

Restrictions on formaldehyde emissions from articles

Draft amendment to Annex XVII REACH

May 2022

On May 2nd, 2022, the European Commission published a draft¹ amendment to Annex XVII of Regulation (EC) No. 1907/2006 (REACH) relating to the maximum permissible emissions of formaldehyde from articles. The draft regulation aims to minimize formaldehyde concentrations in indoor air to protect the general population.

Formaldehyde has been classified as a potential human carcinogen (Carc. 1B) according to Regulation (EC) No. 1272/2008 (CLP). This substance is one of the chemicals with high production volumes and a wide range of applications. Formaldehyde is mainly used as a chemical intermediate in the production of synthesized chemicals. The most commonly produced substances / products made of formaldehyde include urea-formaldehyde resins (UF), phenol-formaldehyde resins (PF) and melamine-formaldehyde resins (MF). These formaldehyde-based polymers are used as binders particularly in the wood-based materials industry and in the production of synthetic glass fibers and are one of the most common sources of formaldehyde release into indoor air.

Furthermore, formaldehyde-based resins as well as other formaldehyde-derived products (e.g. POM², MDI³, polyols, etc.) can be used in the manufacture of numerous other products for a wide range of applications, e.g.:

- Building materials: carpets, wallpapers, insulation materials (in-situ foams, mineral wool, melamine resin foam), adhesives and glues, paints and coatings
- Textile products: curtains, zippers made of POM
- Printed circuit boards, electrical and electronic equipment
- Furniture: upholstery foams (PUR), natural leather, components made of POM

- Various automotive components
- Resin-bonded abrasives, decorative foils, etc.

Application scope and limits

Products where formaldehyde or formaldehyde-releasing substances have been intentionally added during production process are affected. It should be pointed out that without knowing the exact production process it is not possible to assess whether a formaldehyde release is to be expected.

Products and furniture made of wood-based materials may not be placed on the market if they release a formaldehyde concentration greater than 0.062 mg/m^3 ($\triangleq 0.05 \text{ ppm}$) under specific test conditions. Such defined limit value corresponds to the half of the emission value (0.1 ppm) for the classification of wood-based materials in "Formaldehyde emission class E 1" according to EN 13986⁴.

For *articles not made of wood-based materials*, the limit value of 0.08 mg/m^3 must be considered for the proof of marketability.

For the interior of *road vehicles*, the maximum permissible formaldehyde concentration is limited to 0.062 mg/m^3 .

A special situation arises for *toys*. Currently, formaldehyde emissions from wood-based materials used in toys for children under 3 years of age are limited to 0.1 ml/m^3 ($\triangleq 0.1 \text{ ppm}$) by the Toys Safety Directive (2009/48/EC, Annex C). Using an identical test method - EN 717-1 - the upcoming REACH requirement with the limit value of 0.05 ppm defines a significantly higher quality demand for wooden toys. In addition, the formaldehyde emission limits

¹ [Search the database - European Commission \(europa.eu\)](#)

² POM = Polyoxymethylene

³ MDI = Methylendiphenylisocyanate

⁴ DIN EN 13986:2015-06 – Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking

affect toys for all age groups. An uncertainty remains for outdoor wooden toys (children < 3 years of age) which are excluded from the planned REACH requirements whereby the Toys Safety Directive does not define a clear exception. Besides the wooden toys, other toys containing potentially formaldehyde-releasing materials are also affected (play carpets, soft toys filled with polyurethane foam, electric toys, etc.).

For the *wood-based materials used in constructions* currently regulated by the European Construction Products Regulation (EU) 305/2011, a classification in terms of a formaldehyde emission class⁵ will probably no longer be sufficient. In addition to the wood-based materials many other *construction products* will be affected by the planned requirements (some examples have already been mentioned above).

Exceptions

Exempt from these regulations are:

- *Products* that are foreseeably used only *outdoors*
- *Products* intended exclusively for *industrial or professional use*⁶
- *Clothing and accessories*, other *textiles* that come into *contact with human skin* to a similar extent as clothing, and *footwear* (see entry 72 Annex XVII)
- *Biocidal products* acc. to Regulation (EU) No. 528/2012
- *Medical devices* acc. to Regulation (EU) 2017/745
- *Personal protective equipment* acc. to Regulation (EU) 2016/425
- *Products intended to come into contact with food* [Regulation (EC) No. 1935/2004].
- *Second-hand products*

Test method

Reference method for articles

The reference conditions for determination of formaldehyde emissions from products specified by the annex to draft regulation correspond to the standard conditions of DIN EN 717-1⁷ (Table 1).

Table 1

Test chamber parameter	Unit	Value
Temperature	[°C]	23 ± 0.5
Relative humidity	[%]	45 ± 3

⁵ DIN EN 13986, Annex B, Classification of wood-based materials with regard to formaldehyde emission according to classes - E1 (≤ 124 µg/m³) and E2 (> 124 µg/m³).

⁶ Except where the formaldehyde released will result in exposure to the general public

⁷ DIN EN 717-1:2005-01 - Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method

⁸ Other chamber loading factors can be applied according to section 4.2.2 of EN 16516

⁹ When a steady state concentration is reached, a test can be terminated prematurely

¹⁰ DIN EN 16516:2020-10- Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air

Chamber loading factor ⁸	[m²/m³]	1 ± 0.02
Air exchange rate	[h ⁻¹]	1 ± 0.05
Test duration ⁹	[d]	up to 28

Permissible deviations from the reference method

If specified test chamber loading factor of 1 m²/m³ does not reflect a foreseeable conditions of use for a specific product, loading factors for a reference room (volume: V_R = 30 m³) can be applied in accordance with section 4.2.2 of EN 16516¹⁰.

Emission measurements can also be performed under more stringent test conditions - higher temperature and/or higher relative humidity and/or higher loading factor and/or lower air exchange rate.

These permissible but unspecified deviations from the reference test conditions can result in different measurement results and thus in deviating product evaluations when tests are carried out by different emission laboratories.

Alternative method for articles testing

Application of alternative test methods is generally permissible, provided that a correlation of the measurement results from the selected test method and a measurement under reference conditions is known or has been determined.

Measurement method for road vehicles

The test methods specified by ISO 12219-1¹¹, ISO 12219-10¹² or an equivalent test method shall be used for testing formaldehyde concentration in road vehicles including trucks and buses.

Time slots after entry into force

The regulation is scheduled to be legally effective 48 months after their effective date for road vehicles and 36 months after their effective date for all other products within their scope.

Correlation with the currently existing regulations in Germany.

In Germany, the formaldehyde emissions from wood-based materials and products made from them (e.g. furniture) are

¹¹ DIN ISO 12219-1:2013-12 – Interior air of road vehicles – Part 1: Whole vehicle test chamber - Specification and method for the determination of volatile organic compounds in cabin interiors

¹² DIN ISO 12219-10:2021-06 – Interior air of road vehicles – Part 10: Whole vehicle test chamber - Specification and methods for the determination of volatile organic compounds in cabin interiors - Trucks and buses

regulated by the requirements of the German Chemicals Prohibition Ordinance (ChemVerbotsV).

Already since January, 2020, the requirements for formaldehyde emission from wood-based materials and wooden articles were significantly tightened by introduction of a restrictive reference test method with an unchanged limit value of $0.124 \text{ mg/m}^3 (\triangleq 0.1 \text{ ppm})^{13}$.

DIN EN 16516 has been set as a new reference test method. Tests according to the previous reference method

DIN EN 717-1 continue to have equal applicable. However, the measured values determined with the tests according to DIN EN 717-1 must be multiplied by a factor of 2.0, which means that the maximum permissible formaldehyde concentration in a test chamber must not exceed a value of $0.062 \text{ mg/m}^3 (\triangleq 0.05 \text{ ppm})$.

Consequently, the regulations for wood-based materials currently in force in Germany correspond to the planned REACH requirements.

Recommendations for action

The intended rules affect a wide range of products. Some examples are listed above. We recommend collecting data on your products thoroughly. It is important to find out whether formaldehyde or formaldehyde-derived products were used in production based on bills of material data, safety data sheets and information of your material/chemical suppliers. On the basis of this information, it is necessary to decide to what extent an emission test is required to determine the current quality level with regard to the formaldehyde release and, if necessary, to take any required quality improvement measures at an early stage until the regulation comes into force.

Further information on current legal changes can also be found on our homepage at www.tuv.com or <https://www.tuv.com/regulations-and-standards/en/>.

Further technical information can be obtained from:

TÜV Rheinland LGA Products GmbH
Technical Competence Center VOC Emissions & Chamber Testing
Dr. Jelena Galinkina
Jelena.Galinkina@de.tuv.com
Tillystr. 2
90431 Nürnberg
Germany

TÜV Rheinland (Guangdong) Ltd.
Jet Lee
Jet.Lee@tuv.com
199 Kezhu Road
Guangzhou Science City
China

Infobox: For more information on the testing of formaldehyde and VOC emission, please refer to: <https://www.tuv.com/germany/de/voc-and-formaldehyde-emission-testing.html>



Disclaimer

This newsletter contains only information of a general nature without specific reference to particular natural or legal persons, objects or facts. This newsletter is not to be understood as legal advice and does not replace such advice in any case. TÜV Rheinland LGA Products GmbH (TRLPG) cannot guarantee that all formulations correspond exactly to the respective official versions. TRLPG makes every effort to ensure that the information provided is correct and up to date. Nevertheless, errors and ambiguities cannot be completely ruled out. TRLPG therefore accepts no responsibility for the topicality, correctness, completeness or quality of the information provided. For the official text, please refer to the EU Official Journal.

Liability claims regarding damage caused by the use of any information provided, including any kind of information which is incomplete or incorrect, will therefore be rejected.

¹³ <https://www.blac.de/documents/bekanntmachung-analytischer-verfahren-fuer-in-anlage-1-der-chemverbotsv-genannten-stoffen-stoffgruppen-banz-at-26-1543840829.11>