INTERNATIONAL STANDARD

ISO 15487

Second edition
2009-05-15

Textiles — Method for assessing appearance of apparel and other textile end products after domestic washing and drying

Textiles — Méthode d'évaluation de l'aspect des vêtements et autres produits finis textiles après lavage et séchage domestiques

Reference number
ISO 15487:2009(E)

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.

COPYRIGHT PROTECTED DOCUMENT

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.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**

1 Scope **1**

2 Normative references **1**

3 Terms and definition **1**

4 Principle **2**

5 Apparatus and reagents **2**

6 Test specimens **7**

7 Procedure **7**

8 Expression of results **10**

9 Test report **10**

Annex A (informative) **Information on digital descriptions of the ISO smoothness appearance, crease and seam pucker replicas** **11**

Bibliography **12**

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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15487 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 2, *Cleansing, finishing and water resistance tests*.

This second edition cancels and replaces the first edition (ISO 15487:1999), of which it constitutes a minor revision. An informative annex has been added.

Textiles — Method for assessing appearance of apparel and other textile end products after domestic washing and drying

1 Scope

This International Standard specifies a method of test for evaluating the smoothness appearance of flat fabric and seams, and the retention of pressed-in creases in garments and other textile products after one or several domestic washing and drying treatments. This International Standard is applicable to any washable textile end product of any fabric construction. Techniques for seaming and creasing are not included since the purpose is to evaluate textile end products as they are supplied from the manufacturer or as ready-to-use. Techniques for seaming and creasing are controlled by fabric properties.

This method has been developed for use primarily with domestic washing machines of Type B as defined in ISO 6330, but it may be possible to use it with machines of Type A defined in the same International Standard.

It is recognized that prints and patterns may mask the wrinkled appearance present in textile end products. The rating process is, however, based on the visual appearance of specimens including such effects.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 105-A03, *Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining*

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

ISO 6330, *Textiles — Domestic washing and drying procedures for textile testing*

3 Terms and definition

For the purpose of this document, the following terms and definitions apply.

3.1
appearance
overall visual impression of apparel and other textile end product, quantified by comparison of individual components with appropriate reference standards

3.2
crease retention
⟨in fabrics⟩ visual impression of an inserted crease, quantified by comparison with a set of reference standards

3.3
dryer creases
⟨in fabrics⟩ sharp folds or lines running in any direction in a laundered or dried specimen

NOTE Dryer creases are an unintended result of restricted movement of specimens in the washer or the dryer.

3.4
durable press
substantial retention of the initial shape, flat seams, pressed-in creases and unwrinkled appearance during use and after laundering

3.5
laundering
〈of fabric, apparel and textile end products〉 process intended to remove soils and/or stains by treatment (washing) with an aqueous detergent solution and normally including rinsing, extracting and drying

3.6
seam smoothness
〈in fabrics〉 visual impression of flatness of a seamed specimen, quantified by comparison with a set of reference standards

3.7
smoothness appearance
〈in fabrics〉 visual impression of flatness of a specimen, quantified by comparison with a set of reference standards

4 Principle

4.1 Garments or other textile end products are subjected to procedures simulating domestic laundering practices. One of the washing and drying procedures specified in ISO 6330 is used, as agreed between the interested parties.

4.2 Garments or other textile end products are compared visually with plastic smoothness appearance replicas, plastic crease replicas and/or photographic seam standards under specified illumination. A supplemental spot light suitably placed to highlight the creased area of the textile is used in crease evaluation.

5 Apparatus

5.1 Washing and drying apparatus, as specified in ISO 6330.

5.2 Lighting and evaluation area, in a darkened room using lighting arrangement shown in Figure 1 and Figure 2 and comprising the following items. Lamp dimensions should be chosen to extend beyond the overall surface of a test specimen and replicas, when used for the assessment.

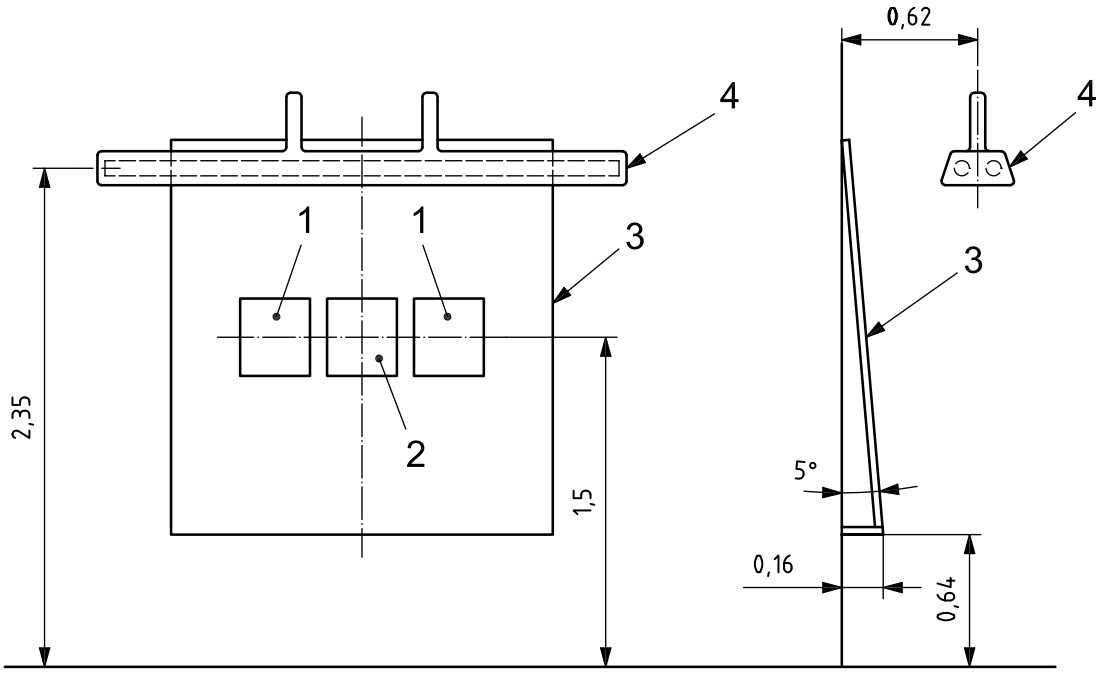
5.2.1 Two CW (cool white) fluorescent lamps, without baffle or glass, a minimum of 2 m in length each, placed side by side.

5.2.2 One white enamel reflector, without baffle or glass.

5.2.3 One thick plywood viewing board, painted grey to match the No. 2 rating on the grey scale for assessing staining specified in ISO 105-A03.

5.2.4 One 500 W reflector floodlight and **lightshield** (for the purpose of protecting the viewer's eyes from direct light for grading creases, as illustrated in Figure 2).

Dimensions in metres

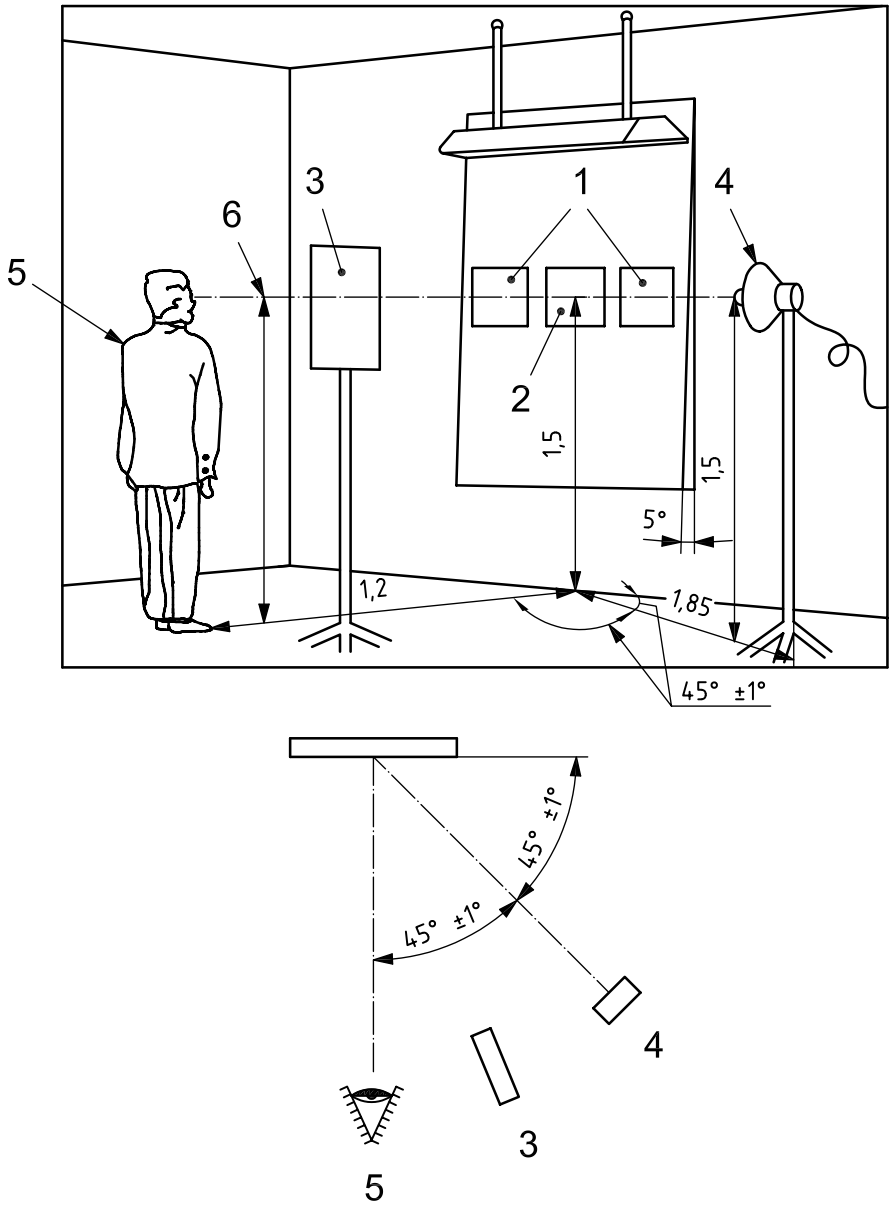


Key

1 replica
2 test specimen
3 board for viewing
4 example of fluorescent lamp placement

Figure 1 — Lighting and viewing arrangement for test specimens for smoothness and seam appearance

Dimensions in metres



Key

1 replica
2 test specimen
3 light shield
4 500 W reflector floodlight
5 observer
6 arbitrary eye level

Figure 2 — Lighting and viewing arrangement for creases only

5.3 American Association of Textile Chemists and Colorists (AATCC) standard plastic crease replicas, prepared for evaluating creases, as shown in Figure 3.

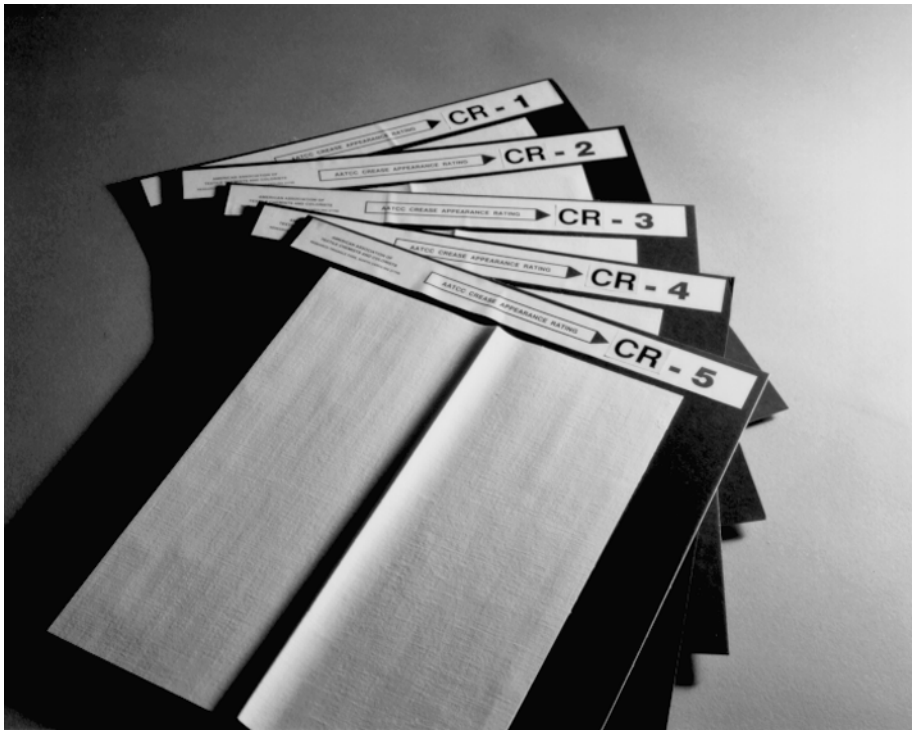


Figure 3 — AATCC standard plastic crease replicas

5.4 AATCC photographic standards prepared for evaluating seam appearance (single- and double-needle stitching), as shown in Figures 4 and 5.

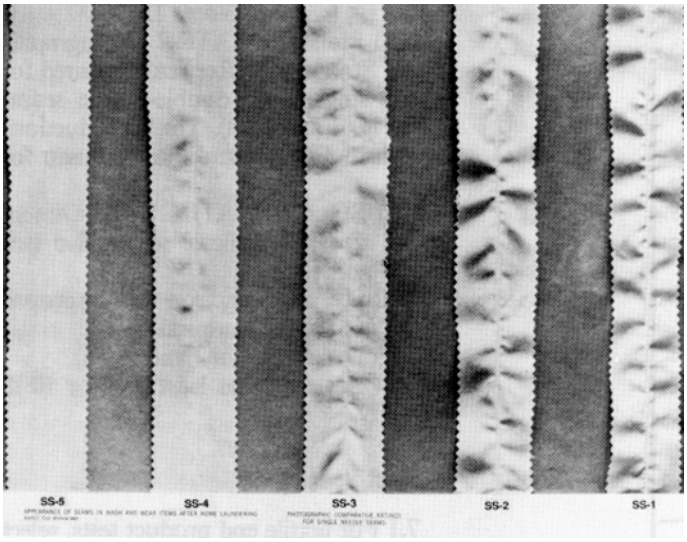


Figure 4 — AATCC standard single-needle seam smoothness photograph

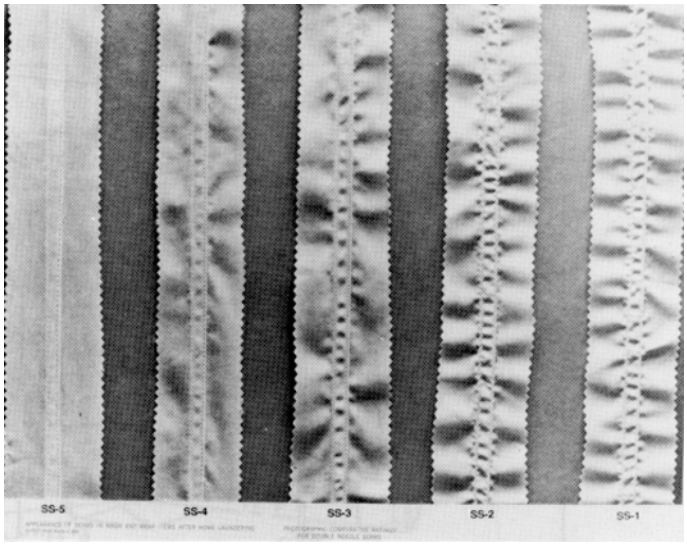


Figure 5 — AATCC standard double-needle seam smoothness photograph

5.5 AATCC standard smoothness appearance replicas prepared for evaluating appearance, as shown in Figure 6 (see also Annex A).

NOTE Details of the source of supply may be obtained from the Secretariat of ISO/TC 38/SC 2.

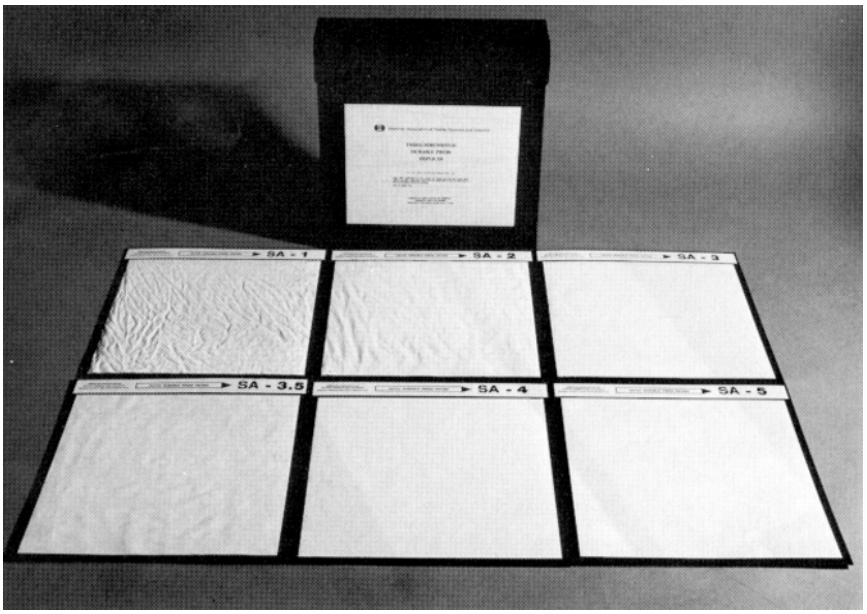


Figure 6 — AATCC standard 3D smoothness appearance replicas

6 Test specimens

For textile end product tests, select three items for testing.

7 Procedure

7.1 Washing and drying

Wash and dry the specimens in accordance with one of the procedures specified in ISO 6330, as agreed between the interested parties.

If required, repeat the selected washing and drying cycle four times to give a total of five cycles.

If dryer creases develop in specimens after any drying cycle except the last, they shall be rewet and an attempt made to remove the creases prior to additional washing and drying. No attempt to remove wrinkles or creases shall be made after the fifth cycle of drying.

7.2 Conditioning

Condition the test specimens for 4 h in one of the atmospheres specified in ISO 139, by hanging on a hanger, straightening and smoothing facings, seams, etc.

7.3 Observation

Three observers shall rate each treated test specimen independently, as follows:

a) The overhead fluorescent light (5.2.1) shall be the only light source for the viewing board (5.2.3). All other lights in the room shall be turned off except when rating crease appearance. In that case, the floodlight with reflector and light shield (5.2.4), positioned as shown in Figure 2, is also required.

b) Apparel and other end use items shall be placed on the viewing board so that, as far as possible, the observer views them in the spatial placement in which they are encountered in use.

c) The observer shall stand directly in front of the specimen 120 cm $\pm$ 3 cm away from the board. It has been found that normal variations in the height of the observer above and below the arbitrary 1,5 m eye level have no significant effect on the grade given.

7.4 Smoothness appearance

7.4.1 Mount the test specimen on the viewing board as illustrated in Figure 1, with the fabric length in the vertical direction. Place the most similar three-dimensional plastic replicas (5.5) on each side of the test specimen to facilitate comparative rating.

7.4.2 Although the 3D smoothness appearance (SA) replicas (5.5) were cast from woven fabrics, it is understood that these wrinkled surfaces do not duplicate all possibilities of fabric surfaces. The replicas shall be used as guides that represent various levels of fabric smoothness or freedom from wrinkles. The observer should mentally integrate the degree and frequency of wrinkles in the specimen in order to determine a level of smoothness that can be identified with the SA replica number which most closely represents that smoothness appearance level (see Table 1).

7.4.3 Assign the numerical grade of the replica which most closely matches the smoothness appearance of the test specimen, or assign a grade midway between those whole-number standards which have no half-number standards separating them (SA-1,5; SA-2,5; SA-4,5) if the appearance of the test specimen warrants it.

7.4.4 An SA-5 grade is equivalent to the SA-5 replica and represents the smoothest appearance, while an SA-1 replica represents very poor appearance.

Table 1 — Fabric smoothness grades by SA replica equivalents

Grade	Description
SA-5	Equivalent to the SA-5 replica. Very smooth, pressed, finished appearance.
SA-4	Equivalent to the SA-4 replica. Smooth, finished appearance.
SA-3,5	Equivalent to the SA-3,5 replica. Fairly smooth but non-pressed appearance.
SA-3	Equivalent to the SA-3 replica. Mussed, non-pressed appearance.
SA-2	Equivalent to the SA-2 replica. Rumpled, obviously wrinkled appearance.
SA-1	Equivalent to the SA-1 replica. Crumpled, creased and severely wrinkled appearance.

7.4.5 If dryer creases are present on any specimens to be evaluated, take care in rating the specimens. Some dryer creases can be disregarded (commonly called “reading out”). When the grade of a dryer-creased specimen differs from the other specimens by more than one grade, the test should be repeated with new specimens, taking all precautions to avoid the occurrence of dryer creases.

7.5 Appearance of seams

7.5.1 Mount the test specimen on the viewing board as illustrated in Figure 1 with the seam in the vertical direction. Place the appropriate single- or double-needle standard seam smoothness (SS) replicas beside the specimen in order to facilitate comparative rating.

7.5.2 Confine observations to the area influenced by the seam and disregard the appearance of the surrounding fabric.

7.5.3 Assign the numerical grade of the photographic standard (5.4) that most closely matches the appearance of the seam in the test specimen.

7.5.4 A seam smoothness grade of SS-5 is equivalent to the appearance of Standard No. 5, the best level of seam appearance; a seam smoothness grade of SS-1 is equivalent to that of Standard No. 1, which represents a very poor level of seam appearance.

7.6 Appearance of creases

7.6.1 Mount the test specimen on the viewing board as illustrated in Figure 2 with the crease in the vertical direction. Place the most similar three-dimensional plastic crease replicas (5.3) on each side of the test specimen to facilitate comparative rating. Mount replicas 1, 3 and 5 on the left and 2 and 4 on the right.

7.6.2 The floodlight with reflector and lightshield shall be positioned in the viewing area, as shown in Figure 2, and used during the rating process.

7.6.3 Confine observations to the crease itself and disregard the appearance of the fabric.

7.6.4 Assign the numerical grade of the replica that most closely matches the appearance of the crease in the test specimen.

7.6.5 A crease retention grade of CR-5 is equivalent to the appearance of Standard No. 5, the best level of crease appearance; a crease retention grade of CR-1 is equivalent to that of Standard No. 1, which represents a very poor level of crease appearance.

7.7 Appearance of textile end products

7.7.1 The individual components to be evaluated in each test item shall be determined and entered in a rating chart (see Figure 7).

7.7.2 If it is desired to designate certain components as more or less important to the overall appearance of the item, weighting factors should be added to the rating chart.

7.7.3 The weighting factors to be assigned to each component are:

3 – Very important to overall item appearance

2 – Moderately important to overall item appearance

1 – Slightly important to overall item appearance

7.7.4 Mount the item on the viewing board so that the centre of the area or component to be rated is approximately 1,5 m from the floor as illustrated in Figures 1 and 2. Place the appropriate three-dimensional plastic replicas or photographs in proper position to facilitate comparative rating (see 7.4, 7.5 or 7.6).

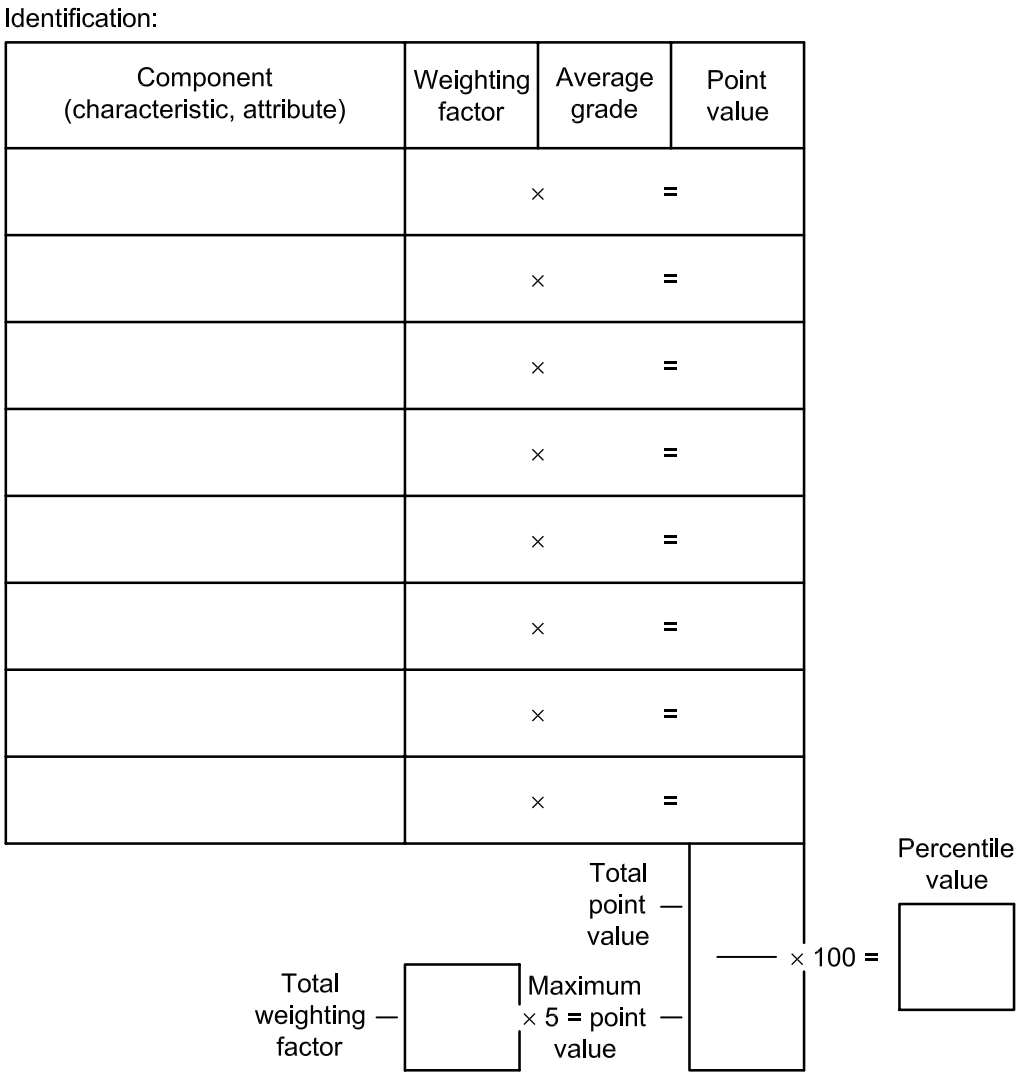


Figure 7 — Rating chart

7.7.5 If the item is exceptionally large, such as a sheet, comforter, bedspread, curtain or drapery, fold the item lengthwise to produce a panel of half the original width. Place this half-panel over a rod so that the fabric length is vertical and the folded item is in equal quarters. The rod should be sufficiently long to accommodate the half-width item. Attach the rod with the large item to the rating board at approximately 1,8 m from the floor. Position the standard replicas or photographs in such a way as to facilitate comparative rating. Evaluate the area across the full width of the quartered panel at the same eye level as the replicas. Evaluate all four quarters in the same manner and report the average grade for each component evaluated in the test item.

8 Expression of results

Average the nine observations made by the three observers on the set of three test specimens for each of the evaluation procedures specified in 7.4, 7.5 and 7.6. Using either Option 1 or Option 2, report the three averages to the nearest half-rating.

a) Option 1: Using weighting factors

   Total the weighting factors assigned to each component in the rating chart (see Figure 7) and multiply by 5. This gives the maximum point value achievable by the item. Multiply the average grade recorded for each component by its assigned weighting factor. Total these values to obtain the actual point value achieved by the item. Report as the percentile value of the item the number obtained by dividing the actual point value by the maximum point value achievable and multiplying by 100. This value is the unit of measure of this test method.

b) Option 2: Calculate and report average grades for each individual component of each test item using the average grade column of the rating chart.

9 Test report

The test report shall include the following information:

a) reference to this International Standard, i.e. ISO 15487:2009;

b) details of the sample evaluated;

c) details of the washing and drying procedures used as specified in ISO 6330;

d) the number of washing and drying cycles used;

e) the value calculated according to 8 a) or the average grades calculated according to 8 b);

f) if fraying occurs in laundering at seams or elsewhere within the product, a record of the location and amount;

g) details of any deviation from the specified procedure.

Annex A
(informative)

Information on digital descriptions of the ISO smoothness appearance, crease and seam pucker replicas

A.1 General

This annex provides references to International Standards that contain digital descriptions of 3D replicas. The data in the referenced documents are not intended to be used to assess specimens. When assessing specimens, the 3D replicas are to be used.

A.2 Processes

Processes of measurement and analysis, and specifications of the scanning systems used, are referenced below.

A.2.1 Smoothness appearance replicas (see ISO 7768).

A.2.2 Crease replicas (see ISO 7769).

A.2.3 Seam pucker replicas (see ISO 7770).

A.3 Conclusion

In each of the replicas, parameters of height and frequency distributions were determined from the images of replicas and statistical analyses were performed. ANOVA test results proved that there is a strong linear relationship between the grades of replica and the parameters.

High correlations between the objective and subjective grades of samples used were proved. This conclusively confirmed that the current ISO replicas are suitable for subjective rating evaluation.

Bibliography

[1] ISO 7768, *Textiles — Test method for assessing the smoothness appearance of fabrics after cleansing*

[2] ISO 7769, *Textiles — Test method for assessing the appearance of creases in fabrics after cleansing*

[3] ISO 7770, *Textiles — Test method for assessing the smoothness appearance of seams in fabrics after cleansing*

[4] AATCC TM 143, *Appearance of apparel and other textile end products after repeated home laundering*

ICS 59.080.01

Price based on 12 pages