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Emission Test of Light Concrete Building Blocks for M1 Classification

Xella A/S

588508 M1

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Danish Technological Institute, Indoor Environment

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1. Test order

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hbk/lwf/hbs
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Request:	Xella Danmark A/S Helge Niensens Allé 7 DK-8723 Løsning
Responsible person:	Jens Lauridsen
Assignment:	Emission measurements for the emission classification of light concrete building blocks according to “M1 Classification of Building Materials: Protocol for Chemical and Sensory Testing of Building Materials”, Technical Research Centre VTT, Finland version 01.01.2014.

2. Test Specimen

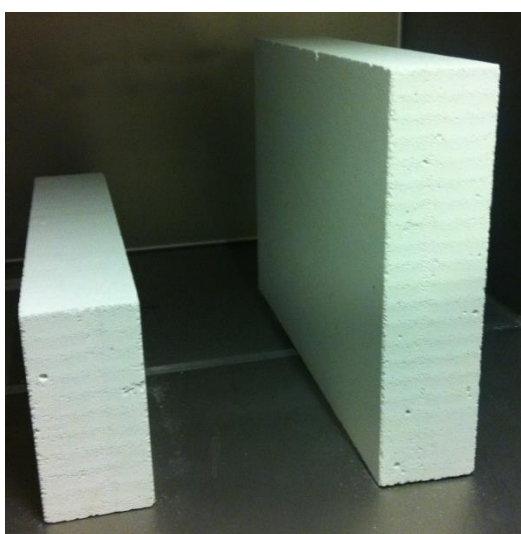
Product type:	Building blocks, light concrete.
Products name:	Ytong 535 (density 535 kg/m ³ , 600 x 400 x 100 mm)
Label:	0.55-599-100-399 ROH 09.01.14 15H<0.14F =1,05 BO <4D
Production date:	2014.01.09
Shipping date:	2014.01.23
Description of packaging and transport:	The test material was delivered and transported directly from assignor to the test laboratory.
Product received at the testing laboratory:	2014.01.23
Test specimen preparation:	The test specimens were treated as building blocks with uniform material homogeneity. One cut surface was sealed by placing it downwards in the test chamber.
Test period started:	2014. 01.27
Conditions during ageing:	Post production storage 2 weeks at ambient temperature. Storage at test laboratory at 18-23 °C.
Emission sampling:	2014.02.24

3. Chamber technique

Climate chamber conditions for TVOC, VOC, Formaldehyde and Ammonia

Climate chamber	1000 L polished stainless steel
Temperature	23°C ± 1°C
Relative humidity	50 ± 5% RH
Air change rate	0.5 ± 0.05 h ⁻¹
Air velocity	0.1 – 0.3 m/s
Panel load	1 m ² /m ³

Test specimen in chamber:



4. Emission sampling and analytical methods

	Method	Absorbent	Sampling volume	Quantification/Analysis method	Detection limit
VOC and E Cat. 1A or 1B carcinogens	ISO 16000-9	Tenax TA	3-6 L	GC-MS Quantified with pure reference standards, and as toluene equivalents	1 µg/m ³
Formaldehyde	ISO 16000-3	DNPH coated silicagel	58 L	HPLC-DAD Calibrated with pure ref. standards	1 µg/m ³
Ammonia	4430 (Eu- rofans)	Sulphuric acid coated silicagel	25 L	Spectrophotometry	30 µg/m ³
Sensory evaluation	Air from the climate chamber was sampled in a Tedlar® bag. Sensory evaluation of acceptance of the air was performed according to ISO 16000-28 with an outlet air flow rate of 0.9 l/s through a funnel, using an untrained panel.				

5. Results

5.1 Specific emission rates (SER)

TVOC C ₆ -C ₁₆ mg/(m ² h)	Formaldehyde mg/(m ² h)	Ammonia mg/(m ² h)	Carcinogens C ₆ -C ₁₆ mg/(m ² h)
0.0025	0.0004	< 0.030	< 0.002

5.2 Standard room concentration (Wall)

TVOC C ₆ -C ₁₆ mg/m ³	Formaldehyde mg/m ³	Ammonia mg/m ³	Carcinogens C ₆ -C ₁₆ mg/m ³
0.005	0.0008	< 0.030	< 0.002

6. Single VOCs C₆-C₁₆ the emission of which exceed 0.005 mg/(m²h)

RT (min)	Compound	CAS	SER (mg/(m ² h))
na	None found	na	na

7. Single VOCs outside the frame C₆-C₁₆. Emission exceeding 0.005 mg/(m²h)

RT (min)	Compound	CAS	SER (mg/(m ² h))
na	None found	na	na

8. Measurement uncertainty

SER _{Formaldehyde}	+/- 15 %
SER _{TVOC}	+/- 20 %
SER _{NH3}	+/- 20 %

9. Sensory evaluation (odour)

The results from the sensory evaluation are shown in Appendix 2. The mean average value is +0.03 and the evaluation of the odour is thus: Just acceptable.

10. Evaluation summary

Based on chemical analyses the product can obtain the M1 Emission Class for Building Materials.

Based on sensory evaluation the product can obtain the M1 Emission Class for Building Materials.

Parameter	Emission 28 days (mg/m ² h)	Requirement (mg/m ² h)
TVOC	0.0025	< 0.20
Formaldehyde	0.0004	< 0.05
Ammonia	< 0.03	< 0.03
Carcinogens*	< 0.002	< 0.005
Odour	Just acceptable	Is not odorous

* The emission of carcinogenic compounds belonging to category 1A or 1B in Annex VI to Regulation (EC) No 1272/2008.

Results of the testing and statement of the applied methods are stated on pages 2-6 and they only concern the tested specimens. Extracts from the report may only be published, if the laboratory has approved the extract.

Date/place: 2014.03.31, Danish Technological Institute, Indoor Environment, Taastrup

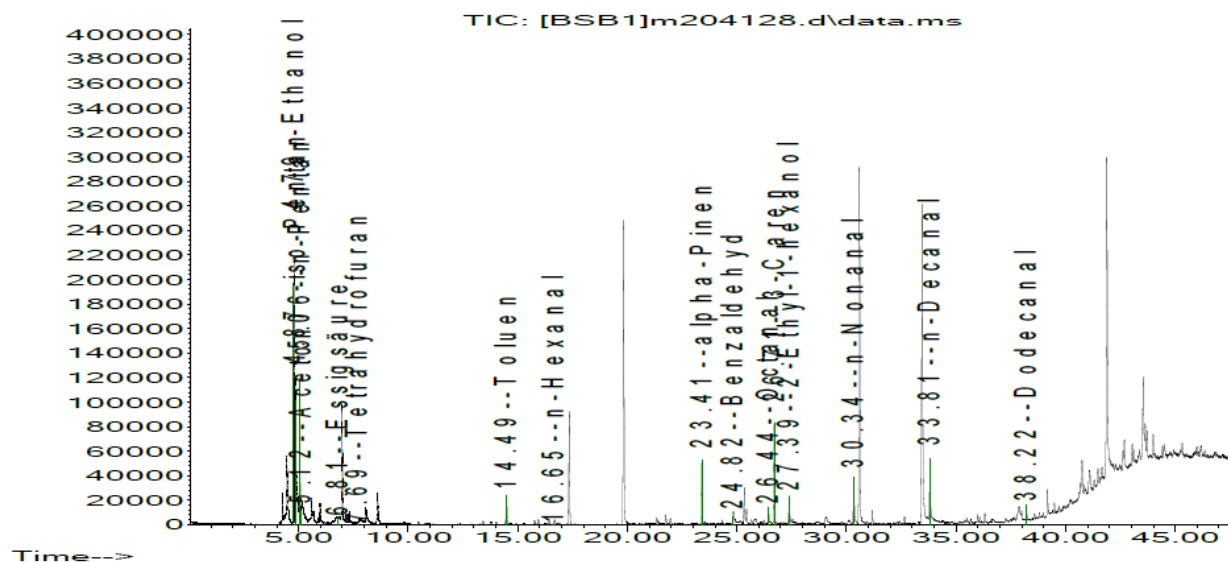


Helene Klinke
Test responsible

Lis Winther Funch
Consultant

Appendix 1 Chromatogram GC-MS

Chromatogram of sample P37307
Abundance



Appendix 2 Sensory Evaluation (acceptability) after 28 days

Sample no.: 588508
Description: Ytong 535
Test Date: 24-02-2013
Panel size: 20 untrained panellists
Comments: Sampled air from climate chamber

n	Sample
1	-0,10
2	-0,80
3	-0,20
4	0,50
5	0,10
6	0,45
7	0,30
8	0,60
9	-0,20
10	0,20
11	0,50
12	-0,10
13	0,10
14	0,25
15	-0,30
16	-0,30
17	-0,70
18	-0,60
19	0,90
20	-0,20
Mean	0,03
Standard deviation	0,45
90% Confidence interval	0,17