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EN 13999:2007 BREEAM Test Report

(emission of carcinogenic and sensitizing substances)

1 Sample Information

Sample identification	Plastimang S
Batch no.	FC14452814
Production date	25/04/14
Product type	Adhesive
Sample reception date	22/08/2014
Testing (start - end)	26/08/2014 - 23/09/2014

2 Evaluation of the Results

The tested product does not comply with the requirements of BREEAM for flooring adhesives (emissions measured with EN 13999:2007 after 1 day):

- Absence of carcinogenic substances (C1A, C1B, C2)
  (risk phrases R40, R45, R46, R49, R60, R61 or R63).
- Absence of sensitizing substances
  (risk phrase R42).

1,4-Dioxane with the risk phrase R40 was detected. Therefore the above mentioned requirements of BREEAM are not fulfilled.

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3 Test Method

Method	Principle	Parameter	Quantification limit	Uncertainty
BREEAM: EN 13999-1, -2, -3, -4 (2007)				
Internal method numbers: 9810, 9811, 9812, 2808, 8400	GC/MS HPLC HPLC	VVOC, VOC, SVOC Volatile aldehydes Diisocyanates	5 µg/m³ 4 µg/m³ 1-10 µg/m³	22% (RSD) U_m = 2 x RSD= 45 %

Test chamber parameters					
Chamber volume, l	119	Temperature, °C	23±1	Relative humidity of the test chamber supply air, %	50±5
Air change rate, 1/h	0.5	Loading ratio, m²/m³	0.4		

Sample preparation	
Application amount, g/m² 300	The sample was homogenised, applied onto a glass plate and structured with a notched trowel "TKB-B1" (hold in a 60° angle of inclination).
Deviations from the test method:	The test was performed only after 1 day in the test chamber.

4 Results

4.1 Emissions Test after 1 Day

Error! Reference source not found.	CAS No.	Reason of rejection	Retention time min	ID-Cat.	Concentration µg/m³	Emission rate µg/(m²*h)
Carcinogenic and sensitizing VOCs, VVOCs and SVOCs						
Single Substances:						
1,4-Dioxane *	123-91-1	R40	2.92	1	5.6	7.0
Carcinogenic and sensitizing volatile Aldehydes						
Formaldehyde	50-00-0	C1B, R45	-	-	< 10	< 20
Acetaldehyde	75-07-0	C2, R40	-	-	< 10	< 20
Carcinogenic and sensitizing volatile Diisocyanates						
HDI (hexamethylene diisocyanate) *	822-06-0	R42	-	-	< 16	< 20
2,6-TDI (2,6-toluene diisocyanate) *	91-08-7	C2, R42	-	-	< 11	< 14
2,4-TDI (2,4-toluene diisocyanate) *	584-84-9	C2, R42	-	-	< 11	< 14
MDI (4,4-methylene diphenyl diisocyanate) *	101-68-8	C2, R42	-	-	< 11	< 14

n.d. Not detected
< Means less than
* Not a part of our accreditation. See 5.1.5 Accreditation.
a This test method is not optimal for very volatile substances. Too low results and lower reliability cannot be excluded for such substances.

Categories of identity:
1 = definitely identified, specifically calibrated
2 = identified by comparison with a mass spectrum obtained from a library, identity 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

Maria Pelle
Chemist

Søren Ryom Villadsen
Analytical Service Manager

5 Appendices

5.1 Testing Method

5.1.1 Test Chamber and air sampling

The test chamber was made of stainless steel. A multi-step air clean-up was performed before loading the chamber, and a blank check of the empty chamber was performed. The operation parameters were 23 ±1 °C, and 50 ± 5 % relative air humidity in the supply air, and ½ air change per hour.

The emissions of carcinogens (Categories C1A, C1B and C2, as per European laws on chemicals) and of sensitizing substances after the specified duration of storage in the ventilated test chamber were tested by drawing sample air from the test chamber outlet through adsorption tubes or filters.

5.1.2 Sampling, Desorption, Analyses

VOC Emissions Testing

The emissions of carcinogenic and sensitizing organic compounds were tested by drawing sample air from the test chamber outlet through Tenax TA tubes. Analysis was performed by thermal desorption and gas chromatography / mass spectroscopy (30 m column, 0.25 mm ID, 0.25 µm film, slightly polar HP-5, Agilent) (EN 13999-2, ISO 16000-6, internal methods no.: 9812 / 2808). All single substances above the quantification limit were identified and their legal classification and the associated risk phrases were looked up. Quantification was performed with the respective response factor and the TIC signal, or in case of overlapping peaks by calculating with fragment ions.

This test covered only substances that can be adsorbed on Tenax TA and that can be thermally desorbed. If other emissions occurred, then these could not be monitored (or with limited reliability only).

5.1.3 Testing of Aldehydes

The presence of carcinogenic or sensitizing volatile aldehydes was tested by drawing air samples from the test chamber outlet through DNPH-coated silicagel tubes. Analysis was performed by solvent desorption, HPLC and UV-/diode array detection (ISO 13999-3, internal methods no.: 9812 / 8400).

The absence of the aldehydes was stated if the specific wavelength UV detector response was lacking at the specific retention time in the chromatogram. Otherwise it was checked whether the detection limit was exceeded. In this case the identity was finally checked by comparing full scan sample UV spectra with full scan standard UV spectra. The legal classification and the associated risk phrases of the identified aldehydes were looked up.

5.1.4 Testing of Isocyanates

The presence of carcinogenic or sensitizing diisocyanates was tested by drawing air samples from the chamber outlet through filters coated with methoxy phenyl piperazine. Analysis was performed by HPLC/UV (EN 13999-4, internal method no.: 8418). The absence of the diisocyanates was stated if the specific wavelength UV detector response was lacking at the specific retention time in the chromatogram. Otherwise it was checked whether the detection limit was exceeded. The identity was finally checked by comparing full scan sample UV spectra with full scan standard UV spectra. The legal classification and the associated risk phrases of the identified diisocyanates were looked up.

5.1.5 Accreditation

The testing methods described above have been accredited (EN ISO/IEC 17025:2005) by DANAK (no. 522). But some parameters are not yet covered by that accreditation. It is difficult to obtain accreditation for complex mixtures of substances. At present the accreditation does not cover the parameters marked with a note

*. But the analysis was done for these parameters at the same level of quality as for the accredited parameters.

5.1.6 Uncertainty of the test method

The relative standard deviation of the test method is amounted to 22% (RSD). The expanded uncertainty U_m is 45% and equals 2 x RSD%, see also www.eurofins.dk/uncertainty.