

## 2 Chemical Testing (DD)

Testing in the areas of harmful emissions from products and materials incl. olfactory inspections, determination of organic substances, heavy metal content and migration, formaldehyde content, wood preservatives content

### 2.1 Sampling and analytics of harmful emissions and olfactory tests

The following were employed as testing methods: test chamber method, desiccator method, flask method, gas analysis method and similar methods.

The analytics takes place via gas chromatography, HPLC, photometry, sensory analysis \*

Type of Testing	Matrix	Parameters	Characteristic Testing Methods
Emissions from materials: test chamber method, desiccator testing, gas analysis method (formaldehyde), flask method (formaldehyde)  sampling and determination in each case	Construction materials, construction products, furniture, furniture elements, wood, wooden materials, furniture components, products for indoor use	VVOC, formaldehyde, VOC, SVOC, odour	DIN EN 717-1 ASTM D6007-14 ASTM E1333-14 VDA 276-2 DIN ISO 16000-3 DIN ISO 16000-6 DIN EN ISO 16000-9 to - 11 DIN ISO 16000-28 DIN CEN/TS 16516 DIN EN ISO 10580 ASTM D5582 – 14 JIS A 1460 DIN EN 717-3 DIN EN ISO 12460-3 DIN EN 12149-C
Sampling and determination of indoor air pollutions	Indoor air	VVOC, formaldehyde, VOC, SVOC, odour	DIN EN ISO 16000-3 DIN EN ISO 16000-6 DIN ISO 16000-28 VDI 3484-1 VDI 3484-2

ASTM D 6007 - 02      Standard Test Method for Determining Formaldehyde Concentrations  
in Air from Wood Products Using a Small Scale Chamber

ASTM D 6007 - 14      Standard Test Method for Determining Formaldehyde Concentrations in Air  
from Wood Products using a Small Scale Chamber

**Annex to the accreditation certificate D-PL-11054-01-00**

ASTM D 5582 - 00	Standard Test Method for Determining Formaldehyde Levels from Wood Products Using a Desiccator
ASTM D 5582 - 14	Standard Test Method for Determining Formaldehyde Levels from Wood Products Using a Desiccator
ASTM E 1333 - 10	Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber
ASTM E 1333 - 14	Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber
GP Dynamic MicroChamber	The GP Dynamic Microchamber Computer-integrated formaldehyde test system, User Manual, copyright 2012 (DMC 2012 GP User's Manual)
Emission testing method of California Specification 0135 2010-02	Standard method for the testing and evaluation of volatile organic chemical emissions from indoor sources using environmental chambers. Version 1.1
DIN EN 120 1992-08	Wood-based panels - Determination of formaldehyde release - Extraction method (called perforator method)
DIN EN 717-1 2005-01	Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method
DIN EN 717-2 1995-01	Wood-based panels - Determination of formaldehyde release - Part 2: Formaldehyde release by the gas analysis method
DIN EN 717-3 1996-05	Wood-based panels - Determination of formaldehyde release - Part 3: Formaldehyde release by the flask method
DIN EN ISO 10580 2012-04	Resilient, textile and laminate floor coverings - Test method for volatile organic compound (VOC) emissions
DIN EN 12149 1998-01	Wallcoverings in roll form - Determination of volatile formaldehyde with the modified WKI method, Test C
DIN EN ISO 12460-3 2016-05	Wood-based panels - Determination of formaldehyde release - Part 3: Gas analysis method

Valid from: 18.02.2022  
Date of issue: 18.02.2022

**Annex to the accreditation certificate D-PL-11054-01-00**

DIN ISO 16000-3 2013-01	Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air; Active sampling method
DIN ISO 16000-6 2012-11	Indoor air - Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA® sorbent, thermal desorption and gas chromatography using MS or FID
DIN EN ISO 16000-9 2008-04	Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method
DIN EN ISO 16000-10 2006-06	Indoor air - Part 10: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test cell method
DIN ISO 16000-28 2012-12	Indoor air - Part 28: Determination of odour emissions from building products using test chambers
JIS A 1460: 2001	Building boards Determination of formaldehyde emission - Desiccator method
JIS A 1460: 2015	Building boards Determination of formaldehyde emission – Desiccator method
VDA 276-2	Bestimmung organischer Emissionen aus Bauteilen für den Kfz-Innenraum mit einer 1 m <sup>3</sup> - Prüfkammer Teil 2: Bestimmung der Abgabe von Formaldehyd, Ammoniak und Phenolen nach der Methode der Ausgleichskonzentration [Determination of organic emissions from components for a car interior of 1 m <sup>3</sup> - Testing chamber part 2: Determination of formaldehyde, ammonia and phenol emissions according to the equalisation concentration method]
VDI 3484 Sheet 2 2001-11	Gaseous ambient air measurements - Indoor-air pollution measurements - Measurement of the formaldehyde concentration with the acetylacetone method
VDI 3485 Sheet 1 1988-12	Ambient air measurement; measurement of gaseous phenolic compounds; p-nitroaniline method

**2.2 Determination of substances in materials by means of extraction and instrumental analysis, such as gas chromatography, photometry, coulometric Karl Fischer titration\***

Type of Testing	Matrix	Parameters	Characteristic Testing Methods
Determination of substances by means of extraction and instrumental analysis (Gas chromatography, photometry, Karl Fischer titration)	Coatings, paints, dispersions, adhesives, wood, wooden materials, plastics, textiles	VOC, SVOC, PAH, active ingredients in wood preservatives, phthalates, formaldehyde	DIN EN ISO 17895 ISO 11890-2 IHD-W-407 IHD-W-409 IHD-W-410 AfPS-GS-2014-01-PAK CPSC-CH-C1001-09.3 DIN EN ISO 12460-5 E DIN EN 14041 DIN EN 12149 VdL-RL 03 [German Paint and Printing Industry Guideline]

AfPS-GS-2014-01-PAK 2014-01	Prüfung und Bewertung von Polyzyklischen Aromatischen Kohlenwasserstoffen (PAK) bei der Zuerkennung des GS-Zeichens [Testing and evaluation of polycyclic aromatic hydrocarbons (PAHs) in the course of GS mark certification]
CPSC-CH-C1001-09.3 2010-04	Standard Operating Procedure for Determination of Phthalates
DIN EN 12149: 1998 Test B	Wallcoverings in roll form - Determination of vinyl chloride monomer
DIN EN ISO 12460-5 2015	Wood-based panels - Determination of formaldehyde release - Part 5: Extraction method (called the perforator method)
DIN EN ISO 17895 2005-06	Paints and varnishes; Determination of the volatile organic compound content of low-VOC emulsion paints (in-can VOC)
DIN EN ISO 17895 Amendment 1 2007-11	Paints and varnishes; Determination of the volatile organic compound content of low-VOC emulsion paints (in-can VOC)

Valid from: 18.02.2022  
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**Annex to the accreditation certificate D-PL-11054-01-00**

ISO 11890-2 2013-07	Paints and varnishes - Determination of volatile organic compound (VOC) content - Part 2: Gas-chromatographic method
DIN EN 14041 2016-07 draft	Resilient, textile and laminate floor coverings - Essential characteristics Annex B: Determination of pentachlorophenol (PCP) content in elastic and textile floor coverings Annex E: Determination of polycyclic aromatic hydrocarbon (PAH) content Annex F: Determination of phthalate content
IHD-W 407 2017_V3_0	Bestimmung von chlorierten Phenolen in Holz und anderen Materialien – Methanolextraktion [The determination of chlorinated phenols in wood and other materials – Methanol extraction]
IHD-W 409 2017_V2_0	Bestimmung von chlorierten Phenolen in Holz und anderen Materialien - Toluol extraktion [The determination of chlorinated phenols in wood and other materials – Toluene extraction]
IHD-W 410 2017_V2_0	Bestimmung von Lindan, 2,4- und 4,4-DDT in Holz und anderen Materialien nach Toluol extraktion [The determination of lindane, 2.4 and 4.4 DDT in wood and other materials after toluene extraction]
VdL-RL 03: 1997	Guideline for the determination of the concentration of formaldehyde in water-dilutable emulsion paints and related products [Richtlinie zur Bestimmung der Formaldehydkonzentration in wasserverdünnbaren Dispersionsfarben und verwandten Produkten]

**2.3 Determination of heavy metals and other elements in materials (migration, content) by means of ICP-OES \***

Type of Testing	Matrix	Parameters	Characteristic Testing Methods
Determination of heavy metals and other elements by means of ICP-OES	Coatings, paints, surface coatings, wood, wooden products, plastics	Heavy metals, elements	DIN EN 71-3 CPSC-CH-E1002-08 ASTM E1613-04 CPSC-CH-E1003-09.1 ASTM E1645 IHD-W 448 DIN EN ISO 11885 DIN EN 12149

**Annex to the accreditation certificate D-PL-11054-01-00**

ASTM E 1613-04 2004-08	Standard test Method for Determination of Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption Spectrometry (FAAS), or Graphite Furnace Atomic Absorption Spectrometry (GFAAS) Techniques
ASTM E1645 2007-08	Standard Practice for Preparation of Dried Paint Samples by Hotplate or Microwave Digestion for Subsequent Lead Analysis
CPSC-CH-E1002-08 2009-02	Standard Operating Procedure for Determining Total Lead (Pb) in Non-Metal Children's Products
CPSC-CH-E1003-09.1 2011-02	Standard Operating Procedure for Determining Lead (Pb) in Paint and Other Similar Surface Coatings
DIN EN 71-3 2017-10	Safety of toys - Part 3: Migration of certain elements
DIN EN ISO 11885 2009-09	Water quality - Determination of selected elements through inductively coupled plasma optical emission spectrometry (ICP-OES) (ISO 11885:2007)
DIN EN 12149 1998-01 Test A	Wallcoverings in roll form - Determination of migration of heavy metals and certain other elements (antimony, arsenic, barium, cadmium, chromium, mercury, lead and selenium)
IHD-W 448 2017-11	Bestimmung von Schwermetallen und anderen Elementen mittels Atomemissionsspektrometrie (ICP-OES) [Determination of heavy metals and other elements by means of atomic emission spectrometry (ICP-OES)]

**2.4 Testing Methods for Wooden Materials and Coatings**

DIN EN 322 1993-08	Wood-based panels; Determination of moisture content
DIN EN ISO 3251 2008-08	Paints, varnishes and plastics - Determination of non-volatile-matter content
DIN EN 52161-1 2006-06	Testing of wood preservatives; Detection of wood preservatives in wood; Sampling from structural timber in service

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**Annex to the accreditation certificate D-PL-11054-01-00**

ISO 11890-1 2007-07	Paints and varnishes - Determination of volatile organic compound (VOC) content - Part 1: Difference method
ISO 16979 2003-05	Wood-based panels; Determination of moisture content
ISO 16999 2003-07	Wood-based panels - Sampling and specimen cutting