Fraunhofer Wilhelm-Klauditz-Institut Holzforschung

Quality Assessment

WKI · FRAUNHOFER-INSTITUT · Bienroder Weg 54 E · D-38108 Braunschweig

H. B. Fuller Deutschland GmbH
Henriettenstraße 32

31582 Nienburg
Germany

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Head of the Testing,
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Your reference	Your message dated	Our reference	Braunschweig,
		Mey	20 October 2008

Test report No. B 3536 / 2008

Customer: H. B. Fuller Deutschland GmbH
Henriettenstraße 32

31582 Nienburg
Germany

Receipt of sample: 21 May 2008

WKI-ID-No.: 1538/08

Start of test: 7 Ocotober 2008

Objective of the test: Determination of formaldehyde release

Content of the test report:

This test report comprises 3 pages and 1 figure.

EC Notified 0765	Testing, Supervising and Certifying Body authorized by the Principal Authority for Supervision of Construction
Deutscher Akkreditierungs Rat DAR DAP-PL-2071.00	Testing laboratory authorised by DAP Deutsches Akkreditierungssystem Prüfwesen GmbH according to DIN EN ISO/IEC 17025. The authorisation covers the test methods listed in the certificate.

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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 value of an adhesive sample named "RAKOLL® ECO 3". The test material was chosen, marked and sent for testing to the WKI by the client.

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. To this end a gas quantity of at least 0.12 m^3 each was taken from the ambient air using gas sampling equipment and led through gas washing bottles filled with absorption liquid. The absorbed formaldehyde was determined photometrically and/or fluorimetrically according to the acetylacetone method.

The test climatic and analytical test conditions correspond to DIN EN 717-1:2005-01. The requirements published in the Federal Health Bulletin 34, 10 (1991), p. 488 - 489, regarding the fulfilment of the Regulation on the Prohibition of Chemicals - ChemVerbotsV -, appendix to § 1, section 3, are also fulfilled.

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3. Test result

For the tested adhesive sample named with "RAKOLL® ECO 3" sent from Messrs. H. B. Fuller Deutschland GmbH in 31582 Nienburg (Germany) as tested as described in Ch. 2 a formaldehyde concentration of 0.01 ppm was determined in the 1 m³ chamber (test period: 243 hours – see figure – blank value of the chamber: ≤ 0,005 ppm;1 ppm ≙ 1.24 mg HCHO/m³ air at 23°C and 1013 hPa).

According to the 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.

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

Bettina Meyer
Official in charge

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

Enclosure to test report No. B 3536 / 2008
dated 20 October 2008

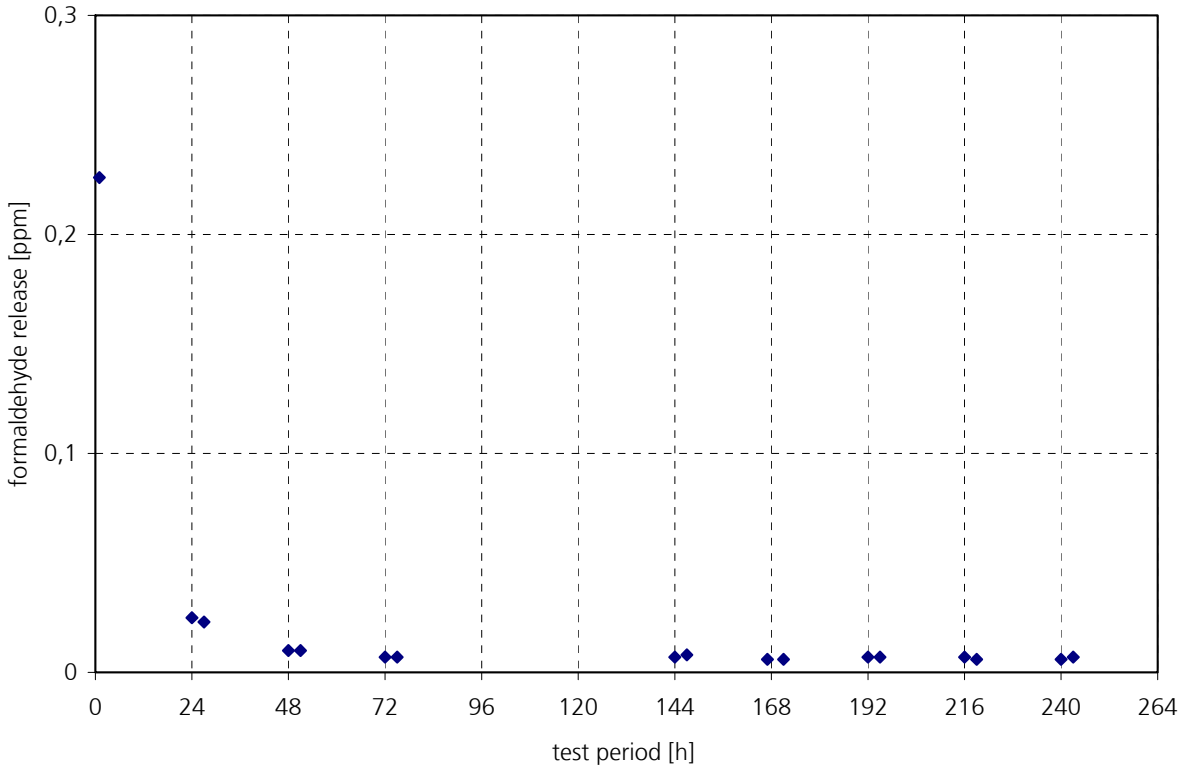

Figure: Determination of formaldehyde release using a 1 m³ chamber of an adhesive sample named "RAKOLL® ECO 3" of Messrs. H. B. Fuller Deutschland GmbH in 31582 Nienburg (Germany)