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Advanced Analytical Chemistry & Materials Engineering

June 23, 2017

Pecora Corporation
165 Wambold Rd.
Harleysville, PA 19438

Attn: Mr. Steven Lawrey

Ref: Lab File # RA-0609-1A-B-17RD

1. SAMPLE(S):

Two (2) 10.1 Fl. Oz. sealed cartridges of **Pecora 864NST Non-Staining, Low Modulus Architectural Silicone Sealant** manufactured by Pecora Corporation

2. ANALYSIS PERFORMED:

STANDARD METHOD FOR THE TESTING AND EVALUATION OF VOLATILE ORGANIC CHEMICAL EMISSION FROM INDOOR SOURCES USING ENVIRONMENTAL CHAMBERS – Version 1.1 –Emission Testing Method for *California Specification 01350*



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3. PROJECT DESCRIPTION:

Rinko & Associates, LLC presents the results of its indoor air evaluation of material identified as : **Pecora 864NST**

Rinko & Associates, LLC conducted this using a product evaluation test protocol following the guidance of ASTM D5116, and requirements of California's Special Environmental Requirements, Specifications Section 01350 .The product was delivered to Rinko & Associates, LLC on June 9, 2017. The product was conditioned for a 10 day period and then tested for 96 hours. Testing parameters are given **TABLE 1**.

The **Pecora 864NST** product was monitored for emissions of total volatile organic compounds (TVOC), individual volatile organic compounds (IVOC), formaldehyde and other aldehydes over the test period. Air samples were collected following the placement of the sample in the test chamber. Measurements were made and predicted exposures were calculated according to California's Section 01350 protocol. All identified VOCs were also compared to the California-EPA OEHHA Proposition 65 list and the California-EPA Air Resource Board list of Toxic Air Contaminants (TACs).



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4. RESULTS:

The **Pecora 864NST** product described above under **1.**

SAMPLE(S): meets the IAQ emission requirements of **California’s Section 01350 and Appendix B. New Single-Family Residence Scenario of CDPH/EHLB/Standard Method v1.1 (February 2010).**Expected concentrations at 96 hours for Classroom, Private Office, and New Single-Family Residence Scenario were calculated using the parameters specified in California Section 01350 as shown in the Tables below:

Ventilation Rate	Room Volume	Surface Area Product Covers
Classroom		
0.90 air changes per hour (ach)	12.19 m x 7.32 m x 2.59 m=231 m ³ (40 x 24 x 8.5 ft = 8,160 ft ³)	89.2 m ²
Private Office		
0.75 air changes per hour (ach)	3.05 m x 3.66 m x 2.74 m=30.6 m ³ (10 x 12 x 9.0 ft = 1080 ft ³)	11.1 m ²
New Single-Family Residence		
0.75 air changes per hour (ach)	19,310 ft ³ = 547 m ³	211.1 m ²



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5. PRODUCT EVALUATION METHODOLOGIES

ENVIRONMENTAL CHAMBER

The **Pecora 864NST** product was tested in a small sized environmental chamber (0.0944 m³ in volume), and chemical emissions were analytically measured from an environmental chamber operation and control measures used in this study complied with ASTM D5116 and CA/DHS/EHLB/R-174 practice. Air supply to the chamber was stripped of formaldehyde, VOCs, and other contaminants, so that any contaminant backgrounds present in the empty chamber fall below levels of <10µg/m³ TVOC, < 10µg/m³ total particles, < 2µg/m³ formaldehyde, and < 2µg/m³ for any individual VOC.

Air supply to the chamber was maintained at a temperature of 23°C±2°C and relative humidity at 50% ±5%. The air exchange rate was 1.00±0.05 air change/hour (ACH).

ANALYTICAL MEASUREMENTS

Selected Aldehydes

Emissions of selected aldehydes including formaldehyde were measured following ASTM D5197 and USEPA IP-6A, measurement by HPLC (High Performance Liquid Chromatography). Solid sorbent cartridges with 2,4-dinitrophenylhydrazine (DNPH) were used to collect formaldehyde and other low-molecular weight carbonyl compounds in chamber air. The DNPH reagent in the cartridge react with carbonyl compounds to form stable hydrazone derivatives retained by the cartridge.

The hydrazone derivatives were eluted from a cartridge with HPLC-grade acetonitrile. An aliquot of the sample was analyzed for low molecular weight aldehyde hydrazone derivatives using reverse-phase high-performance liquid chromatography (HPLC) using scanning photodiode UV detection. The absorbances of the derivatives were measured at 360 nm. The mass responses of the resulting peaks were determined using multi-point calibration curves prepared from standard solutions of the hydrazone derivatives. Measurements are reported to a quantifiable level of 0.1µg based on a standard air volume collection of 45 L.



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ANALYTICAL MEASUREMENTS-continued

Volatile Organic Compounds

VOC measurements were made using gas chromatography with mass spectrometric detection (GC/MS). Chamber air was collected onto a solid sorbent which was then thermally desorbed into the GC/MS. Instrumentation included a sample concentrator (CDS ATD) and a Trimetrics 850 GC/MS. The sorbent collection technique, separation, and detection analysis methodology has been adapted from techniques presented by the USEPA. The techniques follows USEPA Method IP-1B and ASTM D6196 and is generally applicable to C₆ – C₁₆ organic chemicals with boiling points ranging from 35°C to 250°C. Measurements are reported to a quantifiable level of 0.04µg based on a standard air volume of 18 L.

Individual VOCs were separated and detected by GC/MS. The TVOC measurements were made by adding all individual VOC responses obtained by the mass spectrometer and calibrating the total mass relative to toluene. Individual VOCs, when detected, were quantified (using authentic calibration standards when available, or relative to toluene as a standard, if not) and identified using Rinko & Associates, LLC's mass spectra database. Other compounds were identified with less certainty using a general mass spectral library available from National Institute of Standards and Technology (NIST). This library contains mass spectral characteristics of more than 75,000 compounds as made available from NIST, the USEPA and the National Institutes of Health (NIH).

6. QUALITY CONTROL PROCEDURES FOR ENVIRONMENTAL CHAMBER EVALUATIONS

Supply air purity is monitored on a weekly basis, using identical methodology to the chamber testing. The supply air is assured to contain <10µg/m³ TVOC, < 10µg/m³ total particles, < 2µg/m³ formaldehyde, and < 2µg/m³ for any individual VOC. Preventative maintenance ensures supply air purity, and corrective action is taken when any potential problems are noted in weekly samples. Supply air filters maintenance is critical for ensuring the purity of the chamber supply air.

All environmental chamber procedures are in accordance with ASTM D5116 and meet the data quality objectives required.



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TABLE 1

ENVIRONMENTAL CHAMBER STUDY PARAMETERS

PREPARED FOR: Pecora Corporation

Product Description: Pecora 864NST

Product Loading: 0.31 m²/m³

Test Conditions: 1.00±0.05 ACH
50% RH±5% RH
23°C±2°C

Test Period: 06/09/17 –06/23/17

Pollutant Emissions Evaluated: Total Volatile Organic Compounds,
Individual Volatile Organic Compounds
Target List Aldehydes, including Formaldehyde

Test Description: The product was received by Rinko & Associates, LLC on 06/09/17 as packaged and shipped by the customer in the manufacturer's standard packaging. Prior to loading, the products were unpackaged, prepared for the required loading, and placed in a conditioning chamber for 10 days. At the end of the conditioning period, the products were placed inside the environment chamber, and tested according to the specified protocol.



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TABLE 2

CHAMBER CONCENTRATIONS, EMISSION FACTORS, AND PREDICTED EXPOSURE CONCENTRATIONS FOR THE TEN MOST ABUNDANT IDENTIFIED INDIVIDUAL VOLATILE ORGANIC COMPOUNDS (VOCs) AND/OR ALDEHYDES (@96 HOURS FOLLOWING 10 DAYS OF CONDITIONING)

PREPARED FOR: Pecora Corporation

PRODUCT(S) : Pecora 864NST

Compound	Chamber Concentration μg/m ³	Calculated Emission Factor (μg/m ² •hr)	Calculated Predicted Exposure Concentration (μg/m ³)***		
			Classroom	Private Office	New Single-Family Residence
None	ND*(<2)	NA**	Classroom	Private Office	New Single-Family Residence
			NA**	NA**	NA**

Exposure hours are nominal (±1 hour)

*ND = None Detected. Method Detection Limit (MDL) is 2μg/m³

**NA= Not Applicable

***Prediction based on standard classroom floor usage of 89.2 m² in a 231.1 m³ room with 0.9

ACH or private office floor usage of 11.1 m² in a 30.6 m³ room with 0.75 ACH and a new single-family residence of 547 m³ with an ACH of 0.75



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TABLE 3

VOC PREDICTED AIR CONCENTRATIONS AND REGULATORY INFORMATION

(AT 96 HOURS FOLLOWING 10 DAYS OF CONDITIONING)

PREPARED FOR: Pecora Corporation

PRODUCT(S): Pecora 864NST

	Compound Identified	Predicted Exposure Concentration*** µg/m ³			► Indicates Presence on List		
					Chronic REL	CAL PROP. 65	CAL Toxic Air Contaminant
		Class room	Private Office	New Single-Family Residence			
	None	NA**	NA**	NA**	NA**	NA**	NA**

**NA= Not Applicable

***Prediction based on standard classroom floor usage of 89.2 m² in a 231.1 m³ room with 0.9

ACH or Private office floor usage of 11.1 m² in a 30.6 m³ room with 0.75 ACH and a new single-family residence of 547 m³ with an 0.75 ACH

CAL Prop. 65: California Health and Welfare Agency, Proposition 65 Chemicals

CAL Toxic Air Contaminant

Robert A. Haffner,
Chief Analytical Chemist/Engineer

ASTM D 5893-10 Test Report

**Standard Specification for
Cold Applied, Single Component Chemically Curing Silicone
Joint Sealant for Portland Cement Concrete Pavements**

PECORA 301NS PAVEMENT SEALANT

ASTM D 5893-10 Test Report 1/2016

Physical Requirements

TEST	ASTM	NOTES	REQUIREMENT	RESULTS
Cure		.5" cross section	21 Day Max. @ RT	7 days
Slump	D 2202	NS Boeing Jig	$\leq 0.3"$	0.05"
Extrusion Rate,	C 1183	40 psi for 60 sec.	> 20 mL/min.	21
Tack Free Time	C 679	30g on polyethylene Sample size = 3.75" X 1"	5 hrs. +/- 10 min.	68
Heat Aging Effects	C 792	.25" thick casings on Q-Panel	No cracking, chalking $\leq 10\%$ mass Loss	No Cracking, Chalking $< 10\%$
Bond ¹	D 5329	- Non-immersed - H ₂ O immersed - Oven-Aged, 7 days @ 70°C <i>NOTE: Samples must complete 5 extension cycles @ 100% extension within 7 days.</i>	0% Cohesive or Adhesive Failure	0% Coh. 0% Coh.
Hardness	C 661	21 day cure Shore A-2 @ -20°F 21 day cure Shore 00 @RT	≤ 25 $> \geq 30$	14 60



ASTM D 5893-10 Test Report

**Standard Specification for
Cold Applied, Single Component Chemically Curing Silicone
Joint Sealant for Portland Cement Concrete Pavements**

PECORA 30INS PAVEMENT SEALANT

ASTM D 5893-10 Test Report

Physical Requirements

TEST	ASTM	NOTES	REQUIREMENT	RESULTS
Flow	D 5329	21 day cure @ RT then 72 hrs. @ 200°F	No Flow	No Flow
Elongation	D 412	20"/min. crosshead speed	>/=600%	1600%
Modulus	D 412	@ 150% elongation	</= 45 psi	25 psi
Accelerated Weathering	C 793	QUV 5000 hrs., 4 hrs. @ 60°C UV 5 hrs. @ 50°C Wet	No cracking, chalking	No Cracking, Chalking
Resilience	D 5329	Sealant in tin ~2.75" diam. X 1.75 depth Oven age 7 days @ 70°C Cool to RT	>/= 75%	> 95%

¹ Sealant tested @ + 100% extension

Pecora R & D, OC, and Technical Service laboratories operate under guidelines set forth under ASMT C-1021, Standard Practice for Laboratories Engaged in Testing of Building Sealants, and meet all listed qualification to perform the testing reported above.

