	GREENGUARD Gold Criteria		Product Measurement		Product Compliance	
	Short-Term (Acute)*	**Long-Term (Chronic)***	Short Term	Long Term	Short Term	Long Term
TVOC (mg/m^3)[1]	≤ 5.0	≤ 0.22	< 0.002	< 0.002	Yes	Yes
Formaldehyde (ppm)[2]	≤ 0.040	≤ 0.0073	0.002	< 0.002	Yes	Yes
Carcinogens[3]	NA	Less Than the EPA IUR	NA	---	NA	Yes
Chronic Noncancer Toxins[4]	NA	Less Than the ATSDR MRL, ½ the CA CREL, and the EPA RfC	NA	---	NA	Yes
Acute Noncancer Toxins[5]	Less than the ATSDR MRL and the CA AREL	NA	---	NA	Yes	NA
Developmental/Reproductive Toxins[6]	Less than the ATSDR MRL and the CA AREL	NA	---	NA	Yes	NA
Other Individual VOCs[7]	Less than 1/10 the STEL/C corresponding to the ACGIH TLV and AIHA WEEL (or less than the 1/10 TWA, if no STEL/C)	Less than 1/100 the TWA corresponding to the ACGIH TLV and AIHA WEEL (or less than the 1/100 STEL, if no TWA)	---	---	Yes	Yes
Total Phthalates (mg/m^3)[8]	NA	≤ 0.01	NA	< 0.01	NA	Yes

NA = Not Applicable

[1]Defined to be the total response of measured VOCs falling within the C_6 – C_{16} range, with responses calibrated to a toluene surrogate.

[2]Short-term level based on the ATSDR Acute Duration Minimal Risk Level (MRL). Long-term level based on California Specification 01350 Acceptance IAQ Criteria (2012, v1.1 Requirement) determined ALARA (As Low As Reasonably Achievable) value.

[3]Compared to the concentration corresponding to an E-5 risk level for the EPA Inhalation Unit Risk (IUR). Excludes formaldehyde, which is covered by (2) above.

[4]Compared to the EPA Reference Concentration (RfC), CA Chronic Reference Exposure Level (CREL), and the ATSDR Intermediate or Chronic Duration MRL. Intermediate MRLs shall be used if a Chronic MRL is not available for that compound. Excludes Developmental and Reproductive endpoints (see Developmental/Reproductive Toxins).

[5]Compared to ATSDR Acute Duration MRL and CA Acute Reference Exposure Level (AREL). Excludes Developmental and Reproductive endpoints which are covered by Developmental/Reproductive Toxins in (6) below.

[6]Compared to CA ARELs and ATSDR MRLs for chemicals with Developmental or Reproductive endpoints.

[7]For the short-term exposure comparison, any VOC not otherwise listed must produce an air concentration level no greater than 1/10 the Short-Term Exposure Level or Ceiling (STEL/C) listed as an American Conference of Government Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) or American Industrial Hygiene Association (AIHA) Workplace Environmental Exposure Limit (WEEL), or no greater than the Time-Weighted Average TLV or WEEL if no STEL/C available. For the long-term exposure comparison, all VOC's must be less than 1/00 the TWA listed as an ACGIH TLV or AIHA WEEL.

[8]Defined to be the total response of a specific target list of phthalates including dibutyl (DBP), diethylhexyl (DEHD), diethyl (DEP), butylbenzyl (BBP), di-octyl (DOP), and dimethyl (DMP) phthalates (conducted using a modified phthalate specific analytical method, OSHA 104). (Ref 20)

TABLE 1

ENVIRONMENTAL CHAMBER STUDY PARAMETERS
DETOX ENVIRONMENTAL LLC
PRODUCT 90644-A0010AA

Product Description:	CLEANING PRODUCTS/SYSTEMS; CLEANERS - 01: DETOX CP, QT DECP032 (one-sided area = 0.0516 m^2) Product Documentation Sheet with photograph (Appendices 1 and 2)
Product Loading:	0.60 m^2/ m^3
Test Conditions:	1.0 ± 0.05 ACH 50 % RH ± 5% RH 23°C ± 1°C
Test Period:	08/26/2014 - 08/27/2014
Pollutant Emissions Evaluated:	Total Volatile Organic Compounds Individual Volatile Organic Compounds Formaldehyde Target List Aldehydes
Test Description:	The product was received by UL Environment on 08/26/14 as packaged and shipped by the customer. The package was visually inspected and stored in a controlled environment immediately following sample check-in. Just prior to loading, the product was unpackaged, mixed with an equivalent volume of hot water, and 0.74 g (12 g/m^2) of the mixture was applied to a glass substrate following the manufacturer's instructions. The mixture was agitated on the surface of the glass substrate and blot-dried, leaving 0.06 g of product on the substrate. The sample was placed inside the environmental chamber, and tested according to the specified protocol.

Environmental chamber test following ASTM D 5116 in a 0.09 ± 0.007 m^3 chamber.

TABLE 2

SUMMARY OF TVOC EMISSION FACTORS AND PREDICTED EXPOSURE CONCENTRATIONS

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

ELAPSED EXPOSURE HOUR*	EMISSION FACTOR µg/m²•hr	PREDICTED EXPOSURE CONCENTRATION µg/m³**
4	BQL	< 2
14	BQL	< 2

*Exposure hours are nominal (± 1 hour).
**Prediction based on standard floor usage (13.1 m²) in a room with ASHRAE 62.1-2010 ventilation conditions (32 m³ in volume and 0.72 ACH).
BQL = Below quantifiable level of 0.04 µg based on a standard 18 L air collection volume.

TABLE 3

SUMMARY OF FORMALDEHYDE EMISSION FACTORS AND PREDICTED EXPOSURE CONCENTRATIONS

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

ELAPSED EXPOSURE HOUR*	EMISSION FACTOR µg/m²•hr	PREDICTED EXPOSURE CONCENTRATION**	
		µg/m³	ppm
4	4.5	3	0.002
14	BQL	< 2	< 0.002

*Exposure hours are nominal (± 1 hour).
**Prediction based on standard floor usage (13.1 m²) in a room with ASHRAE 62.1-2010 ventilation conditions (32 m³ in volume and 0.72 ACH).
BQL = Below quantifiable level of 0.2 µg based on a standard 45 L air collection volume.

TABLE 4

EMISSION FACTORS OF INDIVIDUAL ALDEHYDES

µg/m²•hr

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

CAS NUMBER	COMPOUND IDENTIFIED	ELAPSED EXPOSURE HOUR	
		4	14
4170-30-3	2-Butenal	BQL	BQL
75-07-0	Acetaldehyde	BQL	BQL
100-52-7	Benzaldehyde	BQL	BQL
5779-94-2	Benzaldehyde, 2,5-dimethyl	BQL	BQL
529-20-4	Benzaldehyde, 2-methyl	BQL	BQL
620-23-5 /104-87-0	Benzaldehyde, 3- and/or 4-methyl	BQL	BQL
123-72-8	Butanal	BQL	BQL
590-86-3	Butanal, 3-methyl	BQL	BQL
50-00-0	Formaldehyde	**4.5**	BQL
66-25-1	Hexanal	BQL	BQL
110-62-3	Pentanal	BQL	BQL
123-38-6	Propanal	BQL	BQL

BQL = Below quantifiable level of 0.1 µg based on a standard 45 L air collection volume.

TABLE 5

EMISSION FACTORS OF SELECTED PHTHALATES AT 14 ELAPSED EXPOSURE HOURS

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

CAS NUMBER	COMPOUND IDENTIFIED	EMISSION FACTOR (µg/m² • hr)
117-81-7	Diethylhexyl phthalate	BQL
85-68-7	Butyl benzyl phthalate	BQL
117-84-0	Di-n-octyl phthalate	BQL
84-74-2	Dibutyl phthalate	BQL
84-66-2	Diethyl phthalate	BQL
131-11-3	Dimethyl phthalate	BQL
	Total phthalates	**BQL**

BQL denotes below quantifiable level of 10 µg based on a standard 240 L air collection volume.
Analysis based on OSHA Method 104 for phthalates.

TABLE 6

EMISSION FACTORS AND PREDICTED CONCENTRATIONS OF COMPOUNDS IDENTIFIED[a]

PREPARED FOR: DETOX ENVIRONMENTAL LLC

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

CAS NUMBER	COMPOUND IDENTIFIED	SHORT TERM EMISSION RATE[b] (µg/m²•hr)	SHORT TERM PREDICTED EXPOSURE CONCENTRATION[c] (µg/m³)	LONG TERM EMISSION RATE[b] (µg/m²•hr)	LONG TERM PREDICTED EXPOSURE CONCENTRATION[c] (µg/m³)
50-00-0	Formaldehyde***	4.5	3	BQL	< 2
	TVOC	4.5	3	BQL	< 2

[a]See Appendix 3, Section 1.0 for derivation.
[b]Short Term Emission Rate based on 4-hour emissions and Long Term Emissions Rate based on 14-hour emissions.
[c]Based on a single application to a 13.1 m² standard floor area in a 32 m³ space ventilated at 0.72 ACH.
*****Indicates NIST/EPA/NIH best library match only based on retention time and mass spectral characteristics.
***Indicates compound identified and quantified by DNPH derivitization and HPLC/UV analysis.
BQL denotes below quantifiable level of 0.04 µg for TVOC based on a standard 18 L air collection volume or 0.1 µg for formaldehyde and other aldehydes based on a standard 45 L air collection volume.

TABLE 7

ACGIH THRESHOLD LIMIT VALUES (TLVs) FOR OCCUPATIONAL EXPOSURES

PREPARED FOR: DETOX ENVIRONMENTAL LLC

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

COMPOUND IDENTIFIED	SHORT TERM PREDICTED CONCENTRATION (mg/m^3)	LONG TERM PREDICTED CONCENTRATION (mg/m^3)	ACGIH TLV (mg/m^3)	
			STEL	TWA
Formaldehyde	0.003	---	C 0.37	---

Key:
ACGIH = American Conference of Governmental Industrial Hygienists
TLV = Threshold Limit Value
TWA = Time Weighted Average
STEL = Short-term Exposure Limit
C = Ceiling; the concentration that shall not be exceeded during any part of the working exposure

*TWA for ozone is dependant:
Heavy work 0.1 mg/m^3
Moderate work 0.16 mg/m^3
Light work 0.2 mg/m^3
Light, moderate, or heavy workload 0.4 $mg/m^3 \leq 2$ hours
** For all isomers of trimethylbenzene

TABLE 8

COMPOUNDS IDENTIFIED IN EMISSIONS WHICH HAVE BEEN EVALUATED FOR CARCINOGENIC EFFECTS BY THE USEPA

PREPARED FOR: DETOX ENVIRONMENTAL LLC

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

COMPOUND IDENTIFIED	CLASSIFICATION	BASIS FOR CLASSIFICATION
Formaldehyde	B1	Based on limited evidence in humans, and sufficient evidence in animals. Human data include nine studies that show statistically significant associations between site-specific respiratory neoplasms and exposure to formaldehyde or formaldehyde-containing products. An increased incidence of nasal squamos cell carcinomas was observed in long-term inhalation studies in rats and in mice. The classification is supported by in vitro genotoxicity data and formaldehyde's structural relationships to other carcinogenic aldehydes such as acetaldehyde.

A: human carcinogen
B1: probable human carcinogen: limited evidence of carcinogenicity in humans
B2: probable human carcinogen: sufficient evidence of carcinogenicity in animals but inadequate evidence or lack of evidence of carcinogenicity in humans
C: possible human carcinogen
D: not classifiable as to human carcinogenicity
E: not carcinogenic in humans
NC: not yet classified
NA: not available

TABLE 9

CARCINOGENIC RISK ESTIMATES BASED ON USEPA UNIT RISK FACTORS

PREPARED FOR: DETOX ENVIRONMENTAL LLC

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

COMPOUND IDENTIFIED	LONG TERM EXPOSURE CONCENTRATION (µg/m³)*	UNIT RISK PER µg/m³	RISK LEVEL FOR PREDICTED CONCENTRATION
None	---	---	---

* Based on a single application to a 13.1 m² standard floor area in a 32 m³ space ventilated at 0.72 ACH.

TABLE 10

NON-CARCINOGENIC HEALTH RISK ESTIMATES BASED ON USEPA EXPOSURE LEVELS

PREPARED FOR: DETOX ENVIRONMENTAL LLC

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

COMPOUND IDENTIFIED	LONG TERM EXPOSURE CONCENTRATION** (µg/m³)	REFERENCE CONCENTRATION (µg/m³)	TOXICITY ENDPOINT**
None	---	---	---

**Developmental effects use the short term exposure concentration.

TABLE 11

NON-CARCINOGENIC HEALTH RISK ESTIMATES BASED ON ATSDR MINIMAL RISK LEVELS FOR INHALATION EXPOSURE

PREPARED FOR: DETOX ENVIRONMENTAL LLC

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

COMPOUND IDENTIFIED	LONG TERM EXPOSURE CONCENTRATION** ($\mu g/m^3$)	MRL ($\mu g/m^3$)	DURATION	TOXICITY ENDPOINT**
Formaldehyde	3	49.1	Acute	Respiratory

** Acute exposure based on the short term predicted exposure concentration. Developmental effects also use the short term exposure concentration.

TABLE 12

CALIFORNIA'S ACUTE REFERENCE EXPOSURE LEVELS

PREPARED FOR: DETOX ENVIRONMENTAL LLC

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

COMPOUND IDENTIFIED	SHORT TERM EXPOSURE CONCENTRATION (µg/m³)	AREL (µg/m³)	TOXICITY ENDPOINTS
Formaldehyde	3	55	Sensory irritation; eyes

TABLE 13

CALIFORNIA'S CHRONIC REFERENCE EXPOSURE LEVELS

PREPARED FOR: DETOX ENVIRONMENTAL LLC

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

COMPOUND IDENTIFIED	LONG TERM EXPOSURE CONCENTRATION (µg/m³)	CREL (µg/m³)
None	---	---

REFERENCES

1. UL 2822, “GREENGUARD Certification Program Method for Measuring and Evaluating Chemical Emissions From Cleaners and Cleaning Maintenance Systems Using Dynamic Environmental Chambers” 2013.

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3. ASTM D 5116, "Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products." ASTM, West Conshohocken, PA, 2010.

4. USEPA Report 600/8-89-074, Research Triangle Park, North Carolina, 1989.

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8. Agency for Toxic Substances and Disease Registry. ATSDR - Minimal Risk Levels for Hazardous Substances (MRLs). Atlanta: Agency for Toxic Substances and Disease Registry, 2011.

9. California RELs and CRELs, http://www.oehha.ca.gov/air/allrels.html - Adopted by the State of California Office of Environmental Health Hazard Assessment (OEHHA), December 2008.

10. U.S. Environmental Protection Agency. Integrated Risk Information System (IRIS). Springfield, VA: National Technical Information Service, 2010.

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13. Winberry, W. T., et al., "Compendium of Methods for the Determination of Air Pollutants in Indoor Air", Office of Research and Development, USEPA, RTP, NC, April 1990.

14. Bertoni, G., F. Bruner, A. Liberti, and C. Perrino, “Some Critical Parameters in Collection, Recovery, and Gas Chromatographic Analysis of Organic Pollutants in Ambient Air Using Light Adsorbents.” J. Chromatogr., 203, 263-270 (1981).

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17. ASTM D 6196 “Practice for the Selection of Sorbents and Pumped Sampling/ Thermal Desorption Analysis Procedures for Volatile Organic Compounds in Air.” ASTM, West Conshohocken, PA, 2009.

18. Sparks, Leslie, Indoor Air Exposure Model, Version 2.0, Air and Energy Engineering Research Laboratory, USEPA, RTP, NC, April, 1991.

19. ASTM D 6670, “Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.” ASTM, West Conshohocken, PA, 2007.

20. OSHA Method 104, Occupational Safety & Health Administration (OSHA), Sampling & Analytical Method 104, http://www.osha.gov/dts/sltc/methods/organic/org104/org104.html, August 1994.

APPENDIX 1

CHAIN OF CUSTODY

UL Environment Inc.
2211 Newmarket Parkway, Suite 106
Marietta, GA 30067-9399 USA
T:888.485.4733/F:770.980.0072
W:UL.com/environment

Chain Of Custody
For UL GREENGUARD Certification Programs

10002648 10466946 1.1

CUOIAE181

Laboratory Use Only

Project #	90644	Reference	
Product #	A0010AA	Rush	☐ Confirm with Laboratory Contact prior to submitting product

Test Information

☒	Annual Certification Test Year 2014 Initial (per Nora Underwood) DB 8/25/14	GREENGUARD ☒	GREENGUARD GOLD ☒
☐	Quarterly Test Year ____ Quarter ____	GREENGUARD ☒	GREENGUARD GOLD ☒

☐ Profile Study Test ☒ Out-of-Scope Test

Test Group: Cleaning Products - 01

Analysis: ☒ TVOC, HCHO, and Total Aldehydes; ☒ Full Speciation

Product Category: Cleaning Products / Systems

Subcategory: General Cleaners

☐ Other

Product and Company Information

Product Description/ Name	DETOX CP, QT DETOX 032		IAT 73°F CAPPED 75°F
Manufacture ID#	CP140825	*Date of Manufacture	8/25/14
Company Submitting Sample	Detox Environmental LLC	Contact Name	David Evans
		Job Title	GM, Eastern Region
Address	3902 W. Valley Highway N. Suite 300	Contact Phone	5713288607
	Auburn, WA 98001	Contact Email	blessedhunter@outlook.com

Collection Information

Collector Name	Scott Rhodes	*Date Collected	8/25/14
Collector Phone	2064652021	Time Collected	13:25
Collector Signature		Collection Location	Auburn, WA 98001

Shipping Information

Carrier	FEDEX EXPRESS		
Shipper Name	Scott Rhodes	*Date Shipped	8/25/14
Shipper Phone	2064652021	Time Shipped	14:57
Shipper Signature		Air Bill #	770837054261

Post Testing Information

☒ Return Samples (information must be provided below for sample return) ☒ Discard sample(s) after testing

Return Shipper: ____ Shipper Acct #: ____

Laboratory Use Only – Receiving Information

Receive Date	8-26-14	Receive Time	1:30 PM
Sample/ Package Condition Upon Arrival	☐ Acceptable ☐ Not Acceptable	Sample Condition Notes	
Receiver Name	MW	Receiver Signature	
Completed By	UL Environment	Based On	Date

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APPENDIX 2

PREPARED FOR: DETOX ENVIRONMENTAL LLC

PRODUCT 90644-A0010AA; CLEANERS - 01: DETOX CP, QT DECP032

This sample is to be applied to a glass surface using the following application procedure:

1) Spray apply product (12 g/m^2) on the surface
2) Immediately weigh the assembly and calculate the weight of the cleaner by difference.
3) Agitate surface and blot dry
4) Re-weigh the assembly and calculate the final weight of the cleaner by difference
5) Load in chamber

APPENDIX 3

METHODOLOGIES

Determination of Predicted Exposure Concentrations

The emission rate data for the individual compounds identified during chamber testing was combined with expected use conditions to determine a predicted exposure concentration. The assumption is made that the space within which the cleaning product is applied is well-mixed.

The space within which the cleaners are applied is assumed to be 32 m^3, with an air exchange rate of 0.72 air changes per hour (ACH). Concentrations of the different compounds emitted by the cleaning product were calculated based on the measured 4-hour emission rates, for the determination of the short-term exposure concentrations, and the measured 14-hour emission rates, for the determination of the long-term exposure concentrations. For each compound, the predicted exposure concentrations are calculated using the following equations:

$$C_{st} = E_4 \times (A/(N \times V)) \quad (1)$$

where:

- C_{st} = the short-term predicted exposure concentration (µg/m^3) of a given compound in the workspace;
- E_4 = the 4-hr emission rate (µg-m^2/hr) of the compound of interest;
- A = the area to which the product is applied in the room (m^2);
- N = the air exchange rate (hr^{-1}) in the room;
- V = the volume (m^3) of the room;

$$C_{lt} = E_{14} \times (A/(N \times V)) \quad (2)$$

where:

- C_{lt} = the long-term predicted exposure concentration (µg/m^3) of a given compound in the workspace;
- E_{14} = the 14-hr emission rate (µg-m^2/hr) of the compound of interest;
- A = the area to which the product is applied in the room (m^2);
- N = the air exchange rate (hr^{-1}) in the room;
- V = the volume (m^3) of the room;

Predicted exposure concentrations are provided in Table 7, and used in Tables 8 and 10-14.