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Dentistry — Magnetic attachments
AMENDMENT 1

Médecine bucco-dentaire — Attaches magnétiques
AMENDEMENT 1

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The committee responsible for this document is ISO/TC 106, *Dentistry*, Subcommittee SC 2, *Prosthodontic materials*.

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Dentistry — Magnetic attachments

AMENDMENT 1

Page 1, Clause 2

Add the following reference:

“ISO 14233, *Dentistry — Polymer-based die materials*”

Page 1, Clause 3

Replace the definition of 3.1 with the following:

“device to provide retention of a prosthesis utilizing magnetic attraction”

Replace the definition of 3.1.1 with the following:

“magnetic attachment which utilizes an open magnetic circuit between the coupled device components”

Replace the NOTE of 3.1.1 with the following:

“The magnet is encased within a corrosion-resistant metal or alloy cover of titanium, titanium alloy or stainless steel to prevent corrosion of the magnet. The attachment uses either a magnet and a ferromagnetic alloy keeper or two magnets as retentive coupling components.”

Page 2, Clause 3

Replace the definition of 3.2 with the following:

“assembly composed of a small magnet which is sealed within ferromagnetic yokes and a non-magnetic spacer, completing a closed magnetic circuit with a keeper”

Page 3, Clause 3

Replace the definition of 3.3 with the following:

“ferromagnetic alloy component fixed to an abutment to retain a prosthesis”

Replace the NOTE of 3.3 with the following:

“The keeper is placed across the poles of a magnet or a magnetic assembly to complete the magnetic circuit.”

Replace the definition of 3.4 with the following:

“ferromagnetic alloy component connected to a permanent magnet and used for concentrating magnetic flux”

Page 4, Subclause 4.4

Replace the superscript number “[3]” with the superscript number “[5]”.

Page 4, Subclause 4.6.1

Replace the cross-reference “(see 6.4.1.4)” with “(see 6.4.1.3)”.

Page 4, Subclause 4.6.2

Replace the existing subclause with the following:

“Breakdown potentials of the magnet or the magnetic assembly and the keeper shall be equal to, or higher than, that of wrought stainless steel in accordance with ISO 5832-1 when tested in accordance with 6.4.2.”

Page 4, Subclause 5.1

Replace the cross-reference “(see 6.3.2)” with “(see 6.3.4)”.

Page 5, Subclause 6.2.1.1

Replace the existing text with the following:

“**Gauss meter**, using a Hall element and in accordance with ISO/IEC 17025.”

Page 5, Subclause 6.2.2

Replace the cross-reference to “(6.2.1)” with “(6.2.1.1)”.

Page 5, Subclause 6.3.1.2

Replace the existing text with the following:

“**Device, containing a low friction ball bearing slider, for fixing and pulling the specimens vertically**, installed in the mechanical testing machine.

NOTE The force required to move the shaft of the device when pulling a specimen should be 0,02 N or less. The lower or upper table can be modified to facilitate fixation of the specimen (magnet, magnetic assembly, or keeper) in a stable manner.

See [Figure 3](#).”

Page 5, Subclause 6.3.1.2

Add the following subclauses to the end of 6.3.1.2.

6.3.2 Materials

6.3.2.1 Adhesive double sided tape, without any residual adhesive on the adhered face after the removal of the tape, for the temporary joining of the specimens and the tables of the device during the alignment procedure.

6.3.2.2 Cyanoacrylate adhesive, for fixing specimens on the lower- and upper-tables.

6.3.2.3 Self-curing acrylic resin, for embedding a non disk-shaped specimen in the embedding ring with properties in accordance with ISO 14233:2003.

6.3.3 Fixing procedure

6.3.3.1 Fixation of specimens

Adjust the position of the lower-table equipped with the device (6.3.1.2) using the X-Y stage so that both centers of the lower- and upper-table are aligned. Attach the mating face of the magnet (or magnetic assembly) to the centre of the lower-table using an adhesive double sided tape (6.3.2.1). Note that the side attached to the double sided tape will be the side that mates with the other magnet (or keeper) once the alignment procedure is completed.

Place a drop of the cyanoacrylate adhesive (6.3.2.2) on the top of the magnet (or magnetic assembly) attached on the lower-table with the double sided tape, being careful not to let the glue flow down the sides of the magnet (or magnetic assembly). Move the upper-table down slowly until it makes contact with the magnet (or magnetic assembly) containing the drop of glue. If necessary, reinforce the bonding area between the magnetic (or magnetic assembly) and the upper-table with the self-curing acrylic resin (6.3.2.3).

After the adhesive joining the magnet (or magnetic assembly) with the upper-table is set, move the table upward and remove the adhesive double sided tape (6.3.2.1), which was used for alignment, from the mating face of the magnet (or magnetic assembly). Put the magnet (or keeper) on the mating face of the magnet (or magnetic assembly) that is now bonded to the upper-table. Make sure that the magnet (or keeper) is properly aligned with the magnet (or magnetic assembly). Place a drop of the cyanoacrylate adhesive (6.3.2.2) at the centre of the lower-table. Move the upper-table down slowly until the bottom of the magnet (or keeper) makes contact with the lower-table containing the drop of glue. If necessary, reinforce the bonding area between the magnet (or keeper) and the lower-table with the self-curing acrylic resin (6.3.2.3). Don't move the lower- or upper-table until the adhesive joining the magnet (or keeper) with the lower-table is set.

Also, to keep the proper alignment of the magnet (or magnetic assembly) on the upper-table with the magnet (or keeper) on the lower-table, do not uninstall the lower- and upper-tables from the device (6.3.1.2) even after the adhesive is set.

Page 5, Subclause 6.3.2

Replace the subclause number **6.3.2 Test procedure** with **6.3.4 Test procedure**.

Replace the second sentence of first paragraph with the following:

“Install the device for fixing and pulling the specimens vertically (6.3.1.2) in the mechanical testing machine.”

Replace the second paragraph with the following:

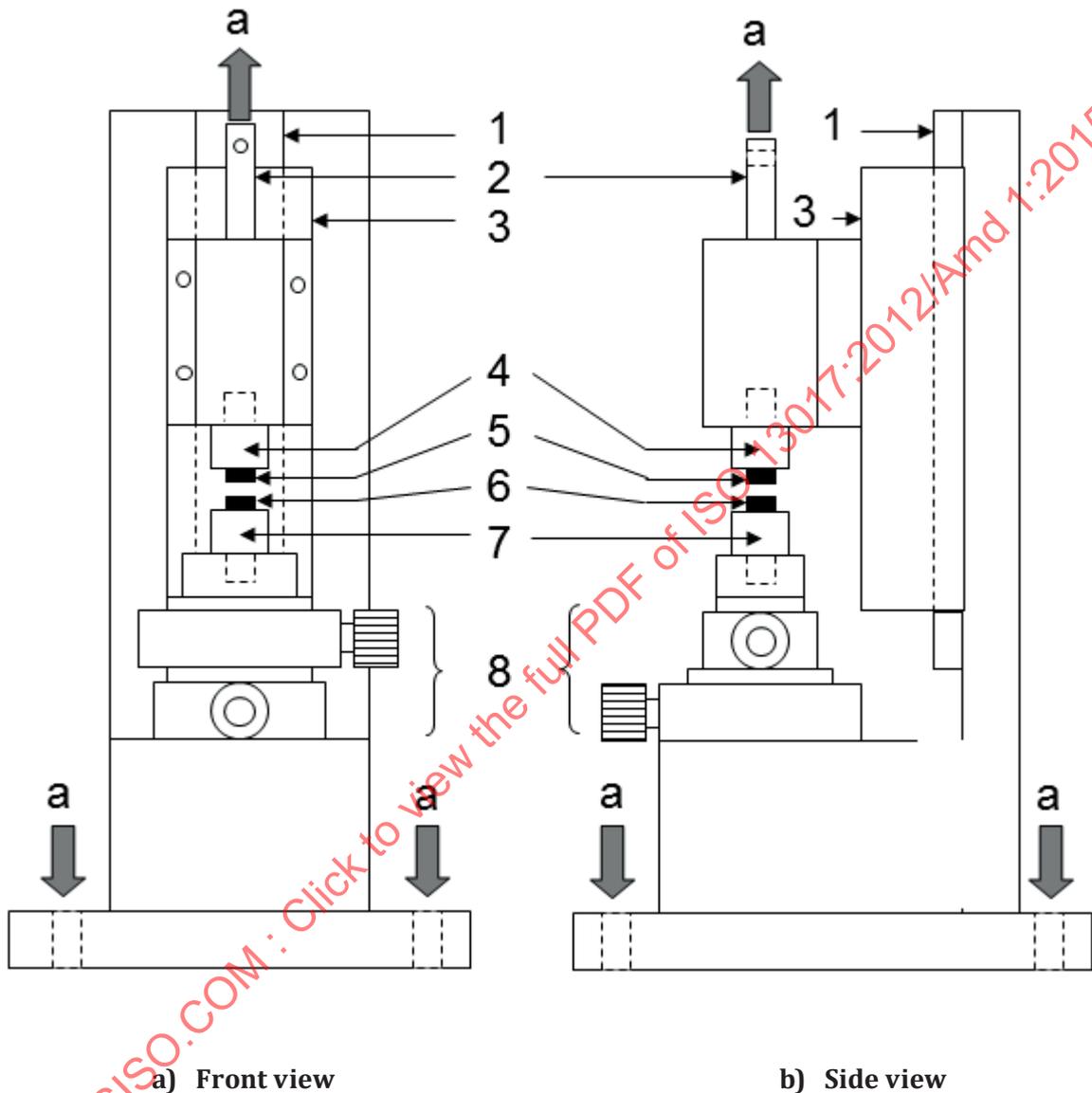
“For each specimen, obtain retention measurement values both at point of separation (A, [Figure 4](#)) and then following mating face separation (B, [Figure 4](#)). To obtain the mating face separation force, which demonstrates loss of magnetic effect, calculate and record a median value for region B of the retentive force curve in [Figure 4](#). Subtract this obtained median value from the initial separation

point value (A). The calculated difference is the retentive force. Repeat this procedure a minimum of five times for each specimen. Record the median retentive force.”

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Page 6, [Figure 3](#)

Replace the [Figure 3](#) including the figure title and key with the following:



Key

- 1 rail for a ball bearing slider
- 2 shaft
- 3 low friction ball bearing slider
- 4 upper non-magnetic table
- 5 specimen (magnet or magnetic assembly)
- 6 specimen (magnet or keeper)
- 7 lower non-magnetic table
- 8 x-y stage
- a Connected to the mechanical testing machine.

Figure 3 — Device using a low friction ball bearing slider for fixing and pulling the specimens vertically