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Australian Standard®

Unified (ISO inch) screw threads, associated gauges, and gauging practice

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CSIRO, Division of Applied Physics

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STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 3635—1990
Unified (ISO inch) screw threads, associated gauges, and gauging practice

RECONFIRMATION NOTICE

Technical Committee ME-029 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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NOTES

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PREFACE

This Standard was prepared by the Standards Australia Committee on Screw Threads to supersede the following Standards:

AS	
B121	*Screw gauge limits and tolerances*
B121.1	Part 1: *Gauges for screw threads of unified form*
B121.4	Part 4: *Limits of size for gauges for screw threads of unified form; diameters 1/4* in *and larger*
B133	*Unified screw threads*
B133.1 & 2	Parts 1 and 2: *Diameters 1/4* in *and larger* (AS B133.1 and AS B133.2)
B133.3	Part 3: *Diameters below 1/4* in (AS B133.3)

In the preparation of this Standard, several points were noted by the committee. One was that although inch-based screw thread systems were theoretically obsolescent, the reality was that there would be a continuing requirement for such threads well into the foreseeable future for maintenance purposes. Additionally, with respect to Unified screw threads, these are used in a wide range of currently manufactured products, and are also used in a number of specialized applications, e.g. high and low temperature bolting for the petrochemical and similar industries. A second point was that the previous Standards for the Unified screw thread system, and for associated gauges and gauging practice, were endorsements of British Standards, which could be withdrawn by the British Standards Institution at any time, and consequently become unavailable in Australia. With respect to this point it was realized that the demand pattern for Unified screw threads in the United Kingdom was likely to be vastly different from Australia, e.g. because of the influence of the EEC. A third point was that the form of presenting the information was far from ideal, as a user required some four Standards to cover the subject. The final point was that in some instances the Standards contained technical ambiguities and included obsolescent terminology.

A further important consideration which influenced the committee in its decision to prepare a new Standard was that Unified screw threads have been standardized internationally by the International Organization for Standardization, and are featured in the following Standards:

ISO	
68	*ISO general purpose screw threads—Basic profile*
263	*ISO inch screw threads—General plan and selection for screws, bolts and nuts—Diameter range 0.06 to 6* in
725	*ISO inch screw threads—Basic dimensions*
5864	*ISO inch screw threads—Allowances and tolerances*

Thus it was agreed that a completely new Australian Standard for Unified screw threads, including gauges, gauging practice, and gauge limits, should be prepared. This Standard contains no technical changes whatsoever, i.e. it includes all the Unified diameter/pitch combinations (UNC, UNF, UNEF, 4 UN, 6 UN, 8 UN, 12 UN, 16 UN, 20 UN, 28 UN, and 32 UN), together with the vulgar fractional and decimal fractional UNS thread series. It also includes associated gauges and gauging practice, and limiting dimensions of gauges for the more popular sizes, again with no technical changes. However, the terminology is aligned with contemporary practices.

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STANDARDS AUSTRALIA

Australian Standard

Unified (ISO inch) screw threads, associated gauges, and gauging practice

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard specifies requirements for parallel screw threads, associated gauges, and gauging practice, having the Unified thread form and covering the diameter size range No 0 (0.060 in) to 6 in inclusive.

The Standard gives information on tolerances, deviations, thread classes, and designations.

A supplementary series of Unified threads (UNS) is given in Appendix A for guidance on Unified threads of diameter greater than 6 in, and non-standard diameter/pitch combinations, which may be required for special applications.

Appendices give the basis of the tabulated values (Appendix B), examples for calculating the limits of size of untabulated screw threads (Appendix C), notes on the production of external threads (Appendix D), notes on pitch and flank angle errors (Appendix F), notes on the function and checking of gauges (Appendix E), notes on a recommended system for gauging coated threads (Appendix G), notes on the setting of adjustable screw ring gauges (Appendix H), and the limiting dimensions of screw gauges for the more commonly used Unified threads (Appendix I).

NOTES:

1. Unified screw threads are also known as the ISO inch series screw threads. These screw threads are obsolescent and should not be used in new designs.
2. Because of the methods adopted for rounding the tabulated values (see Appendix B), the values for the various parameters given in the tables are to be taken as authoritative for the application of this Standard.
3. The information given in Appendix A may also be used for calculating screw thread parameters for diameters greater than 6 in.

1.2 APPLICATION. The Standard is intended for adoption by industry and government authorities concerned with the manufacture, measurement, or use of Unified screw threads.

1.3 THE UNIFIED SCREW THREAD SYSTEM. The Unified screw thread system comprises the following series:

(a) The Unified coarse thread series (UNC), which gives graded diameter/pitch combinations in diameters from 1/4 in to 4 in inclusive.

(b) The Unified fine thread series (UNF), which gives graded diameter/pitch combinations in diameters from 1/4 in to 1 1/2 in inclusive.

(c) The Unified extra fine thread series (UNEF), which gives graded diameter/pitch combinations in diameters from 1/4 in to 1 11/16 in inclusive.

(d) The Unified 'numbered' series which gives graded diameter/pitch combinations for UNC, UNF; and UNEF series in diameters from No 0 (0.060 in) to No 12 (0.216 in) inclusive.

(e) The Unified constant pitch series, which are intended for applications where the UNC, UNF, or UNEF series are unsuitable or inadequate. They are arranged to give a graded system of diameter/pitch combinations as follows:

(i) 4 t.p.i. series (6 UN) from 2 5/8 in to 6 in diameter.

(ii) 6 t.p.i. series (6 UN) from 1 7/16 in to 6 in diameter.

(iii) 8 t.p.i series (8 UN) from 1 1/16 in to 6 in diameter.

(iv) 12 t.p.i. series (12 UN) from 5/8 in to 6 in diameter.

(v) 16 t.p.i. series (16 UN) from 7/16 in to 6 in diameter.

(vi) 20 t.p.i. series (20 UN) from 5/16 in to 3 in diameter.

(vii) 28 t.p.i. series (28 UN) from 5/16 in to 1 1/2 in diameter.

(viii) 32 t.p.i. series (32 UN) from 7/16 in to 1 in diameter.

(f) A further series of Unified threads (UNS) for sizes over 6 in diameter, or where the departure from the diameter/pitch combinations given in the Standard cannot be avoided.

1.4 REFERENCED DOCUMENTS. The following Standards are referred to in this Standard:

AS

1014 Gauging of metric screw threads

2710 Screw gauges—Verification

B129 Designs for geometric limit gauges (plain and screwed in inch units)

1.5 NOTATION. The quantity symbols used in this Standard are listed in Table 1.1.

TABLE 1.1

QUANTITY SYMBOLS

Symbol	Quantity
D	Basic major diameter
$D_{1,\ max}$	Maximum minor diameter of internal thread
D_2	Basic pitch diameter
d_{min}	Minimum major diameter of external thread
G	Fundamental deviation for external thread
H	Height of fundamental triangle
L_e	Length of axial engagement
P	Pitch
R	Root radius of external thread
$T_{D,\ 1}$	Tolerance on minor diameter of internal threads
$T_{D,\ 2}$	Tolerance on pith diameter of external thread
T_d	Tolerance on major diameter of external thread
θ	Flank angle