



February 26, 2016

United Mining Industries  
Shaukat Parkar  
Light Industrial Area, Al Razi St, Po Box 31491  
YANBU AL SINAIYAH  
SAUDI ARABIA

Subject: Project 90783, Profile Study Test Results

Dear Shaukat:

Thank you for choosing UL Environment and its ISO/IEC 17025 accredited testing laboratories for your analytical needs. Please find attached your profile study test report. The results for the "Fiber Cement Board, 16mm" sample tested are compared to the criteria below:

	Environment	TVOC	Formaldehyde	Total Aldehydes	CREL/TLV Issues
<b>GREENGUARD</b>	Office	✓	✓	✓	---
<b>GREENGUARD Gold</b>	Office	✓	✓	✓	---
	Classroom	✓	✓	✓	---

✓ - meets criteria; ✓\* - meets within 25%; X - over by more than 25% of criteria

For more technical information about the GREENGUARD Certification programs, please visit, [www.UL.com/GG](http://www.UL.com/GG).

Sincerely,

Allyson M. McFry  
Chemistry Laboratory Director

Attachment: Report No. 90783-02



GREENGUARD CERTIFICATION PROGRAM PROFILE STUDY TEST REPORT	
SAMPLE INFORMATION	
<b>Customer:</b>	United Mining Industries
<b>Sample Identification:</b>	UL Environment's 90783-P0020AA
<b>Product Description:</b>	GENERAL CONSTRUCTION MATERIALS; Fiber Cement Board, 16mm (one-sided area = 0.0867 m <sup>2</sup> )
<b>Product Loading:</b>	1.00 m <sup>2</sup> /m <sup>3</sup>
<b>Test Period:</b>	02/23/2016 - 02/24/2016
<b>Test Conditions:</b>	1.00 ± 0.05 ACH 50% RH ± 5% RH 23° C ± 1° C
<b>Test Description:</b>	The product was received by UL Environment on 02/09/16 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 top surface only. The sample was placed inside the environmental chamber, and tested according to the specified protocol.
<b>ASTM Test Method:</b>	ASTM D 5116 (0.09 ± 0.007 m <sup>3</sup> chamber)

RESULTS				
Analyte	24 Hour Emission Factor (µg/m <sup>2</sup> ·hr)	168 Hour Predicted Concentration		
		GREENGUARD	GREENGUARD Gold	
			Office	Classroom
TVOC	117	0.091 mg/m <sup>3</sup>	0.091 mg/m <sup>3</sup>	0.028 mg/m <sup>3</sup>
Formaldehyde	5.0	0.003 ppm	0.0032 ppm	0.0010 ppm
Total Aldehydes	36.3	0.016 ppm	0.016 ppm	0.005 ppm

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)	Assumed Decay Parameters		
						k <sub>T</sub>	k <sub>F</sub>	k <sub>A</sub>
GREENGUARD and GREENGUARD Gold Office	CDPH/EHLB/Standard Method V1.1	wall	11.1	30.6	0.68	0.005	0.005	0.005
GREENGUARD Gold Classroom	CDPH/EHLB/Standard Method V1.1	wall	94.6	231	0.82	0.005	0.005	0.005

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Test data and interpretation applicable to  
**GREENGUARD Certification Program only**

<b>IDENTIFIED INDIVIDUAL VOLATILE ORGANIC COMPOUNDS AT 24 ELAPSED EXPOSURE HOURS</b>		
<b>CAS Number</b>	<b>Compound Identified</b>	<b>Emission Factor (µg/m<sup>2</sup>·hr)</b>
---	Unresolved hydrocarbons	44.8
629-62-9	Pentadecane	11.8
42775-75-7	Naphthalene, 5-ethyl-1,2,3,4-tetrahydro-*	9.4
629-59-4	Tetradecane	7.9
78-93-3	2-Butanone (Methyl ethyl ketone, MEK) <sup>†</sup>	7.0
31295-56-4	Dodecane, 2,6,11-trimethyl*	6.7
544-76-3	Hexadecane (Cetane) <sup>†</sup>	4.2
18435-22-8	Tetradecane, 3-methyl*	4.2
61142-28-7	Cyclohexane, 1-ethenyl-3-methylene-5-(1-propenylidene)*	3.2
---	Hydrocarbons	3.1
108-94-1	Cyclohexanone	2.9
295-17-0	Cyclotetradecane	2.7
109-99-9	Furan, tetrahydro (THF)	2.4
5989-27-5	D-Limonene	2.3
25117-24-2	Tetradecane, 4-methyl*	2.3
112-40-3	Dodecane	2.2
124-18-5	Decane <sup>†</sup>	2.1

\*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.

<b>TARGET LIST ALDEHYDES AT 24 ELAPSED EXPOSURE HOURS</b>		
<b>CAS Number</b>	<b>Compound Identified</b>	<b>Emission Factor (µg/m<sup>2</sup>·hr)</b>
4170-30-3	2-Butenal	BQL
75-07-0	Acetaldehyde	<b>29.0</b>
100-52-7	Benzaldehyde	<b>2.3</b>
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
123-72-8	Butanal	BQL
590-86-3	Butanal, 3-methyl	BQL
50-00-0	Formaldehyde	<b>5.0</b>
66-25-1	Hexanal	BQL
110-62-3	Pentanal	BQL
123-38-6	Propanal	BQL

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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.

This test data is provided for general informational purposes only. The data indicate the level of emissions from the designated product and how they compare to the emission criteria of the GREENGUARD and GREENGUARD Gold standards. This data does not imply that the product has been qualified to meet the requirements of the GREENGUARD Certification program nor does it imply that the product is or is not certified by the GREENGUARD Certification program.

UL Environment is an ISO/IEC 17025 Accredited IAQ Firm. This test is accredited under the laboratory's ISO/IEC 17025 accreditation issued by ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation AT-1297.