

GREENGUARD CERTIFICATION TEST REPORT					
Customer Information	SHANDONG SUNFULL INDUSTRIAL CO., LTD. MS.SARAH ECONOMIC DEVELOPMENT ZONE PENGLAI SHANDONG CHINA				
	COMPACT (Phenolic), 2.0mm to 25mm Thickness				
Product Description	Surfacing Materials - 01 (Laminate) (Formerly Penglai Huasheng)				
Test Group	Surfacing Materials				
Category	Certification				
Test Type	Year 8				
Test Method	UL 2821 "GREENGUARD Certification Program Method for Measuring and Evaluating Chemical Emissions From Building Materials, Finishes and Furnishings Using Dynamic Environmental Chambers"				
	Environment	TVOC	Formaldehyde	Total Aldehydes	CREL/TLV
GREENGUARD	Office	✓	✓	✓	✓
GREENGUARD Gold	Office	✓	✓	✓	✓
	Classroom	✓	✓	✓	✓
✓ - meets criteria; X - over criteria					
Authorized by	<div>Ring Zhong</div> <div>Ring Zhong</div> <div>Laboratory Testing Supervisor</div>				

MODELING FOR PREDICTED AIR CONCENTRATION					
Certification Program	Environment Basis	Modeling Basis	Surface Area (m ²)	Room Volume (m ³)	ACH (1/hr)
GREENGUARD and GREENGUARD Gold Office	CDPH/EHLB/Standard Method	Surfacing materials	6.4	30.6	0.68
GREENGUARD Gold Classroom	CDPH/EHLB/Standard Method	Surfacing materials	24.6	231	0.82

Note that certain environments and/or modeling scenarios may prevent assessment of low level CREL and TLV analytes due to the emissions being below the lower LOQ (0.04 µg). For example, benzene ½ CREL is 1.5 µg/m³.

PHOTOGRAPH OF SAMPLE



GREENGUARD RESULTS SUMMARY

Product Description		COMPACT (Phenolic), 2.0mm to 25mm Thickness	
GREENGUARD Acceptable IAQ Criteria		168 Hour Product Measurement	Product Compliance for IAQ
TVOC ^a	≤ 0.25 mg/m ³	< 0.001 mg/m ³	Yes
Formaldehyde	≤ 0.025 ppm	0.004 ppm	Yes
Total Aldehydes ^b	≤ 0.05 ppm	0.004 ppm	Yes
4-Phenylcyclohexene	≤ 0.0033 mg/m ³	< 0.001 mg/m ³	Yes
Individual VOCs	all ≤ 1/10 TLV	----- ^c	Yes
^a "TVOC" is the sum of all VOCs measured via TD/GC/MS which elute between n-hexane (C ₆) and n-hexadecane (C ₁₆) quantified using calibration to a toluene surrogate. ^b "Total Aldehydes" is the sum of all measured normal aldehydes from formaldehyde to nonanal, plus benzaldehyde. Heptanal through nonanal are analyzed using TD/GC/MS. The remaining aldehydes are analyzed using HPL/UV methodology. All aldehydes are quantified to authentic standards. ^c All individual VOCs detected met the criteria of less than 1/10 the ACGIH established threshold limit values (TLVs).			

PROJECT DESCRIPTION

This study was conducted using a UL Environment's GREENGUARD test method following the requirements of GREENGUARD Certification program. The product was monitored for emissions of total volatile organic compounds (TVOC), formaldehyde, target list aldehydes, and other individual volatile organic compounds (VOCs) over a 168 hour exposure period. These emissions were measured and the resultant air concentrations were determined for each of the potential pollutants. Determination of compliance is based on predicted air concentrations modeled using the GREENGUARD program room loading.

Report Outline:

Table 1	Environmental Chamber Study Parameters
Table 2	Emission Factors and Predicted Air Concentrations
Table 3	Chamber Concentrations of Identified VOCs
Table 4	Emission Factors of Identified VOCs
Table 5	Chamber Concentrations of Target List Aldehydes
Table 6	Emission Factor of Target List Aldehydes
Table 7	Supplemental Emissions Information
Chain of Custody	Chain of Custody
Appendix 1	GREENGUARD Gold Results Summary

Download more information regarding UL's technical references and resources, product evaluation methodologies information, quality control program, and environmental chamber evaluations from our website [click here](#) or <https://www.ul.com/offerings/greenguard-certification>

For RSD, Quality Assurance Report or other quality documents, [Request](#) here or contact ULE.

TABLE 1

ENVIRONMENTAL CHAMBER STUDY PARAMETERS			
Product Description	COMPACT (Phenolic), 2.0mm to 25mm Thickness		
Product Manufacture Date	September 1, 2020		
Product Collection Date	September 10, 2020		
Product Shipping Date	September 13, 2020		
Date Received	November 16, 2020		
Test Description	The product was received by ULE Guangzhou Laboratory 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 and prepared for the required loading to expose the finished surfaces only. The sample was placed inside the environmental chamber, and tested according to the specified protocol.		
Test Period	November 18, 2020 - November 25, 2020**		
Area	two-sided area = 0.1800 m ²		
Environmental Chamber ID and Volume	SU1 - 0.0894 m ³		
Product Loading	2.01 m ² /m ³		
Test Conditions	1.00 ± 0.05 ACH 50% RH ± 5% RH 22.0°C - 23.0°C		
*Accredited Laboratory Locations	Testing Laboratory	Analytical Laboratory	Technical Reporting Location
	ULE - Guangzhou	ULE - Guangzhou	ULE - Guangzhou

**The manufacturing date was not within 10 days of receipt and testing of product.
The temperature range specification is 23°C ± 1°. The actual temperature range listed above may vary slightly. If the range is outside this specification, data was reviewed to ensure a negative impact did not occur.

*Accredited Laboratory Locations	
Location	Address
ULE - Marietta	UL Environment 2211 Newmarket Parkway, Marietta, GA 30067-9399 USA
ULE - Guangzhou	UL Verification Services (Guangzhou) 1-3F & Room 501, Building 2 (R&D Center A1), No. 25, South Huanshi Avenue, Nansha District, Guangzhou 511458, China
ULE - Cabiato	UL International Italia S.r.l ATTN: IAQ Laboratory Via Europa, 9, I – 22060 – Cabiato (Como), Italia
ULE - Vietnam	UL VS (VIET NAM) CO. LTD., Lot C5, Conurbation 2, Street K1, Cat Lai Industrial Zone, Thanh My Loi Ward, District 2, Ho Chi Minh City, Vietnam
UL - Shimadzu	Shimadzu Techno-Research, Inc. 1, Nishinokyo-Shimoaicho Nakagyo-ku, Kyoto 604-8436 Japan
KCL	Korea Conformity Laboratories #805, I-Valley, 149 Gongdan-ro Gunpo-si, Gyeonggi-do, 15849 Korea

This test is accredited under the laboratory's ISO/IEC 17025 accreditation issued by International Accreditation Service. Refer to certificate and scope of accreditation TL-441.

This test report is for intended use in certification programs.

TABLE 2

Product Description		COMPACT (Phenolic), 2.0mm to 25mm Thickness		
TVOC CHAMBER CONCENTRATIONS, EMISSION FACTORS AND PREDICTED AIR CONCENTRATIONS				
Elapsed Exposure Hour*	Chamber Concentration $\mu\text{g}/\text{m}^3$	Emission Factor $\mu\text{g}/\text{m}^2\cdot\text{hr}$	Predicted Air Concentration** $\mu\text{g}/\text{m}^3$	
0 (Background)	BQL	BQL	---	
6	3.9	1.9	< 1	
24	2.8	1.4	< 1	
48	NA	NA	NA	
72	2.9	1.4	< 1	
96	3.0	1.5	< 1	
168	2.9	1.4	< 1	
Power Law Decay Constant = $k_T = 0$				
FORMALDEHYDE CHAMBER CONCENTRATIONS, EMISSION FACTORS AND PREDICTED AIR CONCENTRATIONS				
Elapsed Exposure Hour*	Chamber Concentration $\mu\text{g}/\text{m}^3$	Emission Factor $\mu\text{g}/\text{m}^2\cdot\text{hr}$	Predicted Air Concentration**	
			$\mu\text{g}/\text{m}^3$	ppm
0 (Background)	BQL	BQL	---	---
6	55.0	27.3	8	0.007
24	45.0	22.4	7	0.006
48	39.5	19.6	6	0.005
72	35.5	17.6	5	0.004
96	34.3	17.0	5	0.004
168	29.4	14.6	4	0.004
Power Law Decay Constant = $k_F = 0.213$				
TARGET LIST ALDEHYDES CHAMBER CONCENTRATIONS, EMISSION FACTORS AND PREDICTED AIR CONCENTRATIONS				
Elapsed Exposure Hour*	Chamber Concentration $\mu\text{g}/\text{m}^3$	Emission Factor $\mu\text{g}/\text{m}^2\cdot\text{hr}$	Predicted Air Concentration**	
			$\mu\text{g}/\text{m}^3$	ppm
0 (Background)	BQL	BQL	---	---
6	55.0	27.3	8	0.007
24	45.0	22.4	7	0.006
48	39.5	19.6	6	0.005
72	35.5	17.6	5	0.004
96	34.3	17.0	5	0.004
168	29.4	14.6	4	0.004
Power Law Decay Constant = $k_A = 0.213$				

*Exposure hours are nominal (± 1 hour).

BQL = Below quantifiable level of 0.04 μg based on a standard 18 L air collection volume for VOCs and 0.1 μg based on a standard 45 L air collection volume for aldehydes.

**Predicted Air Concentrations are based on GREENGUARD modeling predicted concentration parameters. For more information [click here](#).

NA: data not available due to instrument malfunction.

TABLE 3

Product Description		COMPACT (Phenolic), 2.0mm to 25mm Thickness						
CHAMBER CONCENTRATIONS OF IDENTIFIED INDIVIDUAL VOLATILE ORGANIC COMPOUNDS								
CAS Number	Compound	Elapsed Exposure Hour (µg/m³)						
		0 (BG)	6	24	48	72	96	168
108-95-2	Phenol†		6.0	4.3	NA	4.4	4.6	4.4

TABLE 4

Product Description		COMPACT (Phenolic), 2.0mm to 25mm Thickness						
EMISSION FACTORS OF IDENTIFIED INDIVIDUAL VOLATILE ORGANIC COMPOUNDS								
CAS Number	Compound	Elapsed Exposure Hour (µg/m²•hr)						
		6	24	48	72	96	168	
108-95-2	Phenol†	3.0	2.2	NA	2.2	2.3	2.2	

*Indicates NIST/EPA/NIH best library match only based on retention time and mass spectral characteristics.

†Denotes quantified using multipoint authentic standard curve. Other VOCs quantified relative to toluene.

Quantifiable level is 0.04 µg based on a standard 18 L air collection volume.

NA: data not available due to instrument malfunction.

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TABLE 5

Product Description		COMPACT (Phenolic), 2.0mm to 25mm Thickness						
CHAMBER CONCENTRATIONS OF TARGET LIST ALDEHYDES								
CAS Number	Compound	Elapsed Exposure Hour (µg/m³)						
		0 (BG)	6	24	48	72	96	168
4170-30-3	2-Butenal	BQL	BQL	BQL	BQL	BQL	BQL	BQL
75-07-0	Acetaldehyde	BQL	BQL	BQL	BQL	BQL	BQL	BQL
100-52-7	Benzaldehyde	BQL	BQL	BQL	BQL	BQL	BQL	BQL
5779-94-2	Benzaldehyde, 2,5-dimethyl	BQL	BQL	BQL	BQL	BQL	BQL	BQL
529-20-4	Benzaldehyde, 2-methyl	BQL	BQL	BQL	BQL	BQL	BQL	BQL
620-23-5 /104-87-0	Benzaldehyde, 3- and/or 4-methyl	BQL	BQL	BQL	BQL	BQL	BQL	BQL
123-72-8	Butanal	BQL	BQL	BQL	BQL	BQL	BQL	BQL
590-86-3	Butanal, 3-methyl	BQL	BQL	BQL	BQL	BQL	BQL	BQL
50-00-0	Formaldehyde	BQL	55.0	45.0	39.5	35.5	34.3	29.4
66-25-1	Hexanal	BQL	BQL	BQL	BQL	BQL	BQL	BQL
110-62-3	Pentanal	BQL	BQL	BQL	BQL	BQL	BQL	BQL
123-38-6	Propanal	BQL	BQL	BQL	BQL	BQL	BQL	BQL

TABLE 6

Product Description		COMPACT (Phenolic), 2.0mm to 25mm Thickness					
EMISSION FACTORS OF TARGET LIST ALDEHYDES							
CAS Number	Compound	Elapsed Exposure Hour (µg/m²•hr)					
		6	24	48	72	96	168
4170-30-3	2-Butenal	BQL	BQL	BQL	BQL	BQL	BQL
75-07-0	Acetaldehyde	BQL	BQL	BQL	BQL	BQL	BQL
100-52-7	Benzaldehyde	BQL	BQL	BQL	BQL	BQL	BQL
5779-94-2	Benzaldehyde, 2,5-dimethyl	BQL	BQL	BQL	BQL	BQL	BQL
529-20-4	Benzaldehyde, 2-methyl	BQL	BQL	BQL	BQL	BQL	BQL
620-23-5 /104-87-0	Benzaldehyde, 3- and/or 4-methyl	BQL	BQL	BQL	BQL	BQL	BQL
123-72-8	Butanal	BQL	BQL	BQL	BQL	BQL	BQL
590-86-3	Butanal, 3-methyl	BQL	BQL	BQL	BQL	BQL	BQL
50-00-0	Formaldehyde	27.3	22.4	19.6	17.6	17.0	14.6
66-25-1	Hexanal	BQL	BQL	BQL	BQL	BQL	BQL
110-62-3	Pentanal	BQL	BQL	BQL	BQL	BQL	BQL
123-38-6	Propanal	BQL	BQL	BQL	BQL	BQL	BQL

Quantifiable level is 0.1 µg is based on a standard 45 L air collection volume.

TABLE 7

SUPPLEMENTAL EMISSIONS INFORMATION

The table below represents this product's identified chemical emissions found on certain regulatory lists. This list only provides a statement regarding possible health effects associated with this compound and not the relative risks of exposure. Proper interpretation of the risks associated with exposure to a given regulated compound requires a more detailed evaluation of toxicological activity. Certain purchasing programs may require this information be submitted.

Product Description		COMPACT (Phenolic), 2.0mm to 25mm Thickness					
CAS Number	Compound	✓() = FOUND IN LISTING (CLASS)					
		CAL PROP. 65	NTP	IARC	CAL AIR TOXICS	CREL	TLV
50-00-0	Formaldehyde	✓(1)	✓(2A)	✓(1)	✓(IIA)	✓	✓
108-95-2	Phenol [†]			✓(3)	✓(IIA)	✓	✓

[†]Denotes quantified using multipoint authentic standard curve

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

1 = known to cause cancer

2 = known to cause reproductive toxicity

NTP: National Toxicology Program

2A = known to be carcinogenic to humans

2B = reasonably anticipated to be carcinogenic to humans

IARC: International Agency on Research of Cancer

1 = carcinogenic to humans

3 = unclassifiable as to carcinogenicity to humans

2A = probably carcinogenic to humans

4 = probably not carcinogenic to humans

2B = possibly carcinogenic to humans

California Air Toxics

I = Substances identified as Toxic Air Contaminants, known to be emitted in California, with a full set of health values reviewed by the Scientific Review Panel.

IIA = Substances identified as Toxic Air Contaminants, known to be emitted in California, with one or more health values under development by the Office of Environmental Health Hazard Assessment for review by the Scientific Review Panel.

IIB= Substances NOT identified as Toxic Air Contaminants, known to be emitted in California, with one or more health values under development by the Office of Environmental Health Hazard Assessment for review by the Scientific Review Panel.

III = Substances known to be emitted in California and are NOMINATED for development of health values or additional health values.

IVA = Substance identified as Toxic Air Contaminants, known to be emitted in California and are TO BE EVALUATED for entry into Category III.

IVBA = Substance NOT identified as Toxic Air Contaminants, known to be emitted in California and are TO BE EVALUATED for entry into Category III.

V = Substance identified as Toxic Air Contaminants, and NOT KNOWN TO BE EMITTED from stationary source facilities in California based on information from the AB 2588 Air Toxic "Hot Spots" Program and the California Toxic Release Inventory.

VI = Substances identified as Toxic Air Contaminants, NOT KNOWN TO BE EMITTED from stationary source facilities in California, and are active ingredients in pesticides in California.

CREL: California Office of Environmental Health's Hazard Assessment (OEHHA), Chronic Reference Exposure Levels


✓ = Found in Listing

ACGIH TLV American Conference of Governmental Industrial Hygienists Threshold Limit Values for Chemical Substances and Physical Agents.

✓ = Found in Listing.

CHAIN OF CUSTODY

2 90510

INTERNAL Use Only				3402506	
Project #	1001066065			Description: COMPACT (Phenolic), 2.0mm to 25mm thickness	
Product #	3402506				
Order #	13558602			Customer: SHANDONG SUNFULL INDUSTRIAL CO	
Task Line	2.1	UL BU	UL US	Received Date: 2020-NOV-16 03:00:46 PM Project No.: 1001066065 Group No.: 13558602 Graphic Project No.:	
of				1 of 1	

☐ Rush Request - Subject to upcharge. Customer must confirm with UL prior to submitting product.

GREENGUARD Test Information					
Test Type	<input checked="" type="checkbox"/> Certification Test - Annual/Initial Year 8		<input type="checkbox"/> Out-of-Scope Test		
	<input type="checkbox"/> Quarterly Test - Year Quarter		<input type="checkbox"/> Profile Study Test		
Service Line	<input checked="" type="checkbox"/> GREENGUARD		<input checked="" type="checkbox"/> GREENGUARD GOLD		<input type="checkbox"/> Other
Test Group	Surfacing Materials - 01(Surfacing Materials - 01(Laminate) (formerly Penglai Huasheng)				
Product Category	Surfacing Materials		Subcategory		
Application	<input type="checkbox"/> Floor/Ceiling	<input type="checkbox"/> Panel	<input type="checkbox"/> Wall	<input type="checkbox"/> Work Surface	<input type="checkbox"/> Other
Wet Products Only	Coverage Rate	Density	Specific Gravity		
Product and Company Information					
Product Description	COMPACT (Phenolic), 2.0mm to 25mm thickness				
Manufacture ID#					
Company Name	Shandong Sunfull Industrial Co., Ltd		Date Manufactured	mm/dd/yyyy 09/01/2020	
			Contact Name	Ms. Sarah	
			Job Title		
Address			Contact Phone		
			Contact Email	huasheng@hec-ganor.com	
Collection Information					
Collector Name			Date Collected	mm/dd/yyyy 09/10/2020	
Collector Phone			Time Collected		
Collector Signature			Collection Location		
Shipping Information					
Carrier			Date Shipped	mm/dd/yyyy 09/18/2020	
Shipper Name			Time Shipped		
Shipper Phone			Air Bill #		
Shipper Signature					
Sample Submitted to					
<input type="checkbox"/> UL Environment (Merietta)	<input type="checkbox"/> UL Verification Services (Guangzhou)		<input type="checkbox"/> UL International Italia S.r.l		<input type="checkbox"/> UL VS (Vietnam) Co., Ltd.
2211 Newmarket Flwy Suite 175 Merietta, GA 30067, USA	Building A, 3F, Xuehu Science and Technology Innovation City, No. 25, South Huangshi Avenue, Nansha District, Guangzhou 511428, China		ATTN: IAG Laboratory Via Europa, 3 I-20091 - Cavate (Como), Italia		Lot 05, Conurbafen 2, Street K1, Cat Lai District 15, Ho Chi Minh City, Vietnam
Post Testing Sample Disposition (Samples will be disposed of 30 days after report is issued, if information below is not provided)					
Return Shipping Co.			Customer Shipping Acct #		
Internal Use Only - Receiving Information					
Receiver Name			Receiver Signature	UL	
Condition Upon Arrival	<input checked="" type="checkbox"/> Acceptable <input type="checkbox"/> Not Acceptable		Receive Date	2020.11.16	
Condition Notes			Receive Time	4:20	
Completed By	ULE	Based On	Program Testing Schedule	Date	08/17/2020

05-ENF-FL003 - Issue 8.0

APPENDIX 1

GREENGUARD GOLD RESULTS SUMMARY

Product Description		COMPACT (Phenolic), 2.0mm to 25mm Thickness		
COMPLIANCE WITH GREENGUARD GOLD STANDARD				
GREENGUARD Gold Acceptable IAQ Criteria		168 Hour Predicted Concentration**		Product Compliance for IAQ
		Office	Classroom	
TVOC	≤ 0.22 mg/m³	< 0.001 mg/m³	< 0.001 mg/m³	Yes
Formaldehyde	≤ 0.0073 ppm	0.0037 ppm	0.0015 ppm	Yes
Total Aldehydes	≤ 0.043 ppm	< 0.001 ppm	< 0.001 ppm	Yes
1-Methyl-2-Pyrrolidinone	≤ 0.16 mg/m³	< 0.001 mg/m³	< 0.001 mg/m³	Yes
Individual VOCs	≤ 1/100 TLV and ≤ ½ chronic REL	See Below		

**Predicted Air Concentrations are based on GREENGUARD Gold modeling predicted concentration parameters.

TOP TEN MOST ABUNDANT IDENTIFIED VOCs, INCLUDING ALDEHYDES					
CAS Number	Compound	168 Hour Chamber Concentration (µg/m ³)	168 Hour Emission Factor (µg/m ² ·hr)	Predicted Air Concentration** (µg/m ³)	
				Office	Classroom
50-00-0	Formaldehyde [‡]	29.4	14.6	4	2
108-95-2	Phenol [†]	4.4	2.2	1	0.3

CHEMICALS OF CONCERN WITH EXISTING TLV, CREL, CA PROP 65 OR CAL TOXIC AIR CONTAMINANT VALUES									
CAS Number	Compound	168 Hour Chamber Concentration (µg/m³)	168 Hour Emission Factor (µg/m²·hr)	168 Hour Predicted Concentration** (µg/m³)		✓ INDICATES PRESENCE ON LIST			
				Office	Classroom	CA PROP 65	CA TAC	CA CREL	ACGIH TLV
50-00-0	Formaldehyde‡	29.4	14.6	4	2	✓(1)	✓(IIA)	✓	✓
108-95-2	Phenol†	4.4	2.2	1	0.3		✓(IIA)	✓	✓

COMPARISON OF COMPOUNDS FOUND WITH EXISTING TLV AND/OR CHRONIC REL						
CAS Number	Compound	1/100 TLV ^a (µg/m ³)	½ CA Chronic REL ^b (µg/m ³)	168 Hour Predicted Concentration** (µg/m ³)		Product Compliance
				Office	Classroom	
108-95-2	Phenol	190	100	1	0.3	Yes

^aAmerican Conference of Governmental Industrial Hygienists. Threshold Limit Values for Chemical Substances and Physical Agents. Cincinnati, OH: ACGIH.

^bChronic Reference Exposure Levels (CRELs) adopted by the State of California Office of Environmental Health Hazard Assessment (OEHHA).

[†]Denotes quantified using multipoint authentic standard curve. Other VOCs quantified relative to toluene.

[‡]Indicates compound identified and quantified by DNPH derivitization and HPLC/UV analysis with multipoint authentic standard.

*Identification based on NIST mass spectral database only.

**Predicted Air Concentrations are based on modeling predicted concentration parameters shown [above](#).