alloy NI-PD9001 (NiCu31) rivets	10
6.3	Titanium alloy rivet	10

European foreword

This document (EN 6080:2016) 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 European 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.

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 March 2017, and conflicting national standards shall be withdrawn at the latest by March 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 — $D \leq 10$ mm* ¹⁾

EN 2116, *Aerospace series — Aluminium alloy 2017A-T42 — Wire for solid rivets — $D \leq 10$ mm* ²⁾

EN 2117, *Aerospace series — Aluminium alloy AL-P5056A (5056A)-H32 — Wire for solid rivets — $D \leq 10$ mm* ²⁾

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

EN 2941, *Aerospace series — Nickel alloy rivets — Technical specification* ³⁾

EN 3115, *Aerospace series — Aluminium alloy 7050-T73 — Wire for solid rivets — $D \leq 10$ mm* ³⁾

EN 4372, *Aerospace series — Heat resisting nickel alloy with copper NI-PD9001 (NiCu31) — Wire for solid rivets — $D \leq 10$ mm* ³⁾

EN 6101, *Aerospace series — Rivet, 100° medium flush head, close tolerance — Inch series* ³⁾

EN 6104, *Aerospace series — Rivets, solid, in aluminium or aluminium alloy — Inch series — Technical specification* ³⁾

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*

SAE AMS 4982, *Titanium alloy wire 44.5 Cb* ⁴⁾

MIL-A-8625, *Anodic coatings for aluminum and aluminum alloys* ⁵⁾

MIL-C-5541, *Chemical conversion coatings on aluminium and aluminium alloys* ⁵⁾

NAS 527, *Inspection procedure for flush fasteners* ⁶⁾

NASM 5674, *Rivets, structural, aluminium alloy, titanium columbium alloy, general specification for* ⁶⁾

¹⁾ In preparation at the date of publication of this European Standard.

²⁾ Published as ASD-STAN standard at the date of publication of this European Standard.

³⁾ Published as ASD-STAN Prestandard at the date of publication of this European Standard.

⁴⁾ Published by: Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001.

⁵⁾ Published by: Department of Defense (DoD), the Pentagon, Washington, D.C. 20301.

⁶⁾ Published by: Aerospace Industries Association of America, Inc. (AIA), 1250 Eye Street, N.W., Washington, D.C. 20005-3924, USA

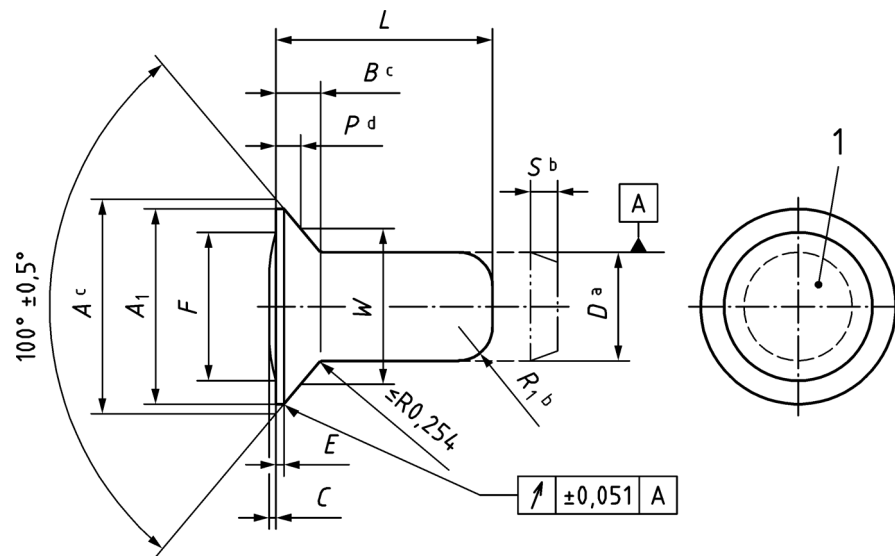
3 Requirements

3.1 Configuration, dimensions, tolerances and masses

The configuration shall conform with Figure 1.

The dimensions, tolerances and masses shall conform with Figure 1 and Tables 1, 2 and 3.

Dimensions and tolerances are expressed in millimetres.



Key

- 1 marking (see Clause 5)
- a 0,025 mm increase of shank diameter is permissible within 2,54 mm of the base of the head.
- b Chamfered ends with radius R_1 dimensions or a 20° chamfer to dimensions S .
- c Maximum head diameters are to theoretical sharp corners as measured by projection.
- d Head protrusion shall be tested in accordance with NAS 527.

Figure 1 — Configuration

3.2 Material and surface treatment

See Table 4.

Table 1 — Dimensions and tolerances

Diameter code	D	A		A ₁	B	C	E	F	P		R ₁	S	W	
	+0,03 -0,03	max.	min.	min.	Ref.	+0,05 0		±0,13	max.	min.	±0,25	±0,25	max.	min.
2	Use rivets according to EN 6101													
3														
4														
5	3,97	7,25	7,15	6,79	1,35	0,08	0,08 to 0,15	5,29	0,706	0,650	1,24	0,99	5,588	5,583
6	4,76	8,95	8,85	8,49	1,74	0,10		6,55	0,899	0,839	1,50	1,19	6,833	6,827
7	5,56	10,55	10,45	10,09	2,07			7,73	1,068	1,005	1,75	1,37	8,033	8,027
8	6,36	12,10	12,00	11,64	2,39			8,88	1,227	1,161	1,98	1,57	9,208	9,202
10	7,93	14,35	14,25	13,89	2,67			10,54	1,371	1,302	2,49	1,98	11,119	11,111
12	9,53	17,65	17,55	17,19	3,39			13,05	1,682	1,608	2,97	2,39	13,684	13,676

Table 2 — Length code and masses

Length ^{a,b}		Diameter code								
		2	3	4	5 ^c	6	7	8	10	12
code	L ± 0,254	Mass ^d kg/ 1 000 parts								
03	4,76	Use rivets according to EN 6101	-	-	-	-	-	-	-	-
04	6,35		-	-	-	-	-	-	-	-
05	7,94		0,32	0,47	-	-	-	-	-	-
06	9,53		0,37	0,55	0,77	-	-	-	-	-
07	11,11		0,43	0,63	0,88	1,17	-	-	-	-
08	12,70		0,49	0,71	0,99	1,32	-	-	-	-
09	14,29		0,54	0,79	1,10	1,46	2,31	-	-	-
10	15,88		0,60	0,87	1,21	1,60	2,53	3,82	-	-
12	19,05		0,71	1,03	1,42	1,88	2,98	4,46	-	-
14	22,23		0,82	1,19	1,64	2,17	3,42	5,10	-	-
16	25,40		0,93	1,35	1,86	2,45	3,86	5,74	-	-
18	28,58		1,04	1,51	2,08	2,74	4,30	6,38	-	-
20	31,75		1,15	1,67	2,29	3,02	4,74	7,02	-	-
22	34,93		1,26	1,83	2,51	3,30	5,18	7,66	-	-
24	38,10		1,38	1,99	2,73	3,59	5,62	8,30	-	-
28	44,45		1,60	2,31	3,16	4,16	6,50	9,58	-	-
32	50,80		1,82	2,63	3,60	4,72	7,38	10,86	-	-
40	63,50		-	-	4,47	5,86	9,16	13,42	-	-
48	76,20	-	-	-	7,00	10,91	15,98	-	-	

^a Intermediate lengths can be created, e.g. 11/16 inch (11,2 mm) corresponds to length code 11.
^b Additional 0,8 mm (1/32 inch) length increments may be obtained by adding code 5 after last digit of part number.
^c Valid also for 5X
^d Mass based on aluminium alloy with a density of 2,79 kg/dm³, refer to Table 3 for conversion factors.

Table 3 — Oversize

Diameter code ^a	D Nominal diameter +0,03 -0,03	A		A ₁	B	C	E	F	P		R ₁	S	W	
		max.	min.	min.	Ref.	+0,05 0	Ref.	±0,13	max.	min.	±0,25	±0,25	max.	min.
5X	4,37	7,25	7,15	6,79	1,19	0,8	0,08 to 0,15	5,29	0,706	0,650	1,24	0,99	5,588	5,583

^a (.015625 inch oversize shank 0,396 mm)

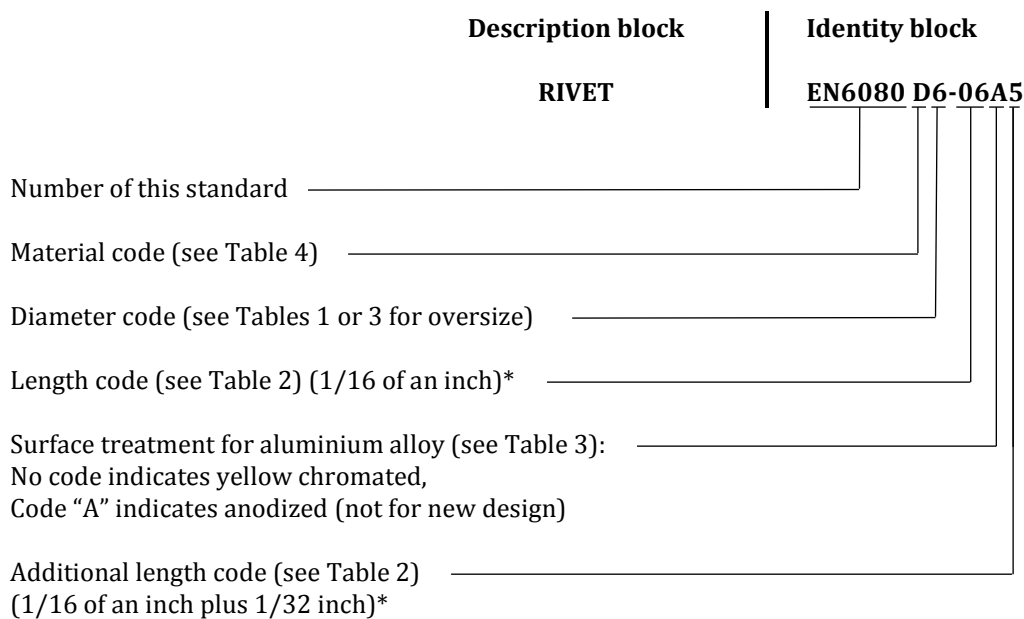
Table 4 — Material code

Diameter code										Surface treatment (Code see Clause 4)	Density kg/dm ³	Multiplier of mass (see Table 2)	Material code
2	3	4	5	6	7	8	10	12	Material				
Use rivets according to EN 6101	Aluminium alloy 2117-T4 per EN 2115			-			Yellow chromated per MIL-C-5541, class 1A	Anodized per MIL-A-8625, type II, class 1, clear ^a	2,75	0,98	AD		
	Aluminium alloy 2017A-H13 per EN 2116								2,79	1	D		
	Aluminium alloy 5056A-H32 per EN 2117								2,64	0,95	B ^a		
	Aluminium alloy AL-P7050 per EN 3115								2,82	1,01	KE		
	Heat resisting alloy NI-PD9001 (NiCu31) per EN 4372, annealed at T ≥ 860 °C, for ≥ 10 min / air						none		8,85	3,17	N		
	Titanium alloy 44.5 Cb heat treat: annealed per AMS 4982			-			anodized per ISO 8080		5,8	2,08	T		
						IVD per EN 6118		V					

^a Not for new design.

4 Designation

EXAMPLE



* For supplying purpose only, see footnotes ^a and ^b in Table 2.

NOTE If necessary, the code I9005 shall be placed between the description block and the identity block.

5 Marking

5.1 Material identification

Symbol on rivet head, see Figure 2.

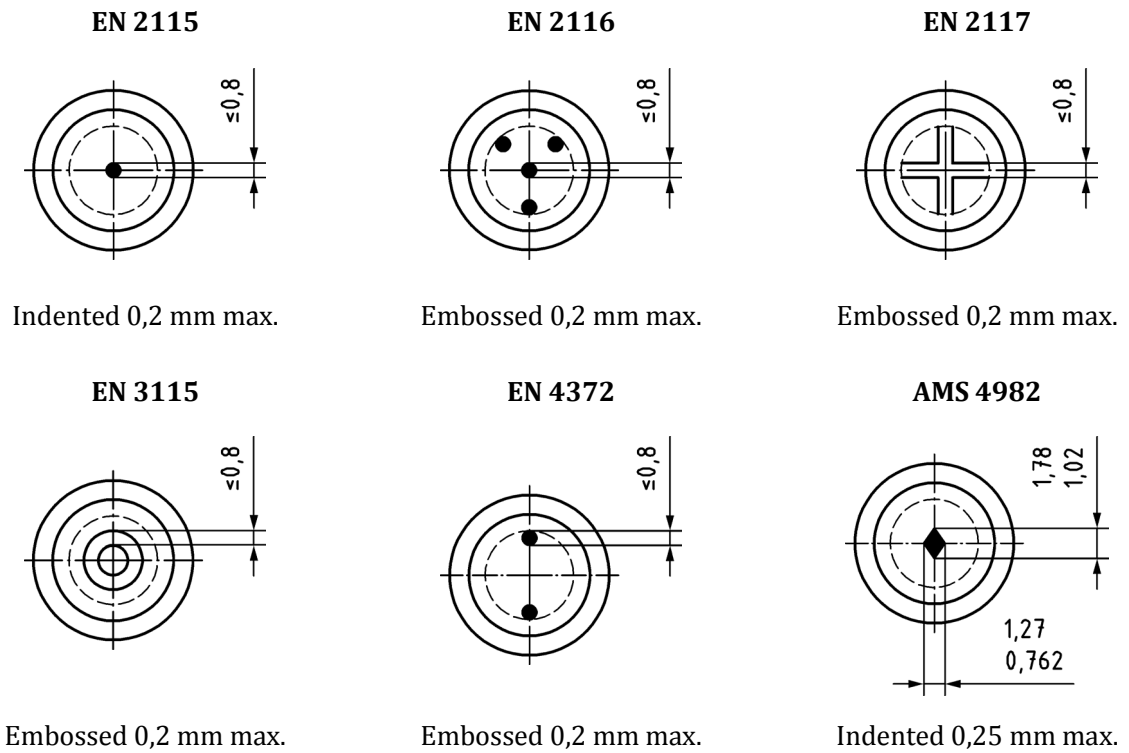
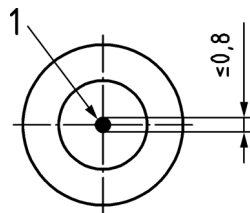


Figure 2 — Material identification

Symbol on rivet end shank end, see Figure 3.



Key

- 1 dimple (0,2 mm max.) on shank end for oversize rivets

Figure 3 — Repair diameter identification

5.2 Manufacturer`s identification

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

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

6 Technical specification

6.1 Aluminium alloy rivet

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

6.2 Heat resisting alloy NI-PD9001 (NiCu31) rivets

NiCu31 (Monel 400) rivets shall conform with the requirements of EN 2941.

Shear strength Rc: 340 MPa to 450 MPa.

6.3 Titanium alloy rivet

Titanium alloy 44.5 Cb rivets shall conform with the requirements of NASM 5674 except for the finish as stated.

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit, or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than 1 device provided that it is accessible by the sole named user only and that only 1 copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.

Standards purchased in hard copy format:

- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than 1 copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright & Licensing team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email subscriptions@bsigroup.com.

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Useful Contacts

Customer Services

Tel: +44 345 086 9001

Email (orders): orders@bsigroup.com

Email (enquiries): cservices@bsigroup.com

Subscriptions

Tel: +44 345 086 9001

Email: subscriptions@bsigroup.com

Knowledge Centre

Tel: +44 20 8996 7004

Email: knowledgecentre@bsigroup.com

Copyright & Licensing

Tel: +44 20 8996 7070

Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK