

# INTERNATIONAL STANDARD

**ISO**  
**7787-2**

Fourth edition  
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## **Dental rotary instruments — Cutters — Part 2: Carbide laboratory cutters**

*Instruments rotatifs dentaires — Fraises techniques —  
Partie 2: Fraises techniques en carbure*



Reference number  
ISO 7787-2:2000(E)

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 7787 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 7787-2 was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 4, *Dental instruments*.

This fourth edition cancels and replaces the third edition (ISO 7787-2:1998), which has been technically revised as follows:

- addition of designation of tothing;
- addition of labelling and marking requirements;
- exclusion of miniature carbide laboratory cutters.

ISO 7787 consists of the following parts, under the general title *Dental rotary instruments — Cutters*:

- *Part 1: Steel laboratory cutters*
- *Part 2: Carbide laboratory cutters*
- *Part 3: Carbide laboratory cutters for milling machines*
- *Part 4: Miniature carbide laboratory cutters*

## Introduction

This part of ISO 7787 is one of a series of standards relating to dental rotary instruments.

The various dimensional and other requirements specified for carbide laboratory cutters are those considered important to ensure the interchangeability and safe usage of these instruments in the dental laboratory.

The nominal diameters of the working part listed in Tables 1 to 11 comply with the diameters specified in ISO 2157, *Dental rotary instruments — Nominal diameters and designation code number*.

Attention is drawn to ISO 6360, which specifies a 15-digit number coding system for the identification of dental rotary instruments of all types.

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# Dental rotary instruments — Cutters —

## Part 2: Carbide laboratory cutters

### 1 Scope

This part of ISO 7787 specifies the dimensional and other characteristics for the 11 most common carbide cutters, which are predominantly used in the dental laboratory.

NOTE Steel laboratory cutters are specified in ISO 7787-1; carbide laboratory cutters for milling machines are specified in ISO 7787-3; miniature carbide laboratory cutters are specified in ISO 7787-4.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 7787. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 7787 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1797-1, *Dental rotary instruments — Shanks — Part 1: Shanks made of metals.*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.*

ISO 6360-1, *Dental rotary instruments — Number coding system — Part 1: General characteristics.*

ISO 6360-2, *Dental rotary instruments — Number coding system — Part 2: Shape and specific characteristics.*

ISO 8325, *Dental rotary instruments — Test methods.*

### 3 Classification

Dental laboratory cutters are classified according to the material used for the working part, as steel laboratory cutters or carbide laboratory cutters. Steel laboratory cutters are specified in ISO 7787-1. This part of ISO 7787 as well as ISO 7787-3 and ISO 7787-4 cover carbide laboratory cutters.

## 4 Symbols

For the purposes of this part of ISO 7787, the following symbols apply.

$d$  diameter of working part, head diameter;

$l$  length of working part, head length;

$\alpha$  angle of working part.

## 5 Requirements

### 5.1 Materials

#### 5.1.1 Working part

The working part shall be made of tungsten carbide. The selection of the type of tungsten carbide and its treatment are at the discretion of the manufacturer.

#### 5.1.2 Shank

The material of the shank shall comply with ISO 1797-1.

### 5.2 Shapes

The shapes of the working part shall be as specified in Figures 1 to 11.

Variations of the shapes are permitted within the limited dimensions and the descriptions used in the subclause titles.

Testing shall be carried out in accordance with 6.1.

### 5.3 Dimensions and number of blades

#### 5.3.1 Working part

##### 5.3.1.1 General

Dimensions are given in millimetres and angles are given in degrees.

The dimensions of the working part shall be as specified in Figures 1 to 11 as appropriate and Tables 1 to 11 as appropriate.

The number of blades shall be as specified in Table 12.

Testing shall be carried out in accordance with 6.2.



5.3.1.2 Spherical, round

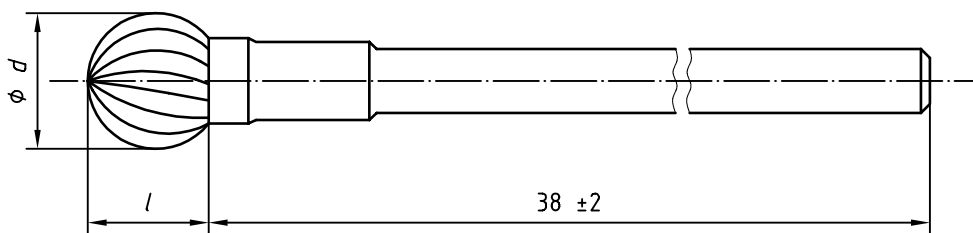


Figure 1

Table 1 — Dimensions

| Designation of nominal diameter (Nominal size) | $d$<br>$\pm 0,3$ | $l$<br>$\pm 0,25$ |
|--|------------------|-------------------|
| 040  | 4                | 3,5               |
| 050  | 5                | 4,5               |
| 060  | 6                | 5,5               |

5.3.1.3 Inverted truncated conical

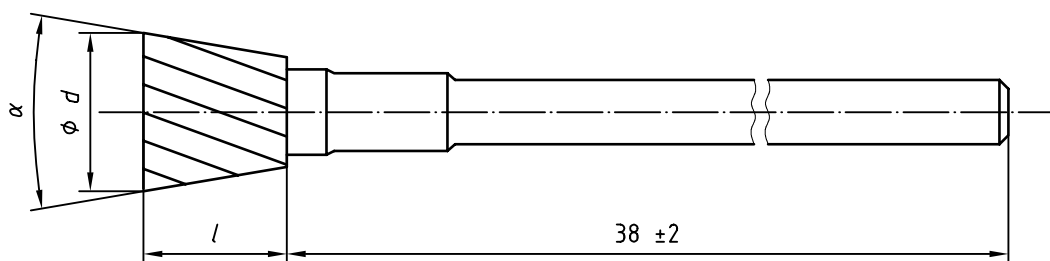


Figure 2

Table 2 — Dimensions

| Designation of nominal diameter (Nominal size) | $d$<br>$\pm 0,3$ | $l$<br>$\pm 0,5$ | $\alpha$  |
|--|------------------|------------------|-----------|
| 060  | 6                | 5,5              | 8° to 12° |

5.3.1.4 Cylindrical (cylinder)

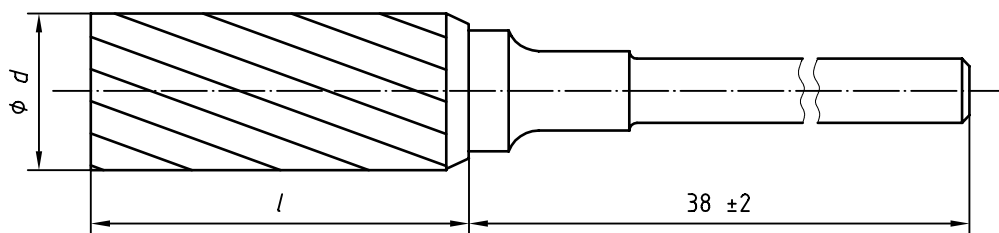


Figure 3

Table 3 — Dimensions

| Designation of nominal diameter (Nominal size) | $d$       | $l$       |
|--|-----------|-----------|
|  | $\pm 0,3$ | $\pm 0,5$ |
| 060  | 6         | 13,0      |

5.3.1.5 Cylindrical domed (hemispherical/cylindrical)

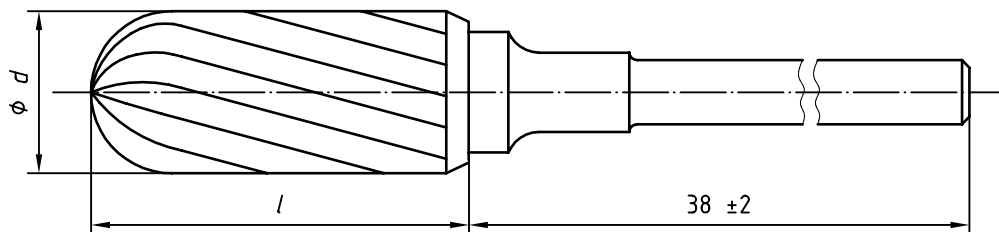


Figure 4

Table 4 — Dimensions

| Designation of nominal diameter (Nominal size) | $d$       | $l$       |
|--|-----------|-----------|
|  | $\pm 0,3$ | $\pm 0,5$ |
| 060  | 6         | 13,0      |
| 070  | 7         | 13,0      |

5.3.1.6 Truncated conical, domed

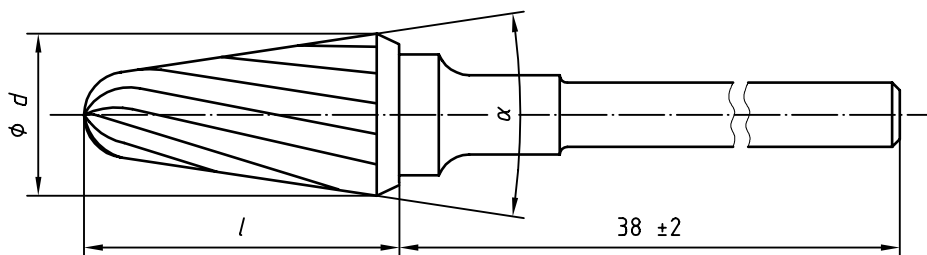


Figure 5

Table 5 — Dimensions

| Designation of nominal diameter (Nominal size) | $d$<br>$\pm 0,3$ | $l$<br>$\pm 0,5$ | $\alpha$   |
|--|------------------|------------------|------------|
| 040  | 4                | 8,0              | 14° to 18° |
| 050  | 5                | 10,0             |            |
| 060  | 6                | 11,0             |            |
| 070  | 7                | 13,0             |            |

5.3.1.7 Rounded cone (truncated conical)

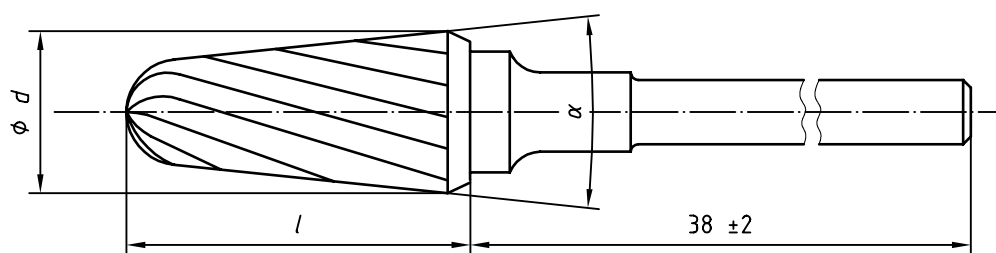


Figure 6

Table 6 — Dimensions

| Designation of nominal diameter (Nominal size) | $d$<br>$\pm 0,3$ | $l$<br>$\pm 0,5$ | $\alpha$   |
|--|------------------|------------------|------------|
| 040  | 4                | 13,0             | 10° to 14° |
| 050  | 5                | 13,0             |            |
| 060  | 6                | 13,0             |            |
| 070  | 7                | 14,0             |            |

5.3.1.8 Bud slender (ogivo/ellipsoidal, long)

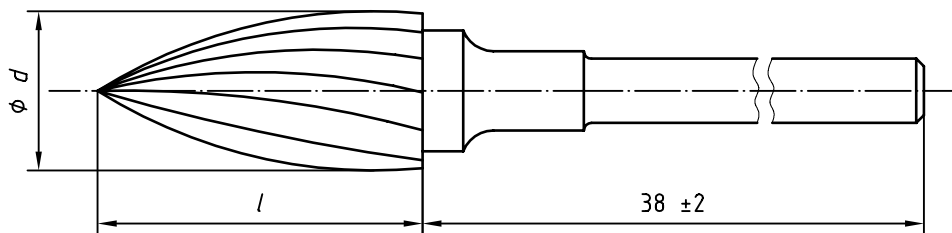


Figure 7

Table 7 — Dimensions

| Designation of nominal diameter (Nominal size) | $d$<br>$\pm 0,3$ | $l$<br>$\pm 0,5$ |
|--|------------------|------------------|
| 050  | 5                | 10,0             |
| 060  | 6                | 12,0             |

5.3.1.9 Paraboloidal

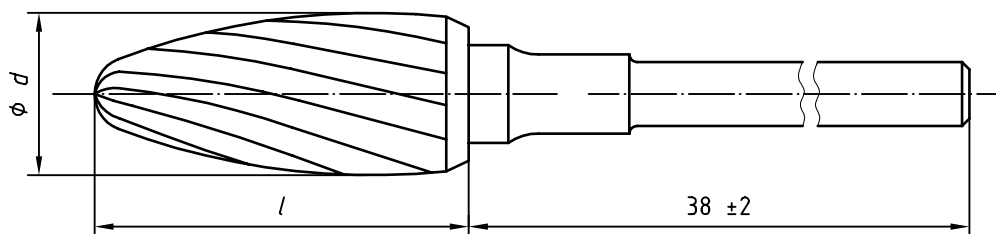


Figure 8

Table 8 — Dimensions

| Designation of nominal diameter (Nominal size) | $d$<br>$\pm 0,3$ | $l$<br>$\pm 0,5$ |
|--|------------------|------------------|
| 060  | 6                | 14,0             |
| 070  | 7                | 14,0             |

5.3.1.10 Cone (truncated conical)

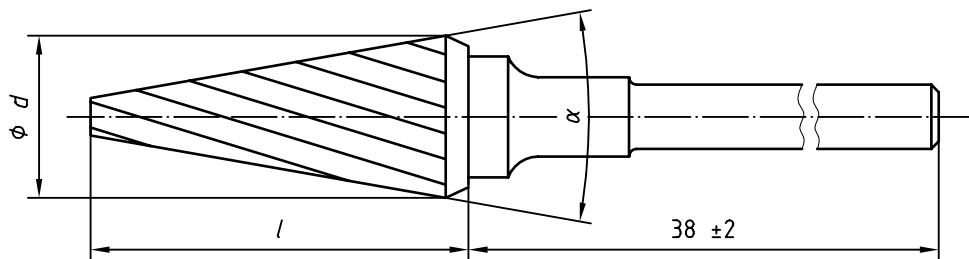


Figure 9

Table 9 — Dimensions

| Designation of nominal diameter (Nominal size) | $d$       | $l$       | $\alpha$   |
|--|-----------|-----------|------------|
|  | $\pm 0,3$ | $\pm 0,5$ |            |
| 060  | 6         | 14,0      | 18° to 22° |

5.3.1.11 Egg (longitudinal ellipsoidal)

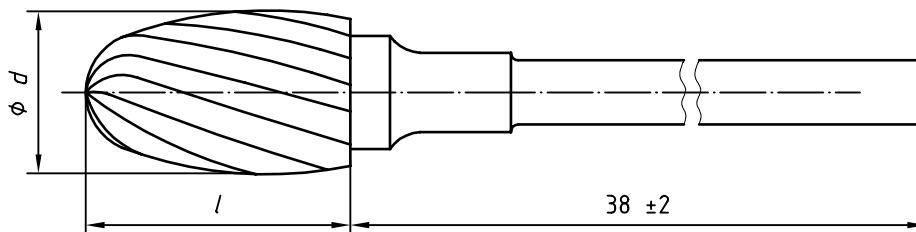


Figure 10

Table 10 — Dimensions

| Designation of nominal diameter (Nominal size) | $d$       | $l$       |
|--|-----------|-----------|
|  | $\pm 0,3$ | $\pm 0,5$ |
| 060  | 6         | 10,0      |

5.3.1.12 Pear (hemispherical conical)

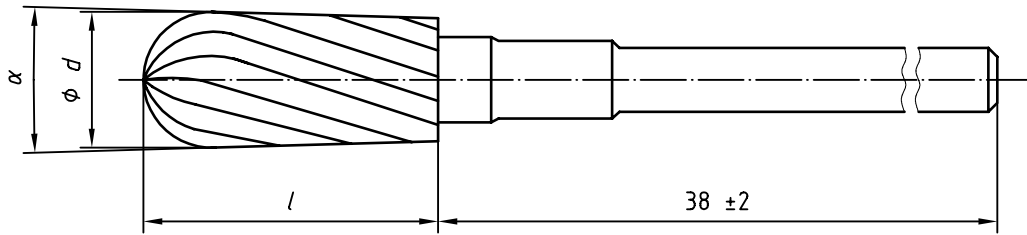


Figure 11

Table 11 — Dimensions

| Designation of nominal diameter (Nominal size) | <i>d</i><br>± 0,3 | <i>l</i><br>± 0,5 | <i>α</i>   |
|--|-------------------|-------------------|------------|
| 050  | 5                 | 10,0              | 14° to 28° |
| 060  | 6                 | 11,0              |            |
| 070  | 7                 | 12,0              |            |

5.3.2 Shank

The shank shall be Type 2 as specified in ISO 1797-1.

5.4 Tothing

The tothing of the instruments in Figures 1 to 11 is shown as examples only. The selection of tothing is left to the discretion of the manufacturer. For the designation of tothing, see clause 8 and Table 12.

Testing shall be carried out in accordance with 6.3.

5.5 Run-out

The total indicated run-out shall not exceed 0,08 mm.

Testing shall be carried out in accordance with 6.4.

6 Test procedures

6.1 Shapes

Determine the shapes by using a shadowgraph or measuring the relevant dimensions in accordance with ISO 8325.

6.2 Dimensions and number of blades

Measure the dimensions in accordance with ISO 8325.

Determine the number of blades by visual inspection.

### 6.3 Toothing

Determine the type of toothing by visual inspection.

### 6.4 Run-out

Determine the run-out in accordance with ISO 8325.

The measurement point shall be at the largest diameter or, for cylindrical cutters, the middle of the working part.

## 7 Sampling and acceptance level (AQL)

The acceptable quality level (AQL) in accordance with ISO 2859-1 shall be 6,5.

## 8 Designation of toothing and number of blades

The toothing shall be designated by any of the following information, or any combination thereof:

- a) a descriptive term (fine, coarse, etc.) as specified in Table 12;
- b) its abbreviation (F, C, etc.) as specified in Table 12;
- c) a colour as specified in Table 12;
- d) the code number as specified in the relevant part of ISO 6360.

The number of blades shall be as specified in Table 12.

**Table 12 — Designation of toothing and number of blades**

| Designation of toothing |                           |        | Number of blades   |                   |                    |                   |                    |                   |                    |                   |
|-------------------------|---------------------------|--------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|
|                         |                           |        | 040 <sup>b</sup>   |                   | 050 <sup>b</sup>   |                   | 060 <sup>b</sup>   |                   | 070 <sup>b</sup>   |                   |
| Term                    | Abbreviation <sup>a</sup> | Colour | right <sup>c</sup> | left <sup>c</sup> | right <sup>c</sup> | left <sup>c</sup> | right <sup>c</sup> | left <sup>c</sup> | right <sup>c</sup> | left <sup>c</sup> |
| Very fine               | VF                        | Yellow |                    |                   |                    |                   |                    |                   |                    |                   |
|                         | VFX                       |        |                    |                   |                    |                   |                    |                   |                    |                   |
| Fine                    | F                         | Red    |                    |                   |                    |                   |                    |                   |                    |                   |
|                         | FX                        |        | 20 to 25           | 15 to 20          | 25 to 27           | 18 to 24          | 27 to 32           | 20 to 26          | 30 to 33           | 23 to 29          |
| Medium                  | M                         | Blue   | 12 to 18           |                   | 16 to 20           |                   | 20 to 25           |                   | 17 to 25           |                   |
|                         | MX                        |        | 12 to 18           | 8 to 14           | 16 to 20           | 10 to 16          | 20 to 22           | 12 to 18          | 22 to 24           | 14 to 20          |
| Coarse                  | C                         | Green  |                    |                   | 10 to 12           |                   | 10 to 14           |                   | 12 to 16           |                   |
|                         | CX                        |        | 8 to 12            | 6 to 8            | 10 to 12           | 6 to 10           | 12 to 14           | 7 to 11           | 14 to 16           | 9 to 14           |
| Very coarse             | VC                        | Black  |                    |                   |                    |                   | 8 to 10            |                   | 10 to 12           |                   |
|                         | VCX                       |        | 6 to 8             | 4 to 5            | 8 to 10            | 4 to 6            | 8 to 10            | 4 to 6            | 8 to 12            | 6 to 8            |

<sup>a</sup> X refers to instruments with crosscut toothing.

<sup>b</sup> Nominal diameter refers to the diameters in Tables 1 to 11.

<sup>c</sup> Right/left refers to toothing helicoidal right or left.

NOTE Empty boxes indicate cutters which do not exist at present.

## **9 Marking on the instrument**

Marking on the carbide laboratory cutters may contain information concerning the tothing.

If a marking is applied, it shall follow the specification of clause 8.

Marking by colour shall be applied behind the working part, outside of the fitting length.

## **10 Labelling on the package**

The labelling on the package shall contain at least the following information:

- a) name and/or trade mark of manufacturer or distributor;
- b) material of the working part;
- c) type of shank, in accordance with ISO 1797-1;
- d) shape number, in accordance with ISO 6360-2;
- e) nominal diameter (nominal size);
- f) identification of tothing;
- g) lot number.

The information should preferably be given in accordance with the relevant part of ISO 6360.

## **11 Packaging**

Carbide laboratory cutters shall be packaged at the discretion of the manufacturer.





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**ICS 11.060.20**

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