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## VOC TEST REPORT

### AgBB

04 January 2016

### 1 Sample Information

Sample name	Balance click+
Batch no.	-
Production date	-
Product type	PVC flooring
Sample reception	05/11/2015

### 2 Brief Evaluation of the Results

Regulation or protocol	Conclusion	Version of regulation or protocol
AgBB	Pass	AgBB of June 2012. DIBt of October 2010

Full details based on the testing and direct comparison with limit values is available in the following pages



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### 3 Applied Test Methods

#### 3.1 General Test References

Regulation, protocol or standard	Version	Reporting limit VOC [ $\mu\text{g}/\text{m}^3$ ]	Calculation of TVOC	Combined uncertainty <sup>a</sup> [RSD(%)]
CEN/TS 16516	October 2013	5	Toluene equivalents	22.5%
ISO 16000 -3 -6 -9 -11	2006-2011 depending on part	2	Toluene equivalents	22.5%
AgBB/DIBt	June 2012/October 2010	5	Compound Specific	22.5%

#### 3.2 Specific Laboratory Sampling and Analyses

Procedure	External Method	Internal S.O.P.	Quantification limit	Analytical principle	Uncertainty <sup>a</sup> [RSD(%)]
Sample preparation	ISO 16000-11:2006, EN16402:2013, CDPH, AgBB/DIBt, EMICODE	71M549810	-	-	-
VOC emission chamber testing	ISO 16000-9:2006, CEN/TS 16516:2013	71M549811	-	Chamber and air control	-
Sampling of VOC	ISO 16000-6:2011, CEN/TS 16516:2013	71M549812	5 L	Tenax TA	-
Analysis of VOC	ISO 16000-6:2011, CEN/TS 16516:2013	71M542808B	1 $\mu\text{g}/\text{m}^3$	ATD-GC/MS	10%
Sampling of aldehydes	ISO 16000-3:2011, CEN/TS 16516:2013	71M549812	35 L	DNPH	-
Analysis of aldehydes	ISO 16000-3:2011, EN 717-1, CEN/TS 16516:2013	71M548400	3-6 $\mu\text{g}/\text{m}^3$	HPLC-UV	10%

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## 4 Test Parameters, Sample Preparation and Deviations

### 4.1 VOC Emission Chamber Test Parameters

Parameter	Value	Parameter	Value
Chamber volume, V[L]	119	Preconditioning period	-
Air Change rate, $n[h^{-1}]$	0.5	Test period	18/11/2015 - 16/12/2015
Relative humidity of supply air, RH [%]	$50 \pm 3$	Area specific ventilation rate, q [m/h or m <sup>3</sup> /m <sup>2</sup> /h]	1.25
Temperature of supply air, T [°C]	$23 \pm 1$	Loading factor [m <sup>2</sup> /m <sup>3</sup> ]	0.4

### 4.2 Preparation of the Test Specimen

Edges and back were covered with aluminium foil and aluminium tape.

### 4.3 Picture of Sample



### 4.4 Deviations from Referenced Protocols and Regulations

No deviations from the referenced test methods were observed.

## 5 Results

### 5.1 VOC Emission Test Results after 3 Days

	CAS No.	Retention time [min]	ID-Cat	Specific Conc. [µg/m³]	Toluene eq. [µg/m³]	Specific SER [µg/(m²*h)]	R <sub>D</sub>
<b>VOC with NIK</b>							
1-Methoxy-2-propanol *	107-98-2	2.56	1	18	8.0	23	0.0050
Methylmethacrylate	80-62-6	2.99	1	3.8	1.7	4.8	-
2-Ethyl-1-hexanol	104-76-7	8.80	1	17	12	21	0.031
2-Ethylhexyl acetate	103-09-3	10.39	1	1.5	1.4	1.9	-
2-Ethylhexyl acrylate	103-11-7	11.31	1	1.6	1.4	2.0	-
<b>VOC without NIK</b>							
3,3,5-Trimethyl-, ciscyclohexanol *	933-48-2	9.15	2	1.4	1.4	1.7	-
Not identified *	-	10.83	4	1.9	1.9	2.4	-
Not identified *	-	11.81	4	1.3	1.3	1.6	-
Not identified *	-	12.11	4	3.7	3.7	4.6	-
<b>Sum of VOC without NIK</b>				< 5	< 5	< 7	
<b>TVOC</b>				35	20	44	
<b>VVOC compounds</b>							
None determined							
<b>TVVOC</b>				< 5	< 5	< 7	
<b>SVOC compounds</b>							
None determined							
<b>TSVOC</b>				< 5	< 5	< 7	
<b>Carcinogens</b>							
<b>Total carcinogens</b>				< 1	< 1	< 2	
<b>Aldehydes</b>							
Formaldehyde	50-00-0		1	< 3	-	< 4	
Acetaldehyde	75-07-0		1	< 3	-	< 4	
Propionaldehyde	123-38-6		1	< 3	-	< 4	
Butyraldehyde	123-72-8		1	< 3	-	< 4	
<b>R-values</b>							0.036

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## 5.2 VOC Emission Test Results after 28 Days

	CAS No.	Retention time [min]	ID-Cat	Specific Conc. [µg/m <sup>3</sup> ]	Toluene eq. [µg/m <sup>3</sup> ]	Specific SER [µg/(m <sup>2</sup> *h)]	R <sub>D</sub>
<b>VOC with NIK</b>							
1-Methoxy-2-propanol *	107-98-2	2.55	1	9.6	4.1	12	0.0026
Methylmethacrylate	80-62-6	2.98	1	3.7	1.7	4.7	-
2-Ethyl-1-hexanol	104-76-7	8.79	1	6.4	4.7	8.1	0.012
<b>VOC without NIK</b>							
None determined							
<b>Sum of VOC without NIK</b>				< 5	< 5	< 7	
<b>TVOC</b>				16	< 5	20	
<b>VVOC compounds</b>							
None determined							
<b>TVVOC</b>				< 5	< 5	< 7	
<b>SVOC compounds</b>							
None determined							
<b>TSVOC</b>				< 5	< 5	< 7	
<b>Carcinogens</b>							
<b>Total carcinogens</b>				< 1	< 1	< 2	
<b>Aldehydes</b>							
Formaldehyde	50-00-0		1	< 3	-	< 4	
Acetaldehyde	75-07-0		1	< 3	-	< 4	
Propionaldehyde	123-38-6		1	< 3	-	< 4	
Butyraldehyde	123-72-8		1	< 3	-	< 4	
<b>R-values</b>							0.015

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## 6 Summary and Evaluation of the Results

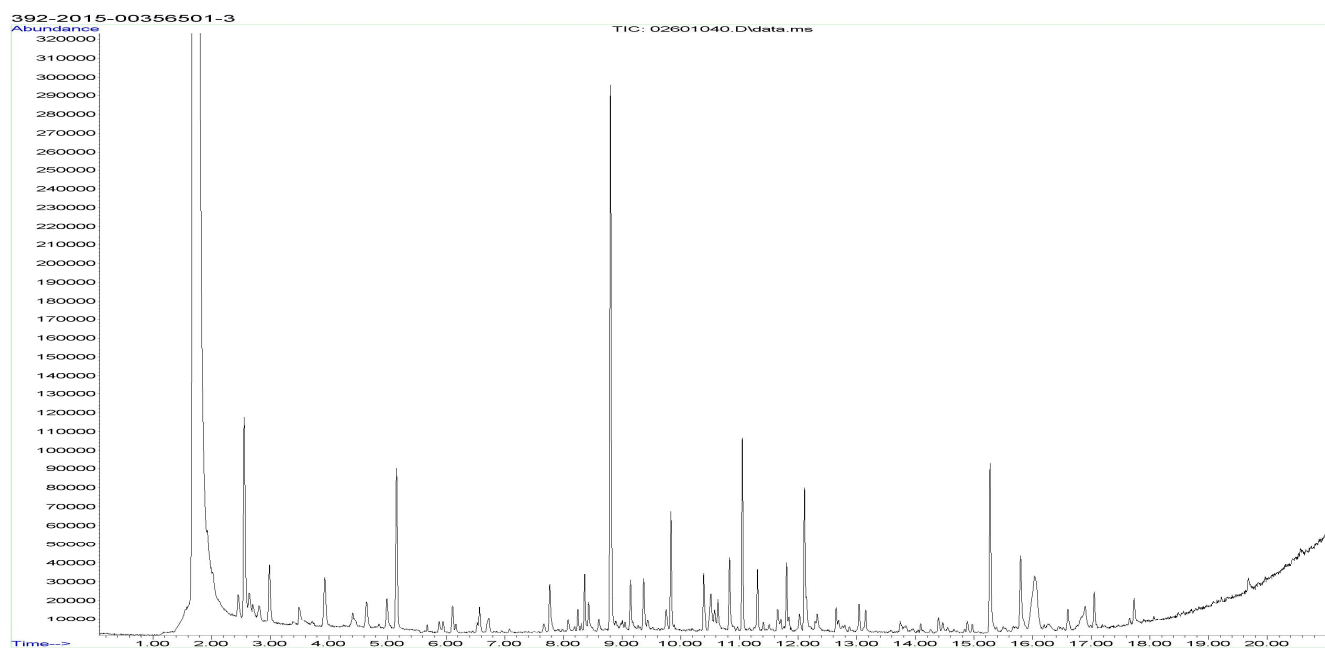
### 6.1 Comparison with Limit Values of AgBB

Parameter	Test after 3 days		Test after 28 days	
	Concentration mg/m <sup>3</sup>	Limit Value mg/m <sup>3</sup>	Concentration mg/m <sup>3</sup>	Limit Value mg/m <sup>3</sup>
<b>TVOC</b>	0.035	≤ 10	0.016	≤ 1.0
<b>TSVOC</b>	< 0.005	-	< 0.005	≤ 0.1
<b>R-value (dimensionless)</b>	0.036	-	0.015	≤ 1
<b>Sum without NIK</b>	< 0.005	-	< 0.005	≤ 0.1
<b>Formaldehyde</b>	-	-	< 0.003	≤ 0.1
<b>Total carcinogens</b>	< 0.001	≤ 0.01	< 0.001	≤ 0.001

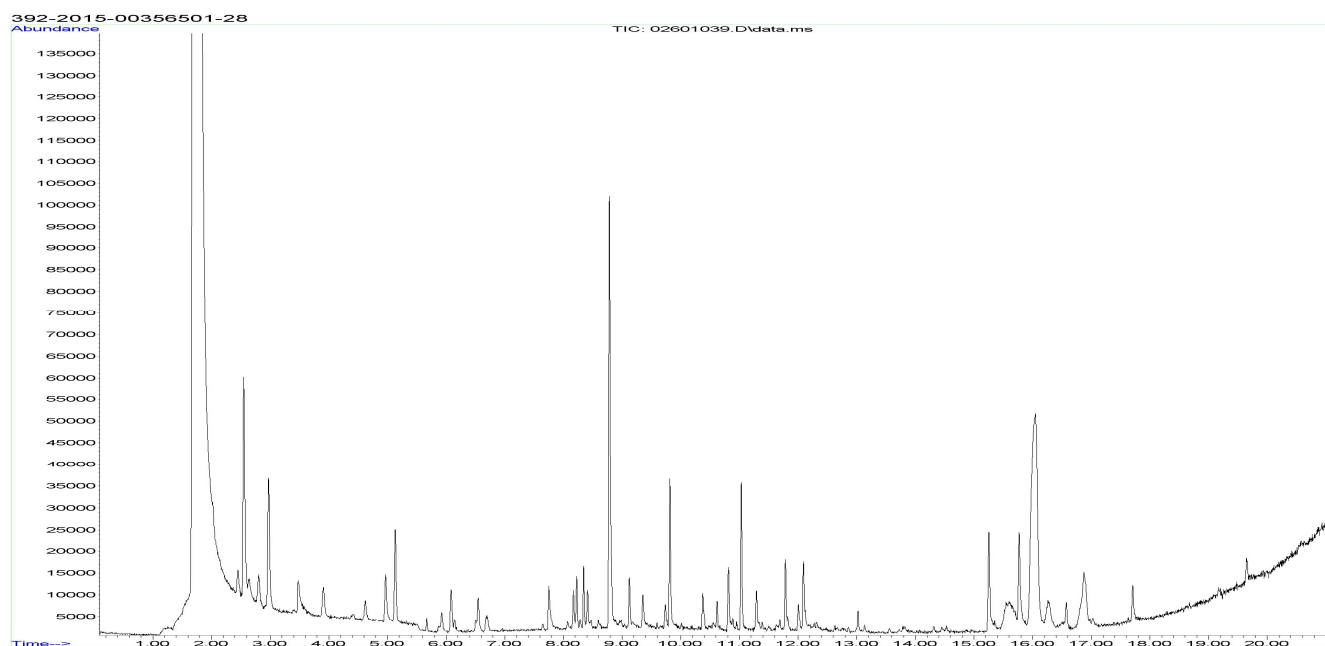
Compliance with the limits alone does not entitle to use the AgBB requirements in conjunction with approval by DIBt. This requires an application, site inspection, and approval. See [www.eurofins.com/dibt-procedures](http://www.eurofins.com/dibt-procedures).

## 7 Appendices

### 7.1 Chromatogram of VOC Emissions after 3 Days



### 7.2 Chromatogram of VOC Emissions after 28 Days



Please consider the different scales.

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### 7.3 ADAM

1. Allgemeine Angaben - General information		
Prüfstelle Testing laboratory	Eurofins Product Testing A/S	
Verantwortlicher Prüfer Responsible laboratory staff	Lise Clement	
Prüfberichts-nr. Number of the test report	392-2015-00356501_D_EN	
Kunde/Antragsteller Client/Applicant	UNILIN Flooring / Quick-Step	
Produktname und Artikel-nr. Name of the product and material number	Balance click+	
Aktenzeichen beim DIBt File number at DIBt	Stellen- zeichen	SVA-Nr.    Sachgebiet    lfd. Nr.    Jahr (2 Ziffern)    Unter- sachgebiet
Art der Prüfung Type of testing	A	S <sub>CL</sub> S <sub>C</sub> S <sub>CL</sub>
Probenbezeichnung Name of the sample	Balance click+	
Datum des Probeneingangs bei der Prüfstelle Date of receipt of the sample	DATE05/11/2015	
Lagerung der Probe bis zur Prüfung Storage of the sample until testing	unopened at room temperature	
2. Beschreibung des Bauprodukts - Description of the construction product		
Bitte auswählen! Choose, please!	<input type="checkbox"/> Textile Bodenbeläge - Textile floor coverings <input type="checkbox"/> Laminat und Paneele - Laminates and panels <input type="checkbox"/> Parkette und Holzfußböden - Parquet and wood floorings <input type="checkbox"/> Elastische Bodenbeläge - Resilient floor coverings <input type="checkbox"/> Beschichtungen - Coatings <input type="checkbox"/> Korkbodenbeläge - Cork floor coverings <input type="checkbox"/> Sportbodenbeläge - Surfaces for sport areas <input type="checkbox"/> Oberflächenbeschichtungen - Surface coatings <input type="checkbox"/> Bodenbelagskleber - Adhesives for floor coverings <input type="checkbox"/> Verlegeunterlagen - Underlayers <input type="checkbox"/> Sonstige Produkte - Other products	
<b>Elastische Bodenbeläge - Resilient floor coverings</b>	<b>Herstellerangaben Manufacturer's data</b>	<b>Prüfstellenangaben Testing laboratory's data</b>
Allgemeine Produktbeschreibung (z.B. PVC, Kautschuk, PUR, Polyolefin, Linoleum) General description of the product (e.g. PVC, rubber, polyurethane, polyolefin, linoleum)	PVC	PVC
Abmessung der gelieferten Probe [mm x mm] Dimensions of the delivered sample [mm x mm]		
Bei PVC-Belägen bitte angeben, ob heterogen oder homogen Please specify for PVC floor coverings, if it's heterogeneous or homogeneous		
Herstellungsart Manufacturing method		
Oberflächengestaltung Surface design		
Farbgestaltung/Musterung Colour design/patterning		
Trittschalldämmung (falls vorhanden) Impact sound insulation (if relevant)	Produktbeschreibung Product description	
	Dicke [mm] Thickness [mm]	
Kleber für Trittschalldämmung Adhesive used for impact sound insulation	Bezeichnung Product name	
	Auftragsmenge [g/m <sup>2</sup> ] Coating quantity [g/m <sup>2</sup> ]	
Gesamtdicke [mm] Total thickness [mm]		
Flächengewicht [g/m <sup>2</sup> ] Area weight [g/m <sup>2</sup> ]		
Oberflächenbeschichtung (falls vorhanden) Surface coating (if relevant)	Chemische Basis Chemical basis	
	Auftragsmenge [g/m <sup>2</sup> ] Applied quantity [g/m <sup>2</sup> ]	
Kantenabdeckung? Verhältnis der offenen zu den abgedeckten Kanten? Covering of the edges? Ratio of covered edges to uncovered edges?		All edges covered
weitere Angaben Additional information		
3. Bemerkungen (z.B. Produktbesonderheiten, Abweichungen von "Grundsätzen zur gesundheitlichen Bewertung von Bauprodukten in Innenräumen" etc.) (neue Zeile mit [ALT] + [RETURN]) Comments (e.g. particularities on the product, variation of the "Principles for health assessment of construction products used in interiors" etc.) (new line with [ALT] + [RETURN])		
DIBt file number and product data were not delivered by manufacturer and have to be inserted into the ADAM report by Eurofins Product Testing A/S before sending the report to DIBt.		

ADAM: 2012: 08: 3

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<b>Produktname - Name of the product</b>		<b>Balance click+</b>	
Datum der Prüfkörperherstellung Date of the manufacture of the test specimen		18/11/2015	
Herstellung des Prüfkörpers durch Preparation of the test specimen by		HBA	
verwendete Hilfsmaterialien used auxiliary materials		Aluminium foil and aluminium tape	
<b>Prüfung - Testing</b>		<b>Datum</b> date	<b>Uhrzeit</b> time
Beginn der Vorkonditionierung Start of preconditioning		$t_{0-x}$	
Einbringen der Probe in die Prüfkammer und Beginn der Prüfung Placing of the test specimen into the test chamber and start of testing		$t_0$	18/11/2015 09:02
erste Probenahme first sampling		$t_{3d}$	21/11/2015 08:33
zweite Probenahme second sampling		$t_{7d}$	
dritte Probenahme third sampling		$t_{28d}$	16/12/2015 08:32
Prüfkörperanordnung in der Prüfkammer Arrangement of the test specimen in the test chamber		mittig / in the middle	
Anwendung der Abbruchkriterien Use of the break-off criteria		3d/7d	
<b>Prüfkammer - Test chamber</b>			
Hersteller/Typ der Prüfkammer Manufacturer/type of the test chamber		Eurofins	
Material der Prüfkammer Material of the test chamber		Edelstahl / Stainless steel	
Volumen der Prüfkammer Volume of the test chamber	[m <sup>3</sup> ]	0,12	
Fläche der Probe Area of the test specimen	[m <sup>2</sup> ]	0,05	
Luftwechselrate Air exchange rate	[h <sup>-1</sup> ]	0,50	
flächenspezifische Luftdurchflussrate q Area specific air flow rate	[mh <sup>-1</sup> ]	1,25	
Temperatur Temperature	[°C]	50 ± 3	
relative Luftfeuchte relative humidity	[%]	23 ± 1	
<b>Berücksichtigungsgrenzen - Limits of consideration</b>		$C_i$ [µg/m <sup>3</sup> ]	
Substanzen mit NIK-Wert Substances with LCI value		5	*) mit Ausnahme aller cancerogenen Substanzen, hier gilt Nachweisgrenze with exception of all carcinogenic substances, detection limit applies here
alle anderen Substanzen*) all other substances		5	
<b>LCI list 2012</b> <b>AgBB scheme 2012</b>			
<b>Anmerkungen zur Prüfung</b> (neue Zeile mit [ALT] + [RETURN]) Comments on testing (new line with [ALT] + [RETURN])			

ADAM\_2012\_08\_3

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Emissionen nach 3 Tagen Emission after 3 days				Retentionbereich Retention range	Quantifizierung Quantification	Identifikation Identification	C <sub>i</sub> [µg/m <sup>3</sup> ]	SER <sub>i</sub> [µg/m <sup>3</sup> h]	Zuordnung Classification [canc./NIK/o.NIK] [canc./LCI/no LCI]	R <sub>i</sub>	lfd. Nr. Serial number	ADAM_2012_08_3	legend VVOC = < C <sub>6</sub> VOC = C <sub>6</sub> - C <sub>16</sub> SVOC = C <sub>16</sub> - C <sub>22</sub>  a = substanzspezifisch substance-specific b = substanzähnlich substance-like c = Toluoläquivalent toluene equivalent d = DNPH  1 = Klasse 1 class 1 2 = Klasse 2 class 2 3 = Klasse 3 class 3
Balance click+	Kommentar Comment	CAS-No.	RT [min]										
<b>gefundenen Substanzen</b> Detected substances													<b>Daten nur über den Button "Messergebnisse eingeben/löschen" in diese Tabelle eintragen</b> Data to be entered only via the button "enter/delete results"
1-Methoxy-2-propanol		107-98-2	2,56	VOC	a	1	18	22,50	3700	0,005	6-8	1	
Methyl methacrylate		80-62-6	2,99	VOC	a	1	4	4,75	2100	0,002	10-8	1	
2-Ethyl-1-hexanol		104-76-7	8,80	VOC	a	1	17	21,25	540	0,031	4-10	1	
Cyclohexanol, 3,3,5-trimethyl-, cis-		933-48-2	9,15	VOC	c	2	1	1,75	ohne NIK			0	
2-Ethylhexyl acetate		103-09-3	10,39	VOC	a	1	2	1,88	690	0,002	10-12	1	
Not identified		-	10,83	VOC	c	3	2	2,38	ohne NIK			0	
2-Ethylhexyl acrylate		103-11-7	11,31	VOC	a	1	2	2,00	380	0,004	10-16	1	
Not identified		-	11,81	VOC	c	3	1	1,63	ohne NIK			0	
Not identified		-	12,11	VOC	c	3	4	4,63	ohne NIK			0	

Emissionen nach 28 Tagen Emission after 28 days				Retentionbereich Retention range	Quantifizierung Quantification	Identifikation Identification	C <sub>i</sub> [µg/m <sup>3</sup> ]	SER <sub>i</sub> [µg/m <sup>3</sup> h]	Zuordnung Classification [canc./NIK/o.NIK] [canc./LCI/no LCI]	R <sub>i</sub>	lfd. Nr. Serial number	ADAM_2012_08_3	legend VVOC = < C <sub>6</sub> VOC = C <sub>6</sub> - C <sub>16</sub> SVOC = C <sub>16</sub> - C <sub>22</sub>  a = substanzspezifisch substance-specific b = substanzähnlich substance-like c = Toluoläquivalent toluene equivalent d = DNPH  1 = Klasse 1 class 1 2 = Klasse 2 class 2 3 = Klasse 3 class 3
Balance click+	Kommentar Comment	CAS-No.	RT [min]										
<b>gefundenen Substanzen</b> Detected substances													<b>Daten nur über den Button "Messergebnisse eingeben/löschen" in diese Tabelle eintragen</b> Data to be entered only via the button "enter/delete results"
1-Methoxy-2-propanol		107-98-2	2,55	VOC	a	1	10	12,00	3700	0,003	6-8	1	
Methyl methacrylate		80-62-6	2,98	VOC	a	1	4	4,63	2100	0,002	10-8	1	
2-Ethyl-1-hexanol		104-76-7	8,79	VOC	a	1	6	8,00	540	0,012	4-10	1	
Formaldehyd		50-00-0	0,00	VVOC	d	1	0	0,00			7-22	1	

<b>Probenbezeichnung</b> Name of the sample	Balance click+		Wichtige Informationen (important information)		Tabellenblätter schützen protect worksheets		
<b>Aktenzeichen beim DIBt</b> File number of DIBt							
<b>Prüfinstitut</b> Testing laboratory	Eurofins Product Testing AS				Blattschutz aufheben unprotect worksheets		
<b>Ergebnisüberblick</b> General view of the results  ADAM_2012_08_3	3 Tage (days)			7 Tage (days) Keine Daten vorhanden - No data available		28 Tage (days)	
	Ergebnisse results	AgBB Anforderungen requirements	Abbruchkriterien break-off criteria	Ergebnisse results	Abbruchkriterien break-off criteria	Ergebnisse results	AgBB Anforderungen requirements
	µg/m <sup>3</sup>	mg/m <sup>3</sup>	mg/m <sup>3</sup>	µg/m <sup>3</sup>	mg/m <sup>3</sup>	µg/m <sup>3</sup>	mg/m <sup>3</sup>
[A] TVOC (C <sub>6</sub> - C <sub>16</sub> )	35	0 ≤ 10 mg/m <sup>3</sup>	0,0 ≤ 0,3 mg/m <sup>3</sup>	0	0,0 ≤ 0,5 mg/m <sup>3</sup>	16	0,0 ≤ 1,0 mg/m <sup>3</sup>
[B] Σ SVOC (C <sub>16</sub> - C <sub>22</sub> )	0	keine none	0,00 ≤ 0,03 mg/m <sup>3</sup>	0	0,00 ≤ 0,05 mg/m <sup>3</sup>	0	0,0 ≤ 0,1 mg/m <sup>3</sup>
[C] R (dimensionlos/dimensionless)	0,036	keine none	0,0 ≤ 0,5	0,000	0,0 ≤ 0,5	0,014	0 ≤ 1
[D] Σ VOC o. NIK without LCI	0	keine none	0,00 ≤ 0,05 mg/m <sup>3</sup>	0	0,00 ≤ 0,05 mg/m <sup>3</sup>	0	0,0 ≤ 0,1 mg/m <sup>3</sup>
[E] Σ Cancerogene	0	0,00 ≤ 0,01 mg/m <sup>3</sup>	0,000 ≤ 0,001 mg/m <sup>3</sup>	0	0,000 ≤ 0,001 mg/m <sup>3</sup>	0	0,000 ≤ 0,001 mg/m <sup>3</sup>
Dieser Block liefert zusätzliche Information This part gives some additional information							
[F] VVOC (< C <sub>6</sub> )	0			0		0	
[G] VOC (C <sub>6</sub> - C <sub>16</sub> ) als Toluoläquivalent as toluene equivalent	20	← Wert manuell eingeben! Enter value manually!		← Wert manuell eingeben! Enter value manually!		< 5	← Wert manuell eingeben! Enter value manually!
[H] Formaldehyd Formaldehyde	n.n.	keine none	≤ 0,060 mg/m <sup>3</sup>	n.n.	≤ 0,060 mg/m <sup>3</sup>	0	0,000 ≤ 0,120 mg/m <sup>3</sup>

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## 7.4 How to Understand the Results

### 7.4.1 Acronyms Used in the Report

- < Means less than
  - > Means bigger than (Tube/GC-MS overload)
  - \* Not a part of our accreditation
  - ± Um(%) is given as 2x RSD%. Please see section regarding Uncertainty in the Appendices.
  - § Deviation from method. Please see deviation section
  - a The method is not optimal for very volatile compounds. For these substances smaller results and a higher measurement uncertainty cannot be ruled out.
  - b The component originates from the wooden panels and is thus removed.
  - c The results have been corrected by the emission from wooden panels.
  - d Very polar organic compounds are not suitable for reliable quantification using tenax TA adsorbent and HP-5 GC column. A high degree of uncertainty must be expected.
- SER Specific emission rate.

### 7.4.2 Explanation of ID Category

#### Categories of Identity:

- 1: Identified and specifically calibrated
- 2: Identified by comparison with a mass spectrum obtained from library and supported by other information. Calibrated as toluene equivalent.
- 3: Identified by comparison with a mass spectrum obtained from a library. Calibrated as toluene equivalent.
- 4: Not identified, calibrated as toluene equivalent.

## 7.5 Applied LCI and NIK Values

### 7.5.1 LCI/NIK Values for Compounds found after 3 Day Measurements

Compound	CAS No.	AgBB 2012 NIK [µg/m <sup>3</sup> ]
1-Methoxy-2-propanol *	107-98-2	3700
Methylmethacrylate	80-62-6	2100
2-Ethyl-1-hexanol	104-76-7	540
2-Ethylhexyl acetate	103-09-3	690
2-Ethylhexyl acrylate	103-11-7	380

### 7.5.2 LCI/NIK Values for Compounds found after 28 Day Measurements

Compound	CAS No.	AgBB 2012 NIK [µg/m <sup>3</sup> ]
1-Methoxy-2-propanol *	107-98-2	3700
Methylmethacrylate	80-62-6	2100
2-Ethyl-1-hexanol	104-76-7	540

## 7.6 Qualitative Description of VOC Emission Test

### 7.6.1 Test Chamber

The test chamber is made of stainless steel. A multi-step air clean-up is performed before loading the chamber, and a blank check of the empty chamber is performed.

The chamber operation parameters are as described in the test method section. (CEN/TS 16516, ISO 16000-9, internal method no.: 71M549811).

### 7.6.2 Expression of the Test Results

All test results are calculated as specific emissions rate, and as extrapolated air concentration in the European Reference Room (CEN/TS 16516, AgBB, EMICODE, M1 and Indoor Air Comfort).

### 7.6.3 Testing of Carcinogenic VOCs

The emission of carcinogens (EU Categories C1A and C1B, as per European law) is tested by drawing sample air from the test chamber outlet through Tenax TA tubes after the specified duration of storage in the ventilated test chamber. Analysis is performed by ATD-GC/MS (automated thermal desorption coupled with gas chromatography and mass spectroscopy using 30 m HP-5 (slightly polar) column with 0.25 mm ID and 0.25 µm film, Agilent) (CEN/TS 16516, ISO 16000-6, internal methods no.: 71M549812 / 71M542808B).

All identified carcinogenic VOCs are listed; if a carcinogenic VOC is not listed then it has not been detected. Quantification is performed using the TIC signal and authentic response factors, or the relative response factors relative to toluene for the individual compounds.

This test only covers substances that can be adsorbed on Tenax TA and can be thermally desorbed. If other emissions occur, then these substances cannot be detected (or with limited reliability only).

### 7.6.4 Testing of VOC, SVOC and VVOC

The emissions of volatile organic compounds are tested by drawing sample air from the test chamber outlet through Tenax TA tubes after the specified duration of storage in the ventilated test chamber. Analysis is performed by ATD-GC/MS using HP-5 column (30 m, 0.25mm ID, 0.25µm film) (CEN/TS 16516, ISO 16000-6, internal methods no.: 71M549812 / 71M542808B).

All single substances that are listed with a LCI/NIK value in the latest publications (hereafter referred to as target compounds) are identified if present. All other appearing VOCs are identified as far as possible. Quantification of target compounds is done using the TIC signal and authentic response factors, or the relative response factors relative to toluene. For certain compound groups, which differ significantly in chemistry from toluene, quantification is performed relative to a representative member of the group for more accurate and precise results. This can include quantification of for example glycols and acids. In addition to that, all results are also expressed in toluene equivalents. All non-target compounds, as well as all non-identified substances, are quantified in toluene equivalents.

The results of the individual substances are calculated in three groups depending on their retention time when analyzing using a non-polar column (HP-1):

- Volatile Organic Compounds (VOC) are defined as: All substances eluting between and including n-hexane (n-C6) and n-hexadecane (n-C16)
- Semi-Volatile Organic Compounds (SVOC) are defined as: All substances eluting after n-hexadecane (n-C16) and before and including n-docosane (n-C22)
- Very Volatile Organic Compounds (VVOC) are defined as: All substances eluting before n-hexane (n-C6).

Total Volatile Organic Compounds (TVOC) is calculated by summation of all individual VOCs with a concentration  $\geq 5 \mu\text{g}/\text{m}^3$ . The TVOC can be expressed either in toluene equivalents as defined in CEN/TS 16516 and similar to ISO 16000-6, or as the sum of concentrations using specific or relative response factors. In the case of summation of concentrations using authentic or relative response factors, the toluene equivalent is applied to all non-target and non-identified VOCs before summing up. Compounds regarded as VOC in line with the above definition but elute before n-C6 or after n-C16 on the HP-5 column are treated as VOC, and are thus added to the TVOC.

Total Semi-Volatile Organic Compounds (TSVOC) is calculated by the summation of all individual SVOCs expressed in toluene equivalents with a concentration  $\geq 5 \mu\text{g}/\text{m}^3$ , as defined in CEN/TS 16516. VOCs that are regarded as VOC in line with the above definition, but elute after n-C16 in this test, are not added to the TSVOC.

Total Very Volatile Organic Compounds (TVVOC) is calculated by the summation of all individual VVOCs with a concentration  $\geq 5 \mu\text{g}/\text{m}^3$  and expressed in toluene equivalents. VOCs that are regarded as VOC in line with the above definition, but elute before n-C6 in this test, are not added to the TVVOC.

This test only covers substances which can be adsorbed on Tenax TA and can be thermally desorbed. If emissions of substances outside these specifications occur then these substances cannot be detected (or with limited reliability only).

#### 7.6.5 Calculation of R Values with LCI Lists

The concentrations of detected compounds  $\geq 5 \mu\text{g}/\text{m}^3$  are divided by their respective LCI/NIK value (if defined in the given publication). The sum of the quotients gives the R value, which can be mathematically expressed:

$$R = \sum_i^n \left( \frac{c_i}{\text{NIK}_i} + \dots + \frac{c_n}{\text{NIK}_n} \right)$$

This R value is calculated, depending on the purpose of this test, for the European LCI list, for the German LCI/NIK list ( $R_D$ ), and/or for the Belgian LCI list ( $R_B$ ).

All VOCs without published LCI/NIK value and concentration  $\geq 5 \mu\text{g}/\text{m}^3$  are summed up as sum of VOCs without LCI/NIK if required by the standard or protocol.

#### 7.6.6 Testing of Aldehydes

The presence of aldehydes after the specified duration of storage in the ventilated test chamber is tested by drawing air samples from the test chamber outlet through DNPH-coated silicagel tubes after the specified duration of storage in the ventilated test chamber. Analysis is performed by solvent desorption and subsequently by HPLC and UV-/diode array detection (CEN/TS 16516, ISO 16000-3, VDI 3862 Blatt 3, internal methods no.: 71M549812 / 71M548400).

The absence of formaldehyde and other aldehydes is stated if UV detector response at the specific wavelength is lacking at the specific retention time in the chromatogram. Otherwise it is checked whether the reporting limit is exceeded. In this case the identity is finally checked by comparing full scan sample UV spectra with full scan standard UV spectra.

### 7.7 Quality Assurance

Before loading the test chamber, a blank check of the empty chamber is performed and compliance with background concentrations in accordance with CEN/TS 16516 / ISO 16000-9 is determined.

Air sampling at the chamber outlet and subsequent analysis is performed in duplicate. Relative humidity, temperature and air change rate in the chambers is logged every 5 minutes and checked daily. A double determination is performed on random samples at a regular interval and results are registered in a control chart to ensure the uncertainty and reproducibility of the method.

The stability of the analytical system is checked by a general function test of device and column, and by use of control charts for monitoring the response of individual substances prior to each analytical sequence.

## 7.8 Accreditation

The testing methods described above are accredited on line with EN ISO/IEC 17025 by DANAK (no. 522). This accreditation is valid worldwide due to mutual approvals of the national accreditation bodies (ILAC/IAF, see also [www.eurofins.com/galten.aspx#accreditation](http://www.eurofins.com/galten.aspx#accreditation)).

Not all parameters are covered by this accreditation. The accreditation does not cover parameters marked with an asterisk (\*), however analysis of these parameters is conducted at the same level of quality as for the accredited parameters.

## 7.9 Uncertainty of the Test Method

The relative standard deviation of the overall analysis is 22.5%. The expanded uncertainty  $U_m$  equals 2 x RSD. For further information please visit [www.eurofins.dk/uncertainty](http://www.eurofins.dk/uncertainty).