
**Textiles — Determination of
formaldehyde —**

**Part 2:
Released formaldehyde (vapour
absorption method)**

Textiles — Dosage du formaldéhyde —

Partie 2: Formaldéhyde dégagé (méthode par absorption de vapeur)



Reference number
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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 14184-2 was prepared by Technical Committee ISO/TC 38, *Textiles*.

This second edition cancels and replaces the first edition (ISO 14184-2:1998), of which it constitutes a minor revision.

ISO 14184 consists of the following parts, under the general title *Textiles — Determination of formaldehyde*:

- *Part 1: Free and hydrolysed formaldehyde (water extraction method)*
- *Part 2: Released formaldehyde (vapour absorption method)*

Textiles — Determination of formaldehyde —

Part 2: Released formaldehyde (vapour absorption method)

WARNING — This part of ISO 14184 calls for the use of substances and/or procedures that may be injurious to health if adequate precautions 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 part of ISO 14184 that the execution of its provisions is entrusted to appropriately qualified and experienced people.

1 Scope

This part of ISO 14184 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 3 500 mg/kg when determined by this method. The lower limit is 20 mg/kg. 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

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 139:2005, *Textiles — Standard atmospheres for conditioning and testing*

ISO 3696:1987, *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 grade 3 water complying with 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 1 000 ml volumetric flask and make up to the mark with water (4.1). Store in a brown bottle.

The reagent darkens in colour slightly on standing over the first 12 h. For this reason, the reagent should be held for 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 % (M/V or M/m).

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 × 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 is 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 $(49 \pm 2) ^\circ\text{C}$.

5.4 Stoppered volumetric flasks, 50 ml, 250 ml, 500 ml and 1 000 ml.

5.5 Pipettes, 1 ml, 5 ml, 10 ml, 15 ml, 20 ml, 25 ml, 30 ml and 50 ml and graduated at intervals of 5 ml.

NOTE An automatic pipette system of the same accuracy as manual pipettes can be used.

5.6 Burettes, 10 ml and 50 ml.

5.7 Spectrophotometer, capable of reading absorbance to a minimum of 3 decimal places at a wavelength of 412 nm.

5.8 Test tubes or spectrophotometer tubes.

5.9 Water bath, capable of maintaining a temperature of $(40 \pm 2) ^\circ\text{C}$.

5.10 Balance, accurate to 0,2 mg.

6 Preparation of standard solution and calibration

6.1 Preparation

Prepare an approximately 1 500 mg/l stock solution of formaldehyde by diluting 3,8 ml of formaldehyde solution (4.3) to 1 litre with water (4.1). Determine the concentration of formaldehyde in the stock solution by the method given in Annex A.