

Specification for

Pinion type cutters for spur gears — 1 to 8 metric module

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

Gauge and Toolmakers Association	Navy and Vickers Gearing Research Association
Milling Cutter and Reamers Association	North East Coast Institution of Engineering and Shipbuilders
National Federation of Engineers Tool Manufacturers	

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Foreword

This British Standard has been prepared under the authority of the Mechanical Engineering Industry Standards Committee and is one of a number dealing with gear cutting tools.

This edition is a revision of the 1957 edition of BS 2887 but in accordance with the UK policy of metrication, diametral pitch cutters have been replaced by metric module cutters. BS 2887 is therefore withdrawn.

It should be noted that, due to established world wide usage, nominal bore sizes in inch units of $1\frac{1}{4}$, $1\frac{3}{4}$ and $2\frac{5}{16}$ have been directly converted into millimetres.

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.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12, 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 Scope

This British Standard specifies certain dimensions and accuracy requirements for non-topping pinion type finishing cutters for generating involute spur gear teeth of 1 to 8 metric module.

The following types of cutter are covered by this standard.

Disc [see Table 1(a) and Table 1(b)].

Extended hub (see Table 2).

Screwed hub (see Table 3).

Parallel shank (see Table 4).

Large stub taper shank (see Table 4).

No. 2 Morse stub taper shank (see Table 4).

These cutters are generally intended for the production of metric module gears which comply with the requirements of ISO 53 and ISO 54 and BS 436-2. This standard, BS 5246, includes two additional modules, 3.25 and 3.75.

Two tolerance grades are given.

Grade AA. Cutters for the production of gears to fine tolerances.

Grade A. Cutters for the production of gears for general purposes.

NOTE Grade AA is applicable to all the cutters illustrated except the screwed hub type shown in Figure 5.

Details of the markings recommended for pinion type cutters and information to be given when ordering standard cutters are included.

2 References

The titles of the British Standard and International Standards referred to in this standard are listed on the inside back cover.

3 Terminology

3.1

normal module, m_n

the quotient of the normal pitch, expressed in mm, by the number π

3.2 General.

The general terms used, common to gears and gear forming tools, are taken from BS 2519¹⁾.

Notations are as given in BS 2519¹⁾.

Figure 1 illustrates the terminology applied to a typical disc type cutter.

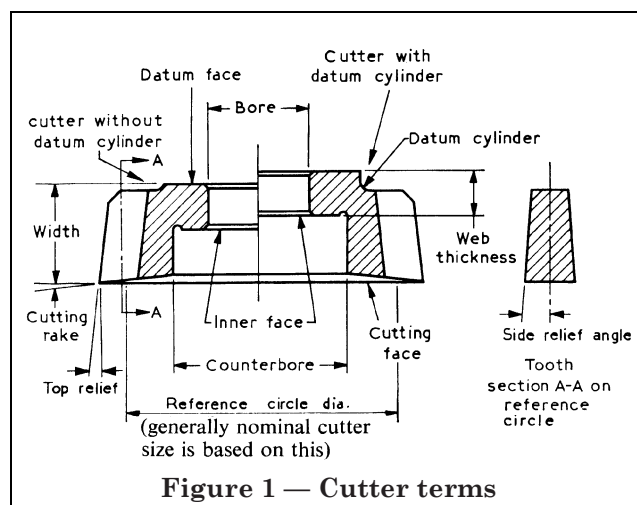


Figure 1 — Cutter terms

4 Tooth form

Pinion type cutters shall have teeth of such a form that they will be capable of generating gear teeth corresponding to the British Standard basic rack tooth profile shown in BS 436-2 except that slight changes in profile, root fillet and root clearance of the gear teeth will occur during the life of the cutter.

The actual dimensions of the following elements of the cutter shall be so related that when cutting a basic rack to the standard tooth thickness, the standard root clearance will be maintained as a minimum over the first 75 % of the useful face width of the cutter teeth:

- outside diameter,
- tooth thickness,
- side relief angle,
- top relief angle.

NOTE With certain combinations of gear and cutter sizes, gears produced by this process will give rise to incorrect tooth action. See Appendix A.

5 Dimensions

Dimensions for the cutters listed shall comply with those given in Table 1 to Table 4 as appropriate. Cutters are also manufactured and used outside the range of pitches indicated for each type but these are not covered by this standard. However, by agreement between the purchaser and manufacturer, essential features of this standard, e.g. tolerances, may be applied to such other designs.

For bore dimensions see clause 6.

¹⁾ Under revision. Will also embody notations given in ISO/R 701.

6 Bore

Each end of the bore shall be broken with a small chamfer or radius not exceeding 1 mm and the bore shall be finished parallel. The dimensions of the bore shall comply with those given in Table 5.

7 Provision of datum cylinders

7.1 For grade AA cutters. All grade AA cutters shall have a datum cylinder as shown in Figure 1, Figure 2, Figure 3 and Figure 5.

7.2 For grade A disc cutters. A datum cylinder as in 7.1 above may be incorporated by arrangement between the purchaser and the manufacturer.

Other grade A cutters do not normally have a datum cylinder.

8 Tolerances

The tolerances appropriate to each type and grade of pinion cutter are given in Table 6.

In general, the tolerances for grade AA cutters apply only to the types referred to in Table 1(a), Table 1(b), Table 2 and Table 4.

9 Marking

Recommendations for the information to be marked on pinion type gear cutters are given below.

Normal module xm_n

Normal pressure angle at reference cylinder	α_n
Number of teeth	xz
Grade of accuracy of cutter	...
Cutting depth	$x CD$
Number and year of this British Standard	BS 5246:1975

Maker's identification mark or number, and cutter material may also be added if desired.

10 Instructions for ordering

Information required by the suppliers of pinion cutters, which should be stated when ordering, is tabulated below.

- Quantity required.
- Type of cutter.
- Normal module.
- Grade of accuracy of cutter.
- Nominal cutter size.
- Diameter of bore or size and type of shank.
- Number of this British Standard.

Example

One: Pinion type disc cutter, 3 metric module, Grade A, 100 mm nominal size, 31.75 mm bore, BS 5246.

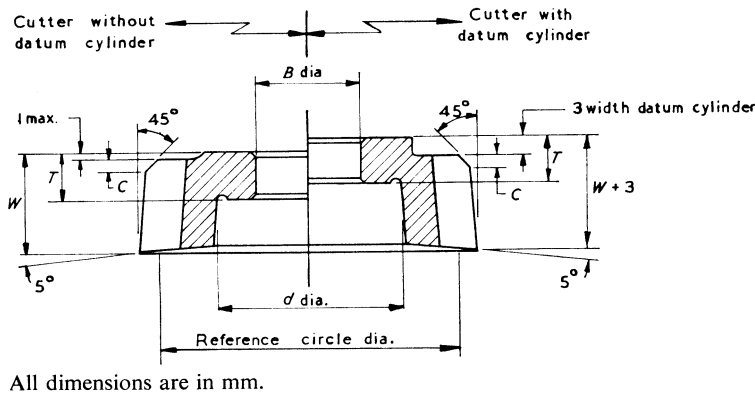


Figure 2 — Disc gear cutter