
Wallcoverings in roll form - Determination of migration of heavy metals and certain other elements, of vinyl chloride monomer and of formaldehyde release

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Wandbekleidungen in Rollen - Bestimmung der Migration von Schwermetallen und bestimmten anderen extrahierenden Elementen, des Gehaltes an Vinylchlorid-Monomer sowie an Formaldehydabgabe

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Revetements muraux en rouleaux - Détermination de la migration de métaux lourds et certains autres éléments extractibles, de la teneur en chlorure de vinyle monomere et du dégagement de formaldéhyde

Ta slovenski standard je istoveten z: EN 12149:1997

ICS:

91.180 P[dæ bæ æ | b } æ ^ | æ Interior finishing

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EUROPEAN STANDARD

EN 12149

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 1997

ICS 91.180

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English version

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This European Standard was approved by CEN on 3 August 1997.

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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 Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

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This European Standard has been prepared by Technical Committee CEN/TC 99 "Wallcoverings", the secretariat of which is held by BSI.

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The following other European standards exist relating to wallcoverings:

EN 233 : 1989 (+A1:1996)	Wallcoverings in roll form; Specification for finished wallpapers, wall vinyls and plastics wallcoverings
EN 234 : 1989 (+A1:1996)	Wallcoverings in roll form; Specification for wallcoverings for subsequent decoration
EN 235 : 1989	Wallcoverings in roll form; Vocabulary and symbols
EN 259 : 1992 (+A1:1996)	Wallcoverings in roll form; Specification for heavy duty wallcoverings
EN 266 : 1992	Textile wallcoverings

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 April 1998, and conflicting national standards shall be withdrawn at the latest by April 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.



Introduction

This European standard has been prepared to cover factors which are considered to be environmental requirements of wallcoverings. The methods of test are based on those described in standards and published work as given in annex A:

1 Scope

This European standard specifies three methods of test concerning respectively:

- test A : the migration of heavy metals and certain other elements (antimony, arsenic, barium, cadmium, chromium, mercury, lead and selenium);
- test B : the determination of vinyl chloride monomer;
- test C : the determination of formaldehyde release.

This European standard applies to all wallcoverings in roll form.

2 Normative references

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest editions of the publication referred to applies.

EN 235	Wallcoverings in roll form - Vocabulary and symbols
EN ISO 3696	Water for analytical laboratory use - Specification and test methods (ISO 3696:1987)
ISO 187	Paper, board and pulps - Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples

3 Definitions

For the purposes of this European standard, the definitions given in EN 235 apply.

4 Test A - Migration of heavy metals and certain other elements (antimony, arsenic, barium, cadmium, chromium, mercury, lead and selenium)

4.1 Principle

The soluble elements are extracted under conditions simulating the ingestion of the materials. The content present in the extract is then determined.

4.2 Reagents

4.2.1 During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and water of equivalent purity to grade 3 according to EN ISO 3696.

4.2.2 Hydrochloric acid solution ($0,07 \pm 0,005$) mol/l.

4.2.3 Hydrochloric acid solution ($2 \pm 0,1$) mol/l.

4.3 Test apparatus

4.3.1 Usual laboratory apparatus and glassware.

4.3.2 pH meter having an accuracy of $\pm 0,2$ pH units.

4.3.3 Shaker, capable of producing a linear reciprocating movement of an amplitude of ($2 \pm 0,5$) cm with a frequency of 1 Hz

4.3.4 Oven, capable of maintaining a constant temperature of (37 ± 2) °C.

4.3.5 Filter with a pore size of $0,45 \mu\text{m}$.

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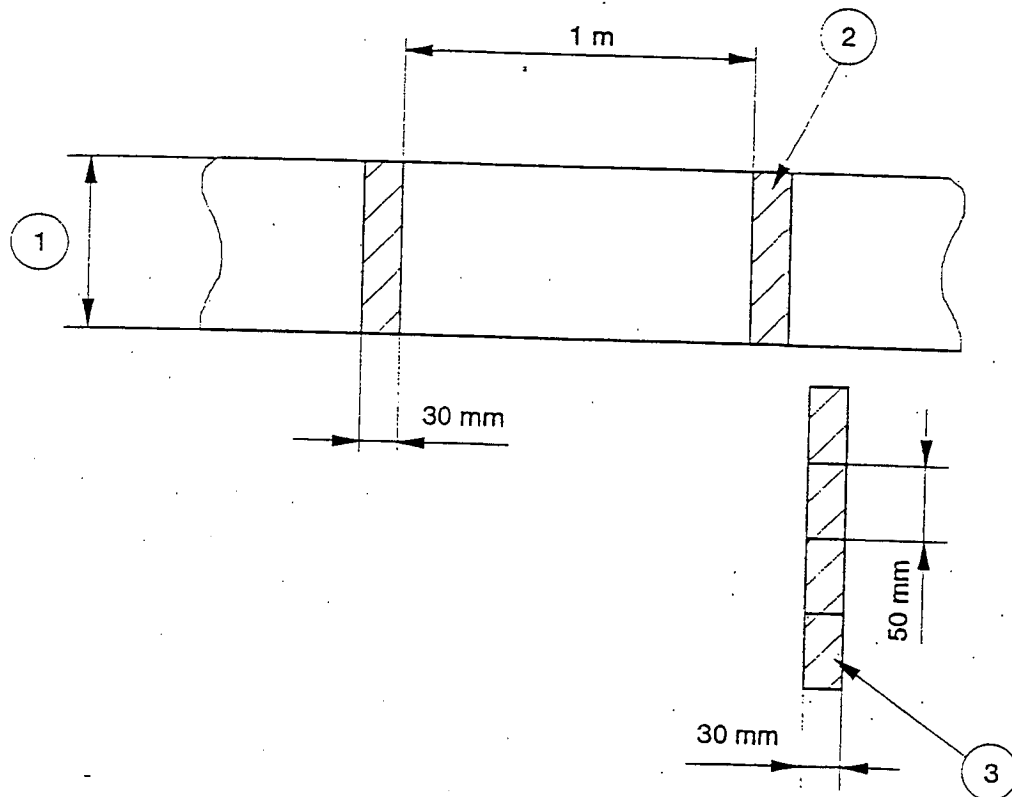
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4.4 Test specimens

4.4.1 Preparation of test specimens

4.4.1.1 Roll (except borders)

Take a roll of wallcovering and make two cuts across the width of the wallcovering to produce a strip (30 ± 1) mm wide with a length the same as the width of the wallcovering. Repeat this at approximately 1 m intervals throughout the length of the roll. Cut the strips into rectangles (50 ± 1) mm long \times (30 ± 1) mm wide (see figure 1).



1. Roll width
2. Strip
3. Rectangles

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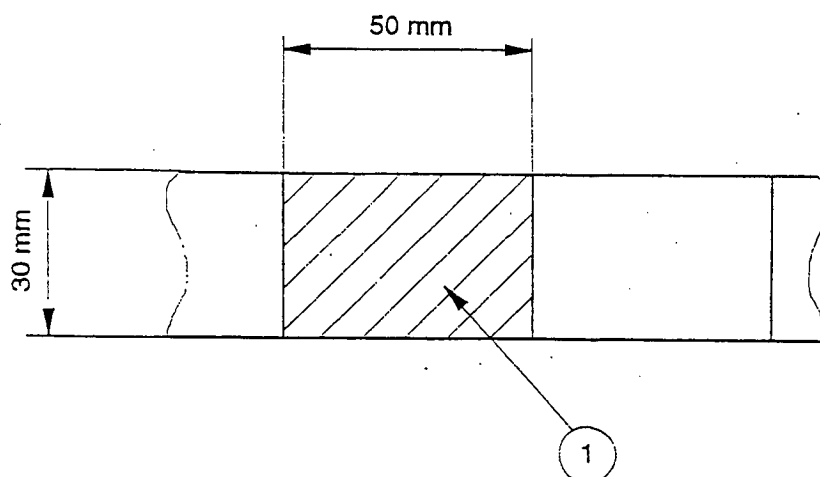
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Figure 1

4.4.1.2 Borders

Cut a strip of (30 ± 1) mm width through the whole length of the border. Cut this strip into rectangles of (50 ± 1) mm length. Use the appropriate number of rolls to produce at least 50 rectangles (see figure 2).



1. Rectangles

Figure 2

4.4.2 Selection of test specimens

Select by visual inspection the 10 rectangles which have the maximum amount of coating and/or the deepest yellow or red colour. Condition in accordance with ISO 187.

Cut these 10 rectangles into squares of approximately 6 mm × 6 mm and mix the squares obtained.

4.5 Procedure

4.5.1 Extraction method

Weigh to the nearest milligram ($1 \pm 0,05$) g of the small squares (4.4.2) in a glass container of approximately 100 ml capacity. Add ($50 \pm 0,1$) ml of the hydrochloric acid (4.2.2) at (37 ± 2) °C. Shake vigorously for 1 min, determine the pH of the solution (4.3.2).

If the pH is higher than 1,5 add dropwise, while shaking, the hydrochloric acid (4.2.3) until the pH is below 1,5 and above 1,0.

Mount the container on a shaker (4.3.3) and place in the oven (4.3.4) at (37 ± 2)°C, shake the mixture at (37 ± 2) °C for (60 ± 2) min, then allow to stand at (37 ± 2) °C for (60 ± 2) min. Filter immediately through the 0,45 µm pore size filter (4.3.5) and collect the filtrate for the determination of the heavy metal (or other elements) content.

4.5.2 Determination of extracted heavy metals (and other elements)

Use a method having a detection limit not exceeding 1/10 of the specified limit values.

NOTE 1: The detection limit is estimated at three times the standard deviation of the blank test value of the method being used.

NOTE 2: In principle, the methods given below (non-exhaustive list) satisfy the above condition:

- atomic absorption spectrometry;
- ICP emission spectrometry.

4.6 Expression of results

Calculate the heavy metal extracted for each metal (or element) in milligrams per kilogram of wallcovering from the following equation:

$$R = \frac{c}{m} \times 50 \quad (1)$$

where:

R is the determined heavy metal (or element) content, in milligrams per kilogram of wallcovering;

c is the concentration of the heavy metal (or element) in the extract, as determined by the method of 4.5.2, in milligrams per litre;

m is the test portion, in grams.

5 Test B - Determination of vinyl chloride monomer

5.1 Principle

Dissolution or suspension of a test portion in a suitable solvent and determination of the vinyl chloride content by gas chromatography using the "head-space" method.

5.2 Reagents

5.2.1 During the analysis, unless otherwise stated, use only reagents of recognized analytical grade suitable for gas chromatography and water of equivalent purity to grade 3 of EN ISO 3696.

5.2.2 Vinyl chloride (pure): lecture bottle fitted with fine adjustment valve.

5.2.3 N,N-dimethyl acetamide.

5.2.4 Hydrogen.

5.2.5 Nitrogen.

5.2.6 Air.

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5.3 Standard solutions

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5.3.1 Preparation of stock solution

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Take 50 ml of N,N-dimethyl acetamide (5.2.3) and weigh. Bubble vinyl chloride through for approximately 10 s, until a concentration of approximately 10 g/l is obtained, re-weigh and seal the container.

5.3.2 Diluted standard

Take the solution prepared in accordance with 5.3.1 and further dilute by a factor of 500 (20 mg/l). For example, dilute 10 μ l of stock to 5 ml with the N,N-dimethyl acetamide.

5.4 Test apparatus

5.4.1 Usual laboratory apparatus.

5.4.2 Gas chromatograph, fitted with an automatic headspace sampler, or with facilities for manual sample injection, and a flame ionization detector.

5.4.3 Gas chromatographic column, capable of completely separating the air peak, and the vinyl chloride peak from the standard solution (5.3.2) and the internal standard peak, if used.

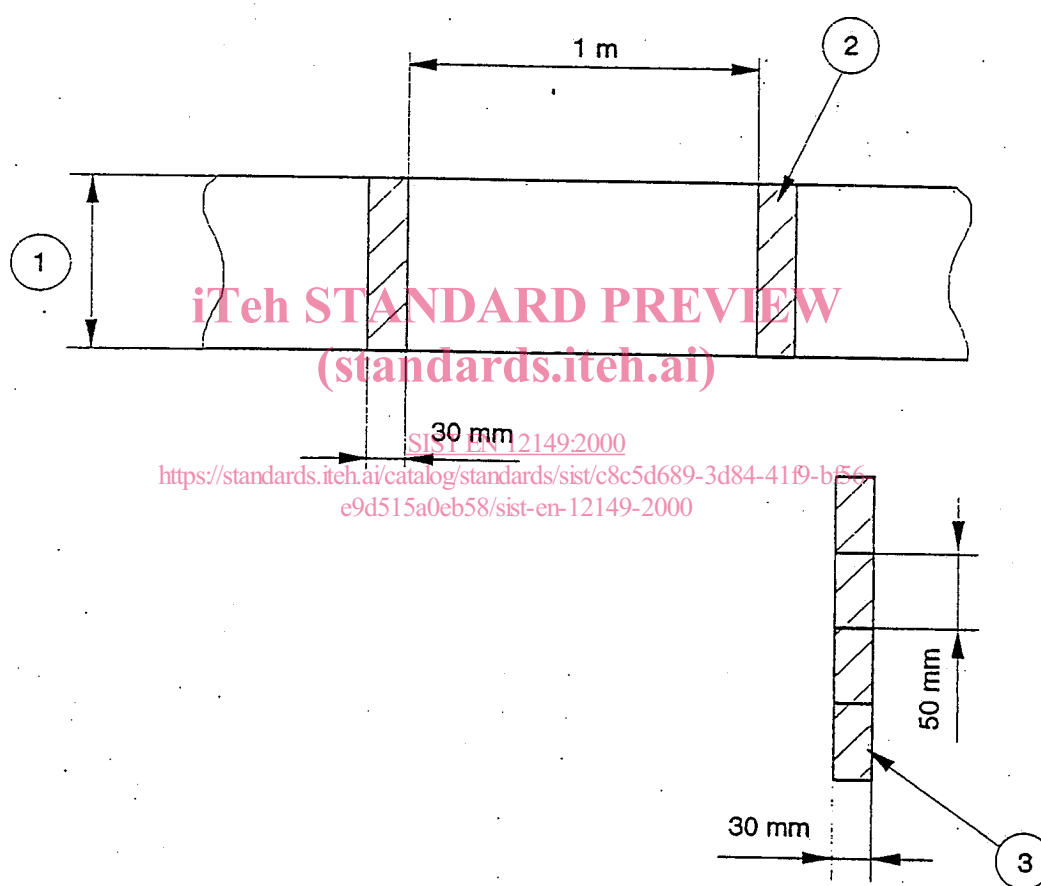
The signal obtained from the column in use with a solution containing 0,02 mg of vinyl chloride per litre or kilogram shall be at least five times that of the background noise.

5.5 Test specimens

5.5.1 Preparation of test specimens

5.5.1.1 Roll (except borders)

Take a roll of wallcovering and make two cuts across the width of the wallcovering to produce a strip (30 ± 1) mm wide with a length the same as the width of the wallcovering. Repeat this at approximately 1 m intervals throughout the length of the roll. Cut the strips into rectangles (50 ± 1) mm long \times (30 ± 1) mm wide (see figure 3).

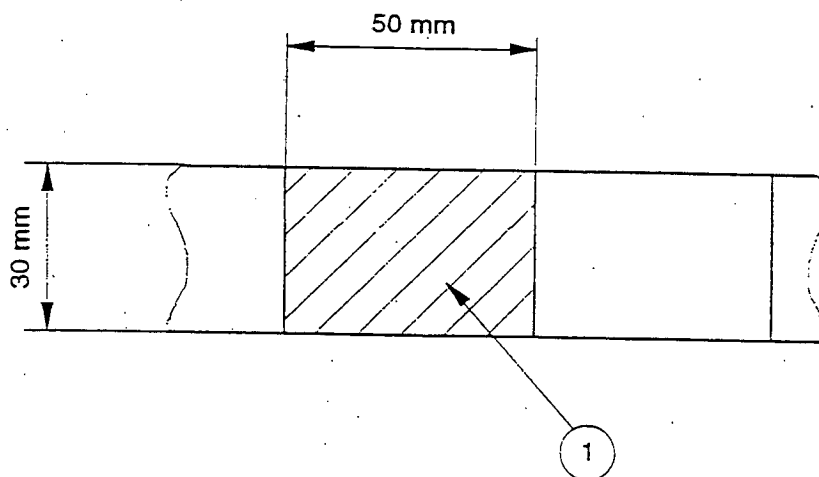


1. Roll width
2. Strip
3. Rectangles

Figure 3

5.5.1.2 Borders

Cut a strip of (30 ± 1) mm width through the whole length of the border. Cut this strip into rectangles of (50 ± 1) mm length. Use the appropriate number of rolls to produce at least 50 rectangles (see figure 4).



1. Rectangles

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Figure 4
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5.5.2 Selection of test specimens

Select by visual inspection the 10 rectangles most representative of the overall decoration. Condition in accordance with ISO 187.

Cut these 10 rectangles into squares of approximately $6 \text{ mm} \times 6 \text{ mm}$ and mix the squares obtained.

5.6 Procedure

5.6.1 Preparation of test solutions

Weigh accurately 0,5 g of the test specimens (5.5.2) into a headspace vial of 10 ml maximum capacity and add 2 ml of N,N-dimethyl acetamide (5.2.3). Close the vial.

5.6.2 Preparation of the calibration solution

Into each of five vials, introduce 2 ml of N,N-dimethyl acetamide (5.2.3) and add to each the appropriate volume of the diluted standard solution such that a series of solutions is obtained approximately 0 ng, 125 ng, 250 ng, 375 ng and 500 ng of vinyl chloride monomer. Close the vials.

5.6.3 Procedure for gas chromatography

5.6.3.1 Place the vials containing the test solutions (5.6.1) and the calibration solutions (5.6.2) in a water bath controlled at $(60 \pm 1) ^\circ\text{C}$ for 2 h to attain equilibrium. Agitate the vials, avoiding contact between the liquid and stopper, to obtain, in the vials containing the test solutions, a suspension of resin as homogeneous as possible.