



BSI Standards Publication

## Paints and varnishes - Cross-cut test

---

EUROPEAN STANDARD

**EN ISO 2409**

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2020

ICS 87.040

Supersedes EN ISO 2409:2013

English Version

**Paints and varnishes - Cross-cut test (ISO 2409:2020)**Peintures et vernis - Essai de quadrillage (ISO  
2409:2020)Beschichtungsstoffe - Gitterschnittprüfung (ISO  
2409:2020)

This European Standard was approved by CEN on 16 August 2020.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## European foreword

This document (EN ISO 2409:2020) has been prepared by Technical Committee ISO/TC 35 "Paints and varnishes" in collaboration with Technical Committee CEN/TC 139 "Paints and varnishes" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2021, and conflicting national standards shall be withdrawn at the latest by March 2021.

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

This document supersedes EN ISO 2409:2013.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Endorsement notice

The text of ISO 2409:2020 has been approved by CEN as EN ISO 2409:2020 without any modification.

<b>Contents</b>	Page
<b>Foreword</b> .....	<b>iv</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Principle</b> .....	<b>2</b>
<b>5 Apparatus</b> .....	<b>2</b>
5.1 General.....	2
5.2 Cutting tool.....	2
5.2.1 General requirements.....	2
5.2.2 Single-blade cutting tools.....	2
5.2.3 Multi-blade cutting tools.....	2
5.3 Guiding and spacing edges.....	5
5.4 Viewing lens.....	5
<b>6 Sampling</b> .....	<b>6</b>
<b>7 Test specimen</b> .....	<b>7</b>
7.1 Substrate.....	7
7.2 Thickness of coating.....	7
<b>8 Procedure</b> .....	<b>7</b>
8.1 General.....	7
8.1.1 Test conditions.....	7
8.1.2 Conditioning of the test panels.....	7
8.1.3 Number of cuts.....	7
8.1.4 Spacing of cuts.....	7
8.1.5 Number of determinations.....	8
8.2 Cutting the coating using the manual procedure.....	8
8.3 Cutting the coating using a motor-driven tool.....	8
<b>9 Evaluation and expression of results</b> .....	<b>8</b>
<b>10 Designation of the test result</b> .....	<b>9</b>
<b>11 Precision</b> .....	<b>10</b>
11.1 Repeatability limit, <i>r</i> .....	10
11.2 Reproducibility limit, <i>R</i> .....	10
<b>12 Test report</b> .....	<b>10</b>
<b>Annex A (informative) Examples of suitable procedures for removing loose paint</b> .....	<b>12</b>
<b>Bibliography</b> .....	<b>14</b>

## 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 (see [www.iso.org/directives](http://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 (see [www.iso.org/patents](http://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.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 139, *Paints and varnishes*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fifth edition cancels and replaces the fourth edition (ISO 2409:2013), which has been technically revised. The main changes compared to the previous edition are as follows:

- [Clause 3](#) has been added;
- [Clause 4](#) has been added;
- the general requirements for the use of single-cutting tools and multi-cutting tools in [5.2.1](#) have been updated;
- references to commercially available cutters have been deleted from [5.2.2.3](#);
- coating of the test panels has been deleted from [Clause 7](#), because final test specimen are assumed;
- the text has been editorially revised and the normative references have been updated.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Paints and varnishes — Cross-cut test

## 1 Scope

This document specifies a test method for assessing the resistance of paint coatings and varnishes (including wood stains) to separation from substrates when a right-angle lattice pattern is cut into the coating, penetrating through to the substrate. The property determined by this empirical test procedure depends, among other factors, on the adhesion of the coating to either the preceding coat or the substrate. This procedure is not, however, a means of measuring adhesion.

NOTE 1 Where a measurement of adhesion is required, see the method described in ISO 4624.

NOTE 2 Although the test is primarily intended for use in the laboratory, the test is also suitable for field testing.

The method described can be used either as a pass/fail test or, where circumstances are appropriate, as a six-step classification test. When applied to a multi-coat system, assessment of the resistance to separation of individual layers of the coating from each other can be made.

The test can be carried out on finished objects and/or on specially prepared test specimens.

Although the method is applicable to paint on hard (e.g. metal) and soft (e.g. wood and plaster) substrates, these different substrates need a different test procedure (see [Clause 8](#)).

The method is not suitable for coatings of total thickness greater than 250 µm or for textured coatings.

NOTE 3 The method, when applied to coatings designed to give a rough patterned surface, will give results which will show too much variation (see also ISO 16276-2).

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1513, *Paints and varnishes — Examination and preparation of test samples*

ISO 2808, *Paints and varnishes — Determination of film thickness*

ISO 4618, *Paints and varnishes — Terms and definitions*

ISO 13076, *Paints and varnishes — Lighting and procedure for visual assessments of coatings*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4618 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

## 4 Principle

Six parallel cuts are introduced in the coating and another six cuts are introduced perpendicular to the first cuts. Any loose paint particles are removed. The cut area is examined visually and compared to a six-step classification.

## 5 Apparatus

### 5.1 General

Use ordinary laboratory apparatus, together with the apparatus specified in [5.2](#) to [5.4](#).

### 5.2 Cutting tool

#### 5.2.1 General requirements

It is particularly important to ensure that the cutting tool is capable of creating the specified V-shape throughout the total coating thickness, and that the cutting edges are in good condition. Suitable tools are described in [5.2.2](#) and [5.2.3](#) and shown in [Figures 1](#) and [2](#).

A single-blade cutting tool ([5.2.2](#)) as well as the multi-blade cutting tool ([5.2.3](#)) are suitable for all coatings and substrates; it shall be ensured that all cuts mark or scratch the substrate. The depth of indentation into the substrate shall be as low as possible, however.

The tools described in [5.2.2](#) and [5.2.3](#) are suitable for manual use, which is the more usual method of use, but the tools may also be mounted on a motor-driven apparatus, which gives more uniform cutting. The application of the latter procedure shall be subject to agreement between the interested parties.

The apparatus (manual or motor-driven) and the type of cutting tool used have an influence on the test result. Results obtained with different types of cutting tool cannot be directly compared. For each test series, the same cutting tool shall be used.

#### 5.2.2 Single-blade cutting tools

**5.2.2.1 Hand-held single-blade cutting tool** with a cutting edge as shown in [Figure 1 a](#)).

**5.2.2.2 Single-blade cutting tool** used in motor-driven apparatus as shown in [Figure 3](#).

**5.2.2.3 Cutter with a rigid blade** with a V-shaped cutting edge as shown in [Figure 1 b](#)).

The specific thickness of the blade is not specified, as long as the blade is rigid and the cut produced is V-shaped through the whole thickness of the coating.

NOTE The cutter blade is designed to be broken in a defined manner so that a sharp blade is available at any time.

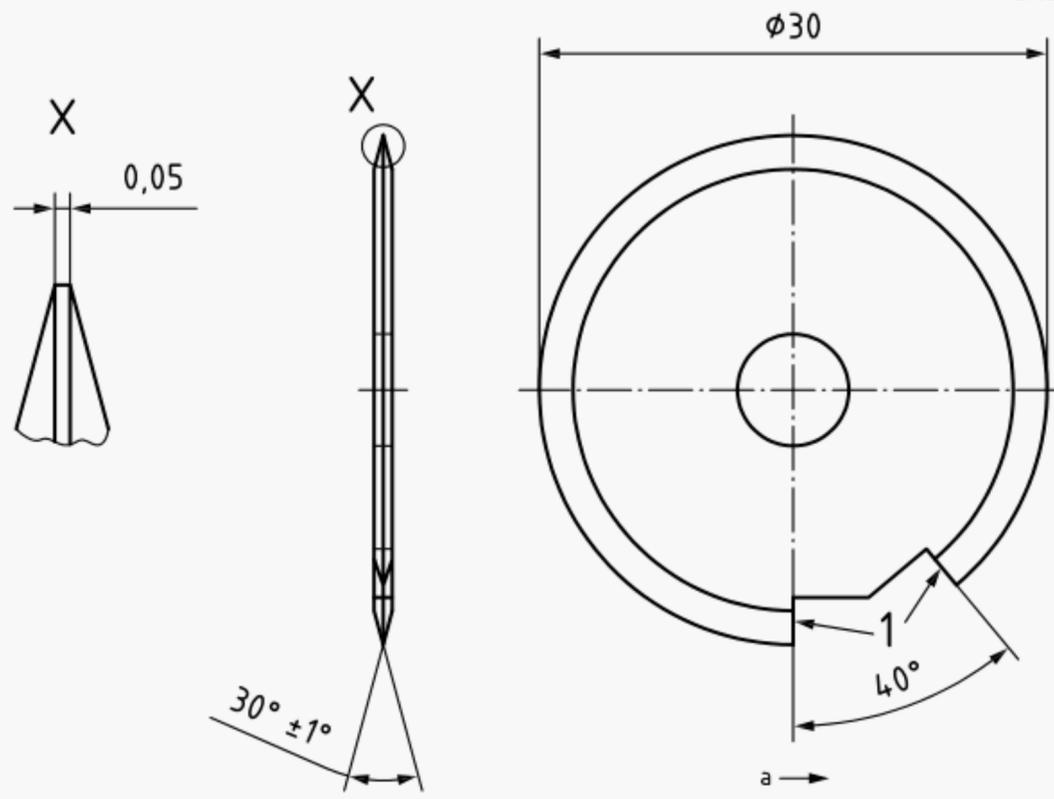
#### 5.2.3 Multi-blade cutting tools

**5.2.3.1 Hand-held multi-blade cutting tool** with cutting edges as shown in [Figure 2](#).

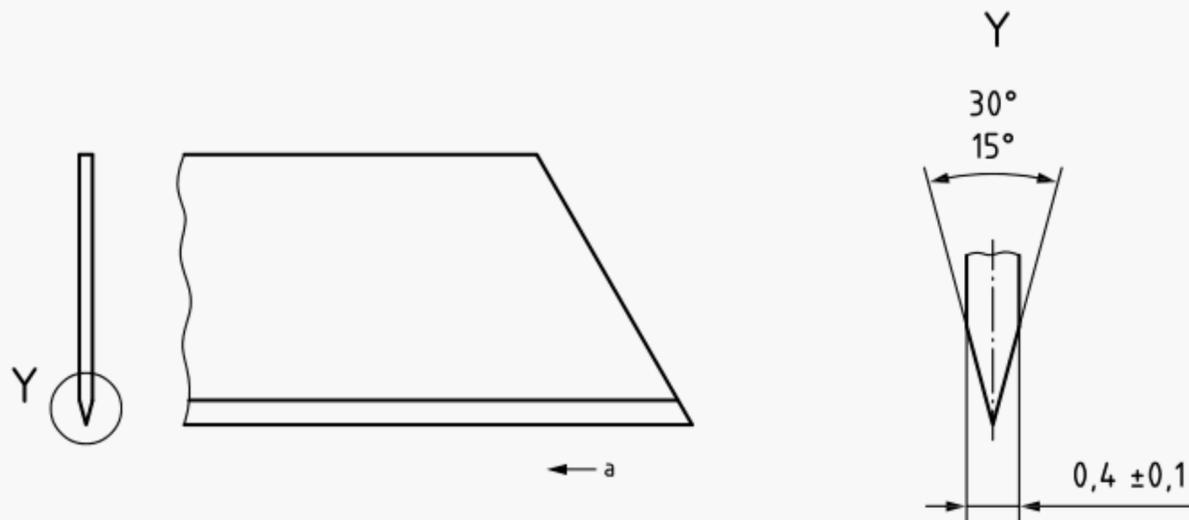
**5.2.3.2 Multi-blade cutting tool** used in motor-driven apparatus as shown in [Figure 3](#).

The multi-blade cutting tool shall have six cutting edges spaced 1 mm, 2 mm or 3 mm apart. In addition, two guide edges (see [Figure 2](#)) are necessary to make handling easier. The guide edges and the cutting edges shall lie in one plane (see [Figure 2](#)).

Dimensions in millimetres



**a) Hand-held single-blade cutting tool**



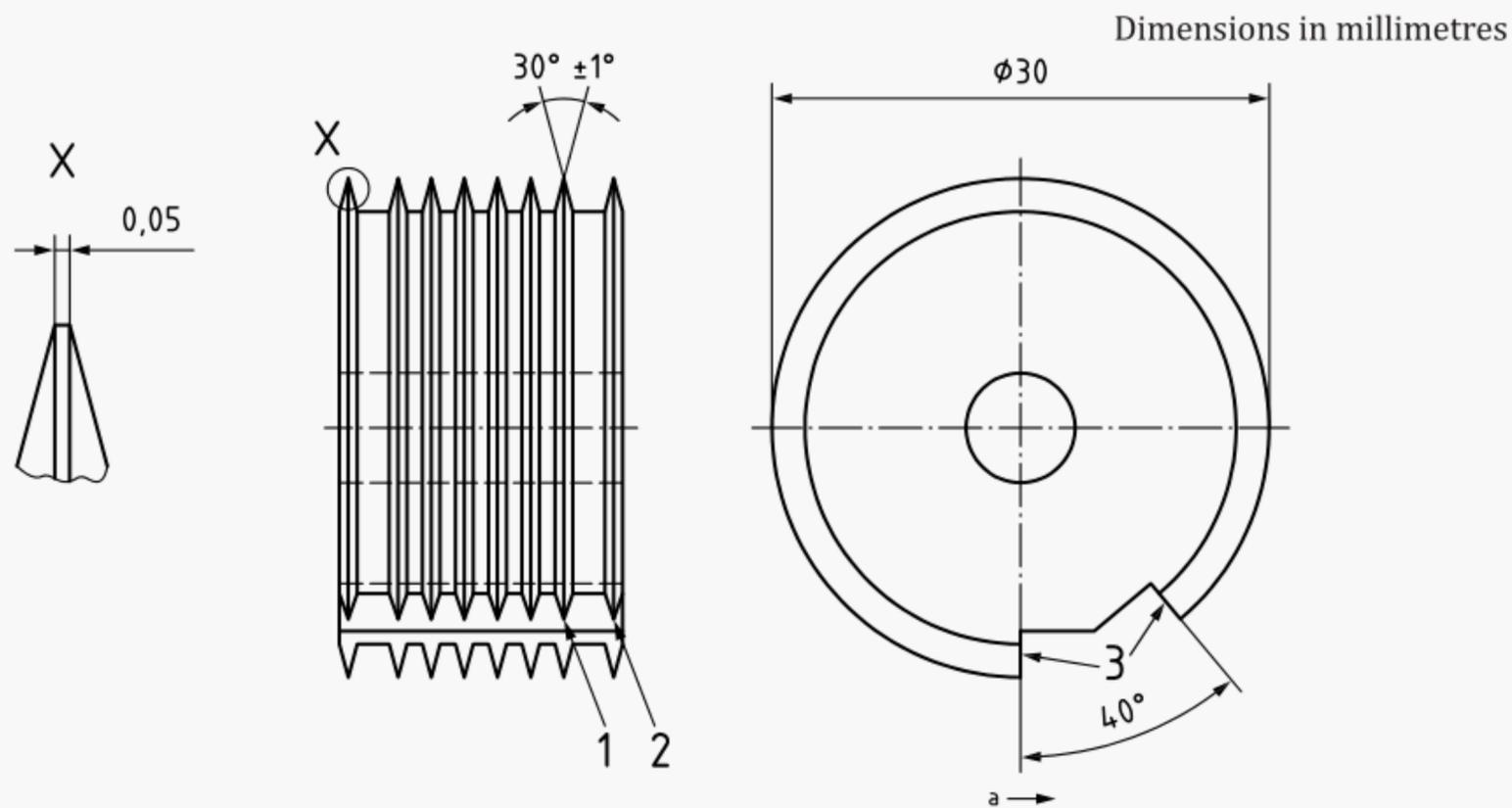
**b) Cutter with rigid blade with V-shaped cutting edge (see [5.2.2.3](#))**

**Key**

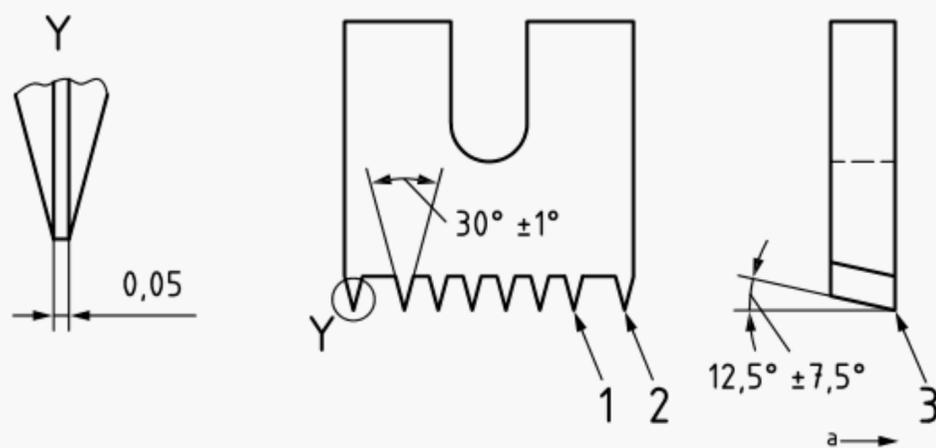
- 1 cutting edges
- a Direction of cut.

NOTE All dimensions approximate except where tolerances are specifically indicated.

**Figure 1 — Examples of single-blade cutting tools**



a) Hand-held multi-blade cutting tool



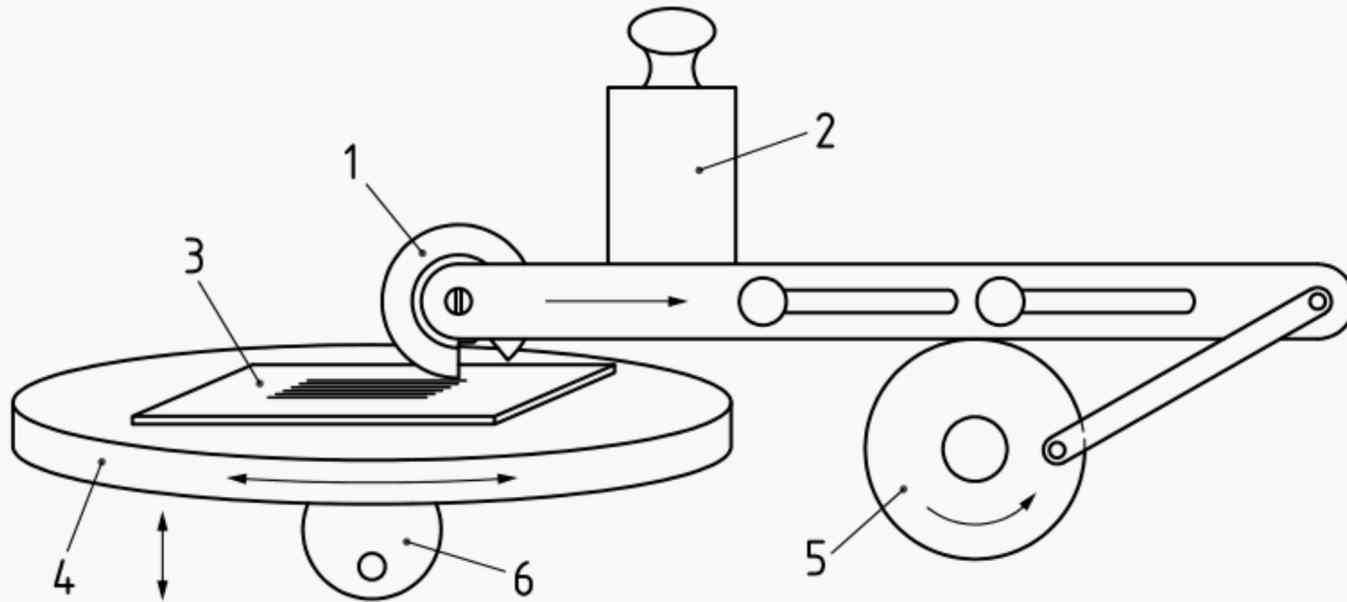
b) Multi-blade cutting tool used in motor-driven apparatus

**Key**

- 1 cutting blade
- 2 guide edge
- 3 cutting edges
- a Direction of cut.

NOTE All dimensions are approximate.

**Figure 2 — Examples of multi-blade cutting tools**



**Key**

- 1 cutting tool
- 2 weight
- 3 test panel
- 4 rotating test panel holder
- 5 motor
- 6 handle for rotating the test panel holder

**Figure 3 — Motor-driven apparatus**

### 5.3 Guiding and spacing edges

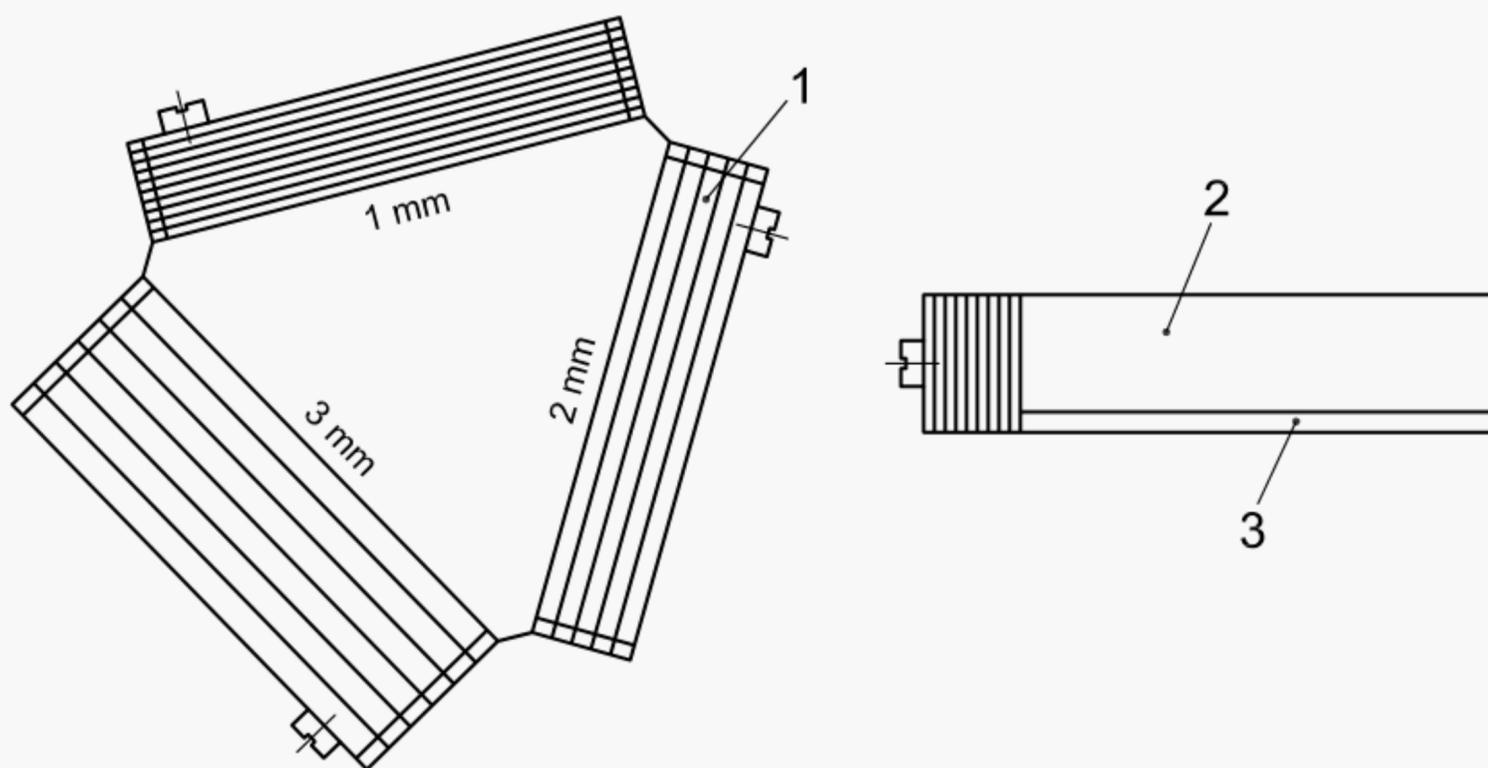
In order to space the cuts correctly, a series of guiding and spacing edges is necessary when using a single-blade cutting tool.

A folding ruler suitable for use with hand-held single-blade cutting tools (5.2.2.1) is shown in Figure 4 a).

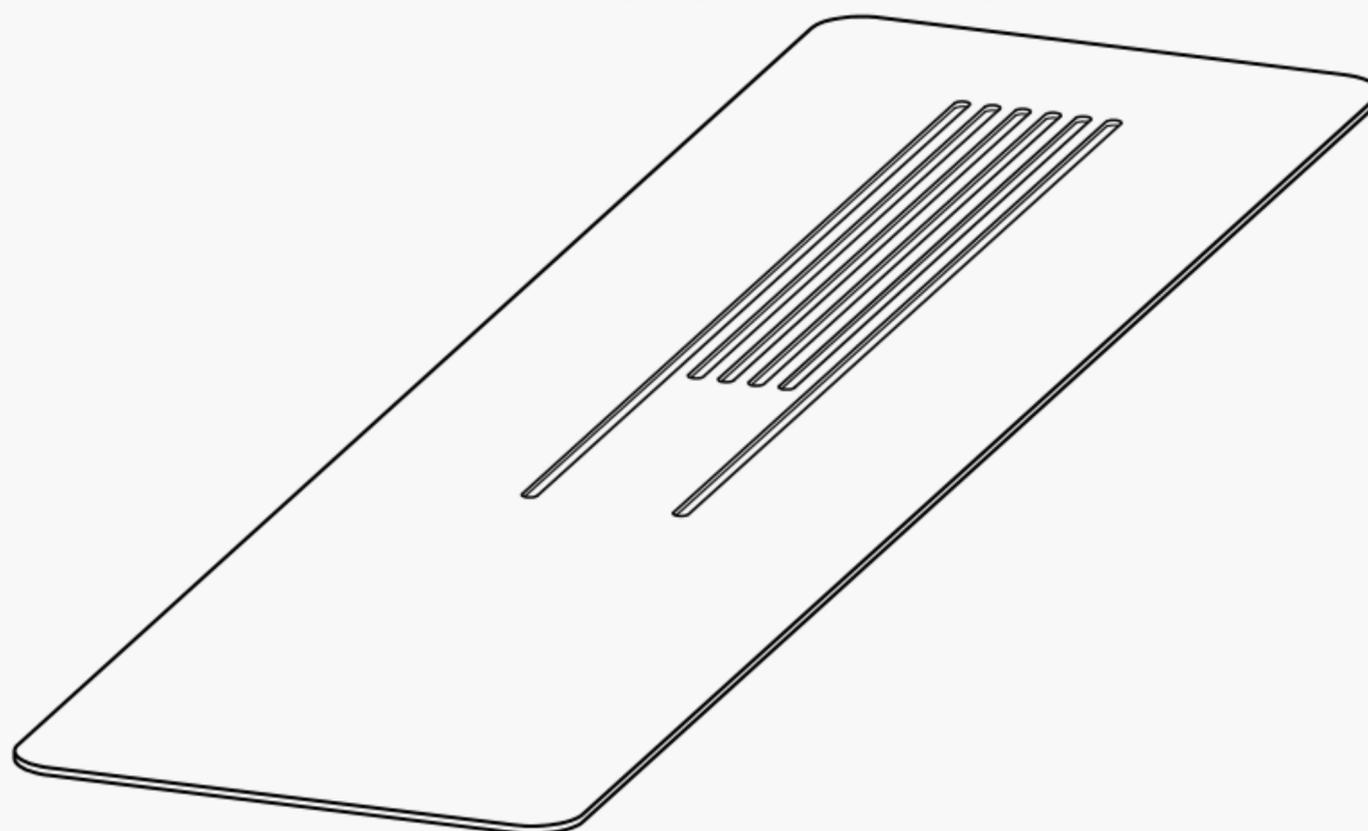
A series of guiding edges suitable for use with cutters with a rigid blade with a V-shaped cutting edge (see 5.2.2.3) is shown in Figure 4 b).

### 5.4 Viewing lens

Use a hand-held lens with a magnification of  $\times 2$  or  $\times 3$ .



a) Series of spacing edges of the folding ruler



b) Series of guiding edges

**Key**

- 1 spacing edges for 1 mm, 2 mm and 3 mm cuts
- 2 laminated plastic or steel
- 3 rubber

**Figure 4 — Examples of guiding and spacing edges**

## 6 Sampling

Take a representative sample of the product to be tested, as described in ISO 15528.

Examine and prepare each sample for testing, as described in ISO 1513.

## 7 Test specimen

### 7.1 Substrate

The test specimen shall be plain and free from deformations, preferably test panels. The dimensions shall be such as to allow the test to be carried out at three different positions not less than 5 mm from each other and from the edge of the panel.

Where panels consist of a relatively soft material such as wood, the minimum thickness shall be 10 mm. Where panels consist of a hard material, the minimum thickness shall be 0,25 mm.

NOTE In cases where the panel is made of wood, the direction and the structure of the grain can influence the test, and a pronounced grain will render the evaluation impossible.

### 7.2 Thickness of coating

Determine the thickness, in micrometres, of the dried coating by one of the procedures specified in ISO 2808. Make the measurement at, or as near as possible to, the positions at which the cross-cut is to be made. The number of thickness determinations is dependent on the method used.

## 8 Procedure

### 8.1 General

#### 8.1.1 Test conditions

Carry out the test at a temperature of  $(23 \pm 2)$  °C and a relative humidity of  $(50 \pm 5)$  %.

In field tests, the ambient conditions shall be measured and recorded [see [Clause 12](#), d)].

#### 8.1.2 Conditioning of the test panels

Condition the test panels immediately prior to the test at a temperature of  $(23 \pm 2)$  °C and a relative humidity of  $(50 \pm 5)$  % for a minimum of 16 h.

NOTE This paragraph is not applicable for in field tests.

#### 8.1.3 Number of cuts

The number of cuts in each direction of the lattice pattern shall be six.

#### 8.1.4 Spacing of cuts

The spacing of the cuts in each direction shall be equal and shall depend on the thickness of the coating and on the type of substrate as follows:

up to 60 µm:	1 mm spacing, for hard (e.g. metal and plastics) substrates;
up to 60 µm:	2 mm spacing, for soft (e.g. wood and plaster) substrates;
61 µm to 120 µm:	2 mm spacing, for both hard and soft substrates;
121 µm to 250 µm:	3 mm spacing, for both hard and soft substrates.

The cross-cut test is not suitable for coatings of total thicknesses greater than 250 µm.

NOTE For coatings of total thickness greater than 250 µm, the X-cut method described in ISO 16276-2 can be used.

### 8.1.5 Number of determinations

For routine testing, carry out a single determination.

If a higher precision is required, carry out the test in at least three different places (see [7.1](#)) on the panel. If the results do not match, the differences being more than one classification unit, repeat the test at three other places, if necessary using different panels, and record all the results.

## 8.2 Cutting the coating using the manual procedure

**8.2.1** Place the test panel on a rigid, flat surface to prevent any deformation of the panel during the test.

**8.2.2** Before the test, inspect the cutting edge of the blade and maintain its condition by sharpening or replacement.

Perform the cutting manually, following the specified procedure.

If the panel is of wood or similar material, make the cuts at approximately 45° to the direction of the grain.

**8.2.3** Hold the cutting tool ([5.2](#)) with the blade normal (perpendicular) to the test panel surface. With uniform pressure on the cutting tool and using the appropriate spacing guide ([5.3](#)), make six cuts in the coating at a uniform cutting rate. The minimum cut length shall be significantly longer than the width of the multi-cut tool. All cuts shall mark or scratch the substrate. The depth of indentation into the substrate shall be as low as possible, however. For some substrates, e.g. plastics, there is the risk of tearing and flaking of the coating if the cutting tool penetrates the substrate too deep.

If it is not possible, due to the hardness of the coating, to penetrate to the substrate, the test shall be declared invalid and so reported.

**8.2.4** Repeat this operation, making a further six parallel cuts, crossing the original cuts at 90° to them so that a lattice pattern is formed.

**8.2.5** Remove any loose paint from the area of cutting. Examples of suitable methods are given in [Annex A](#). The method for removing the loose paint shall be agreed between the interested parties and shall be stated in the test report.

## 8.3 Cutting the coating using a motor-driven tool

If the cutting tool is used with a motor-driven apparatus, take care that the points described in the manual procedure are observed, particularly with respect to the number and spacing of the cuts and the number of tests. Each cut shall continue on beyond the outermost of the cuts perpendicular to it for approximately 1 mm to 2 mm to give definite intersection points.

Remove any loose paint from the area of cutting. Examples of suitable methods are given in [Annex A](#). The method for removing the loose paint shall be agreed between the interested parties and shall be stated in the test report.

## 9 Evaluation and expression of results

Carefully examine visually the cut area of the test coating in good lighting as specified in ISO 13076, using normal or corrected vision or, if agreed between the interested parties, using a viewing lens ([5.4](#)). During the viewing process, where appropriate rotate the panel so that the viewing and lighting of the test area are not confined to one direction. Classify the test area in accordance with [Table 1](#), by comparison with the illustrations.

NOTE Additional guidance is given by the descriptions in [Table 1](#).

For a multi-coat system, report the interface at which any flaking occurs.

If test results differ, report each test result. In the case of a multi-coat system, report the site of separation (between coats or between coating and substrate).

If delaminated flakes occur, interested parties shall agree on a pass/fail criteria.

## 10 Designation of the test result

A designation code which may be used to indicate the test result is given below. It shall comprise a reference to this document, a reference to the cutting tool used and the classification achieved. For example:

ISO 2409:2020 — 1a — 2

Number of this document — Cutting tool and method used — Classification

Key for cutting tool and method used:

### 1 Single-blade cutting tool:

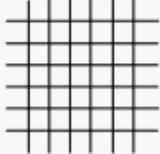
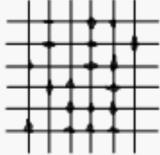
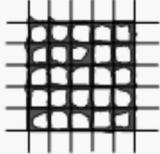
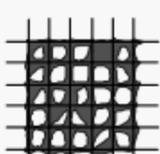
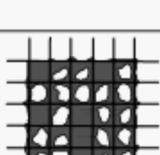
- 1a Hand-held single-blade cutting tool
- 1b Single-blade cutting tool used in motor-driven apparatus
- 1c Cutter with rigid blade with V-shaped cutting edge (see [5.2.2.3](#))

### 2 Multi-blade cutting tool:

- 2a Hand-held multi-blade cutting tool
- 2b Multi-blade cutting tool used in motor-driven apparatus

See [Table 1](#) for the classification of test results.

**Table 1 — Classification of test results**

Classification	Description	Appearance of surface of cross-cut area from which flaking has occurred <sup>a</sup> (Example for six parallel cuts)
0	The edges of the cuts are completely smooth; none of the squares of the lattice is detached.	
1	Detachment of small flakes of the coating at the intersections of the cuts. A cross-cut area not greater than 5 % is affected.	
2	The coating has flaked along the edges and/or at the intersections of the cuts. A cross-cut area greater than 5 %, but not greater than 15 %, is affected.	
3	The coating has flaked along the edges of the cuts partly or wholly in large ribbons, and/or it has flaked partly or wholly on different parts of the squares. A cross-cut area greater than 15 %, but not greater than 35 %, is affected.	
4	The coating has flaked along the edges of the cuts in large ribbons and/or some squares have detached partly or wholly. A cross-cut area greater than 35 %, but not greater than 65 %, is affected.	
5	Any degree of flaking that cannot even be classified by classification 4.	—

<sup>a</sup> The figures are examples for a cross-cut within each step of the classification. The percentages stated are based on the visual impression given by the pictures and the same percentages will not necessarily be reproduced with digital imaging.

## 11 Precision

### 11.1 Repeatability limit, $r$

The repeatability limit  $r$  is the value below which the absolute difference between two single test results, each the mean of duplicates, can be expected to lie with a 95 % probability when this method is used under repeatability conditions, i.e. when the test results are obtained on identical material by one operator in one laboratory within a short interval of time. For this test method,  $r$  is 1 classification unit.

### 11.2 Reproducibility limit, $R$

The reproducibility limit  $R$  is the value below which the absolute difference between two single test results, each the mean of duplicates, can be expected to lie with a 95 % probability when this method is used under reproducibility conditions, i.e. when the test results are obtained on identical material by operators in different laboratories. For this test method,  $R$  is 2 classification units.

## 12 Test report

The test report shall contain at least the following information:

- all details necessary to identify the product tested;
- a reference to this document, i.e. ISO 2409:2020;

- c) details of the preparation of the test panels, including:
  - 1) the material, the thickness and the surface preparation of the substrate (see [7.1](#)),
  - 2) the method of application of the coating material to the substrate, including the duration and conditions of drying between coats in the case of a multi-coat system,
  - 3) the duration and conditions of drying (or stoving) and ageing (if applicable) of the coating before testing,
  - 4) the thickness, in micrometres, of the dry coating and the method of measurement used in ISO 2808, and whether it is a single coating or a multi-coat system (see [7.2](#));
- d) the temperature and relative humidity during the test, if different from those specified in [8.1.1](#);
- e) the type of cutting tool used and the method of operation (manual or motor-driven);
- f) details of the method used to remove loose paint (see [Annex A](#));
- g) the results of the test, as indicated in [Clause 9](#) (pass/fail or classification test);
- h) any deviations from the procedure specified;
- i) any unusual features (anomalies) observed during the test;
- j) the date of the test.

## Annex A (informative)

### Examples of suitable procedures for removing loose paint

#### A.1 General

These methods are only examples for suitable procedures to remove loose particles of paint in lattice pattern. They are not used to delaminate the adhering coating.

#### A.2 Brushing

Brush the panel lightly with a soft brush several times backwards and several times forwards along each of the diagonals of the lattice pattern.

#### A.3 Using pressure-sensitive adhesive tape

Place the centre of the tape over the lattice in a direction parallel to one set of cuts as shown in [Figure A.1](#) and smooth the tape into place over the area of the lattice. The procedure shall be carried out in such a way that the adhesive tape fully covers the lattice.

To ensure good contact with the coating, rub the tape firmly with a fingertip or fingernail.

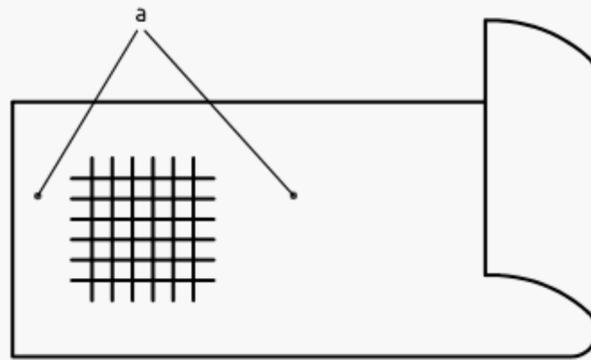
Within 5 min after applying the tape, remove the tape by grasping the free end and pulling it off steadily in 0,5 s to 1,0 s at an angle which is as close as possible to 60° (see [Figure A.1](#)).

The operation of applying and removing the tape can be carried out more than once, depending on the kind of coating and cutting direction. A new piece of tape shall be used for each lattice area.

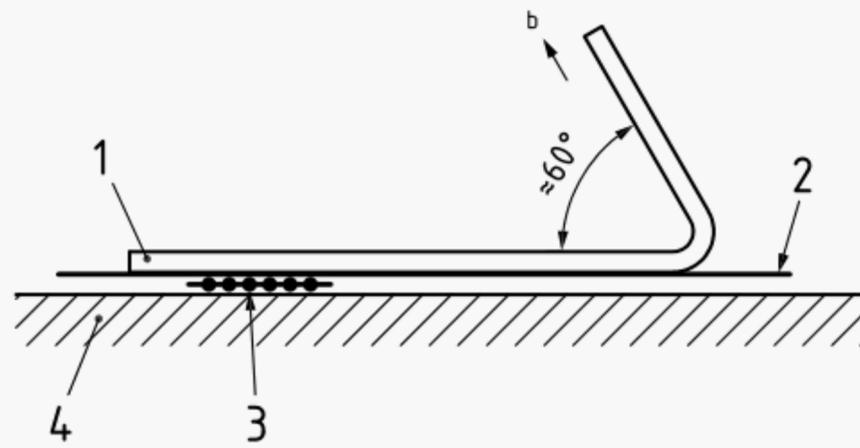
When testing coatings on non-porous substrates, the back side of the adhesive tape after pull-off can be evaluated visually for any potential residues of the substrate. This practice can be used as a screening test for the correct cross-cut tool (see also [5.2.1](#) and [8.2.3](#)).

#### A.4 Using compressed air or nitrogen

Remove any loose paint with compressed air or nitrogen.



a) Position of adhesive tape with respect to grid



b) Position immediately prior to removal from grid

**Key**

- 1 tape
- 2 coating
- 3 cuts
- 4 substrate
- a Smoothed down.
- b Direction of removal.

**Figure A.1 — Positioning of adhesive tape**

## Bibliography

- [1] ISO 4624, *Paints and varnishes — Pull-off test for adhesion*
- [2] ISO 16276-2, *Corrosion protection of steel structures by protective paint systems — Assessment of, and acceptance criteria for, the adhesion/cohesion (fracture strength) of a coating — Part 2: Cross-cut testing and X-cut testing*



# 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](http://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](http://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.

## Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

## Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than one device provided that it is accessible by the sole named user only and that only one copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.

Standards purchased in hard copy format:

- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than one copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

## Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright and Licensing 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](http://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](http://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 [cservices@bsigroup.com](mailto:cservices@bsigroup.com).

## 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.

## Useful Contacts

### Customer Services

**Tel:** +44 345 086 9001

**Email:** [cservices@bsigroup.com](mailto:cservices@bsigroup.com)

### Subscriptions

**Tel:** +44 345 086 9001

**Email:** [subscriptions@bsigroup.com](mailto:subscriptions@bsigroup.com)

### Knowledge Centre

**Tel:** +44 20 8996 7004

**Email:** [knowledgecentre@bsigroup.com](mailto:knowledgecentre@bsigroup.com)

### Copyright & Licensing

**Tel:** +44 20 8996 7070

**Email:** [copyright@bsigroup.com](mailto:copyright@bsigroup.com)

## BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK