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Date
5 May 2015

ISO 16000 Test Report

1 Sample Information

Sample identification	Power Coat “3 in 1”
Batch no.	28
Production date	01/2015
Product type	Paint
Date when sample was received	08.04.2015
Testing (start - end)	22.04.2015 – 25.04.2015

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2 Test Method

Method	Principle	Parameter	Quantification limit	Uncertainty
ISO 16000-6, 16000-9, 16000-11, ISO 16017-1				
Internal method numbers: 9810, 9811, 9812, 2808	GC/MS	VVOC, VOC, SVOC	2 µg/m³	22% (RSD) U_m = 2 x RSD= 45 %

Test chamber parameter					
Chamber volume, l	119	Temperature, °C	23±1	Relative humidity, %	50±3
Air change rate, 1/h	0.5	Loading ratio, m²/m³	1		

Sample preparation					
The sample was homogenised and applied onto a glass plate.					
Application amount, g/m²	166	Number of layers	1	Drying time, h	-
Deviations from the test method:		None			

For detailed method description, see: 4.1 Description of the applied test method page 5.

3 Results

3.1 Emissions Test after 3 Days

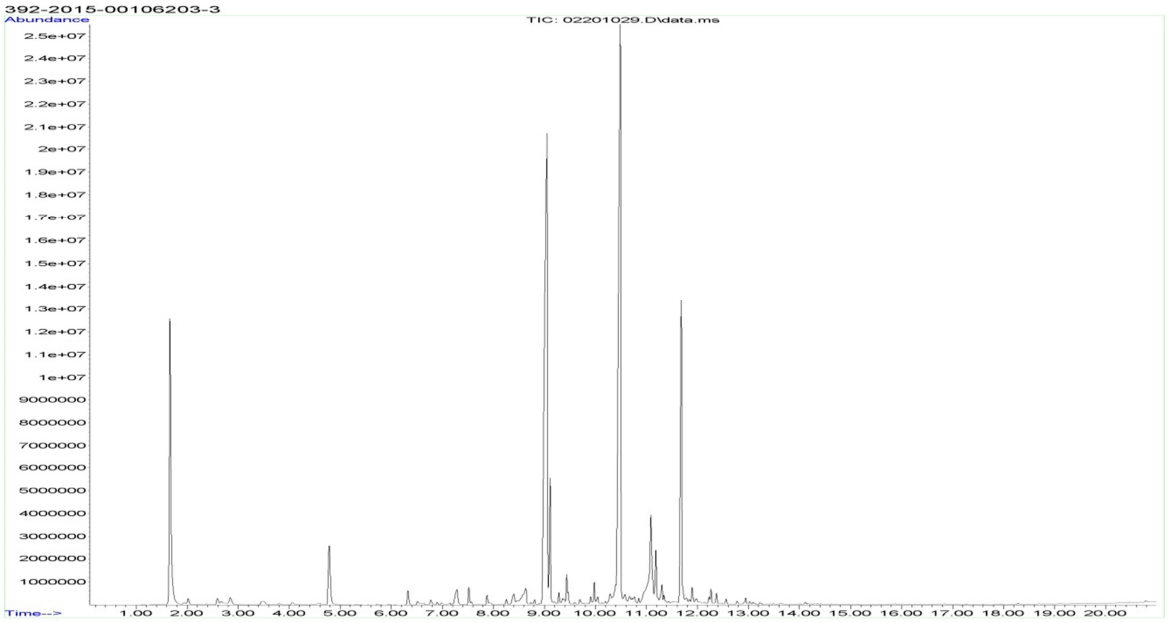
	Toluene equivalent µg/m^3	Emission rate µg/(m^2*h)
TVOC (C_6-C_{16})	7400	3700

Maria Pelle
Chemist

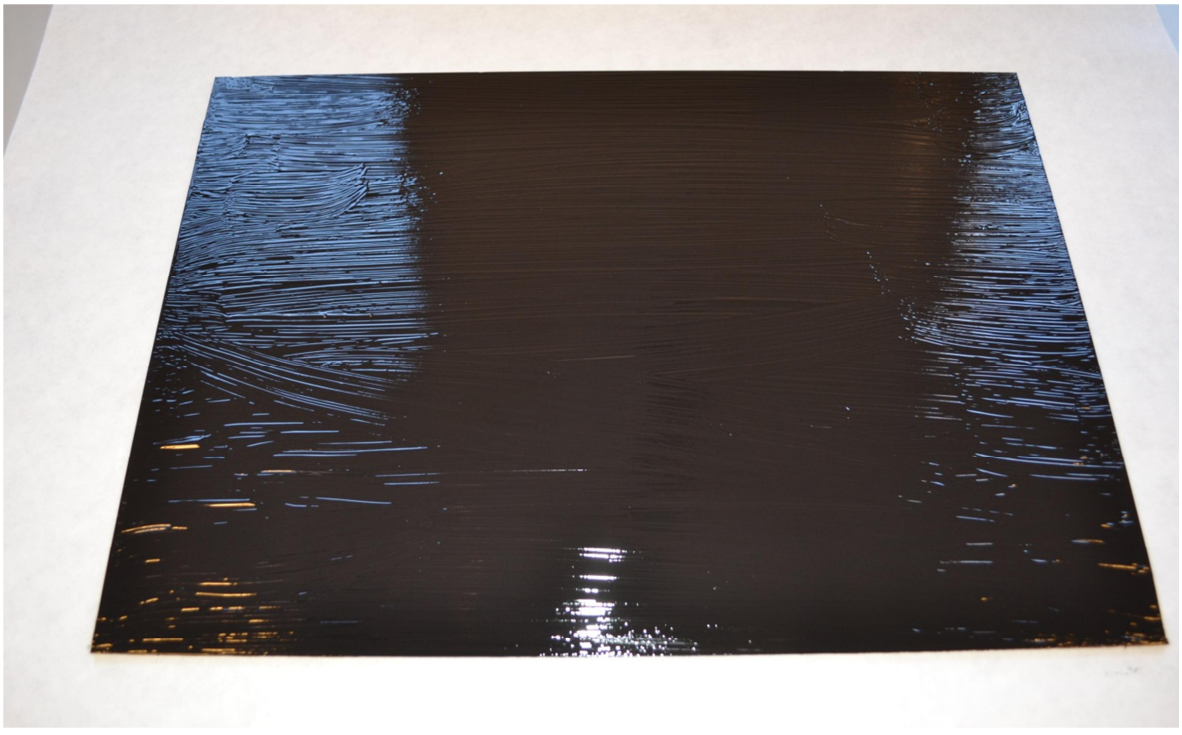
Janne R. Norup
Chemist

3.2 Chromatograms

3.2.1 Chromatogram after 3 days



3.3 Photograph of the sample



4 Appendix

4.1 Description of the applied test method

4.1.1 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 operation parameters are 23 ± 1 °C, 50 ± 5 % relative humidity in the supply air and 0.5 air changes per hour (CEN/TS 16516, ISO 16000-9, internal method no.: 54M719811).

4.1.2 Sampling and Analysis

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).

Testing of VOC and TVOC Emissions
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.: 54M719812 / 54M712808B).

Quantification is done using the TIC signal and 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 other single substances, 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-C_6) and n-hexadecane (n-C_{16}).
- Semi-Volatile Organic Compounds (SVOC) are defined as: All substances eluting after n-hexadecane (n-C_{16}) and before and including n-docosane (n-C_{22}).
- Very Volatile Organic Compounds (VVOC) are defined as: All substances eluting before n-hexane (n-C_6).

Total Volatile Organic Compounds (TVOC) is calculated by summation of all individual VOCs with a concentration ≥ 5 µg/m^3. The TVOC is 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 relative response factors. Compounds that are regarded as VOC in line with the above definition but elute after n-C_{16} on the HP-5 column are treated as VOC, and are 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 ≥ 5 µg/m^3, as defined in CEN/TS 16516. VOCs that are regarded as VOC in line with the above definition, but elute after n-C_{16} 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 ≥ 5 µg/m^3 and expressed in toluene equivalents, as defined in CEN/TS 16516. VOCs that are regarded as VOC in line with the above definition, but elute before n-C_6 in this test, are not added to the TVVOC.

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

4.1.3 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 (ISO 16000-3, VDI 3862 Blatt 3, internal methods no.: 54M719812 / 54M718400).

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

4.1.4 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.

Sampling at the chamber outlet and subsequent analysis is performed in duplicate.

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.

4.1.5 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.

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.

4.1.6 Uncertainty of the test method

The relative standard deviation of the test method amounts to 22% (RSD). The expanded uncertainty U_m is 45% and equals 2 x RSD. For further information please visit www.eurofins.dk/uncertainty.