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

**Part 2:
Drum test**

*Revêtements de sol textiles — Essais d'encrassement en laboratoire —
Partie 2: Essai au tambour*
(standards.iteh.ai)

[ISO 11378-2:2001](https://standards.iteh.ai/catalog/standards/sist/3872e3db-fb08-469b-8d45-818143082e88/iso-11378-2-2001)

<https://standards.iteh.ai/catalog/standards/sist/3872e3db-fb08-469b-8d45-818143082e88/iso-11378-2-2001>



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 11378-2:2001

<https://standards.iteh.ai/catalog/standards/sist/3872e3db-fb08-469b-8d45-818143082e88/iso-11378-2-2001>

© ISO 2001

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

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 11378-2 was prepared by Technical Committee ISO/TC 219, *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 B and C form a normative part of this part of ISO 11378. Annexes A and D are for information only.

ISO 11378-2:2001
<https://standards.iteh.ai/catalog/standards/sist/3872e3db-1b08-469b-8d43-818143082e88/iso-11378-2-2001>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 11378-2:2001

<https://standards.iteh.ai/catalog/standards/sist/3872e3db-fb08-469b-8d45-818143082e88/iso-11378-2-2001>

Textile floor coverings — Laboratory soiling tests —

Part 2: Drum test

1 Scope

1.1 This part of ISO 11378 describes the equipment and the test method for assessing the propensity of textile floor coverings to soiling in the absence of abrasive wear and texture changes using a standard artificial soil composition.

1.2 This test method is applicable for use in testing unused textile floor coverings of all types.

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

STANDARD PREVIEW
(standards.iteh.ai)

2 Normative references

[ISO 11378-2:2001](https://standards.iteh.ai/catalog/standards/sist/3872e3db-fb08-469b-8d45-)

<https://standards.iteh.ai/catalog/standards/sist/3872e3db-fb08-469b-8d45->

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, *Machine-made textile floor coverings — Selection and cutting of specimens for physical tests*

ISO 9405, *Textile floor coverings — Assessment of changes in appearance*

ISO 10361, *Textile floor coverings — Production of changes in appearance by means of Vettermann drum and hexapod tumbler testers*

ISO 11379, *Textile floor coverings — Laboratory cleaning procedure using spray extraction*

3 Principle

Carpet test specimens are subjected to an accelerated soiling process. The degree of soiling is measured by calculating the change in colour between soiled and original textile floor covering, or by use of the large grey scales.

4 Apparatus and materials

4.1 Drum and driving systems, conforming to the specified hexapod tumbler tester of ISO 10361 or to the modified drum test equipment described in annex B.

4.2 Wide-mouth mixing container, such as a standard mill jar, for preparation of soiled pellets.

4.3 Polyamide polymer pellets, having a volume of (13 ± 2) mm³ per pellet.

4.4 Chrome alloy steel balls (ball bearings), of total mass $(1\ 000 \pm 10)$ g, each with a diameter of $(9,5 \pm 0,02)$ mm.

4.5 Magnet, capable of attracting and holding several chrome alloy steel balls at one time.

4.6 Standard soiling compound, compatible with the equipment, selected from those listed in annex C. The preferred soiling compound is the compound C.5.

NOTE The standard soils have a limited shelf life and should be stored in sealed containers.

4.7 Suction (vacuum) cleaner, with an airflow of (25 ± 5) l/s through the suction orifice of (125 ± 25) mm \times $(15 \pm 2,5)$ mm.

4.8 Specimen backing sheet, a polyethylene sheet of nominal size 950 mm \times 215 mm \times 2 mm.

4.9 Double-sided pressure sensitive adhesive tape, approximately 50 mm in width used to secure the textile floor covering specimens to the backing sheet.

4.10 Straight edged ruler, of minimum length 200 mm.

4.11 Control textile floor covering.

A light-coloured carpet of known specifications is used as a reference for each test evaluation.

4.12 Assessment equipment

4.12.1 Colour measurement equipment, consisting of a colour measurement device with a $(50 \pm 0,5)$ 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.

4.12.2 Large grey scales, in accordance with ISO 105-A02.

4.12.3 Template, used in conjunction with the colour measurement equipment, of the same size as the test specimen(s) with six holes of the same dimensions as the measuring head of the colour measuring equipment (see Figure 1).

Dimensions in millimetres

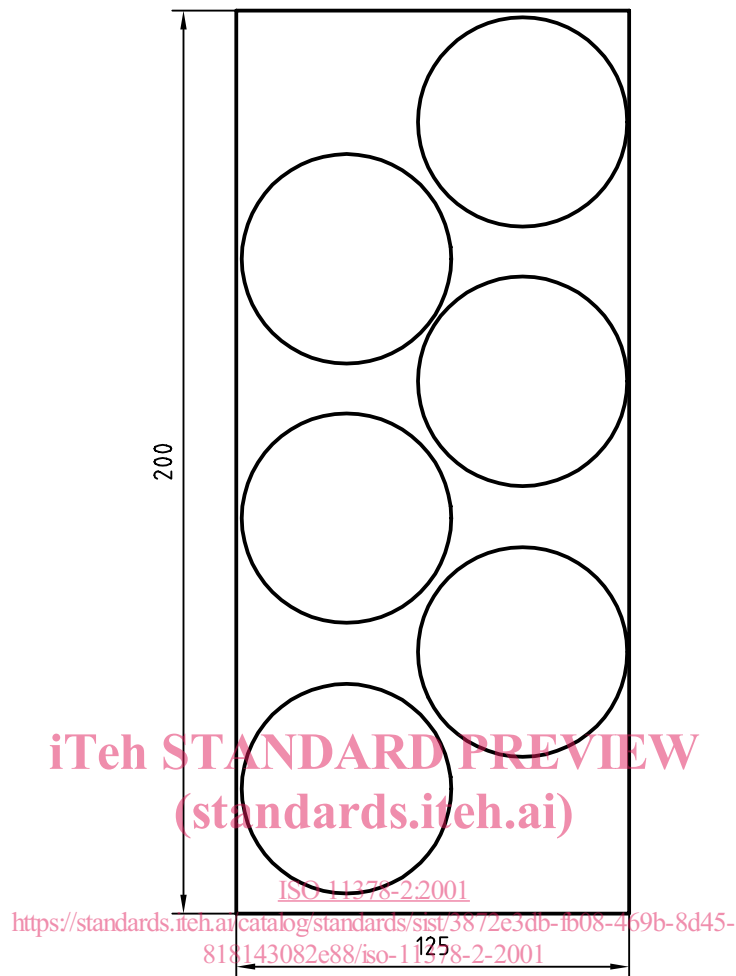


Figure 1 — Example of suitable template for colour measurement

5 Atmosphere for conditioning and testing

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

6 Sampling and preparation of soiled pellets and test specimens

6.1 Preparation of soiled pellets

Place $(3 \pm 0,1)$ g of the preferred soiling compound C5 and 1 000 g of polyamide pellets in the mixing container. Secure the lid and place the mixing container on the driving system (4.1) for 20 min. to ensure a homogeneous mixture of the soil and the pellets.

To simulate particular use areas it may be necessary to adjust the type and/or quantity of soiling compound

NOTE If large quantities of soiled pellets are prepared (e.g. more than 2 000 g) they should be kept in an airtight container to ensure that no loss of moisture from the mixture occurs, and the supply should not be allowed to dwindle below 25 % of the original quantity prepared.

6.2 Sampling

Select test specimens of each textile floor covering being tested in accordance with ISO 1957.

NOTE Colour and design play a large part in the assessment and this should be borne in mind when selecting test specimens and when assessing.

6.3 Number and dimensions

Cut a minimum of two test specimens per textile floor covering measuring a minimum of (125 ± 1) mm in the direction of manufacture by (200 ± 2) mm wide. Mark an arrow in the direction of manufacture or, in the case of pile carpets, in the direction of the pile lay on the back of the test specimen. Allow the test specimens to condition in the standard atmosphere (clause 5), flat, singly and with use-surface uppermost, for a minimum of 24 h.

6.4 Preparation of test specimen

6.4.1 Attach double-sided adhesive tape (4.9) along each edge, across the ends and at each specimen cross junction of the specimen backing sheet. Mount the test specimens and the control textile floor covering (4.11), use surface uppermost, allowing a (5 ± 1) mm gap at each end and an (8 ± 1) mm gap between specimens to allow for the specimens to remain attached when the specimen backing sheet is curved to fit the internal circumference of the drum. Check to ensure that each test specimen is flat to the specimen backing sheet and in the direction of manufacture when it is curved to the inside drum diameter. If the test specimens are not properly secured adjust the test specimen accordingly. When test specimens of differing thickness are tested together, the difference in thickness of the adjacent test specimens shall not exceed 1 mm.

6.4.2 Use the suction cleaner (4.7) to remove loose fibre from the test specimens, using a total of four strokes, two strokes in each direction of manufacture or, in the case of pile carpets two against and two with the direction of the pile lay.

6.4.3 In the case of cut pile test specimens align the pile in the direction of natural pile lay by using the ruler (4.10). Move the ruler once across the test specimen in the direction of pile lay, applying slight pressure.

<https://standards.iteh.ai/catalog/standards/sist/3872e3db-fb08-469b-8d45-818143082e88/iso-11378-2-2001>

7 Procedure

7.1 If using colour measurement for assessment, locate the measuring template (4.12.3) on the test specimen and, using the colour measuring equipment (4.12.1), measure the colour of the test specimens in six places. Record these values.

7.2 Ensure that the inside of the drum (4.1) and the chrome alloy steel balls (4.4) are clean.

7.3 Fit the mounted test specimens into the clean drum, ensuring that the backing sheet fits tightly and lies smoothly around the internal circumference.

7.4 Place $(1\,000 \pm 10)$ g of chrome alloy steel balls (4.4) and (250 ± 2) g of soiled pellets into the drum and secure the lid.

7.5 Place the drum on the driving system, start the machine and allow the drum to rotate for 30 min. When the test is completed stop the machine, remove the drum and sit it upright.

7.6 Remove the backing sheet (4.8) with the test specimens and carefully clean the test specimens by suction with the suction cleaner (4.7) to remove loose surface soil and fibre, using a total of four strokes in each direction of manufacture or, in the case of pile carpets, 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 straight edged rule (4.10) across the pile in the direction of the pile lay, applying slight pressure to align the pile.

7.7 Using the magnet (4.5) remove the chrome alloy steel balls (4.4) from the drum.

7.8 With the suction cleaner (4.7), vacuum the used soil pellets from the inside of the drum. Clean the inside of the drum with a damp cloth.

8 Assessment

8.1 General

Use the assessment method described in 8.2 or in 8.3 depending on availability of the relevant equipment.

8.2 Colour measurement

Using the measuring template (4.12.3) and the colour measuring device (4.12.1) measure the colour of the soiled test specimens in the same six places on each test specimen. Calculate the mean colour difference (ΔE), or mean lightness difference (ΔL) between original and soiled test specimens according to the following formulae:

$$\Delta E = \sqrt{(L_0 - L_s)^2 + (a_0 - a_s)^2 + (b_0 - b_s)^2} \text{ or } \Delta L = L_0 - L_s$$

where

L_0 , a_0 , and b_0 are the mean CIE colour co-ordinates of the original test specimen;

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

8.3 Large grey scales

Three operators shall assess the colour differences between the soiled and the original test specimens in accordance with ISO 105-A02. Assessment shall be made using the large grey scales (4.12.2) and under the lighting conditions specified in ISO 9405.

9 Accuracy and precision

ISO 11378-2:2001

<https://standards.iteh.ai/catalog/standards/sist/3872e3db-fb08-469b-8d45-81914566288f/iso-11378-2-2001>

Accuracy and precision data was obtained by means of inter-laboratory trials, and are documented in annex C. The results demonstrated that this test method has satisfactory accuracy and precision. The coefficient of variation shows repeatability is good and reliability exists with floor soiling tests. The results from laboratory to laboratory are reproducible.

10 Test report

The test report shall include the following information:

- a) all the information necessary for complete identification of the test specimen;
- b) reference to this part of ISO 11378, i.e. ISO 11378-2;
- c) date of test;
- d) conditioning and testing atmosphere used;
- e) details of the soiling compound and quantity used;
- f) whether assessment was by colour measurement device (see 8.2) or by large grey scales assessment (see 8.3);
- g) the test results;
- h) any deviation from this part of ISO 11378, or from the International Standards to which reference is made, that could have affected the results.

Annex A (informative)

Assessment of the effects of fibre finishes, cleaning chemicals and cleaning equipment

A.1 General

The scope of this laboratory soiling test can be extended by either cleaning the soiled test specimens with different chemicals or by using different cleaning machines. Colour measurement or large grey scale assessments can then be used to quantify the relative efficiencies of the cleaning products or processes being evaluated.

A.2 Assessment of further properties

A.2.1 Dependent upon the number of chemicals and/or machines, the number of specimens per sample can be increased or decreased accordingly.

A.2.2 Carry out each test in accordance with the prescribed protocol, up to and including the assessment procedure (clause 8).

A.2.3 Clean the specimens in accordance with the method specified in ISO 11379. To assess cleaning chemical performance, use the same extraction cleaning machine for each chemical, and to assess cleaning machines use a standard cleaning chemical.

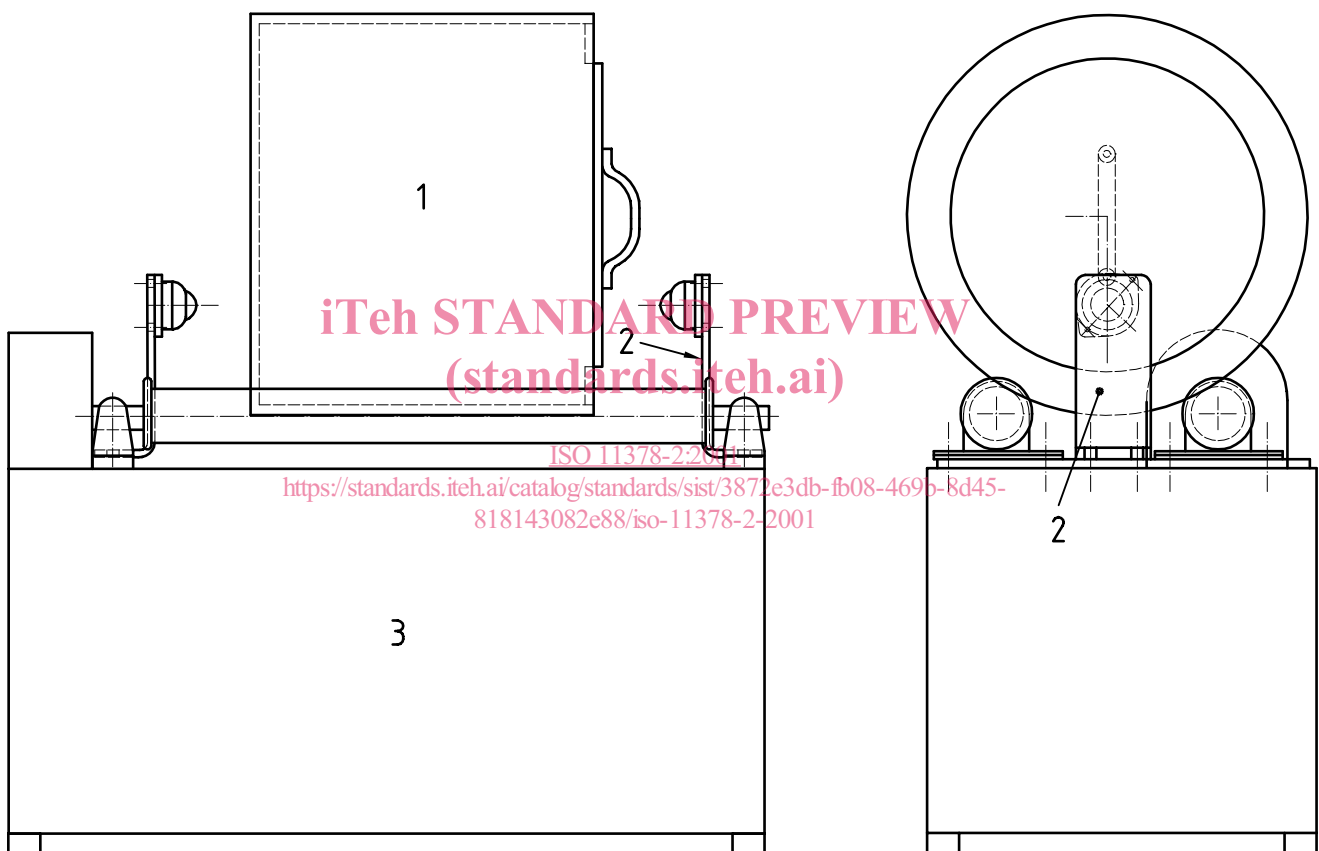
A.2.4 Assess the efficiency of the cleaning process by one of the methods given in clause 8. The efficiency is assessed by comparison to the original unsoiled material i.e. how well the cleaning process has restored the original appearance, or how much soil the cleaning process has removed.

Annex B (normative)

Modified drum test equipment

The modified drum uses a ball mill drive (see Figure B.1) capable of characteristics similar to that of the hexapod drum apparatus. All operation conditions are retained except for the size of the backing sheet and that of the test specimens. Test specimens are cut to a minimum size of (125 ± 2) mm in the direction of manufacture by (264 ± 2) mm width. Ensure that the ball bearing is centred on the drum.

The findings in annex D indicate that both types of apparatus provide a uniformly soiled textile floor covering.



Key

- 1 Side of drum
- 2 Drum guide bracket mounts to bearing plate
- 3 Driving system

Figure B.1 — Modified drum tester