INTERNATIONAL STANDARD

ISO 7493

Second edition
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Dental operator's stool

Siège d'opérateur dentaire

Reference number
ISO 7493:1997(E)

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.

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.

International Standard ISO 7493 was prepared by Technical Committee ISO/TC 106, *Dentistry*, Sub-Committee SC 6, *Dental equipment*.

This second edition cancels and replaces the first edition (ISO 7493:1985), which has been technically revised.

Annex A of this International Standard is for information only.

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Introduction

The objectives of this International Standard are to ensure that the design and functioning of dental operator's stools will be such as to enable the dental operator to perform his or her work effectively and safely, to minimize the muscular and skeletal stresses, particularly in shoulders and spine, that arise during the performance of the work, and to allow freedom of movement without undue muscular activity.

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Dental operator's stool

1 Scope

This International Standard specifies requirements, recommendations and methods of test for dental operator's stools as well as requirements for manufacturer's instructions, marking and packaging. It covers also recommendations to manufacturers on the design of stools.

NOTE — For the purposes of this International Standard, "dental operator" includes dental assistants and dental hygienists.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1942-4:1989, *Dental vocabulary — Part 4: Dental equipment.*

ISO 8191-1:1987, *Furniture — Assessment of the ignitability of upholstered furniture — Part 1: Ignition source: smouldering cigarette.*

ISO 9687:1993, *Dental equipment — Graphical symbols.*

IEC 601-1:1988, *Medical electrical equipment — Part 1: General requirements for safety.*

3 Definitions

For the purposes of this International Standard, the definitions in ISO 1942-4 and the following definitions apply.

3.1 dental operator's stool: Movable seat, adjustable in height, which satisfies the general requirements relevant to the performance of dentistry by a seated operator. [ISO 1942-2:1989, 4.021].

3.2 seat height, h_1 or h_2 (see figure 1): Vertical distance between the floor and the point of intersection of the swivel axis with the plane of the loaded surface (h_1) or the unloaded surface (h_2) of the seat.

3.3 seat width, b (see figure 1): Horizontal dimension of the widest part of the seat between the upper edges of the sides of the seat, measured perpendicularly to the anteroposterior plane of the seat.

3.4 seat depth, c_1 or c_2 (see figure 1): Horizontal dimension (c_1) measured alongside the centre of width b in the anteroposterior plane of the seat between the vertical projections of the front edge and the back edge of the seat.

If the stool is provided with a backrest, the dimension (c_2) is measured between the foremost projection of the centreline of the backrest and the normal projection of the front edge of the seat.

3.5 backrest height, h_3 (see figure 1): Vertical distance between reference points A and B, measured with the seat loaded and with an unloaded backrest (in free-standing position).

For this measurement the backrest shall be adjusted in its most forward position and, if it can be pivoted upon a horizontal axis, it shall be put in the vertical position.

3.6 least favourable position of the stool: Position of the stool at which the load-bearing part of the seat and two adjacent castors are placed in their least favourable position with regard to the seat-tipping stability.

In the design shown in figure 1, this position is identified by e, which is the horizontal distance between the line connecting the swivel axis and the axes of two adjacent castors in their least favourable position.

NOTE — This figure is not intended to specify the design of the dental operator's stool.

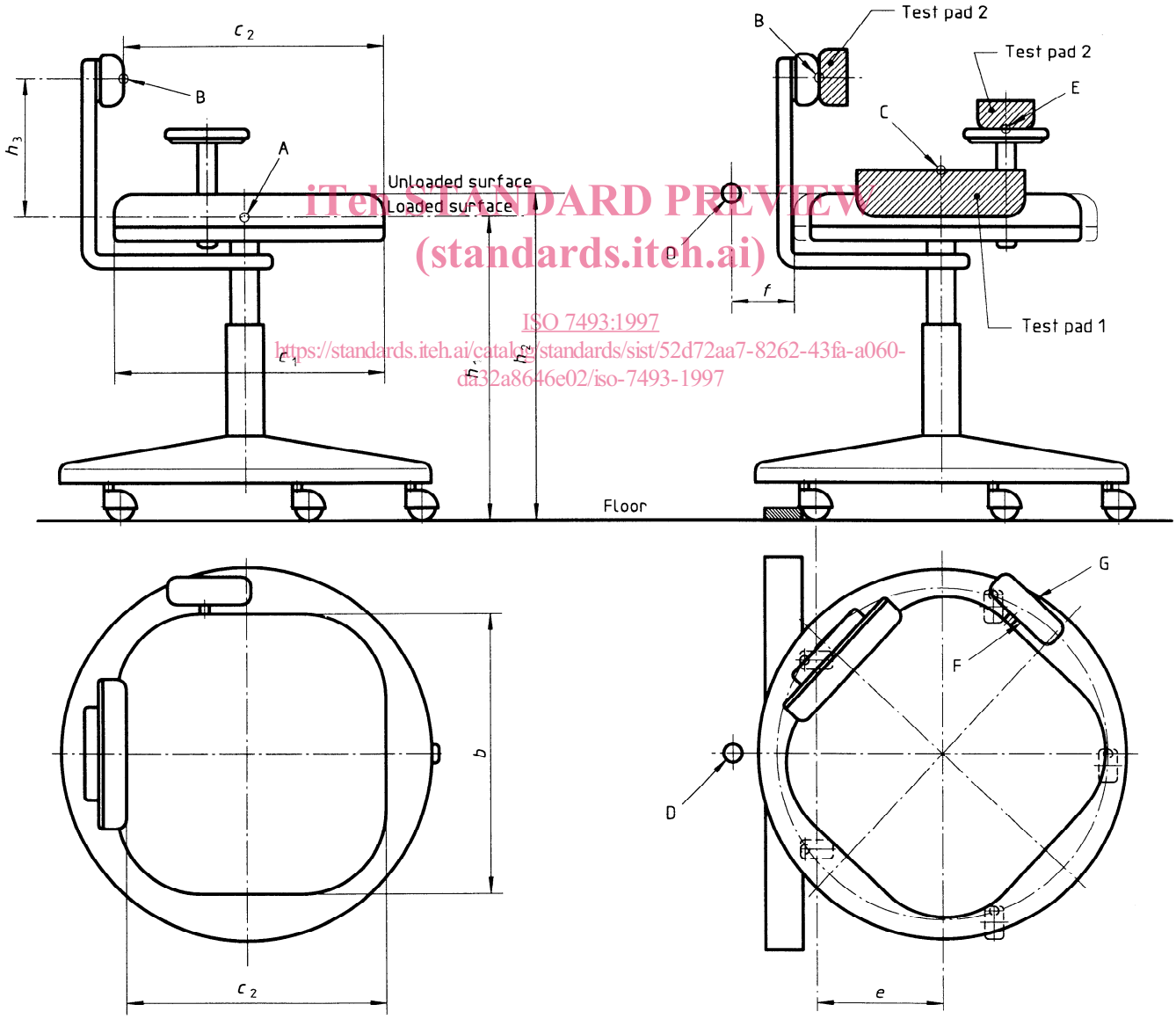

Figure 1 — Dental operator's stool

4 Requirements and recommendations

4.1 General

Compliance shall be checked by visual inspection.

4.1.1 The seat of the dental operator's stool shall be adjustable in height and shall swivel freely around the vertical axis.

4.1.2 The upper part of the dental operator's stool shall not be removable from the base without the use of a tool.

4.1.3 The dental operator's stool should be provided with a backrest which can be adjusted horizontally and vertically independent of the seat height.

4.1.4 The dental operator's stool should be provided with five castors arranged pentagonally on the base of the stool.

4.2 Reference points used in figure 1

4.2.1 Reference point A: Point of intersection of the plane of the upper loaded surface of the seat with the vertical axis of the stool.

4.2.2 Reference point B: Centre of the area on the backrest that provides lumbar support. Point of application of the force for testing the deflection of the backrest.

4.2.3 Reference point C: Point on the vertical axis where the vertical force for testing the load-carrying capacity of the stool is applied.

4.2.4 Reference point D: Point on the upper plane of the unloaded seat at a distance of 60 mm from the least favourable edge of the seat where the vertical force for testing the stability of the stool is applied.

4.2.5 Reference points E, F and G: Points for the application of vertical or horizontal forces for testing the armrest.

4.3 Seat height and range of adjustment

The lowest adjustable height of the loaded seat (h_1) shall not be lower than 420 mm.

The range of adjustment of seat height shall be given by the manufacturer in the instructions (see clause 6).

Compliance shall be checked by visual inspection.

4.4 Load-carrying capacity of the stool

The dental operator's stool shall not collapse or yield upon application of the load specified in 5.1 (after the period of early settlement), i.e. the change in height shall not exceed 10 mm throughout the range of the seat height adjustment.

Testing shall be carried out in accordance with 5.1.

4.5 Stability of the stool

The dental operator's stool shall not tip during testing.

Testing shall be carried out in accordance with 5.2.

4.6 Deflection of the backrest

The backrest, if provided, shall not show a horizontal deflection at point B that exceeds 30 mm, when subjected to the force specified in 5.3.

Testing shall be carried out in accordance with 5.3.

4.7 Armrest

Armrests, if provided, shall be capable of withstanding without failure or permanent deformation the force specified in 5.4.

Testing shall be carried out in accordance with 5.4.

4.8 Material

Only upholstering resistant to water should be used.

4.9 Cleaning and disinfection

All exterior parts of the dental operator's stool shall be capable of being cleaned and disinfected, using agents recommended by the manufacturer, without deteriorating the stool's surface and markings.

Testing shall be carried out in accordance with 5.5.

4.10 Flammability

The upholstery and padding of dental operator's stools shall not catch fire and resultant charring, if any, shall not be greater in length than 30 mm in any direction measured from the nearest point of the test cigarette.

Testing shall be carried out in accordance with 5.6.

5 Test procedures

5.1 Load-carrying capacity of stool

Adjust the seat height to its maximum value.

Select and mark a suitable point on the seat, and arrange means for determining its vertical distance from some other suitable point marked on the floor.

Apply and maintain a downward vertical force of 1350 N to the centre of the seat point (point C in figure 1) using test pad 1 (350 mm in diameter and a radius of 15 mm at the edge).

After 5 min, determine and record the value of the vertical distance, in millimetres (reading 1).

After 60 min, redetermine and record the value of the vertical distance, in millimetres (reading 2).

Report the change in value, in millimetres (reading 1 minus reading 2).

5.2 Stability of the stool

Adjust the stool castors and the loading-bearing part in the least favourable position (see 3.6) with the seat at its maximum height and swivelled in its least favourable position relative to the castors.

Apply a downward vertical force of 800 N at point D as shown in figure 1.

Report whether the stool tips.

5.3 Deflection of the backrest

Adjust the backrest to its highest position.

Fix the stool rigidly to the floor.

Mark the reference point B (see figure 1) on the backrest, and determine its horizontal distance, in millimetres, from some other clearly marked point (for example on the floor). If the backrest is springloaded, determine this horizontal distance after full compression of the springs.

Apply a horizontal force of 250 N at point B using test pad 2 (100 mm in diameter and a radius of 15 mm at the edge).

Redetermine the horizontal distance, in millimetres, of point B from the marked point.

Calculate the deflection, in millimetres, as the difference between the two values obtained.

5.4 Armrest

Apply a downward vertical force of 335 N at the most critical armrest location (point E in figure 1) for 1 min using test pad 2, and subsequently a horizontal force of 220 N at the points F and G for the outward and inward directions respectively.

5.5 Cleaning and disinfection

Testing shall be carried out in accordance with IEC 601-1:1988, clause 44.7.

5.6 Flammability

Testing shall be carried out in accordance with ISO 8191-1.