Client: Drew Fraser
Forza
3211 Nebraska Ave, #300 Council Bluffs, IA 51501
Phone: 1(402) 672-5209
Email: drewf@applicheminc.com

Approval Date	:	November 04, 2022	**Labeled Age Grade/Size**	:	NA
Date of Receipt	:	November 03, 2022	**Tested Age Grade**	:	NA
Retest	:	No	**Test Request Form #**	:	TRF221110462
# of Samples Submitted	:	4 cartridges of 300 mL			
Manufacturer's Name	:	Forza			
Item Description	:	Joint Sealant OA12			
Item Number	:	NA			
Country of Origin	:	US			
Country of Import	:	NA			
PO Number	:	NA			
Delivery Conditions	:	Satisfactory, Samples tested as received			
Testing Date Range	:	11-04-2022 to 12-14-2022			

The following test item(s) was/were performed on submitted sample(s) and/or component(s) confirmed by applicant

TEST REQUESTED	RESULT
[PAWE7] CDPH Section 1350 (CDK003)**	See Attachment

** Analysis completed by Eurofins Subcontract Laboratory

Signed for and on behalf of
Eurofins Product Testing US Inc.

Sam Neuendorf / Project Coordinator

ATTACHMENT

Attestation

CDPH CA01350

On the 14th of November 2022, Eurofins Product Testing A/S received a sample of a joint sealant with the product name:

OA12

supplied by

Forza

The emissions were tested according to CDPH Section 01350. Sampling, testing and evaluation were performed according to ISO 16000-3, ISO 16000-6, ISO 16000-9, ISO 16000-11 (see test report no. 392-2022-00500001_H_EN).

Evaluation of the emission test result according to CDPH Section 01350 / CA01350

- No carcinogens and reproductive/developmental toxins could be detected.
- No individual compound exceeds one-half of the lowest concentrations of interest in a building (chronic REL).
- The requirements were passed both in reference to classrooms and office buildings.

The tested product complies with the requirements of the "Standard method for the testing and evaluation of volatile organic chemical emissions from indoor sources using environmental chambers (version 1.2)" as defined by the California Department of Public Health (CDPH) – Version of January 2017.

14 December 2022

Rasmus Verdier
Analytical Service Manager

Laura Hartung Sørensen
Analytical Service Manager

Eurofins Product Testing A/S
Smedeskovvej 38
8464 Galten
Denmark

CustomerSupport@eurofins.com
www.eurofins.com/VOC-testing

Eurofins Product Testing US inc.
11822 North Creek Pkwy N #110
WA 98011 Bothell
USA

Applicant:
Forza
3211 Nebraska Ave, Suite 300, Council Bluffs, IA 51501
51501
USA

VOC EMISSION TEST REPORT
CDPH

14 December 2022

1 Sample Information

Sample name	OA12
Batch no.	22283A
Stated production date	10/10/2022
Product type	Joint sealant
Sample reception	14/11/2022

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

Rasmus Verdier
Analytical Service Manager

Laura Hartung Sørensen
Analytical Service Manager

Table of contents

3 Applied Test Methods

3.1 General Test References

Regulation, protocol or standard	Version	Reporting limit VOC [µg/m³]	Calculation of TVOC	Combined uncertainty¤ [RSD(%)]
EN 16516	2017 + A1:2020	5	Toluene equivalents	22%
ISO 16000 -3 -6 -9 -11	2006-2021 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¤ [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 µg/m³	ATD-GC/MS	10%
Sampling of aldehydes	ISO 16000-3:2011, EN 16516:2017+A1:2020	71M549812	35 L	DNPH	-
Analysis of aldehydes	ISO 16000-3:2011, EN 16516:2017+A1:2020	71M548400	3-6 µg/m³	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 µg/m³	Headspace-GC/MS	10%

4 Test Parameters, Sample Preparation and Deviations

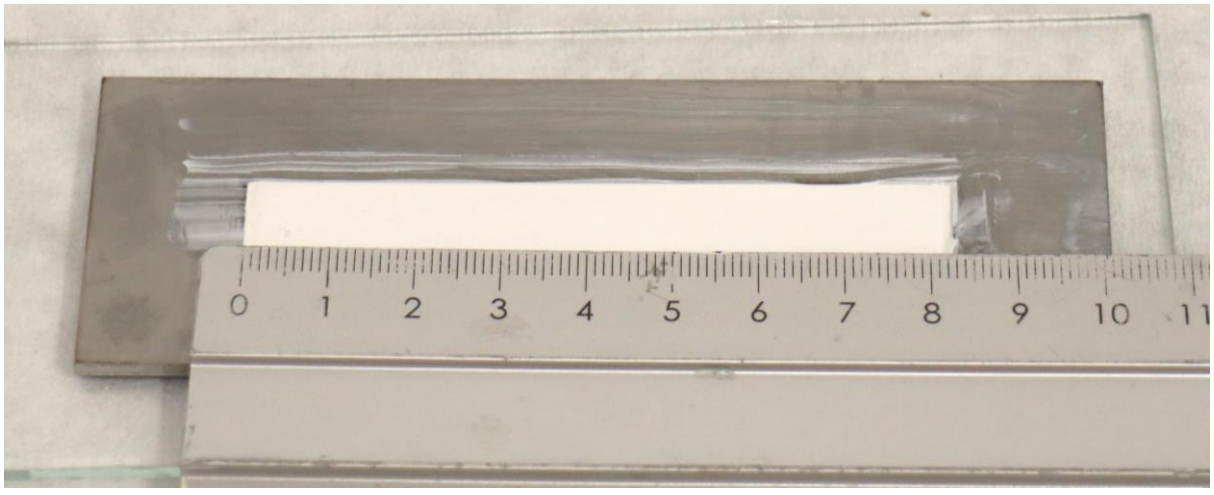
4.1 VOC Emission Chamber Test Parameters

Parameter	Value	Parameter	Value
Chamber volume, V[L]	119	Preconditioning period	-
Air Change rate, n[h^{-1}]	1.0	Chamber test period	23/11/2022 - 07/12/2022
Area specific ventilation rate, q [m/h or $m^3/m^2/h$]	143	Analytical test period	23/11/2022 - 14/12/2022
Relative humidity of supply air, RH [%]	50 ± 3	Loading factor [m^2/m^3]	0.007
Temperature of supply air, T [°C]	23 ± 1	Test scenario	Very small area

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 m^2/m^3 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.

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.				6.4	910
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.				7.4	1100
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)							
2-propyl-1-heptanol *	10042-59-8	11.43	2	590	5.0	0.61	
TVOC (C5-C17)tol. eq.				590	5.0	0.61	
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/m³]	Concentration in Office Room [µg/m³]	½ CREL [µg/m³]
TVOC (C5-C17)tol. eq.	-	5.0	0.61	-
Single compounds (with defined CREL values) None determined	-	-	-	-
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

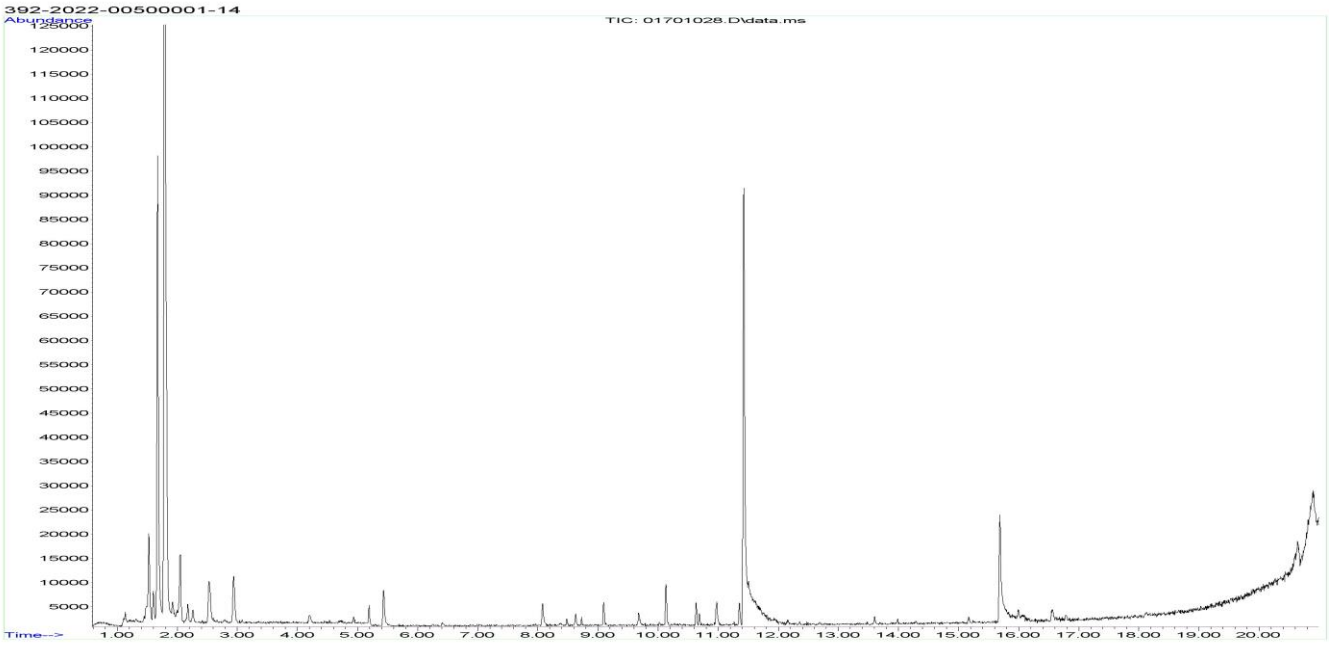
The CDPH method requires calculation of the measured emission rates into concentrations in given reference rooms. The equation and parameters figured below have been applied to calculate the concentrations in an office room or a classroom as required in the CDPH. The area used in the calculation varies 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.

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

		Classroom parameters	Office Room parameters
SER	Area specific emission rate, µg/(m²h)	As tested	As tested
n	Air change, h^{-1}	0.82	0.68
V	Volume of reference room, m³	231	30.6
A	Floor area, m²	89.2	11.1
	Walls area, m²	94.3	33.4
	Ceiling and Wall, m²	183.8	N/A
	Door and Millwork, m²	1.89	1.89
	Desk or Chair, units	27	1
	Very Small areas, m²	1.62	0.021
	Small areas, m²	11.55	1.53

7 Appendices

7.1 Chromatogram of VOC Emissions after 14 Days



7.2 Chain of Custody

eurofins

Chain of Custody

Name of the product: OA12	**Type of product: Joint grout, Org. based**
Model / Program / Series: OA12	**Batch N°.: 22283A**
Article N°.: There are 4 cartridges Misc.	**Date of batch production: 10/10/2022**
Name of the manufacturer at the place of sampling (address / stamp): Forza 3211 Nebraska Ave, Suite 300 Council Bluffs, IA, 51501, USA	**Manufacturer** (if deviating from company's name at the place of sampling):
Sample collector (Name, company, telephone): Drew Fraser Forza 3211 Nebraska Ave, Suite 300 Council Bluffs, IA, 51501, USA	**Signature of sample collector:**
Sample is taken from ☒ the ongoing production ☐ stocks	**Date of sampling: 10/10/2022**
Number of Samples 4	**Time: 26:00**
Where had the product been stored prior to sampling? ☒ Production ☐ Store ☐ Miscellaneous Place of storage: Mix tank	**How had the product been stored prior to sampling?** ☒ open ☐ in the stack ☐ wrapped up Packing material: It went from the mix tank to the cartridge filler
Further links in chain of custody (Name, function, company, telephone)	**Signature**
Further links in chain of custody (Name, function, company, telephone)	**Signature**
Sample sender (Name, company, telephone): Drew Fraser Forza 3211 Nebraska Ave, Suite 300 Council Bluffs, IA, 51501, USA	**Signature of sample sender:**
Date and time of sending: 11/9/2022	**Shipment details/Carrier: FedEx 578687932271 Appears to be delivered**
Where had the product sample been stored prior to sending? ☒ Production ☐ Store ☐ Miscellaneous Place of storage: Production Warehouse	**How had the product sample been stored prior to sending?** ☐ open ☐ in the stack ☒ wrapped up Packing material: In a cardboard box
Laboratory receiving details (date, condition of package and sample, assigned lab no.):	
Receptionist, Eurofins Product Testing A/S:	**Signature of receptionist:**

CHAIN OF CUSTODY - COPY

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
¤	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).

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.

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 Um equals 2 x RSD. For further information please visit www.eurofins.dk/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
14/12/2022	392-2022-00500001_H_EN	Current version