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Dentistry — Denture base polymers

AMENDMENT 1

Art dentaire — Polymères pour base de prothèses dentaires
AMENDEMENT 1



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Foreword

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

Amendment 1 to ISO 1567:1999 was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 2, *Prosthetic materials*.

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Dentistry — Denture base polymers

AMENDMENT 1

Page 1, Scope

Add to paragraph 1.1

Furthermore, it applies to denture base polymers for which the manufacturer claims that the material is a high impact polymer. It also specifies the requirement and the test method to be used.

Page 1, Normative references

Add the following reference:

ISO 179:1993, *Plastics — Determination of Charpy impact strength*

Page 4, subclause 5.1.3

First line, delete Type 1 class 2 and Type 2 class 2.

Page 5, subclause 5.2.10

Last paragraph, last line after 0,2 % add “mass fraction”.

After subclause 5.2.12 add the following subclause:

5.2.13 Impact strength

When the manufacturer claims that the material is a high impact polymer, the impact strength shall not be less than 2,0 kJ/m² when tested in accordance with 8.9.

Page 14, subclause 8.5.3.5.2.5

Before 5.2.7 and 5.2.8 add “requirements of”.

Page 16, subclause 8.7.3.3.2

Replace 8.7.3.1.1.1 with 8.7.3.1.1.

Page 22, subclause 8.8.5.4

Second paragraph replace two with three to read: “If at least three of the”.

After subclause 8.8.5.5 add the following subclause:

8.9 Impact strength

8.9.1 Materials

This consists of two specimen plates, freshly formed and processed in accordance with the manufacturer's instructions, each from a separate mix. Use the material, the apparatus (8.5.1.1) and the mould (8.5.1.1.2) (except that the dimensions of the plates shall be (50 ± 2) mm long, (50 ± 2) mm wide and $(4 \pm 0,2)$ mm in height).

8.9.2 Apparatus

8.9.2.1 See 8.5.3.2.1, 8.5.3.2.2 and 8.5.3.2.4.

8.9.2.2 Standard metallographic grinding papers, progressively finer grades using a grain size of approximately $26 \mu\text{m}$ (600 FEPA) for the final finishing stage.

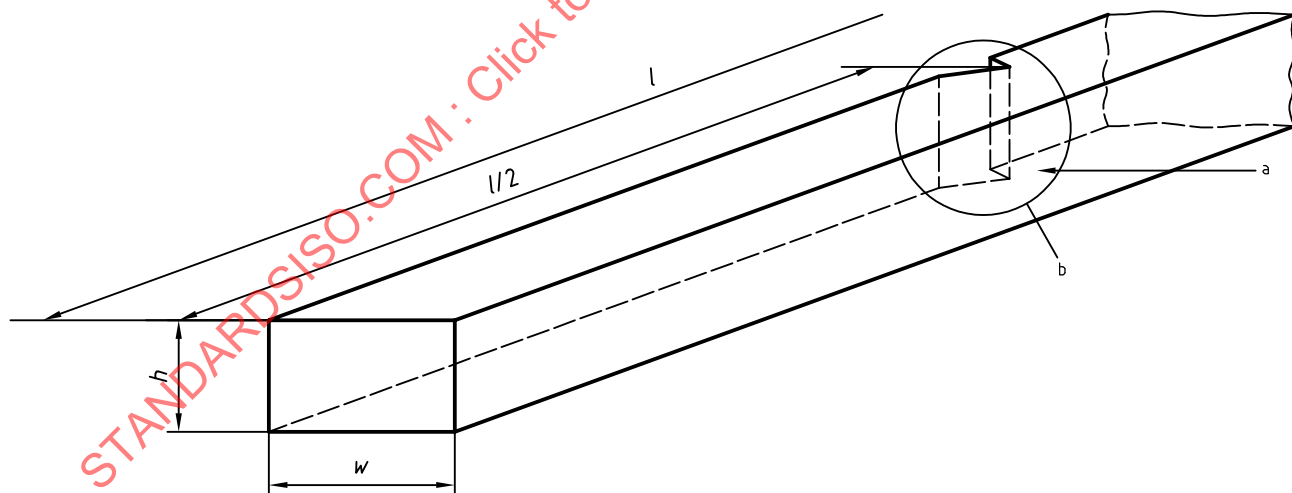
8.9.2.3 Containers of water, for storing the specimen strips at $(23 \pm 2) ^\circ\text{C}$ and $(37 \pm 1) ^\circ\text{C}$ for pre-test conditioning.

8.9.2.4 Pendulum impact testing machine, conforming to ISO 179:1993. A test capacity of 0,5 J is suitable.

8.9.3 Procedure

Within (24 ± 2) h of the beginning of the curing cycle of the denture base polymer, cut each plate lengthways into seven to eight equal strips, (50 ± 2) mm long (l), $(6 \pm 0,2)$ mm wide (w) and $(4 \pm 0,2)$ mm in height (h). Machine the strips in a milling machine (8.5.3.2.2) on the edges and equally from both moulded surfaces so that the dimensions remain slightly oversized. Take care to avoid overheating the specimen strips. Wet-grind all faces and edges smooth and flat with metallographic grinding papers (8.9.2.2).

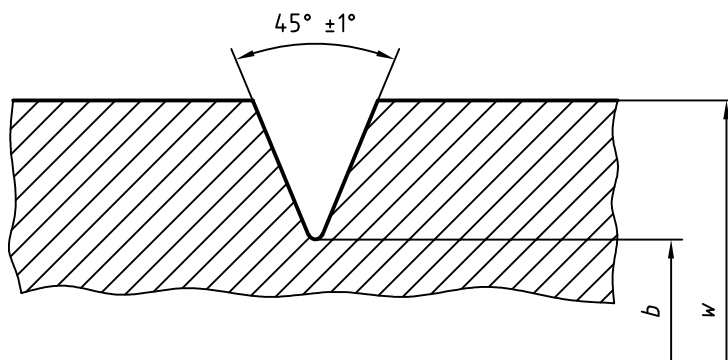
Cut a notch (type A) (see Figure 4) in the middle of each specimen strip as described in ISO 179:1993. Cut the notch edgewise to a depth of $(1,2 \pm 0,1)$ mm leaving a residual depth beneath the notch of $(4,8 \pm 0,1)$ mm. The radius of the notch base (tip) shall be $(0,25 \pm 0,05)$ mm (see Figure 5).



a Direction of blow.

b See Figure 5.

Figure 4 — Charpy edgewise impact test, with single-notched specimen



Radius of notch base $r_n = (0,25 \pm 0,05)$ mm.

Figure 5 — Part of single-notched specimen strip with type A notch

Measure and record, the height, h , [nominal $(4 \pm 0,2)$ mm] of each specimen strip near the notch and the residual depth, b , [nominal $(4,8 \pm 0,1)$ mm] beneath the notch using a measuring instrument (8.2.1.5 or 8.5.3.2.4). Use only specimen strips which are of good quality and fall within the correct size range.

Store 12 selected specimen strips in the container of water at $(37 \pm 1)^\circ\text{C}$ for $7\text{ d} \pm 2\text{ h}$. Condition the specimen strips in the container of water at $(23 \pm 2)^\circ\text{C}$ for (60 ± 15) min prior to testing. After conditioning, remove a specimen strip from the water and place it on the specimen supports of the testing apparatus (8.9.2.4). Set the specimen supports at a separation of $(40,0 \pm 0,2)$ mm. Place the specimen strip with the notch facing away from the point of impact of the pendulum. Ensure that the specimen strip is centred with regard to the position of the notch and the point of impact of the pendulum. As soon as possible after removing each separate specimen strip from the water bath, release the pendulum in order to fracture the specimen. Record the value of energy absorbed, J_1 .

Re-zero the instrument and allow the pendulum to swing again with no specimen strip in place. (The energy recorded, J_2 , gives an indication of the friction in the system.)

8.9.4 Calculation and expression of results

Calculate the impact strength of notched specimen, a , in kilojoules per square metre (kJ/m^2) using the formula:

$$\frac{(J_1 - J_2) \times 10^3}{bh}$$

where

J_1 is the value of energy, in joules, absorbed by the specimen strip;

J_2 is the friction energy, in joules, of the system;

h is the height, in millimetres, of the specimen strip;

b is the depth, in millimetres, behind the notch.

8.9.5 Pass/fail determination of impact strength

If results obtained for at least nine of the twelve specimen strips conform to the requirement stated in 5.2.13, the material fulfils the requirement of a high impact denture base polymer.

If five or fewer of the twelve specimen strips conform to the requirement stated in 5.2.13, the polymer fails.

If only six to eight of the twelve specimen strips conform to the requirement stated in 5.2.13, repeat the test.

If at least ten of the second series of specimen strips conform to the requirement stated in 5.2.13, the polymer passes.

8.9.6 Expression of results

Report the number of specimens evaluated, all results for impact strength with the number of specimens conforming to 5.2.13 and whether the material passes.

Page 22,

After subclause 9.2.1 k) add the following item:

- l) the term “high impact” if the manufacturer wishes to claim that the material is a high impact polymer. If claimed, the polymer shall conform to the requirement of 5.2.13 when tested in accordance with 8.9.

Page 23,

After subclause 9.2.2 k) add the following item:

- l) the term “high impact” if the manufacturer wishes to claim that the material is a high impact polymer. If claimed, the polymer shall conform to the requirement of 5.2.13 when tested in accordance with 8.9.

Page 24,

After subclause 9.3 m) add the following item.

- n) the term “high impact” if the manufacturer wishes to claim that the material is a high impact polymer. If claimed, the polymer shall conform to the requirement of 5.2.13 when tested in accordance with 8.9.