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Braunschweig, 24 March 2020

Test report No. QA-2020-1196

Customer:	Green Angel Sp. z o.o. ul. Mokotowska 49 00-542 Warsaw (Poland)										
Product name:	Melamine faced particleboard LE - low emission structure SM, 18 mm										
WKI-ID-No.:	0098_2020										
Receipt of sample:	11 February 2020										
Start of test:	18 February 2020										
Objective of the test:	Determination of the formaldehyde release according to EN 717-1										
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This test report comprises 3 pages, 2 tables and 1 figure.

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The test results exclusively refer to the objects of the test. The test material was used up.



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1. Task

The Fraunhofer Institute for Wood Research, Wilhelm-Klauditz-Institut WKI, was entrusted by Messrs. Green Angel Sp. z o.o. in 00-542 Warsaw (Poland) with the determination of formaldehyde emission of a wood-based panel according to chamber method EN 717-1:2005 "Wood-based panels – Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method".

The determination of formaldehyde release should be carried out according to the test methods required by the German Ordinance on bans and restrictive measures for the marketing of hazardous substances, preparations and products according to the Chemicals Act (Chemicals Prohibition Ordinance; Chemikalien-Verbotsverordnung, ChemVerbotsV).

The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) announced the new analytical procedures for the sampling and investigation in the German "Bundesanzeiger" (German Federal Gazette) with date of 26 November 2018. The required test methods are mentioned in table 1 of this test report.

2. Test material

Product:	particleboard; faced on both sides
Product name:	Melamine faced particleboard LE – low emission structure SM, 18 mm
Product code:	decor D-6887
Thickness [mm]:	18
Manufacturer:	Kronospan Mielec Sp. z o.o. ul Wojska Polskiego 3
Production date ref. customer:	2020-01-23
WKI-ID-No.:	0098_2020

The sample material was selected by the customer, marked and sent to the WKI for examination. The test material arrived at WKI packed in polyethylene foil on 11 February 2020, was marked with WKI-ID-No. "0098_2020" and stored under room conditions until the test start on 18 February 2020.

3. Execution of the test

For the determination of formaldehyde release the samples were placed vertical and approximately in the centre of the closed chamber, with their surfaces parallel to the direction of the air flow, and separated by not less than 200 mm. The summary of chamber parameter, number of samples and sizes are mentioned in table 2.

Prior to testing the edges were sealed gas-tight with aluminium foil to get a ratio U (unsealed edges) / A (surface area) of 1.5 m/m^2 and correspond to the large chamber ratio. The edges were sealed air-tight by using self-adhesive aluminium tape.

The concentration of formaldehyde in the chamber was measured twice a day by drawing app. 0.12 m^3 air from the chamber through gas washing bottles filled with absorption solution. The formaldehyde content of the aqueous solution was determined photometrically or fluorimetrically by the acetyl acetone method. Sampling has been periodically continued until the formaldehyde concentration in the chamber has reached a steady-state.

4. Test result

For the tested sample named "Melamine faced particleboard LE - low emission structure SM – Thickness: 18 mm" of Messrs. Green Angel Sp. z o.o. in 00-542 Warsaw (Poland) tested according to EN 717-1 following formaldehyde release was determined in the test chamber:

test period [h]	formaldehyde release in the chamber EN 717-1	
	[mg/m ³]	[ppm]
243	0.010	0.01

The course of formaldehyde release is shown in figure 1 enclosed to the test report. The blank value of the chamber before starting the test was determined with ≤ 0.006 mg/m³ resp. 0.005 ppm (1 ppm $\hat{=}$ 1.24 mg HCHO/m³ air at 23°C and 1013 hPa).

5. Assessment of test result

According to the German Ordinance on bans and restrictive measures for the marketing of hazardous substances, preparations and products according to the Chemicals Act (Chemicals Prohibition Ordinance; German: Chemikalien-Verbotsverordnung, ChemVerbotsV), Appendix 1 to Section 3, Prohibition on entry into force, "Entry 1: Formaldehyde" Clause 2 (1), coated and uncoated wood-based materials (particleboards, blockboard, veneer boards and fibreboards) shall not be placed on the market if the level of formaldehyde in the air determined as steady-state concentration in chamber caused by the wood-based material exceeds 0.1 ml/cbm (ppm).

Based on the results the tested material complies with the formaldehyde limit value of the German Chemicals Prohibition Ordinance (ChemVerbotsV) with start on January 1, 2020 mentioned below:

Requirement of limit value fulfilled?	Test method [test result]	Evaluation acc. limit value	ChemVerbotsV [BMU Veröffentlichung Prüfverfahren 2018-11-26] valid from 2020-01-01
Chamber method	EN 717-1 [x factor 2.0]	0.1 ppm formaldehyde	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no

We draw your attention to the fact that the effected test was made as a material parameter and not as a classifying test.

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Official in charge



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Table 1: Analytical procedures for sampling and testing announced by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) with regard to formaldehyde for fulfillment of the German Chemicals Prohibition Ordinance (ChemVerbotsV), published on 26 November 2018

Here: »Bekanntmachung analytischer Verfahren für Probenahmen und Untersuchungen für die in Anlage 1 der ChemVerbotsV genannten Stoffe und Stoffgruppen«

Annex 1 (to § 3) ChemVerbotsV	Matrix	Sample preparation	Test method/ procedure
Formaldehyde	coated and uncoated wood-based panels	<p>Reference method: Emission testing in a test chamber; average of a double determination of the 28th day as steady-state concentration; air exchange rate 0.5/h, room loading 1.8 m²/m³; partly edge sealing: perimeter/area = 1.5 m⁻¹</p> <p>Additional method: emission testing in a test chamber; steady-state concentration has to be multiplied by factor 2.0</p> <p>Derived test methods: derived test methods are only suitable for production control. Therefore, a product specific manufacturer correlation has to be established.</p>	<p>DIN EN 16516</p> <p>DIN EN 717-1</p> <p>e. g. EN ISO 12460-3</p>
		<p>Valid up to 31 December 2019:</p> <p>»Prüfverfahren für Holzwerkstoffe und Produkte aus Holzwerkstoffen«</p> <p>Reference method: emission testing in the test chamber (all plain wood-based panels)</p> <p>Derived method: extraction method ref. to perforator method (only raw particleboards, raw MDF)</p> <p>Derived method: emission testing acc. to gas analysis method (only raw plywood and coated wood-based panels)</p>	<p>Bundesgesundheitsblatt 34, 10 (1991), S.488-489</p> <p>DIN EN 717-1</p> <p>EN ISO 12460-5</p> <p>EN ISO 12460-3</p>

Table 2: Test parameter referring to chamber method EN 717-1

Chamber volume		0.225	[m ³]
temperature		23 ± 0.5	[°C]
rel. humidity		45 ± 3	[%]
air exchange	(volume of air flow)	0.225	[h ⁻¹]
emission surface area	(without edges)	0.225	[m ²]
loading rate	(surface area per chamber volume)	1	[m ² / m ³]
air exchange rate	(air volume per chamber volume)	1	[m ³ / h / m ³]
Test pieces	number	dimensions	
	1	length x width/height	280 x 200 [mm]
	1	length x width/height	280 x 200 [mm]
		edges	partly sealed gastight*

* ref. to EN 717-1: ratio U (unsealed edges) / A (surface area) of 1.5 m/m²

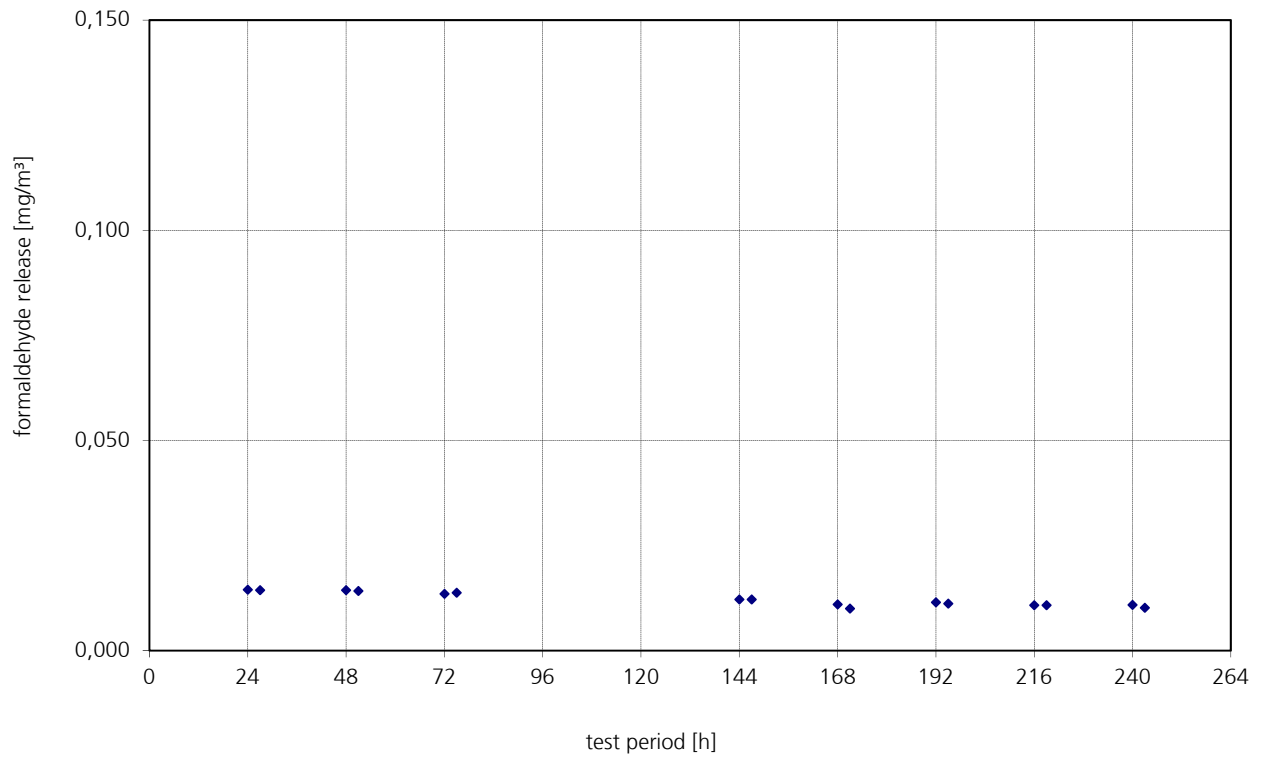


Figure 1: Course of formaldehyde release [mg/m³] in the test chamber during the test of a sample named "Melamine faced particleboard LE - low emission structure SM – Thickness: 18 mm" sent by Messrs. Green Angel Sp. z o.o. in 00-542 Warsaw (Poland)