Australian Standard®

SCREWING TAPS

Part 1—GENERAL PURPOSE METRIC SCREW THREADS

[Title Allocated by Defence Cataloguing Authority:
TAP, THREAD CUTTING (ISO Metric Series) . . . . . NSC 5136]

The following scientific, industrial and governmental organizations were officially represented on the committee entrusted with the preparation of this standard:

CSIRO, Division of Tribophysics

CSIRO, National Measurement Laboratory

Confederation of Australian Industry

Department of Defence

Department of Productivity

Department of Technical and Further Education

Electricity Supply Association of Australia

Fasteners Institute of Australia

Institution of Production Engineers

Materials Research Laboratories

Railways of Australia Committee

Telecom Australia.

This standard, prepared by Committee ME/28, Screw Threads, was approved on behalf of the Council of the Standards Association of Australia on 1 June 1978, and was published on 1 July 1978.

This standard was issued in draft form for public review as DR 77076.

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Part 1—GENERAL PURPOSE METRIC SCREW THREADS

First published 1978

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 1500 7

PREFACE

This standard was prepared by the Association's Committee on Screw Threads. It supersedes AS B88, Part 1 — 1958, Screwing Taps — Taps for Threads other than Unified Threads, which was the endorsement of BS 949: Part 1: 1951.

The purpose of this standard is to provide information for the tapping of metric screw threads in accordance with AS 1275, Metric Screw Threads for Fasteners (based on ISO Recommendations), and AS 1721, General Purpose Metric Screw Threads. The need for the standard arose primarily because Australia has adopted the metric (SI) system of measurement, but it is equally important that Australian practice be aligned with current world practice as given in ISO standards.

The standard is comprehensive in its scope in so far as it contains all relevant information, including tapping drill sizes, within the one document and brings together the information contained separately in one ISO recommendation and three ISO standards; additionally, the standard includes 'cut thread taps' which are not currently covered in ISO documents. The following ISO documents were taken into account in its preparation:

ISO/R529 Short Machine and Hand Taps — General Dimensions

ISO 2283 Long Shank Machine Taps with Nominal Diameters from 3 to 24 mm and $^1/_8$ to 1 inch — General Dimensions

ISO 2857 Ground Thread Taps for ISO Metric Threads of Tolerances 4H to 8H and 4G to 6G, Coarse and Fine Pitches — Manufacturing Tolerances on the Threaded Portion

ISO 2306 Drills for Use Prior to Tapping Screw Threads.

With respect to tap blanks sizes for standard machine and hand taps, the standard seeks to rationalize the number of varieties from that given in ISO/R529 and consequently covers only the metric coarse and fine pitch series in the size range from 1 mm to 64 mm inclusive. The general dimensions for these sizes are identical with those in ISO/R529. Information is given in Appendix D (which is also in agreement with ISO/R529) on tap blank sizes for diameters up to and including 100 mm, which are also suitable for extra fine and non-standard diameter pitch combinations.

In the interests of promoting world standardization the tolerances and deviations for the threaded portion of ground thread taps are basically the same as those given in ISO 2857, even though the committee considered that these were far from optimum. In ISO 2857 the deviations, which take into account the different thread classes, are restricted to the pitch diameter only, whereas in this standard they are additionally applied to the major diameter. It was felt by the committee that unless this requirement was included, i.e. that the whole thread profile be moved according to the internal thread deviation, there was a serious risk of interference on the major diameter (on assembly), particularly with coated threads. As in the case with tap blanks the number of sizes of fine pitch series screw thread taps has been reduced from that given in ISO 2857 to align this standard with AS 1275 and AS 1721.

The committee also noted that the ISO system for tolerances on ground thread taps was unsuitable for critical tapping applications, and that there was an urgent need for such information. Under the inch system of measurement the American 'H' system of tap tolerances was extensively used in Australian industry for critical applications. It was favoured because it provided a graded series of deviations from nominal size, and enabled users to select a particular tap deviation more precisely than is possible with the ISO system. Realizing this and also being aware that the 'H' system was imperially based and hence unsuitable for soft conversion to metric units, the committee has developed a graded tap tolerancing system which has the ISO system as its base and yet extends and subdivides this system to give equivalence to the 'H' system.

Cut thread taps are used in Australia for certain tapping applications and currently these are not covered by ISO standards. The committee considered that there would continue to be a need for these relatively low cost taps in a metric series and consequently the relevant requirements are included in this standard. The tolerancing system for the threaded element has been developed by the committee and approximates the system for inch taps given in AS B88, Part I. The system given in this standard, however, has the ISO system as its base and it is expected that users will benefit by having a single coherent system of tolerancing for all taps.

General dimensions for long shank machine taps are the same as those given in ISO 2283 except that again the number of varieties has been reduced to align this standard with AS 1275 and AS 1721; the size range covered is the same as that in ISO 2283. Because long shank machine taps are not used much in Australia, details for these taps are given in an appendix. It should be noted that these taps are not normally carried as stock items.

In the preparation of this standard the committee gave serious consideration to the inclusion of recommendations with respect to tapping drill sizes, suitable for the whole series of general purpose metric screw threads. It was considered that essential basic information in this area would be of value to both designers and production engineers particularly during the interim period of metric conversion when it would be helpful

to establish preliminary guidelines on tapping drill sizes. This information is given in Appendix C, which has been based on ISO 2306, but this material at this juncture has not been the subject of an authoritative Australian study.

This standard may require reference to the following standards:

AS 1275 Metric Screw Threads for Fasteners

AS 1654 Limits and Fits for Engineering

AS 1721 General Purpose Metric Screw Threads.

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PART 1—GENERAL PURPOSE METRIC SCREW THREADS

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard applies to taps for cutting ISO metric screw threads. It includes standard machine taps and hand taps with ground threads and also taps with cut threads, and covers diameters from 1 mm up to and including 64 mm in both coarse and fine pitch series. The diameter/pitch combinations are in agreement with AS 1275* and AS 1721†. General dimensions, tolerances, and deviations for the threaded portion, types of taps, and other main features are specified, but the details of design are left to the manufacturer. If specific design features are required these need to be specified by the purchaser at the time of his enquiry or order. Taps for the tapping of nut threads are not specified in this standard owing to the many varieties in existence.

Cut thread taps are specified for metric coarse pitch screw threads only, and one tolerance class is specified.

The general dimensions of long shank machine taps, and tapping drill sizes for use with fluted taps are also included in appendices.

NOTE: To ensure interchangeability of machine taps in related holders, the blank dimensions given in Supplement 1 for inch screwing taps‡ are the same as those specified in this standard for metric threads.

1.2 TERMS AND DEFINITIONS. For the purpose of this standard, the terms and definitions given in Clauses 1.2.1 to 1.2.3 and Figs 1 to 4 apply.

1.2.1 Terminology of the Thread Profiles. General terms related to the screw thread profile of an internal thread and a tap are given in Figs 1 and 2.

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* AS 1275, Metric Screw Threads for Fasteners (Based on ISO recommendations).
† AS 1721, General Purpose Metric Screw Threads.
‡ In the course of preparation.