

SPECIFICATION FOR
DENTAL CHISELS,
EXCAVATORS,
PROBES AND SCALERS

BS 2965 : 1970

THIS BRITISH STANDARD, having been approved by the Dental Industry Standards Committee, was published under the authority of the Executive Board on 31 March, 1970.

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The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

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 5000, fully indexed and with a note of the contents of each, will be found in the British Standards Yearbook, price £1. The BS Yearbook may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards:

BS 427. Method for Vickers hardness test.

Part 1. Testing of metals.

BS 3978. Water for laboratory use.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following BSI references relate to the work on this standard:
Committee reference DNMH/2 Draft for comment 68/30975

**Amendment Slip No. 1, published 23 September, 1971
to BS 2965: 1970**

Dental chisels, excavators, probes and scalers

NOTE. Attention has recently been drawn to certain paragraphs in the classification of this specification, which are at variance with the nomenclature originally devised by Black (1898) and used since that time by the leading instrument manufacturers, both in this country and the U.S.A.

BS 2965 states (p. 5) that 'the classification for dental chisels is the one originally devised by Dr. G. V. Black', but a misinterpretation of Black's original instruction* is responsible for the difference between the standard and actual practice. The relevant sentence in Black's publication reads: Measure the length of the blade from the centre of the angle to the cutting edge in millimeters. It is now clear that the intended reference point (underlined), is the midpoint of the (assumed circular) arc formed by the inside bend between blade and shank (in chisels) or stem and shank (in excavators) and not the point of intersection of the centre line of the blade (or stem) with the centre line of the shank.

*Reference G. V. Black (1898) Dental Digest 4, 1.

The following alterations to BS 2965 have therefore been made.

Revised text

Appendix A. Classification

A.2.1.2 Length of blade. On line 4 of this clause delete the existing text from (2) onwards and substitute the following:

'(2) the line at right angles to the centre line through the midpoint *M* defined as the 'centre of arc'. The latter is constructed as follows: Bisect the angle between the centre line of the blade and the centre line of the shank. This bisector crosses the inner bend between blade and shank at *M*. Point *M* is thus defined as the midpoint of the centre of arc. (See Fig. 6 for example).'

A.3.1.2 Length of stem. Delete the existing text and substitute the following:

'Along the centre line of the stem between two lines at right angles to the centre line, viz. (1) a line through the point of intersection of the centre line of the stem with the base of the disc and (2) a line through the midpoint *M* of the arc between stem and shank. Point *M* is constructed by bisecting the angle between the centre line of the blade and the centre line of the shank. *M* is the point where the bisector crosses the inner bend between blade and shank. (See Fig. 10 for example).'

A.4.1.3 Note 1. Delete the end of this Note in brackets: '(not the centre line as in the case of chisels and excavators).'

Figures

Figs. 2, 3, 4, 5, 6, 7, 8, 10, 11, 12. Amend all these figures in respect of point *M* as detailed in the new texts for Clauses A.2.1.2 and A.3.1.2.

As examples, modified drawings for Figs. 6 and 10 are given to illustrate the changes which are applicable.



Formula 20 95 9 12 R

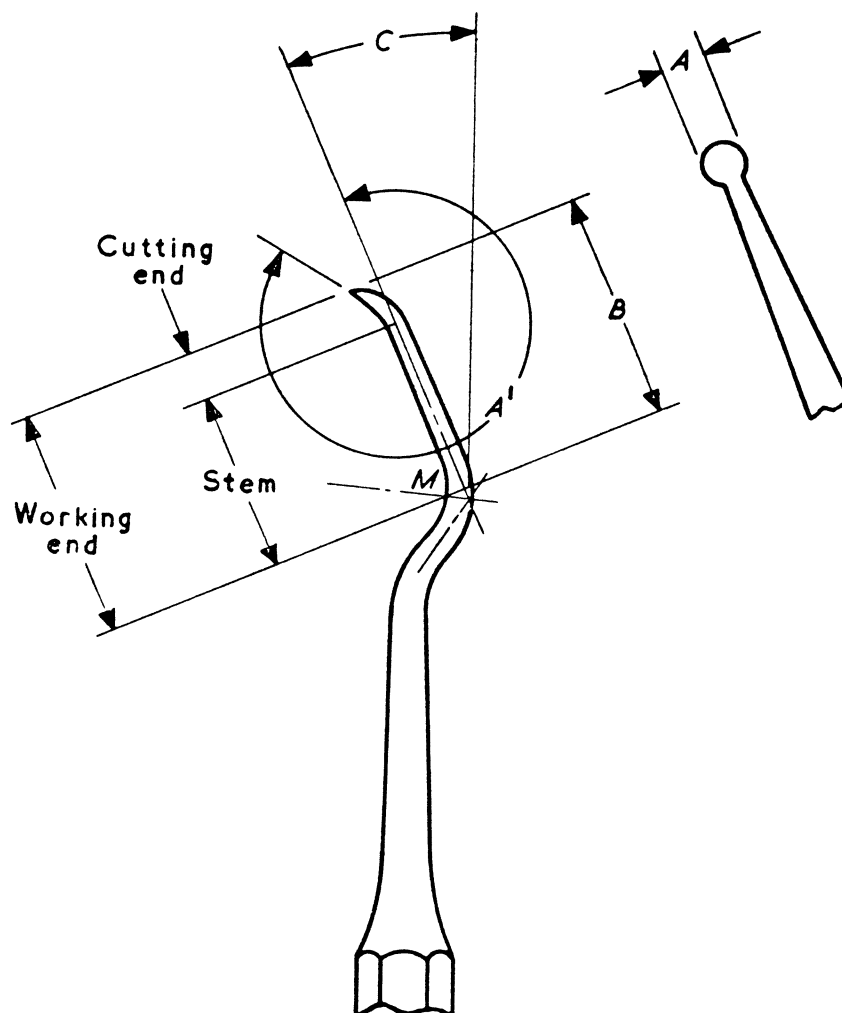


Fig. 10. Angle disc excavator

A A' B C

Formula 16 90 18 6

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CO-OPERATING ORGANIZATIONS

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

- * Association of Dental Hospitals of Great Britain and Northern Ireland
- * British Dental Association
- * British Dental Trade Association
- Dental Education Advisory Council
- * Department of Health and Social Security
- Ministry of Defence, Navy Department
- Ministry of Technology—Laboratory of the Government Chemist
- * Ministry of Technology—National Engineering Laboratory
- * Royal Society of Medicine
- Scottish Home and Health Department

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:

British Steel Industry
Dental Laboratories Association
Institute of British Surgical Technicians (Dental Section)
Institute of Dental Surgery
London Dental Study Club
Ministry of Defence, Air Force Department
Ministry of Defence, Army Department
Royal College of Surgeons of England

BRITISH STANDARD SPECIFICATION FOR DENTAL CHISELS, EXCAVATORS, PROBES AND SCALERS

FOREWORD

This British Standard, prepared under the authority of the Dental Industry Standards Committee, was originally requested by the Ministry of Health, the British Dental Association, and manufacturers.

Acknowledgement is made to the United States Federal Authorities, whose specifications were drawn upon for the compilation of this standard.

In this British Standard requirements for quality of material and finish and for the degree of approximation of actual sizes to nominal sizes are specified.

As an aid to standardization a classification is set out in Appendix A, that for dental chisels being the one originally devised by Dr. G. V. Black. This system has been extended to cover excavators and probes, but owing to the great variety of types, scalers are not at present included in the classification. Scalers are nevertheless subject to the general requirements (Section 1) of this standard, and the detail requirements of Section 5.

The units of Black's system (millimetres, tenths of millimetres and centigrades) are so firmly established throughout the dental field, both in Europe and the USA, that the introduction of new units would seem to be inadvisable. The use of the centigrade scale for angles was proposed by G. V. Black* as follows:

‘ The astronomical circle with its graduation of 360 degrees is far in excess of our needs and becomes cumbersome, because of the minuteness of its sub-divisions. On the other hand, it is the division of the circle most used and best known. The mariner's compass with its division of the circle into 32 points seems insufficient. The division of the circle into 100, the centigrade circle, seems very much better suited to our needs. In this, 25 centigrade is a quarter of a circle, and equal to 90 degrees of the astronomical circle. The quarter circle is about all that we use and the graduations of this are much more quickly caught and appreciated than in the larger number of divisions ’.

The inclusion of the word ‘ centigrade ’ as a unit of angular measurement in a British Standard has been objected to not only because of the association of ‘ centigrade ’ with the measurement of temperature, but also because of possible confusion with the units of the so-called Centesimal Measure (mainly used in

* *The Dental Digest* (Chicago) 1898, 4, 1.

France). It is not known whether G. V. Black was aware of the units of that system, to which his 'centigrade' is related in a simple arithmetical way, viz:

1 grade (or 1G) = $\frac{1}{100}$ of a right angle

1 centigrade (Black) = $\frac{1}{100}$ of four right angles,
hence 1 centigrade (Black) = 4G.

Although the word 'centigrade' does not appear to be used in the centesimal system, the centigrade (Black) unit of angular measure has in this standard been denoted by the term 'tetragrade' (where 1 tetragrade unit = 4 grades = 3.6 astronomical degrees) in order to meet the various objections to the use of the word 'centigrade'.

Recommendations are made to standardize the range of sizes as it exists at present without restricting the members of the dental profession in the choice of their instruments. These recommendations approximate to the sizes which G. V. Black first established for chisels and some other instruments, as follows:

Width of instruments (in tenths of millimetre) in the three series:

3, 4, 5, 6, 8

10, 15, 20, 25, 30, 35

12, 18 (as an alternative to the popular 'set of three' 10, 15, 20)

Angles (in tetragrade units of angular measure):

0, 6, 12, 18, 23

with some of their complementaries, supplementaries, etc. (This represents approximately the division of a right angle into four equal parts.)

Tests are specified which as far as possible simulate conditions of actual use, but difficulty has been experienced through the absence of objective scientific tests for such qualities as sharpness. To specify particular tests for these qualities would seem to require extensive research; investigations, however, indicate a definite correlation between *minimum hardness* and satisfactory performance in the case of steel instruments.

The further requirement that *hardness range* shall be included in the instrument marking will allow consumers to assess more closely the relationship between hardness and actual performance.

No detailed recommendations are made for the composition of materials used in manufacture, since it was felt that to do so would handicap future developments. This applies particularly to the question of the relative merits of corrosion-resisting steel instruments and plated carbon steel instruments.

The revision of this standard was considered necessary primarily to take into account the more widespread use of autoclaving in instrument sterilization. The opportunity has also been taken to introduce other detail changes, principally in respect of hardness marking and new test equipment, and certain passages relating to formula marking have been rephrased in order to clarify their meaning.

Appendix C gives a list of preferred sizes.

SPECIFICATION

1. GENERAL

1.1 SCOPE

This British Standard specifies certain requirements for the design, materials of construction and methods of test of dental chisels, excavators, probes and scalers. With the exception of scalers, the various classes of these instruments are described together with the designations of size and other dimensional characteristics.

NOTE. The values in metric units are the standard.

1.2 DEFINITIONS

For the purposes of this British Standard the following definitions apply:

Dental chisel. An edged instrument with a straight bevelled end for shaping dentine or enamel. The working end of a chisel is called its 'blade'.

Dental excavator. An edged instrument with a curved cutting end primarily designed for removing carious dentine. The working end of an excavator is called its 'blade'. It consists of a cutting end (spoon, disc or pear) and a stem, and it is attached to the handle by the shank. The stem may be absent.

Dental probe. A thin, wire-like instrument with a sharp point, primarily designed for detecting dental caries. Its working end is defined as a 'tine' and may be carried by a stem or may join the shank directly.

Dental scaler. An instrument for removing deposits from the surfaces of teeth.

1.3 GENERAL DESIGN

The completed instrument may be made in one piece; when the working end is manufactured separately, the component parts shall be permanently joined together. With the exception of the overall length specified in 1.5.1, the design shall be, in general, at the discretion of the manufacturer, but once decided upon the design shall be uniformly adhered to from batch to batch and subsequent significant changes in design shall be suitably publicized.

1.4 MATERIALS

The working ends of instruments shall be made either from carbon steel or from corrosion-resisting alloy.

Instruments made in whole or in part of any material liable to corrosion shall be suitably plated except near the cutting edge (or point) of the instrument.

Instruments made of corrosion-resisting alloy, and the plated surface of carbon steel instruments, shall show no signs of corrosion when subjected to the corrosion test given in Appendix B (B.2).

The supplier shall publish data on the hardness ranges of chisels, excavators and scalers, stating the range which applies to any one particular instrument.

The data shall specify minimum and maximum hardness, measured in Vickers hardness values according to BS 427*, and the differences between these two figures shall not exceed 50 HV.

The hardness range shall be indicated on the instrument handle by the following capital letter coding:

Code A indicating hardness value from 500 HV up to and including 550 HV

Code B indicating hardness value above 550 HV up to and including 600 HV

Code C indicating hardness value above 600 HV up to and including 650 HV

Code D indicating hardness value above 650 HV up to and including 700 HV

Code E indicating hardness value above 700 HV up to and including 750 HV

Code F indicating hardness value above 750 HV up to and including 800 HV

The material of the working end of instruments belonging to the same pattern shall have a hardness lying within the hardness range applying to that particular instrument as stated above. The hardness shall be measured as near to the cutting edge as is practicable, and shall follow the procedure described in BS 427*. With carbon steel instruments the hardness shall not be measured on a plated surface.

1.5 DIMENSIONS AND TOLERANCES

1.5.1 Overall length. Instruments shall have a maximum overall length of 168 mm ($6\frac{5}{8}$ in).

1.5.2 Instrument sets. Instruments designed to be used as a set shall be reasonably similar, and, in particular:

(1) the thickness of handles comprising a set shall be constant, subject to a tolerance of ± 0.05 mm (0.002 in), and

(2) if the finish includes fillet-type serrations, these shall not vary in depth by more than 0.05 mm (0.002 in) between any two points on the handle.

1.5.3 Particular instruments. For any particular instrument design, tolerances on dimensions shall be as follows:

Overall length	}	± 0.8 mm ($\frac{1}{32}$ in)
Length of handle		
Thickness of handle	}	± 0.05 mm (0.002 in) measured at corresponding points
Thickness of shank		

1.6 WORKMANSHIP AND FINISH

All surfaces shall be free from imperfections and smoothly polished, and the instrument shall be generally suitable for the purpose for which it is intended.

* BS 427, 'Method for Vickers hardness test', Part 1, 'Testing of metals'.