

Attestation

LEED v4 and v4.1 BETA

On the 6th of June 2023, Eurofins Product Testing A/S received a sample of an sealant with the product name:

DEWALT Pure220+

supplied by

DEWALT

The sample was supplied as being representative of the manufactured product, and it has been tested in accordance with the relevant ISO 16000, CDPH 01350 and ASTM D2369 testing standards (See test report no. 392-2023-00262201_H_EN and no. 392-2023-00262202_XG_EN).

The test results of the tested sample indicate that the product qualifies for LEED v4 and LEED v4.1 BETA (February 2021) projects globally by showing compliance with the specifications for VOC emissions and VOC content by complying with:

VOC emissions specifications in LEED EQ credit "Low-Emitting Materials" for LEED projects globally:

- The requirements of LEED v4 and LEED v4.1 BETA (February 2021): CDPH-IAQ (California Department of Public Health (CDPH) Standard Method v1.2-2017); and a TVOC below 0.5 mg/m³ in both office and class room.

VOC content specifications in LEED EQ credit "Low-Emitting Materials" for LEED projects globally:

- The requirements of LEED v4 and LEED v4.1 BETA (February 2021): South Coast Air Quality Management District (SCAQMD) Rule 1168 (2017) for 'multi-purpose construction adhesives' having a VOC content below 70 g/L.

11 July 2023



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VOC EMISSION TEST REPORT

CDPH

11 July 2023

1 Sample Information

| | |
|------------------------|-----------------|
| Sample name | DEWALT Pure220+ |
| Batch no. | #71 |
| Stated production date | 28/04/2023 |
| Product type | Joint sealant |
| Sample reception | 06/06/2023 |

2 Brief Evaluation of the Results

| Regulation or protocol | Conclusion | Version of regulation or protocol |
|------------------------|------------|--|
| CDPH | Pass | CDPH/EHLB/Standard Method V1.2. (January 2017) |

Full details based on the testing and direct comparison with limit values are available in the following pages
Regarding pass/fail decision rule please see appendix



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3 Applied Test Methods

3.1 General Test References

| Regulation, protocol or standard | Version | Reporting limit VOC [$\mu\text{g}/\text{m}^3$] | Calculation of TVOC | Combined uncertainty ^a [RSD(%)] |
|----------------------------------|--|--|---------------------|--|
| EN 16516 | 2017 + A1:2020 | 5 | Toluene equivalents | 22% |
| ISO 16000 -3 -6 -9 -11 | 2006-2022 depending on part | 2 | Toluene equivalents | 22% |
| ASTM D5116-10 | 2010 | - | - | - |
| CDPH | CDPH/EHLB/Standard Method V1.2. (January 2017) | 2 | Toluene equivalents | 22% |

3.2 Specific Laboratory Sampling and Analyses

| Procedure | External Method | Internal SOP | Quantification limit / sampling volume | Analytical principle | Uncertainty ^a [RSD(%)] |
|------------------------------|---|--------------|--|-------------------------|-----------------------------------|
| Sample preparation | ISO 16000-11:2006, EN 16516:2017+A1:2020, CDPH:2017 | 71M549810 | - | - | - |
| Emission chamber testing | ISO 16000-9:2006, EN 16516:2017+A1:2020 | 71M549811 | - | Chamber and air control | - |
| Sampling of VOC | ISO 16000-6:2021, EN 16516:2017+A1:2020 | 71M549812 | 5 L | Tenax TA | - |
| Analysis of VOC | ISO 16000-6:2021, EN 16516:2017+A1:2020 | 71M542808B | 1 $\mu\text{g}/\text{m}^3$ | ATD-GC/MS | 10% |
| Sampling of aldehydes | ISO 16000-3:2022, EN 16516:2017+A1:2020 | 71M549812 | 35 L | DNPH | - |
| Analysis of aldehydes | ISO 16000-3:2022, EN 16516:2017+A1:2020 | 71M548400 | 3-6 $\mu\text{g}/\text{m}^3$ | HPLC-UV | 10% |
| Sampling on Charcoal tubes | ISO 16200-1:2001 | 71M549812 | 60 L | Charcoal | - |
| Analysis of Charcoal tubes * | ISO-16200-1:2001 | 71M546081 | 20 $\mu\text{g}/\text{m}^3$ | Headspace-GC/MS | 10% |

4 Test Parameters, Sample Preparation and Deviations

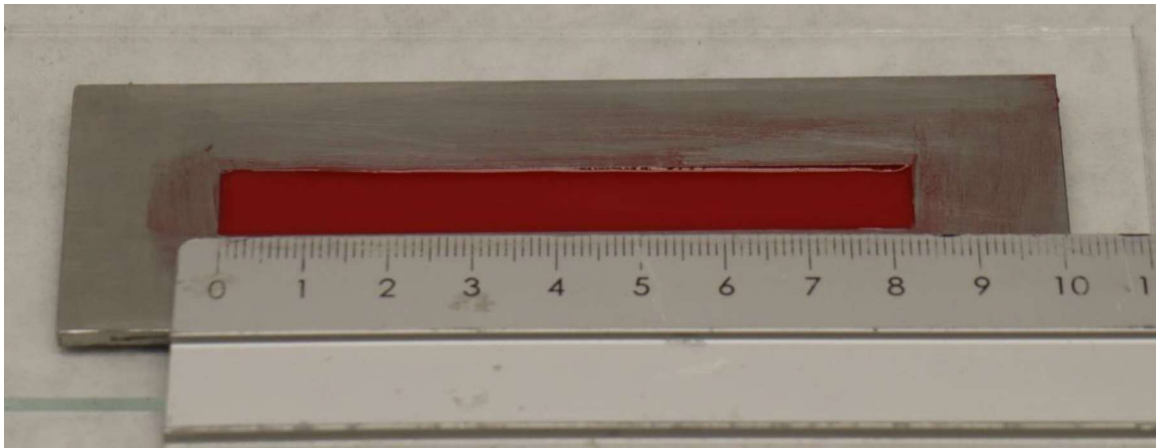
4.1 VOC Emission Chamber Test Parameters

| Parameter | Value | Parameter | Value |
|--|--------|--|-------------------------|
| Chamber volume, V[L] | 119 | Preconditioning period | - |
| Air change rate, n[h ⁻¹] | 1.0 | Chamber test period | 19/06/2023 - 03/07/2023 |
| Area specific ventilation rate, q [m/h or m ³ /m ² /h] | 143 | Analytical test period | 19/06/2023 - 10/07/2023 |
| Air Velocity [m/s] | 0.1 | Loading factor [m ² /m ³] | 0.007 |
| Temperature of supply air, T [°C] | 23 ± 1 | Test scenario | Very small area |
| Relative humidity of supply air, RH [%] | 50 ± 3 | | |

4.2 Preparation of the Test Specimen

The sample was applied onto a glass plate and drawn off over a model giving a 3 mm thick and uniform layer with a broadness of 10 mm.

4.3 Picture of Sample



4.4 Deviations from Referenced Protocols and Regulations

The loading factor was less than the lowest factor of 0.3 m²/m³ that CDPH method specifies for testing; CDPH method does not specify a clear loading factor in any model room. Instead, the loading factor as specified in EN 16516 was applied both during testing and for calculation of the air concentration in office and classroom.

4.5 Air Samplings from the Test Chamber

| Sampling media | Day (yyyy-mm-dd) | Time (hh:mm) | Volume [L] |
|----------------------------|------------------|---------------|------------|
| 11 Day, Tenax TA | 2023-06-30 | 10:25 - 11:25 | 5.3 |
| 11 Day-Res, Tenax TA | 2023-06-30 | 11:25 - 12:14 | 2.1 |
| 11 Day, DNPH silicagel | 2023-06-30 | 10:24 - 12:13 | 36 |
| 11 Day-Res, DNPH silicagel | 2023-06-30 | 10:25 - 12:13 | 36 |
| 12 Day, DNPH silicagel | 2023-07-01 | 10:13 - 12:03 | 36 |
| 12 Day-Res, DNPH silicagel | 2023-07-01 | 10:13 - 12:03 | 36 |
| 12 Day, Tenax TA | 2023-07-01 | 10:14 - 11:14 | 5.2 |
| 12 Day-Res, Tenax TA | 2023-07-01 | 11:14 - 12:04 | 2.2 |
| 14 Day, Tenax TA | 2023-07-03 | 11:21 - 12:22 | 5.1 |
| 14 Day-Res, Tenax TA | 2023-07-03 | 12:22 - 13:12 | 2.2 |
| 14 Day, Carboxen 1000 | 2023-07-03 | 08:46 - 11:16 | 15 |
| 14 Day-Res, Carboxen 1000 | 2023-07-03 | 08:47 - 11:17 | 16 |
| 14 Day, DNPH silicagel | 2023-07-03 | 11:20 - 13:10 | 36 |
| 14 Day-Res, DNPH silicagel | 2023-07-03 | 11:20 - 13:11 | 36 |

5 Results

5.1 VOC Emission Test Results after 11 Days

| | CAS No. | Specific Conc. [µg/m³] | Specific SER [µg/(m²·h)] | Toluene eq. [µg/m³] | Toluene SER [µg/(m²·h)] |
|------------------------------|---------|---------------------------|-----------------------------|------------------------|----------------------------|
| TVOC (C5-C17)tol. eq. | | | | < 2 | < 300 |
| Aldehydes | | | | | |
| Formaldehyde | 50-00-0 | < 3 | < 500 | | |
| Acetaldehyde | 75-07-0 | < 3 | < 500 | | |

5.2 VOC Emission Test Results after 12 Days

| | CAS No. | Specific Conc. [µg/m³] | Specific SER [µg/(m²·h)] | Toluene eq. [µg/m³] | Toluene SER [µg/(m²·h)] |
|------------------------------|---------|---------------------------|-----------------------------|------------------------|----------------------------|
| TVOC (C5-C17)tol. eq. | | | | < 2 | < 300 |
| Aldehydes | | | | | |
| Formaldehyde | 50-00-0 | < 3 | < 500 | | |
| Acetaldehyde | 75-07-0 | < 3 | < 500 | | |

5.3 VOC Emission Test Results after 14 Days

| | CAS No. | Retention time [min] | ID-Cat | SER [µg/(m²·h)] | Classroom Conc. [µg/m³] | Office Conc. [µg/m³] | ½ CREL [µg/m³] |
|------------------------------|----------|-------------------------|--------|--------------------|----------------------------|-------------------------|-------------------|
| VOC (C5-C17) | | | | | | | |
| Not identified * | | 2.43 | 4 | 570 | 4.9 | < 2 | |
| Not identified * | | 2.69 | 4 | 290 | 2.5 | < 2 | |
| Toluene | 108-88-3 | 4.18 | 1 | 570 | 4.9 | < 2 | 150 |
| Not identified * | | 5.77 | 4 | 780 | 6.7 | < 2 | |
| TVOC (C5-C17)tol. eq. | | | | 2200 | 19 | 2.3 | |
| Aldehydes | | | | | | | |
| Formaldehyde | 50-00-0 | | 1 | < 500 | < 5 | < 1 | 9 |
| Acetaldehyde | 75-07-0 | | 1 | < 500 | < 5 | < 1 | 70 |

6 Summary and Evaluation of the Results

6.1 Comparison with Limit Values of CDPH

| Parameter | Test after 14 days | | | |
|---|---------------------------------|--|--|--------------------------------|
| | CAS No. Single compounds | Concentration in Classroom [µg/m ³] | Concentration in Office Room [µg/m ³] | ½ CREL [µg/m ³] |
| TVOC (C5-C17)tol. eq. | - | 19 | 2.3 | - |
| Single compounds (with defined CREL values) | | | | |
| Toluene | 108-88-3 | 4.9 | < 2 | 150 |
| Formaldehyde | 50-00-0 | < 5 | < 1 | ≤ 9 |
| Acetaldehyde | 75-07-0 | < 5 | < 1 | ≤ 70 |

6.1.1 Conversion of Emission Rates to CDPH Reference Room Concentrations

The CDPH method requires calculation of the measured emission rates into concentrations in given reference rooms. The equation and parameters figured below have been applied to calculate the concentrations in an office room or a classroom as required in the CDPH. The area used in the calculation varies depending on the expected usage of the product and therefore several entries can be found. Small and Very Small areas are not provided within the CDPH but are adapted from definitions given in EN 16516 and ISO 16000-9.

$$C_{\text{Calculated}} = \frac{SER_A \cdot A}{n \cdot V}$$

| | | Classroom parameters | Office Room parameters |
|-----|--|----------------------|------------------------|
| SER | Area specific emission rate, µg/(m ² h) | As tested | As tested |
| n | Air change, h ⁻¹ | 0.82 | 0.68 |
| V | Volume of reference room, m ³ | 231 | 30.6 |
| A | Floor area, m ² | 89.2 | 11.1 |
| | Walls area, m ² | 94.3 | 33.4 |
| | Ceiling and Wall, m ² | 183.8 | N/A |
| | Door and Millwork, m ² | 1.89 | 1.89 |
| | Desk or Chair, units | 27 | 1 |
| | Very Small areas, m ² | 1.62 | 0.021 |
| | Small areas, m ² | 11.55 | 1.53 |

7 Appendices

7.1 Chromatogram of VOC Emissions after 14 Days



7.3 How to Understand the Results

7.3.1 Acronyms Used in the Report

| | |
|-----|--|
| < | Means less than |
| > | Means bigger than |
| * | Not a part of our accreditation |
| α | Please see section regarding uncertainty in the Appendices |
| § | Deviation from method. Please see deviation section |
| a | The method is not optimal for very volatile compounds. For these substances smaller results and a higher measurement uncertainty cannot be ruled out |
| b | The component originates from the substrate and is thus removed |
| c | The results have been corrected by the emission from the substrate |
| d | Very polar organic compounds are not suitable for reliable quantification using Tenax TA adsorbent and HP-5ms GC column. A high degree of uncertainty must be expected |
| e | The component may be overestimated due to contribution from the system |
| SER | Specific Emission Rate |

7.3.2 Explanation of ID Category

Categories of Identity:

- 1: Identified by comparison with a mass spectrum obtained from library and supported by other information and quantified through specific calibration.
- 2: Identified by comparison with a mass spectrum obtained from library and supported by other information. Quantified as toluene equivalent.
- 3: Identified with a lower match by comparison with a mass spectrum obtained from a library. Quantified as toluene equivalent.
- 4: Not identified, quantified as toluene equivalent.

7.4 Description of VOC Emission Test

7.4.1 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).

The recovery rates in the climate test chamber have been investigated using toluene and n-dodecane. The mean recovery rates of toluene and n-dodecane were concluded to be between 95 % and 100 % depending on the chamber size. These values comply with the criteria of a minimum mean recovery rate of 80 % stated in the 16000-9 test method.

Air sampling from the test chamber is carried out in a clean test chamber room at ambient air pressure and 23 ± 1 °C.

7.4.2 Expression of the Test Results

All test results are calculated as specific emission rate, and as extrapolated air concentration in the European Reference Room (EN 16516, AgBB, EMICODE, M1 and Indoor Air Comfort).

7.4.3 Testing of Carcinogenic VOCs

The emission of carcinogens (EU Categories C1A and C1B, as per European law) is 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 (automated thermal desorption coupled with gas chromatography and mass spectroscopy using 30 m HP-5 (slightly polar) column with 0.25 mm ID and 0.25 µm film, Agilent) (EN 16516, ISO 16000-6, internal methods no.: 71M549812 / 71M542808B).

All identified carcinogenic VOCs are listed; if a carcinogenic VOC is not listed then it has not been detected. Quantification is performed using the TIC signal and authentic response factors, or the relative response factors relative to toluene for the individual compounds.

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

7.4.4 Testing of VOC

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).

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

7.4.5 Testing of Aldehydes

The presence of aldehydes 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.

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.

Conversions of specific aldehydes from µg/m³ to ppm are done by the ideal gas law using a temperature of 23 degree Celsius and standard atmospheric pressure.

The results are only valid for the tested sample(s).

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7.4.6 Testing of Charcoal tubes

The presence of low boiling VOC is tested by drawing air samples from the test chamber outlet through charcoal tubes after the specified duration of storage in the ventilated test chamber. Analysis is performed by solvent desorption and subsequently by HS-GC/MS using a stabilwax column. This test only covers substances which has a CREL value and are not possible to sample on Tenax tubes.

7.5 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.

7.6 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.

7.7 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/product-testing/uncertainty/.

7.8 Decision Rules

Eurofins Product Testing A/S, declare statement of conformity based on the “Binary Statement for Simple Acceptance Rule” described in ILAC’s “Guidelines on decision Rules and Statements of Conformity” ILAC-G8:09/2019.

This means that results above the detection limit are always reported with two significant digits. Results are evaluated with the same number of significant digits as the corresponding limit values, and conformity is based on results being less than or equal to limit values.

For limit values with more than two significant digits, the third digit will be used to confirm whether a result is below or equal to the limit value. It will always be indicated in the evaluation table if this expanded evaluation is performed.

For further information, please visit www.eurofins.dk/product-testing/om-os/beslutningsregler/

7.9 Version History

| Report date | Report number | Modification |
|-------------|------------------------|-----------------|
| 11/07/2023 | 392-2023-00262201_H_EN | Current version |

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TEST REPORT

VOC Content

7 July 2023

1 Sample Information

| | |
|------------------------|-------------------|
| Sample name | DEWALT Pure220+ |
| Sample no. | 392-2023-00262202 |
| Stated production date | 28/04/2023 |
| Batch No. | #71 |
| Sample reception | 06/06/2023 |

2 Brief Evaluation of the Results

| Regulation or protocol | Conclusion | Version of regulation or protocol |
|-------------------------|------------|-----------------------------------|
| SCAQMD Rule 1168 | Pass | November 2022 |
| LEED v4.1 (VOC Content) | Pass | February 2021 |

Full details based on the testing and direct comparison with limit values are available in the following pages
Regarding pass/fail decision rule please see appendix



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3 Applied Test Methods

3.1 General Test References

| Regulation, protocol or standard | Scope | Version |
|----------------------------------|-----------------------------------|---------------|
| SCAQMD Rule 1168 | Adhesive and sealant applications | November 2022 |

3.2 Specific Laboratory Sampling and Analyses

| Test | Regulation, protocol or standard | Version | Internal SOP | Limit of detection | Uncertainty U _{95%} |
|----------------|----------------------------------|---------|--------------|--------------------|------------------------------|
| | | | | [g/L] | % |
| Solids Content | ASTM D2369 | 2020 | 71 M 544830 | 1 | 10 |
| VOC | ASTM D2369 | 2020 | 71 M 544830 | 1 | 10 |
| Density * | Internal method | - | 71 M 543130 | - | 10 |

3.3 Preparation of the Test Specimen

The sample was homogenised and applied directly onto the test dish.

4 Results

4.1 VOC content

| | Remarks on the test results | Results | Unit |
|--------------------------|---------------------------------------|---------|---------|
| Density * | Tested by the lab | 1.44 | g/mL |
| Water content | Assumed to be 0 | 0 | % (w/w) |
| Exempt compounds * | Assumed to be 0 | 0 | % (w/w) |
| Solids Content | Tested by the lab | 98.1 | % (w/w) |
| VOC content (less water) | Calculated based on the results above | 27 | g/L |

4.2 Comparison with Limit Values of VOC Content (less Water)

| Parameter | Results | Product type | Regulation or protocol | VOC limit |
|-------------|---------|--------------------------------------|------------------------|-----------|
| | [g/L] | | | [g/L] |
| VOC content | 27 | Multi-Purpose Construction Adhesives | SCAQMD Rule 1168 | 70 |

5 Appendices

5.1 How to Understand the Results

5.1.1 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
- 1 Analysed by another Eurofins laboratory

5.2 Description of VOC Content Test

5.2.1 Testing of VOC

Volatile content of the sample was determined gravimetrically by heating to 110 °C in 60 minutes. Multicomponent products are mixed according to the manufacturer's instructions and allowed to cure before heating.

The result is the average of two replicates. The result was calculated as:

$$VOC = \frac{([g \text{ All Volatiles}] - [g \text{ Water}] - [g \text{ Exempt Compounds}])}{([liter \text{ Material}] - [liter \text{ Water}] - [liter \text{ Exempt Compounds}])}$$

5.2.2 Testing of Density

The density was calculated using gravimetric and volumetric determination. The result is the average of three determinations.

5.3 Uncertainty of the Test Method

Um(%): The expanded uncertainty Um is equal to 2 x RSD%.

5.4 Decision Rules

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