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H. B. Fuller Deutschland GmbH
Henriettenstraße 32
31582 Nienburg
Germany

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Your reference	Your message dated	Our reference	
		Hus	Braunschweig, 16 May 2018

Test report No. QA-2018-1395

Customer:	H. B. Fuller Deutschland GmbH Henriettenstraße 32 31582 Nienburg Germany
Receipt of sample:	10 April 2018
WKI-ID-No.:	0118_2018
Start of test:	2 May 2018
Objective of the test:	Determination of the formaldehyde release

Content of the test report:

This test report comprises 3 pages and 1 figure.

Deutsche Akkreditierungsstelle D-PL-11140-14-00

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1. Task and test material

The Fraunhofer-Institut für Holzforschung, Wilhelm-Klauditz-Institut (WKI), was entrusted by Messrs. H. B. Fuller Deutschland GmbH in 31582 Nienburg (Germany) with the determination of formaldehyde emission of an adhesive sample named "RAKOLL ECO 4". The test material was chosen, marked and sent for testing to the WKI by the client.

The test shall be carried out following the EN 717-1:2005 "Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method" considering the requirements of the German Chemikalien-Verbotsverordnung - ChemVerbotsV-, annex § 1, para 3, in relation with the publication of the Federal Health Office in the journal "Bundesgesundheitsblatt" No. 34, issue October 1991 (p. 487 – 489).

2 . Execution of the test

As to the determination of the formaldehyde emission potential the adhesive was appliquéd one-sided on glass plates (referring to manufactures' instruction with a quantity of 200 g/m²) with a surface of 1 m² capable of emission and positioned in a closed chamber with a volume of 1 m³.

During the test the temperature was kept at 23°C ± 0.5 K, the relative humidity of the air was kept at 45 ± 3 % and the air exchange rate was adjusted to 1 h^{-1}. Therefore, the relationship between air exchange level and room load was 1.

The formaldehyde concentration in the chamber was measured one hour after loading and furthermore twice a day until the equilibrium concentration was reached by drawing app. 0.12 m³ 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 acetylacetone method

The analytical and climatic test parameter above-mentioned correspond to EN 717-1:2005-01. The standard test parameters published in the German "Bundesgesundheitsblatt" No. 34, 10 (1991), page 488 - 489, to fulfill the requirements of the German Chemikalien-Verbotsverordnung - ChemVerbotsV-, annex § 1, para 3, are observed as well.

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3. Test result

For the tested sample named "RAKOLL ECO 4" of Messrs. H. B. Fuller Deutschland GmbH in 31582 Nienburg (Germany) as tested as described in Ch. 2 a formaldehyde concentration of ≤ blank value was determined in the 1 m³ chamber (blank value of the chamber: ≤ 0,005 ppm testing period: 291 hours – see figure enclosed – 1 ppm ≙ 1.24 mg HCHO/m³ air at 23°C and 1013 hPa).

According to the German Regulation on the Prohibition of Chemicals an admissible maximum value of 0.1 ppm of formaldehyde measured in a test chamber applies to wood-based materials, determined as an equilibrium concentration.

Requirement of limit value fulfilled?	Evaluation acc.	German ChemVerbotsV [BGA Blatt 34, 10/91]
Chamber method EN 717-1		[X] yes [ ] no

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

K. Huslage

Kathrin Huslage
Official in charge

Accredited Testing Laboratory Wilhelm-Klauditz-Institut WKI Braunschweig in accordance with ISO/IEC 10725

H. Schwab

Dipl.-Ing. Harald Schwab
Head of Testing, Supervision and Certifying Body

Enclosure to test report No. QA-2018-1395
dated 16 May 2018

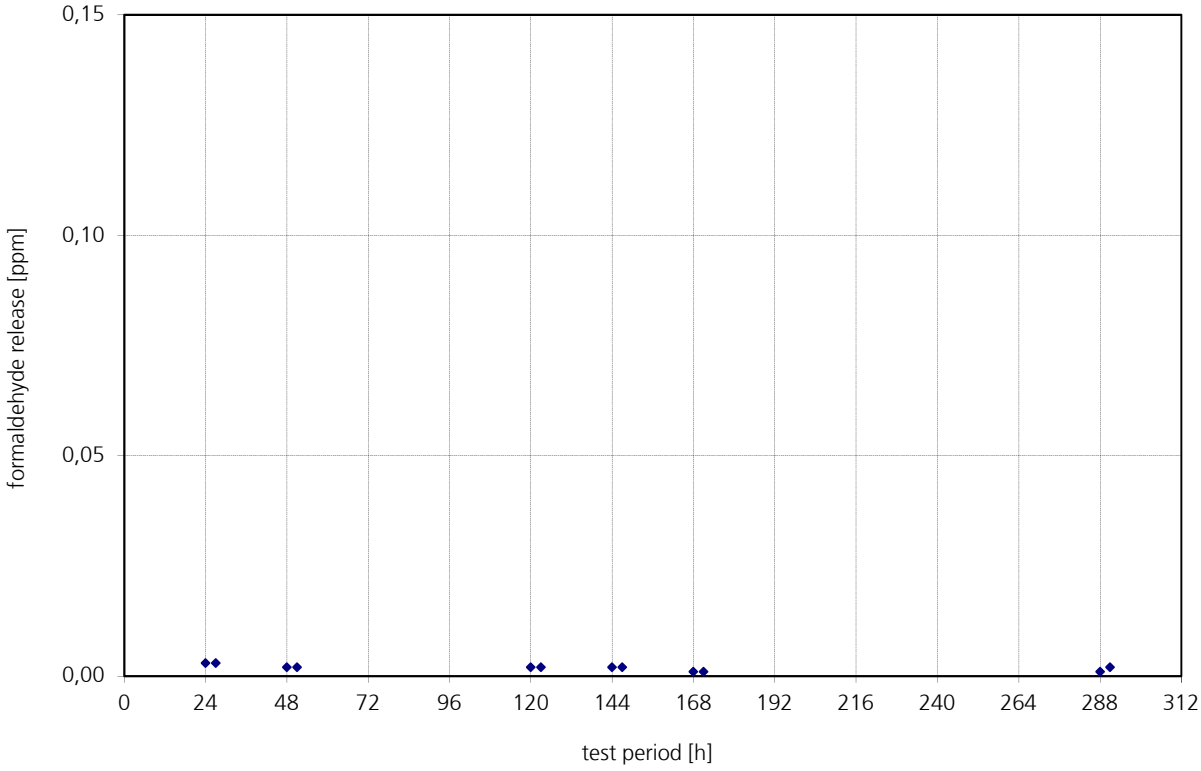

Figure: Determination of formaldehyde release using a 1 m³ chamber of an adhesive sample named "RAKOLL ECO 4" of Messrs. H. B. Fuller Deutschland GmbH in 31582 Nienburg (Germany)

Test conditions:

chamber volume		1	[m³]
temperature		23°C ± 0,5	[°C]
rel. humidity		45 % ± 3	[%]
air exchange rate		1	[h^{-1}]
sample dimensions (glas plates)	width	333	[mm]
	length	1000	[mm]
applied quantity		200	[g/m²]
number of samples		3 (one side faced with adhesive)	
emission surface area		1	[m²]
loading rate		1	[m² / m³]
ratio loading rate / air exchange rate		1	