Note.—The Institution desires to call attention to the fact that this standard is intended to include the technical provisions necessary for the supply of the material herein referred to, but does not purport to comprise all the necessary provisions of a contract.

British Standards Institution

Incorporated by Royal Charter.

FORMED IN 1901 AS THE ENGINEERING STANDARDS COMMITTEE.

INCORPORATED IN 1918 AS THE BRITISH ENGINEERING STANDARDS ASSOCIATION.

BRITISH STANDARD SPECIFICATION FOR

MEDIUM TENSILE STEEL HEXAGONAL NUTS (ORDINARY, THIN, SLOTTED AND CASTLE)

FOR AIRCRAFT PURPOSES

Notes—(1) All orders shall state the part reference of the nuts required (see Clause 6 (d))—for part references see Tables 3, 4, 5 and 6.

(2) Medium tensile steel nuts are suitable for assembly on high tensile steel bolts to British Standard A. 25. The tensile strength of the material specified for these nuts is varied with size but throughout the whole range of sizes static tensile tests on assemblies of bolts with ordinary nuts have confirmed that the nuts will not fail until the tensile stress in the bolt exceeds 65 tons per square inch measured on the mean diameter of the bolt thread.

Thin and slotted nuts will be proportionately weaker and designers should make allowance for this.

Where nuts secured by means of split cotter pins are required to develop the full strength of the bolt in tension, eastle nuts should be used instead of slotted nuts.

1. Material and manufacture.

(a) The nuts shall be machined from bright drawn bars which comply with the latest issue of the following British Standards:—

6. 4. and 2 B.A. - S.112. 40 ton semi-free cutting steel

 $\frac{1}{4}$ in. to $\frac{1}{2}$ in. B.S.F. - S.113. 45 ton carbon steel

inclusive.

Over ½ in. B.S.F. - S.114. 55 ton manganese-molybdenum steel.

(b) The nuts shall be hexagonal, chamfered on both faces as shown in Figs. 1, 3, 4 and 5, and produced in such a manner as to ensure that the top and bottom faces are machined truly flat and parallel with each other, and that these faces are at right angles to the axis of the thread, as defined by the test specified in Clause 5. The machining of the nuts shall be carried out in such a manner as to ensure that the hexagon is concentric with the thread.

(C) See amendment NO. 3.

2. Anti-corrosion coating.

All finished nuts shall be uniformly coated with cadmium in accordance with the latest issue of Ministry of Supply Aircraft Process Specification D.T.D. 904.

Amendment No. I, published 28 May 1953

to British Standard A. 27: 1950

Medium tensile steel hexagonal nuts (ordinary, thin, slotted and castle) for aircraft purposes

Revision

Page 1. Clause 1 (a). Below the reference to S.114 insert: 'or S. 117 55 ton, 1 per cent chromium steel.'

Insert new clause, 1A, as follows:-

- '1A. Freedom from defects. (a) The nuts shall be free from harmful defects.
- (b) Nuts may be rejected at any time for faults in, or revealed by, manufacture although they have been made from steel passed previously for chemical composition and mechanical tests.'
- **Page 2.** Clause 4 (b). Delete Table 1 and amend clause to read as follows:—
 - '(b) **B.A. nuts.** The screw threads in all B.A. nuts, after coating, shall be in accordance with B.S. 93:1951, "British Association (B.A.) screw threads", and shall conform to the limits and tolerances specified in Table 11 of that standard.

The screw threads, before coating, shall not exceed the maximum dimensions specified in Table 11 of B.S. 93, nor shall the screw threads, after coating, be smaller than the minimum dimensions.

The screw threads, after coating, shall be required to pass gauges approved by the Inspecting Authority'.

Delete Note (1) and re-number Note (2) as '(1)'.

- 'age 3. Clause 6 (c). Line 2. After the word 'have' insert: 'the number of this British Standard and'.
- 'age 6. Table 5. Insert a note as follows below Fig. 4:—
 'Note. The slots may be made rectangular as in Fig. 4 above, or rounded as in Table 6, Fig. 5, at the option of the manufacturer'.

A. 27. August, 1950
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(see Clause 6 (d))—for part refer.

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S.114. 55 ton manganese-molybdenum steel.

(b) The nuts shall be hexagonal, chamfered on both faces as shown in Figs. 1, 3, 4 and 5, and produced in such a manner as to ensure that the top and bottom faces are machined truly flat and parallel with each other, and that these faces are at right angles to the axis of the thread, as defined by the test specified in Clause 5. The machining of the nuts shall be carried out in such a manner as to ensure that the hexagon is concentric with the thread.

(C) See americant Mo. 3.

Anti-corrosion coating

All finished nuts shall be uniformly coated with cadmium in accordance with the latest issue of Ministry of Supply Aircraft Process Specification D.T.D. 904.

Amendment No. 2, published 22 September 1955

to British Standard A. 27: 1950

Medium tensile steel hexagonal nuts (ordinary, thin, slotted and castle) for aircraft purposes

Revision

Pages 4 and 5. Tables 3 and 4. Column 4. 6 B.A. nominal size: B min. :o read '0.188'.

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The screw threads, before coating, shall not exceed the maximum dimensions specified in Table 11 of B.S. 93, nor shall the screw threads, after coating, be smaller than the minimum dimensions.

The screw threads, after coating, shall be required to pass gauges approved by the Inspecting Authority'.

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A. 21. August, 1950

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(b) The nuts shall be hexagonal, chamfered on both faces as shown in Figs. 1, 3, 4 and 5, and produced in such a manner as to ensure that the top and bottom faces are machined truly flat and parallel with each other, and that these faces are at right angles to the axis of the thread, as defined by the test specified in Clause 5. The machining of the nuts shall be carried out in such a manner as to ensure that the hexagon is concentric with the thread. amendment NO. 3.

Anti-corrosion coating.

All finished nuts shall be uniformly coated with cadmium in accordance with the latest issue of Ministry of Supply Aircraft Process Specification D.T.D. 904.

3. Dimensions.

All finished nuts, after the application of the anti-corrosion coating, shall conform to the dimensions and tolerances given in Tables 1, 2, 3, 4, 5 and 6.

4. Screw threads.

(a) B.S.F. nuts. The screw threads in all B.S.F. nuts, after coating, shall be in accordance with B.S. 84, 'Screw threads of Whitworth form', and shall conform to the 'free fit' limits and tolerances specified in Table 14 of that standard.

The screw threads, before coating, shall not exceed the maximum dimensions specified in Table 14 of B.S. 84 nor shall the screw threads, after coating, be smaller than the minimum dimensions.

The screw threads, after coating, shall be required to pass gauges approved by the Inspecting Authority.

(b) B.A. nuts. The screw threads in all B.A. nuts, after coating, shall have the thread form and pitches specified in B.S. 93, 'Screw threads, British Association, with tolerances for sizes Nos. 0 to 15 B.A.' but shall conform to the limits and tolerances specified in Table 1.

Nominal size	Threads	Major diameter	Effe	ective diam	eter	Minor diameter				
	per inch (approx.)	min.	max.	tol.	min.	max.	tol.	min.		
6 B.A. 4 B.A. 2 B.A.	47·9 38·5 31·3	0·1102 0·1417 0·1850	0.1311	0.0044 0.0049 0.0054	0.1262	0·0934 0·1207 0·1590	0.0101	0.1106		

TABLE 1-Limits and tolerances

The screw threads, before coating, shall not exceed the maximum dimensions specified in Table 1, nor shall the screw threads after coating be smaller than the minimum dimensions.

The screw threads, after coating, shall be required to pass gauges approved by the Inspecting Authority.

- Note.—(1) B.S. 93 is at present under revision, and the limits and tolerances for B.A. nuts specified in Table 1 shall only apply as a temporary measure, until the revised B.S. 93 is issued. The limits specified in Table 1 are dimensionally in accord with those given in wartime A.I.D. leaflet A.9 (since cancelled).
 - (2) In view of the fact that coating affects the dimensions of internal screw threads only to a small extent, the additional allowance of 0.001 in. for coating, permissible below the minimum thread dimensions of bolts, is not applicable to the maximum thread dimensions of B.S.F. and B.A. nuts before coating.

5. Squareness of face to thread.

The axis of the thread of the nut shall be square to the face of the nut, subject to the squareness tolerance specified in Table 2. The squareness tolerance specified in Table 2 for nuts up to and including $\frac{5}{8}$ in is calculated from the formula:

Squareness tolerance = (maximum size across flats \times 0.006) + 0.003 in.

A selected percentage of nuts, as determined by the Inspecting Authority, shall be tested as follows:—

The nut shall be screwed by hand on to a tapered truncated screw gauge until the thread of the nut is tight on the thread of the screw gauge. A sliding

sleeve, having a face diameter equal to the minimum distance across flats of the nut, which is exactly at 90° to the axis of the screw gauge, shall then be brought into contact with the leading face of the nut, and it shall not be possible for a feeler gauge, of thickness equal to the squareness tolerance, to enter between the leading face of the nut and the face of the sleeve. (See Fig. 6). The squareness gauge of the type indicated in Fig. 6 shall be approved by the Inspecting Authority.

Nut size Squareness tolerance Nut size Squareness tolerance 6 B.A. 0.0040 ½ in. B.S.F. 0.008 4 B.A. 0.00452 in. B.S.F. 0.0092 B.A. 0.005§ in. B.S.F. 0.0090.009 $\frac{1}{4}$ in. B.S.F. 0.006 $\frac{3}{4}$ in. B.S.F. た in. B.S.F. $\frac{7}{8}$ in. B.S.F. 0.0060.0093 in. B.S.F. 0.0071 in. B.S.F. 0.0097 in. B.S.F. 0.007

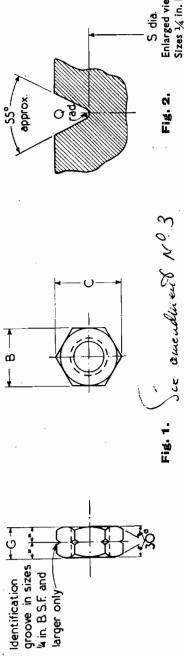
TABLE 2-Squareness tolerance

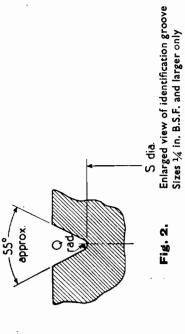
$6.\,$ Identification and marking.

- (a) All nuts $\frac{1}{4}$ in. nominal size and larger shall have an identification groove to the shape and dimensions given in Tables 3, 4, 5 and 6.
- Note.—Nuts in the B.A. sizes do not carry the identification groove because they are of equivalent strength to those complying with British Standard A.16 (now withdrawn). Differentiation between B.A. nuts to British Standard A. 27. and existing stocks of B.A. nuts to British Standard A.16 is therefore unnecessary.
- (b) All nuts over $\frac{3}{8}$ in nominal size shall have the appropriate part reference (see Clause 6 (d)) applied on one of the hexagonal faces.
- (c) All nuts $\frac{3}{8}$ in nominal size and under shall be made into parcels which shall have the appropriate part reference (see Clause 6 (d)), clearly stated on the labels.
- (d) The number of this British Standard, and the distinguishing letter for the type of nut included with the part reference in Tables 3, 4, 5 and 6, namely P (ordinary nut), T (thin nut), S (slotted nut) and C (castle nut), shall not be applied on the nuts, the B.S. number and the letter being only for the purpose of specifying nuts on drawings and for ordering the parts. For example, the complete part reference number for a 1/16 in. ordinary nut (right hand thread) for ordering etc., is A. 27. LP, but the corresponding marking on the nuts will be L.

TABLE 3

Medium tensile steel hexagonal ordinary nuts

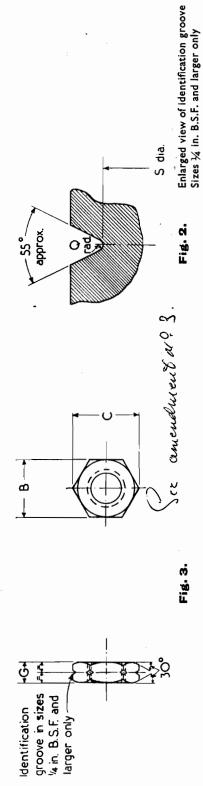




	4									
10	cation ove	groove Diameter		ii.	0.450 0.530 0.610	0.720 0.830 0.940	1.030 1.230 1.330	1.530		
6	Identification groove	Radins	õ	ii.	0.010 0.010 0.010	0.020 0.020 0.020	0.020 0.020 0.040	0.040		
∞	Thickness		ckness		тах.	in. 0·105 0·135 0·167	0.200 0.250 0.312	0.375 0.437 0.500	0.562 0.687 0.750	0.875
7			min.	in. 0.095 0.125 0.157	0.190 0.240 0.302	0.365 0.427 0.490	0.552 0.677 0.740	0.865		
9	Width across corners C		max.	in. 0.22 0.29 0.37	0.51 0.61 0.69	0.82 0.95 1.06	1.17 1.39 1.50	1.71		
32	Width across flats	В	max.	in. 0·193 0·248 0·324	0.445 0.525 0.600	0.710 0.820 0.920	1.010 1.200 1.300	1.480		
4	Width		min.	in. 0.189 0.243 .0.319	0.438 0.518 0.592	0·702 0·812 0·912	1.000 1.190 1.288	1.468		
3	Part reference	I off hand	thread	APL BPL CPL	EPL GPL JPL	LPL NPL PPL	TAN SAL TAS	WPL		
2	Part re	Dight hand	thread	AP BP CP	EP GP JP	LP NP PP	OP SP UP	WP		
	Nominal size			2.8 mm. 3.6 mm. 4.7 mm.	0.2500 in. 0.3125 in. 0.3750 in.	0.4375 in. 0.5000 in. 0.5625 in.	0.6250 in. 0.7500 in. 0.8750 in.	1.0000 in.		
1				6 B.A. 4 B.A. 2 B.A.	4 in. B.S.F. 18 in. B.S.F. 8 in. B.S.F.	16 in. B.S.F. 1 in. B.S.F. 18 in. B.S.F.	\$ in. B.S.F. \$ in. B.S.F. \$ in. B.S.F.	1 in. B.S.F.		

TABLE 4

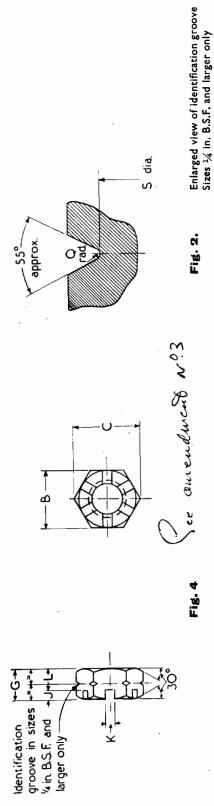
Medium tensile steel hexagonal thin nuts



			-													
10	ation ove	Diameter	S	in.		0.450	0.530	0.610	0.720	0.830	0.940	1.030	1.230	1.330	1.530	
6	Identification groove	Radius	õ	rii		0.010	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.040	0.040	
80	Thickness	ڻ ا	max.	in. 0.073	0.094 0.123	0.133	0.166	0.208	0.250	0.291	0.333	0.375	0.458	0.500	0.583	
2	Thic	i	min.	in. 0.063	0.084 0.113	0.123	0.156	0.198	0.240	0.281	0.323	0.365	0.448	0.490	0.573	
9	Width across corners	O	ma x.	in. 0.22	0·29 0·37	0.51	0.61	69.0	0.82	0.95	1.06	1.17	1.39	1.50	1.71	
70	th across flats	B -	max.	in. 0·193	0.248 0.324	0.445	0.525	0.09	0.710	0.820	0.920	1.010	1.200	1.300	1.480	
4	Width across flats		min.	in. 0.189	0.243 0.319	0.438	0.518		0.702	0.812	0.912	1.000	1.190	1.288	1.468	
3	Part reference	Left-hand	thread	ATL	· BTL CTL	ETL	GTL	JTL	LTL	NTL	PTL	QTL	$SL\Gamma$	UTL	WTL	
7	Part re	Right-hand	thread	AT	BT CT	ET	GT	JT	LT	L	PT	ΩŢ	ST	UT	WT	
	nal			2·8 mm.	3.6 mm. 4.7 mm.	0.2500 in.	0.3125 in.	0.3750 in.	0.4375 in.	0.5000 in.	0.5625 in.	0.6250 in.	0.7500 in.	0.8750 in.	1.0000 in.	
1	Nominal	Size			4 B.A. 2 B.A.	4 in. B.S.F.		ij.	7 in. B.S.F.		in.	§ in. B.S.F.	∦ in. B.S.F.	§ in. B.S.F.	1 in. B.S.F.	

TABLE 5

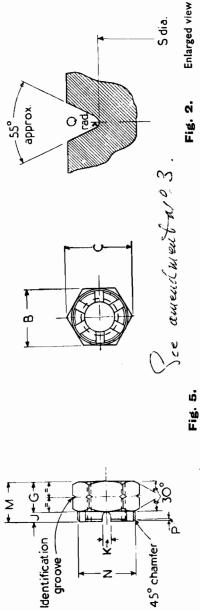
Medium tensile steel hexagonal slotted nuts



6											
15	cation	Diameter	S	in.	0.450	0.610	0.720	0.830	1.030	1.230	1.530
14	Identification groove		South South	in.	0.010	0.010	0.020	0.020	0.020	0.020	0.040
13	face of	lot	max.	in. 0.160	0.170	0.222	0.235	0.297 0.313	0.375	0.453 0.516	0.595
12	Lower face of nut to bottom	of s I	min.	in. 0.150	0.160	0.212	0.225	0.287 0.303	0.365	0.443 0.506	0.585
11		Width K	max.	in. 0-090	0.100	0.100	0.135	$0.135 \\ 0.175$	0.175	0.218 0.218	0.260
10	Slot	Wie	min.	in. 0.080	060-0	060-0	0.125	$0.125 \\ 0.165$	0.165	0.208	0.250
6		$\frac{\mathrm{Depth}}{\mathrm{J}}$	approx.	in. 0.090	060.0	060-0	0.140	$0.140 \\ 0.187$	0.187	0:234 0:234	0.280
8	Thickness	IJ	max.	in. 0.250	0.260	0.312	0.375	0.437	0.562	0.587	0.875
7	Thic		min.	in. 0.240	0.250	0.302	0.365	0.427	0.552	0.677 0.740	0.865
9	Width	corners	max.	in. 0.37	0.51	0.69	0.82	$0.95 \\ 1.06$	1.17	1.39 1.50	1.71
ĸ	th across flats	В	max.	in. 0.324	0.445	0.600	0.710	0.820 0.920	1.010	1.200 1.300	1.480
4	Width across flats		min.	in. 0-319	0.438	0.592	0.702	0.812 0.912	1.000	1.190 1.288	1.468
3	ference	3	Lerr-nand thread								
2	Part reference		Kight-hand thread	CS	ES	SS	TS	NS PS	SÕ	SS	S/M
				4·7 mm.	0.2500 in.	0.3125 in. 0.3750 in.	0.4375 in.	0.5000 in. 0.5625 in.	0.6250 in.	0.7500 in. 0.8750 in.	1.0000 in.
_		Nominal size		2 B.A.	ij.	# in. B.S.F. # in. B.S.F.	. <u>:</u>	1 in. B.S.F. 18 in. B.S.F.		in. B.S.F. in. B.S.F.	1 in. B.S.F.

7

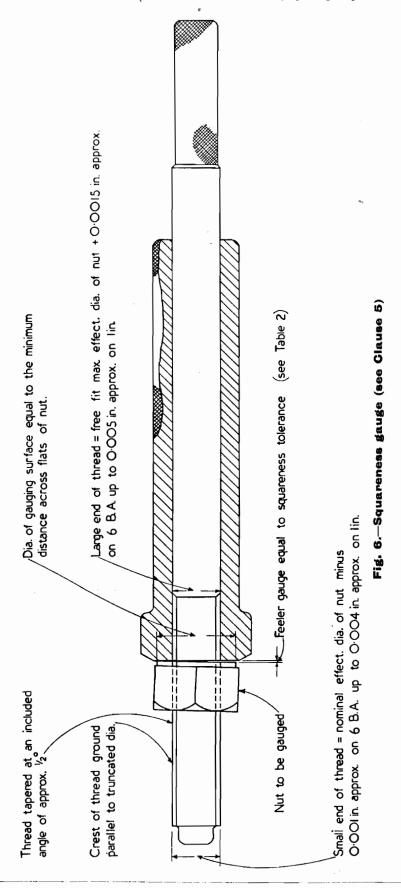
Medium tensile steel hexagonal castle nuts TABLE 6



Enlarged view of identification groove

NOTE. The slots may be made rectangular as in Table 5, Fig. 4., or rounded as in Fig. 5 above at the option of the manufacturer.

17	ă —	neter .	s	in. 0.450	30	210	720	0.830		1.030	330	330	1.530
- :	Identification groove	Diameter	<u>, </u>				_	_					
16	Ident	Radius	0	in. 0.010	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.040	0.040
15	Depth of chamfer	Д	approx.	in. 0.04	0.05	0.05	90.0	90.0	00.0	0.07	80.0	80.0	60.0
14		th	max.	in. 0·100	0.100	0.100	0.135	0.135	0.173	0.175	0.218	0.218	0.260
13	Slot	Width K	min.	in. 0•090	060-0	060-0	0.125	0.125	C01.0	0.165	0.208	0.208	0.250
12		Depth	approx.	in. 0.090	060.0	060.0	0.140	0.140	0.187	0.187	0.234	0.234	0.280
=	eter	Diameter N min. max. in. in. 0.425 0.430 0.500 0.510		0.510	0.585	0.695	0.805	c06-0	0.995	1.185	1.285	1.465	
10	Diam			Diame		in. 0.425	0.500	0.575	0.685	0.795	0.895	0.985	1.165
6	ss of portion lower nut to of slots		max.	in. 0.200	0.250	0.312	0.375	0.437	0.500	0.562	0.687	0.750	0.875
∞	Thickness of hexagon portion and from lower	face of nut to bottom of slots G	min.	in. 0.190	0.240	0.302	0.365	0.427	0.490	0.552	0.677	0.740	0.865
7	al			in.	0.340	0.402	0.515	0.577	0.687	0.749	0.921	0.984	1.155
9	Total	uncki.	min.	in.	0.330	0.392	0.505	0.567	0.677	0.739	0.911	0.974	1.145
rv.	Width	corners	max.	in.	0.61	69.0	0.82	0.95	1.06	1.17	1.39	1.50	1.71
4	cross	across s		in.	25.5	0.09-0	0.710	0.820	0.920	1.010	1.200	1.300	1.480
8	Width across	flats B	min.	in.	215.0	0.592	0.702	0.812	0.912	1.000	1.190	1.288	1.468
2		Part reference			ا ا ا	32	J 1	NC	PC	ن) ()) (n n	WC
		1 2000	0.2300 III.	0.3750 in.	0.4375 in	0.5000 in.	· 0·5625 in.	0.6250 in	0.7500 in	0.8750 in.	1.0000 in.		
1			Ė.	in. B.S.F.		is in. D.S.F.	'n.			4 in. B.S.F.	1 in. B.S.F.		



This British Standard, having been approved by the Aircraft Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council of the Institution on 17th August, 1950.

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 edition.

Users wishing to be informed of any alteration to this standard should notify Sales and Distribution Department of the Institution, giving the number and title of the standard.