SLOVENSKI STANDARD
SIST EN ISO 14184-2:1999

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Tekstilije - Določ evanje formaldehida - 2.del: Sprogļ eni formaldehid (metoda parne absorpcije) (ISO 14184-2:1998)

Textiles - Determination of formaldehyde - Part 2: Released formaldehyde (vapour absorption method) (ISO 14184-2:1998)

Textilien - Bestimmung des Gehaltes an Formaldehyd - Teil 2: Freigesetzter Formaldehyd (Wasserdampf-Absorptions-Verfahren) (ISO 14184-2:1998)

Textiles - Dosage du formaldéhyde - Partie 2: Formaldéhyde dégagé (Méthode par absorption de vapeur) (ISO 14184-2:1998)

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This European Standard was approved by CEN on 2 May 1998.

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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
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

The text of EN ISO 14184-2:1998 has been prepared by Technical Committee CEN/TC 248 "Textiles and textile products", the secretariat of which is held by BSI, in collaboration with Technical Committee ISO/TC 38 "Textiles".

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of an identical text or by endorsement, at the latest by January 1999, and conflicting national standards shall be withdrawn at the latest by January 1999.

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.

WARNING. This standard calls for the use of substances and/or procedures that may be injurious to health if adequate precaution are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage. It has been assumed in the drafting of this standard that the execution of its provisions is entrusted to appropriately qualified and experienced people.

1 Scope

This standard specifies a method for determining the amount of formaldehyde released under the conditions of accelerated storage from textiles in any form by means of a vapour absorption method.

The procedure is intended for use in the range of releasable formaldehyde on the fabric between 20 mg/kg and 3500 mg/kg when determined by this method. The lower limit is 20 mg. Below this limit the result is reported as 'not-detectable'.

A method for determination of free formaldehyde and formaldehyde extracted partly through hydrolysis in aqueous solution is given in ISO 14184-1.

2 Normative references

This European Standard incorporates by dated and 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 edition of the publication referred to applies.

ISO 139 Textiles - Standard atmospheres for conditioning and testing

ISO 3696 Water for analytical laboratory use - Specification and test methods

3 Principle

A weighed fabric specimen is suspended over water in a sealed jar. The jar is placed in an incubator at a controlled temperature for a specified length of time. The amount of formaldehyde absorbed by the water is then determined colorimetrically.

4 Reagents

All reagents shall be of analytical reagent quality.

4.1 Distilled water or water complying with grade 3 of ISO 3696.

4.2 Acetylacetone reagent (Nash reagent).

Dissolve 150 g of ammonium acetate in about 800 ml of water (4.1), add 3 ml of glacial acetic acid and 2 ml of acetylacetone, transfer into a 1000 ml volumetric flask and make up to the mark with water (4.1). Store in a brown bottle.

NOTE The reagent darkens in colour slightly on standing over the first 12 h. For this reason the reagent should be held 12 h before use. Otherwise, the reagent is usable over a considerable period of time, at least 6 weeks. However, since the sensitivity may change slightly over a long period of time, it is good practice to run a calibration curve weekly to correct for slight changes in the standard curve. As an alternative the chromotropic acid method described in annex B may be used.

4.3 Formaldehyde solution, approximately 37 % (W/V or W/W).

5 Apparatus

5.1 Glass preserving jars, 0,95 l to 1,0 l with gas tight sealing caps (see figure 1).

5.2 Small wire mesh baskets (or other suitable means for suspending the test specimen above the water level inside the jars. As an alternative to the wire mesh baskets, a double strand of sewing thread may be used to make a loop in the test specimen that has been folded in half twice, suspended above the water level. The two double-thread ends are draped over the top of the jar and held securely by the jar cap.

NOTE A simple support for insertion in the preserving jars can be constructed as follows : A piece of aluminium wire screening 15,2 cm x 14,0 cm is bent around a length of wood 3,8 cm square and fastened together to form a rectangular, open-ended cage. One side is cut at the corners about halfway up the side and the cut section folded inward and fastened. This folded piece forms the bottom of the wire basket while the other three sides form the support legs. Fastening can be accomplished by twisting short lengths of wire through or around the appropriate part.

5.3 Incubator, thermostatically controlled at (49 ± 2)°C.

5.4 Stoppered volumetric flasks, 50 ml, 250 ml, 500 ml and 1000 ml.

5.5 Pipettes, 1 ml, 5 ml, 10 ml, 15 ml, 20 ml, 25 ml, 30 ml and 50 ml volumetric and 5 ml graduated.

> **NOTE** An automatic pipette system of the same accuracy as manual pipettes may be used.

5.6 Burettes, 10 ml and 50 ml.

5.7 Photoelectric colorimeter or spectrometer(wavelength 412 nm).

5.8 test tubes, colorimeter tubes, or spectrometer tubes.

5.9 Water bath at (40 ± 2) °C.

5.10 Balance, accurate to 0,2 mg.

6 Preparation of standard solution and calibration

6.1 Preparation

Prepare an approximately 1500 mg/l stock solution of formaldehyde by diluting 3.8 ml of formaldehyde solution (4.3) to one litre with water(4.1). Determine the concentration of formaldehyde in the stock solution by the method given in annex A.

Record the accurate concentration of this standardized stock solution. This stock solution will keep for up to four weeks and is used to prepare standard dilutions.

6.2 Dilution

The equivalent concentrations of the formaldehyde in the test specimen, based on the mass of 1 g of the test specimen and 50 ml of water, will be 50 times the accurate concentrations of the standard solutions.

6.2.1 Preparation of the standard-solution (S2)

Dilute 10 ml of the titrated standard solution (containing 1,5 mg/ml of formaldehyde), prepared in 6.1, with water (4.1) to 200 ml in a volumetric flask. This solution contains 75 mg/l of formaldehyde.

6.2.2 Preparation of the calibration-solutions

Dilute calibration solutions from the standard solution (S2), by diluting with water (4.1) in 500 ml volumetric flasks, using a minimum of five solutions from the following:

1 ml S2 to 500 ml, containing 0,15 µg CH_20 / ml ≡ 7,5 mg/kg CH_20 on the fabric
2 ml S2 to 500 ml, containing 0,30 µg CH_20 / ml ≡ 15 mg/kg CH_20 on the fabric
5 ml S2 to 500 ml, containing 0,75 µg CH_20 / ml ≡ 37,5 mg/kg CH_20 on the fabric
10 ml S2 to 500 ml, containing 1,50 µg CH_20 / ml ≡ 75 mg/kg CH_20 on the fabric
15 ml S2 to 500 ml, containing 2,25 µg CH_20 / ml ≡ 112,5 mg/kg CH_20 on the fabric
20 ml S2 to 500 ml, containing 3,00 µg CH_20 / ml ≡ 150 mg/kg CH_20 on the fabric
30 ml S2 to 500 ml, containing 4,50 µg CH_20 / ml ≡ 225 mg/kg CH_20 on the fabric
40 ml S2 to 500 ml, containing 6,00 µg CH_20 / ml ≡ 300 mg/kg CH_20 on the fabric

Calculate the first order regression curve of the type $y = a + bx$. This regression curve will be used for all measurements. If the test specimens contains a higher amount of formaldehyde than 500 mg/kg dilute the sample solution.

NOTE This double-dilution is necessary to have the same formaldehyde concentrations in the calibration solutions as in the test solutions of the fabrics. If the fabric contains 20 mg/kg formaldehyde, a 1,00 g specimen is extracted with 50 ml water; the solution contains 20 µg formaldehyde and from this follows, 1 ml of the test solution contains 0,4 µg of formaldehyde.

7 Test specimens

Do not condition the test specimen because the predrying and humidity in connection with the conditioning may cause changes in the formaldehyde content of the sample Prior to test store the sample sealed in a container.

From the sample cut at least two specimens into small pieces and weigh approximately one gram of the pieces to an accuracy of 10 mg.

NOTE Storage maybe in a polyethylene bag and wrapped in aluminium foil. The reason for the storage precaution is that formaldehyde may diffuse through the pores of the bag. In addition, catalysts, or other compounds present in a finished, unwashed fabric may react with the foil if in direct contact.