INTERNATIONAL STANDARD

ISO 27020

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Dentistry — Brackets and tubes for use in orthodontics

Médecine bucco-dentaire — Consoles et tubes utilisés en orthodontie

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

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The main task of technical committees is to prepare International Standards. 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.

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ISO 27020 was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 1, *Filling and restorative materials*.

Introduction

This International Standard has been developed as a result of the difficulty often encountered by clinicians to make meaningful comparisons between brackets and tubes using the information currently available from manufacturers and suppliers.

Dentistry — Brackets and tubes for use in orthodontics

1 Scope

This International Standard is applicable to brackets and tubes for use in fixed orthodontic appliances.

This International Standard gives details of methods to compare the functional dimensions of orthodontic brackets and tubes, the test methods by which they can be determined, as well as packaging and labelling information.

This International Standard does not specify specific qualitative and quantitative requirements for freedom from biological hazards; which are covered in ISO 10993-1 and ISO 7405.

2 Normative references

The following referenced documents are indispensable for the application 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*

3 Terms and definitions

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

3.1
angle of torque
θ
occlusal-gingival angle formed between the intersection of the line perpendicular to the tangent to the tooth side surface of the base and the line bisecting the slot in the occlusal-gingival direction, when viewed along the mesial-distal long-axis of the slot

NOTE If the angle is oriented toward the occlusal (gingival), it is designated as positive (negative).

See Figure 1.

3.2
angulation
α
angle between the line perpendicular to the mesial-distal long-axis of the slot and the central occlusal-gingival axis of the bracket/tube, when viewed from the buccal/labial

NOTE The angulation is positive (negative) when the gingival part of the central occlusal-gingival axis is inclined toward the distal (mesial) relative to the line perpendicular to the mesial-distal long-axis of the slot.

See Figure 2.

3.3
archwire
wire that is formed approximately to the shape of the dental arch

3.4
auxiliary slot
additional opening in the bracket or tube for insertion of auxiliary elements

3.5
auxiliary slot dimensions
diameter/cross-sectional dimensions of the largest wire that passes through an auxiliary slot

3.6
band
structural annular component affixed to the outer circumference of the crown of a tooth and to which a bracket or tube can be attached

3.7
base
part of the bracket or the tube that is attached to the enamel or band

3.8
descriptor
code to identify the nominal slot height in thousandths of an inch without unit designation, in accordance with accepted orthodontic practice (e.g. 18 or 22)

3.9
bracket
tube
structural unit attached to a band or base that is capable of retaining an archwire

3.10 in-out

3.10.1
bracket in-out
l_i
distance between the floor of the slot and the tooth side surface of the base along the intersection of the plane perpendicular to mesial-distal long-axis of the slot in the centre of the bracket slot and the plane bisecting the slot in the occlusal-gingival direction, when viewed along the mesial-distal long-axis of the slot

See Figure 3 a).

3.10.2
tube in-out
l_i
distance between the floor of the slot and the tooth side surface of the base, at the mesial end of the tube and in the midplane of the slot in the occlusal-gingival direction; for tubes with a mesial chamfer, the in-out is the distance at the mesial end of the tube between that part of the floor of the slot in contact with the largest dimension of an archwire (round wire for a round tube and a rectangular wire for a rectangular tube) able to pass the entire tube, and the tooth side surface of the base in the midplane of the slot in the occlusal-gingival direction, when viewed from the gingival

See Figure 3 b).

3.11
rotational offset
δ
angle between a line parallel to the floor of the slot and the line connecting the points of intersection of the lines along the mesial and distal end-faces of the slot at the tooth side surface of the base, when viewed from the occlusal

NOTE When the distal (mesial) part of the floor of the slot is furthest from the tooth it is known as a distal (mesial) offset.

See Figure 4.

3.12
slot
mesial-distal oriented opening in a bracket or tube primarily to contain an archwire

3.13
slot depth
d
minimum buccal-lingual dimension of a rectangle where the projection of its buccal/labial side is tangent to the shorter side of the intended slot, when viewed along the mesial-distal axis of the slot

See Figure 5.

3.14
slot height
h
maximum occlusal-gingival dimension of a rectangle that is fully engaged in the slot, when viewed along the mesial-distal long-axis of the slot

See Figure 5.

3.15
slot length
l_s
smallest mesial-distal dimension of the slot between the mesial and distal ends of the slot

4 Requirements

4.1 Hazardous elements

For the purposes of this International Standard, cadmium, beryllium, lead and nickel are designated to be hazardous elements and the manufacturer shall state the concentrations as a mass fraction expressed as a percentage.

4.2 Measurement of dimensions

4.2.1 The following dimensions shall be recorded to the nearest 0,01 mm. When determined in accordance with Clause 5, the following dimensions of the product shall comply with the ranges stated by the manufacturer:

a) in-out l_i

b) slot depth d

c) slot height h

d) slot length l_s

e) dimensions of each auxiliary slot.

4.2.2 The following angles shall be recorded to the nearest 1°. When determined according to Clause 5, the following angles of the product shall comply with the ranges stated by the manufacturer:

a) angle of torque θ

b) angulation α

c) the rotational offset δ

5 Test methods

5.1 Sampling

Six specimens of a single product from one batch shall be procured for each test.

Measurements shall be made on each dimension listed in 4.2 of each sample.

5.2 Dimensions

5.2.1 Apparatus

Measurements shall be taken with callipers, micrometers, optical comparators, or other devices with an accuracy of 0,005 mm or 0,5°.

5.2.2 Measurement procedures

5.2.2.1 Angle of torque (see Figure 1)

5.2.2.1.1 When viewed from the labial/buccal, perform the following.

a) Construct a line along the mesial-distal long-axis of the slot (X-axis).

b) Construct plane 1 (see A–A in Figure 1) perpendicular to the X-axis in the centre of the slot (depicted by the symbol ⊥ | A).

5.2.2.1.2 When viewed in plane 1, perform the following in plane 1.

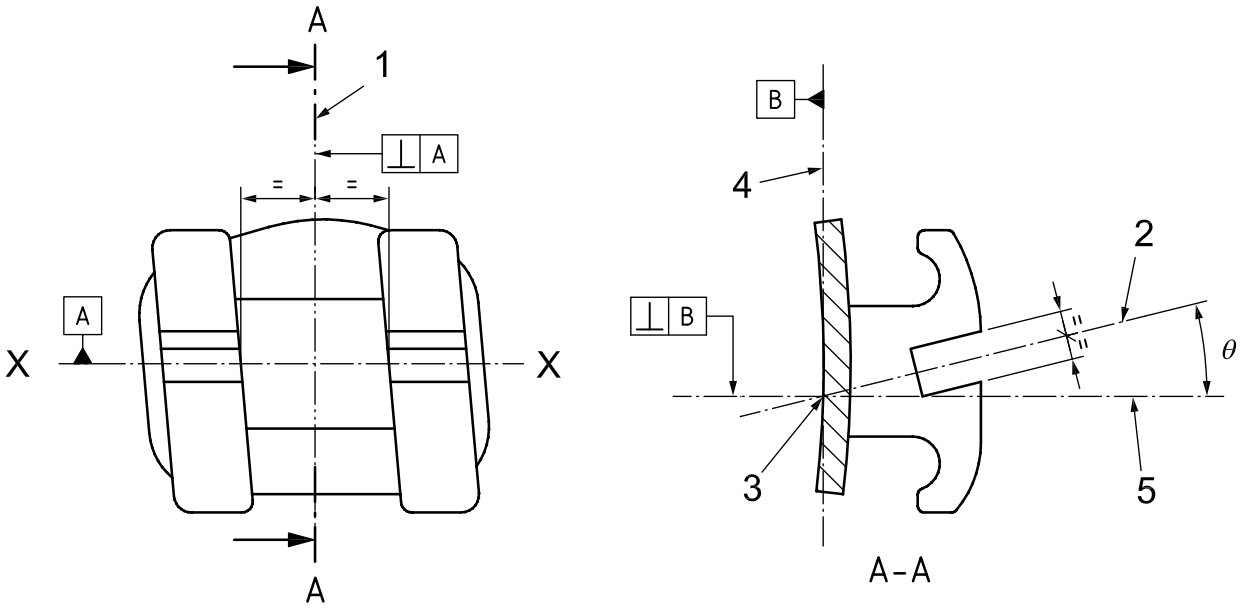
a) Construct line 2 bisecting the slot in the occlusal-gingival direction.

b) At the point of intersection of the tooth side surface of the base and line 2 (point 3 in Figure 1), construct line 4 tangent to the tooth side surface of the base.

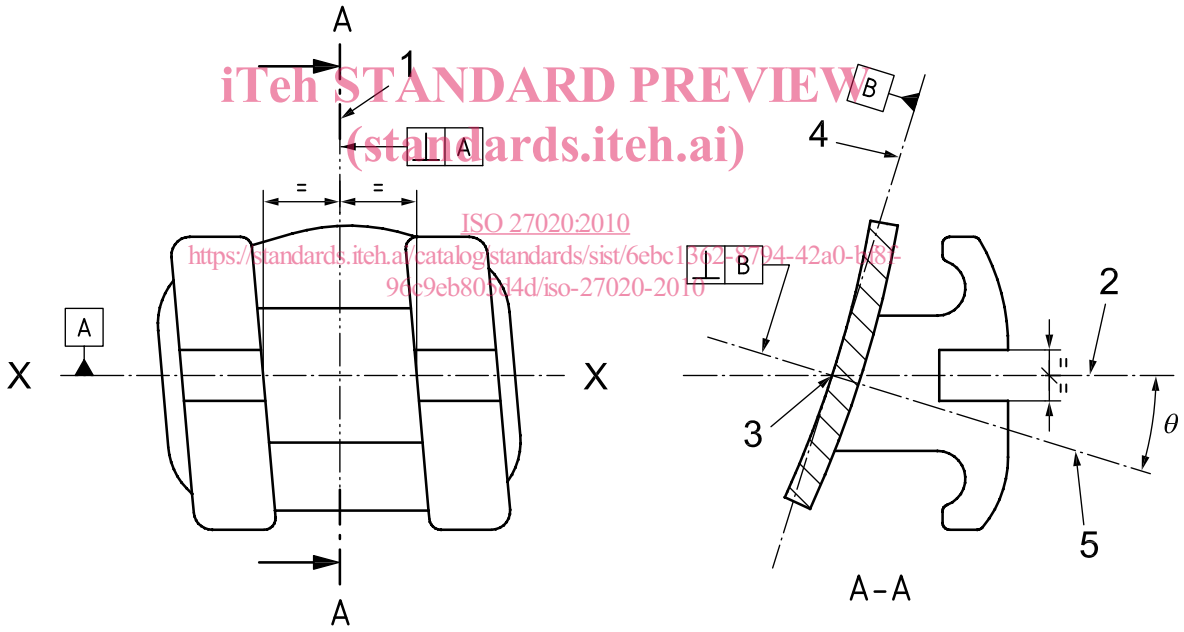
c) Construct line 5 perpendicular to line 4 (depicted by the symbol ⊥ | B) passing through point 3.

d) Measure the angle of torque, θ, between line 5 and line 2.

A suggested method is to view along the mesial-distal long-axis of the slot (X-axis) of the bracket or tube and place a convex radius template in plane 1 of the bracket or tube, against the tooth side surface of the base, thus constructing the tooth side surface of the base. Then construct lines 2, 4 and 5 as defined above.



a) Angle of torque in-face



b) Angle of torque in-base

Key

X mesial-distal long-axis of the slot
1 plane perpendicular to the X-axis in the centre of the slot
2 line bisecting the slot in the occlusal-gingival direction
3 point of intersection of line 2 to the tooth side surface of the base
4 line tangent to the tooth side surface of the base passing through point 3
5 line perpendicular to line 4 passing through point 3
θ angle of torque

Figure 1 — Angle of torque of the bracket or tube