INTERNATIONAL STANDARD

ISO 14679

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Adhesives — Measurement of adhesion characteristics by a three-point bending method

Adhésifs — Détermination des caractéristiques d'adhésion par une méthode de flexion à trois points

INTERNATIONAL ISO

Reference number
ISO 14679:1997(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 14679 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

It is technically similar but not identical to ENV 1966:1995.

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Adhesives – Measurement of adhesion characteristics by a three-point bending method

1 Scope

This International Standard specifies a test method to determine the ability of a cured adhesive (if necessary with a primer) to adhere to a substrate with a certain surface finish, or which has been subjected to a specific surface preparation, using the "three-point bending method".

This standard is only applicable to quality assurance and only to substrates which are rigid or resistant enough to bending, such as steel or aluminium alloys. For other substrates, the thickness is adjusted to the modulus of elasticity of a suitable stiffener is used.

The adhesive is allowed to cure without the application of pressure in order to obtain the thickness needed to provide sufficient rigidity, otherwise a bonded reinforcing piece of the same material and the same thickness as the substrate is substituted for the block of adhesive.

This test method is not suitable for film adhesives.

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 286-1:1988, *ISO system of limits and fits - Part 1: Bases of tolerances, deviations and fits.*

ISO 4588:1995, *Adhesives - Guidelines for the surface preparation of metals.*

ISO 9142:1990, *Adhesives - Guide to the selection of standard laboratory ageing conditions for testing bonded joints.*

ISO 10365:1992, *Adhesives - Designation of main failure patterns.*

ISO 13895:1996, *Adhesives - Guidelines for the surface preparation of plastics.*

3 Definition

For the purposes of this International Standard, the following definition applies:

interfacial zone: The zone between the adhesive and substrate, adhesive and coating or coating and substrate, where the physical, chemical and mechanical properties are different from those of substrate, the adhesive or any coating applied before bonding (see figure 1).

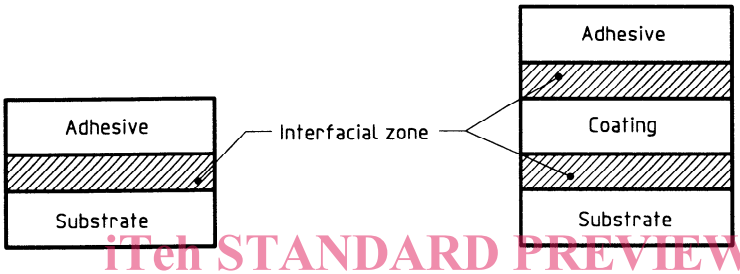


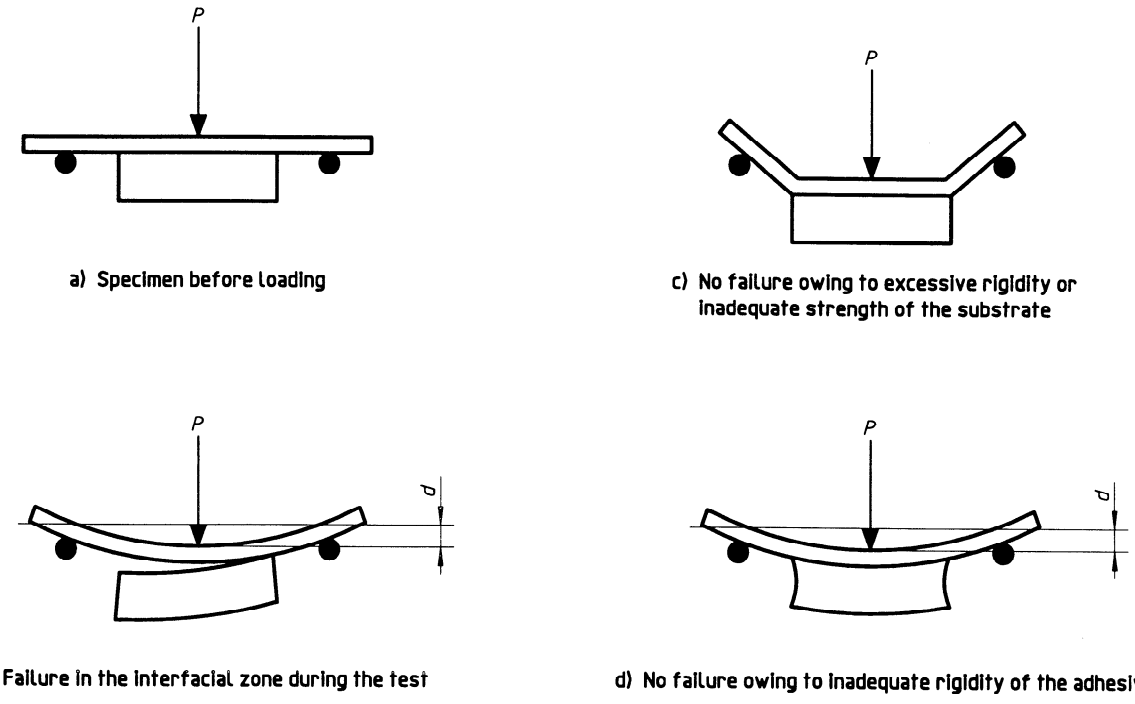
Figure 1 — Schematic diagram of test specimens showing the interfacial region

4 Principle

A specimen consisting of a substrate at the centre of which a rectangular block of adhesive has been moulded, thus giving a single substrate/interfacial zone/adhesive zone, is subjected to bending (see figure 2). The force-deformation curve is recorded and, from this curve, the maximum force and maximum specimen deformation are determined (these values correspond to the initiation of fracture, i.e. the moment when clear space is just visible between the adhesive and the substrate). They represent the adhesive power of the adhesive.

Note 1 The block of adhesive modifies the rigidity of the substrate in the area covered by the block. When the specimen is bent, therefore, a fracture is produced in the interfacial zone, at the edge of the block of adhesive, chiefly as a result of the adhesive forces acting perpendicular to the plane of bonding.

Note 2 As a general rule, the adhesive will be sufficiently rigid for adhesion failure to occur at the interfacial zone.



P = Force

d = Deformation

Figure 2 — Principle of the test

5 Apparatus

5.1 Specimen preparation device (see figure 3), consisting of the following three elements:

- located underneath, an aluminium alloy plate (see figure 4) with substrate seatings positioned at regular intervals;

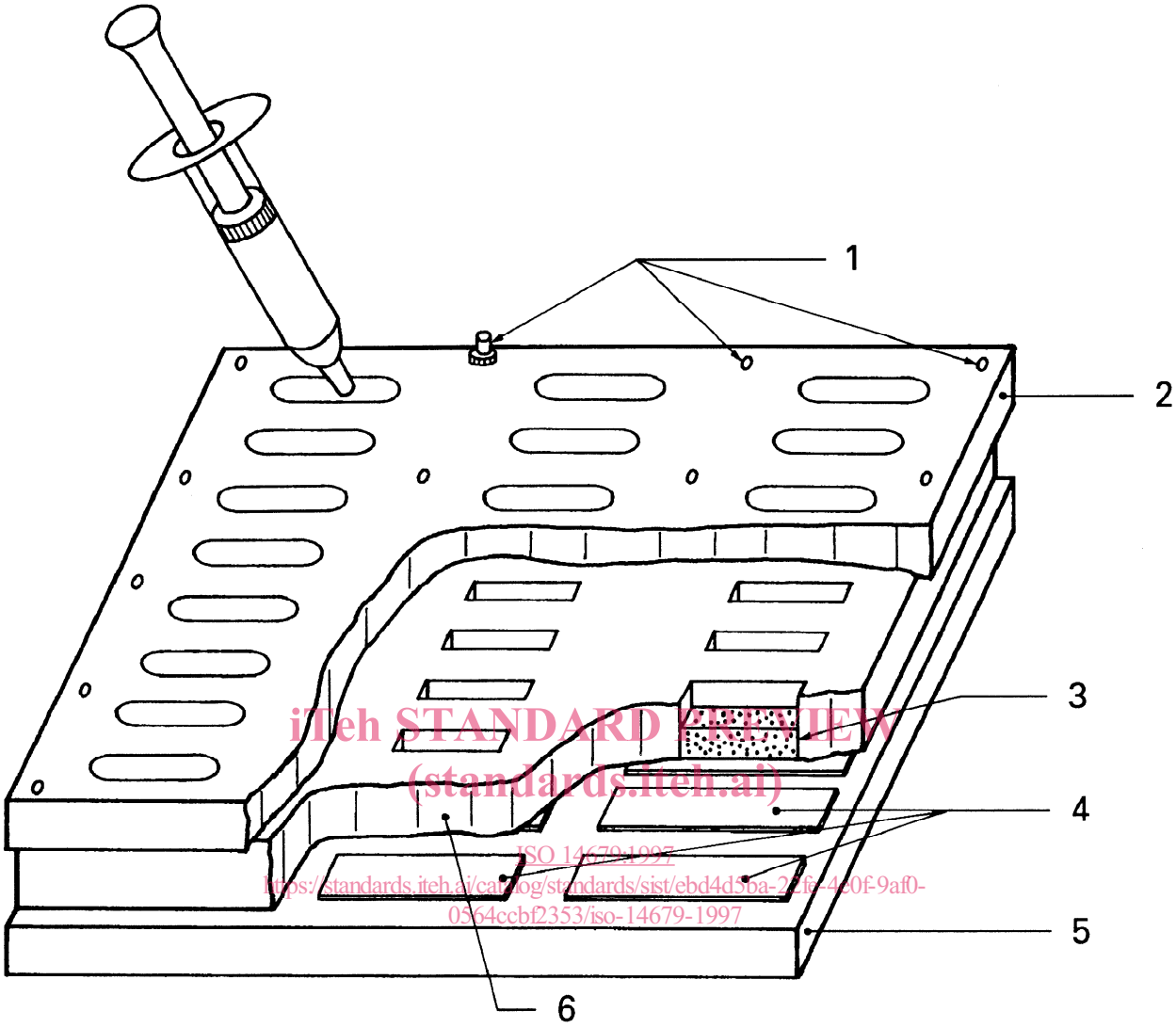
- in the centre, a silicone rubber mould (see figure 5) containing adhesive-moulding cells, of dimensions equal to those required for the blocks of adhesive, above the substrate seatings and obtained from a negative mould;

- on top, an aluminium alloy securing plate (see figure 6), with cutouts above the cells to allow them to be filled.

The whole assembly is held together by bolting the lower plate to the securing plate, thus ensuring that the silicone rubber mould fits tightly against the lengths of substrate.

5.2 Syringe, graduated in 1/100ths of a cubic centimetre, or some other suitable device capable of placing a constant amount of adhesive in each cell.

5.3 Bending machine, capable of fracturing the specimen at between 10% and 80% of the full-scale reading of the force-indicating instrument. The rate of displacement of the moving head shall be 0,5 mm/min +/- 0,001 mm/min.

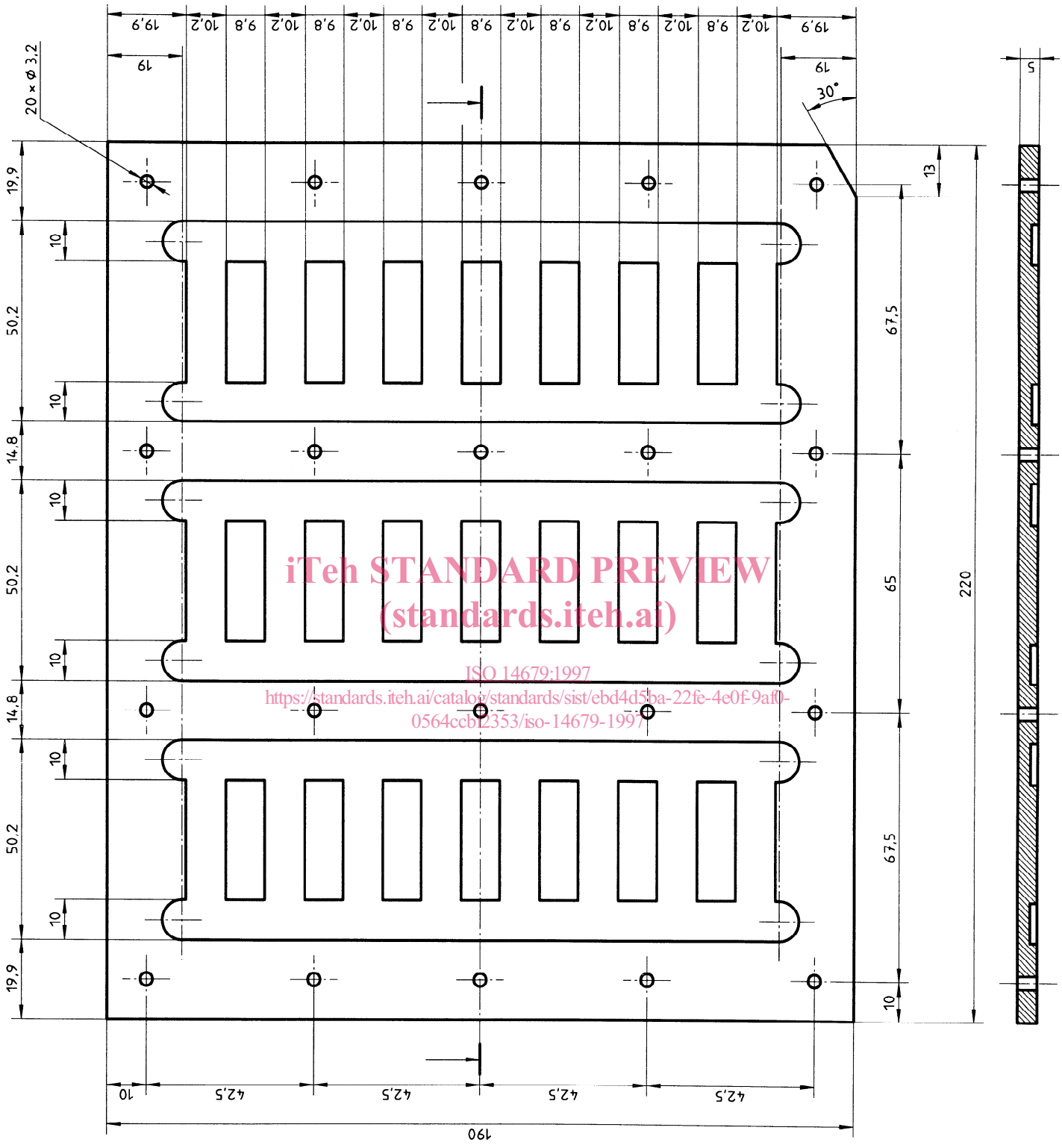


Key

1	Securing bolts (20)	4	Substrates
2	Securing plate	5	Lower plate
3	Adhesive	6	Silicone rubber mould

Figure 3 — Specimen preparation device

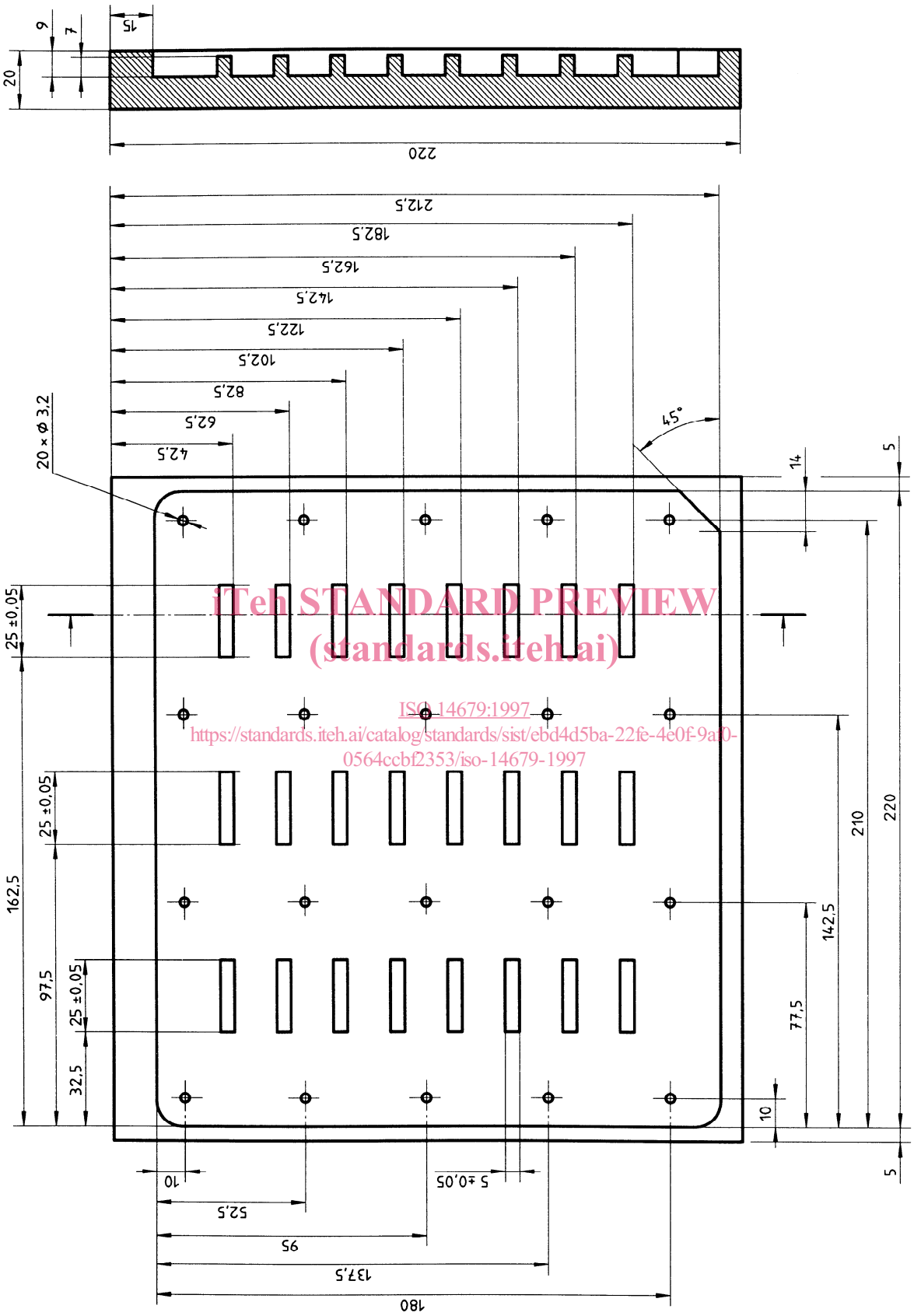
Dimensions in millimetres



Standard tolerance grade 7 (IT7) as defined in ISO 286-1.

Figure 4 — Lower plate

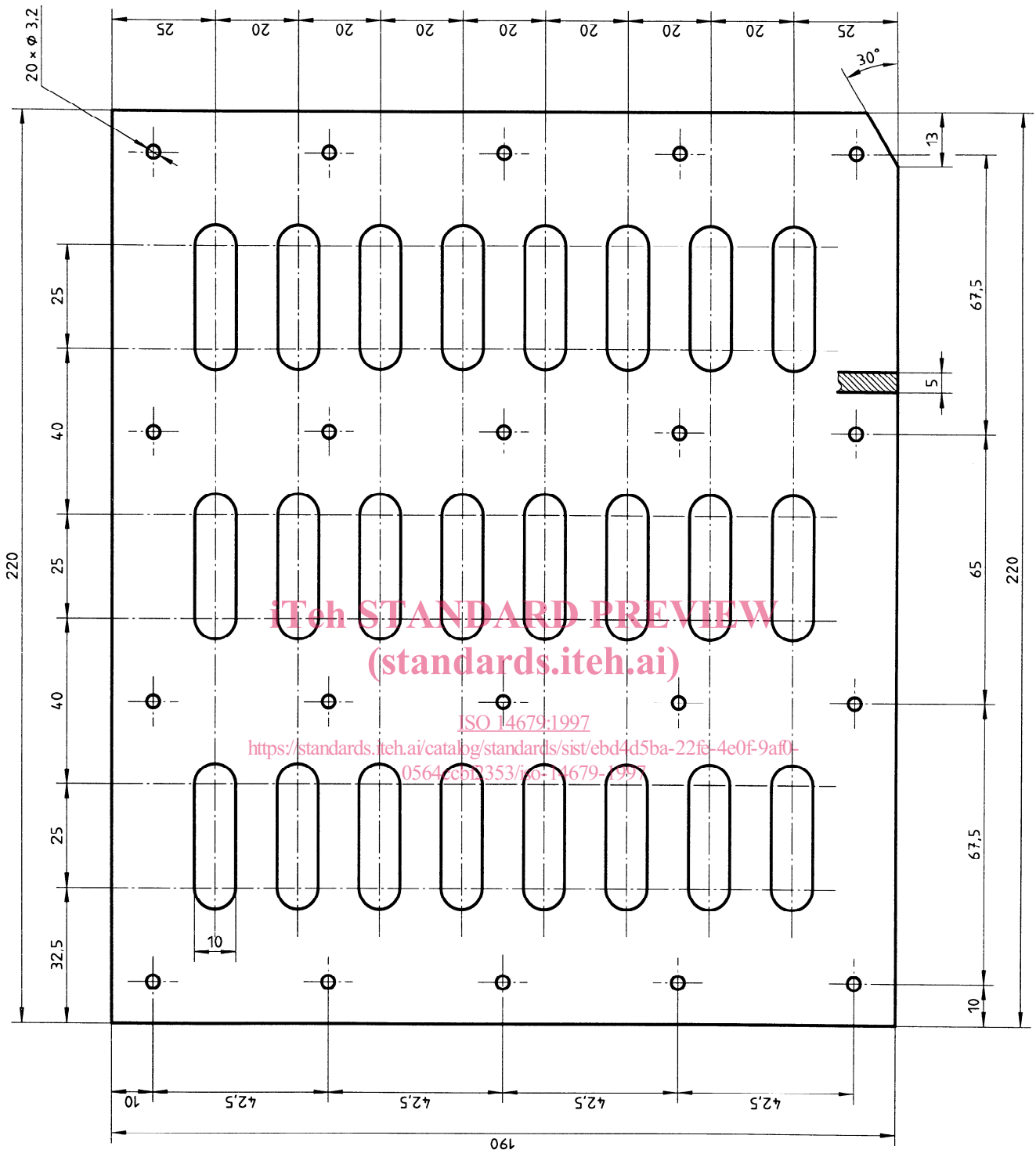
Dimensions in millimetres



Standard tolerance grade 7 (IT7) as defined in ISO 286-1.

Figure 5 — Silicone rubber mould

Dimensions in millimetres



Standard tolerance grade 7 (IT7) as defined in ISO 286-1.

Figure 6 — Securing plate