

TEST REPORT

TÜV SÜD Industrie Service GmbH

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Industrie Service

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Report No.: **22-Y2034-2**

Client: YSHIELD GmbH & Co. KG
Rotthofer Straße 1
D-94099 Ruhstorf

Sample receipt: 02.03.2022

Internal laboratory no.: 20220308499, 20220409693 – 20220409699
20220411882 - 20220411884

Name of product: **Yshield Eco P-xxx** (Eco P-100-53 was tested)

Test basis: TM-22 „Wallpaper“ edition 08-2020
(Heavy metals by migration, SVOC, Emissions)

Test period: 22.03.2022 – 03.05.2022

Results: All limit values of the tested parameters of the guideline
TM 22 "Wallpaper" edition 08-2020 were complied with.

Date: 2022-05-11

Our reference:
IS-USL-MUC/HS

Document:
test report 22-Y2034-2.docx

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7 Pages and 1 attachment.
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The test results refer exclusively
to the units under test.

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1 Sample Information

Type of product: Shielding wallpaper
Sample name: YSHIELD Eco P-100-53
Specification of sample: Roll 60 cm x 60 cm

2 Measured test results

2.1 Heavy metals by Migration according EN 71-3

Parameter	Testing method	RL ¹ [mg/kg]	Limit value ² [mg/kg]	Measured value [mg/kg]
Arsenic	DIN EN 71-3:2021-06	1	≤ 5	< RL
Lead		1	≤ 20	< RL
Cadmium		1	≤ 5	< RL
Chromium		1	≤ 5	< RL
Cobalt		1	≤ 20	< RL
Nickel		1	≤ 20	< RL
Mercury		1	≤ 2	< RL
Tin		1	≤ 10	< RL

2.2 Chromium VI

Parameter	Testing method	RL ¹ [mg/kg]	Limit value ² [mg/kg]	Measured value [mg/kg]
Chromium VI	Deriving from measurement of total chromium DIN EN 71-3:2021-06	1	≤ 1	< RL

2.3 Semi-volatile organic compounds

Parameter	Testing method	RL ¹ [mg/kg]	Limit value ² [mg/kg]	Measured value [mg/kg]
SVOC ³	SAA-L-1516:2021-11 (Solvent extraction/GC-MS)	100	≤ 500	< RL

2.4 Emission of volatile organic compounds

2.4.1 Test method

The tests in the emission test chamber were performed according to following standards:

- - DIN EN 16516:2020-10
- - DIN EN ISO 16000-9:2008-04
- - DIN EN 16402:2019-08



2.4.2 Specification of the emission test chamber

Parameter	Description
Volume	212 Litres
Material	Glass
Equipment	Ventilator, humidity and temperature sensor
Air supply	Cleaned air (activated charcoal)
Temperature	23 °C ± 1 °C
Relative humidity	50 % ± 5 %
Air flow	0,1 m/s - 0,3 m/s
Air exchange rate	0,5 h ⁻¹ ± 5 %
Loading factor	1 m ² product surface / m ³ volume test chamber
Specific area air exchange rate	0,36 m ³ /m ² h

2.4.3 Analyses-method

Cartridge/Tube	Parameter	Analyses - method
TENAX TA-tube	Volatile organic compounds (VOC)	DIN EN ISO 16000-6:2020-08-E
DNPH-cartridge	Aldehydes	DIN EN ISO 16000-3:2021-03-E

2.4.4 Sample preparation and sampling

Loading factor: 1 m²/m³
Sample surface: 0,212 m²
Preconditioning: none

The emissions were determined after 3, 7 and 28 days.

2.4.5 Test results Emission chamber

Test results after 3 days

Parameter	CAS No.	Retention time [min]	Conc. [µg/m ³]	Toluene Eq. [µg/m ³]	Spec. SER [µg/(m ² *h)]	R value
VOC with LCI						
Acetic acid	64-19-7	2,1	19	4	10	0,016
Sum VOC with LCI	-	-	19	4	10	-
VOC without LCI						
Non detectable						
Sum VOC without LCI	-	-	< 2	< 2	< 1	-
VVOC-substances						
Non detectable						
TVVOC	-	-	< 2	< 2	< 1	-
SVOC-substances						
Non detectable						
TSVOC	-	-	< 2	< 2	< 1	-



Parameter	CAS No.	Retention time [min]	Conc. [$\mu\text{g}/\text{m}^3$]	Toluene Eq. [$\mu\text{g}/\text{m}^3$]	Spec. SER [$\mu\text{g}/(\text{m}^2\cdot\text{h})$]	R value
CMR-substances						
Sum CMR	-	-	< 1	< 1	< 1	-
R value						0,016
TVOC			19	4	10	-

Test results after 7 days

Parameter	CAS No.	Retention time [min]	Conc. [$\mu\text{g}/\text{m}^3$]	Toluene Eq. [$\mu\text{g}/\text{m}^3$]	Spec. SER [$\mu\text{g}/(\text{m}^2\cdot\text{h})$]	R value
VOC with LCI						
Non detectable						
Sum VOC with LCI	-	-	< 2	< 2	< 1	-
VOC without LCI						
Non detectable						
Sum VOC without LCI	-	-	< 2	< 2	< 1	-
VVOC-substances						
Non detectable						
TVVOC	-	-	< 2	< 2	< 1	-
SVOC-substances						
Non detectable						
TSVOC	-	-	< 2	< 2	< 1	-
CMR-substances						
Sum CMR	-	-	< 1	< 1	< 1	-
Aldehydes						
Formaldehyde	50-00-0	-	13	-	6	0,13
Acetaldehyde	75-07-0	-	< 2	-	< 1	< 0,001
Propanal	123-38-6	-	< 3	-	< 1	< 0,001
Butanal	123-72-8	-	< 8	-	< 3	< 0,001
Glutaraldehyde	111-30-8	-	< 2	-	< 1	< 0,001
2-Butenal	123-73-9	-	< 3	-	< 1	< 0,001
Propenal	107-02-8	-	< 3	-	< 1	< 0,001
Ketones						
Acetone	67-64-1	-	< 8	-	< 3	< 0,001
R value						0,13
TVOC			< 2	< 2	< 1	-



Test results after 28 days

Parameter	CAS No.	Retention time [min]	Conc. [$\mu\text{g}/\text{m}^3$]	Toluene Eq. [$\mu\text{g}/\text{m}^3$]	Spec. SER [$\mu\text{g}/(\text{m}^2\cdot\text{h})$]	R value
VOC with LCI						
Non detectable						
Sum VOC with LCI	-	-	< 2	< 2	< 1	-
VOC without LCI						
Non detectable						
Sum VOC without LCI	-	-	< 2	< 2	< 1	-
VVOC-substances						
Non detectable						
TVOC	-	-	< 2	< 2	< 1	-
SVOC-substances						
Unidentifiable SVOC (1 peak)	-	20,73	4	4	2	-
TSVOC	-	-	4	4	2	-
CMR-substances						
Sum CMR	-	-	< 1	< 1	< 1	-
Aldehydes						
Formaldehyde	50-00-0	-	6	-	3	0,06
Acetaldehyde	75-07-0	-	< 2	-	< 1	< 0,001
Propanal	123-38-6	-	< 3	-	< 1	< 0,001
Butanal	123-72-8	-	< 8	-	< 3	< 0,001
Glutaraldehyde	111-30-8	-	< 2	-	< 1	< 0,001
2-Butenal	123-73-9	-	< 3	-	< 1	< 0,001
Propenal	107-02-8	-	< 3	-	< 1	< 0,001
Ketones						
Acetone	67-64-1	-	< 8	-	< 3	< 0,001
R value						0,06
TVOC			< 2	< 2	< 1	-

Detection limit depending on the substance 1 - 10 $\mu\text{g}/\text{m}^3$

Note: The following substances were extracted via DNPH cartridges and analysed using HPLC:
 Formaldehyde, Acetaldehyde, Propanal, Butanal, Pentanal, 2-Butenal, Glutaraldehyde, Acetone

2.4.6 Comparison with the limit values

Parameter	Limit value after 3 days $\mu\text{g}/\text{m}^3$	Measured value after 3 days $\mu\text{g}/\text{m}^3$
TVOC	-	19
TVOC without acetic acid ⁴	≤ 5.000	< 2
VOC (incl. VVOC und SVOC) classified in ⁵ : Regulation (EC) No. 1272/2008: Categories Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B; TRGS 905: K1A, K1B, M1A, M1B, R1A, R1B; IARC ⁶ Group 1 & 2A; DFG MAK-List: Category III1, III2	n. d. ⁷	< 1
Parameter	Limit value after 28 days $\mu\text{g}/\text{m}^3$	Measured value after 28 days $\mu\text{g}/\text{m}^3$
TVOC	-	< 2
TVOC without acetic acid ⁴	≤ 300	< 2
VOC (incl. VVOC und SVOC) classified in ⁵ : Regulation (EC) No. 1272/2008: Categories Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B; TRGS 905: K1A, K1B, M1A, M1B, R1A, R1B; IARC ⁶ Group 1 & 2A; DFG MAK-List: Category III1, III2	n. d. ⁷	< 1
Sum (VOC) without LCI ⁸	≤ 100	< 2
VOC (Individual amounts):		
Sum bicyclic Terpenes	≤ 200	< 2
Sum sensitising substances classified in: DFG (MAK-List): Category IV, TRGS 907	≤ 100	6
Sum VOC (incl. VVOC und SVOC) classified in: Regulation (EC) Nr. 1272/2008: Categories Carc. 2, Muta. 2, Repr. 2; TRGS 905: K2, M2, R2; IARC ⁶ : Group 2B; DFG (MAK-List): Category III3	≤ 50	< 2
Sum C9 – C14 Alkanes / Iso-alkanes	≤ 200	< 2
Sum C4 – C11 Aldehyde, acyclic, aliphatic	≤ 100	< 2
Sum C9 – C15 Alkylbenzenes	≤ 100	< 2
Sum Cresols	≤ 5	< 5
Sum Xylenes	≤ 100	< 2
VOC (Individual substances):		
Styrene	≤ 30	< 2
Benzaldehyde	≤ 20	< 2
2-Ethyl-1-hexanol, Ethylene glycol monobutyl ether, 2-Hexoxyethanol, Methyl-isobutyl ketone (Limit values per individual substance)	≤ 100	< 2
2-Butoxyethyl acetate	≤ 200	< 2
Propane-1,2-diol	≤ 60	< 5
2-Phenoxyethanol	≤ 30	< 5
Phenol	≤ 20	< 2
Total semi-volatile organic compounds (TSVOC between C ₁₆ – C ₂₂)	≤ 100	4
Formaldehyde	≤ 24	6
Acetaldehyde	≤ 24	< 2
R-Value ⁹	Value ≤ 1	Value 0,06



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Notes:

Unless otherwise agreed, declared for the individual case, or normatively specified, PASS or FAIL verdicts are given based on the measured value without any considerations of measurement uncertainties (decision rule). Every test method has a measurement uncertainty which has been evaluated by the laboratory and is available on request. By taking measurement uncertainties into account, it might happen that measured values can neither be assessed as PASS nor as FAIL. Please inform us if you intend to use a different decision rule as part of your own conformity assessment. We are glad to provide you with the relevant information on the expanded measurement uncertainty.

¹ RL: report limit

² Limit value according to TÜV SÜD guideline TM-22 "wallpaper" edition 08-2020

³ SVOC: quantification of semi-volatile substances in the retention range C14 and C22

⁴ After adsorption to Tenax TA with the test methods DIN EN 16516 and DIN EN 16402 (non-polar column HP5), Acetic acid cannot be determined quantitatively and only with a high measurement uncertainty. Therefore, the results are not included in the TVOC. When calculating the R value, however, acetic acid is considered.

⁵ Exceptions apply to formaldehyde and similarly acetaldehyde (Classification: Carc. 1B) due to an assumed "Practical threshold", below which there is no expectation of a significant carcinogenic risk. For these substances individual examinations are conducted.

⁶ IARC = International agency for research on cancer

⁷ n.d. = not determinable; Limit of quantification = 1 µg/m³

⁸ LCI = Low concentrations of interest, it always applies the latest LCI list from the AgBB

⁹ R-Value = Sum of all quotients (concentration_i / NIK_i); based on the AgBB scheme (values up to 1,49 are allowed)