

CONFIRMED
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Specification

Undercuts & runouts for screw threads —

Part 1: Inch screw threads

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The Mechanical Engineering Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:—

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Air Ministry*	Institute of Petroleum
Associated Offices Technical Committee	Institution of Civil Engineers
Association of Consulting Engineers (Incorporated)	Institution of Gas Engineers
British Chemical Plant Manufacturers' Association	Institution of Heating and Ventilating Engineers
British Compressed Air Society	Institution of Mechanical Engineers*
British Electrical and Allied Manufacturers' Association*	Institution of Mechanical Engineers (Automobile Division)
British Electricity Authority and Area Boards	Institution of Production Engineers*
British Engineers' Association*	Locomotive Manufacturers' Association*
British Internal Combustion Engine Manufacturers Association	Machine Tool Trades Association
British Iron and Steel Federation	Ministry of Fuel and Power
British Railways, The Railway Executive*	Ministry of Labour and National Service (Factory Department)
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D.S.I.R. — Mechanical Engineering Research Organization*	Ministry of Transport
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	National Physical Laboratory*
	Office of the High Commissioner for India
	War Office

The Government departments marked with an asterisk in the above list, together with the following scientific and industrial organizations, were directly represented on the committee entrusted with the preparation of this standard :—

Agricultural Engineers Association	Radio Industry Council
British Bolt, Nut, Screw and Rivet Conference	Scientific Instrument Manufacturers Association
Cut Thread Screwing Tool Manufacturers Association	Society of Motor Manufacturers and Traders Ltd.
Engineering Standards Co-ordinating Committee	Telecommunication Engineering and Manufacturing Association
Ground Thread Tap Association	
National Association of Marine Enginebuilders	

Amendments issued since publication

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Foreword

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 4000, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook.

This standard makes reference to the following British Standards:—

BS 84, *Screw threads of Whitworth form.*

BS 93, *B.A. screw threads.*

BS 811, *Cycle threads.*

BS 949, *Screwing taps.*

BS 1580, *Unified screw threads.*

BS 1936, *Undercuts and runouts for screw threads .*

BS 1936-2, *ISO metric screw threads.*

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10 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.

Introductory notes

During the preparation of this standard it was appreciated that in present practice two alternative methods are used for defining the width of an undercut, namely from the shoulder to the crest of the first adjacent thread and from the shoulder to the intersection of the cylindrical portion of the undercut with the chamfer of the first thread. The latter method has been adopted in this standard. This nominal width of undercut is also the nominal width and designation of the tool for producing it. These nominal widths are in accord with a preferred number series (the 10 series) and allow the production of an adequate variety of undercuts on threads of many pitches with a minimum number of standard tools.

It cannot be too strongly emphasized that too narrow undercuts, or the demand for perfect or full threads up to shoulders or to the bottoms of blind holes, add greatly to manufacturing cost by necessitating the use of special taps and dies, a second screwing operation, or resort to processes such as thread milling or grinding.

It is suggested that where recommendations for any of the standard forms of undercut appear at first sight to be inapplicable, an endeavour should be made to accommodate them by alterations in design, e.g. by using through-tapped holes.

A counterbore or undercut on the first few threads of an internal thread may readily be drilled when tapping a hole and is much simpler to produce than the equivalent undercut on the mating external thread. (See Figure 4.)

BS 1936-2 published in 1970 specifies the requirements for undercuts and runouts for ISO metric screw threads.

1 Scope

This British Standard relates to dimensions for profile and width of undercuts for external and internal threads of Unified, Whitworth, B.A. and Cycle thread forms and provides for a series of standard tools for producing the undercuts recommended. It makes recommendations concerning practice in regard to undercuts and relates also to allowances for thread runouts. It includes the following:—

- a) Nominal widths of machined undercuts and thread runouts (washout threads) produced from screwing tools.
- b) Recommendations for minimum widths of undercut or runout for various production requirements.
- c) Limits of tolerance on diameters of undercuts.
- d) Standard tools for undercuts.
- e) Formulae for calculating widths of undercuts and runouts. (See Appendix.)

2 Form of undercut

When an external thread projects from a component of larger size or diameter, an undercut of reasonable width allows the thread to be cut without the end face of the die fouling the component. The type of undercut, Form A, recommended for use on external or internal threads is shown in Figure 1. Design requirements are usually for a reasonable degree of control on the diameter at the root or crest of the undercut to avoid weakening the section at this point, and for an ample radius at the end of the undercut to avoid stress concentration. The production requirement is for an adequate width of undercut to allow the use of dies and taps with a reasonable throat angle or taper lead. Recommendations of widths in terms of pitch are given in Table 2. (See also Appendix.) The dimensions of this form of undercut and of suitable tools are given in Table 1, Table 3 and Table 4.

The diameter of the undercut D_m or D_f must be calculated as this will vary with the diameter, pitch and form of thread used.

Figure 2, Form B, shows a similar undercut, except that the shape is arranged to provide a register or location for the insertion of a jointing washer, gasket, etc., between the external and the internal thread. From the design point of view this undercut may not be as satisfactory under fatigue conditions as the other type. Detail dimensions for tools for this type of undercut are not given as each pitch requires a special tool. As in the case of Figure 1, Form A, the diameter must be calculated.

Figure 3, Form B, shows an undercut of form similar to that shown in Figure 2 but used on an external thread at the end of a cylindrical component of the same diameter as the thread.