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Secretariat: DIN

Date: 2023-11-23xx

Wood-based panels — Determination of formaldehyde release —

Part 2:
Small-scale chamber method

Panneaux à base de bois — Détermination du dégagement de formaldéhyde —

Partie 2: Méthode à la petite chambre

PROOF

Style Definition ...

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ISO 20344, Personal protective equipment — Test methods for footwear

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Foreword

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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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at ~~www.iso.org/patents~~ www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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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.

This document was prepared by Technical Committee ISO/TC 89, *Wood-based panels*.

This second edition cancels and replaces the first edition (ISO 12460-2:2018), which has been technically revised.

The main changes are as follows:

— ~~—~~implementation of different chamber sizes, analytical procedures, re-calculation of results to other standard parameters and establish a correlation between reference chamber method and the method used for factory production control.

A list of all parts in the ISO 12460 series can be found on the ISO website.

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.

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Wood-based panels — Determination of formaldehyde release —

Part 2:
Small-scale chamber method

1 Scope

This document specifies a procedure for a chamber test with different options of chamber sizes to measure the formaldehyde concentrations in air from wood products under defined test conditions of temperature, relative humidity, loading and air exchange rate.

Results obtained from this small-scale chamber test method can be used for quality control (factory production control – 'FPC') based on correlation established by reference chamber test methods according to ISO, EN or ASTM standards. The establishment of a correlation is described in ~~Annex D.~~Annex D.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

— ~~—~~ISO Online browsing platform: available at ~~https://www.iso.org/obp~~https://www.iso.org/obp

— ~~—~~IEC Electropedia: available at ~~https://www.electropedia.org/~~https://www.electropedia.org/

3.1
air exchange rate
N
quotient of air volume Q passing through the chamber per hour (m^3/h) and the chamber volume (m^3) expressed in (h^{-1})

3.2
loading ratio
L
total exposed surface area, excluding panel edges, of the product being tested divided by the test chamber's volume (m^2/m^3)

3.3
make-up airflow
Q
quantity of conditioned and filtered air fed into the chamber per unit time, in m^3/h

3.4
***Q/A* ratio**
ratio of air flow through the chamber (Q) to sample surface area (A), in $m^3/h\ m^2$

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3.5
sample surface area
A
total area of all sample faces exposed in the chamber, in m^2

3.6
measured concentration
C
formaldehyde concentration (expressed in mg/m^3 and/or ppm rounded to 2 decimal places) under the defined environmental test parameters of this method. In the case of a establishing a correlation, it can be advantageous to round the results to 3 decimal places

3.7
chamber volume
V
interior volume of the test chamber, in m^3

4 General

This document specifies the measurement to quantify the amount of formaldehyde in an air sample from a test chamber accepted in a range of sizes (examples are described in ~~Annex A)~~Annex A) and as determined by different analytical methods as specified in ~~Annex C.~~Annex C. Other analytical procedures may be used to determine the quantity of formaldehyde in the air sample provided that such methods give equivalent results. The test report shall include full description of the analytical procedure employed.

The values stated in SI units are the standard values. Any values given in parentheses are for information only.

NOTE This document does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.

5 Significance and use

5.1 Various national and regional regulations on formaldehyde emission levels have been established for wood panels. This international test method was adapted from chamber test methods specified in different EN, ISO and ASTM standards. This test method provides a means of testing smaller samples and reduces the time required for testing compared with a reference chamber method.

5.2 Formaldehyde concentration levels obtained by this small-scale chamber method can differ from expected in full-scale indoor environments. Variations in product loading, temperature, relative humidity, and air exchange will affect formaldehyde emission rates and thus likely indoor air formaldehyde concentrations.

5.3 This test method is applicable for the use of a chambers from 0,004 m^3 to 1 m^3 in volume (see examples in ~~Annex A)~~Annex A) to evaluate the formaldehyde concentration in air using the following controlled conditions which are defined within this standard method:

a) ~~a)~~ conditioning of specimens prior to testing;

b) ~~b)~~ exposed surface area of the specimens in the test chamber;

c) ~~c)~~ edge sealing;

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d) d) test chamber temperature and relative humidity;

e) e) the Q/A ratio;

f) f) air exchange rate within the chamber.

6 Interferences

Interferences of the used analytical methods should be determined by reference to other applicable standard test methods.

7 Apparatus

7.1 Test chamber

7.1.1 General

The interior volume of the small chamber shall be between 0,004 m³ and 1 m³ (examples see Annex A).Annex A). The interior of the test chamber shall be free of refrigeration coils that condense water and items such as humidifiers with water reservoirs since water has the potential for collecting formaldehyde and thus influencing test results. The interior surfaces of the small chamber, including any sample support system, shall be a non-absorbent material. For example, stainless steel, aluminumaluminium, and polytetrafluoroethylene (PTFE) have been found appropriate as chamber lining materials. All joints except for doors used for loading and unloading specimens should be sealed. Doors shall be self-sealing.

7.1.2 Air exchange rate

The clean and conditioned air supply to the chamber shall either be monitored continouslycontinuously or frequently during testing.

The air exchange rate shall not vary by more than ±5 %.

The effective air exchange shall be regularly checked, by using e.g. either a calibrated gas meter, or the tracer gas procedure (see Clause 11).Clause 11).

7.1.3 Air circulation

Low speed mixing fans or multi-port inlet and outlet diffusers are two techniques that have been used successfully to ensure mixing of the chamber air over all sample surfaces. If the air exchange is higher than 10/h mixing fans are not necessary.

7.1.4 Make-up air

The make-up air should come from a filtered dust-free environment and contain no more than 0,006 mg/m³ of formaldehyde. Make-up air for the chamber shall pass through a calibrated air flow measuring device. If the make-up air is taken from a conditioning environment it should contain no more than 0,012 mg/m³.

7.1.5 Equipment for monitoring of test conditions

Measuring equipment and recording facilities capable of continuous or frequent monitoring of the specified test conditions with an error limit as follows:

— — Temperature: 0,1 K;

— — Relative humidity: 2 %;

— Air exchange rate: 0,03/h.

7.1.6 Air sampling port

The exhaust flow (that is, chamber outlet) is normally used as the sampling point, although separate sampling ports in the chamber can be used. The sampling system shall be constructed of a material to minimize absorption (for example, glass or stainless steel), and the system should be maintained at the same temperature as the test chambers.

7.2 Air sampling system

7.2.1 Sampling system for wet-chemistry analysis

7.2.1.1 General

Figure 1 shows the principle of a sampling system for the determination of the formaldehyde concentration in the chamber air. The sampling tube shall be placed either in the air outlet, or inside the chamber, close to the air outlet.

Other sampling systems may be used based on the requirements of the analytical procedure used.

The numbers in brackets refer to the numbers in Figure 1:

7.2.1.2 sampling tube (1).

7.2.1.3 one or two 30 ml up to 100 ml gas washing bottle(s) (2), with inserts like impinger or Muenke or frits, containing between 8 ml to 40 ml absorber solution, or DNPH cartridges for absorption and subsequent determination of formaldehyde.

7.2.1.4 silica absorber for drying the air (3).

7.2.1.5 gas flow valve (4).

7.2.1.6 gas sampling pump (5).

7.2.1.7 gas flow meter (6).

7.2.1.8 gas meter (including a thermometer) for measuring the volume of air (7).

7.2.1.9 air pressure meter (8).

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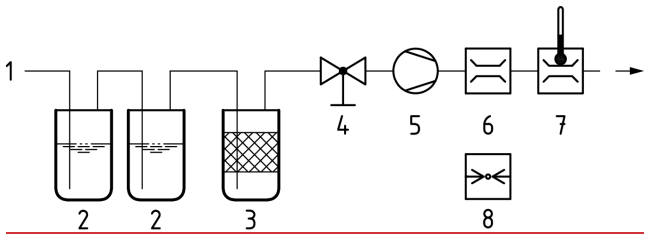

Key

1	sampling tube	5	gas sampling pump
2	gas washing bottle	6	gas flow meter

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