
**Textile floor coverings — Laboratory
soiling tests —**

**Part 1:
Kappasoil test**

*Revêtements de sol textiles — Essais d'encrassement en laboratoire —
Partie 1: Essai Kappasoil*
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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 11378 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 11378-1 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 12, *Textile floor coverings*.

ISO 11378 consists of the following parts, under the general title *Textile floor coverings — Laboratory soiling tests*:

— *Part 1: Kappasoil test*

— *Part 2: Drum test*

Annexes A, B and C of this part of ISO 11378 are for information only.

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Textile floor coverings — Laboratory soiling tests —

Part 1: Kappasoil test

1 Scope

This part of ISO 11378 specifies a method for assessing the propensity of textile floor coverings to soiling using an artificial soil composition.

The scope of this test method can be extended to assess the efficiency of cleaning chemicals, and cleaning equipment (see annex A).

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2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 11378. 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 11378 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 International Standards.

ISO 105-A02:1993, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour.*

ISO 105-J01:1997, *Textiles — Tests for colour fastness — Part J01: General principles for measurement of surface colour.*

ISO 139:1973, *Textiles — Standard atmospheres for conditioning and testing.*

ISO 1957:—¹⁾, *Machine-made textile floor coverings — Selection and cutting specimens for physical tests.*

ISO 9405:—²⁾, *Textile floor coverings — Assessment of changes in appearance.*

3 Principle

Carpet specimens are subjected to an accelerated soiling process. The degree of soiling is measured by comparing the change in colour between soiled and original specimens.

1) To be published. (Revision of ISO 1957:1986)

2) To be published. (Revision of ISO/TR 9405:1990)

4 Apparatus

4.1 **Kappasoil machine**, consisting of the following components.

4.1.1 **Circular table**, (600 ± 2) mm in diameter, rotating at a speed of (0,3 ± 0,016) s⁻¹ [(18 ± 1) rpm] and reversing direction every 250 revolutions, to which the test specimens are attached.

4.1.2 **Two cones**, which rest radially on the table, one being free-running and the other driven in the same direction and with a cone surface speed (5 ± 1) % higher than the surface speed of the table, each cone assembly being adjusted to apply a load of (40 ± 2) N.

4.1.3 **Soil dispenser**, placed above the table, capable of dispensing soil uniformly and intermittently for distribution on the test specimens over a period of time during the machine cycle.

NOTE Typically (1,4 ± 0,01) g of soiling compound (4.2) is dispensed every 250 revolutions of the table and distributed evenly for one full revolution.

4.2 **Standard soiling compound**, compatible with the equipment.

NOTE Examples of such soiling compounds are listed in annex B.

4.3 **Suction (vacuum) cleaner**, with an airflow of (25 ± 5) l·s⁻¹ through the suction-only nozzle with a suction surface of (125 ± 25) mm × (15 ± 2,5) mm.

4.4 **Means of securing** floor covering specimens to the horizontal table.

NOTE This can be double-sided, pressure-sensitive adhesive tape or (aerosol) contact adhesive or a clamping system.

4.5 **Colour measurement instrument**, with a (50 ± 0,5) mm aperture, capable of measuring the colour of textile floor-coverings and expressing the results as ΔE or ΔL (CIELAB system) in accordance with ISO 105-J01.

4.6 **Grey scales**, in accordance with ISO 105-A02.

4.7 **Template**, to be used in conjunction with the colour measurement instrument and of the same size as the specimens with five holes of the same dimensions as the measuring head of the colour measurement equipment (see Figure 2).

4.8 **Straight edged ruler**, at least 200 mm long.

4.9 **Illumination device**, as described in ISO 9405.

5 Atmosphere for conditioning and testing

The standard atmospheres for conditioning and testing of textiles shall be one of those specified in ISO 139.

6 Sampling and preparation of test specimens

6.1 Sampling

Select a minimum of two test specimens per textile floor covering being tested in accordance with ISO 1957. Cut each test specimen in such a way that in the case of those textile floor coverings with a "natural" pile lay, the direction of pile lay is at right angles to the direction of the rotational motion of the table. The specimens and soiling compound (4.2) shall be conditioned for a minimum of 24 h, and the test and assessment carried out in one of the standard atmospheres (clause 5).

6.2 Preparation of test specimens

A maximum of twelve test specimens (see Figure 1) from the same or different samples shall be exposed in each test run. Cut out the appropriate number of test specimens and allow to condition in the standard atmosphere (clause 5), flat, singly and use-surface uppermost, for at least 24 h.

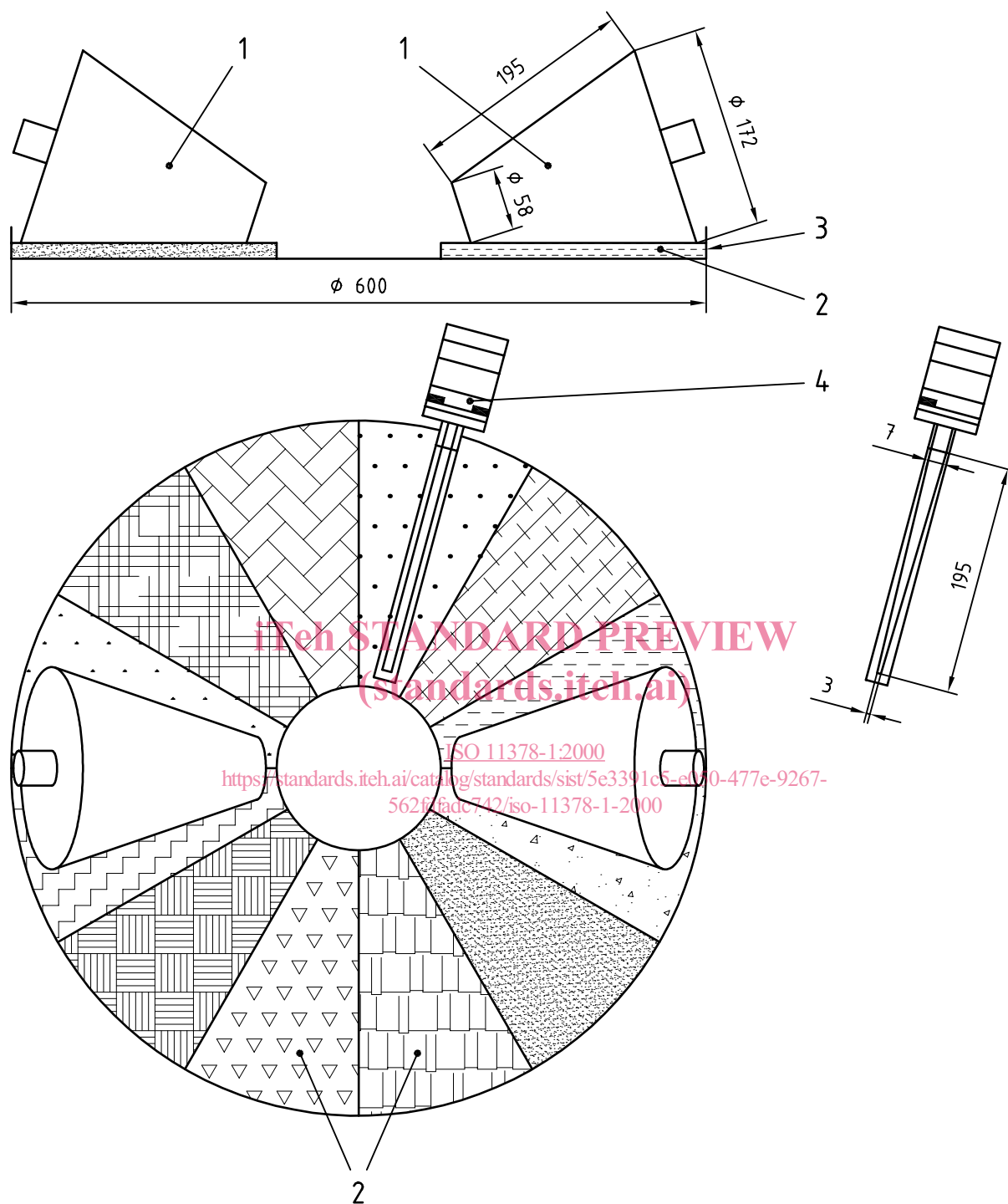
If there are insufficient specimens available for testing, any vacant spaces on the circular table of the Kappasoil machine shall be filled with spare floor covering material of similar thickness.

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Dimensions in millimetres



Key

- 1 Cones
- 2 Carpet specimens
- 3 Table
- 4 Soil dispenser

Figure 1 — Diagram of Kappasoil machine

7 Procedure

7.1 Clean the test specimens using the suction cleaner (4.3) to remove loose surface fibre using a total of four strokes, two against and two with the direction of pile lay. In the case of cut pile carpet, align the pile in the direction of natural pile lay by using a clean straight edged ruler (4.8). Move the ruler once across the carpet pile in the direction of pile lay, applying slight pressure.

If the assessment is made using grey scales, proceed to 7.3.

7.2 Locate the measuring template (4.7) on the test specimen and, using the colour measurement instrument (4.5), measure the colour of the test specimen in five places. Record these values.

7.3 Attach the test specimens securely on the table (4.1.1), ensuring that there are no gaps between the test specimens and that, when specimens of differing thickness are tested, the difference in thickness of adjacent test specimens is not more than 1 mm. Place the soiling compound mixture (4.2) in the soil dispenser.

NOTE When filling the soil dispenser, it is essential that the test specimens be protected from accidental soil spillage.

7.4 Start the machine and continue until 5 000 revolutions of the table have been completed.

If there is a build-up of loose fibre on the surface of the test specimens during the early part of the test, stop the machine and carefully remove the loose fibre by hand. Restart the machine and continue the test.

7.5 Remove the test specimens carefully and clean them by suction with the suction cleaner (4.3) to remove loose dirt and fibre, using a total of four strokes (two against the direction of the pile lay, and two with).

In the case of cut pile carpets, ensure that the last stroke of the suction nozzle is in the direction of the pile lay. Move the clean straight edged ruler (4.8) across the pile in the direction of pile lay, applying slight pressure.

8 Assessment

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8.1 Colour measurement

Using the measuring template and the colour measurement instrument (4.5), measure the colour of the soiled test specimens in the same five places on each specimen (see Figure 2). Calculate the mean colour difference (ΔE) or mean lightness difference (ΔL) between original and soiled specimens according to the following formulae:

$$\Delta E = \sqrt{(L_o - L_s)^2 + (a_o - a_s)^2 + (b_o - b_s)^2}$$

or

$$\Delta L = L_o - L_s$$

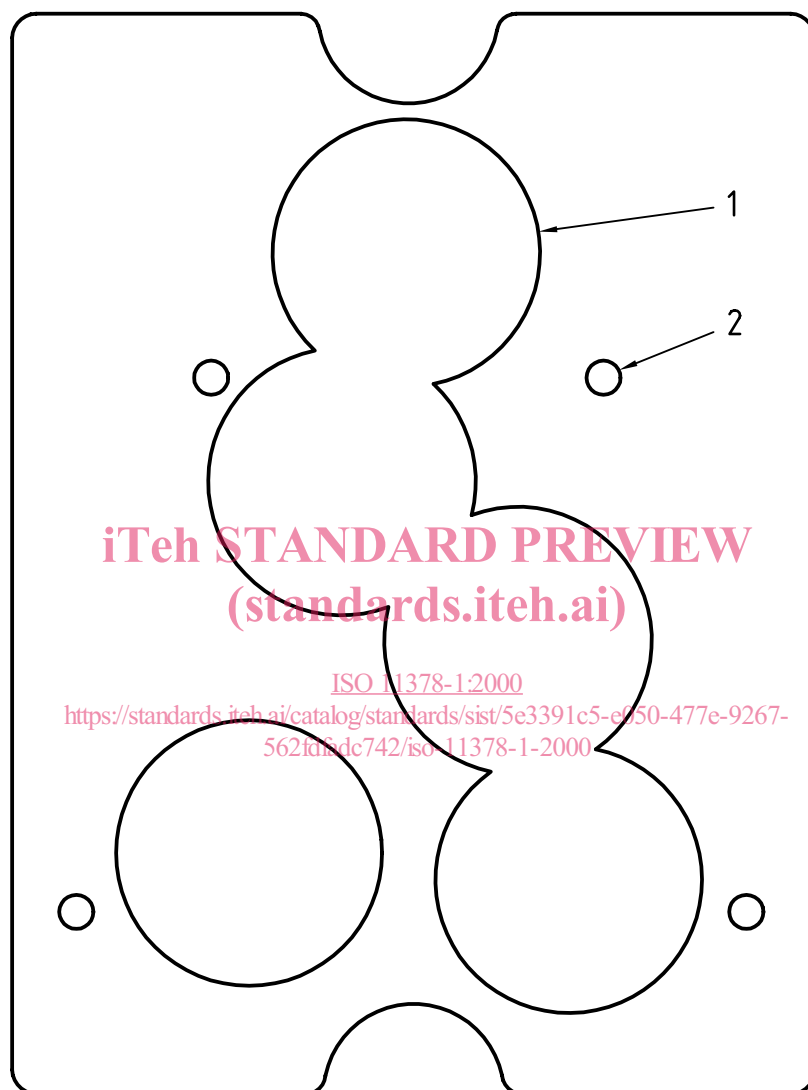
where

L_o , a_o and b_o are the mean CIE colour co-ordinates of the original specimen;

L_s , a_s and b_s are the mean CIE colour co-ordinates of the soiled specimen.

8.2 Grey scales

Three operators shall assess the colour difference between the soiled and original specimens in accordance with ISO 105-A02. Assessment shall be made using the large size grey scales and under the lighting conditions specified in ISO 9405.



Key

- 1 Colour measuring aperture
- 2 Specimen locating peg

Figure 2 — Example of suitable template for colour measurement (actual size)

9 Accuracy and precision

Accuracy and precision data, obtained by means of interlaboratory trials, are given in annex C.

10 Test report

The test report shall include the following information:

- a) all information necessary for complete identification of the sample;
- b) reference to this part of ISO 11378, i.e. ISO 11378-1;
- c) date of test;
- d) conditioning and test atmosphere used;
- e) details of the soiling compound used;
- f) whether assessment was by colour measurement instrument or by grey scales assessment;
- g) the test results;
- h) any deviation to this part of ISO 11378 which could have affected the result.

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