

TFI Report 460347-01

Emission Testing

for the Approval According to DIBt Criteria

Customer

LG Hausys Ltd.
One IFC, 20 Yeouido-gong, Yeongdeungpo-gu
150-876 Seoul
REPUBLIC OF KOREA

Product

resilient floor covering
Medistep Origin 3M

Responsible at TFI

Dr. Anja Krick
Tel: +49 241 9679 143
a.krick@tfi-aachen.de

This report includes 2 pages and 2 annex(es).

Aachen, 03 May 2016

Dr. Jens-Christian Winkler
authorized manager

The present document is provided with a qualified electronic signature and is valid without autograph signature.



This report only applies to the tested samples and has been established to the best of our knowledge. Only the entire report shall be reproduced. Under no circumstances, extracts shall be used. Furthermore, we apply the "General Terms and Conditions for the Execution of Contracts" of the TFI Aachen GmbH, also with regard to the order execution.

1 Transaction

Test order	Approval testing according to the "Principles for health assessment of construction products used in interiors" of "Deutsches Institut für Bautechnik" (DIBt, 2010)
Order date	24 February 2016
Your reference	Yana Choi
Product designation	Medistep Origin 3M
TFI sample number	16-02-0242
Date of manufacture	--
Date of sample receipt	25 February 2016
Sampling performed by	customer no sampling report

2 Product Specification

cf. annex Emissions

3 Results

DIBt approval testing requirements fulfilled

The tested specimen fulfils in every particular the requirements of DIBt.

The present report does not replace any National Technical Approval within the scope of a building control procedure.

4 Annexes

Emission ^a	E 460347-01
Sampling report	none

The annexes marked ^a are based on tests accredited in accordance with EN ISO/IEC 17025.

Evaluation according to AgBB 2015

E 460347-01

1. General Information

Testing laboratory	TFI Aachen GmbH
Responsible laboratory staff	Norbert Beckers
Number of the test report	E 460347-01
Client/Applicant	LG Hausys Ltd.
Name of the product and material number	Medistep Origin 3M, Artikel Nr./ article no. -- , TFI Probennummer/ TFI sample no. 16-02-0242
Control type	Other
Date of batch production	
Date of receipt of the sample	2016-02-25
Storage of the sample until testing	geschützt vor Kontaminationen / saved for contaminations
Product Group	PVC floor coverings
Flooring is	null
Surface coating	null
backed underlay	null

Description of the construction product:










Parameter	Manufacturer	Laboratory
General description of the product	Elastischer Bodenbelag / resilient floor covering	Elastischer Bodenbelag / resilient floor covering
Underlayer	PVC	PVC
Underlayer		
Adhesive		
Adhesive		
Total thickness		
Area weight		
Surface coating		
Surface coating		
Additional information		

Comments

2. Test parameter

Date of the completion of the test specimen	2016-03-21
Preparation of the test specimen by	Birgit Hönisch
Used auxiliary materials	Glasplatte, Aluminiumfolie / glassplate, aluminiumfoil
Start of preconditioning	
Placing of the test specimen into the test chamber and start of testing	2016-03-21
Arrangement of the test specimen in the test chamber	mittig auf Gestell / centered on rack
Covering of the edges? Ratio of covered edges to uncovered edges?	komplett umklebte Kanten / covered edges
Use of the break-off criteria	No
Manufacturer/type of the test chamber	TFI Aachen GmbH
Material of the test chamber	Edelstahl / stainless steel
Volume of the test chamber [m³]	0.25
Area of the test specimen [m²]	0.1
Air exchange rate [1/h]	0.5
Area specific air flow rate [m/h]	1.250
Temperature [°C]	23.0
Relative humidity [%]	50.0
Comments on testing	<p>EN ISO 16000-11:2006 EN ISO 16000-9:2006 ISO 16000-6:2011 EN ISO 16017-1:2000 ISO 16000-3:2011</p> <p>VOC Probennahme auf Tenax, ca. 5 l, 80 ml/min Thermodesorption / Gaschromatographie / Massenspektrometrie (TD/GC/MS) Gerstel Thermodesorber / Kaltaufgabesystem, Agilent GC/MS, unpolare Kapillarsäule</p> <p>Aldehyde und Ketone Probennahme auf DNPH-Kartuschen, ca. 50 l, 1000 ml/min Lösungsmitteldesorption / Flüssigchromatographie / Dioden Array Detektor (HPLC/DAD) Agilent HP 1200 / DAD, C18-Säule, ternäres Eluentengemisch</p> <p>VOC sampling on Tenax, approx. 5 l, 80 ml/min Thermal desorption / gas chromatography / mass spectrometry (TD/GC/MS) Gerstel thermal desorber/ cooled injection system, Agilent GC/MS non-polar capillary column</p> <p>Aldehydes and ketones sampling on DNPH cartridges, approx. 50 l, 1000 ml/min Solvent desorption / liquid chromatography / diode array detector (HPLC/DAD) Agilent HP 1200 / DAD, C18-column, ternary eluent mixture</p>

3. Evaluation for AgBB 2015




Parameter	Day 3					Day 7				Day 28			
	  					 				 			
	[µg/m³]	[mg/m³]	[mg/m³]	[mg/m³]	[mg/m³]	[µg/m³]	[mg/m³]	[mg/m³]	[mg/m³]	[µg/m³]	[mg/m³]	[mg/m³]	[mg/m³]
TVOC	20	0.0	0.3	10.0	>10.0	-	-	0.5	>0.5	8	0.0	1.0	>1.0
S SVOC	0	0.00	0.03	>0.03	-	-	-	0.05	>0.05	0	0.0	0.1	>0.1
R-Value *	2.000	2.0	0.5	>0.5	-	-	-	0.5	>0.5	0.800	1	1	>1
S VOC w/o LCI	0	0.00	0.05	>0.05	-	-	-	0.05	>0.05	0	0.0	0.1	>0.1
S Carcinogenic	0	0.000	0.001	0.01	>0.01	-	-	0.001	>0.001	0	0.000	0.001	>0.001
Total							-						

DIBt Parameter

Formaldehyde	0	0.000	0.060	>0.060	-	-	-	0.060	>0.060	-	-	0.120	>0.120
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Additional Information

S VVOC	0	0	-	-	-	-	-	-	-	0	0	-	-
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*) dimension less  Pass  Continue  Fail

4. Measurement

4.1. Day 3

Date of measurement: 2016-03-24
TVOC ISO 16000-6: 23 µg/m³

CAS-No.	Compound name	Ret. Range	RT [min]	C [µg/m ³]	Identification	C_tol [µg/m ³]	Quantification	Comment	Ri	LCI Value
	saturated aliphatic hydrocarbons until C8	VOC	7.032	3	Tol. equiv.	3	III		0.000	15000
100-52-7	Benzaldehyde	VOC	13.104	2	specific	2	II		0.000	90
108-95-2	Phenol	VOC	13.375	20	specific	13	II		2.000	10
104-76-7	2-Ethyl-1-hexanol	VOC	14.651	4	specific	3	I		0.000	300
	other saturated n- and iso-alcohols, C11-C13	VOC	24.866	3	specific	2	II	Dodecanol	0.000	500
	Not identified SVOC	SVOC	28.137	4	Tol. equiv.	4	III	Terpene	-	-
50-00-0	Formaldehyde	VVOC	1,005.2	0	DNPH		I		0.000	100 (VVOC)

4.2. Day 28

Date of measurement: 2016-04-18
TVOC ISO 16000-6: 12 µg/m³

CAS-No.	Compound name	Ret. Range	RT [min]	C [µg/m ³]	Identification	C_tol [µg/m ³]	Quantification	Comment	Ri	LCI Value
116-09-6	1-Hydroxyacetone	VOC	7.036	2	similar	1	III		0.000	2400
108-95-2	Phenol	VOC	13.161	8	specific	5	II		0.800	10
104-76-7	2-Ethyl-1-hexanol	VOC	14.436	2	specific	1	I		0.000	300
	Not identified VOC	VOC	16.254	2	Tol. equiv.	2	III		-	-

CAS-No.	Compound name	Ret. Range	RT [min]	C [$\mu\text{g}/\text{m}^3$]	Identification	C_tol [$\mu\text{g}/\text{m}^3$]	Quantification	Comment	Ri	LCI Value
	other saturated n- and iso-alcohols, C11-C13	VOC	24.663	2	specific	1	II	Dodecanol	0.000	500
	Not identified SVOC	SVOC	27.919	2	Tol. equiv.	2	III	Terpen	-	-
	Not identified SVOC	SVOC	30.943	1	Tol. equiv.	1	III	alkyl. Phthalat	-	-

5. Images

5.1. Specimen image

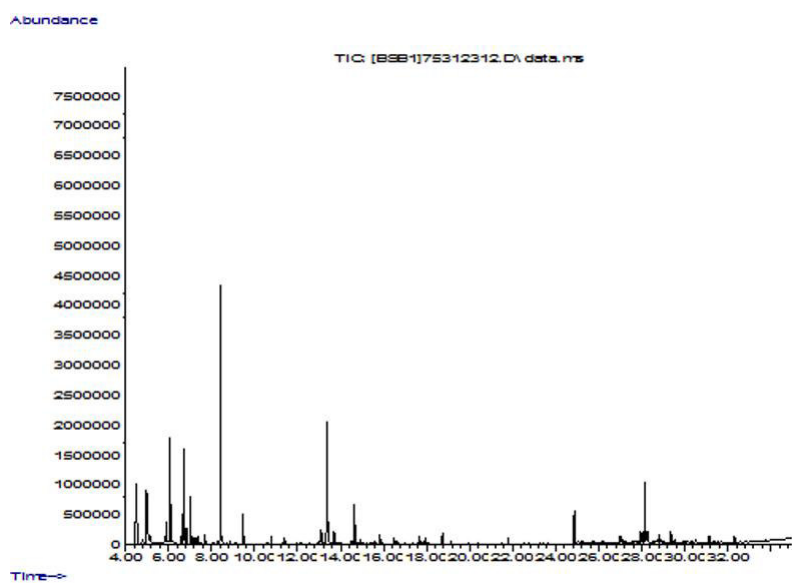


5.2. Product image



6. Chromatograms

6.1. Day 3



6.2. Day 28

