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## VOC TEST REPORT EN 717-1

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### 1 Sample Information

|                  |                                                                    |
|------------------|--------------------------------------------------------------------|
| Sample name      | UNFINISHED TWO LAYERS ENGINEERED WOOD FLOORING -<br>PLYWOOD 12 mm. |
| Batch no.        | 2                                                                  |
| Production date  | 28/06/2019                                                         |
| Product type     | Wooden parquet                                                     |
| Sample reception | 23/07/2019                                                         |

### 2 Brief Evaluation of the Results

| Regulation or protocol | Conclusion | Version of regulation or protocol |
|------------------------|------------|-----------------------------------|
| EN 717-1               | E1         | EN 717-1:2004                     |

Full details based on the testing and direct comparison with limit values are available in the following pages



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### 3 Applied Test Methods

#### 1.1 General Test References

| Regulation, protocol or standard | Version | Reporting limit VOC [ $\mu\text{g}/\text{m}^3$ ] | Calculation of TVOC | Combined uncertainty <sup>a</sup> [RSD(%)] |
|----------------------------------|---------|--------------------------------------------------|---------------------|--------------------------------------------|
| EN 717-1                         | 2004    | -                                                | (Formaldehyde only) | 22%                                        |

#### 1.2 Specific Laboratory Sampling and Analyses

| Procedure                    | External Method                           | Internal S.O.P. | Quantification limit / sampling volume | Analytical principle    | Uncertainty <sup>a</sup> [RSD(%)] |
|------------------------------|-------------------------------------------|-----------------|----------------------------------------|-------------------------|-----------------------------------|
| Sample preparation           | ISO 16000-11:2006, EN 717-1; 2004         | 71M549810       | -                                      | -                       | -                                 |
| VOC emission chamber testing | ISO 16000-9:2006, EN 16516:2017           | 71M549811       | -                                      | Chamber and air control | -                                 |
| Sampling of aldehydes        | ISO 16000-3:2011, EN 16516:2017           | 71M549812       | 35 L                                   | DNPH                    | -                                 |
| Analysis of aldehydes        | ISO 16000-3:2011, EN 717-1, EN 16516:2017 | 71M548400       | 3-6 $\mu\text{g}/\text{m}^3$           | HPLC-UV                 | 10%                               |

## 4 Test Parameters, Sample Preparation and deviations

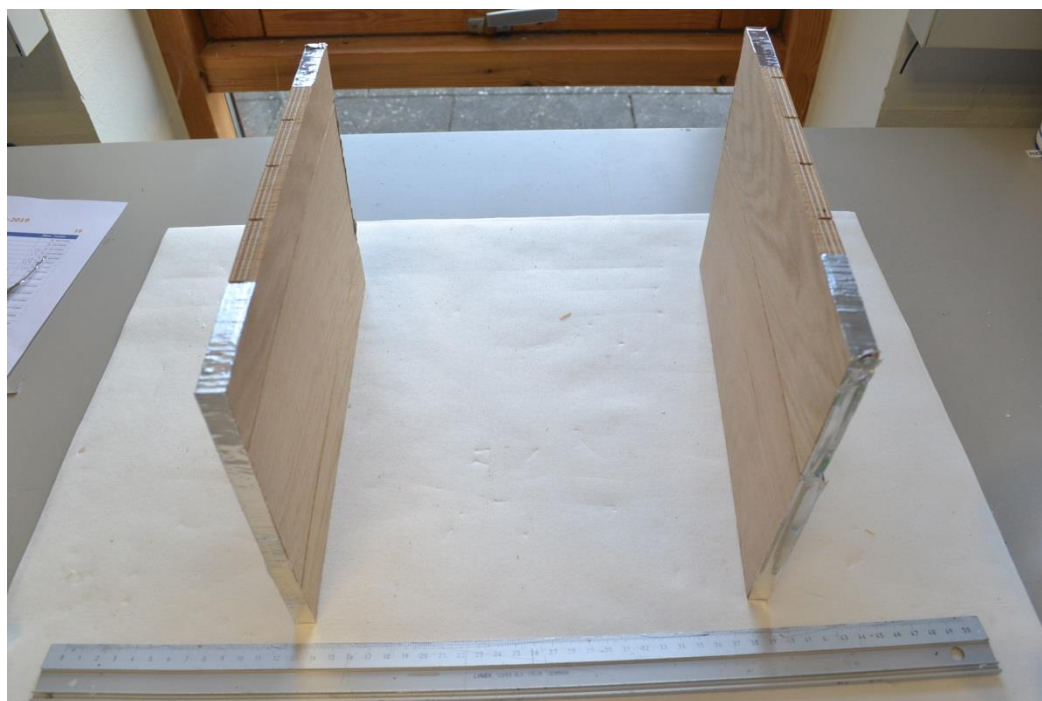
### 4.1 VOC Emission Chamber Test Parameters

| Parameter                               | Value      | Parameter                                                       | Value |
|-----------------------------------------|------------|-----------------------------------------------------------------|-------|
| Chamber volume, V[L]                    | 225        | Preconditioning period                                          | -     |
| Air Change rate, $n[h^{-1}]$            | 1          | Test period                                                     | -     |
| Relative humidity of supply air, RH [%] | $45 \pm 3$ | Area specific ventilation rate, $q [m/h \text{ or } m^3/m^2/h]$ | 1     |
| Temperature of supply air, T [°C]       | $23 \pm 1$ | Loading factor [ $m^2/m^3$ ]                                    | 1     |

### 4.2 Preparation of the Test Specimen

A length of 34 cm of the edge was left open; otherwise edges and back were covered with aluminium foil. Two samples were placed in the chamber, positioned with a distance of 20 cm between the two pieces.

### 4.3 Picture of Sample



### 4.4 Deviations from Referenced Protocols and Regulations

The temperature was  $23 \pm 1^\circ\text{C}$  and not  $23 \pm 0.5^\circ\text{C}$ . No other deviations.

## 5 Results

### 5.1 Emission Test Results

| Sampling time<br>[Days] | Formaldehyde Concentration in the Test Chamber<br>[mg/m <sup>3</sup> ] |
|-------------------------|------------------------------------------------------------------------|
| 1                       | 0.0050                                                                 |
| 2                       | 0.0069                                                                 |
| 3                       | 0.0059                                                                 |
| 4                       | 0.0049                                                                 |
| 7                       | 0.0035                                                                 |
| 8                       | 0.0032                                                                 |
| 9                       | 0.0033                                                                 |
| 10                      | 0.0041                                                                 |
| 11                      | 0.0029                                                                 |
| 14                      | 0.0025                                                                 |
| 15                      | 0.0035                                                                 |
| 16                      | 0.0033                                                                 |
| 17                      | 0.0025                                                                 |
| 18                      | 0.0030                                                                 |
| 21                      | 0.0028                                                                 |
| 22                      | 0.0027                                                                 |
| 23                      | 0.0029                                                                 |
| 24                      | 0.0028                                                                 |
| 25                      | 0.0031                                                                 |
| 28                      | 0.0025                                                                 |

### 5.2 Steady-state Emission

With above data, following power function to determine the steady-state emission value was determined:

$$C = 16,4x^{-0.29}$$

C= chamber concentration, mg/m<sup>3</sup>

T= time, h

Steady state is defined using the following formula:

$$\frac{C_t - C_{t+96h}}{C_{t+96h}} \leq \delta, \text{ where } \delta = 0.05$$

The steady state emission was reached at time t = 624 h.

|                                      |                   |
|--------------------------------------|-------------------|
|                                      | mg/m <sup>3</sup> |
| <b>Steady-state emission (624 h)</b> | <b>&lt; 0.003</b> |

## 6 Summary and Evaluation of the Results

### 6.1 Comparison with Limit Values of EN 14041

| Parameter    | Concentration<br>mg/m <sup>3</sup> | E2<br>mg/m <sup>3</sup> | E1<br>mg/m <sup>3</sup> |
|--------------|------------------------------------|-------------------------|-------------------------|
| Formaldehyde | < 0.003                            | > 0.124                 | ≤ 0.124                 |

## **7 Appendices**

### **7.1 How to Understand the Results**

#### **7.1.1 Acronyms Used in the Report**

- < Means less than
- > Means bigger than
- \* Not a part of our accreditation
- ⌘ Please see section regarding Uncertainty in the Appendices.
- § Deviation from method. Please see deviation section

## 7.2 Qualitative Description of VOC Emission Test

### 7.2.1 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 chamber operation parameters are as described in the test method section (EN 16516, ISO 16000-9, internal method no.: 71M549811).

### 7.2.2 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 (EN 16516, ISO 16000-3, VDI 3862 Blatt 3, internal methods no.: 71M549812 / 71M548400).

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

## 7.3 Quality Assurance

Before loading the test chamber, a blank check of the empty chamber is performed and compliance with background concentrations in accordance with EN 16516 / ISO 16000-9 is determined.

Air sampling at the chamber outlet and subsequent analysis is performed in duplicate. Relative humidity, temperature and air change rate in the chambers is logged every 5 minutes and checked daily. A double determination is performed on random samples at a regular interval and results are registered in a control chart to ensure the uncertainty and reproducibility of the method.

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.

## 7.4 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](http://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.

## 7.5 Uncertainty of the Test Method

The relative standard deviation of the overall analysis is 22%. The expanded uncertainty  $U_m$  equals 2 x RSD. For further information please visit [www.eurofins.dk/uncertainty](http://www.eurofins.dk/uncertainty).