
**High-pressure decorative laminates —
Composite elements —**

Part 1:
Test methods

Stratifiés décoratifs haute pression — Éléments composites —

Partie 1: Méthodes d'essai

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ISO 13894-1:2000

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this part of ISO 13894 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 13894-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

ISO 13894 consists of the following parts, under the general title *High-pressure decorative laminates — Composite elements*:

— *Part 1: Test methods*

— *Part 2: Specification of wood-based HPDL elements*

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High-pressure decorative laminates — Composite elements —

Part 1: Test methods

1 Scope

This part of ISO 13894 specifies the methods of test for determination of the properties of composite elements surfaced, and possibly edged, with high-pressure decorative laminate (HPDL) as defined in clause 3.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 13894. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 13894 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid part of ISO 13894.

ISO 1478:1999, *Tapping screw thread*. <https://standards.iteh.ai/catalog/standards/sist/67608e23-2bfd-41db-ab03-45131c7e212e/iso-13894-1-2000>

ISO 4586-1:1997, *High-pressure decorative laminates — Sheets made from thermosetting resins — Part 1: Classification and specifications*.

ISO 4586-2:1997, *High-pressure decorative laminates — Sheets made from thermosetting resins — Part 2: Determination of properties*.

ISO 7170:1993, *Furniture — Storage units — Determination of strength and durability*.

3 Terms and definitions

For the purposes of this part of ISO 13894, the following terms and definitions apply.

3.1

composite element surfaced with high-pressure decorative laminate

a composite board produced by adhesively bonding high-pressure decorative laminate (HPDL) sheet material to one or both sides of a substrate

NOTE 1 The substrate may be a wood-based product (e.g. particle board), mineral board (e.g. calcium silicate), metal sheet, expanded honeycomb or a plastic material.

NOTE 2 Examples of adhesives are PVAc, urea formaldehyde and polychloroprene.

NOTE 3 Certain tests contained in this part of ISO 13894 are not applicable to all types of composite element.

3.2
high-pressure decorative laminate(s)
HPDL, HPL
See definition 3.1 in ISO 4586-1:1997.

4 Conditioning

Composite elements shall be pre-conditioned for a minimum period of 7 days at $20\text{ °C} \pm 5\text{ °C}$ and $(45 \pm 20)\%$ relative humidity before testing, or other conditions of temperature and humidity if agreed between supplier and purchaser.

5 Appearance

5.1 Principle

The HPDL elements are inspected for appearance under standardized conditions of lighting and viewing.

5.2 Procedure

Inspect the element from a distance of 1,5 m in accordance with test method 5.1 of ISO 4586-2:1997.

5.3 Expression of results

Report HPDL defects, as defined in 5.1 of ISO 4586-2:1997, plus fabrication defects such as surface ripple, bumps, cracks, indentations and adhesive smears.

5.4 Test report

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The test report shall include the following information:

- a) a reference to this part of ISO 13894;
- b) the name and type of product;
- c) any defects observed;
- d) any deviations from the specified test method;
- e) the date of the test.

6 Dimensions

6.1 Determination of length and width

6.1.1 Principle

The length and width of the element are measured using a steel tape or rule.

6.1.2 Apparatus

6.1.2.1 Steel tape or rule, of sufficient length to measure the greatest dimension of the element, and graduated to allow a reading accuracy of 0,5 mm. For cut-to-size elements requiring more precise dimensional tolerances, suitable high-precision measuring equipment shall be used.

6.1.3 Specimen

The specimen shall be the element as supplied by the manufacturer.

6.1.4 Procedure

Apply the steel tape or rule (6.1.2.1) to each edge of the element in turn, on a line approximately 25 mm from and parallel to the edge. Measure the length on each edge to the nearest 0,5 mm.

6.1.5 Expression of results

Express the length and width of the element, to the nearest 0,5 mm, as the length and width measurements showing the greatest deviation from the corresponding nominal values.

6.1.6 Test report

The test report shall include the following information:

- a) a reference to this part of ISO 13894;
- b) the name and type of product;
- c) the length and width values (see 6.1.5);
- d) any deviations from the specified test method;
- e) the date of the test.

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6.2 Determination of edge straightness ISO 13894-1:2000

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6.2.1 Principle

A bow gauge is applied to the edge of the element and the deviation of the board edge from a straight line is measured.

6.2.2 Apparatus

6.2.2.1 Bow gauge, of suitable length (l in Figure 3), as specified in 7.2.1.

6.2.3 Specimen

The specimen shall be the element as supplied by the manufacturer.

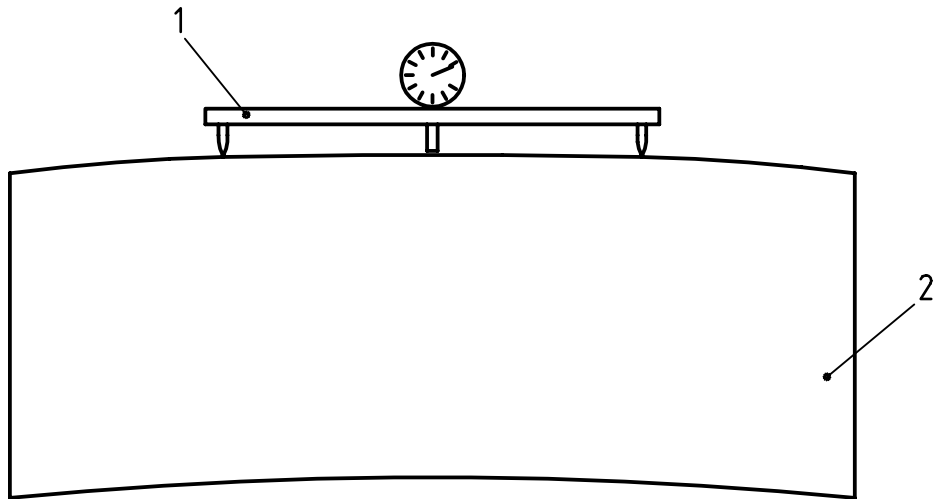
6.2.4 Procedure

Place the bow gauge (6.2.2.1) so that the three feet (two fixed and one movable) are lightly touching one edge of the element in the area of greatest deformation, and measure the straightness deviation (shown on the dial gauge) to the nearest 0,1 mm. Repeat this procedure for the other three edges.

For postformed elements, the feet of the bow gauge shall touch the extreme edge of the profile.

6.2.5 Expression of results

Record the maximum deviation for each of the four edges. Designate results “+” if the edge is convex, and “-” if the edge is concave.



Key

- 1 Bow gauge
- 2 Element

Figure 1 — Measuring edge straightness

6.2.6 Test report

The test report shall include the following information:

- a) a reference to this part of ISO 13894;
- b) the name and type of product;
- c) the test result for each of the four edges (see 6.2.5);
- d) the distance *l* between the fixed feet of the bow gauge;
- e) any deviations from the specified test method;
- f) the date of the test.

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6.3 Determination of edge squareness

6.3.1 Principle

A right-angled square is applied to the corner of the element and the deviation of the edge from the square is measured using a steel rule.

6.3.2 Apparatus

6.3.2.1 Right-angled square, with two arms at least 1 000 mm ± 1 mm long (see Figure 2).

6.3.2.2 Steel rule, graduated in 0,5 mm divisions.

6.3.3 Specimen

The specimen shall be the element as supplied by the manufacturer.

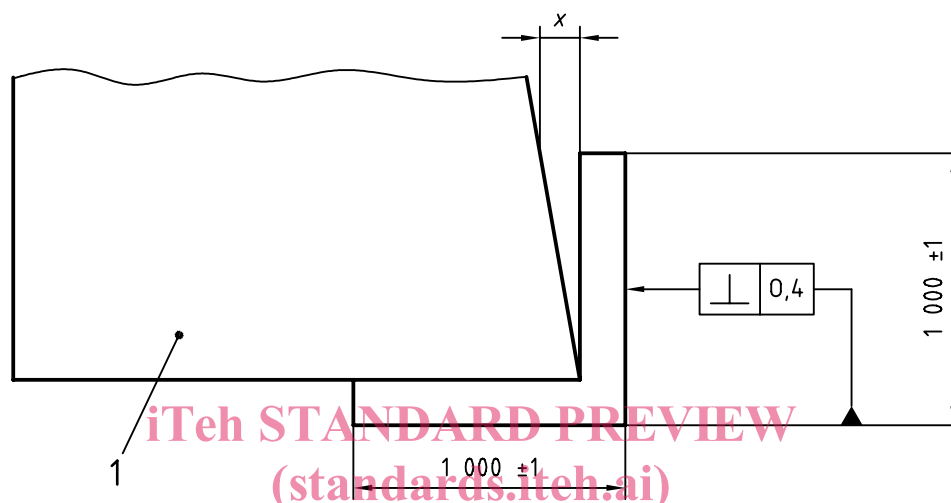
6.3.4 Procedure

Apply the right-angled square (6.3.2.1) to one corner of the element and measure the deviation of the edge of the board from the arm of the square at a distance of 1 m from the corner. Record the results to the nearest 0,5 mm. Repeat the procedure with the square applied to the diagonally opposite corner of the element.

6.3.5 Expression of results

Record the maximum deviation from square for the two diagonally opposite corners (x in Figure 2).

Dimensions in millimetres



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Key

1 Element

Figure 2 — Measuring edge squareness

6.3.6 Test report

The test report shall include the following information:

- a reference to this part of ISO 13894;
- the name and type of product;
- the test result for each corner (see 6.3.5);
- any deviations from the specified test method;
- the date of the test.

6.4 Determination of thickness

6.4.1 Principle

The thickness of the element is measured using a thickness gauge.

6.4.2 Apparatus

6.4.2.1 Suitable thickness gauge, e.g. micrometer gauge, dial gauge or vernier sliding calliper, graduated to allow a reading accuracy of 0,1 mm.

6.4.3 Specimen

The specimen shall be the element as supplied by the manufacturer.

6.4.4 Procedure

Measure the thickness to the nearest 0,1 mm at the centre of each of the four edges, at a position 25 mm from the edge.

6.4.5 Expression of results

Calculate the thickness of the element as the arithmetic mean of the four thickness measurements, expressing it to the nearest 0,1 mm. Record the maximum and minimum values also.

6.4.6 Test report

The test report shall include the following information:

- a) a reference to this part of ISO 13894;
- b) the name and type of product;
- c) the mean thickness value, and maximum and minimum values (see 6.4.5);
- d) any deviations from the specified test method; [ISO 13894-1:2000](https://standards.iteh.ai/catalog/standards/sist/67608e23-2bfd-41db-ab03-45131c7e212e/iso-13894-1-2000)
- e) the date of the test.

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7 Flatness

7.1 Principle

The bow (deviation from flatness) of the element is measured using a bow gauge placed at the position of the greatest deformation.

7.2 Apparatus

7.2.1 Bow gauge, of suitable length (l in Figure 3), graduated to permit a reading accuracy of 0,1 mm.

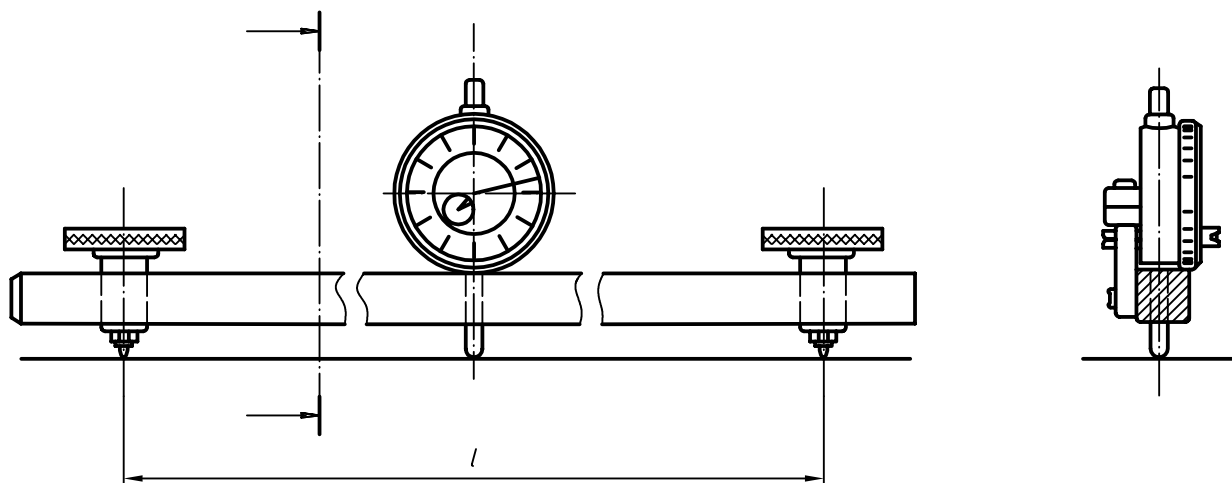


Figure 3 — Bow gauge

7.3 Specimen

The specimen shall be the element as supplied by the manufacturer.

7.4 Procedure

Position the element either horizontally or vertically as defined in the relevant specification.

When measured horizontally, the element shall be placed concave side up without restraint on a flat horizontal surface. When measured vertically, the element shall be held in a vertical position with the short or long edge resting on a horizontal base, and the bow shall be measured on the concave side.

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Place the bow gauge (7.2.1) so that the three feet (two fixed and one movable) are lightly touching the surface of the element in the area of the greatest deformation, and measure the deviation from flatness (shown on the dial gauge) to the nearest 0,1 mm.

7.5 Expression of results

Record the maximum deviation from flatness measured using the bow gauge.

7.6 Test report

The test report shall include the following information:

- a) a reference to this part of ISO 13894;
- b) the name and type of product;
- c) the maximum deviation from flatness (see 7.5);
- d) the distance l between the fixed feet of the bow gauge;
- e) any deviations from the specified test method;
- f) the date of the test.

8 Glue-line quality

8.1 Principle

The laminate is separated from the substrate using a chisel, followed by visual assessment of the separated components.

NOTE This test is only an assessment of the glue-line; it does not measure the integrity of the composite element.

8.2 Apparatus

8.2.1 **Wood chisel**, with a rigid steel blade approximately 30 mm wide (see Figure 4).

8.2.2 **G-clamp**, suitable for clamping the specimen to the bench.

8.2.3 **Protective gloves**.

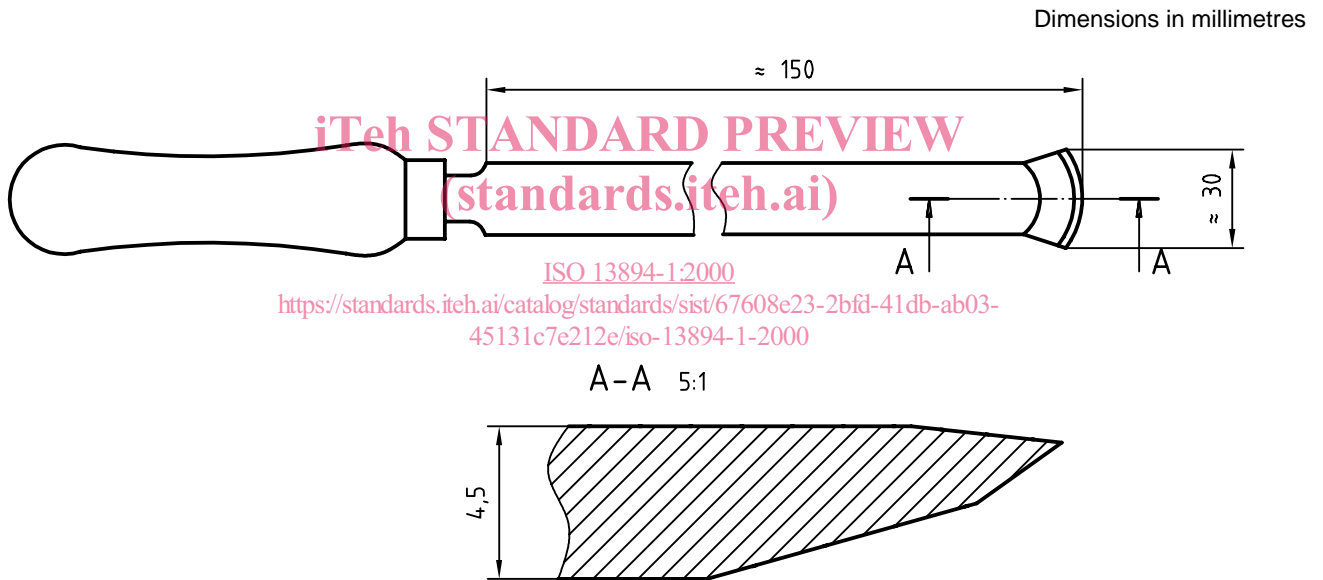


Figure 4 — Suggested tool for glue-line quality test

8.3 Specimens

Each specimen shall be approximately 300 mm × 100 mm, cut from the element after it has been stored in normal workshop conditions for at least 7 days after pressing. Two specimens shall be tested.

8.4 Procedure

WARNING — Suitable protective gloves must be worn when carrying out this test.

Clamp the specimen firmly to the bench using a G-clamp (8.2.2) or other suitable arrangement.

Starting from one of the narrow sides, insert the blade of the chisel (8.2.1) into the glue-line, by hammering if necessary, and carefully separate the laminate from the substrate, trying as far as possible to remove the laminate in one piece. Continue until all the laminate has been removed, either in one piece or several pieces, or until it becomes obvious that the laminate cannot be removed.