BRITISH STANDARD AEROSPACE SERIES

BS 2A 229:1972

Incorporating Amendment Nos. 1, 2 and 3

Specification for

Hexagonal head steel bolts 1100 MPa

UDC 629.7:621.882.211:669.14

This British Standard, having been approved by the Aerospace 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 12 September 1972

The following BSI reference relates to the work on this standard:
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2129	October 1976	
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Contents

This revision of BS A229:1968 has been prepared to incorporate Amendment Slip No. 1:1969 (AMD 195,) and also to extend the size range to include $^{9}/_{16}$–18 to $1^{1}/_{4}$–12 UNJF bolts. Dimensions for oversize bolts are given in Appendix A.

It provides a range of 1 100 MPa to 1 250 MPa steel bolts with UNJ profile threads and close tolerance shanks for aircraft use. The lengths of the bolts are in fractional increments.

This standard requires reference to the following British Standards:

BS 4084, *Unified screw threads of "UNJ" basic profile.*

BS A 100, *General requirements for bolts and nuts of tensile strength not exceeding 1 250 MPa.*

BS S 147, *Nickel-chromium-molybdenum steel (bar for the manufacture of forged bolts only).*

BS S 148, *Low nickel-chromium steel (bar for the manufacture of forged bolts only).*

BS S 149, *1.75 per cent nickel-chromium-molybdenum steel.*

BS S ..., *1 % chromium-molybdenum steel bars for the manufacture of forged bolts and forged nuts*[1)].

NOTE 1 The values in imperial units are to be regarded as the standard. The table in Appendix A provides millimetre equivalents of inch dimensions and is based on the tables in BS 350, "*Conversion factors and tables*".

NOTE 2 1 MPa = 1 N/mm^2 = 1 MN/m^2 = 145.0 lbf/in^2. Information on SI units is given in BS 3763, "*The International System of units (SI)*".

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

[1)] In course of preparation.

1 Scope

This British Standard specifies the materials, dimensions, finish and inspection requirements for cadmium plated steel bolts with hexagonal heads and Unified threads for aircraft use.

2 General requirement

The bolts shall be manufactured, inspected and tested in accordance with the requirements of BS A 100.

3 Material and manufacture

3.1 The bolts shall be forged from material which complies with the latest issue of one of the following British Standards:

BS S 147

or BS S 148

or BS S 149

or BS S ...[2)].

3.2 In the finally heat-treated condition, the mechanical properties of the material used for forged bolts shall be as follows:

0.2 % proof stress	not less than 965 MPa
Tensile strength	not less than 1 100 MPa
Elongation on 5.65 $\sqrt{S_0}$	not less than 10 %

4 Dimensions

4.1 All bolts, after application of the ant-corrosion coating, shall conform to the dimensions and tolerances given in Table 1 and Table 2 or Appendix A.

4.2 The run-out of the thread shall comply with the relevant requirements of BS A 100.

4.3 The nominal length of the bolt shall be the bearing length *L*.

4.4 Dimensions of oversize bolts are given in Appendix A.

5 Screw threads

The screw threads shall conform to the basic thread form, diameter and related pitches specified in BS 4084, "*Unified screw threads of "UNJ" basic profile (Class 3A)*".

6 Anti-corrosion treatment

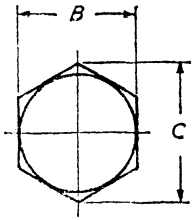
All bolts shall be coated with cadmium, in accordance with the relevant requirements of BS A 100.

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 numbers shown in Table 2, e.g. 2A 229E62.

Oversize bolts shall be marked as state in Appendix A.

[2)] In course of preparation.



NOTE It is permissible to suitable chamfer the blank prior to thread rolling operation without any subsequent machining provided dia *G* and the max. runout of thread at bolt end are maintained.

* For bearing length *L* and overall length *E* see Table 2

Figure 1

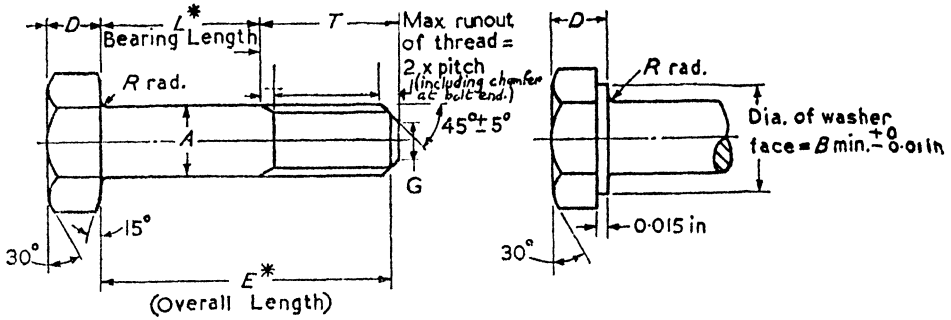


Figure 2

Alternative form of bolt head at the option of the bolt manufacturer

Third angle projection

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Nominal size UNJF	**Decimal equivalent of nominal size**	**Diameter of plain portion of shank *A***		**2 × pitch**	***T* min. (reference only)**	**Width across flats** *B*		**Width across corners** *C*		**Thickness of head** *D*		**Radius under bolt head** *R*		**Diameter of chamfer** *G*
		Max.	**Min.**			**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	± 0.010
	in	in	in	in	in	in	in	in	in	in	in	in	in	in
10–32	0.1900	0.1895	0.1885	.063	0.381	0.376	0.367	0.434	0.419	0.125	0.110	0.025	0.015	0.120
1/4–28	0.2500	0.2495	0.2485	.071	0.443	0.439	0.430	0.507	0.491	0.140	0.125	0.025	0.015	0.174
5/16–24	0.3125	0.3120	0.3110	.083	0.506	0.502	0.492	0.580	0.561	0.171	0.156	0.025	0.015	0.229
3/8–24	0.3750	0.3745	0.3735	.083	0.615	0.564	0.553	0.651	0.631	0.203	0.188	0.025	0.015	0.292
7/16–20	0.4375	0.4370	0.4360	.100	0.631	0.690	0.679	0.797	0.775	0.234	0.219	0.030	0.020	0.344
1/2–20	0.5000	0.4995	0.4985	.100	0.757	0.752	0.741	0.868	0.845	0.265	0.250	0.030	0.020	0.406
9/16–18	0.5625	0.5615	0.5605	0.111	0.859	0.877	0.865	1.001	0.987	0.296	0.281	0.035	0.020	0.462
5/8–18	0.6250	0.6240	0.6230	0.111	0.921	0.940	0.928	1.073	1.059	0.327	0.312	0.040	0.025	0.524
3/4–16	0.7500	0.7490	0.7480	0.125	1.057	1.064	1.052	1.214	1.200	0.390	0.375	0.045	0.030	0.640
7/8–14	0.8750	0.8740	0.8730	0.143	1.195	1.252	1.239	1.429	1.414	0.453	0.438	0.050	0.035	0.754
1–12	1.0000	0.9990	0.9980	0.167	1.314	1.440	1.427	1.643	1.628	0.515	0.500	0.060	0.045	0.865
1 1/8–12	1.1250	1.1240	1.1225	0.167	1.463	1.627	1.614	1.856	1.842	0.577	0.562	0.070	0.055	0.990
1 1/4–12	1.250	1.2490	1.2475	0.167	1.651	1.814	1.801	2.071	2.055	0.640	0.625	0.075	0.060	1.114

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

NOTE Unallocated part numbers should not be used.

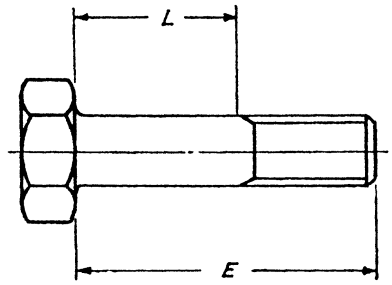


Figure 3

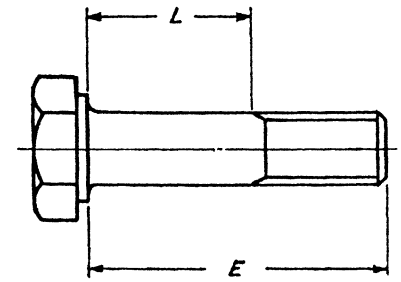


Figure 4

No. 10–32 UNJF			$^1/_4$–28 UNJF			$^5/_{16}$–24 UNJF		
Part No.	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**
	in	in		in	in		in	in
D2	0.125	0.531						
D3	0.188	0.594	E3	0.188	0.656	G3	0.188	0.719
D4	0.250	0.656	E4	0.250	0.718	G4	0.250	0.781
D5	0.312	0.718	E5	0.312	0.780	G5	0.312	0.843
D6	0.375	0.781	E6	0.375	0.843	G6	0.375	0.906
D7	0.438	0.844	E7	0.438	0.906	G7	0.438	0.969
D8	0.500	0.906	E8	0.500	0.968	G8	0.500	1.031
D9	0.562	0.968	E9	0.562	1.030	G9	0.562	1.093
D10	0.625	1.031	E10	0.625	1.093	G10	0.625	1.156
D11	0.688	1.094	E11	0.688	1.156	G11	0.688	1.219
D12	0.750	1.156	E12	0.750	1.218	G12	0.750	1.281
D13	0.812	1.218	E13	0.812	1.280	G13	0.812	1.343
D14	0.875	1.281	E14	0.875	1.343	G14	0.875	1.406
D15	0.938	1.344	E15	0.938	1.406	G15	0.938	1.469
D16	1.000	1.406	E16	1.000	1.468	G16	1.000	1.531
D17	1.062	1.468	E17	1.062	1.530	G17	1.062	1.593
D18	1.125	1.531	E18	1.125	1.593	G18	1.125	1.656
D19	1.188	1.594	E19	1.188	1.656	G19	1.188	1.719
D20	1.250	1.656	E20	1.250	1.718	G20	1.250	1.781
D21	1.312	1.718	E21	1.312	1.780	G21	1.312	1.843
D22	1.375	1.781	E22	1.375	1.843	G22	1.375	1.906
D23	1.438	1.844	E23	1.438	1.906	G23	1.438	1.969
D24	1.500	1.906	E24	1.500	1.968	G24	1.500	2.031
D25	1.562	1.968	E25	1.562	2.030	G25	1.562	2.093
D26	1.625	2.031	E26	1.625	2.093	G26	1.625	2.156
D27	1.688	2.094	E27	1.688	2.156	G27	1.688	2.219
D28	1.750	2.156	E28	1.750	2.218	G28	1.750	2.281
D29	1.812	2.218	E29	1.812	2.280	G29	1.812	2.343
D30	1.875	2.281	E30	1.875	2.343	G30	1.875	2.406
D31	1.938	2.344	E31	1.938	2.406	G31	1.938	2.469

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

No. 10–32 UNJF			$^1/_4$–28 UNJF			$^5/_{16}$–24 UNJF		
Part No.	*L* ± 0.010	*E* ± 0.015	Part No.	*L* ± 0.010	*E* ± 0.015	Part No.	*L* ± 0.010	*E* ± 0.015
	in	in		in	in		in	in
D32	2.000	2.406	E32	2.000	2.468	G32	2.000	2.531
D34	2.125	2.531	E34	2.125	2.593	G34	2.125	2.656
D36	2.250	2.656	E36	2.250	2.718	G36	2.250	2.781
D38	2.375	2.781	E38	2.375	2.843	G38	2.375	2.906
D40	2.500	2.906	E40	2.500	2.968	G40	2.500	3.031
D42	2.625	3.031	E42	2.625	3.093	G42	2.625	3.156
D44	2.750	3.156	E44	2.750	3.218	G44	2.750	3.281
D46	2.875	3.281	E46	2.875	3.343	G46	2.875	3.406
D48	3.000	3.406	E48	3.000	3.468	G48	3.000	3.531
D50	3.125	3.531	E50	3.125	3.593	G50	3.125	3.656
D52	3.250	3.656	E52	3.250	3.718	G52	3.250	3.781
D54	3.375	3.781	E54	3.375	3.843	G54	3.375	3.906
D56	3.500	3.906	E56	3.500	3.968	G56	3.500	4.031
D58	3.625	4.031	E58	3.625	4.093	G58	3.625	4.156
D60	3.750	4.156	E60	3.750	4.218	G60	3.750	4.281
D62	3.875	4.281	E62	3.875	4.343	G62	3.875	4.406
D64	4.000	4.406	E64	4.000	4.468	G64	4.000	4.531
D66	4.125	4.531	E66	4.125	4.593	G66	4.125	4.656
D68	4.250	4.656	E68	4.250	4.718	G68	4.250	4.781
D70	4.375	4.781	E70	4.375	4.843	G70	4.375	4.906
D72	4.500	4.906	E72	4.500	4.968	G72	4.500	5.031
D74	4.625	5.031	E74	4.625	5.093	G74	4.625	5.156
D76	4.750	5.156	E76	4.750	5.218	G76	4.750	5.281
D78	4.875	5.281	E78	4.875	5.343	G78	4.875	5.406
D80	5.000	5.406	E80	5.000	5.468	G80	5.000	5.531
D82	5.125	5.531	E82	5.125	5.593	G82	5.125	5.656
D84	5.250	5.656	E84	5.250	5.718	G84	5.250	5.781
D86	5.375	5.781	E86	5.375	5.843	G86	5.375	5.906
D88	5.500	5.906	E88	5.500	5.968	G88	5.500	6.031
D90	5.625	6.031	E90	5.625	6.093	G90	5.625	6.156
D92	5.750	6.156	E92	5.750	6.218	G92	5.750	6.281
D94	5.875	6.281	E94	5.875	6.343	G94	5.875	6.406
D96	6.000	6.406	E96	6.000	6.468	G96	6.000	6.531

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

NOTE Unallocated part numbers should not be used.

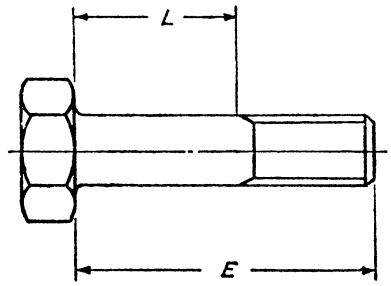


Figure 3

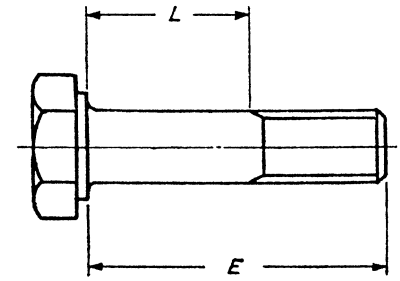


Figure 4

$^{3}/_{8}$–24 UNJF			$^{7}/_{16}$–20 UNJF			$^{1}/_{2}$–20 UNJF		
Part No.	*L* ± 0.010	*E* ± 0.015	Part No.	*L* ± 0.010	*E* ± 0.015	Part No.	*L* ± 0.010	*E* ± 0.015
	in	in		in	in		in	in
J4	0.250	0.891	L4	0.250	0.906			
J5	0.312	0.954	L5	0.312	0.968	N5	0.312	1.094
J6	0.375	1.016	L6	0.375	1.031	N6	0.375	1.157
J7	0.438	1.079	L7	0.438	1.094	N7	0.438	1.220
J8	0.500	1.141	L8	0.500	1.156	N8	0.500	1.282
J9	0.562	1.203	L9	0.562	1.218	N9	0.562	1.334
J10	0.625	1.266	L10	0.625	1.281	N10	0.625	1.407
J11	0.688	1.329	L11	0.688	1.344	N11	0.688	1.470
J12	0.750	1.391	L12	0.750	1.406	N12	0.750	1.532
J13	0.812	1.453	L13	0.812	1.468	N13	0.812	1.594
J14	0.875	1.516	L14	0.875	1.531	N14	0.875	1.657
J15	0.938	1.579	L15	0.938	1.594	N15	0.938	1.720
J16	1.000	1.641	L16	1.000	1.656	N16	1.000	1.782
J17	1.062	1.703	L17	1.062	1.718	N17	1.062	1.844
J18	1.125	1.766	L18	1.125	1.781	N18	1.125	1.907
J19	1.188	1.829	L19	1.188	1.844	N19	1.188	1.970
J20	1.250	1.891	L20	1.250	1.906	N20	1.250	2.032
J21	1.312	1.953	L21	1.312	1.968	N21	1.312	2.094
J22	1.375	2.016	L22	1.375	2.031	N22	1.375	2.157
J23	1.438	2.079	L23	1.438	2.094	N23	1.438	2.220
J24	1.500	2.141	L24	1.500	2.156	N24	1.500	2.282
J25	1.562	2.203	L25	1.562	2.218	N25	1.562	2.344
J26	1.625	2.266	L26	1.625	2.281	N26	1.625	2.407
J27	1.688	2.329	L27	1.688	2.344	N27	1.688	2.470
J28	1.750	2.391	L28	1.750	2.406	N28	1.750	2.532
J29	1.812	2.453	L29	1.812	2.468	N29	1.812	2.594
J30	1.875	2.516	L30	1.875	2.531	N30	1.875	2.657
J31	1.938	2.579	L31	1.938	2.594	N31	1.938	2.720

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

$^{3}/_{8}$–24 UNJF			$^{7}/_{16}$–20 UNJF			$^{1}/_{2}$–20 UNJF		
Part No.	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**
	in	in		in	in		in	in
J32	2.000	2.641	L32	2.000	2.656	N32	2.000	2.782
J34	2.125	2.766	L34	2.125	2.781	N34	2.125	2.907
J36	2.250	2.891	L36	2.250	2.906	N36	2.250	3.032
J38	2.375	3.016	L38	2.375	3.031	N38	2.375	3.157
J40	2.500	3.141	L40	2.500	3.156	N40	2.500	3.282
J42	2.625	3.266	L42	2.625	3.281	N42	2.625	3.407
J44	2.750	3.391	L44	2.750	3.406	N44	2.750	3.532
J46	2.875	3.516	L46	2.875	3.531	N46	2.875	3.657
J48	3.000	3.641	L48	3.000	3.656	N48	3.000	3.782
J50	3.125	3.766	L50	3.125	3.781	N50	3.125	3.907
J52	3.250	3.891	L52	3.250	3.906	N52	3.250	4.032
J54	3.375	4.016	L54	3.375	4.031	N54	3.375	4.157
J56	3.500	4.141	L56	3.500	4.156	N56	3.500	4.282
J58	3.625	4.266	L58	3.625	4.281	N58	3.625	4.407
J60	3.750	4.391	L60	3.750	4.406	N60	3.750	4.532
J62	3.875	4.516	L62	3.875	4.531	N62	3.875	4.657
J64	4.000	4.641	L64	4.000	4.656	N64	4.000	4.782
J66	4.125	4.766	L66	4.125	4.781	N66	4.125	4.907
J68	4.250	4.891	L68	4.250	4.906	N68	4.250	5.032
J70	4.375	5.016	L70	4.375	5.031	N70	4.375	5.157
J72	4.500	5.141	L72	4.500	5.156	N72	4.500	5.282
J74	4.625	5.266	L74	4.625	5.281	N74	4.625	5.407
J76	4.750	5.391	L76	4.750	5.406	N76	4.750	5.532
J78	4.875	5.516	L78	4.875	5.531	N78	4.875	5.657
J80	5.000	5.641	L80	5.000	5.656	N80	5.000	5.782
J82	5.125	5.766	L82	5.125	5.781	N82	5.125	5.907
J84	5.250	5.891	L84	5.250	5.906	N84	5.250	6.032
J86	5.375	6.016	L86	5.375	6.031	N86	5.375	6.157
J88	5.500	6.141	L88	5.500	6.156	N88	5.500	6.282
J90	5.625	6.266	L90	5.625	6.281	N90	5.625	6.407
J92	5.750	6.391	L92	5.750	6.406	N92	5.750	6.532
J94	5.875	6.516	L94	5.875	6.531	N94	5.875	6.657
J96	6.000	6.641	L96	6.000	6.656	N96	6.000	6.782

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

$^{9}/_{16}$–18 UNJF						$^{5}/_{8}$–18 UNJF					
Part No.	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**
	in	in		in	in		in	in		in	in
P 5	0.312	1.196	P74	4.625	5.509	Q 5	0.312	1.258	Q74	4.625	5.571
P 6	0.375	1.259	P76	4.750	5.635	Q 6	0.375	1.321	Q76	4.750	5.696
P 7	0.438	1.322	P78	4.875	5.759	Q 7	0.438	1.381	Q78	4.875	5.821
P 8	0.500	1.382	P80	5.000	5.884	Q 8	0.500	1.446	Q80	5.000	5.946
P 9	0.562	1.446	P82	5.125	6.009	Q 9	0.562	1.508	Q82	5.125	6.071
P10	0.625	1.519	P84	5.250	6.314	Q10	0.625	1.571	Q84	5.250	6.196
P11	0.688	1.572	P86	5.375	6.259	Q11	0.688	1.634	Q86	5.375	6.321
P12	0.750	1.634	P88	5.500	6.384	Q12	0.750	1.696	Q88	5.500	6.446
P13	0.812	1.642	P90	5.625	6.509	Q13	0.812	1.758	Q90	5.625	6.571
P14	0.875	1.729	P92	5.750	6.634	Q14	0.875	1.821	Q92	5.750	6.696
P15	0.938	1.822	P94	5.875	6.759	Q15	0.938	1.884	Q94	5.875	6.821
P16	1.000	1.884	P96	6.000	6.884	Q16	1.000	1.946	Q96	6.000	6.946
P17	1.062	1.946				Q17	1.062	2.008			
P18	1.125	2.009				Q18	1.125	2.071			
P19	1.188	2.072				Q19	1.188	2.134			
P20	1.250	2.134				Q20	1.250	2.196			
P21	1.312	2.196				Q21	1.312	2.258			
P22	1.375	2.259				Q22	1.375	2.321			
P23	1.438	2.322				Q23	1.438	2.384			
P24	1.500	2.384				Q24	1.500	2.446			
P25	1.562	2.446				Q25	1.562	2.508			
P26	1.625	2.509				Q26	1.625	2.571			
P27	1.688	2.572				Q27	1.688	2.634			
P28	1.750	2.634				Q28	1.750	2.696			
P29	1.812	2.696				Q29	1.812	2.758			
P30	1.875	2.759				Q30	1.875	2.821			
P31	1.938	2.822				Q31	1.938	2.884			
P32	2.000	2.884				Q32	2.000	2.946			
P34	2.125	3.009				Q34	2.125	3.071			
P36	2.250	3.134				Q36	2.250	3.196			
P38	2.375	3.259				Q38	2.375	3.321			
P40	2.500	3.384				Q40	2.500	3.446			
P42	2.625	3.509				Q42	2.625	3.571			
P44	2.750	3.634				Q44	2.750	3.696			
P46	2.875	3.759				Q46	2.875	3.821			
P48	3.000	3.884				Q48	3.000	3.940			
P50	3.125	4.009				Q50	3.125	4.071			
P52	3.250	4.314				Q52	3.250	4.196			
P54	3.375	4.259				Q54	3.375	4.321			
P56	3.500	4.384				Q56	3.500	4.446			
P58	3.625	4.509				Q58	3.625	4.571			
P60	3.750	4.634				Q60	3.750	4.696			
P62	3.875	4.759				Q62	3.875	4.821			
P64	4.000	4.884				Q64	4.000	4.946			
P66	4.125	5.009				Q66	4.125	5.071			
P68	4.250	5.314				Q68	4.250	5.196			
P70	4.375	5.259				Q70	4.375	5.321			
P72	4.500	5.384				Q72	4.500	5.446			

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

¾–16 UNJF						⅞–14 UNJF					
Part No.	*L* ± 0.010	*E* ± 0.015	Part No.	*L* ± 0.010	*E* ± 0.015	Part No.	*L* ± 0.010	*E* ± 0.015	Part No.	*L* ± 0.010	*E* ± 0.015
	in	in		in	in		in	in		in	in
S 5	0.312	1.394	S74	4.625	5.707	U 5	0.312	1.532	U74	4.625	5.845
S 6	0.375	1.457	S76	4.750	5.832	U 6	0.375	4.595	U76	4.750	5.970
S 7	0.438	1.520	S78	4.875	5.957	U 7	0.438	1.658	U78	4.875	6.005
S 8	0.500	1.582	S80	5.000	6.082	U 8	0.500	1.720	U80	5.000	6.220
S 9	0.562	1.644	S82	5.125	6.207	U 9	0.562	1.782	U82	5.125	6.345
S10	0.625	1.707	S84	5.250	6.332	U10	0.625	1.845	U84	5.250	6.470
S11	0.688	1.770	S86	5.375	6.457	U11	0.688	1.908	U86	5.375	6.595
S12	0.750	1.832	S88	5.500	6.582	U12	0.750	1.970	U88	6.500	6.720
S13	0.812	1.894	S90	5.625	6.707	U13	0.812	2.032	U90	5.625	6.845
S14	0.875	1.957	S92	5.750	6.832	U14	0.875	2.095	U92	5.750	6.970
S15	0.938	2.020	S94	5.875	6.957	U15	0.938	2.203	U94	5.875	7.095
S16	1.000	2.082	S96	6.000	7.082	U16	1.000	2.220	U96	6.000	7.220
S17	1.062	2.144				U17	1.062	2.282			
S18	1.125	2.207				U18	1.125	2.345			
S19	1.188	2.270				U19	1.188	2.408			
S20	1.250	2.332				U20	1.250	2.470			
S21	1.312	2.394				U21	1.312	2.532			
S22	1.375	2.457				U22	1.375	2.595			
S23	1.438	2.520				U23	1.438	2.658			
S24	1.500	2.582				U24	1.500	2.720			
S25	1.562	2.644				U25	1.562	2.782			
S26	1.625	2.707				U26	1.625	2.845			
S27	1.688	2.770				U27	1.688	2.908			
S28	1.750	2.832				U28	1.750	2.970			
S29	1.812	2.894				U29	1.812	3.032			
S30	1.875	2.957				U30	1.875	3.095			
S31	1.938	3.020				U31	1.938	3.158			
S32	2.000	3.082				U32	2.000	3.220			
S34	2.125	3.207				U34	2.125	3.345			
S36	2.250	3.332				U36	2.250	3.470			
S38	2.375	3.457				U38	2.375	3.595			
S40	2.500	3.582				U40	2.500	3.720			
S42	2.625	3.707				U42	2.625	3.845			
S44	2.750	3.832				U44	2.750	3.970			
S46	2.875	3.957				U46	2.875	4.095			
S48	3.000	4.082				U48	3.000	4.220			
S50	3.125	4.207				U50	3.125	4.345			
S52	3.250	4.332				U52	3.250	4.470			
S54	3.375	4.457				U54	3.375	4.595			
S56	3.500	4.582				U56	3.500	4.720			
S58	3.625	4.707				U58	3.625	4.845			
S60	3.750	4.832				U60	3.750	4.970			
S62	3.875	4.957				U62	3.875	5.095			
S64	4.000	5.082				U64	4.000	5.220			
S66	4.125	5.207				U66	4.125	5.345			
S68	4.250	5.332				U68	4.250	5.470			
S70	4.375	5.457				U70	4.375	5.595			
S72	4.500	5.582				U72	4.500	5.720			

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

1–12 UNJF						1⅛–12 UNJF					
Part No.	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**
	in	in		in	in		in	in		in	in
W 5	0.312	1.651	W74	4.625	5.964	Y 5	0.312	1.800	Y74	4.625	6.113
W 6	0.375	1.714	W76	4.750	6.089	Y 6	0.375	1.863	Y76	4.750	6.238
W 7	0.438	1.777	W78	4.875	6.214	Y 7	0.438	1.926	Y78	4.875	6.363
W 8	0.500	1.839	W80	5.000	6.339	Y 8	0.500	1.988	Y80	5.000	6.488
W 9	0.562	1.901	W82	5.125	6.464	Y 9	0.562	2.050	Y82	5.125	6.613
W10	0.625	1.964	W84	5.250	6.589	Y10	0.625	2.113	Y84	5.250	6.738
W11	0.688	2.027	W86	5.375	6.714	Y11	0.688	2.176	Y86	5.375	6.863
W12	0.750	2.089	W88	5.500	6.839	Y12	0.750	2.238	Y88	5.500	6.988
W13	0.812	2.151	W90	5.625	6.964	Y13	0.812	2.300	Y90	5.625	7.113
W14	0.875	2.214	W92	5.750	7.089	Y14	0.875	2.363	Y92	5.750	7.238
W15	0.938	2.277	W94	5.875	7.214	Y15	0.938	2.426	Y94	5.875	7.363
W16	1.000	2.339	W96	6.000	7.339	Y16	1.000	2.488	Y96	6.000	7.488
W17	1.062	2.401				Y17	1.062	2.550			
W18	1.125	2.464				Y18	1.125	2.613			
W19	1.188	2.527				Y19	1.188	2.676			
W20	1.250	2.589				Y20	1.250	2.738			
W21	1.312	2.651				Y21	1.312	2.800			
W22	1.375	2.714				Y22	1.375	2.863			
W23	1.438	2.777				Y23	1.438	2.926			
W24	1.500	2.839				Y24	1.500	2.988			
W25	1.562	2.901				Y25	1.562	3.050			
W26	1.625	2.964				Y26	1.625	3.113			
W27	1.688	3.027				Y27	1.688	3.176			
W28	1.750	3.089				Y28	1.750	3.238			
W29	1.812	3.151				Y29	1.812	3.300			
W30	1.875	3.214				Y30	1.875	3.363			
W31	1.938	3.277				Y31	1.938	3.426			
W32	2.000	3.339				Y32	2.000	3.488			
W34	2.125	3.464				Y34	2.125	3.613			
W36	2.250	3.589				Y36	2.250	3.738			
W38	2.375	3.714				Y38	2.375	3.863			
W40	2.500	3.839				Y40	2.500	3.988			
W42	2.625	3.964				Y42	2.625	4.113			
W44	2.750	4.089				Y44	2.750	4.238			
W46	2.875	4.214				Y46	2.875	4.363			
W48	3.000	4.339				Y48	3.000	4.488			
W50	3.125	4.464				Y50	3.125	4.613			
W52	3.250	4.589				Y52	3.250	4.738			
W54	3.375	4.714				Y54	3.375	4.863			
W56	3.500	4.839				Y56	3.500	4.988			
W58	3.625	4.964				Y58	3.625	5.113			
W60	3.750	5.089				Y60	3.750	5.238			
W62	3.875	5.214				Y62	3.875	5.363			
W64	4.000	5.339				Y64	4.000	5.488			
W66	4.125	5.464				Y66	4.125	5.613			
W68	4.250	5.589				Y68	4.250	5.738			
W70	4.375	5.714				Y70	4.375	5.863			
W72	4.500	5.839				Y72	4.500	5.988			

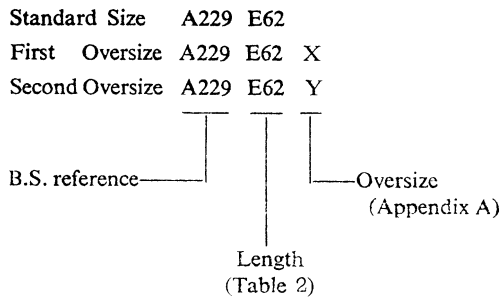
Table 2 — Bearing length *L* and overall length *E*

1¼–12 UNJF					
Part No.	***L*** **± 0.010**	***E*** **± 0.015**	**Part No.**	***L*** **± 0.010**	***E*** **± 0.015**
	in	in		in	in
Z 5	0.312	1.988	Z74	4.625	6.301
Z 6	0.375	2.051	Z76	4.750	6.426
Z 7	0.438	2.114	Z78	4.875	6.551
Z 8	0.500	2.176	Z80	5.000	6.676
Z 9	0.562	2.238	Z82	5.125	6.801
Z10	0.625	2.301	Z84	5.250	6.926
Z11	0.688	2.364	Z86	5.375	7.051
Z12	0.750	2.426	Z88	5.500	7.176
Z13	0.812	2.488	Z90	5.625	7.301
Z14	0.875	2.551	Z92	5.750	7.426
Z15	0.938	2.614	Z94	5.875	7.551
Z16	1.000	2.676	Z96	6.000	7.676
Z17	1.062	2.738			
Z18	1.125	2.801			
Z19	1.188	2.864			
Z20	1.250	2.926			
Z21	1.312	2.988			
Z22	1.375	3.051			
Z23	1.438	3.114			
Z24	1.500	3.176			
Z25	1.562	3.238			
Z26	1.625	3.301			
Z27	1.688	3.364			
Z28	1.750	3.426			
Z29	1.812	3.488			
Z30	1.875	3.551			
Z31	1.938	3.614			
Z32	2.000	3.676			
Z34	2.125	3.801			
Z36	2.290	3.926			
Z38	2.375	4.054			
Z40	2.590	4.176			
Z42	2.625	4.301			
Z44	2.790	4.426			
Z46	2.875	4.551			
Z48	3.000	4.676			
Z50	3.125	4.801			
Z52	3.250	4.926			
Z54	3.375	5.051			
Z56	3.590	5.176			
Z58	3.625	5.301			
Z60	3.750	5.426			
Z62	3.875	5.551			
Z64	4.000	5.676			
Z66	4.125	5.801			
Z68	4.250	5.926			
Z70	4.375	6.051			
Z72	4.500	6.176			

Appendix A Oversize bolts

Nominal Size UNJF	Decimal equivalent	*A* (Plain shank dia.)		First oversize (X)		Second oversize (Y)	
		Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
10–32	0.1900	0.1895	0.1885	0.2026	0.2016	0.2182	0.2172
1/4	0.2500	0.2495	0.2485	0.2651	0.2641	0.2808	0.2798
5/16	0.3125	0.3120	0.3110	0.3276	0.3266	0.3433	0.3423
3/8	0.3750	0.3745	0.3735	0.3901	0.3891	0.4058	0.4048
7/16	0.4375	0.4370	0.4360	0.4526	0.4516	0.4683	0.4673
1/2	0.5000	0.4995	0.4985	0.5151	0.5141	0.5308	0.5298
9/16	0.5625	0.5615	0.5605	0.5771	0.5761	0.5928	0.5918
5/8	0.6250	0.6240	0.6230	0.6396	0.6386	0.6553	0.6543
3/4	0.7500	0.7490	0.7480	0.7646	0.7636	0.7803	0.7793
7/8	0.8750	0.8740	0.8730	0.8896	0.8886	0.9053	0.9043
1.0	1.0000	0.9990	0.9980	1.0146	1.0136	1.0303	1.0293
1 1/8–12	1.1250	1.1240	1.1225	1.1396	1.1381	1.1553	1.1538
1 1/4–12	1.2500	1.2471	1.2475	1.2646	1.2631	1.2803	1.2788

Examples of part numbers for identification of bolts:



Appendix B Table for the conversion of inches to millimetre equivalents

in	mm
1	25.4
2	50.8
3	76.2
4	101.6
5	127.0
6	152.4
7	177.8
8	203.2
9	228.6
10	254.0

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