Institut für **Baubiologie** Rosenheim GmbH

Expert Report

No. 3017 - 935
with reference to the seal of approval

"Tested and Recommended by the IBR"

for the product

Blooming System

WOCA product group 3

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Term of validity: April 2019

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It is the objective of the IBR to identify non-polluting building products for healthy living for the consumer by awarding the seal of approval "TESTED AND APPROVED BY THE IBR".

The seal of approval was created by the Institut für Baubiologie Rosenheim GmbH in 1982 to enable consumers with awareness for health and ecological matters to protect themselves against health hazards caused by building materials and furniture in their residential environment.
The seal of approval is awarded to products which ensure healthy living with respect to building biology and at the same time protect the environment. When awarding the seal of approval, we only use scientific and technical analysis methods which are based on normative regulations as well as the current state-of-the-art of laboratory analytics so that they should be understood both by third-party experts and by end consumers.
The aim of awarding the seal of approval "TESTED AND RECOMMENDED BY THE IBR" to as many products as possible is to enable an increasing number of consumers and end users to make criteria related to building biology a critical part of their decision when purchasing products for building and furnishing their homes.
The tests listed in our expert reports are not supposed to supersede the requirements in terms of building physics, supervision, legal regulations, or safety. They are merely a complementary set of tests related to health, physiology, building biology, and ecology aspects which have been neglected.
The seal of approval "TESTED AND APPROVED BY THE IBR" is based on a holistic perspective. Besides its focus on the tests that determine the potential physiological impact of the products on human beings and/or the environment, the expert report associated with granting the seal also honours any product whose production, processing, use, and ecological recycling have no or only a limited, tolerable adverse effect on the environment.
The emission of harmful substances, e.g. with a carcinogenic and/or mutagenic potential, is always to be considered as a criterion for exclusion. The seal of approval will under no circumstances be awarded to such products.
Any names of companies, products or brands mentioned in our expert reports are protected by copyright. The fact that we mention them is neither to be construed as a valuation nor as a recommendation in this context.

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1. Product description

With the objective to obtain the seal of approval, the company commissioned us to test their products:

- WOCA Master Floor Oil natural, white, colour
- WOCA Master Oil
- WOCA Maintenance Oil natur, white, colour
- WOCA Diamand Oil natural, white, colour
- WOCA No1 Wood Floor Oil natural, white
- WOCA No1 Invisible Oil
- WOCA Industrial Oil 1502, 1503,1552,1582,1592 + colour
- WOCA Industrial Hardwax Oil 1505, natural and white
- WOCA Hardwax Oil Extreme
- WOCA Industrial Oil No1 +colour
- WOCA Hardwax Oil natur, extra white
- WOCA Oil Refresher natural, white + Spray
- WOCA No 1 Invisible Oil Care
- WOCA No1 Invisible Primer

to building biology follow-up testing based on follow-up testing conducted in 2015 (expert report no. 3015 – 770, 771, 773). The products were collected from the customer on 23 of May 2017.
The product range submitted for testing consists of blooming wood oils and film-forming coatings for exterior and interior use. The surface treatment system is expanded by a number of compatible cleaning and care products.
The need to use personal protective equipment when processing the material within the scope of the standards stipulated by the employer's liability insurance associations is pointed out explicitly.

Persons charged with processing these materials can make use of readily available assistance. Comprehensive product information and processing regulations can be viewed on the manufacturer's website or can be found in the product-specific printed documentation.

The production is subject to continuous internal and external monitoring.

Any further examinations exclusively refer to the materials mentioned above and the products manufactured therefrom.

The local application of additives or coating which might be necessary is not part of the examination. The required safety data sheets were submitted to us for review.

There are no issues with respect to safe disposal. There are no hazardous components to be disclosed. Furthermore, a complete declaration of the component materials was available.

For more detailed specifications, please contact the manufacturer.

In the next part of the expert report, the products are examined for harmlessness with respect to building biology. The results disclosed below are valid for all products mentioned above, if not explicitly stated otherwise.

2. Test results

2.1 Radioactivity

Natural radiation exposure is composed of cosmic and terrestrial radiation. Humans are mainly subject to internal exposure due to radon gas. In addition to radon in ground air due to geological conditions, an increased concentration of radon may be found in living spaces because of certain building materials. Breathing in the gas over a long period of time may expose the lungs to radioactive radiation. While most radon particles are exhaled again, its radioactive decay products can be deposited in the lungs. In 1999, the Radiation Protection 112 document issued by the European Commission proposed an Activity Concentration Index (ACI) for building materials. The limit is ACI ≤ 1.00 while the Institut für Baubiologie Rosenheim sets the ACI limit at ≤ 0.75. Gamma-spectrometry is used to determine the natural radioactivity.

Evaluation:

The tested boards with a value of 0.00 are below the allowable limits and are therefore safe in regard to radiation exposure.

2.2 Biocides, pyrethroids, OHCs, phthalates

Biocides, pyrethroids, organic halogenated compounds (OHCs) or phthalates are added to different building materials to produce various properties such as pest resistance and durability, or

also for technical processing reasons. Organic halogenated compounds are further differentiated into AOX (adsorbable organic halogens), POX (purgeable organic halogens) and EOX (extractable organic halogens) according to DIN 1485. In order to prevent the impairment of health due to the classes of compounds named above, limit values have been established for safe use of the building materials in living spaces and these should not be exceeded.

2.2.1 Biocides

Test method: several hours of soxhlet extraction with n-hexane respectively methanol and qualitative/quantitative gas chromatography with mass spectrometry (GC-MS)

PCP/TCP-analysis: Derivation with acetic anhydride under alkaline conditions.

Substance	Measured value [mg/kg]	Limit of detection [mg/kg]
Pentachlorophenol PCP	-	0.1
2,3,4,5 – Tetrachlorophenol	-	0.1
2,3,5,6 – Tetrachlorophenol	-	0.1
beta – HCH	-	0.3
gamma – HCH (Lindane)	-	0.3
Dichlofluanid	-	0.3
Tolylfluanid	-	0.3
Chlorthalonil	-	0.3
alpha – Endosulfan	-	0.3
beta – Endosulfan	-	0.3
Endosulfan – sulphate	-	0.3
Furmecyclox	-	0.3
Hexachlorobenzene	-	0.3
Methylparathion	-	0.3
Ethylparathion	-	0.3
Chlorpyriphos	-	0.3
Heptachlor	-	0.3
Aldrin	-	0.3
cis – heptachlor epoxide	-	0.3
trans – heptachlor epoxide	-	0.3
cis – chlordane	-	0.3
trans – chlordane	-	0.3
Endrin	-	0.3
Dieldrin	-	0.3
Bromophos	-	0.3
Mirex	-	0.3
Malathion	-	0.3
Hexachlorophene	-	0.3
o,p – DDT	-	0.3
o,p‘ – DDT	-	0.3
o,p – DDD	-	0.3

p,p‘ – DDD	-	0.3
o,p – DDE	-	0.3
p,p‘ – DDE	-	0.3
Eulan	-	0.3
Chlornaphtalin	-	0.3
Dichlorvos	-	0.3
IPBC	-	0.3
Propiconazol	-	0.3
Tebuconazol	-	0.3
Cyproconazol	-	0.3
Silafluofen	-	0.3
Etofenprox	-	0.3
Resmethrin	-	0.3
Deltamethrin	-	0.3
Tetramethrin	-	0.3
Cypermethrin	-	0.3
Cyfluthrin	-	0.3
cis – trans – Permethrin	-	0.3
Allethrin	-	0.3
Phenothrin	-	0.3
Cyhalothrin	-	0.3

2.2.2. Polychlorinated biphenyls

Test method: Extraction and qualitative/quantitative gas chromatography with mass spectrometry (GC-MS) (DIN ISO 10382)

Substance	Measured value [mg/kg]	Limit of detection [mg/kg]
Polychlorinated biphenyls (PCB) no.: 28	-	0.02
Polychlorinated biphenyls (PCB) no.: 52	-	0.02
Polychlorinated biphenyls (PCB) no.: 101	-	0.02
Polychlorinated biphenyls (PCB) no.: 138	-	0.02
Polychlorinated biphenyls (PCB) no.: 153	-	0.02
Polychlorinated biphenyls (PCB) no.: 180	-	0.02
Polychlorinated biphenyls PCB: – in total	-	0.1

2.2.3 Phthalate

Test method: Extraction following DFG-S19 and qualitative/quantitative gas chromatography with mass spectrometry (GC-MS) (GC-MS)

Substance	Measured value [mg/kg]	Limit of detection [mg/kg]
Phthalic acid anhydride	-	1
Dimethyl phthalate	-	1

Diethyl phthalate	-	1
Diisobutylphthalat(Bis-2-methylpropylphthalat) DiBP	-	1
Di-n-butyl phthalate DBP	-	1
Benzylbutyl phthalate BBP	-	1
Dioctyl phthalate DOP	-	1
Diisononyl phthalate DINP	-	1
Didecyl phthalate	-	1
Di(2-ethylhexyl) adipate	-	1
Di(2-ethylhexyl) phthalate DEHP	-	1

2.2.4 Flame retardants

Test method: Extraction following DFG-S19 and qualitative/quantitative gas chromatography with mass spectrometry (GC-MS) (GC-MS)

Substance	Measured value [mg/kg]	Limit of detection [mg/kg]
Pentabrominated diphenyl ether (Penta-BDE)	-	1
Octabrominated diphenyl ether (Octa-BDE)	-	1
Decabrominated diphenyl ether (Deca-BDE)	-	1
Tetrabisphenol A (TBBPA)	-	1
Hexabromocyclododecane (HBCD)	-	1
Polybrominated bipyhenyls(PBB)	-	1
Polybrominated diphenyl ether (PBDE)	-	1
Chlorinated paraffins	-	100
Mirex	-	1
Tris(2-chloroethyl) phosphate (TCEP)	-	0.1
Tris(2-ethylhexyl) phosphate (TEHP)	-	0.1
Tris(monochloropropyl)phosphate (TDCPP)	-	0.1
Tris(2-butoxyethyl) phosphate	-	0.1
Triphenylphosphate (TPP)	-	0.1
Trikresylphosphate (TKP)	-	0.1
Isopropylated Triphenylphosphate (ITP)	-	1
Resorcin-bis-diphenylphoshate (RDP)	-	1
Bisphenol-A-bis(diphenylphosphate) (BDP)	-	1

Evaluation:

No biocides, organic halogenated compounds, pyrethroids or phthalates in measurable concentrations could be detected in the plasters submitted for testing. All measurements are below the detection limits specific to the analysis.

2.3 Solvent and odoriferous VOC substance testing

With an increasing presence of chemical substances at our workplaces and in everyday life, the ambient air quality in indoor environment has deteriorated continually. For workplaces, TLV values (threshold limit values) reflecting the concentration of harmful substances have been defined. For habitable rooms, however, where people spend much more time, there are still no legally stipulated maximum quantities or limit values for harmful substances in the indoor air. It is the declared objective of the new federal building codes in Germany and the European Construction Products Directive to protect the health of building users. The corresponding board which is responsible for finding and establishing VOC limit values is called ECA (European Collaborative Action). As early as in 1997, this board recommended the use of the so-called LCI (Lowest Concentration of Interest) as an evaluation scheme, i.e. concentrations that are just of interest from a toxicological point of view. With the exception of pesticides, volatile organic substances were classified according to the WHO definitions with respect to their boiling ranges or the volatility resulting from it. The tested materials all have boiling points, which fall into the range shown below.

Description	Boiling Range
1. Very Volatile Organic Compound (VVOC)	< 0 to 50...100 °C
2. Volatile Organic Compound (VOC)	50...100 to 240...260 °C
3. Semi Volatile Organic Compound (SVOC)	240...260 to 380...400 °C
4. Organic compound associated with particulate matter or particulate organic matter (POM)	380 °C

Test method: The tests are conducted by means of VOC emission chamber measurement according to DIN EN ISO 16000-9. The air exchange rate was adapted to the surface size of the test body. The following test parameters were selected:

Chamber Volume	Loading Factor	Air Exchange Rate	Surface of Test Device	Air Temperature	Relative Humidity
60 l	0.417 m²/m³	0.52/h ± 0.05/h	250 cm²	23°C ± 1 K	50 ± 3 %

or:

Chamber Volume	Loading Factor	Air Exchange Rate	Surface of Test Device	Air Temperature	Relative Humidity
225 l	0.39 m²/m³	0.5/h ± 0.05/h	875 cm²	23°C ± 1 K	50 ± 3 %

Volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOC) were concentrated by adsorbing them to activated charcoal. After three days, the VOCs were isolated by gas chromatography following carbon disulphide-mediated desorption. The VOCs were then identified using mass spectrometry. The individual substances were either quantified against an external toluene standard or quantified substance-specifically by mass spectrometry.

Evaluation basis: The evaluation was performed according to the standards of the "Ausschuss zur gesundheitlichen Bewertung von Bauprodukten" (Committee for the Health Assessment of

Building Products) (AgBB). It was founded in 1997 by the state workgroup "Umweltbezogener Gesundheitsschutz" (Environmental Health Protection" (LAUG) of the "Arbeitsgemeinschaft der Obersten Landesgesundheitsbehörden" (Working Committee of the Upper State Health Authorities) (AOLG).

The AgBB schema, which is updated regularly, constitutes an approach to the health assessment of VOC emissions from building products that are used on the interior of buildings.

Volatile organic compounds according to this schema encompass compounds in the retention range from C6 to C_{16}, that are examined as individual substances and sum parameters within the scope of the TVOC concept (Total Volatile Organic Compounds), as well as semi-volatile organic compounds (SVOC) in the retention range from C16 to C_{22}. The cumulative SVOC value indicates the sum of all individual substances with a detection limit of 5 µg/m³. A detection limit of 1 µg/m³ is applied for all other individual substances.

All CMR substances (carcinogenic, mutagenic, toxic to reproduction/fertility) according to the Ordinance on Hazardous Substances are not included. These always to be considered as a criterion for exclusion.

The quantification of the identified substances with NIK and CMR values is performed by substance. The quantification of the identified substances without NIK values and the unknown substances is respectively performed against toluol equivalents.

Stop criteria: The test can be terminated no sooner than 7 days after loading, if the determined values are less than half the requirements for the 28-day values and there is no significant increase in the concentration of individual substances compared to the measurement on the 3rd day.

Evaluation criteria for test performance after 3 days:

Cumulative TVOC value ($TVOC_3$) ≤ 10 mg/m³

CMR substances ≤ 0.01 mg/m³ as individual substances

Evaluation criteria for test performance after 7 days:

Review of the results as above to determine whether the stop criteria are met.

Evaluation criteria for test performance after 28 days:

Cumulative TVOC value ($TVOC_{28}$) ≤ 1.0 mg/m³

Cumulative value $SVOC_{28}$ ≤ 0.1 mg/m³

CMR substances ≤ 0.001 mg/m³ as individual substances

A sensory test is performed as well.

All CAS numbers are specified when reporting on the individual substance evaluations.

VOCs according to the NIK list are incorporated in the evaluation with a detection limit of 5 µg/m³.

For the VOC evaluation according to the NIK list, the ratio Ri is used with $R_i = C_i / NIK_i$ where it can be assumed that there is no effect when R_i does not exceed the value 1.

If several compounds with concentrations over 5 µg/m³ are identified, the cumulation of the effects is assumes. This circumstance is represented by the cumulative value R:

Where

R Cumulative value Ri of the individual measurements from the quotient total $R_i = \sum C_i / NIK_i$

C_i Substance concentration in the test chamber air

R_i Individual measurement

With the condition R > 1, the product is rejected according to the AgBB schema.

In order to avoid having a product classified as harmless even though it emits larger amounts of VOCs that cannot be evaluated, a quantity limit is established for non-identifiable VOCs or those without a NIK value which, for the cumulative value, makes up 10 % of the allowable TVOC value. A product meets the criteria if the VOCs that cannot be evaluated with a concentration of 0.005 mg/m³ and up do not exceed 0.1 mg/m³ in total.

Significantly higher values lead to rejection according to the AgBB schema.

For more details, also see the current information of the Federal Environmental Agency on the health assessment of VOC emissions from building products on the internet:

www.umweltbundesamt.de

Evaluation: When a product meets all requirements as described above, we classify it as not hazardous to health for use in the interior rooms of buildings.

Evaluation according to AgBB scheme:

Diamand Oil

Test results after 3 days:

Parameter	Measured value	AgBB-requirement
TVOC C_6 to C_{16}	1.3 mg/m³	≤ 10 mg/m³
∑ SVOC C_{16} to C_{22}	< 0.005 mg/m³	-
R of ∑ R_i	2.5	-
∑ VOC without NIK	0.01 mg/m³	-
∑ CMR- substances	< 1 µg/m³	≤ 10 µg/m³
Formaldehyde	0.008 mg/m³	-

Test results after 28 days:

Parameter	Measured value	AgBB-requirement
TVOC C_6 to C_{16}	0.3 mg/m³	≤ 1 mg/m³
∑ SVOC C_{16} to C_{22}	< 0.005 mg/m³	≤ 0.1 mg/m³
R of ∑ R_i	0.5	≤ 1
∑ VOC without NIK	< 0.001 mg/m³	≤ 0.1 mg/m³
∑ CMR- substances	< 1 µg/m³	≤ 1 µg/m³
Formaldehyde	< 0.002 mg/m³	≤ 0.1 ml/m³

No1 Wood Floor Oil:

Test results after 3 days:

Parameter	Measured value	AgBB-requirement
TVOC C_6 to C_{16}	0.7 mg/m³	≤ 10 mg/m³
∑ SVOC C_{16} to C_{22}	< 0.005 mg/m³	-
R of ∑ R_i	1.2	-
∑ VOC without NIK	< 0.005 mg/m³	-
∑ CMR- substances	< 1 µg/m³	≤ 10 µg/m³
Formaldehyde	< 0.002 mg/m³	-

Test results after 28 days:

Parameter	Measured value	AgBB-requirement
TVOC C_6 to C_{16}	0.1 mg/m³	≤ 1 mg/m³
∑ SVOC C_{16} to C_{22}	< 0.005 mg/m³	≤ 0.1 mg/m³
R of ∑ R_i	0.2	≤ 1
∑ VOC without NIK	< 0.001 mg/m³	≤ 0.1 mg/m³
∑ CMR- substances	< 1 µg/m³	≤ 1 µg/m³
Formaldehyde	< 0.002 mg/m³	≤ 0.1 ml/m³

Master Floor Oil:

Test results after 3 days:

Parameter	Measured value	AgBB-requirement
TVOC C_6 to C_{16}	4.6 mg/m³	≤ 10 mg/m³
∑ SVOC C_{16} to C_{22}	< 0.005 mg/m³	-
R of ∑ R_i	1.7	-
∑ VOC without NIK	0.005 mg/m³	-
∑ CMR- substances	< 1 µg/m³	≤ 10 µg/m³
Formaldehyde	0.004 mg/m³	-

Test results after 28 days:

Parameter	Measured value	AgBB-requirement
TVOC C_6 to C_{16}	0.62 mg/m³	≤ 1 mg/m³
∑ SVOC C_{16} to C_{22}	< 0.005 mg/m³	≤ 0.1 mg/m³
R of ∑ R_i	0.22	≤ 1
∑ VOC without NIK	< 0.005 mg/m³	≤ 0.1 mg/m³
∑ CMR- substances	< 1 µg/m³	≤ 1 µg/m³
Formaldehyde	< 0.002 mg/m³	≤ 0.1 ml/m³

Maintenance Oil:

Test results after 3 days:

Parameter	Measured value	AgBB-requirement
TVOC C_6 to C_{16}	0.4 mg/m³	≤ 10 mg/m³
∑ SVOC C_{16} to C_{22}	< 0.005 mg/m³	-
R of ∑ R_i	0.4	-
∑ VOC without NIK	0.02 mg/m³	-
∑ CMR- substances	< 1 µg/m³	≤ 10 µg/m³
Formaldehyde	0.003 mg/m³	-

Test results after 28 days:

Parameter	Measured value	AgBB-requirement
TVOC C_6 to C_{16}	0.01 mg/m³	≤ 1 mg/m³
∑ SVOC C_{16} to C_{22}	< 0.005 mg/m³	≤ 0.1 mg/m³
R of ∑ R_i	0.01	≤ 1
∑ VOC without NIK	< 0.005 mg/m³	≤ 0.1 mg/m³
∑ CMR- substances	< 1 µg/m³	≤ 1 µg/m³
Formaldehyde	< 0.002 mg/m³	≤ 0.1 ml/m³

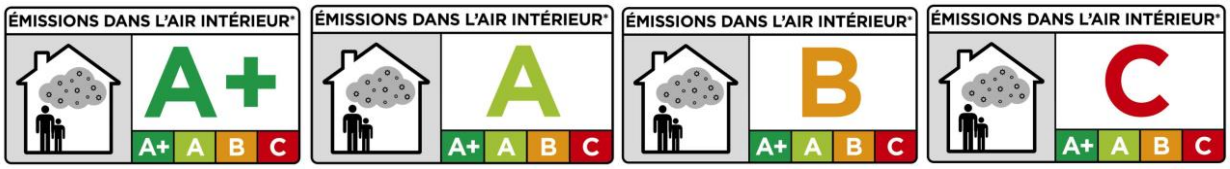
Evaluation:

Based on the measurement results and the comparison of measures according to the AgBB schema as well as the approval principles of the DIBt, exposure to emissions of volatile organic compounds due to the tested product is not expected. Using the products in the interior rooms of buildings is therefore harmless in regard to VOC emissions.

2.4 French VOC ordinance

In order to be brought to market in France, all building products as well as decorative elements and furnishings have to be identified with an emission class since January 2012 (A+, A, B, C) based on VOC emission testing according to the ISO 16000 series of standards. For products that were already available in the French market prior to January 2012, this rule only becomes man-

datory starting in September of 2013. A+ identifies products that are virtually free of emissions, while the C rating represents a level that is only just tolerable. The appearance of the labels has been specified in detail.



The building product has to be permanently identified with the emission class in addition to the CE marking with a minimum size of 15 x 30 mm. Products with emissions that significantly exceed these requirements may no longer be brought to market in France. Only metallic building elements, mineral glass products and products used only on the exterior are exempt. The testing system corresponds to the AgBB (Committee for the Health Assessment of Building Products) requirements in Germany, which are also used as the evaluation standard by the "Deutsches Institut für Bautechnik" (German Institute for Building Technology) (DIBt).

This validation method constitutes a significant simplification compared to the elaborate tests according to the AgBB requirements, and provides sufficiently accurate information on the emission behaviour of a material. Detailed information, e.g. on CMR (carcinogenic, mutagenic, toxic to reproduction) substances cannot be derived.

The classification into emission classes is performed by the manufacturer or operator under its own responsibility. The emission class limit values in µg/m³ refer to the cumulative value of total emissions as well as the evaluation for 10 significant harmful substances:

Substance	**Emission classes according to French VOC directive**				**Measured value**
	[µg/m³]				
	C	**B**	**A**	**A+**	
Formaldehyde	> 120	< 120	< 60	< 10	< 2
Acetaldehyde	> 400	< 400	< 300	< 200	< 2
Toluene	> 600	< 600	< 450	< 300	< 1
Tetrachloroethylene	> 500	< 500	< 350	< 250	< 1
Xylol	> 400	< 400	< 300	< 200	< 1
1,2,4-trimethylbenzene	> 2000	< 2000	< 1500	< 1000	< 1
1,4-dichlorobenzene	> 120	< 120	< 90	< 60	< 1
Ethylbenzene	> 1500	< 1500	< 1000	< 750	< 1
2-butoxyethanol	> 2000	< 2000	< 1500	< 1000	< 1
Styrene	> 500	< 500	< 350	< 250	< 1
Cumulative value TVOC	> 2000	< 2000	< 1500	< 1000	260[1]/ 205[2]/ 770[3] / 70[4]

[1]Diamand Oill, [2] No 1Wood Floor Oil, [3] Master Floor Oil, [4]Maintenance Oil

Evaluation: None of the tested substances could be detected in measurable concentrations with the exception of formaldehyde and acetaldehyde. The measured values are below the

specific limit of detection set for each analysis so the tested products are assigned to emission class A+.

2.5 Migration of specific elements

Contamination with heavy metals can have devastating health effects. Illnesses caused by lead or quicksilver are widely known, but other heavy metals can also have a severe impact on health. It is therefore important to keep the exposure to heavy metals as low as possible, for example through the quality of foodstuffs and also in garden fertilisation.

Consequently, the concentration of heavy metals should be as low as possible, for instance in furniture stains, carpets or similar products that may get in direct contact with the skin.

The product under review was tested according to EN 71-3 to exclude contamination with heavy metals.

All results are given in mg/kg and refer to the soluble element.

Maintenance Oil:

Element	B	Al	$Cr^{(III)}$/ $Cr^{(VI)}$	Mn	Co	Ni
Limits (Cat. II, mg/kg))	300	71406	9.4 / 0.005	300	2.6	18.8
Analysis results	< 0.05*	< 0.25*	Total Cr < 0.02/ < 0.005*	11	< 0.05*	< 0.25*

Element	Se	Sr	Cd	Sn	Organozinn	Ba
Limits (Cat. II, mg/kg)	9.4	1125	0.3	13750	0.2	375
Analysis results	< 0.5*	260	< 0.05*	2.3	< 0.2*	3.2

Element	Hg	Pb	Sb	Zn	As	Cu
Limits (Cat. II, mg/kg))	1.9	3.4	11.3	938	0.9	156
Analysis results	< 0.05*	< 0.05*	< 0.25*	< 0,25*	< 0,05*	< 0,05*

* Detection limit

Master Floor Oil:

Element	B	Al	$Cr^{(III)}$/ $Cr^{(VI)}$	Mn	Co	Ni
Limits (Cat. II, mg/kg))	300	71406	9.4 / 0.005	300	2.6	18.8
Analysis results	0.3	< 0.25*	Total Cr < 0.02/ < 0.005*	9.4	< 0.05*	< 0.25*

Element	Se	Sr	Cd	Sn	Organozinn	Ba
Limits (Cat. II, mg/kg)	9.4	1125	0.3	13750	0.2	375
Analysis results	< 0.5*	130	< 0.05*	0.24	< 0.2*	1.6

Element	Hg	Pb	Sb	Zn	As	Cu
Limits (Cat. II, mg/kg))	1.9	3.4	11.3	938	0.9	156
Analysis results	0.07	< 0.05*	< 0.25*	< 0.25*	< 0.05*	< 0.05*

* Detection limit

Invisible Oil:

Element	B	Al	$^{Cr\ (III)}/_{Cr\ (VI)}$	Mn	Co	Ni
Limits (Cat. II, mg/kg))	300	71406	9.4 / 0.005	300	2.6	18.8
Analysis results	< 0.05*	19	Total Cr < 0.02/ < 0.005*	61	< 0.05*	< 0.25*

Element	Se	Sr	Cd	Sn	Organozinn	Ba
Limits (Cat. II, mg/kg)	9.4	1125	0.3	13750	0.2	375
Analysis results	< 0.5*	0.36	< 0.08*	0.24	< 0.2	0.37

Element	Hg	Pb	Sb	Zn	As	Cu
Limits (Cat. II, mg/kg))	1.9	3.4	11.3	938	0.9	156
Analysis results	< 0.05*	< 0.05*	< 0.25*	0.85	< 0.05*	0.07

* Detection limit

Industrial Oil:

Element	B	Al	$^{Cr\ (III)}/_{Cr\ (VI)}$	Mn	Co	Ni
Limits (Cat. II, mg/kg))	300	71406	9.4 / 0.005	300	2.6	18.8
Analysis results	< 0.05*	< 0.25*	Total Cr < 0.02/ < 0.005*	29	< 0.05*	< 0.25*

Element	Se	Sr	Cd	Sn	Organozinn	Ba
Limits (Cat. II, mg/kg)	9.4	1125	0.3	13750	0.2	375
Analysis results	< 0.5*	340	< 0.05*	< 0.08*	< 0.2	3

Element	Hg	Pb	Sb	Zn	As	Cu
Limits (Cat. II, mg/kg))	1.9	3.4	11.3	938	0.9	156
Analysis results	< 0.05*	< 0.05*	< 0.25*	1.5	< 0.05*	0.08

* Detection limit

Wood Floor Oil:

Element	B	Al	$Cr_{(III)}$/ $Cr_{(VI)}$	Mn	Co	Ni
Limits (Cat. II, mg/kg))	300	71406	9.4 / 0.005	300	2.6	18.8
Analysis results	< 0.05*	< 0.25*	Total Cr < 0.02/ < 0.005*	13	< 0.05*	< 0.25*

Element	Se	Sr	Cd	Sn	Organozinn	Ba
Limits (Cat. II, mg/kg)	9.4	1125	0.3	13750	0.2	375
Analysis results	< 0.5*	240	< 0.05*	< 0.08*	< 0.2	2.1

Element	Hg	Pb	Sb	Zn	As	Cu
Limits (Cat. II, mg/kg))	1.9	3.4	11.3	938	0.9	156
Analysis results	< 0.05*	< 0.05*	< 0.25*	< 0.25*	< 0.05*	< 0.05*

* Detection limit

Hardwax Oil:

Element	B	Al	$Cr_{(III)}$/ $Cr_{(VI)}$	Mn	Co	Ni
Limits (Cat. II, mg/kg))	300	71406	9.4 / 0.005	300	2.6	18.8
Analysis results	< 0.05*	< 0.25*	Total Cr < 0.02/ < 0.005*	43	< 0.05*	< 0.25*

Element	Se	Sr	Cd	Sn	Organozinn	Ba
Limits (Cat. II, mg/kg)	9.4	1125	0.3	13750	0.2	375
Analysis results	< 0.5*	< 0.25*	< 0.05*	< 0.08*	< 0.2	< 0.25*

Element	Hg	Pb	Sb	Zn	As	Cu
Limits (Cat. II, mg/kg))	1.9	3.4	11.3	938	0.9	156
Analysis results	< 0.05*	< 0.05*	< 0.25*	< 0.25*	< 0.05*	< 0.05*

* Detection limit

Evaluation: Based on the measurement values which are below the specified limit values, contamination with heavy metals is not expected.

3. Overall assessment

Based on the tests that were conducted, the tested WOCA products from the company Wood-Care can be classified as safe in regards to the criteria of the seal of approval guidelines defined by the Institut für Baubiologie Rosenheim GmbH.

Notices on awarding and using the seal of approval

In order to ensure neutrality and impartiality, all tests were carried out by independent third parties. We commission the required studies and tests from economically independent laboratories with which we have been maintaining long-standing business relationships. All test results contained in this expert report have been taken from the external test reports. They are archived and can be viewed by the ordering party at any time. The logo of the seal of approval as shown below is protected by copyright. All rights are owned by the IBR.

This seal of approval must always be used in conjunction with the entire product name. The manufacturer may only use the seal of approval in advertising for the specific products for which it was awarded. The manufacturer is obliged not to try to mislead consumers as to for which products the seal of approval has been awarded and for which not. This also applies to the term "TESTED AND APPROVED BY THE IBR".

The "IBR" mark may only be used as a constituent part of the seal of approval.

It is possible to apply for an extension before the period of validity expires. Continued use of the seal of approval depends on the results from the subsequent tests performed by the IBR. Subsequent testing will always be performed according to the seal of approval guidelines valid at the time of testing.

The manufacturers are obliged to inform the IBR in due time of any modification of the product that might have any impact on the product relevant to building biology.

In case of misuse, the institute may prohibit the use of the seal of approval without notice. Employees of the IBR or persons charged by the IBR may at any time, even without prior notice, visit the applicant's production site.

Rosenheim, 13.10.2017

Reimut Hentschel | Manager Dr. Nicole Dannenbauer | Dipl.-Chem.

Bibliography

Within the framework of quality management, we also aim to provide sufficient transparency of our processes to third parties. Among other things, this includes listing all parties involved in the certification process.

Laboratories	Investigations	Address	Internet
Indikator GmbH	Heavy metals content	Kaiserstraße 86 a 42329 Wuppertal/Germany +49 (0)202 2641085	www.indikator-labor.de info@indikator-labor.de
IAF Radioökologie GmbH	Radioactivity	Wilhelm-Rönsch-Str. 9 D-01454 Radeberg +49 (0)3528487300	www.iaf-dresden.de info@iaf-dresden.de
MPA	VOC/biocides Formaldehyde Fine dusts Building design certificates	Alfred-Möller-Straße 1 D-16225 Eberswalde /Germany +49 (0)33 34 65 560	www.mpawede office@mpaew.de
Eurofins Consumer Product Testing GmbH	Heavy metal content	Am Neuländer Gewerbepark 4 D-21079 Hamburg +49 (0)40 49294 6859	www.Product-Testing.eurofins.com service@eurofins.de

All of the aforementioned parties are economically independent companies who provide commercial laboratory analyses in their own name and on their own account.