




GREENGUARD CERTIFICATION PROGRAM QUARTERLY TEST REPORT					
Product Description		10-15MM ENGINEERED BAMBOO FLOORING (PLYWOOD CORE)			
<b>SUMMARY</b>		<b>Environment</b>	<b>TVOC</b>	<b>Formaldehyde</b>	<b>Total Aldehydes</b>
	<b>GREENGUARD</b>	Office	✓	✓	✓
	<b>GREENGUARD Gold</b>	Office	✓	✓	✓
		Classroom	✓	✓	✓
✓ - meets criteria; ✓* - meets within 25%; X - over by more than 25% of criteria					

<b>Customer Information</b>	CHANGXING JINGWEI BAMBOO PRODUCTS CO., LTD. NELSON WANG YANGFENG VILLAGE, HUAIKAN TOWNSHIP CHANGXING COUNTY, HUZHOU ZHEJIANG 313119 CHINA		
<b>Test Group</b>	Engineered Bamboo Flooring – 01 (Plywood)		
<b>Category</b>	FLOORING		
<b>Test Type</b>	Year 1	Quarter 2	
<b>Laboratory Approval</b>	 Ring Zhong Laboratory Testing Supervisor		

MODELING PREDICTED CONCENTRATION PARAMETERS					
Certification Program	Environment Basis	Product Usage	Surface Area (m <sup>2</sup> )	Room Volume (m <sup>3</sup> )	ACH (1/hr)
GREENGUARD and GREENGUARD Gold Office	CDPH/EHLB/Standard Method	Floor	11.1	30.6	0.68
GREENGUARD Gold Classroom	CDPH/EHLB/Standard Method	Floor	89.2	231	0.82

SAMPLE INFORMATION	
<b>Testing Laboratory Location</b>	UL Verification Services (Guangzhou), 1-3F & Room 501, Building 2 (R&D Center A1), No. 25, South Huanshi Avenue, Nansha District, Guangzhou 511458, China
<b>Test Description</b>	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.
<b>Date Received</b>	November 20, 2019
<b>Test Period</b>	11/22/2019 - 11/23/2019
<b>Area</b>	one-sided area = 0.0365 m <sup>2</sup>
<b>Chamber Volume</b>	0.0857 m <sup>3</sup>
<b>Product Loading</b>	0.43 m <sup>2</sup> /m <sup>3</sup>
<b>Test Conditions</b>	1.00 ± 0.05 ACH 50% RH ± 5% RH 23° C ± 1° C

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.

GREENGUARD STANDARD						
Analyte	24 Hour Emission Factor (µg/m <sup>2</sup> •hr)	168 Hour Predicted Concentration	GREENGUARD Criteria	Meets Criteria	Meets Criteria within 25%	Exceeds Criteria by > 25%
TVOC <sup>a</sup>	17.9	0.002 mg/m <sup>3</sup>	≤ 0.5 mg/m <sup>3</sup>	✓		
Formaldehyde	6.1	0.003 ppm	≤ 0.05 ppm	✓		
Total Aldehydes <sup>b</sup>	39.7	0.006 ppm	≤ 0.1 ppm	✓		
4-Phenylcyclohexene (4-PC)	BQL	< 0.001 mg/m <sup>3</sup>	≤ 0.0065 mg/m <sup>3</sup>	✓		
Individual VOCs	-----	-----	all ≤ 1/10 TLV	✓		

GREENGUARD GOLD STANDARD							
Analyte	24 Hour Emission Factor (µg/m <sup>2</sup> •hr)	168 Hour Predicted Concentration		GREENGUARD Gold Criteria	Meets Criteria	Meets Criteria within 25%	Exceeds Criteria by > 25%
		Office	Classroom				
TVOC <sup>a</sup>	17.9	0.002 mg/m <sup>3</sup>	0.002 mg/m <sup>3</sup>	≤ 0.22 mg/m <sup>3</sup>	✓		
Formaldehyde	6.1	0.0028 ppm	0.0025 ppm	≤ 0.0073 ppm	✓		
Total Aldehydes <sup>b</sup>	39.7	0.006 ppm	0.006 ppm	≤ 0.043 ppm	✓		
1-Methyl-2-pyrrolidinone	BQL	< 0.001 mg/m <sup>3</sup>	< 0.001 mg/m <sup>3</sup>	≤ 0.16 mg/m <sup>3</sup>	✓		
Individual VOCs	-----	-----		≤ 1/100 TLV and ≤ ½ chronic REL	✓		

<sup>a</sup>“TVOC” is the sum of all VOCs measured via TD/GC/MS which elute between n-hexane (C<sub>6</sub>) and n-hexadecane (C<sub>16</sub>) quantified using calibration to a toluene surrogate.

<sup>b</sup>“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. Predicted concentrations are based on decay parameters determined from full certification testing.

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/m<sup>3</sup>.

IDENTIFIED VOLATILE ORGANIC COMPOUNDS AT 24 ELAPSED EXPOSURE HOURS		
CAS Number	Compound	Emission Factor (µg/m <sup>2</sup> •hr)
64-19-7	Acetic acid	19.5
100-52-7	Benzaldehyde	11.9
108-95-2	Phenol <sup>†</sup>	9.9

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

<sup>†</sup>Denotes quantified using multipoint authentic standard curve. Other VOCs quantified relative to toluene.

TARGET LIST ALDEHYDES AT 24 ELAPSED EXPOSURE HOURS		
CAS Number	Compound	Emission Factor (µg/m <sup>2</sup> •hr)
4170-30-3	2-Butenal	BQL
75-07-0	Acetaldehyde	6.6
100-52-7	Benzaldehyde	22.3
5779-94-2	Benzaldehyde, 2,5-dimethyl	BQL
529-20-4	Benzaldehyde, 2-methyl	BQL
620-23-5 /104-87-0	Benzaldehyde, 3- and/or 4-methyl	BQL

<b>TARGET LIST ALDEHYDES AT 24 ELAPSED EXPOSURE HOURS</b>		
<b>CAS Number</b>	<b>Compound</b>	<b>Emission Factor (µg/m<sup>2</sup>•hr)</b>
123-72-8	Butanal	BQL
590-86-3	Butanal, 3-methyl	BQL
50-00-0	Formaldehyde	<b>6.1</b>
66-25-1	Hexanal	BQL
110-62-3	Pentanal	BQL
123-38-6	Propanal	<b>4.7</b>

Analyses based on EPA Compendium Method TO-17 and ASTM D 6196 for VOCs by thermal desorption followed by gas chromatography/mass spectrometry (TD/GC/MS), and EPA Method TO-11A and ASTM D 5197 for selected aldehydes by high performance liquid chromatography (HPLC).

BQL denotes below quantifiable level of 0.04 µg based on a standard 18 L air collection volume for TVOC and individual VOCs and 0.1 µg based on a standard 45 L air collection volume for formaldehyde and total aldehydes.

Testing followed UL 2821, "GREENGUARD Certification Program Method for Measuring and Evaluating Chemical Emissions From Building Materials, Finishes and Furnishings Using Dynamic Environmental Chambers" 2013.

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.