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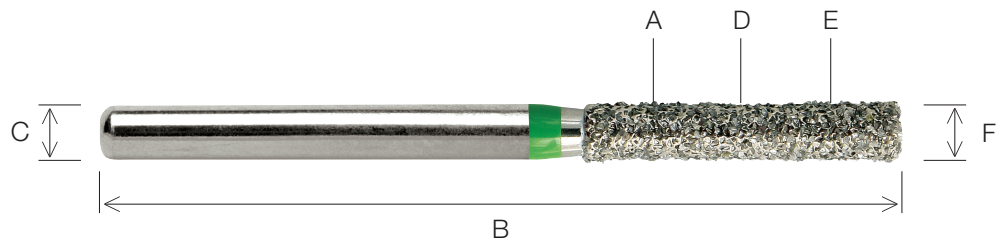
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General information

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General information

Composition of ISO-Number (ISO 6360, 2157 and 1797)



- A** Material of the working part.
Example: **806** diamond / 500 tungsten carbide, etc.
- B C** Shank and overall length.
Example: **314** FG / 204 RA, etc.
- D** Shape of the active part.
Example: **111** cylinder, 001 round, etc.
- E** Type of finish of the active part.
Example: **534** coarse diamond grits, 007 cross-cut helicoidal blades, etc.
- F** Nominal size, diameter of the largest working part in 1/10 mm.
Example: **012** diameter 0.12 mm, etc.

$$A + B C + D + E + F = \text{ISO-No. 806 314 111 534 012}$$

Description of the different parts

A – Material of the working part

There are essentially two categories:

- 1 – Abrasive diamond instruments
- 2 – Cutting steel and tungsten carbide instruments

1 – Diamond instruments – ISO 806

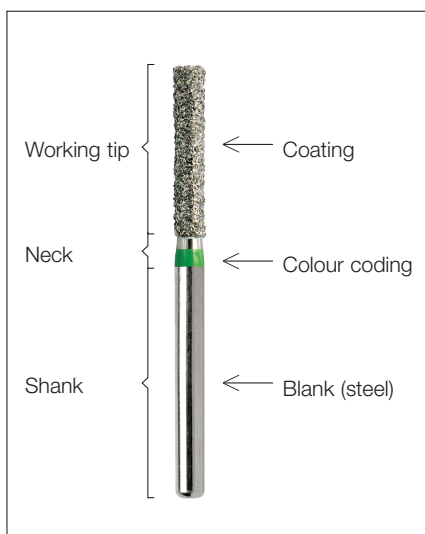
The active part of the bur is coated with calibrated natural or synthetic diamond grits. The great abrasive capacity of this surface, associated to a high rotation speed, allows a very effective cutting effect of the hard tooth structures (enamel and healthy dentin). However it is not efficient to remove soft tooth structures (dentin decay).

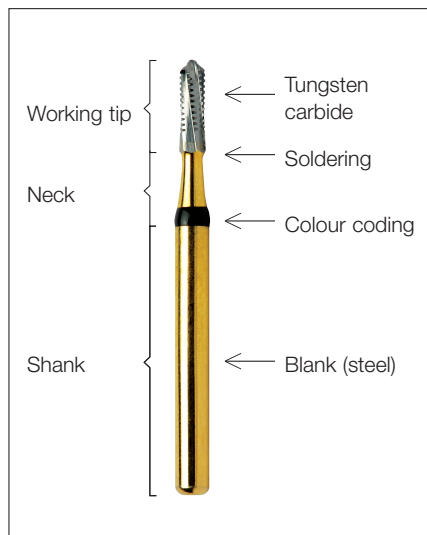
Use:

- at high speed, connected to a turbine or a high speed handpiece
- always with water sprayed within the mouth

The size of the diamond particles varies according to the cutting effectiveness required:

- Thanks to their high efficiency, coarse or super-coarse diamond instruments are used to make any kind of dental preparation without increasing the temperature.
- Standard burs use medium grit size particles, allowing a good abrasion and a reasonable thin cut.
- Finishing diamond instruments present a fine grit that allows a more accurate work while obtaining a perfectly smooth surface.





2 – Tungsten carbide instruments – ISO 500

The active part is made of blades, which profile allows an effective cutting effect associated to debris removal.

- Blades can be axial or helicoidal.
- Blades can be crosscut forming small slots.
- The quantity of blades and the space between them can increase or diminish according to the aim of the work.
- Few and spaced out blades will lead to a good cutting effectiveness and a good debris removal, in exchange for greater fragility and more vibration.
- A great number of close blades will allow slow and accurate finishing work without vibration, with less cutting effectiveness and heat production.

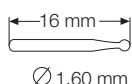
Use:

- At high speed, connected to a turbine or high speed contra-angle, in order to drill hard tooth structures.
- At low speed, connected to a low speed contra-angle, for cavity trimming (fine and numerous blades), expulsion of soft structures, dentin decay (wide and spaced out blades), rotary curettage.

B C – Shanks and overall length

ISO 313

FGS

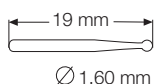


1. FGS type (Friction Grip Short shank)

- For all type of turbine or high speed (red) contra-angle use
- Diameter: 1.60 mm
- Shank's length L: 16 mm
- In all the cases in which the working height is limited, a smaller shank length allows a handy access

ISO 314

FG

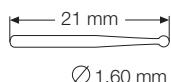


2. FG type (Friction Grip standard shank)

- For all type of turbine or high speed (red) contra-angle use
- Diameter: 1.60 mm
- Shank's length L: 19 mm
- Currently, the most used type of shanks (the greatest consumption)

ISO 315

FGL

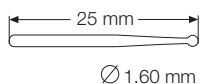


3. FGL type (Friction Grip Long shank)

- For all type of turbine or high speed (red) contra-angle use
- Diameter: 1.60 mm
- Shank's length L: 21 mm

ISO 316

FGXL

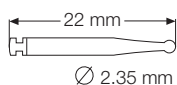


4. FGXL type (Friction Grip Xtra Long shank)

- For all type of turbine or high speed (red) contra-angle use
- Diameter: 1.60 mm
- Shank's length L: 25 mm
- This shank length allows surgery

ISO 204

RA

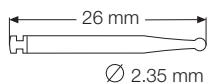


5. RA type (Right Angle shank)

- For all type of slow (blue or green) contra-angle use
- Diameter: 2.35
- Shank length L: 22 mm

6. RAL type (Right Angle Long shank)

ISO 205

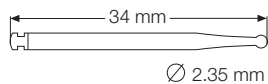


RAL

- For all type of slow (blue or green) contra-angle use
- Diameter: 2.35
- Shank's length L: 26 mm

7. RAXL type (Right Angle Xtra Long shank)

ISO 206

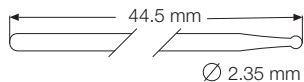


RAXL

- For all type of slow (blue or green) contra-angle use
- Diameter: 2.35
- Shank's length L: 34 mm

8. HP type (Hand Piece standard shank)

ISO 104



HP

- For straight handpiece use
- Diameter: 2.35
- Shank's length L: 44.5 mm

D – Shape of the active part

Each shape is associated with a three number reference.

E – Type of finish of the active part

For diamond burs, corresponding to the size of diamond grits.
Example: 514 fine grits.

For tungsten carbide burs, corresponding to the type of blades.
Example: 007 cross-cut helicoidal blades.

F – Nominal size

It is the maximum diameter of the active part measured in 1/10° of mm.

This dimension is expressed as a run of 3 numbers, corresponding to the international ISO norms.

The diameter sets the size and volume of all the burs.

Additional information concerning the different driving modes

There are three different types of driving modes:

- Turbine
- Contra-angle
- Handpiece

A – Turbine

Turbines are actually the most commonly used dental driving mode.

- The turbine rotor head is activated by means of compressed air.
- The bur is constantly irrigated by a water and air spray that allows cooling and the removal of cutting debris.
- Rotation speed: 250.000 to 400.000 rpm (rotation per minute).
- Low torque power.
- Low maintenance.

B – Contra-angle

The contra-angle is a more traditional driving mode with a reduced field of application.

The movement is transmitted inside the instrument by means of an axis and a return angle.

- Use of water and air spray.
- Rotation speed: from several to 200.000 rpm (rotation per minute).
- High torque power.
- Good visual control, better precision and less vibration.

We can distinguish between three types of contra-angle:

- 1. Red contra-angle:** speed-multiplier of the engine, working with all FG type shanks.
- 2. Blue contra-angle:** same speed as the engine, working with all RA type shanks.
- 3. Green contra-angle:** speed-reducer of the engine, working with all RA type shanks.

C – Handpiece

Straight handpieces driving modes are powered by means of an electric motor or a pneumatic rotor, they are working with HP shanks.

For extraoral use, except when used for surgery.

Handpieces are mainly found in prosthetic laboratories.

Quality criteria for a dental bur

A – Common criteria for diamond and tungsten carbide instruments

B – Quality criteria for diamond instruments

C – Quality criteria for tungsten carbide instruments

A – Common criteria for diamond and tungsten carbide instruments

1 – Rotary precision : absence of vibratory movements

Every bur must be perfectly calibrated and balanced in order to have a clean rotation movement.

Not calibrated burs will have an imperfect rotary movement, causing unwanted vibration, unpleasant for the patient as well as for the dentist. This is a typical reason for bur breakage, especially for the tungsten carbide burs, damaging the driving mode.

2 – Abrasion – Cutting effectiveness

The abrasion or cutting effectiveness corresponds to the time needed for a specific dental activity.

The efficiency relies on the choice of a good product (natural diamond, adapted grits, sharp blades...) and to an adjusted speed.

3 – Half-Life

Half-Life is characterized by the preservation in time of the abrasion or cutting efficiency.

Incorrect use will cause premature wear of the instrument, excessive heat and reduce the instrument's effectiveness.

4 – Minimum heating

Heating must always be controlled and kept between the biological limits in order not to damage the tooth's pulpar vitality.

The overheating of a worn-out instrument will immediately cause a painful inflammatory reaction which is harmful to the dental pulp.

5 – Concept of the instrument: shape and size

Each dentist chooses his instruments according to his preference and personal training.

B – Quality criteria for diamond instruments

- Accurate calibration of the abrasive grits' sizes
- Homogeneity of the coating
- Quality coating by electro deposition
- Diamond quality
 - Natural: high hardness / sharp edges / very good galvanic properties (low metallic content)
 - Synthetic: smooth cutting edges / high impurity content (bad galvanic properties)

High abrasive capacity and longevity is achieved by selected natural diamond and a high quality homogeneous coating.

The first visible sign of wear of a diamond instrument is characterized by the loss of diamond particles on the bur.

C – Quality criteria typical for tungsten carbide instruments

- Good wearing-out and breaking resistance.
- Precision machining of the cutting part.

The active part is designed to allow good cutting effectiveness and debris removal, without vibration and undue wear.

