2SP 157-163 : November : 1973

(Superseding British Standard SP 157-163)

UDC 629.7.02 : 621.884.2 : 669.245'3 + 629.7.02 : 621.884.2 : 669.715

British Standard : Aerospace Series
Specification for

Solid rivets with universal head made from BS L 86 (SP 157 and 163), BS L 58 (SP 160 and 161), BS L 37 (SP 162) and DTD 204 (SP 158 and 159) materials

Index form of title: Rivets, solid, universal head, from L 86, L 58, L 37 and DTD 204 materials.

This British Standard, having been approved by the Aerospace Industry Standards Committee, was published under the authority of the Executive Board on 30 November, 1973

ISBN: 0 580 07607 5

Contract requirements
Attention is drawn to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

Revision of British Standards
British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. **It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.**

The following BSI references relate to the work on this standard:
Committee references ACE/14 Draft for approval 72/35870.

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Rivets, solid, universal head, L 86, L 58, L 37, and DTD 204

2SP 157-163 : 1973

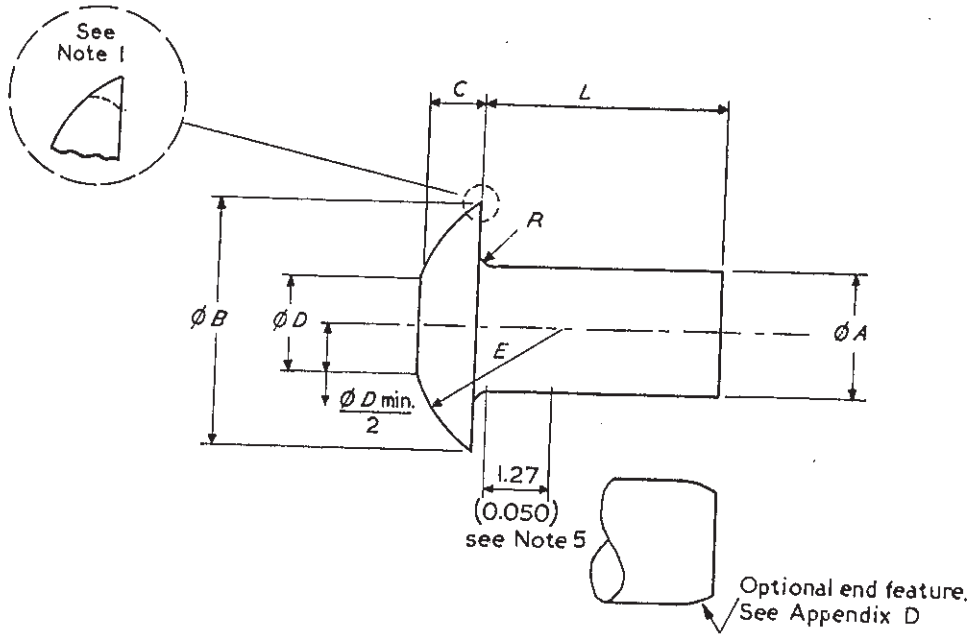


Fig. 1. Details of rivets

Table 1. Dimensions

Size dash no.			-24	-32	-40	-48	-56	-64	-80	-96
Nominal diameter			2.4 (0.094)	3.2 (0.126)	4.0 (0.157)	4.8 (0.189)	5.6 (0.220)	6.4 (0.250)	8.0 (0.315)	9.6 (0.378)
⌀A		max.	2.46 (0.097)	3.25 (0.128)	4.04 (0.159)	4.83 (0.190)	5.63 (0.222)	6.43 (0.253)	8.00 (0.315)	9.60 (0.378)
		min.	2.36 (0.093)	3.15 (0.124)	3.94 (0.155)	4.73 (0.186)	5.53 (0.218)	6.33 (0.249)	7.90 (0.311)	9.50 (0.374)
⌀B	to theoretical sharp corners		5.0 (0.197)	6.7 (0.264)	8.3 (0.327)	10.0 (0.394)	11.7 (0.461)	13.3 (0.524)	16.7 (0.657)	20.0 (0.787)
	absolute minimum		4.5 (0.177)	6.0 (0.236)	7.5 (0.295)	9.0 (0.354)	10.5 (0.413)	12.1 (0.476)	15.1 (0.594)	18.1 (0.713)
⌀D	¾× ⌀A minimum		1.80 (0.071)	2.40 (0.094)	3.00 (0.118)	3.60 (0.142)	4.20 (0.165)	4.80 (0.189)	6.00 (0.236)	7.20 (0.283)
C +0.25 (0.010) −0			1.05 (0.041)	1.40 (0.055)	1.70 (0.067)	2.05 (0.081)	2.40 (0.094)	2.75 (0.108)	3.40 (0.134)	4.10 (0.161)
E radius		nom.	2.9 (0.114)	4.0 (0.157)	4.9 (0.193)	6.0 (0.236)	7.1 (0.280)	8.0 (0.315)	10.2 (0.402)	12.3 (0.484)
R radius		max.	0.25 (0.010)	0.25 (0.010)	0.38 (0.015)	0.38 (0.015)	0.38 (0.015)	0.38 (0.015)	0.38 (0.015)	0.38 (0.015)
		min.	0.10 (0.004)	0.10 (0.004)	0.20 (0.008)	0.20 (0.008)	0.20 (0.008)	0.20 (0.008)	0.20 (0.008)	0.20 (0.008)

Rivets, solid, universal head, L 86, L 58, L 37, and DTD 204

2SP 157-163 : 1973

Table 1A. Length dimensions

Length dash no.		L +0.5 (0.020) −0	Size dash no.	-24	-32	-40	-48	-56	-64	-80	-96
	-04		4 (0.157)								
	-06		6 (0.236)								
	-08		8 (0.315)								
	-10		10 (0.394)								
	-12		12 (0.472)								
	-14		14 (0.551)								
	-16		16 (0.630)	⊠							
	-18		18 (0.709)								
	-20		20 (0.787)		⊠						
	-22		22 (0.866)								
	-24		24 (0.945)								
	-26		26 (1.024)			⊠					
	-28		28 (1.102)				⊠				
	-30		30 (1.181)								
	-32		32 (1.260)					⊠	⊠		
	-35		35 (1.378)							⊠	⊠
	-40		40 (1.575)								
	-45		45 (1.772)								
	-50		50 (1.969)								
	-55		55 (2.165)								
	-60		60 (2.362)								

LENGTH RANGE

Maximum available length of rivets with radiused tails is indicated thus ⊠ in each size column. See Note 11.

NOTES

1. A rounded edge form is permissible provided that it is contained within the head diameter ($\varnothing B$) tolerance.
2. Dimensions and tolerances are in millimetres, inch conversions are in parentheses.
3. When required to be cadmium coated, the dimensions of the rivets after coating may exceed the maximum dimensions given in Tables 1 and 1A by not more than 0.013 (0.000 5).
4. Remove burrs 0.25 (0.010) max.
5. $\varnothing A$ may increase gradually over this length to $\varnothing A$ max. + 0.05 (0.002) at point of tangency with fillet radius.
6. Head to be concentric with shank within 0.25 (0.010) T.I.R.
7. Unassigned part numbers are not to be used.
8. Example of call up:

SP 157–32–18

Standard part No. (Table 2)

Length dash No. (Table 1A)

Size dash No. (Table 1)

9. The snap profile recommended for use with these rivets is contained in Appendix A.
10. Rivets shall be packaged, bagged or labelled, and such packages, bags or labels shall bear the complete appropriate part number as in Note 8.
11. Appendix D gives details of rivets with radiused tails for use in auto-riveting machines.

Table 2. Material

BS SP number	Material	Finish		Identification mark (See Appendix B)
	British Standard	Protective treatment	Colour	
SP 157	*L 86	Anodize to DEF 151	Violet to DTD 913	o Indented
SP 163			—	
SP 158	Procurement Executive M.O.D. Specification *DTD 204	None	—	oo Indented
SP 159		Cadmium coated to DTD 904		
SP 160	*L.58	Anodize to DEF 151	Green	+ Embossed
SP 161			—	
SP 162	*L 37	None	—	— o — Embossed

* Latest issue.

Appendix A
Recommended snap profile

Table 3. Dimensions of snap profile

Rivet size dash no.	Depth of cupping, *A* ±0.05	Cupping flat, *B* +0.25	Radius of cupping, *R* (nom.)
	mm	mm	mm
–24	0.72	2.95	3.3
–32	1.15	3.80	4.4
–40	1.24	4.65	5.3
–48	1.47	5.50	6.4
–56	1.76	6.10	7.5
–64	2.00	7.10	8.4
–80	2.56	8.60	10.6
–96	3.20	10.20	12.7

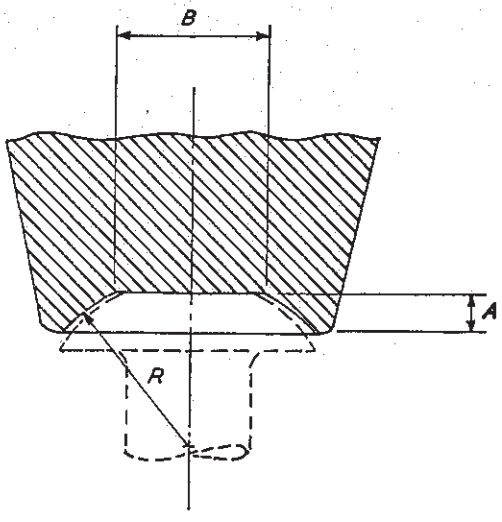


Fig. 2. Details of snap profile

Appendix B

Rivet markings: position and dimensions

B.1 Indentification and marking

B.1.1 The marking of the rivets shall be as specified in Table 1, and shall be applied as follows.

(1) Rivets over size –24 diameter which do not exceed 8 diameters in length shall be marked on the shank end.

(2) Size –24 diameter rivets in all lengths, and rivets over size –24 diameter which exceed 8 diameters in length may be marked on either the head or the shank end.

The marking, whether indented or embossed, shall be clearly visible, and height or depth shall not exceed the following dimensions.

0.006 in on sizes up to and including size –32 diameter;
0.008 in on sizes –40 and –48 diameter;
0.010 in on sizes –56 diameter and over.

B.1.2 The rivets shall be identified for ordering purposes by the relevant part number. (See Note 8.)

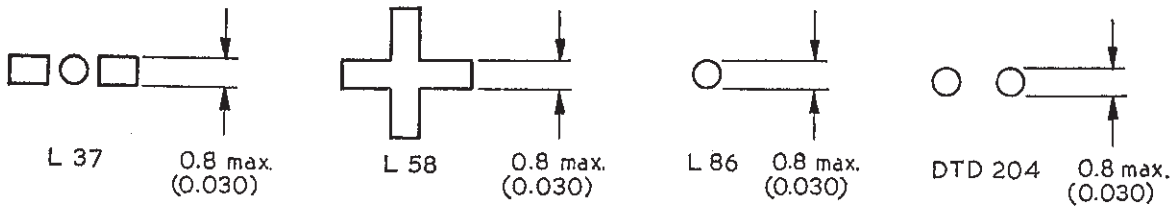


Fig. 3. Dimensions of identification marks

Appendix C
Heat treatment

C.1 SP 157, SP 163—L 86 Material

Rivets to British Standards SP 157 and SP 163 shall be heat treated by the rivet manufacturer as follows.

Solution treat at a temperature of 495 ±5°C and quench in water at a temperature not exceeding 40 °C. Age at room temperature for not less than four days.

C.2 SP 162—L 37 Material

C.2.1 Immediately before use or before refrigeration as described below, rivets to British Standard SP 162 shall be heated uniformly at a temperature of 495±5 °C and quenched in water at a temperature not exceeding 40 °C.

C.2.2 Rivets to British Standard SP 162 commence to age harden immediately when kept at atmospheric temperature after quenching. Ageing may be delayed, however, by storing the rivets at low temperatures after quenching, and they may be expected to remain in a condition suitable for closing for a period depending on the storage temperature as shown below:

Temperature	Maximum storage period
0 °C to — 5 °C	45 hours
−15 °C to −20 °C	150 hours

The rivets shall be closed within two hours of solution treatment if kept at atmospheric temperature or within two hours of removal from cold storage.

C.3 SP 160, SP 161—L 58 Material

Rivets in L 58 material do not require heat treatment.

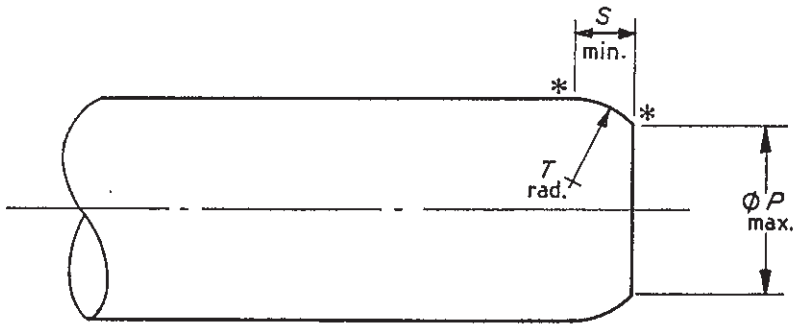
C.4 SP 158, SP 159—DTD 204 Material

Rivets in DTD 204 material do not require heat treatment.

Appendix D

Rivets for use in auto-riveting machines

D.1 With the advent of auto-riveting machines, it is necessary to form the rivet tail with a small radius. Conventional methods of riveting are unaffected by this feature.



* Intersection points.

Fig. 4. Detail of radiused tail

Table 4. Dimensions of radiused tails

Nominal diameter	*S* min.	*T* rad. ±0.25 in. (0.010)	Dia. *P* max.
mm (in)	mm (in)	mm (in)	mm (in)
2.4 (0.094)	0.46 (0.018)	0.74 (0.029)	1.98 (0.078)
3.2 (0.126)	0.66 (0.026)	0.98 (0.039)	2.59 (0.102)
4.0 (0.157)	0.86 (0.034)	1.24 (0.049)	3.25 (0.128)
4.8 (0.189)	1.07 (0.042)	1.50 (0.059)	3.89 (0.153)
5.6 (0.220)	1.24 (0.049)	1.75 (0.069)	4.60 (0.180)
6.4 (0.250)	1.45 (0.057)	1.98 (0.078)	5.13 (0.202)
8.0 (0.315)	1.86 (0.073)	2.50 (0.098)	6.30 (0.248)
9.6 (0.378)	2.26 (0.089)	2.97 (0.117)	7.47 (0.294)

D.2 After 1976, rivets of standard lengths and diameters, up to the maximum available lengths indicated thus ⊠, as shown in Table 1A, will only be supplied with radiused tails. Until then, manufacturers are free to supply rivets with either tail form, unless purchasers specifically order rivets with radiused tails.

D.3 Rivets with lengths and diameters outside the range detailed in **D.2** will, normally, only be supplied in the blunt-ended configuration.

BSI

Amendment Slip No. 2
published and effective from 31 July 1980
to British Standard 2SP 157-163 : 1973
(Aerospace Series)

Solid rivets with universal head made from BS L 86 (SP 157 and 163), BS L 58 (SP 160 and 161), BS L 37 (SP 162) and DTD 204 (SP 158 and 159) materials

Revised text

AMD 3269
July 1980

Table 1A. Length dimensions

Delete the existing table and substitute the following:

Length dash no.		Size dash no.	−24	−32	−40	−48	−56	−64	−80	−96
−04		4 (0.157)								
*−05		5 (0.197)								
−06		6 (0.236)								
*−07		7 (0.276)								
−08		8 (0.315)								
*−09		9 (0.354)								
−10		10 (0.394)								
*−11		11 (0.433)								
−12		12 (0.472)								
*−13		13 (0.512)								
−14		14 (0.551)								
*−15		15 (0.591)								
−16		16 (0.630)								
*−17		17 (0.669)								
−18		18 (0.709)								
*−19		19 (0.748)								
−20	+0.5 (0.020) 0	20 (0.787)								
*−21		21 (0.827)								
−22		22 (0.866)								
*−23		23 (0.906)								
−24		24 (0.945)								
−26		26 (1.024)								
−28		28 (1.102)								
−30		30 (1.181)								
−32		32 (1.260)								
−35		35 (1.378)								
−40		40 (1.575)								
−45		45 (1.772)								
−50		50 (1.969)								
−55		55 (2.165)								
−60		60 (2.362)								

LENGTH RANGE

*Non-preferred lengths.