BS ISO 4211-3:2013

BSI Standards Publication

Furniture — Tests for surface finishes

Part 3: Assessment of resistance to dry heat

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of ISO 4211-3:2013.

The UK participation in its preparation was entrusted to Technical Committee FW/0/1, Common Test Methods for Furniture.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 71901 1

ICS 97.140

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 May 2013.

Amendments issued since publication

Date	Text affected

BS ISO 4211-3:2013

INTERNATIONAL STANDARD

ISO 4211-3

Second edition
2013-05-15

Furniture — Tests for surface finishes —

Part 3: Assessment of resistance to dry heat

Ameublement — Essais des finitions de surface —

Partie 3: Évaluation de la résistance à la chaleur sèche

Reference number
ISO 4211-3:2013(E)

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

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. www.iso.org/patents

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

The committee responsible for this document is ISO/TC 136, *Furniture*.

This second edition cancels and replaces the first edition (ISO 4211-3:1993), which has been technically revised. Significant technical changes in this version are as follows:

— change in the illumination of the diffuse light source; it is now (1200 ± 400) lx;

— changes in the descriptive numerical rating code: new descriptions apply.

ISO 4211 consists of the following parts, under the general title *Furniture — Tests for surface finishes*:

— *Part 2: Assessment of resistance to wet heat*

— *Part 3: Assessment of resistance to dry heat*

— *Part 4: Assessment of resistance to impact*

INTERNATIONAL STANDARD ISO 4211-3:2013(E)

Furniture — Tests for surface finishes —

Part 3: Assessment of resistance to dry heat

1 Scope

This part of ISO 4211 specifies a method for the assessment of the resistance to dry heat of all rigid furniture surfaces regardless of materials.

It does not apply to leather and textile surfaces.

The test is intended to be carried out on a part of the finished furniture, but can be carried out on test panels of the same material, finished in an identical manner to the finished product and of a size sufficient to meet the requirements of the test.

The test is carried out on unused surfaces.

2 Normative references

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

ISO 209, *Aluminium and aluminium alloys — Chemical composition*

ISO 1770, *Solid-stem general purpose thermometers*

ISO 4287, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

ISO 4288, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*

3 Terms and definitions

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

3.1
test panel
panel including the test surface

Note 1 to entry: It may be cut from a finished item of furniture or it may be a separate panel produced in the same manner as the finished item of furniture.

3.2
test surface
part of the test panel

3.3
test area
part of the test surface under the heat source (5.2)

3.4
roughness
R_a
arithmetic mean of the absolute values of the profile deviations from the mean line

4 Principle

A standard aluminium alloy block at a specified test temperature is placed on the test surface. After a specified period of time, the block is removed. The test surface is wiped dry and the test panel left undisturbed for at least 16 h. It is then examined under specified lighting conditions for signs of damage (discolouration, change in gloss and colour, blistering, swelling, or other defects). Test results are assessed in terms of a descriptive numerical rating code.

5 Apparatus and materials

5.1 Thermometer, as specified in ISO 1770, capable of insertion to the bottom of the centre bore of the heat source (5.2) or other means of measuring the temperature of the heat source to an accuracy of ± 1 °C.

5.2 Heat source, a block as shown in Figure 1 manufactured from aluminium alloy according to ISO 209, Al Mg Si (alloy shall contain more than 94 % aluminium). The roughness of the bottom surface shall be (2 ± 1) µm, expressed as R_a, according to ISO 4287 and ISO 4288.

NOTE Alloy 6060 and 64430 are suitable.

For this International Standrad, the following tolerances are applicable:

Dimensions: ± 0,2 mm of the nominal dimension;

Angles: ± 2° of the nominal angle.

Dimensions in millimetres

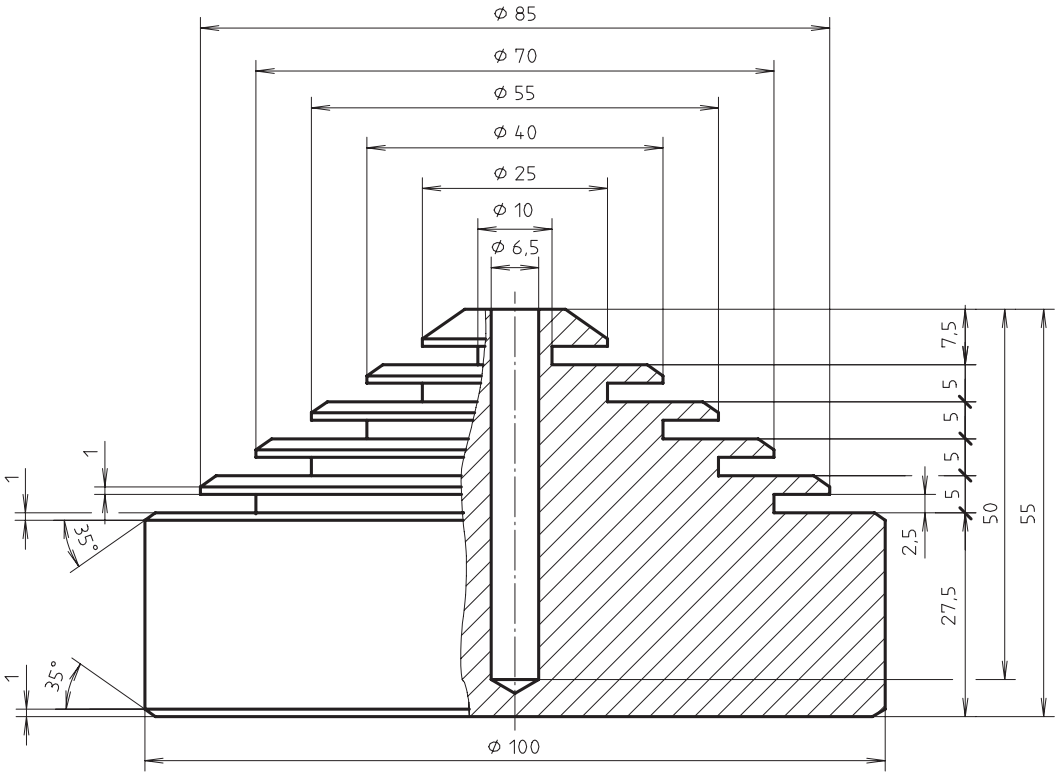

Figure 1 — Aluminium block used as heat source

5.3 Oven, which can heat the heat source to a temperature higher than the test temperature.

5.4 Cleaning cloth, white soft absorbent cloth.

5.5 Heat-insulating foam, a melamine foam, with the following characteristics: density between 8,5 kg/m^3 and 11,5 kg/m^3; heat conductivity, less than 0,035 W/mK. The foam shall withstand a temperature higher than 200 °C.

5.6 Diffuse light source, light source providing evenly diffused light, giving an illumination on the test surface of (1200 ± 400) lx. This may either be diffused daylight or be diffused artificial daylight.

NOTE The daylight should be unaffected by surrounding trees, etc. When artificial daylight is used, it is recommended that it should have a correlated colour temperature of (6500 ± 50) K and an R_a greater than 92 by using a colour-matching booth in accordance with ISO 3668:1998.

6 Preparation and conditioning

6.1 Conditioning

Conditioning of the test surface shall begin at least one week before testing and shall be carried out in air at a temperature of (23 ± 2) °C and relative humidity of (50 ± 5) %.

The conditioning time shall be stated in the test report (see Clause 10).

6.2 Test surface

The test surface shall be substantially flat and of a size sufficient to meet the requirements of Clause 7.

7 Test procedure

7.1 Testing

Immediately after conditioning, the test shall be carried out in a test atmosphere of (23 ± 2) °C.

The test surface shall be placed horizontally. It shall accommodate the required number of tests, with at least 15 mm spacing between the perimeter of adjacent test surfaces, and between the perimeters of the test surfaces and the edges of the panel. Where tests are carried out simultaneously, the perimeters of the test surfaces shall be separated by a minimum of 50 mm. If there is any reason to suppose that the properties of the test surface may vary, two identical tests shall be carried out simultaneously.

The test surface shall be lightly wiped with a cleaning cloth (5.4) before the test.

Using the oven (5.3), raise the temperature of the heat source to a temperature higher than the specified test temperature, and transfer it to the heat-insulating foam (5.5).

Place the thermometer (5.1) or other means of measuring temperature in the centre bore of the heat source (5.2). If the temperature is not higher than the specified test temperature, the heat source shall be placed again in the oven until achieving this higher temperature.

When the heat source reaches the specified test temperature with an accuracy of ± 1 °C, immediately place it on the test surface.

After 20 min in this position, remove the block.

Wipe the test surface dry with the cleaning cloth when it has cooled.

Record the position of each test surface and its temperature.

Allow the test surface to stand undisturbed from 16 h to 24 h.

Wipe each test surface with the cleaning cloth (5.4) and examine the test panel.

7.2 Test temperatures

The test temperatures shall be stated in requirement specifications, selected from the following:

55 °C 70 °C 85 °C 100 °C 120 °C 140 °C 160 °C 180 °C 200 °C

8 Examination of test panel

Carefully examine the test surface, with light coming from all directions, for damage, e.g. discoloration, change in gloss and colour, blistering, swelling, and other defects. For this purpose, illuminate the surface separately using the light source (5.6) and examine from different angles, including angle combinations such that the light is reflected from the test surface and towards the observer's eye. Viewing distance shall be 0,25 m to 1,0 m.

Changes caused by the test shall also be determined by touching the surface.

9 Assessment of results

Rate the test surfaces by comparing the test area with the area surrounding it according to Table 1.

Table 1 — Descriptive numerical rating code

Numerical rating	Description
5	**No change** test area indistinguishable from adjacent surrounding area
4	**Minor change** test area distinguishable from adjacent surrounding area, only when the light source is mirrored on the test surface and is reflected towards the observer's eye, e.g. discoloration, change in gloss and colour no change in the surface structure, e.g. deformation, swelling, fibre raising, cracking, blistering
3	**Moderate change** test area distinguishable from adjacent surrounding area, visible in several viewing directions, e.g. discoloration, change in gloss and colour no change in the surface structure, e.g. swelling, fibre raising, cracking, blistering
2	**Significant change** test area clearly distinguishable from adjacent surrounding area, visible in all viewing directions, e.g. discoloration, change in gloss and colour and/or structure of the surface slightly changed, e.g. swelling, fibre raising, cracking, blistering
1	**Strong change** the structure of the surface being distinctly changed and/or discoloration, change in gloss and colour and/or the surface material being totally or partially removed

Each test surface shall be rated by an experienced observer.

In cases of doubt, three observers shall be required. All observers shall have good colour vision. In case of three observers, the reported rating for the test surface shall be the average to the nearest nominal value.

Duplicate tests shall be assessed and reported separately.

10 Test report

The test report shall include at least the following information:

a) a reference to this part of ISO 4211 (i.e. ISO 4211-3:2013);

b) a description of the test panel (relevant data);

c) the test temperature or temperatures;

d) the conditioning time;

e) the assessment of each test surface in accordance with Clause 9;

f) if applicable, additional information regarding type of damage;

g) any deviations from this part of ISO 4211;

h) the name and address of the test facility;

i) the date of the test.

Bibliography

[1] ISO 3668, *Paints and varnishes — Visual comparison of the colour of paints*

ICS 97.140
Price based on 6 pages

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™