

## Emission measurements of barrier sheet on concrete

(2 appendices)

### Test object

An emission barrier was supplied to RISE by the client.

Product name:	<b>Spärrskiktsfolie 1.1</b>
Manufacturer:	Densvit
Production date:	2020-01-03
Batch No:	76072090
Date of arrival:	2020-03-09

### Assignment

A reference sample according to GBR testing protocol “Measuring the emission characteristics of composite floor structures -2016 ver. 3” was used to make a combination specimen with the emission barrier.

Emission measurements of the combination specimen are made after 1 day, 4 and 34 weeks regarding 1-Butanol (CAS 71-36-3), 2-Ethyl-hexanol (CAS 104-76-7) and other alcohols resulting from the alkaline hydrolysis of the floor adhesive.

### Method

The concrete of reference sample was originally cast on September 19, 2017 and the sample was coated with adhesive and PVC flooring on September 27, 2017. The reference sample has been stored at  $23 \pm 2$  °C and  $50 \pm 5$  % since then. The PVC flooring and adhesive was removed from the concrete on March 25, 2020. The concrete surface was grinded smooth and left to condition for five days at  $23 \pm 2$  °C and  $50 \pm 5$  %.

After the 5 day conditioning the specimen was put into the test cell for measurement of the emission from the concrete surface. The emission barrier was then sealed to the concrete surface with aluminium tape. The emission from the combination specimen of concrete – emission barrier was measured after 1 day, 4 and 34 weeks. The specimen was placed into the test cell 24 hours prior to air sampling and otherwise stored in a room with controlled climate conditions of  $23 \pm 2$  °C and  $50 \pm 5$  % RH.

Conditions of the test in the FLEC chamber:

Test chamber volume:	0.000035 m <sup>3</sup>
Area of test specimen:	0.0177 m <sup>2</sup>
Air exchange rate:	171 h <sup>-1</sup>
Area specific air change rate:	0.34 m <sup>3</sup> /m <sup>2</sup> h.
Temperature:	$23 \pm 1$ °C
Relative humidity:	$50 \pm 5$ % RH
Air velocity at specimen surface:	0.1 – 0.3 m/s

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Tenax TA was used as adsorption medium for VOC. The tubes were thermally desorbed and analysed in accordance to RISE method 0601, similar to ISO 16000-6:2011 (Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS/FID). This means an analysis in a gas chromatograph and detection with a flame ionisation detector (FID) and mass selective detector (MS). The capillary column used is coated with 5% phenyl/ 95 % methylpolysiloxane. The FID signals are used for compound quantification. Minimum duplicate air samples were taken and the results are mean values. Sampled volumes are 2 to 5 L.

## Results

The results in Table 1 are expressed as area specific emission rates.

**Table 1.**

Emission results after before and after 1 day, 4 and 34 weeks. The results are in  $\mu\text{g}/\text{m}^2\text{h}$ , in toluene-equivalents

Test specimen	1-Butanol	2-Ethylhexanol	Other alcohols	Sum of alcohols
Concrete, before sealing with emission barrier	610	90	30	730
Combination specimen concrete-emission barrier, 1 d	< 1	< 1	< 1	< 1
Combination specimen concrete-emission barrier, 4 w	< 1	< 1	< 1	< 1
Combination specimen concrete-emission barrier, 34 w	< 1	< 1	< 1	< 1

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## Appendices

1. Photo of test specimen
2. Gas Chromatograms

## Appendix 1

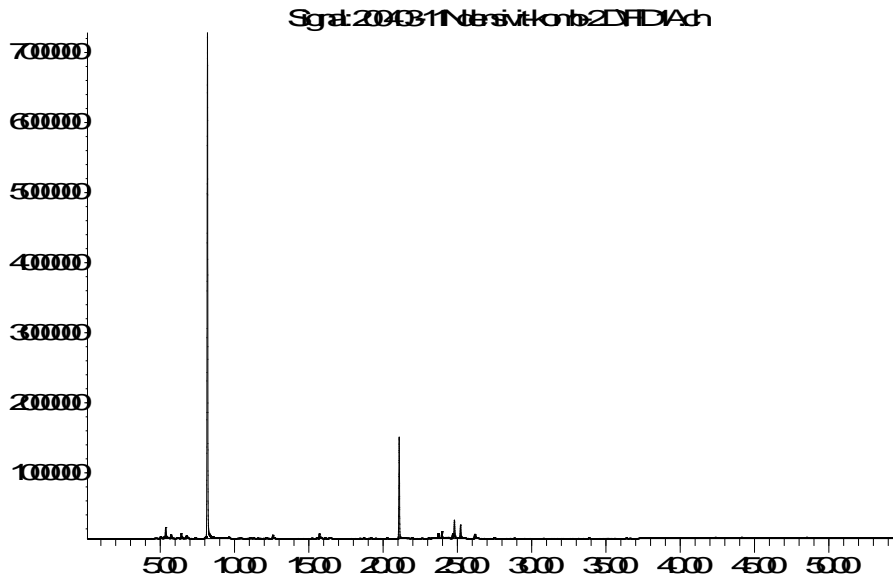
**Photo of test specimen**

Appendix 2

**Gas chromatograms**

**Concrete, before sealing with emission barrier:**

Abundance

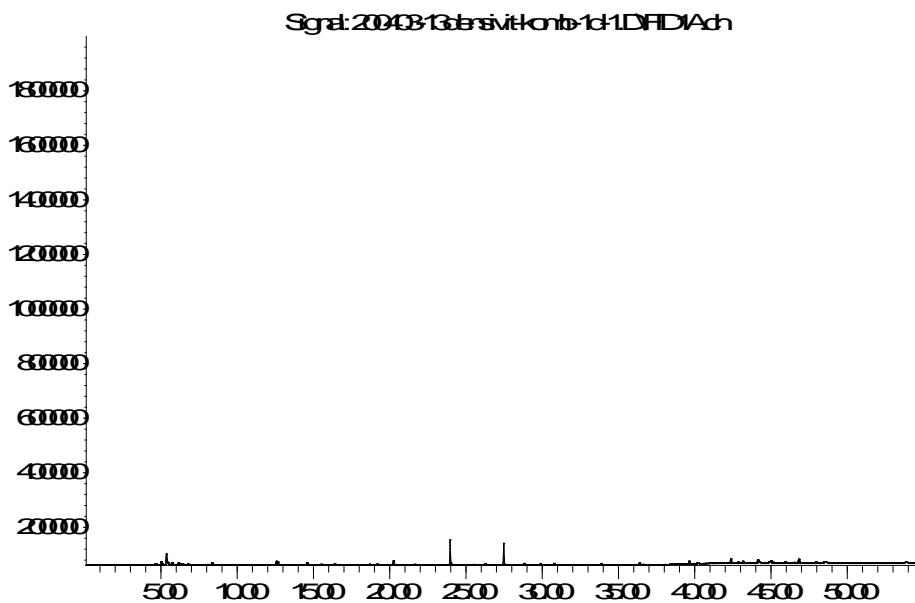


Time=>

1-Butanol and 2-Ethyl-hexanol are present at the retention time 8.1 and 21 min respectively.

**Combination specimen concrete-emission barrier, 1 d:**

Abundance

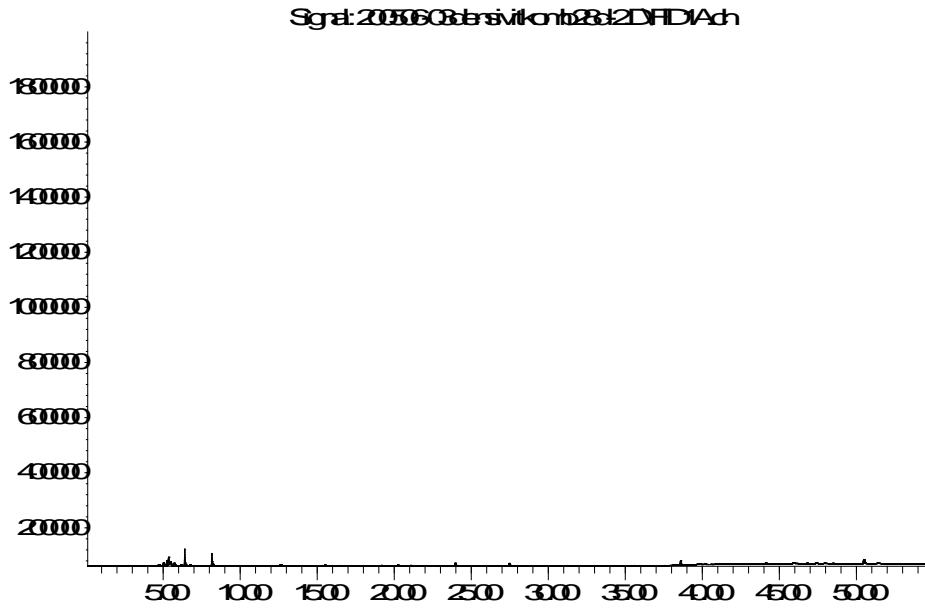


Time=>

Appendix 2

Combination specimen concrete-emission barrier, 4 w:

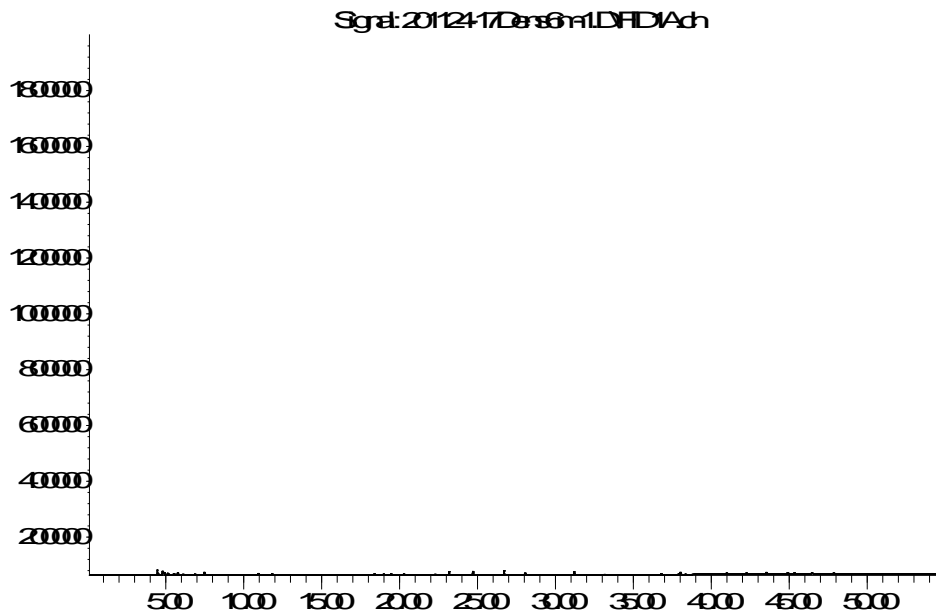
Abundance



Time->

Combination specimen concrete-emission barrier, 4 w:

Abundance



Time->