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ISO 7492

Third edition
2018-01

Dentistry — Dental explorer

Médecine bucco-dentaire — Sondes exploratrices dentaires

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 4, *Dental instruments*.

This third edition cancels and replaces the second edition (ISO 7492:1997), which has been technically revised.

The main changes compared to the previous edition are as follows:

a) Reduction of forms by combination of similar forms in one Figure (e. g Form A and Form B in Figure 2; Form C and Form D in Figure 3; Form E and Form F in Figure 4).

b) Addition of new forms shown in Figure 7, Figure 8 and Figure 9;

c) Addition of requirement for resistance to reprocessing.

Dentistry — Dental explorer

1 Scope

This document specifies the dimensions and performance requirements for dental explorers.

This document is not applicable to endodontic explorers.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1942, *Dentistry — Vocabulary*

ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method*

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method*

ISO 7153-1, *Surgical instruments — Materials — Part 1: Metals*

ISO 17664, *Processing of health care products — Information to be provided by the medical device manufacturer for the processing of medical devices*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1942 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

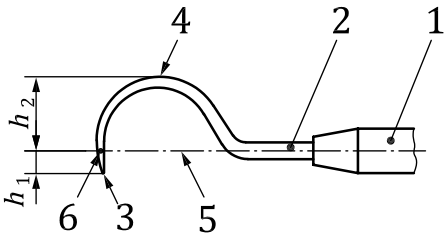
— IEC Electropedia: available at https://www.electropedia.de

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1.1
dental explorer
handheld dental instrument with a pointed tip designed for tactile examination of tooth surfaces

Note 1 to entry: See Figure 1.

Note 2 to entry: Dental explorer is used to examine teeth for decay (caries), calculus, furcations, or other abnormalities.



Key

1 handle
2 shank
3 working tip
4 first bending point
5 centreline
6 datum point
h_1 working end height
h_2 shank height

Figure 1 — Designation of parts and dimensions for dental explorers

3.1.2
datum point
section point between the centreline of the handle, at right angle to the centreline, and the working tip

Note 1 to entry: The datum point is where h_1 and h_2 meet.

3.1.3
handle
area used for holding the *dental explorer* (3.1.1) during tactile exploration

3.1.4
shank
part of the *dental explorer* (3.1.1) that connects the working end to the handle

3.1.5
working end
part of the *dental explorer* (3.1.1) after the first bend of the shank including the working tip

Note 1 to entry: The working end is the combination of h_1 and h_2 directly on the explorer.

3.1.6
working tip
active part of the working end which will be first to contact the tooth surface

3.2 Symbols and abbreviated terms

For the purposes of this document, the following symbols and abbreviated terms apply, and are shown in Figure 1 to Figure 9.

b length of working tip (only used in Figure 5)

h_1 working end height

h_2 shank height

r working end radius

α working end angle

β secondary angle of working tip (only used in Figure 5)

4 Requirements

4.1 Materials

4.1.1 Material of the working end

The working end of a dental explorer shall be made of metallic materials in accordance with ISO 7153-1.

4.1.2 Material of the handle

The material for the handle, selected at the discretion of the manufacturer, shall meet the requirements of Clause 5.

5.3 does not apply.

4.2 Location of measurement points

The location of the points of measurement for dental explorers shall be as shown in Figure 1 and in Table 1.

Table 1 — Measurement of dimensions for dental explorers

Symbol	Meaning	Points of measurement
b	Length of working tip (only used in Figure 5)	distance from the extreme tip of the working end, parallel to the centre-line of the working tip, to the first bend of the working end
h_1	Working end height	distance from the datum point, at right angles to the centreline of the shank, to the farthest extremity of the working tip
h_2	Shank height	distance from the datum point, at right angles to the centreline of the shank, to the furthest point on the external surface of the first bend of the working end
r	Working end radius	radius of curvature of the inside of the first bend of the working end
α	Working end angle	angle between the centreline of the shank and the working end
β	Secondary angle of working tip (only used in Figure 5)	angle between the centreline of the shank and a line parallel to the tangent to the first bend of the working end

4.3 Shape and dimensions

The dental explorer shall have one of the forms shown in Figure 2 to Figure 9.

Commonly used dimensions are shown in Table 2. The column is arranged according to the increase in the dimension h_1.

The dimensions shall be measured in accordance with Table 1 and Figure 1.

The working tip shall be pointed but the exact shape and design of the working end is left to the discretion of the manufacturer.

The maximum length of a dental explorer shall be at the manufacturer's discretion, but it should be noted that overall lengths in excess of 178 mm can cause difficulty in containment within a sterilization cassette.

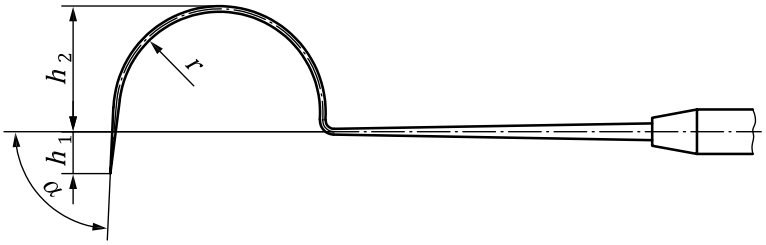


Figure 2 — Dental explorer

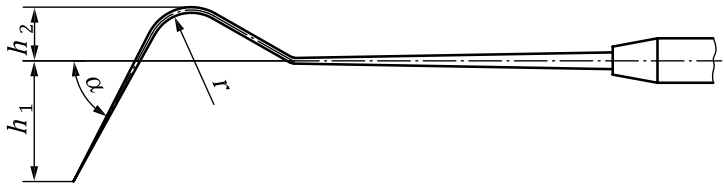


Figure 3 — Dental explorer

Figure 4 — Dental explorer

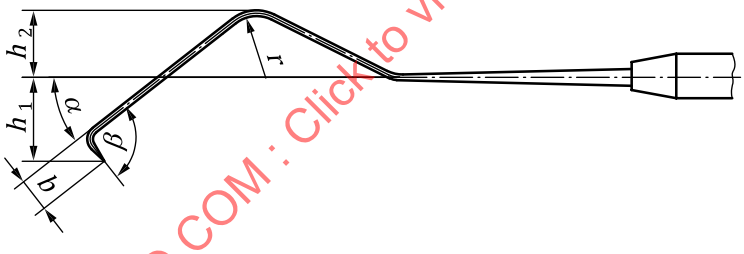


Figure 5 — Dental explorer

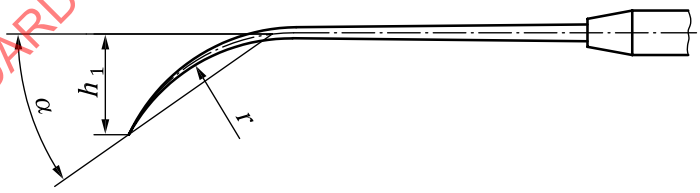


Figure 6 — Dental explorer

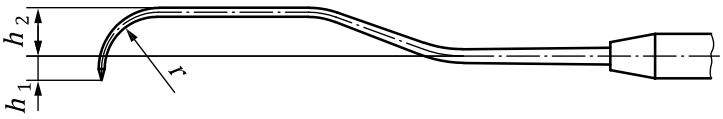


Figure 7 — Dental explorer

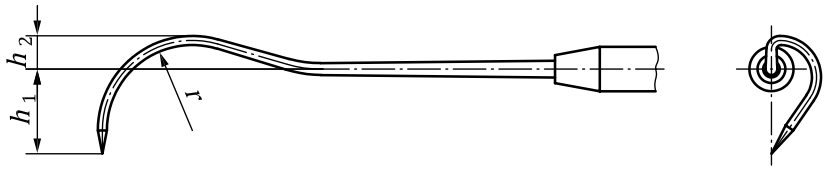


Figure 8 — Dental explorer

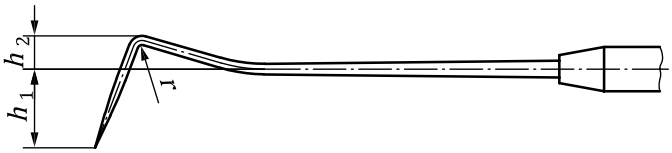


Figure 9 — Dental explorer

Table 2 — Dimensions of dental explorer

Linear dimensions in millimetres
Angular dimensions in degrees

Shape	b ±0,5	h_1 ±0,5	h_2 ±0,5	r ±0,5	α ±10°	β ±10°
Figure 2	—	1,5	9,0	6	90°	—
	—	2,0	9,0	6	70°	—
	—	2,5	7,5	6	85°	—
	—	3,0	8,5	6	90°	—
	—	4,2	3,8	4	85°	—
Figure 3	—	6,3	4,0	1,5	40°	—
	—	7,2	3,2	2,5	62°	—
	—	8,2	4,1	2,5	85°	—
	—	9,0	3,0	2	90°	—
	—	9,0	3,0	2	60°	—
	—	10,0	3,0	2	85°	—
Figure 4	—	4,5	—	—	80°	—
	—	6,0	—	—	67°	—
	—	11,5	—	—	67°	—
	—	12,0	—	—	80°	—
	—	13,0	—	—	40°	—
	—	14,3	—	—	70°	—
Figure 5	1,6	5,2	5,8	5	50°	260°
	1,6	6,5	5,8	5	50°	100°
	2,0	5,0	4,0	2	38°	125°
Figure 6	—	4	—	11	25°	—
	—	5	—	4	55°	—
	—	5	—	12	25°	—
	—	6	—	11	35°	—
	—	7	—	8	40°	—
	—	11	—	11	45°	—
	—	11,5	—	8	55°	—

Table 2 *(continued)*

Shape	b ±0,5	h_1 ±0,5	h_2 ±0,5	r ±0,5	α ±10°	β ±10°
Figure 7	—	1,6	3,2	4	—	—
Figure 8	—	5,6	2,2	5	—	—
Figure 9	—	5,2	2,2	0,2	—	—

4.4 Hardness of working tip

The hardness of the working tip of the finished instrument shall be for:

a) Martensitic stainless steel: 500 HV1 to 650 HV1.

b) Austenitic stainless steel: greater than 500 HV1.

c) Cobalt-based alloys: greater than 500 HV1.

Test the hardness in accordance with 5.3.

4.5 Connection between working end and handle

The connection between working end and handle of the dental explorer shall not loosen under tensile test or torque.

The connection between working end and handle shall meet at least a tensile force of 600 N and a torque of 0,45 Nm.

Test the tensile strength in accordance with 5.4.1.

Test the torque in accordance with 5.4.2.

4.6 Surface finish

4.6.1 All surfaces

The surface finish is at the discretion of the manufacturer, but shall be visibly free from surface defects, e.g. pores, crevices, grinding marks, and from production residues, e.g. residual scale, acids, grease, remaining grinding and polishing material.

Handle surface finishes should be able to be easily cleaned.

Test in accordance with 5.1.

4.6.2 Surface finish of handle

The mirror finish shall be both uniform and smooth with a highly reflective surface.

Test in accordance with 5.1.

4.7 Resistance to reprocessing

Dental explores shall withstand 100 reprocessing cycles, as defined by the manufacturer's instructions, without deformation or showing signs of corrosion.

There shall be no visible damage to reflective coating. For hollow components there shall be no ingress of water within the hollow portion of the instrument.

Test in accordance with 5.5.

5 Test methods

5.1 Visual inspection

Conduct visual inspection at normal visual acuity without magnification.

5.2 Dimensions

Measure the dimensions using a measuring device that is accurate to 1/10 of the tolerance to be measured.

5.3 Hardness testing

Carry out hardness testing in accordance with ISO 6508-1, scale C or ISO 6507-1.

5.4 Connection between working end and handle

5.4.1 Tensile load

Connect the handle and the working end to a tensile strength machine. Pull at 0,5 mm per minute until both parts loosen. Record the tensile force data.

5.4.2 Torque

Connect the handle and the working end to a torque control bench. Twist at one full turn per minute until both parts get loose. Record the breakage torque data.

5.5 Resistance to reprocessing

Carry out 100 reprocessing cycles with the dental explorer, as defined by the manufacturer's instructions. The reprocessing cycle shall include the manufacturer's recommended methods of cleaning, disinfection and sterilization, in accordance with ISO 17664.

If the manufacturer has specified a maximum number of cycles less than 100, this number shall be used for the test.

Inspect all of the surfaces of the dental explorer for any signs of corrosion or surface defects.

The dental explorer shall show no signs of deterioration, distortion or corrosion.

NOTE Discolorations due to water stains are no signs of corrosion.

For dental explorers with hollow components, there shall be no signs of fluid accumulation within the hollow portion of the instrument.

6 Marking and labelling

6.1 Labelling

The dental explorer shall be labelled as follows:

a) name and address of the manufacturer;

b) model number (reference number);

c) lot number (batch designation).