BS 4A 228 : 1997

Specification for

Steel double hexagon bolts — 1250 MPa (180,000 lbf/in^2) for aircraft

ICS 49.030.20

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee ACE/12, Aerospace fasteners and fastening systems, upon which the following bodies were represented:

British Industrial Fasteners Federation
Ministry of Defence
Society of British Aerospace Companies Ltd.

This British Standard, having been prepared under the direction of the Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on
15 June 1997

First published as BS A 228
Second edition BS 2A 228 : 1971
Third edition BS 3A 228 : January 1979

The following BSI references relate to the work on this standard:
Committee reference ACE/12
Draft for comment 96/709182 DC

ISBN 0 580 27198 6

Amendments issued since publication

Amd. No.	Date	Text affected

Contents

Foreword

This British Standard has been prepared by Technical Committee ACE/12. It supersedes BS 3A 228 : 1979 which is withdrawn.

This edition incorporates the requirements for 1⅛ UNJF bolts and at the same time corrects several editorial errors that have been noted in the previous edition. It does not reflect a full review or revision of the standard which will be undertaken in due course.

Oversize dimensions for 10 – 32 and 1⅛ diameter bolts have not been included.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12, an inside back cover and a back cover.

Specification

1 Scope

This British Standard specifies the materials, dimensions, finish and inspection requirements for steel bolts of high metallurgical quality with double hexagon head and unified screw threads of 'UNJF' basic profile for aircraft use.

NOTE. The latest edition of an Aerospace Series standard is indicated by a prefix number.

2 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies, any subsequent amendments to or revisions of the cited publication apply to this standard only when incorporated by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

3 Materials, manufacture, inspection and testing

3.1 Materials

The bolts shall be manufactured from steel bars conforming to the requirements of BS S 147 or BS S 149, according to the discretion of the manufacturer.

3.2 Manufacture, inspection and testing

The bolts shall be manufactured, inspected and tested in accordance with the requirements of BS A 241.

4 Screw threads

The screw threads shall conform to the requirements of BS 4084.

5 Dimensions

5.1 All finished bolts, after the application of the cadmium coating shall conform to the dimensions and tolerances given in tables 1 and 2. See also figure 1.

5.2 The wrenching profile of the bolts shall conform to the dimensions and tolerances given in SBAC publication RS 680[1].

5.3 Oversize bolts are designated X and Y for the first and second oversize respectively. Dimensions for oversize bolts are given in annex A.

5.4 With reference to figure 1 and table 1, the following conditions shall apply.

a) Dimensions A, B and G shall be concentric to each other within values specified for K.

b) Dimensions W and G shall be concentric to each other within values specified for M.

c) Dimensions A and the effective thread diameter shall be concentric to each other within values specified for N.

d) Untoleranced linear dimensions shall be within $\pm$ 0.01 in and untoleranced angles shall be within $\pm$ 2°.

6 Anti-corrosion treatment

All finished bolts shall be coated with cadmium in accordance with DEF STAN 03-19[2].

7 Identification and marking

The bolts shall be marked on the top face of the head with the number of this British Standard and the relevant Part number given in table 2 and annex A. The bolts shall be marked in accordance with the requirements of BS A 241.

Examples of bolt marking	
Standard size	A228E6
Standard size — drilled head	A228E6H
First oversize	A228E6X
First oversize — drilled head	A228E6HX
Second oversize	A228E6Y
Second oversize — drilled head	A228E6HY

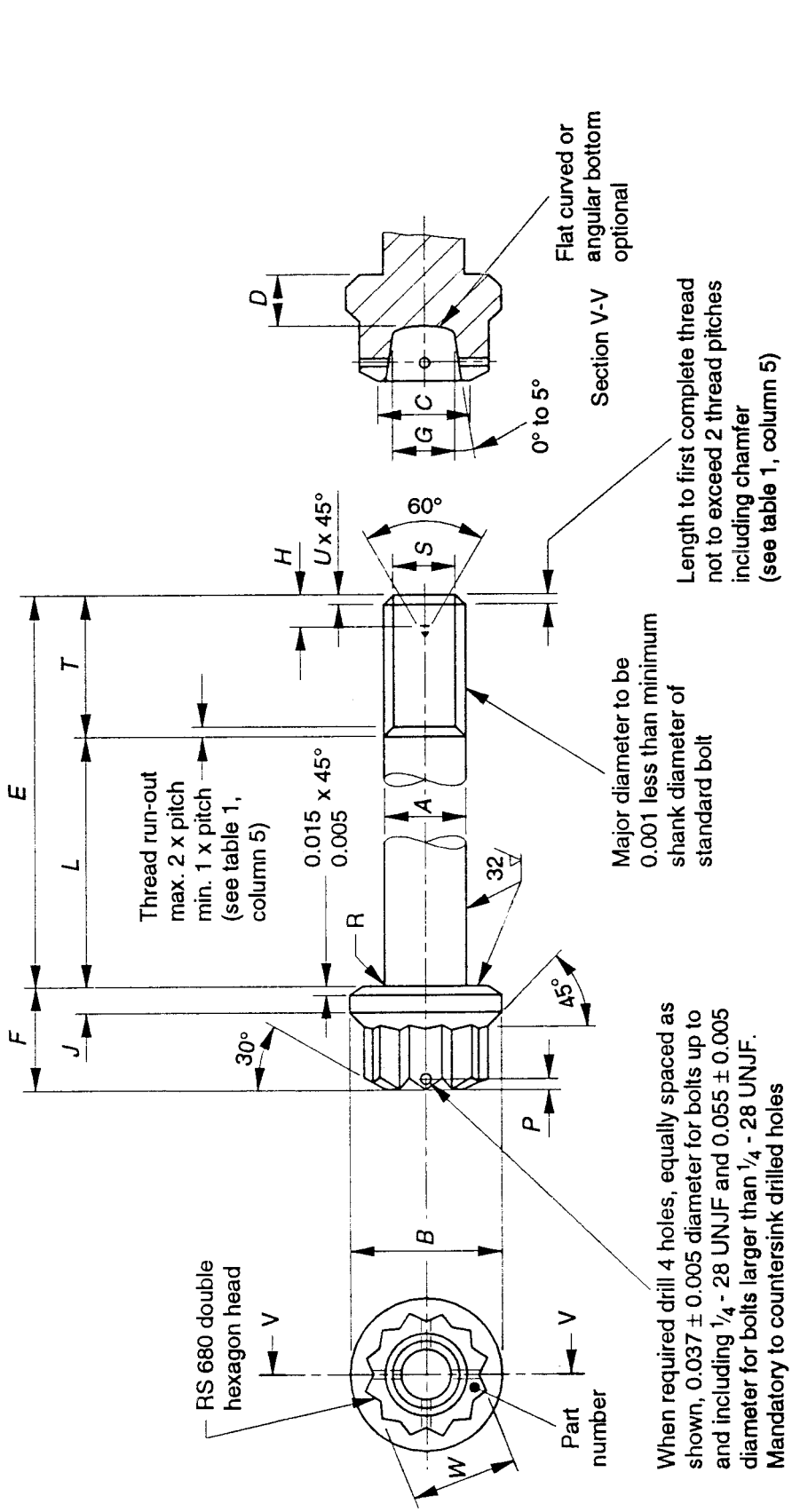


Figure 1. Dimensions

Table 1. Dimensions

All dimensions are in inches

1	2	3	4	5	6	7	8	9	10	11	12	13
Nominal size and threads per in	**Decimal equiv. of nominal size**	*A* **diameter**		**2 ×** **pitch**	*T* **in ref.**	*B* **diameter**		*C* **diameter**		*D* **min.**	*r*	*G* **dia.** +0.010 −0.030
		max.	**min.**			**max.**	**min.**	**max.**	**min.**			
10 – 32 UNJF	0.1900	0.1895	0.1885	0.063	0.420	0.350	0.340	0.250	0.235	0.092	0.265	0.125
$\frac{1}{4}$ – 28 UNJF	0.2500	0.2495	0.2485	0.071	0.492	0.438	0.428	0.312	0.297	0.135	0.300	0.180
$\frac{5}{16}$ – 24 UNJF	0.3125	0.3120	0.3110	0.083	0.579	0.531	0.521	0.375	0.360	0.162	0.348	0.215
$\frac{3}{8}$ – 24 UNJF	0.3750	0.3745	0.3735	0.083	0.625	0.649	0.639	0.437	0.422	0.197	0.388	0.260
$\frac{7}{16}$ – 20 UNJF	0.4375	0.4370	0.4360	0.100	0.721	0.750	0.740	0.500	0.485	0.228	0.435	0.320
$\frac{1}{2}$ – 20 UNJF	0.5000	0.4995	0.4985	0.100	0.768	0.828	0.818	0.562	0.547	0.254	0.504	0.380
$\frac{9}{16}$ – 18 UNJF	0.5625	0.5615	0.5605	0.111	0.852	0.938	0.928	0.625	0.610	0.287	0.557	0.440
$\frac{5}{8}$ – 18 UNJF	0.6250	0.6240	0.6230	0.111	0.899	1.050	1.040	0.687	0.672	0.327	0.618	0.500
$\frac{3}{4}$ – 16 UNJF	0.7500	0.7490	0.7480	0.125	1.036	1.230	1.220	0.812	0.797	0.380	0.711	0.570
$\frac{7}{8}$ – 14 UNJF	0.8750	0.8740	0.8730	0.143	1.244	1.438	1.428	0.937	0.922	0.438	0.808	0.650
1 – 12 UNJF	1.0000	0.9990	0.9980	0.167	1.479	1.625	1.615	1.062	1.047	0.493	0.923	0.740
$1\frac{1}{8}$ – 12 UNJF	1.1250	1.1240	1.1225	0.167	1.650	1.875	1.865	1.250	1.235	0.556	1.051	0.840

NOTE 1. Reference dimensions are for design purposes only and are not an inspection or manufacturing requirement.

NOTE 2. On bolts $\frac{3}{4}$ in or larger, centre drilling of shank is optional for manufacture.

Table 1. Dimensions *(continued)*

All dimensions are in inches

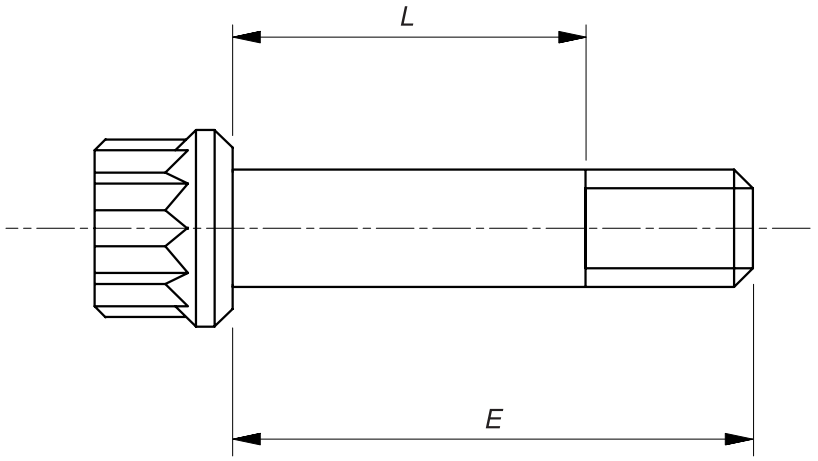
1	14	15	16	17	18	19	20	21	22	23	24
Nominal size and threads per in	*H*	*J*	*P*	*R*		*S* **dia.**	*U* ± **0.016**	*W* **nominal**	**Concentricity (see 4.3)**		
	max.			**max.**	**min.**	**max.**			*K*	*M*	*N*
10 – 32 UNJF	—	0.055		0.041	0.031	—	0.031	0.2500	0.004	0.003	0.0045
$\frac{1}{4}$ – 28 UNJF	–	0.069	0.062	0.041	0.031	—	0.031	0.3125	0.005	0.004	0.0045
$\frac{5}{16}$ – 24 UNJF	—	0.082		0.041	0.031	—	0.047	0.3750	0.006	0.005	0.0045
$\frac{3}{8}$ – 24 UNJF	—	0.091	0.070	0.057	0.047	—	0.047	0.4375	0.008	0.006	0.0045
$\frac{7}{16}$ – 20 UNJF	—	0.099		0.057	0.047	—	0.047	0.5000	0.009	0.008	0.006
$\frac{1}{2}$ – 20 UNJF	—	0.123		0.057	0.047	—	0.047	0.5625	0.010	0.008	0.006
$\frac{9}{16}$ – 18 UNJF	—	0.133		0.057	0.047	—	0.062	0.6250	0.011	0.009	0.006
			0.094								
$\frac{5}{8}$ – 18 UNJF	—	0.150		0.073	0.063	—	0.062	0.6875	0.012	0.010	0.006
$\frac{3}{4}$ – 16 UNJF	0.200	0.178		0.073	0.063	0.187	0.062	0.8125	0.015	0.012	0.006
$\frac{7}{8}$ – 14 UNJF	0.260	0.198		0.073	0.063	0.187	0.078	0.9375	0.018	0.014	0.009
1 – 12 UNJF	0.260	0.222	0.125	0.073	0.063	0.250	0.078	1.0625	0.020	0.016	0.009
$1\frac{1}{8}$ – 12 UNJF	0.320	0.258		0.073	0.063	0.250	0.094	1.2500	0.022	0.019	0.009

NOTE 1. Reference dimensions are for design purposes only and are not an inspection or manufacturing requirement.

NOTE 2. On bolts $\frac{3}{4}$ in or larger, centre drilling of shank is optional for manufacture.

Table 2. Bearing length *L* and overall length *E*

NOTE. Unallocated part numbers should not be used.
All dimensions are in inches



No. 10 – 32 UNJF			No. 10 – 32 UNJF			$\frac{1}{4}$ in UNJF			$\frac{1}{4}$ in UNJF		
Part no.	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010
D 2	0.125	0.565	D46	2.875	3.315	E 2	0.125	0.637	E46	2.875	3.387
D 3	0.187	0.627	D48	3.000	3.440	E 3	0.187	0.699	E48	3.000	3.512
D 4	0.250	0.690	D50	3.125	3.565	E 4	0.250	0.762	E50	3.125	3.637
D 5	0.312	0.752	D52	3.250	3.690	E 5	0.312	0.824	E52	3.250	3.762
D 6	0.375	0.815	D54	3.375	3.815	E 6	0.375	0.887	E54	3.375	3.887
D 7	0.438	0.878	D56	3.500	3.940	E 7	0.438	0.950	E56	3.500	4.012
D 8	0.500	0.940	D58	3.625	4.065	E 8	0.500	1.012	E58	3.625	4.137
D 9	0.562	1.002	D60	3.750	4.190	E 9	0.562	1.074	E60	3.750	4.262
D10	0.625	1.065	D62	3.875	4.315	E10	0.625	1.137	E62	3.875	4.387
D11	0.688	1.128	D64	4.000	4.440	E11	0.688	1.200	E64	4.000	4.512
D12	0.750	1.190	D66	4.125	4.565	E12	0.750	1.262	E66	4.125	4.637
D13	0.812	1.252	D68	4.250	4.690	E13	0.812	1.324	E68	4.250	4.762
D14	0.875	1.315	D70	4.375	4.815	E14	0.875	1.387	E70	4.375	4.887
D15	0.938	1.378	D72	4.500	4.940	E15	0.938	1.450	E72	4.500	5.012
D16	1.000	1.440	D74	4.625	5.065	E16	1.000	1.512	E74	4.625	5.137
D18	1.125	1.565	D76	4.750	5.190	E18	1.125	1.637	E76	4.750	5.262
D20	1.250	1.690	D78	4.875	5.315	E20	1.250	1.762	E78	4.875	5.387
D22	1.375	1.815	D80	5.000	5.440	E22	1.375	1.887	E80	5.000	5.512
D24	1.500	1.940	D82	5.125	5.565	E24	1.500	2.012	E82	5.125	5.637
D26	1.625	2.065	D84	5.250	5.690	E26	1.625	2.137	E84	5.250	5.762
D28	1.750	2.190	D86	5.375	5.815	E28	1.750	2.262	E86	5.375	5.887
D30	1.875	2.315	D88	5.500	5.940	E30	1.875	2.387	E88	5.500	6.012
D32	2.000	2.440	D90	5.625	6.065	E32	2.000	2.512	E90	5.625	6.137
D34	2.125	2.565	D92	5.750	6.190	E34	2.125	2.637	E92	5.750	6.262
D36	2.250	2.690	D94	5.875	6.315	E36	2.250	2.762	E94	5.875	6.387
D38	2.375	2.815	D96	6.000	6.440	E38	2.375	2.887	E96	6.000	6.512
D40	2.500	2.940				E40	2.500	3.012			
D42	2.625	3.065				E42	2.625	3.137			
D44	2.750	3.190				E44	2.750	3.262			

Table 2. Bearing length *L* and overall length *E* *(continued)*

$\frac{5}{16}$ in UNJF			$\frac{3}{8}$ in UNJF			$\frac{7}{16}$ in UNJF			$\frac{1}{2}$ in UNJF		
Part no.	*L* ± 0.010	*E* ± 0.010	Part no.	*L* ± 0.010	*E* ± 0.010	Part no.	*L* ± 0.010	*E* ± 0.010	Part no.	*L* ± 0.010	*E* ± 0.010
G 2	0.125	0.724									
G 3	0.187	0.786									
G 4	0.250	0.849	J 4	0.250	0.895	L 4	0.250	0.991	N 4	0.250	1.038
G 5	0.312	0.911	J 5	0.312	0.957	L 5	0.312	1.053	N 5	0.312	1.100
G 6	0.375	0.974	J 6	0.375	1.020	L 6	0.375	1.116	N 6	0.375	1.163
G 7	0.438	1.037	J 7	0.438	1.083	L 7	0.438	1.179	N 7	0.438	1.226
G 8	0.500	1.099	J 8	0.500	1.145	L 8	0.500	1.241	N 8	0.500	1.288
G 9	0.562	1.161	J 9	0.562	1.207	L 9	0.562	1.303	N 9	0.562	1.350
G10	0.625	1.224	J10	0.625	1.270	L10	0.625	1.366	N10	0.625	1.413
G11	0.688	1.287	J11	0.688	1.333	L11	0.688	1.429	N11	0.688	1.476
G12	0.750	1.349	J12	0.750	1.395	L12	0.750	1.491	N12	0.750	1.538
G13	0.812	1.411	J13	0.812	1.457	L13	0.812	1.553	N13	0.812	1.600
G14	0.875	1.474	J14	0.875	1.520	L14	0.875	1.616	N14	0.875	1.663
G15	0.938	1.507	J15	0.938	1.583	L15	0.938	1.679	N15	0.938	1.726
G16	1.000	1.599	J16	1.000	1.645	L16	1.000	1.741	N16	1.000	1.788
G18	1.125	1.724	J18	1.125	1.770	L18	1.125	1.866	N18	1.125	1.913
G20	1.250	1.849	J20	1.250	1.895	L20	1.250	1.991	N20	1.250	2.038
G22	1.375	1.974	J22	1.375	2.020	L22	1.375	2.116	N22	1.375	2.163
G24	1.500	2.099	J24	1.500	2.145	L24	1.500	2.241	N24	1.500	2.288
G26	1.625	2.224	J26	1.625	2.270	L26	1.625	2.366	N26	1.625	2.413
G28	1.750	2.349	J28	1.750	2.395	L28	1.750	2.491	N28	1.750	2.538
G30	1.875	2.474	J30	1.875	2.520	L30	1.875	2.616	N30	1.875	2.663
G32	2.000	2.599	J32	2.000	2.645	L32	2.000	2.741	N32	2.000	2.788
G34	2.125	2.724	J34	2.125	2.770	L34	2.125	2.866	N34	2.125	2.913
G36	2.250	2.849	J36	2.250	2.895	L36	2.250	2.991	N36	2.250	3.038
G38	2.375	2.974	J38	2.375	3.020	L38	2.375	3.110	N38	2.375	3.163
G40	2.500	3.099	J40	2.500	3.145	L40	2.500	3.241	N40	2.500	3.288
G42	2.625	3.224	J42	2.625	3.270	L42	2.625	3.366	N42	2.625	3.413
G44	2.750	3.349	J44	2.750	3.395	L44	2.750	3.491	N44	2.750	3.538
G46	2.875	3.474	J46	2.875	3.520	L46	2.875	3.616	N46	2.875	3.663
G48	3.000	3.599	J48	3.000	3.645	L48	3.000	3.741	N48	3.000	3.788
G50	3.125	3.724	J50	3.125	3.770	L50	3.125	3.866	N50	3.125	3.913
G52	3.250	3.849	J52	3.250	3.895	L52	3.250	3.991	N52	3.250	4.038
G54	3.375	3.974	J54	3.375	4.020	L54	3.375	4.116	N54	3.375	4.163

Table 2. Bearing length *L* and overall length *E* *(continued)*

$\frac{5}{16}$ in UNJF			$\frac{3}{8}$ in UNJF			$\frac{7}{16}$ in UNJF			$\frac{1}{2}$ in UNJF		
Part no.	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010
G56	3.500	4.099	J56	3.500	4.145	L56	3.500	4.241	N56	3.500	4.288
G58	3.625	4.224	J58	3.625	4.270	L58	3.625	4.366	N58	3.625	4.413
G60	3.750	4.349	J60	3.750	4.395	L60	3.750	4.491	N60	3.750	4.538
G62	3.875	4.474	J62	3.875	4.520	L62	3.875	4.616	N62	3.875	4.663
G64	4.000	4.599	J64	4.000	4.645	L64	4.000	4.741	N64	4.000	4.788
G66	4.125	4.724	J66	4.125	4.770	L66	4.125	4.866	N66	4.125	4.913
G68	4.250	4.849	J68	4.250	4.895	L68	4.250	4.991	N68	4.250	5.038
G70	4.375	4.974	J70	4.375	5.020	L70	4.375	5.116	N70	4.375	5.163
G72	4.500	5.099	J72	4.500	5.145	L72	4.500	5.241	N72	4.500	5.288
G74	4.625	5.224	J74	4.625	5.270	L74	4.625	5.366	N74	4.625	5.413
G76	4.750	5.349	J76	4.750	5.395	L76	4.750	5.491	N76	4.750	5.538
G78	4.875	5.474	J78	4.875	5.520	L78	4.875	5.616	N78	4.875	5.663
G80	5.000	5.599	J80	5.000	5.645	L80	5.000	5.741	N80	5.000	5.788
G82	5.125	5.724	J82	5.125	5.770	L82	5.125	5.866	N82	5.125	5.913
G84	5.250	5.849	J84	5.250	5.895	L84	5.250	5.991	N84	5.250	6.038
G86	5.375	5.974	J86	5.375	6.020	L86	5.375	6.116	N86	5.375	6.163
G88	5.500	6.099	J88	5.500	6.145	L88	5.500	6.241	N88	5.500	6.288
G90	5.625	6.224	J90	5.625	6.270	L90	5.625	6.366	N90	5.625	6.413
G92	5.750	6.349	J92	5.750	6.395	L92	5.750	6.491	N92	5.750	6.538
G94	5.875	6.474	J94	5.875	6.520	L94	5.875	6.616	N94	5.875	6.663
G96	6.000	6.599	J96	6.000	6.645	L96	6.000	6.741	N96	6.000	6.788

Table 2. Bearing length *L* and overall length *E* *(continued)*

$\frac{9}{16}$ in UNJF			$\frac{5}{8}$ in UNJF			$\frac{3}{4}$ in UNJF			$\frac{7}{8}$ in UNJF		
Part no.	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010
P 6	0.375	1.247	Q 6	0.375	1.294	S 6	0.375	1.431			
P 7	0.438	1.310	Q 7	0.438	1.357	S 7	0.438	1.494			
P 8	0.500	1.372	Q 8	0.500	1.419	S 8	0.500	1.556	U 8	0.500	1.764
P 9	0.562	1.434	Q 9	0.562	1.481	S 9	0.562	1.618	U 9	0.562	1.826
P10	0.625	1.497	Q10	0.625	1.544	S10	0.625	1.681	U10	0.625	1.889
P11	0.688	1.560	Q11	0.688	1.607	S11	0.688	1.744	U11	0.688	1.952
P12	0.750	1.622	Q12	0.750	1.669	S12	0.750	1.806	U12	0.750	2.014
P13	0.812	1.684	Q13	0.812	1.731	S13	0.812	1.868	U13	0.812	2.076
P14	0.875	1.747	Q14	0.875	1.794	S14	0.875	1.931	U14	0.875	2.139
P15	0.938	1.810	Q15	0.938	1.857	S15	0.938	1.994	U15	0.938	2.202
P16	1.000	1.872	Q16	1.000	1.919	S16	1.000	2.056	U16	1.000	2.264
P18	1.125	1.997	Q18	1.125	2.044	S18	1.125	2.181	U18	1.125	2.389
P20	1.250	2.122	Q20	1.250	2.169	S20	1.250	2.306	U20	1.250	2.514
P22	1.375	2.247	Q22	1.375	2.294	S22	1.375	2.431	U22	1.375	2.639
P24	1.500	2.372	Q24	1.500	2.419	S24	1.500	2.556	U24	1.500	2.764
P26	1.625	2.497	Q26	1.625	2.544	S26	1.625	2.681	U26	1.625	2.889
P28	1.750	2.622	Q28	1.750	2.669	S28	1.750	2.806	U28	1.750	3.014
P30	1.875	2.747	Q30	1.875	2.794	S30	1.875	2.931	U30	1.875	3.139
P32	2.000	2.872	Q32	2.000	2.919	S32	2.000	3.056	U32	2.000	3.264
P34	2.125	2.997	Q34	2.125	3.044	S34	2.125	3.181	U34	2.125	3.389
P36	2.250	3.122	Q36	2.250	3.169	S36	2.250	3.306	U36	2.250	3.514
P38	2.375	3.247	Q38	2.375	3.294	S38	2.375	3.431	U38	2.375	3.639
P40	2.500	3.372	Q40	2.500	3.419	S40	2.500	3.556	U40	2.500	3.764
P42	2.625	3.497	Q42	2.625	3.544	S42	2.625	3.681	U42	2.625	3.889
P44	2.750	3.622	Q44	2.750	3.669	S44	2.750	3.806	U44	2.750	4.014
P46	2.875	3.747	Q46	2.875	3.794	S46	2.875	3.931	U46	2.875	4.139
P48	3.000	3.872	Q48	3.000	3.919	S48	3.000	4.056	U48	3.000	4.264
P50	3.125	3.997	Q50	3.125	4.044	S50	3.125	4.181	U50	3.125	4.389
P52	3.250	4.122	Q52	3.250	4.169	S52	3.250	4.306	U52	3.250	4.514
P54	3.375	4.247	Q54	3.375	4.294	S54	3.375	4.431	U54	3.375	4.639
P56	3.500	4.372	Q56	3.500	4.419	S56	3.500	4.556	U56	3.500	4.764
P58	3.625	4.497	Q58	3.625	4.544	S58	3.625	4.681	U58	3.625	4.889
P60	3.750	4.622	Q60	3.750	4.669	S60	3.750	4.806	U60	3.750	5.014
P62	3.875	4.747	Q62	3.875	4.794	S62	3.875	4.931	U62	3.875	5.139
P64	4.000	4.872	Q64	4.000	4.919	S64	4.000	5.056	U64	4.000	5.264

Table 2. Bearing length *L* and overall length *E* *(continued)*

$\frac{9}{16}$ in UNJF			$\frac{5}{8}$ in UNJF			$\frac{3}{4}$ in UNJF			$\frac{7}{8}$ in UNJF		
Part no.	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010	**Part no.**	*L* ± 0.010	*E* ± 0.010
P66	4.125	4.997	Q66	4.125	5.044	S66	4.125	5.181	U66	4.125	5.389
P68	4.250	5.122	Q68	4.250	5.169	S68	4.250	5.306	U68	4.250	5.514
P70	4.375	5.247	Q70	4.375	5.294	S70	4.375	5.431	U70	4.375	5.639
P72	4.500	5.372	Q72	4.500	5.419	S72	4.500	5.556	U72	4.500	5.764
P74	4.625	5.497	Q74	4.625	5.544	S74	4.625	5.681	U74	4.625	5.889
P76	4.750	5.622	Q76	4.750	5.669	S76	4.750	5.806	U76	4.750	6.014
P78	4.875	5.747	Q78	4.875	5.794	S78	4.875	5.931	U78	4.875	6.139
P80	5.000	5.872	Q80	5.000	5.919	S80	5.000	6.056	U80	5.000	6.264
P82	5.125	5.997	Q82	5.125	6.044	S82	5.125	6.181	U82	5.125	6.389
P84	5.250	6.122	Q84	5.250	6.169	S84	5.250	6.306	U84	5.250	6.514
P86	5.375	6.247	Q86	5.375	6.294	S86	5.375	6.431	U86	5.375	6.639
P88	5.500	6.372	Q88	5.500	6.419	S88	5.500	6.556	U88	5.500	6.764
P90	5.625	6.497	Q90	5.625	6.544	S90	5.625	6.681	U90	5.625	6.889
P92	5.750	6.622	Q92	5.750	6.669	S92	5.750	6.806	U92	5.750	7.014
P94	5.875	6.747	Q94	5.875	6.794	S94	5.875	6.931	U94	5.875	7.139
P96	6.000	6.872	Q96	6.000	6.919	S96	6.000	7.056	U96	6.000	7.264
P98	6.125	6.997	Q98	6.125	7.044	S98	6.125	7.181	U98	6.125	7.389
P100	6.250	7.122	Q100	6.250	7.169	S100	6.250	7.306	U100	6.250	7.514
P102	6.375	7.247	Q102	6.375	7.294	S102	6.375	7.431	U102	6.375	7.639
P104	6.500	7.372	Q104	6.500	7.419	S104	6.500	7.556	U104	6.500	7.764
P106	6.625	7.497	Q106	6.625	7.544	S106	6.625	7.681	U106	6.625	7.889
P108	6.750	7.622	Q108	6.750	7.669	S108	6.750	7.806	U108	6.750	8.014
P110	6.875	7.747	Q110	6.875	7.794	S110	6.875	7.931	U110	6.875	8.139
P112	7.000	7.872	Q112	7.000	7.919	S112	7.000	8.056	U112	7.000	8.264

Table 2. Bearing length *L* and overall length *E* *(continued)*

1 in UNJF			$1\frac{1}{8}$ in UNJF		
Part no.	*L* ± 0.010	*E* ±0.010	Part no.	*L* ±0.010	*E* ±0.010
W 8	0.500	1.999	X 8	0.500	2.170
W 9	0.562	2.061	X 9	0.562	2.232
W10	0.625	2.124	X10	0.625	2.295
W11	0.688	2.187	X11	0.688	2.358
W12	0.750	2.249	X12	0.750	2.420
W13	0.812	2.311	X13	0.812	2.482
W14	0.875	2.374	X14	0.875	2.545
W15	0.938	2.437	X15	0.938	2.608
W16	1.000	2.499	X16	1.000	2.670
W18	1.125	2.624	X18	1.125	2.795
W20	1.250	2.749	X20	1.250	2.920
W22	1.375	2.874	X22	1.375	3.045
W24	1.500	2.999	X24	1.500	3.170
W26	1.625	3.124	X26	1.625	3.295
W28	1.750	3.249	X28	1.750	3.420
W30	1.875	3.374	X30	1.875	3.545
W32	2.000	3.499	X32	2.000	3.670
W34	2.125	3.624	X34	2.125	3.795
W36	2.250	3.749	X36	2.250	3.920
W38	2.375	3.874	X38	2.375	4.045
W40	2.500	3.999	X40	2.500	4.170
W42	2.625	4.124	X42	2.625	4.295
W44	2.750	4.249	X44	2.750	4.420
W46	2.875	4.374	X46	2.875	4.545
W48	3.000	4.499	X48	3.000	4.670
W50	3.125	4.624	X50	3.125	4.795
W52	3.250	4.749	X52	3.250	4.920
W54	3.375	4.874	X54	3.375	5.045

Table 2. Bearing length *L* and overall length *E* *(continued)*

1 in UNJF			$1\frac{1}{8}$ in UNJF		
Part no.	*L* ± 0.010	*E* ±0.010	Part no.	*L* ±0.010	*E* ±0.010
W56	3.500	4.999	X56	3.500	5.170
W58	3.625	5.124	X58	3.625	5.295
W60	3.750	5.249	X60	3.750	5.420
W62	3.875	5.374	X62	3.875	5.545
W64	4.000	5.499	X64	4.000	5.670
W66	4.125	5.624	X66	4.125	5.795
W68	4.250	5.749	X68	4.250	5.920
W70	4.375	5.874	X70	4.375	6.045
W72	4.500	5.999	X72	4.500	6.170
W74	4.625	6.124	X74	4.625	6.295
W76	4.750	6.249	X76	4.750	6.420
W78	4.875	6.374	X78	4.875	6.545
W80	5.000	6.499	X80	5.000	6.670
W82	5.125	6.624	X82	5.125	6.795
W84	5.250	6.749	X84	5.250	6.920
W86	5.375	6.874	X86	5.375	7.045
W88	5.500	6.999	X88	5.500	7.170
W90	5.625	7.124	X90	5.625	7.295
W92	5.750	7.249	X92	5.750	7.420
W94	5.875	7.374	X94	5.875	7.545
W96	6.000	7.499	X96	6.000	7.670
W98	6.125	7.624	X98	6.125	7.795
W100	6.250	7.749	X100	6.250	7.920
W102	6.375	7.874	X102	6.375	8.045
W104	6.500	7.999	X104	6.500	8.170
W106	6.625	8.124	X106	6.625	8.295
W108	6.750	8.249	X108	6.750	8.420
W110	6.875	8.374	X110	6.875	8.545
W112	7.000	8.499	X112	7.000	8.670

Annex

Annex A (normative)
Oversize bolts

The dimensions of oversize bolts shall be as specified in table A.1.

Table A.1 Dimensions of oversize bolts

All dimensions are in inches

Nominal size UNJF	Decimal equivalent	*A* Plain shank diameter		*X* First oversize		*Y* Second oversize	
		max.	min.	max.	min.	max.	min.
$\frac{1}{4}$ – 28 UNJF	0.2500	0.2495	0.2485	0.2651	0.2641	0.2808	0.2798
$\frac{5}{16}$ – 24 UNJF	0.3125	0.3120	0.3110	0.3276	0.3266	0.3433	0.3423
$\frac{3}{8}$ – 24 UNJF	0.3750	0.3745	0.3735	0.3901	0.3891	0.4058	0.4048
$\frac{7}{16}$ – 20 UNJF	0.4375	0.4370	0.4360	0.4526	0.4516	0.4683	0.4673
$\frac{1}{2}$ – 20 UNJF	0.5000	0.4995	0.4985	0.5151	0.5141	0.5308	0.5298
$\frac{9}{16}$ – 18 UNJF	0.5625	0.5615	0.5605	0.5771	0.5761	0.5928	0.5918
$\frac{5}{8}$ – 18 UNJF	0.6250	0.6240	0.6230	0.6396	0.6386	0.6553	0.6543
$\frac{3}{4}$ – 16 UNJF	0.7500	0.7490	0.7480	0.7646	0.7636	0.7803	0.7793
$\frac{7}{8}$ – 14 UNJF	0.8750	0.8740	0.8730	0.8896	0.8886	0.9053	0.9043
1 – 12 UNJF	1.0000	0.9990	0.9980	1.0146	1.0136	1.0303	1.0293

NOTE 1. All other dimensions are as given in table 1.

NOTE 2. Examples of part numbers for identification of bolts are given in clause **6**.

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List of references (see clause 2)

Normative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS A 241 : 1973	*General requirements for steel protruding head bolts of tensile strength 1250 MPa (180 000 lbf/in^2) or greater*
BS 2S 147 : 1976	*Specification for 0.5 % nickel-chromium-molybdenum steel bars for the manufacture of forged bolts and forged nuts*
BS 2S 149 : 1976	*Specification for 1.75 % nickel-chromium-molybdenum steel bars for the manufacture of forged bolts and forged nuts*
BS 4084 : 1996	*UNJ threads, with controlled root radius, for aerospace — Inch series*

Other references

[1] RS 680 *Wrenching configuration, double hexagon threaded fasteners* available from Society of British Aerospace Companies, 60 Petty France, Victoria, London, SW1H 9EU.

[2] DEF STAN 03-19 *Electro-Deposition of Cadmium* available from Ministry of Defence (Procurement Executive), Directorate of Standardization, Kentigern House, 65 Brown St, Glasgow G2 8EX.

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