

STANDARDS ASSOCIATION OF AUSTRALIA.

Headquarters :

Science House, Gloucester and Essex Streets, Sydney.

AUSTRALIAN STANDARD SPECIFICATION FOR AIRCRAFT MATERIAL
(Emergency Series)

RIVETS (SOLID)

This standard forms one of a series prepared by the Standards Association of Australia at the request of Departments of the Commonwealth Government for particular application in time of national emergency. In appropriate cases these specifications will be reviewed for inclusion in the normal series of Australian standards.

(The order shall state the part number of the rivets required.)

1. Material. All rivets shall be manufactured from wire or bars of the appropriate material specified in Table I, as required by the purchaser, and as indicated by the part number.

2. Freedom from Defects.

- (a) All rivets shall be free from defects.
- (b) Any rivets may be rejected for faults in manufacture or incorrectness of dimensions, notwithstanding the fact that the bars or wires from which they were manufactured have been passed previously as complying with Clause 1 of this specification.

3. Dimensions. Rivets shall be made to the shape and dimensions given in the appropriate table, as follows :

- (a) Snap head rivets—aluminium and aluminium alloy—Table II.
- (b) Snap head rivets—steel and copper—Table III.
- (c) Brazier head rivets—all materials—Table IV.
- (d) Countersunk head (78°) rivets—all materials—Table V.
- (e) Countersunk head (100°) rivets—all materials—Table VI.*
- (f) Countersunk head (120°) rivets—all materials—Table VII.*
- (g) Flat head rivets—all materials—Table VIII.

4. Heat-Treatment. All aluminium alloy rivets shall be supplied in the finally heat-treated condition.

5. Protective Coating. Unless otherwise specified by the purchaser, all finished steel rivets shall be submitted to an approved anti-corrosion treatment. If cadmium coated, the coating shall be uniformly applied and the thickness of the coating shall be not less than 0.0003 in. If the coating is electro-deposited the rivets shall be heated to a suitable temperature between 100°C. and 200°C. for at least 30 minutes after coating.

6. Identification. All rivets supplied to this specification shall be identified as follows :

- (a) Aluminium rivets shall be dyed black by an anodic or other approved process.
- (b) Aluminium alloy rivets shall have a hemispherical depression stamped on the head, as shown, for example, in Fig. 1.
- (c) Steel rivets shall be identified by the magnetic properties of the material and by the protective film.
- (d) Copper rivets shall be identified by the natural colour of the material.

*NOTE.—It is not possible to measure all of the essential dimensions of the heads of countersunk head rivets by methods suitable for application to routine checking. Type CM (100° countersunk head) and type CW (120° countersunk head) rivets shall therefore be checked for conformity with those dimensions printed in heavy type in Tables VI and VII and the head form generally shall be checked by means of approved gauges.

For the assistance of users of this specification, dimensional details of two types of approved gauges are given in Appendix A.

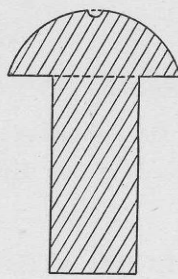


FIG. 1.

TABLE I.
MATERIAL, PROTECTIVE TREATMENT AND IDENTIFICATION.

Material	Material Number	Specification	Protective Treatment	Identification
Aluminium	1	L. 36 ¹	None	Black film
Aluminium alloy	2	DTD. 327 ²	None	Dimple
Mild Steel	3	As below ³	Cadmium coated or other approved treatment	Magnetic quality and protective film
Copper	4		None	Natural colour

¹British Standard No. L.36 has been endorsed without amendment as A.S. No. (E)D.632.

²British Air Ministry Material Specification No. D.T.D.327 has been endorsed without amendment as A.S. No. (E)D.634.

³The material shall be mild steel limited to Sulphur, 0.05% (Maximum) and Phosphorus, 0.05% (Maximum). The wire in the annealed state shall give 20 to 32 tons per sq. in. tensile and 24% to 30% elongation on eight diameters. Each rivet shall be capable of being bent through an angle of 45° over a radius equal to the diameter of the rivet, without breaking.

7. **Marking.** Rivets of the same size, form and material, shall, after having been passed by the inspector, be made into parcels which shall be stamped with the number of this specification, the part number of the rivets and the inspector's stamp.

SNAP HEAD RIVETS.

(TYPE S).

(a) Aluminium and Aluminium Alloy.

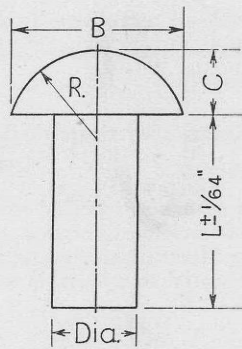


FIG. 2.

TABLE II.

Diameter—in.	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
Tolerance on Dia.—in.	+·004 -·003	+·004 -·003	+·004 -·004	+·005 -·004	+·006 -·005	+·006 -·005	+·008 -·006	+·008 -·006	+·008 -·006
B—in.	$\frac{1}{8}$ ±·008	$\frac{3}{16}$ ±·010	$\frac{1}{4}$ ±·010	$\frac{5}{16}$ ±·016	$\frac{3}{8}$ ±·016	$\frac{7}{16}$ ±·025	$\frac{1}{2}$ ±·025	$\frac{5}{8}$ ±·031	$\frac{3}{4}$ ±·037
C—in.	·047 ±·005	·070 ±·005	·094 ±·005	·117 ±·005	·141 ±·007	·164 ±·009	·188 ±·009	·234 ±·012	·281 ±·014
R—in. (approx.)	·065	·098	·130	·163	·195	·228	·260	·325	·391

(b) Steel and Copper.

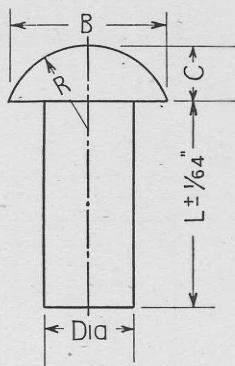


FIG. 3.

TABLE III.

Diameter—in.	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
Tolerance on Dia.—in.	+·004 -·003	+·004 -·003	+·004 -·004	+·005 -·004	+·006 -·005	+·006 -·005	+·008 -·006	+·008 -·006	+·008 -·006
B—in.	.109 ±·008	.164 ±·010	.219 ±·010	.273 ±·016	.328 ±·016	.383 ±·025	.438 ±·025	.547 ±·031	.656 ±·037
C—in.	.038	.056	.075	.094	.113	.131	.150	.188	.255
R—in. (approx.)	.06	.09	.12	.15	.18	.21	.24	.29	.35

BRAZIER HEAD RIVETS.

(TYPE B).

All Materials.

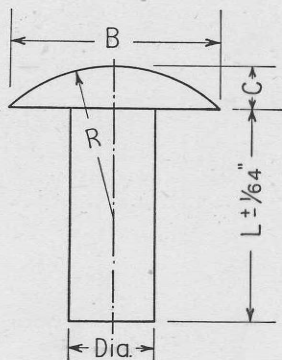


FIG. 4.

TABLE IV.

Diameter—in.	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
Tolerance on Dia.—in.	+·004 -·003	+·004 -·003	+·004 -·004	+·005 -·004	+·006 -·005	+·006 -·005	+·008 -·006	+·008 -·006	+·008 -·006
B—in.	.156 ±·008	.234 ±·010	.312 ±·010	.390 ±·016	.469 ±·016	.546 ±·025	.625 ±·025	.781 ±·031	.938 ±·037
C—in.	.031 ±·005	.047 ±·005	.062 ±·005	.078 ±·005	.094 ±·005	.109 ±·005	.125 ±·005	.156 ±·005	.188 ±·005
R—in.	.113	.170	.225	.282	.340	.395	.453	.565	.681

COUNTERSUNK HEAD (78°) RIVETS.
(TYPE CN).

(NOTE.—This rivet type is obsolescent and is intended for use in existing designs of aircraft only.)
All Materials.

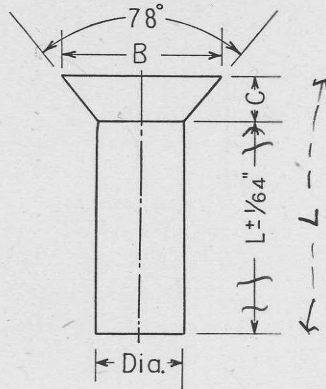


FIG. 5.

TABLE V.

Diameter—in.	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$
Tolerance on Dia.—in.	+·004 -·003	+·004 -·003	+·004 -·004	+·005 -·004	+·006 -·005	+·006 -·005	+·008 -·006
B—in.	.113 ±·010	.170 ±·010	.226 ±·010	.282 ±·010	.340 ±·010	.395 ±·010	.452 ±·010
C—in.	.031	.047	.062	.078	.094	.109	.125

COUNTERSUNK HEAD (100°) RIVETS.
(TYPE CM).

All Materials.

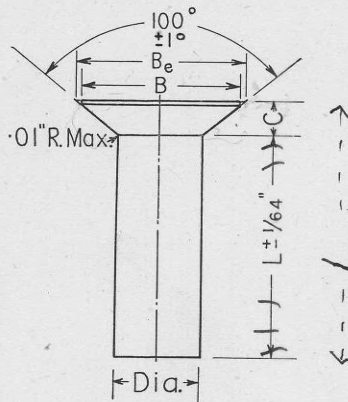


FIG. 6.

TABLE VI.

Diameter—in.	$\frac{1}{16}$	$\frac{1}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
Tolerance on Dia.—in.	+·004 -·003	+·004 -·003	+·004 -·004	+·005 -·004	+·006 -·005	+·008 -·006	+·008 -·006	+·008 -·006
B. (Min.)—in.	.099	.164	.210	.272	.337	.460	.548	.678
B _e —in.	.115 +·006 -·008	.180 +·006 -·008	.225 +·006 -·008	.287 +·006 -·008	.354 +·006 -·008	.476 +·006 -·008	.565 +·006 -·008	.694 +·006 -·008
C (Nom.)—in.	.022	.036	.042	.055	.070	.095	.106	.134

The rivets shall be checked for conformity with those dimensions printed in heavy type in Table VI, the shank diameter being measured within 0.1 in. of the base of the head. The other essential head dimensions shall be checked by means of approved gauges.

COUNTERSUNK HEAD (120°) RIVETS.
(TYPE CW).

All Materials.

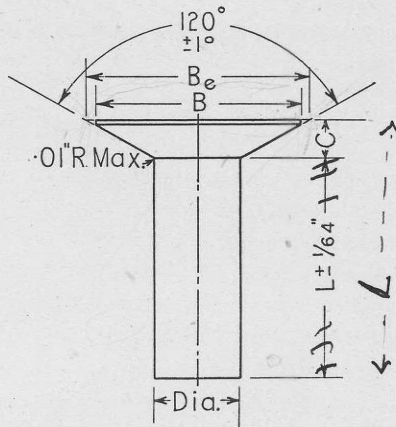


FIG. 7.

TABLE VII.

Diameter—in.	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
Tolerance on Dia.—in.	+·004 -·003	+·004 -·003	+·004 -·004	+·005 -·004	+·006 -·005	+·006 -·005	+·008 -·006	+·008 -·006	+·008 -·006
B (Min.)—in.	·105	·168	·230	·273	·355	·418	·480	·605	·730
B_e—in.	·125 +·006 -·008	·188 +·006 -·008	·250 +·006 -·008	·313 +·006 -·008	·375 +·006 -·008	·438 +·006 -·008	·500 +·006 -·008	·625 +·006 -·008	·750 +·006 -·008
C (Nom.)—in.	·018	·027	·036	·045	·054	·063	·072	·090	·108

The rivets shall be checked for conformity with those dimensions printed in heavy type in Table VII, the shank diameter being measured within 0.1 in. of the base of the head. The other essential head dimensions shall be checked by means of approved gauges.

FLAT HEAD RIVETS.
(TYPE F).

All Materials.

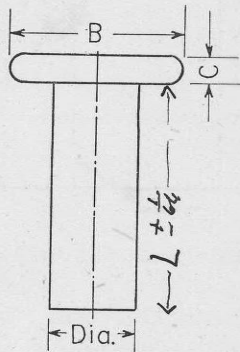


FIG. 8.

TABLE VIII.

Diameter—in.	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$
Tolerance on Dia.—in.	+·004 -·003	+·004 -·004	+·005 -·004	+·006 -·005
B—in.	·188 ±·010	·250 ±·010	·313 ±·016	·375 ±·016
C—in.	·028 ±·005	·038 ±·005	·047 ±·005	·056 ±·005

PART NUMBERS.

NOTE.—The part numbers applicable to rivets covered by this specification comprise combinations of numbers and letters which will, in themselves, identify the rivets to which they apply.

The part numbers shall consist of:

(a) The material number denoting the material from which the rivet is made, thus—

- “ 1 ”—for aluminium
- “ 2 ”—for aluminium alloy
- “ 3 ”—for steel
- “ 4 ”—for copper

(b) the type letter denoting the form of the rivet, thus—

- “ S ” —for snap head rivets
- “ B ” —for brazier head rivets
- “ CN ”—for countersunk head (78°) rivets
- “ CM ”—for countersunk head (100°) rivets
- “ CW ”—for countersunk head (120°) rivets
- “ F ” —for flat head rivets

(c) the size numbers denoting the diameter in thirty-seconds of an inch and the length in sixteenths of an inch, thus—

TABLE IX.

SIZE NUMBERS.

Length—in.	Diameter—in.								
	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
$\frac{1}{8}$	2—2								
$\frac{3}{16}$	2—3	3—3	4—3						
$\frac{1}{4}$	2—4	3—4	4—4	5—4	6—4				
$\frac{5}{16}$	2—5	3—5	4—5	5—5	6—5				
$\frac{3}{8}$	2—6	3—6	4—6	5—6	6—6	7—6	8—6		
$\frac{7}{16}$	2—7	3—7	4—7	5—7	6—7	7—7	8—7		
$\frac{1}{2}$	2—8	3—8	4—8	5—8	6—8	7—8	8—8	10—8	
$\frac{9}{16}$	2—9	3—9	4—9	5—9	6—9	7—9	8—9	10—9	12—9
$\frac{5}{8}$	2—10	3—10	4—10	5—10	6—10	7—10	8—10	10—10	12—10
$\frac{11}{16}$	2—11	3—11	4—11	5—11	6—11	7—11	8—11	10—11	12—11
$\frac{3}{4}$	2—12	3—12	4—12	5—12	6—12	7—12	8—12	10—12	12—12
$\frac{13}{16}$	2—13	3—13	4—13	5—13	6—13	7—13	8—13	10—13	12—13
$\frac{7}{8}$	2—14	3—14	4—14	5—14	6—14	7—14	8—14	10—14	12—14
$\frac{15}{16}$	2—15	3—15	4—15	5—15	6—15	7—15	8—15	10—15	12—15
1	2—16	3—16	4—16	5—16	6—16	7—16	8—16	10—16	12—16
$1\frac{1}{8}$		3—18	4—18	5—18	6—18	7—18	8—18	10—18	12—18
$1\frac{1}{4}$		3—20	4—20	5—20	6—20	7—20	8—20	10—20	12—20
$1\frac{3}{8}$		3—22	4—22	5—22	6—22	7—22	8—22	10—22	12—22
$1\frac{1}{2}$		3—24	4—24	5—24	6—24	7—24	8—24	10—24	12—24
$1\frac{3}{4}$						7—28	8—28	10—28	12—28
2							8—32	10—32	12—32

Examples of Part Numbers :

- 1 S 4—8 —Snap Head Aluminium $\frac{1}{8}$ in. (dia.) by $\frac{1}{2}$ in. (length).
- 4 F 3—5 —Flat Head Copper $\frac{3}{32}$ in. (dia.) by $\frac{5}{16}$ in. (length).
- 2 B 5—10 —Brazier Head Aluminium Alloy $\frac{5}{32}$ in. (dia.) by $\frac{5}{8}$ in. (length).
- 3 CN 8—24—Countersunk Head (78°) Mild Steel $\frac{1}{4}$ in. (dia.) by $1\frac{1}{2}$ in. (length).

Sizes for which there are no numbers listed on Table VIII shall be denoted by their actual fractional dimensions.

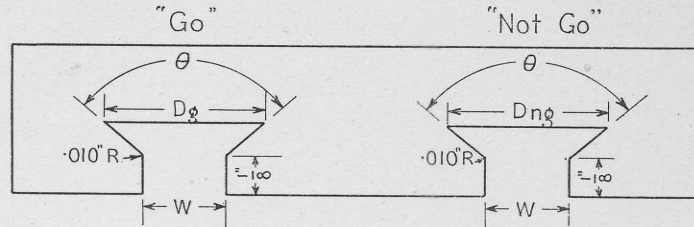
Example :

- 2 F $\frac{1}{8} \times \frac{17}{32}$ —Flat Head Aluminium Alloy $\frac{1}{8}$ in. (dia.) by $\frac{17}{32}$ in. (length).

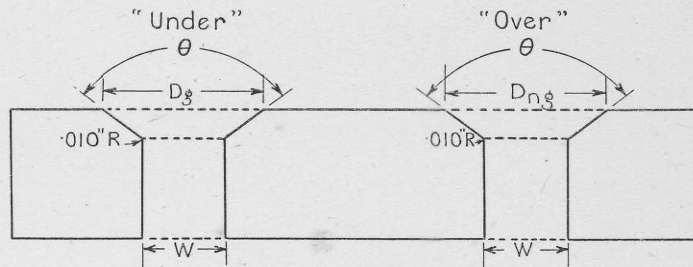
APPENDIX A.

The following are two types of gauges suitable for checking Type CM and Type CW rivets.

(i) Gauge A.



(ii) Gauge B.



DIMENSIONS OF GAUGES FOR TYPE CM RIVETS.

Nominal dia. of Rivet—in.	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
Angle θ —deg.	100	100	100	100	100	100	100	100
D_g —in.	.121	.186	.231	.293	.360	.482	.571	.700
D_{ng} —in.	.107	.172	.217	.279	.346	.468	.557	.686
W.—in.	.068	.099	.130	.162	.195	.259	.322	.384

DIMENSIONS OF GAUGES FOR TYPE CW RIVETS.

Nominal dia. of Rivet—in.	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{2}$	$\frac{5}{16}$	$\frac{3}{8}$
Angle θ —deg.	120	120	120	120	120	120	120	120	120
D_g —in.	.131	.194	.256	.319	.381	.444	.506	.631	.756
D_{ng} —in.	.117	.180	.242	.305	.367	.430	.492	.617	.742
W.—in.	.068	.099	.130	.162	.195	.226	.259	.322	.384

Gauging Procedure.

- (i) Gauge A. The rivet shall pass through the "GO" opening but shall not pass through the "NOT GO" opening.
- (ii) Gauge B. When the rivet is inserted in the "UNDER" hole, the head shall be flush with or lower than the surface of the gauge and when it is inserted in the "OVER" hole, the head shall be flush with or project beyond the surface.

For the purposes of this specification the term "Inspector" shall be interpreted in the manner directed by the Australian Airworthiness Authority concerned.

This specification, prepared by the Special Committee on Aircraft Materials and Components, was approved on behalf of the Council of the Association on 15th November, 1943.

NOTE.

In order to keep abreast of progress in the industries concerned, Australian standards are subject to periodical review. Suggestions for improvement, addressed to the Headquarters of the Association, will be welcomed.