

Specification for

Fine pitch gears (metric module) —

Part 2: Hobs and cutters

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Machine Tool Trades Association	
Milling Cutter and Reamer Association	

This British Standard, having been prepared under the direction of the Mechanical Engineering Standards Committee, was published under the authority of the Executive Board on 31 October 1978

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Foreword

This British Standard has been prepared under the direction of the Mechanical Engineering Standards Committee.

This standard is a metric revision of BS 978 “*Fine pitch gears*” Part 5:1965 “*Hobs and cutters*” but, in accordance with the UK policy of metrication, diametral pitch hobs and cutters have been replaced by metric hobs and cutters.

It should be noted that BS 978-5 will be retained in being as long as the other Parts of BS 978, which deal with the various types of fine pitch gears, are themselves retained as current standards.

This standard is specifically intended to apply to gears produced in accordance with BS 4582 “*Fine pitch gears*” Part 1 “*Involute spur and helical gears*” which deals exclusively with metric module gears. Provision is also made for cutters for gears made in accordance with the requirements of BS 978-2 which is based on modules, should a range of metric cutter blanks be desired.

The grades of cutters specified in this standard are related to similar grades of gears in BS 4582-1 as follows.

Grade A corresponds jointly to class A and class B gears in BS 4582-1.

Grade B corresponds to class C gears in BS 4582-1.

Grade C corresponds to class D gears in BS 4582-1

Grade A is intended for the production of precision gears which are defined in more detail in the specifications for classes A and B in BS 4582-1.

Grade B is for the production of gears for high class work and this is defined in more detail in the specification for class C gears in BS 4582-1.

Grade C is for general engineering gears according to the specification for class D gears given in BS 4582-1.

Dimensions of keys and keyways are taken from ISO 240, except in respect of those for the 19.05 mm bore hole for which keys and keyways are based on existing practice.

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.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 32, 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 standard specifies dimensions and accuracy requirements for the following gear cutting tools for fine pitch gears of metric module produced in accordance with the requirements of BS 4582-1.

- a) Gear hobs.
- b) Rotary form-relieved gear cutters.
- c) Pinion type cutters.

This standard may also be used for cutters for gears produced in accordance with the requirements of BS 978-2 if desired.

2 References

The titles of the publications referred to in this standard are listed on the inside back cover.

3 Terminology

The general terms and notations used, common to gears and gear forming tools, are taken from BS 2519-1 and BS 2519-2.

Figure 1, Figure 7 and Figure 9 illustrate the terms used.

4 Gear hobs for fine pitch gears, metric module

4.1 Amplification of scope. This clause of this British Standard specifies dimensions and accuracy requirements for single start, topping and non-topping, right and left hand gear hobs for the production of spur and helical gears in the range from 0.07 to 1 metric module. It is applicable to gears produced in accordance with the requirements of BS 4582-1.

These hobs may be driven by means of an axial keyway or by a tenon drive. Details are given in Table 2, Table 3 and Table 5.

It should be noted that, unless otherwise specified by the purchaser, the hobs supplied in accordance with this standard will be right-hand.

Three grades of tolerance are given (see foreword): A, B and C.

4.2 Tooth form. The hob tooth shall be such that it will generate gears corresponding to the appropriate basic rack tooth profile listed below:

- a) Involute as shown in Figure 1 of BS 4582-1:1970. (See Figure 2(a) of this standard.)
- b) Involute with backlash allowance as shown in Figure 2 of BS 4582-1:1970. (See Figure 2 (b) of this standard.)
- d) Double circular arc as specified in addendum 1 of BS 978-2:1952 (PD 3376) which also includes details of the cutter tooth profile.

NOTE One hob will cut gears with any number of teeth of the forms given in a), b) or d).

4.3 Dimensions. The dimensions of hobs shall be in accordance with Table 1. All hobs are subject to the provisions of 4.4, 4.5 and 4.6.

4.4 Bore and arbor. The standard form of bore shall be parallel and may be recessed in the centre portion. Bore tolerances shall be as given in Table 4.

Tolerances for arbor diameters shall be as given in Table 3.

4.5 Bosses. Bosses may be either cylindrical or conical. The cylindrical diameter dimensions given in Table 1 correspond to the major diameters of conical bosses.

4.6 Gashes. Hobs should preferably be gashed parallel to the axis.

4.7 Keys and keyways. When applicable, dimensions shall be in accordance with Table 2 and Table 3 respectively.

4.8 Tenon drive. Where applicable, dimensions shall be in accordance with Table 5.

4.9 Marking. Hobs shall be marked with the following information where applicable. For convenience the symbols should be used.

a) Normal module	$x m_n$
b) Normal pressure angle at reference cylinder	$x^\circ \alpha_n$
c) Tooth lead angle	$x^\circ x' \gamma$
d) Cutting depth	x mm CD
e) Grade of accuracy of cutter	A, B or C as appropriate
f) Gash lead (if-gash is helical)	x mm GL
g) Right-hand or left-hand	R or L
h) Single start	SS
i) Number and year of this British Standard	BS 4582-2:1978
j) Topping or non-topping	t or N
k) Involute	Inv
l) Cycloidal	Cy
m) Double circular arc	Circ arc

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

4.10 Ordering instructions. It is recommended that the purchaser should state:

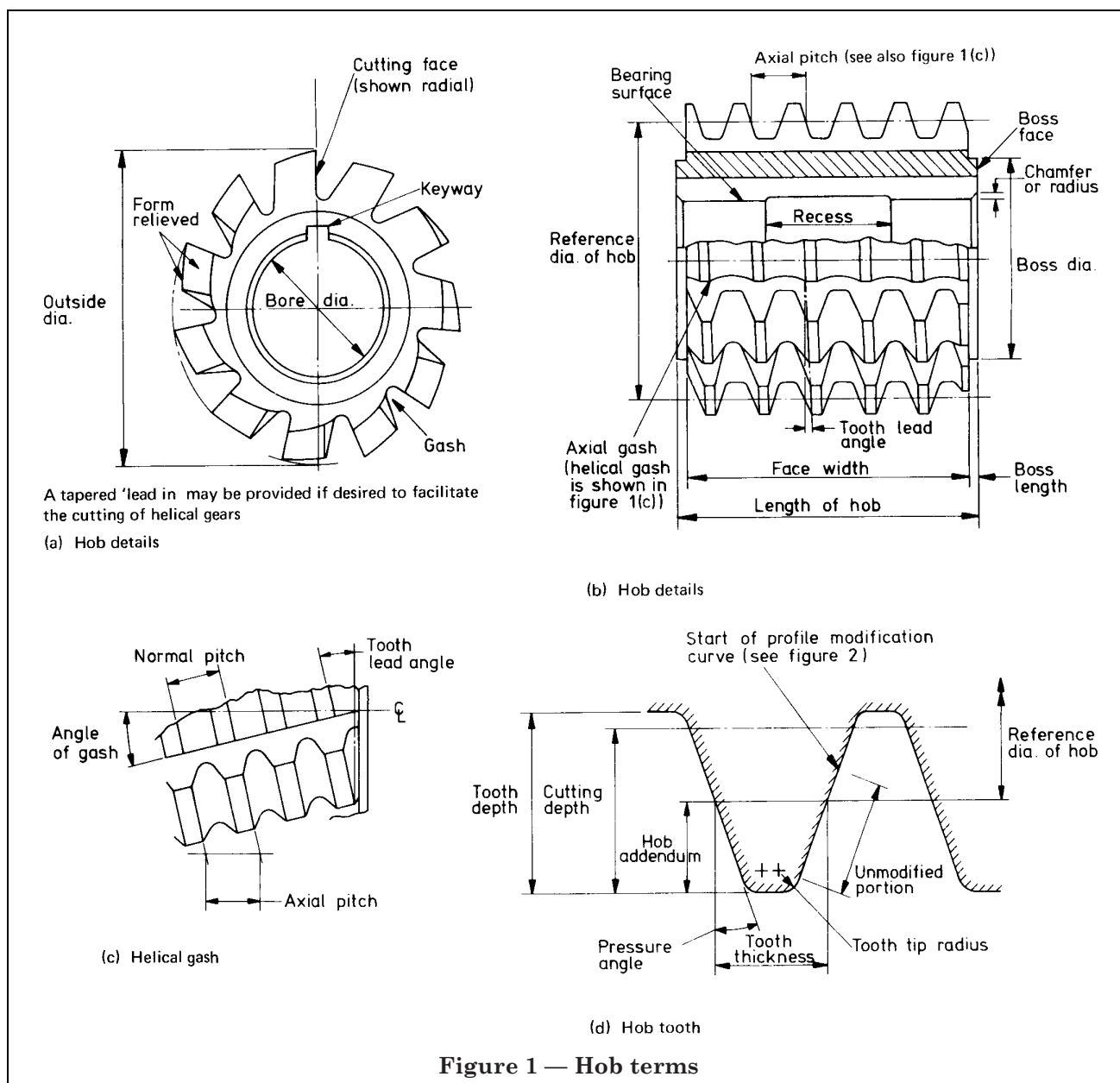
- a) the number of this British Standard;
- b) quantity of hobs required;
- c) normal module;
- d) grade of accuracy of cutter;
- e) hand (right or left)¹⁾;
- f) tooth form;
- g) diameter and length and bore if different from that given in Table 1;

Example

One off: 0.8 module, grade A hob to BS 4582-2, right-hand.

- h) type of drive.

¹⁾ Unless otherwise specified by the purchaser, the hobs supplied in accordance with this standard will be right-hand.



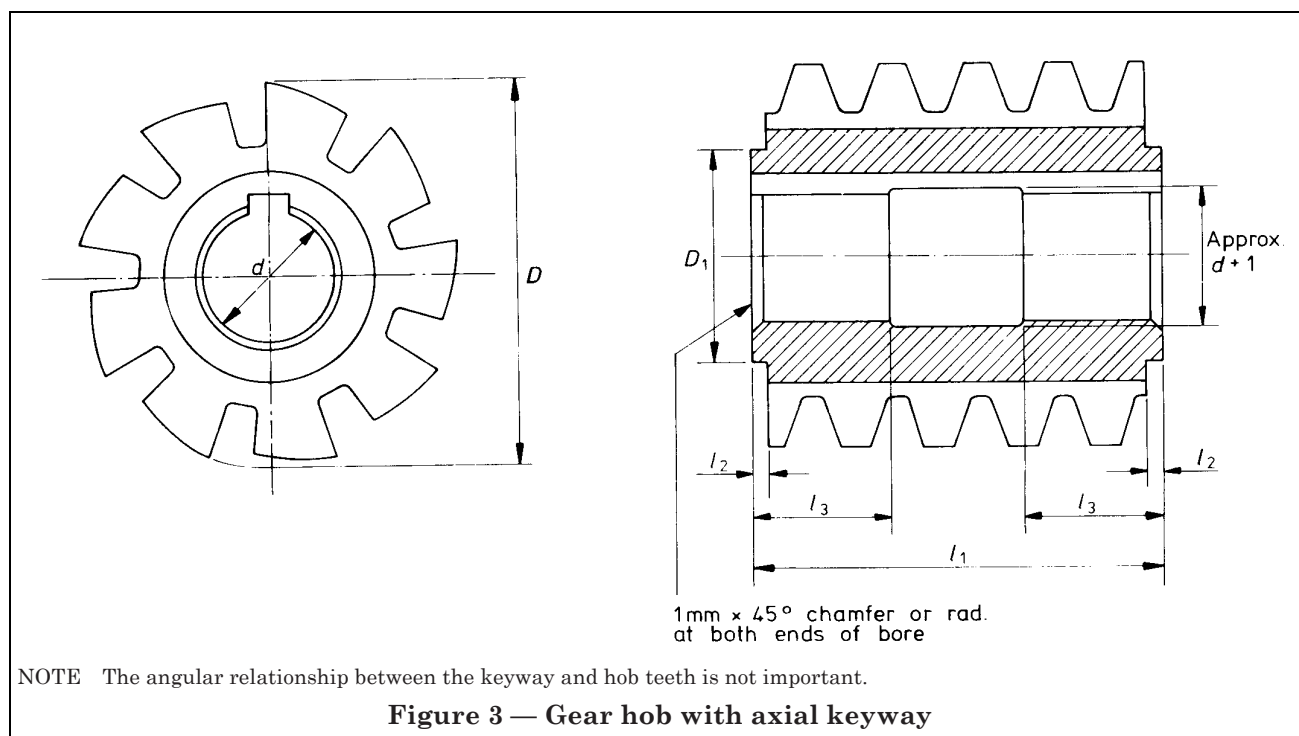
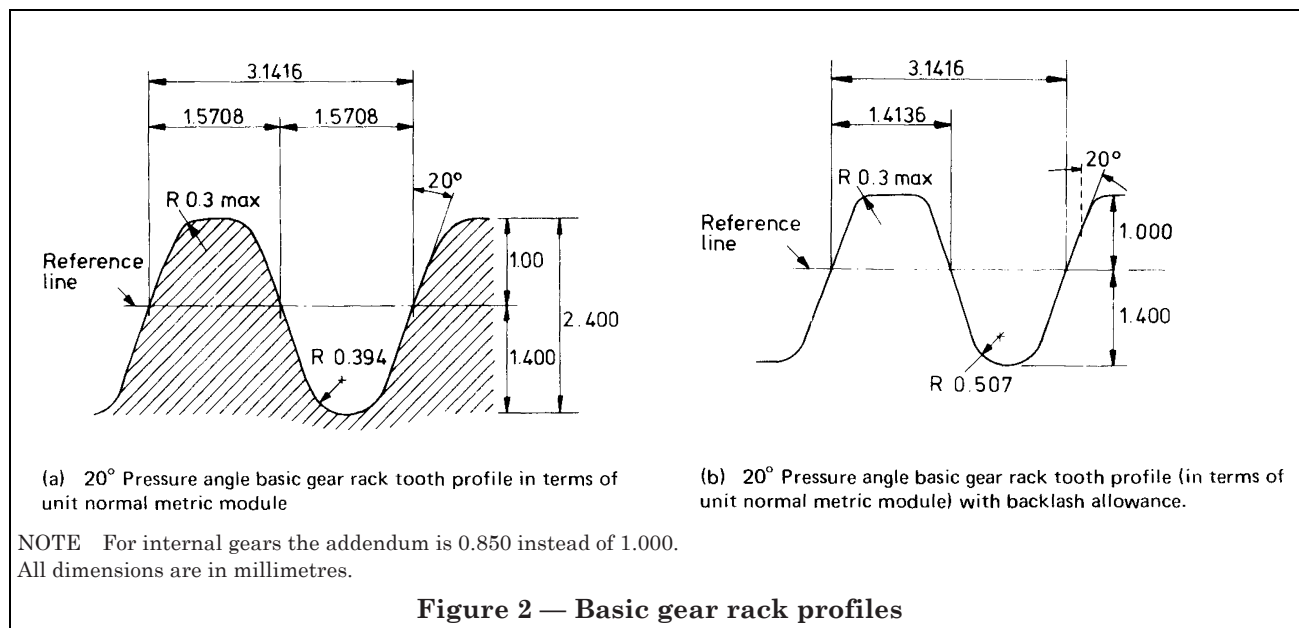


Table 1 — Dimensions of gear hobs for fine pitch gears for preferred^a metric modules
(see Figure 3)

All dimensions are in millimetres.

1	2	3	4	5	6	7
Module	Outside diameter	Overall length	Bore	Approx. bearing length ^b	Boss	
m_n	D	l_1	d	l_3	Diameter ^c D_1	Length ^d l_2 min.
0.08	40 32 24	34 22 16 max.	19.050 10 8	1/3 of overall length for all modules	27 20 16	2.5 for all modules
0.1	40 32 24	34 22 16 max.	19.050 10 8		27 20 16	
0.12	40 32 24	34 22 16 max.	19.050 10 8		27 20 16	
0.16	40 32 24	34 22 16 max.	19.050 10 8		27 20 16	
0.2	40 40 32 24	34 34 22 16 max.	19.050 13 10 8		27 27 20 16	
0.25	40 40 32 24	34 34 22 16 max.	19.050 13 10 8		27 27 20 16	
0.3	40 40 32 24	34 34 22 16 max.	19.050 13 10 8		27 27 20 16	
0.4	40 40 32 24	34 34 22 16 max.	19.050 13 10 8		27 27 20 16	
0.5	48 40 32 24	34 34 22 16 max.	19.050 13 10 8		35 27 20 16	
0.6	48 40 32 24	34 34 22 16 max.	19.050 13 10 8		35 27 20 16	
0.7	48 48 40 32 24	34 34 34 22 16 max.	19.050 16 13 10 8		35 35 27 20 16	

Table 1 — Dimensions of gear hobs for fine pitch gears for preferred^a metric modules
(see Figure 3)

All dimensions are in millimetres.

1	2	3	4	5	6	7
Module m_n	Outside diameter D	Overall length l_1	Bore d	Approx. bearing length ^b l_3	Boss	
					Diameter ^c D_1	Length ^d l_2 min.
0.8	48	34	19.050		35	
	48	34	16		35	
	40	34	13		27	
	32	22	10		20	
	24	16 max.	8		16	
0.9	48	34	19.050		35	
	48	34	16		35	
	40	34	13		27	
	32	22	10		20	
1.0	48	34	19.050		35	
	48	34	16		35	
	40	34	13		27	
	32	22	10		20	

^a For dimensions of non-preferred module hobs, the dimensions recommended for use are those of the next larger preferred module hob.
^b Hob bores may be unrecessed or have more than one recess in the bore. In such cases, the bearing lengths quoted do not apply.
^c The boss periphery may be used as a datum surface subject to its permissible run-out.
^d The overall length of the boss may be increased as required should tenon drive be specified (see 4.8).
Although dimensions for the boss diameter are given, this feature should be as large as possible.
Bosses need not be provided on grades B and C hobs and in such cases the length of the hob may be reduced by twice the boss length.
For grade A hobs, single or double bosses may be provided depending upon the purchaser's requirements.

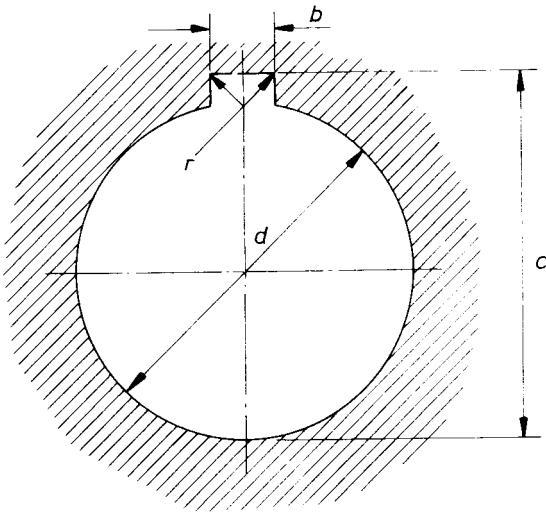


Figure 4 — Keyway in hob