

BRITISH STANDARD

Unified screw threads –

Part 3: Screw threads with diameters below $\frac{1}{4}$ in – Requirements

ICS 21.040.20

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Foreword

Publishing information

This part of BS 1580 is published by BSI and came into effect on 31 December 2007. It was prepared by Subcommittee SFTSE/1, *Screws and fasteners technical specification committee*, under the authority of Technical Committee FME/9, *Nuts, bolts and accessories*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of BS 1580 supersedes BS 1580-3:1965, which is withdrawn.

Relationship with other publications

BS 1580 is now published in two parts

- *Part 1: Screw threads with diameters $\frac{1}{4}$ in and larger – Requirements*
- *Part 3: Screw threads with diameters below $\frac{1}{4}$ in – Requirements*

This part of BS 1580 is intended for use with BS 919-1 which specifies the corresponding screw gauges.

Information about this document

This part of BS 1580 has been fully revised to bring it up to date.

The range of diameters covered by this part of BS 1580 falls within the range of the B.A. screw thread sizes given in BS 93. The various pitches given for the same diameter in the unified system, however, offer a wider selection of diameter/pitch combinations for specific applications than do those in the B.A. system. The UNF series gives the closest approximation to the B.A. diameter/pitch combinations.

Hazard warnings

WARNING. Attention is drawn to the fact that, with the different screw thread forms available, there is the possibility of a mismatch, which is potentially hazardous. It is the responsibility of the designer of the end product to ensure that this possibility is reduced to a minimum. For further information on mismatches of screw thread systems see PD 6494.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This part of BS 1580 specifies limits of sizes, and tolerances, for single-start, clearance-fit unified screw threads, in inch units with diameters below $\frac{1}{4}$ in.

This part of BS 1580 specifies unified screw threads from Number 0 (0.060 in diameter) to Number 12 (0.216 in diameter), known as the “numbered sizes” in the following standard series:

- a coarse thread (UNC) series;
- a fine thread (UNF) series;
- for Number 12 threads, an extra fine (UNEF) 32 threads per inch diameter/pitch combination.

NOTE Unified screw threads below $\frac{1}{4}$ in diameter for attachment purposes and for general use in the aircraft industry are specified in Annex A.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 919-1:2007, *Screw gauge limits and tolerances – Part 1: Specification for gauges for screw threads of unified form*

BS 1580-1:2007, *Unified screw threads – Part 1: Screw threads with diameters $\frac{1}{4}$ in and larger – Requirements*

BS 1981, *Specification for unified machine screws and machine screw nuts*

BS 6528:1984, *Glossary of terms for cylindrical screw threads*

3 Terms and definitions and symbols

3.1 Terms and definitions

For the purposes of this part of BS 1580 the terms and definitions given in BS 6528:1984 and in BS 1580-1:2007 apply.

3.2 Symbols

For the purposes of this part of BS 1580 the symbols given in BS 1580-1:2007 apply.

4 Thread profiles

The basic profile and the design profile shall be as specified in BS 1580-1:2007, Clause 4.

The dimensions of the thread profile shall be as specified in Table 16.

5 Diameter/pitch combinations

The diameter/pitch combinations for standard series unified threads below $\frac{1}{4}$ in diameter shall be as specified in Table 1.

NOTE Where possible, the use of No. 1, No. 3 and No. 12 sizes should be avoided and preference should be given to the first choice sizes listed in Column 1.

6 Tolerance classes

External threads and internal threads shall be of one of the following tolerance classes as specified in BS 1580-1:2007, Clause 6:

- a) external threads:
 - Class 2A;
 - Class 2AG (see Note 1)
 - Class 3A;
- b) internal threads:
 - Class 2B;
 - Class 3B.

NOTE 1 These are Class 2A coated threads where the allowance has to be maintained after coating.

NOTE 2 Classes 1A and 1B specified in BS 1580-1 are not considered suitable for the sizes of unified screw threads specified in this part of BS 1580.

NOTE 3 Owing to the tendency for close-fitting external and internal threads made of stainless steel to seize when tightened together, it is recommended that stainless steel external and internal uncoated threads should not be made to Class 3 limits but rather to Class 2 limits.

7 Tolerances, allowances and limits of size for uncoated threads

Tolerances, allowances and limits of size for finished uncoated threads shall be as given in Table 2.

NOTE 1 The limits and tolerances for threads specified in Table 2 are repeated in Table 3 to Table 12, separated according to series and tolerance class for the convenience of users of this standard.

NOTE 2 The tolerances and allowances for unified screw threads below $\frac{1}{4}$ inch diameter, of Classes 2A, 2B, 3A and 3B have been based on the same formulae as those for the larger diameters (see BS 1580-1:2007, Annex A) with the exception of the tolerances for the minor diameters of Class 2B internal threads which are the same as those for Class 3B internal threads. These tolerances have been calculated from the following formula:

$$0.05\sqrt[3]{P^2} + 0.03P/D - 0.002$$

with a maximum tolerance of 0.394P.

NOTE 3 The effective diameter tolerances have been based on a length of engagement between $\frac{2}{3}$ and $1\frac{1}{2}$ times the nominal major diameter. For adjustment of these tolerances for shorter lengths of engagement see BS 1580-1:2007, Clause 7 Note 4.

NOTE 4 The values given for the minimum major diameters of internal threads are not realized in practice as the roots of the threads are always cleared above the minimum major diameter.

8 Coated threads

8.1 General

NOTE 1 Electroplated coatings on threaded components (cadmium on steel components and zinc on steel components) are specified in BS 3382: Parts 1&2. Recommendations on the appropriate system of gauging for coated threads are given in BS 919-1:2007, Annex D.

Limits of thread sizes before and after coating shall be in accordance with **8.2** to **8.6**.

NOTE 2 These requirements are applicable to coatings conforming to BS 3382: Parts 1&2, which are of the order of 0.000 2 in. For thicker coatings, special provisions are necessary (see BS 3382-7).

8.2 Class 2A external threads

It shall be permissible for Class 2A coated threads to exceed the maximum limits given in Table 2 provided they can be accepted by a GO screw gauge of basic size. The limits of the coated threads before coating shall be those given in Table 2.

8.3 Class 2AG external threads

Before coating, both the maximum and the minimum limits specified in Table 2 shall be reduced by an amount equal to the allowance specified in Table 2 for Class 2A threads. After coating the maximum tabulated limits shall not be exceeded.

8.4 Class 3A external threads

Class 3A coated threads shall not exceed the maximum limits given in Table 2 and shall be accepted by a GO screw gauge of basic size. Before coating, both the maximum and minimum limits given in Table 2 shall be reduced by an amount equal to the Class 2A allowances given in Table 2.

8.5 Class 2B internal threads

Class 2B coated threads shall be not smaller than the minimum limits given in Table 2 and shall be accepted by a GO screw gauge of basic size.

NOTE 1 Although small internal threads are difficult to coat, a thin deposit can be achieved and it is recommended that before coating the minimum limits given in Table 2 be increased by not more than the following amounts:

No. 0: No increase;

No. 1: No increase;

No. 2: 0.000 3 in;

No. 3: 0.000 4 in;

No. 4: 0.000 5 in;

No. 5: 0.000 6 in;

No. 6: 0.000 7 in;

No. 8: 0.000 8 in;

No. 10: 0.001 in;

No. 12, 0.001 in.

The maximum limits before coating shall remain unchanged.

NOTE 2 The tolerances resulting from the amounts recommended in Note 1 are substantially the same as those for Class 3B, and are considered to be a practical minimum. It is, therefore, strongly recommended that coated Class 2B threads be used instead of coated Class 3B threads.

8.6 Class 3B internal threads

Class 3B coated threads shall be not smaller than the minimum limits given in Table 2 and shall be accepted by a GO screw gauge of basic size.

NOTE If before coating these minimum limits are increased by the amounts recommended for Class 2B threads (see 8.5 Note 1) and the maximum limits remain unchanged, the resulting working tolerances might be too small to be practical. To remedy this, it might then be necessary to increase the maximum limits by the same amounts as those recommended for the minimum limits. The resulting maximum limits would then be substantially the same as the Class 2B maximum limits. For this reason that it is strongly recommended that coated Class 2B threads (see 8.5) be used instead of coated Class 3B threads.

9 Designation of threads

9.1 Basic designation

The numbered sizes of unified screw threads shall have a basic designation comprising the following:

- a) the thread number;

NOTE This may be followed by the nominal size in parentheses.
- b) the number of threads per inch;
- c) the thread series, UNC, UNF or UNEF;
- d) the thread class, 2A, 2AG, 3A, 2B or 3B.

EXAMPLES

6 (0.138) — 32 UNC — 2A

12 (0.216) — 28 UNF — 3B

12 (0.216) — 32 UNEF — 2A

9.2 Additional designations

For coated threads and threads with other special characteristics, the basic designation shall be followed by the relevant additional designation(s) given in BS 1580-1:2007, Clause 11.

10 Gauges

Gauges conforming to BS 919-1 shall be used.

NOTE It is recommended that the American-type high-addendum NOT GO effective diameter screw plug gauge be used for checking the numbered sizes of internal threads.

Table 1 Unified screw threads below $\frac{1}{4}$ in diameter, standard series
(Extension of Table 1 of BS 1580-1)

Designation numbers		Basic major diameter in	Threads per inch			Designation numbers
1st choice	2nd choice		Series with graded pitches			
			Coarse UNC	Fine UNF	Extra fine UNEF	
0	1	0.060 0	—	80	—	0
2		0.073 0	64	72	—	1
	3	0.086 0	56	64	—	2
4		0.099 0	48	56	—	3
5		0.112 0	40	48	—	4
6		0.125 0	40	44	—	5
8		0.138 0	32	40	—	6
10		0.164 0	32	36	—	8
		0.190 0	24	32	—	10
	12	0.216 0	24	28	32	12

NOTE 1 The diameter/pitch combinations of the UNF series are substantially similar to those of B.A. threads as specified in BS 93, but the coarse series threads might be more suitable for use with certain materials.

NOTE 2 For the values of the basic dimensions of the UNC, UNF and UNEF threads, see Table 13, Table 14 and Table 15, respectively.

Table 2 Unified screw threads below $\frac{1}{4}$ in diameter, standard series – Limits of size
(Extension of Table 2 of BS 1580-1)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Nominal size and threads per inch	Series designation	External threads									Internal threads						
		Class	Allowance	Major diameter		Effective diameter			Minor diameter		Class	Minor diameter		Effective diameter			Major diameter
				Max.	Min.	Max.	Min.	Tol.	Max.	Min.		Min.	Max.	Min.	Max.	Tol.	Min.
				in	in	in	in	in	in	in		in	in	in	in	in	in
0-80	UNF	2A	0.000 5	0.059 5	0.056 3	0.051 4	0.049 6	0.001 8	0.044 2	0.041 5	2B	0.046 5	0.051 4	0.051 9	0.054 2	0.002 3	0.060 0
		3A	0.000 0	0.060 0	0.056 8	0.051 9	0.050 6	0.001 3	0.044 7	0.042 5	3B	0.046 5	0.051 4	0.051 9	0.053 6	0.001 7	0.060 0
1-64	UNC	2A	0.000 6	0.072 4	0.068 6	0.062 3	0.060 3	0.002 0	0.053 2	0.050 1	2B	0.056 1	0.062 3	0.062 9	0.065 5	0.002 6	0.073 0
		3A	0.000 0	0.073 0	0.069 2	0.062 9	0.061 4	0.001 5	0.053 8	0.051 2	3B	0.056 1	0.062 3	0.062 9	0.064 8	0.001 9	0.073 0
1-72	UNF	2A	0.000 6	0.072 4	0.068 9	0.063 4	0.061 5	0.001 9	0.055 4	0.052 5	2B	0.058 0	0.063 5	0.064 0	0.066 5	0.002 5	0.073 0
		3A	0.000 0	0.073 0	0.069 5	0.064 0	0.062 6	0.001 4	0.056 0	0.053 6	3B	0.058 0	0.063 5	0.064 0	0.065 9	0.001 9	0.073 0
2-56	UNC	2A	0.000 6	0.085 4	0.081 3	0.073 8	0.071 7	0.002 1	0.063 5	0.060 1	2B	0.066 7	0.073 7	0.074 4	0.077 2	0.002 8	0.086 0
		3A	0.000 0	0.086 0	0.081 9	0.074 4	0.072 8	0.001 6	0.064 1	0.061 2	3B	0.066 7	0.073 7	0.074 4	0.076 5	0.002 1	0.086 0
2-64	UNF	2A	0.000 6	0.085 4	0.081 6	0.075 3	0.073 3	0.002 0	0.066 2	0.063 0	2B	0.069 1	0.075 3	0.075 9	0.078 6	0.002 7	0.086 0
		3A	0.000 0	0.086 0	0.082 2	0.075 9	0.074 4	0.001 5	0.066 8	0.064 1	3B	0.069 1	0.075 3	0.075 9	0.077 9	0.002 0	0.086 0
3-48	UNC	2A	0.000 7	0.098 3	0.093 8	0.084 8	0.082 5	0.002 3	0.072 7	0.068 9	2B	0.076 4	0.084 5	0.085 5	0.088 5	0.003 0	0.099 0
		3A	0.000 0	0.099 0	0.094 5	0.085 5	0.083 8	0.001 7	0.073 4	0.070 2	3B	0.076 4	0.084 5	0.085 5	0.087 7	0.002 2	0.099 0
3-56	UNF	2A	0.000 7	0.098 3	0.094 2	0.086 7	0.084 5	0.002 2	0.076 4	0.072 9	2B	0.079 7	0.086 5	0.087 4	0.090 2	0.002 8	0.099 0
		3A	0.000 0	0.099 0	0.094 9	0.087 4	0.085 8	0.001 6	0.077 1	0.074 2	3B	0.079 7	0.086 5	0.087 4	0.089 5	0.002 1	0.099 0
4-40	UNC	2A	0.000 8	0.111 2	0.106 1	0.095 0	0.092 5	0.002 5	0.080 5	0.076 2	2B	0.084 9	0.093 9	0.095 8	0.099 1	0.003 3	0.112 0
		3A	0.000 0	0.112 0	0.106 9	0.095 8	0.093 9	0.001 9	0.081 3	0.077 6	3B	0.084 9	0.093 9	0.095 8	0.098 2	0.002 4	0.112 0
4-48	UNF	2A	0.000 7	0.111 3	0.106 8	0.097 8	0.095 4	0.002 4	0.085 7	0.081 8	2B	0.089 4	0.096 8	0.098 5	0.101 6	0.003 1	0.112 0
		3A	0.000 0	0.112 0	0.107 5	0.098 5	0.096 7	0.001 8	0.086 4	0.083 1	3B	0.089 4	0.096 8	0.098 5	0.100 8	0.002 3	0.112 0
5-40	UNC	2A	0.000 8	0.124 2	0.119 1	0.108 0	0.105 4	0.002 6	0.093 6	0.089 2	2B	0.097 9	0.106 2	0.108 8	0.112 1	0.003 3	0.125 0
		3A	0.000 0	0.125 0	0.119 9	0.108 8	0.106 9	0.001 9	0.094 3	0.090 6	3B	0.097 9	0.106 2	0.108 8	0.111 3	0.002 5	0.125 0

NOTE The limits of size given in this table apply to finished uncoated threads. For modifications to some of these limits to suit coated threads before and after coating see Clause 8.

Table 2 Unified screw threads below 1/4 in diameter, standard series – Limits of size
(Extension of Table 2 of BS 1580-1) (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Nominal size and threads per inch	Series designation	External threads									Internal threads							
		Class	Allowance	Major diameter		Effective diameter			Minor diameter		Class	Minor diameter		Effective diameter			Major diameter	
				Max.	Min.	Max.	Min.	Tol.	Max.	Min.		Min.	Max.	Min.	Max.	Tol.		Min.
				in	in	in	in	in	in	in		in	in	in	in	in		in
5-44	UNF	2A	0.000 7	0.124 3	0.119 5	0.109 5	0.107 0	0.002 5	0.096 4	0.092 3	2B	0.100 4	0.107 9	0.110 2	0.113 4	0.003 2	0.125 0	
		3A	0.000 0	0.125 0	0.120 2	0.110 2	0.108 3	0.001 9	0.097 1	0.093 6	3B	0.100 4	0.107 9	0.110 2	0.112 6	0.002 4	0.125 0	
6-32	UNC	2A	0.000 8	0.137 2	0.131 2	0.116 9	0.114 1	0.002 8	0.098 8	0.093 7	2B	0.104 0	0.114 0	0.117 7	0.121 4	0.003 7	0.138 0	
		3A	0.000 0	0.138 0	0.132 0	0.117 7	0.115 6	0.002 1	0.099 7	0.095 3	3B	0.104 0	0.114 0	0.117 7	0.120 4	0.002 7	0.138 0	
6-40	UNF	2A	0.000 8	0.137 2	0.132 1	0.121 0	0.118 4	0.002 6	0.106 5	0.102 1	2B	0.111 0	0.119 0	0.121 8	0.125 2	0.003 4	0.138 0	
		3A	0.000 0	0.138 0	0.132 9	0.121 8	0.119 8	0.002 0	0.107 3	0.103 5	3B	0.111 0	0.118 6	0.121 8	0.124 3	0.002 5	0.138 0	
8-32	UNC	2A	0.000 9	0.163 1	0.157 1	0.142 8	0.139 9	0.002 9	0.124 8	0.119 6	2B	0.130 0	0.139 0	0.143 7	0.147 5	0.003 8	0.164 0	
		3A	0.000 0	0.164 0	0.158 0	0.143 7	0.141 5	0.002 2	0.125 7	0.121 3	3B	0.130 0	0.138 9	0.143 7	0.146 5	0.002 8	0.164 0	
8-36	UNF	2A	0.000 8	0.163 2	0.157 7	0.145 1	0.142 3	0.002 8	0.129 1	0.124 3	2B	0.134 0	0.142 0	0.146 0	0.149 6	0.003 6	0.164 0	
		3A	0.000 0	0.164 0	0.158 5	0.146 0	0.143 9	0.002 1	0.129 9	0.125 8	3B	0.134 0	0.141 6	0.146 0	0.148 7	0.002 7	0.164 0	
10-24	UNC	2A	0.001 0	0.189 0	0.181 8	0.161 9	0.158 6	0.003 3	0.137 9	0.131 6	2B	0.145 0	0.156 0	0.162 9	0.167 2	0.004 3	0.190 0	
		3A	0.000 0	0.190 0	0.182 8	0.162 9	0.160 4	0.002 5	0.138 9	0.133 4	3B	0.145 0	0.155 5	0.162 9	0.166 1	0.003 2	0.190 0	
10-32	UNF	2A	0.000 9	0.189 1	0.183 1	0.168 8	0.165 8	0.003 0	0.150 8	0.145 5	2B	0.156 0	0.164 0	0.169 7	0.173 6	0.003 9	0.190 0	
		3A	0.000 0	0.190 0	0.184 0	0.169 7	0.167 4	0.002 3	0.151 7	0.147 2	3B	0.156 0	0.164 1	0.169 7	0.172 6	0.002 9	0.190 0	
12-24	UNC	2A	0.001 0	0.215 0	0.207 8	0.187 9	0.184 5	0.003 4	0.163 9	0.157 5	2B	0.171 0	0.181 0	0.188 9	0.193 3	0.004 4	0.216 0	
		3A	0.000 0	0.216 0	0.208 8	0.188 9	0.186 4	0.002 5	0.164 9	0.159 3	3B	0.171 0	0.180 7	0.188 9	0.192 2	0.003 3	0.216 0	
12-28	UNF	2A	0.001 0	0.215 0	0.208 5	0.191 8	0.188 6	0.003 2	0.171 2	0.165 4	2B	0.177 0	0.186 0	0.192 8	0.197 0	0.004 2	0.216 0	
		3A	0.000 0	0.216 0	0.209 5	0.192 8	0.190 4	0.002 4	0.172 2	0.167 2	3B	0.177 0	0.185 7	0.192 8	0.195 9	0.003 1	0.216 0	
12-32	UNEF	2A	0.000 9	0.215 1	0.209 1	0.194 8	0.191 7	0.003 1	0.176 8	0.171 4	2B	0.182 0	0.190 0	0.195 7	0.199 8	0.004 1	0.216 0	
		3A	0.000 0	0.216 0	0.210 0	0.195 7	0.193 3	0.002 4	0.177 7	0.173 1	3B	0.182 0	0.189 5	0.195 7	0.198 8	0.003 1	0.216 0	

NOTE The limits of size given in this table apply to finished uncoated threads. For modifications to some of these limits to suit coated threads before and after coating see Clause 8.

Table 3 **Coarse thread series (UNC) below $\frac{1}{4}$ in diameter – Limits and tolerances for finished uncoated threads – External threads Class 2A**
(Extension of Table 5 of BS 1580-1)

1	2	3	4	5	6	7	8	9	10
Designation	Major diameter			Effective diameter			Minor diameter		
	Max.	Min.	Tol.	Max.	Min.	Tol.	Max.	Min.	Tol.
	in	in	in	in	in	in	in	in	in
1 — 64 UNC — 2A	0.072 4	0.068 6	0.003 8	0.062 3	0.060 3	0.002 0	0.053 2	0.050 1	0.003 1
2 — 56 UNC — 2A	0.085 4	0.081 3	0.004 1	0.073 8	0.071 7	0.002 1	0.063 5	0.060 1	0.003 4
3 — 48 UNC — 2A	0.098 3	0.093 8	0.004 5	0.084 8	0.082 5	0.002 3	0.072 7	0.068 9	0.003 8
4 — 40 UNC — 2A	0.111 2	0.106 1	0.005 1	0.095 0	0.092 5	0.002 5	0.080 5	0.076 2	0.004 3
5 — 40 UNC — 2A	0.124 2	0.119 1	0.005 1	0.108 0	0.105 4	0.002 6	0.093 6	0.089 2	0.004 4
6 — 32 UNC — 2A	0.137 2	0.131 2	0.006 0	0.116 9	0.114 1	0.002 8	0.098 8	0.093 7	0.005 1
8 — 32 UNC — 2A	0.163 1	0.157 1	0.006 0	0.142 8	0.139 9	0.002 9	0.124 8	0.119 6	0.005 2
10 — 24 UNC — 2A	0.189 0	0.181 8	0.007 2	0.161 9	0.158 6	0.003 3	0.137 9	0.131 6	0.006 3
12 — 24 UNC — 2A	0.215 0	0.207 8	0.007 2	0.187 9	0.184 5	0.003 4	0.163 9	0.157 5	0.006 4

Table 4 **Coarse thread series (UNC) below $\frac{1}{4}$ in diameter – Limits and tolerances for finished uncoated threads – Internal threads Class 2B**
(Extension of Table 6 of BS 1580-1)

1	2	3	4	5	6	7	8
Designation	Minor diameter			Effective diameter			Major diameter
	Min.	Max.	Tol.	Min.	Max.	Tol.	Min.
	in	in	in	in	in	in	in
1 — 64 UNC — 2B	0.056 1	0.062 3	0.006 2	0.062 9	0.065 5	0.002 6	0.073 0
2 — 56 UNC — 2B	0.066 7	0.073 7	0.007 0	0.074 4	0.077 2	0.002 8	0.086 0
3 — 48 UNC — 2B	0.076 4	0.084 5	0.008 1	0.085 5	0.088 5	0.003 0	0.099 0
4 — 40 UNC — 2B	0.084 9	0.093 9	0.009 0	0.095 8	0.099 1	0.003 3	0.112 0
5 — 40 UNC — 2B	0.097 9	0.106 2	0.008 3	0.108 8	0.112 1	0.003 3	0.125 0
6 — 32 UNC — 2B	0.104 0	0.114 0	0.010 0	0.117 7	0.121 4	0.003 7	0.138 0
8 — 32 UNC — 2B	0.130 0	0.139 0	0.009 0	0.143 7	0.147 5	0.003 8	0.164 0
10 — 24 UNC — 2B	0.145 0	0.156 0	0.011 0	0.162 9	0.167 2	0.004 3	0.190 0
12 — 24 UNC — 2B	0.171 0	0.181 0	0.010 0	0.188 9	0.193 3	0.004 4	0.216 0

NOTE The limits of size given in this table apply to finished uncoated threads. For modifications to some of these limits to suit coated threads before and after coating see Clause 8.

Table 5 Coarse thread series (UNC) below $\frac{1}{4}$ in diameter – Limits and tolerances for finished uncoated threads – External threads Class 3A
(Extension of Table 7 of BS 1580-1)

1	2	3	4	5	6	7	8	9	10
Designation	Major diameter			Effective diameter			Minor diameter		
	Max.	Min.	Tol.	Max.	Min.	Tol.	Max.	Min.	Tol.
	in	in	in	in	in	in	in	in	in
1 — 64 UNC — 3A	0.073 0	0.069 2	0.003 8	0.062 9	0.061 4	0.001 5	0.053 8	0.051 2	0.002 6
2 — 56 UNC — 3A	0.086 0	0.081 9	0.004 1	0.074 4	0.072 8	0.001 6	0.064 1	0.061 2	0.002 9
3 — 48 UNC — 3A	0.099 0	0.094 5	0.004 5	0.085 5	0.083 8	0.001 7	0.073 4	0.070 2	0.003 2
4 — 40 UNC — 3A	0.112 0	0.106 9	0.005 1	0.095 8	0.093 9	0.001 9	0.081 3	0.077 6	0.003 7
5 — 40 UNC — 3A	0.125 0	0.119 9	0.005 1	0.108 8	0.106 9	0.001 9	0.094 3	0.090 6	0.003 7
6 — 32 UNC — 3A	0.138 0	0.132 0	0.006 0	0.117 7	0.115 6	0.002 1	0.099 7	0.095 3	0.004 4
8 — 32 UNC — 3A	0.164 0	0.158 0	0.006 0	0.143 7	0.141 5	0.002 2	0.125 7	0.121 3	0.004 4
10 — 24 UNC — 3A	0.190 0	0.182 8	0.007 2	0.162 9	0.160 4	0.002 5	0.138 9	0.133 4	0.005 5
12 — 24 UNC — 3A	0.216 0	0.208 8	0.007 2	0.188 9	0.186 4	0.002 5	0.164 9	0.159 3	0.005 6

Table 6 Coarse thread series (UNC) below $\frac{1}{4}$ in diameter – Limits and tolerances for finished uncoated threads – Internal threads Class 3B
(Extension of Table 8 of BS 1580-1)

1	2	3	4	5	6	7	8
Designation	Minor diameter			Effective diameter			Major diameter
	Min.	Max.	Tol.	Min.	Max.	Tol.	Min.
	in	in	in	in	in	in	in
1 — 64 UNC — 3B	0.056 1	0.062 3	0.006 2	0.062 9	0.064 8	0.001 9	0.073 0
2 — 56 UNC — 3B	0.066 7	0.073 7	0.007 0	0.074 4	0.076 5	0.002 1	0.086 0
3 — 48 UNC — 3B	0.076 4	0.084 5	0.008 1	0.085 5	0.087 7	0.002 2	0.099 0
4 — 40 UNC — 3B	0.084 9	0.093 9	0.009 0	0.095 8	0.098 2	0.002 4	0.112 0
5 — 40 UNC — 3B	0.097 9	0.106 2	0.008 3	0.108 8	0.111 3	0.002 5	0.125 0
6 — 32 UNC — 3B	0.104 0	0.114 0	0.010 0	0.117 7	0.120 4	0.002 7	0.138 0
8 — 32 UNC — 3B	0.130 0	0.138 9	0.008 9	0.143 7	0.146 5	0.002 8	0.164 0
10 — 24 UNC — 3B	0.145 0	0.155 5	0.010 5	0.162 9	0.166 1	0.003 2	0.190 0
12 — 24 UNC — 3B	0.171 0	0.180 7	0.009 7	0.188 9	0.192 2	0.003 3	0.216 0

NOTE The limits of size given in this table apply to finished uncoated threads. For modifications to some of these limits to suit coated threads before and after coating see Clause 8.

Table 7 **Fine thread series (UNF) below $\frac{1}{4}$ in diameter – Limits and tolerances for finished uncoated threads – External threads Class 2A**
(Extension of Table 11 of BS 1580-1)

1	2	3	4	5	6	7	8	9	10
Designation	Major diameter			Effective diameter			Minor diameter		
	Max.	Min.	Tol.	Max.	Min.	Tol.	Max.	Min.	Tol.
	in	in	in	in	in	in	in	in	in
0 — 80 UNF — 2A	0.059 5	0.056 3	0.003 2	0.051 4	0.049 6	0.001 8	0.044 2	0.041 5	0.002 7
1 — 72 UNF — 2A	0.072 4	0.068 9	0.003 5	0.063 4	0.061 5	0.001 9	0.055 4	0.052 5	0.002 9
2 — 64 UNF — 2A	0.085 4	0.081 6	0.003 8	0.075 3	0.073 3	0.002 0	0.066 2	0.063 0	0.003 2
3 — 56 UNF — 2A	0.098 3	0.094 2	0.004 1	0.086 7	0.084 5	0.002 2	0.076 4	0.072 9	0.003 5
4 — 48 UNF — 2A	0.111 3	0.106 8	0.004 5	0.097 8	0.095 4	0.002 4	0.085 7	0.081 8	0.003 9
5 — 44 UNF — 2A	0.124 3	0.119 5	0.004 8	0.109 5	0.107 0	0.002 5	0.096 4	0.092 3	0.004 1
6 — 40 UNF — 2A	0.137 2	0.132 1	0.005 1	0.121 0	0.118 4	0.002 6	0.106 5	0.102 1	0.004 4
8 — 36 UNF — 2A	0.163 2	0.157 7	0.005 5	0.145 1	0.142 3	0.002 8	0.129 1	0.124 3	0.004 8
10 — 32 UNF — 2A	0.189 1	0.183 1	0.006 0	0.168 8	0.165 8	0.003 0	0.150 8	0.145 5	0.005 3
12 — 28 UNF — 2A	0.215 0	0.208 5	0.006 5	0.191 8	0.188 6	0.003 2	0.171 2	0.165 4	0.005 8

Table 8 **Fine thread series (UNF) below $\frac{1}{4}$ in diameter – Limits and tolerances for finished uncoated threads – Internal threads Class 2B**
(Extension of Table 12 of BS 1580-1)

1	2	3	4	5	6	7	8
Designation	Minor diameter			Effective diameter			Major diameter
	Min.	Max.	Tol.	Min.	Max.	Tol.	Min.
	in	in	in	in	in	in	in
0 — 80 UNF — 2B	0.046 5	0.051 4	0.004 9	0.051 9	0.054 2	0.002 3	0.060 0
1 — 72 UNF — 2B	0.058 0	0.063 5	0.005 5	0.064 0	0.066 5	0.002 5	0.073 0
2 — 64 UNF — 2B	0.069 1	0.075 3	0.006 2	0.075 9	0.078 6	0.002 7	0.086 0
3 — 56 UNF — 2B	0.079 7	0.086 5	0.006 8	0.087 4	0.090 2	0.002 8	0.099 0
4 — 48 UNF — 2B	0.089 4	0.096 8	0.007 4	0.098 5	0.101 6	0.003 1	0.112 0
5 — 44 UNF — 2B	0.100 4	0.107 9	0.007 5	0.110 2	0.113 4	0.003 2	0.125 0
6 — 40 UNF — 2B	0.111 0	0.119 0	0.008 0	0.121 8	0.125 2	0.003 4	0.138 0
8 — 36 UNF — 2B	0.134 0	0.142 0	0.008 0	0.146 0	0.149 6	0.003 6	0.164 0
10 — 32 UNF — 2B	0.156 0	0.164 0	0.008 0	0.169 7	0.173 6	0.003 9	0.190 0
12 — 28 UNF — 2B	0.177 0	0.186 0	0.009 0	0.192 8	0.197 0	0.004 2	0.216 0

NOTE The limits of size given in this table apply to finished uncoated threads. For modifications to some of these limits to suit coated threads before and after coating see Clause 8.

Table 9 **Fine thread series (UNF) below $\frac{1}{4}$ in diameter – Limits and tolerances for finished uncoated threads – External threads Class 3A**
(Extension of Table 13 of BS 1580-1)

1	2	3	4	5	6	7	8	9	10
Designation	Major diameter			Effective diameter			Minor diameter		
	Max.	Min.	Tol.	Max.	Min.	Tol.	Max.	Min.	Tol.
	in	in	in	in	in	in	in	in	in
0 — 80 UNF — 3A	0.060 0	0.056 8	0.003 2	0.051 9	0.050 6	0.001 3	0.044 7	0.042 5	0.002 2
1 — 72 UNF — 3A	0.073 0	0.069 5	0.003 5	0.064 0	0.062 6	0.001 4	0.056 0	0.053 6	0.002 4
2 — 64 UNF — 3A	0.086 0	0.082 2	0.003 8	0.075 9	0.074 4	0.001 5	0.066 8	0.064 1	0.002 7
3 — 56 UNF — 3A	0.099 0	0.094 9	0.004 1	0.087 4	0.085 8	0.001 6	0.077 1	0.074 2	0.002 9
4 — 48 UNF — 3A	0.112 0	0.107 5	0.004 5	0.098 5	0.096 7	0.001 8	0.086 4	0.083 1	0.003 3
5 — 44 UNF — 3A	0.125 0	0.120 2	0.004 8	0.110 2	0.108 3	0.001 9	0.097 1	0.093 6	0.003 5
6 — 40 UNF — 3A	0.138 0	0.132 9	0.005 1	0.121 8	0.119 8	0.002 0	0.107 3	0.103 5	0.003 8
8 — 36 UNF — 3A	0.164 0	0.158 5	0.005 5	0.146 0	0.143 9	0.002 1	0.129 9	0.125 8	0.004 1
10 — 32 UNF — 3A	0.190 0	0.184 0	0.006 0	0.169 7	0.167 4	0.002 3	0.151 7	0.147 2	0.004 5
12 — 28 UNF — 3A	0.216 0	0.209 5	0.006 5	0.192 8	0.190 4	0.002 4	0.172 2	0.167 2	0.005 0

Table 10 **Fine thread series (UNF) below $\frac{1}{4}$ in diameter – Limits and tolerances for finished uncoated threads – Internal threads Class 3B**
(Extension of Table 14 of BS 1580-1)

1	2	3	4	5	6	7	8
Designation	Minor diameter			Effective diameter			Major diameter
	Min.	Max.	Tol.	Min.	Max.	Tol.	Min.
	in	in	in	in	in	in	in
0 — 80 UNF — 3B	0.046 5	0.051 4	0.004 9	0.051 9	0.053 6	0.001 7	0.060 0
1 — 72 UNF — 3B	0.058 0	0.063 5	0.005 5	0.064 0	0.065 9	0.001 9	0.073 0
2 — 64 UNF — 3B	0.069 1	0.075 3	0.006 2	0.075 9	0.077 9	0.002 0	0.086 0
3 — 56 UNF — 3B	0.079 7	0.086 5	0.006 8	0.087 4	0.089 5	0.002 1	0.099 0
4 — 48 UNF — 3B	0.089 4	0.096 8	0.007 4	0.098 5	0.100 8	0.002 3	0.112 0
5 — 44 UNF — 3B	0.100 4	0.107 9	0.007 5	0.110 2	0.112 6	0.002 4	0.125 0
6 — 40 UNF — 3B	0.111 0	0.118 6	0.007 6	0.121 8	0.124 3	0.002 5	0.138 0
8 — 36 UNF — 3B	0.134 0	0.141 6	0.007 6	0.146 0	0.148 7	0.002 7	0.164 0
10 — 32 UNF — 3B	0.156 0	0.164 1	0.008 1	0.169 7	0.172 6	0.002 9	0.190 0
12 — 28 UNF — 3B	0.177 0	0.185 7	0.008 7	0.192 8	0.195 9	0.003 1	0.216 0

NOTE The limits of size given in this table apply to finished uncoated threads. For modifications to some of these limits to suit coated threads before and after coating see Clause 8.

Table 11 Extra fine thread series (UNEF) below $\frac{1}{4}$ in diameter – Limits and tolerances for finished uncoated threads – External threads Classes 2A and 3A

1	2	3	4	5	6	7	8	9	10
Designation	Major diameter			Effective diameter			Minor diameter		
	Max.	Min.	Tol.	Max.	Min.	Tol.	Max.	Min.	Tol.
	in	in	in	in	in	in	in	in	in
12 — 32 UNEF — 2A	0.215 1	0.209 1	0.006 0	0.194 8	0.191 7	0.003 1	0.176 8	0.171 4	0.005 4
12 — 32 UNEF — 3A	0.216 0	0.210 0	0.006 0	0.195 7	0.193 3	0.002 4	0.177 7	0.173 0	0.004 7

Table 12 Extra fine thread series (UNEF) below $\frac{1}{4}$ in diameter – Limits and tolerances for finished uncoated threads – Internal threads Classes 2B and 3B

1	2	3	4	5	6	7	8
Designation	Minor diameter			Effective diameter			Major diameter
	Min.	Max.	Tol.	Min.	Max.	Tol.	Min.
	in	in	in	in	in	in	in
12 — 32 UNEF — 2B	0.182 0	0.190 0	0.008 0	0.195 7	0.199 8	0.004 1	0.216 0
12 — 32 UNEF — 3B	0.182 0	0.189 5	0.007 5	0.195 7	0.198 8	0.003 1	0.216 0

NOTE The limits of size given in this table apply to finished uncoated threads. For modifications to some of these limits to suit coated threads before and after coating see Clause 8.

Table 13 Coarse thread series (UNC) sizes below $\frac{1}{4}$ in diameter – Basic dimensions
(Extension of Table 15 of BS 1580-1)

1	2	3	4	5	6	7	8	9	10	
Designation number		Major diameter	Threads per inch	Effective diameter	Minor diameter external threads	Minor diameter internal threads	Lead angle at basic effective diameter		Section at minor diameter at $D-2h_s$	Tensile stress area
First choice	Second choice						deg	min		
		D in	n	E in	K_s in	K_n in			in ²	A_s in ²
2	1	0.073 0	64	0.062 9	0.053 8	0.056 1	4	31	0.002 3	0.002 8
	3	0.086 0	56	0.074 4	0.064 1	0.066 7	4	22	0.003 2	0.003 8
0.099 0		48	0.085 5	0.073 4	0.076 4	4	26	0.004 2	0.005 0	
0.112 0		40	0.095 8	0.081 3	0.084 9	4	45	0.005 2	0.006 2	
5		0.125 0	40	0.108 8	0.094 3	0.097 9	4	11	0.007 0	0.008 1
6		0.138 0	32	0.117 7	0.099 7	0.104 2	4	50	0.007 8	0.009 3
8		0.164 0	32	0.143 7	0.125 7	0.130 2	3	58	0.012 4	0.014 2
10		0.190 0	24	0.162 9	0.138 9	0.144 9	4	39	0.015 2	0.017 9
	12	0.216 0	24	0.188 9	0.164 9	0.170 9	4	1	0.021	0.024 6

NOTE See notes to Table 15.

Table 14 Fine thread series (UNF) sizes below $\frac{1}{4}$ in diameter – Basic dimensions
(Extension of Table 16 of BS 1580-1)

1	2	3	4	5	6	7	8	9	10	
Designation number		Major diameter	Threads per inch	Effective diameter	Minor diameter external threads	Minor diameter internal threads	Lead angle at basic effective diameter		Section at minor diameter at $D-2h_s$	Tensile stress area
First choice	Second choice						deg	min		
		D in	n	E in	K_s in	K_n in			in ²	A_s in ²
0	1	0.060 0	80	0.051 9	0.044 7	0.046 5	4	23	0.001 6	0.001 8
		0.073 0	72	0.064 0	0.056 0	0.058 0	3	57	0.002 5	0.002 8
2	3	0.086 0	64	0.075 9	0.066 8	0.069 1	3	45	0.003 5	0.004 0
		0.099 0	56	0.087 4	0.077 1	0.079 7	3	43	0.004 7	0.005 3
4		0.112 0	48	0.098 5	0.086 4	0.089 4	3	51	0.005 9	0.006 7
5		0.125 0	44	0.110 2	0.097 1	0.100 4	3	45	0.007 4	0.008 4
6		0.138 0	40	0.121 8	0.107 3	0.110 9	3	44	0.009 0	0.010 3
8		0.164 0	36	0.146 0	0.129 9	0.133 9	3	28	0.013 3	0.014 9
10		0.190 0	32	0.169 7	0.151 7	0.156 2	3	21	0.018 0	0.020 3
	12	0.216 0	28	0.192 8	0.172 2	0.177 3	3	22	0.023 3	0.026 2

NOTE See notes to Table 15.

Table 15 **Extra fine thread series (UNEF) sizes below $\frac{1}{4}$ in diameter – Basic dimensions**
(Extension of Table 17 of BS 1580-1)

1	2	3	4	5	6	7	8	9
Designation number	Major diameter	Threads per inch	Effective diameter	Minor diameter external threads	Minor diameter internal threads	Lead angle at basic effective diameter	Section at minor diameter at $D-2h_s$	Tensile stress area
	D in	n	E in	K_s in	K_n in	λ deg min	in ²	A_s in ²
12	0.216 0	32	0.195 7	0.177 7	0.182 2	2 55	0.024 8	0.027 4

NOTE 1 Areas of section at minor diameter (external threads) are calculated from the formula:

$$\frac{\pi}{4} (D - 1.226 87P)^2$$

NOTE 2 The tensile stress areas (external threads) are based on the mean of the basic effective diameter ($D - \frac{3}{4}H$) and the basic minor diameter ($D - 1\frac{5}{12}H$), the formula being:

$$\frac{\pi}{4} (D - 0.938 20P)^2$$

NOTE 3 For illustrations of symbols in headings of Tables 13, 14 and 15 see BS 1580-1:2007, Annex D.

Table 16 **Thread data for unified thread form 24 t.p.i. to 80 t.p.i.**
 (Extension of Table 26 of BS 1580-1 with identical values in the overlapping range of 40 t.p.i. to 24 t.p.i.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Threads per inch	Pitch	Width of flat at internal thread crest	Width of flat at internal thread root and external thread crest	Height of sharp V-thread	Truncation of internal thread root and external thread crest	Truncation of external thread root	Truncation of internal thread crest	Addendum of external thread	Height of internal thread and depth of thread engagement	Height of external thread	Twice the external thread addendum	Double height of internal thread	Double height of external thread	Threads per inch
n	P in	F_{cn} $P/4$ $0.25P$ in	F_{rn} F_{cs} $P/8$ $0.125P$ in	H $0.866\ 025P$ in	f_{rn} f_{cs} $H/8$ $0.108\ 25P$ in	S_{rs} $H/6$ $0.144\ 34P$ in	f_{cn} $H/4$ $0.216\ 51P$ in	h_{as} $\frac{3}{8}H$ $0.324\ 76P$ in	h_n h_e $\frac{5}{8}H$ $0.541\ 27P$ in	h_s $\frac{17}{24}H$ $0.613\ 43P$ in	h_b $2h_{as}$ $\frac{3}{4}H$ $0.649\ 519P$ in	$2h_n$ $1\frac{1}{4}H$ $1.082\ 53P$ in	$2h_s$ $1\frac{5}{12}H$ $1.226\ 87P$ in	n
80	0.012 500	0.003 12	0.001 56	0.010 825	0.001 35	0.001 80	0.002 71	0.004 06	0.006 77	0.007 67	0.008 119	0.013 53	0.015 34	80
72	0.013 889	0.003 47	0.001 74	0.012 028	0.001 50	0.002 00	0.003 01	0.004 51	0.007 52	0.008 52	0.009 021	0.015 04	0.017 04	72
64	0.015 625	0.003 91	0.001 95	0.013 532	0.001 69	0.002 26	0.003 38	0.005 07	0.008 46	0.009 58	0.010 149	0.016 91	0.019 17	64
56	0.017 857	0.004 46	0.002 23	0.015 465	0.001 93	0.002 58	0.003 87	0.005 80	0.009 67	0.010 95	0.011 599	0.019 33	0.021 91	56
48	0.020 833	0.005 21	0.002 60	0.018 042	0.002 26	0.003 01	0.004 51	0.006 77	0.011 28	0.012 78	0.013 532	0.022 55	0.025 56	48
44	0.022 727	0.005 68	0.002 84	0.019 682	0.002 46	0.003 28	0.004 92	0.007 38	0.012 30	0.013 94	0.014 762	0.024 60	0.027 88	44
40	0.025 000	0.006 25	0.003 12	0.021 651	0.002 71	0.003 61	0.005 41	0.008 12	0.013 53	0.015 34	0.016 238	0.027 06	0.030 67	40
36	0.027 778	0.006 94	0.003 47	0.024 056	0.003 01	0.004 01	0.006 01	0.009 02	0.015 04	0.017 04	0.018 042	0.030 07	0.034 08	36
32	0.031 250	0.007 81	0.003 91	0.027 063	0.003 38	0.004 51	0.006 77	0.010 15	0.016 91	0.019 17	0.020 297	0.033 83	0.038 34	32
28	0.035 714	0.008 93	0.004 46	0.030 929	0.003 87	0.005 15	0.007 73	0.011 60	0.019 33	0.021 91	0.023 197	0.038 66	0.043 82	28
24	0.041 667	0.010 42	0.005 21	0.036 084	0.004 51	0.006 01	0.009 02	0.013 53	0.022 55	0.025 56	0.027 063	0.045 11	0.051 12	24

NOTE For application of symbols see BS 1580-1:2007, Annex D.

Annex A (normative)

Unified screw threads below $\frac{1}{4}$ in diameter for attachment purposes and for general use in the aircraft industry

NOTE The following five numbered sizes of screw threads, having the unified profile, have been standardized between American, Canadian and UK industry in order to achieve interchangeability in this smaller size range for purposes of attachment, e.g. an instrument to a panel. Four of these sizes (omitting the non-preferred 10 — 24 UNC size) have also been adopted for general purposes in the aircraft industry. The UK electrical, radio and instrument industries continue to use B.A. screw threads conforming to BS 93 for all normal purposes within an assembly.

4 — 40 UNC

6 — 32 UNC

8 — 32 UNC

10 — 32 UNF

10 — 24 UNC (non-preferred).

A.1 Tolerance class

External threads shall be Class 2A and internal threads shall be Class 2B in accordance with Clause 6.

A.2 Allowance for uncoated threads

An allowance shall be provided between maximum external and minimum internal threads (in the finished uncoated condition) on the same basis as for sizes $\frac{1}{4}$ in diameter and above as specified in BS 1580-1:2007 (see also BS 1580-1:2007, Annex A).

A.3 Limits of size

The limits of size for the screw threads shall be as given in BS 1981.

A.4 Coated threads

Coated threads shall conform to BS 1580-1:2007, Clause 9.

A.5 Designation of threads

The designation of the screw threads specified in this annex shall comprise the screw number or the basic major diameter, the number of threads per inch, the thread series (UNC or UNF) and the thread class (2A or 2B).

EXAMPLE:

4 — 40 UNC — 2A or

.112 — 40 UNC — 2A

A.6 Gauges

Screw gauges conforming to BS 919-1 shall be used.

NOTE It is recommended that the American-type high-addendum NOT GO effective diameter screw plug gauge be used for checking the numbered sizes of internal threads.

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 93, *Specification for British Association (B.A.) screw threads with tolerances for sizes 0 B.A. to 16 B.A.*

BS 3382: Parts 1 & 2, *Specification for electroplated coatings on threaded components – Part 1: Cadmium on steel components – Part 2: Zinc on steel components*

BS 3382-7, *Specification for electroplated coatings on threaded components – Part 7: Thicker platings for threaded components*

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