

WALLQUEST TEST REPORT

SCOPE OF WORK

CDPH 01350 Standard Method Version 1.2 on 20 oz Nonwoven Backing

REPORT NUMBER

105069741GRR-001b

ISSUE DATE

06-July-2022

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TEST REPORT FOR [REDACTED]

Report No.: 105069741GRR-001b

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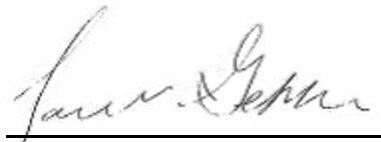
SECTION 1

CLIENT INFORMATION

[REDACTED] [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
Wayne PA 19087 USA
[REDACTED] [REDACTED]
[REDACTED] [REDACTED]



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SECTION 2

SUMMARY AND CONCLUSION

Test Method: Standard Method Version 1.2 for CDPH 01350
Modeling Scenario: Private office (PO), school classroom (SC) and single family residence (R)

DESCRIPTION OF SAMPLES

Manufacturer / Location	Varquest Inc / Wayne, PA USA
Product Name	20 oz Nonwoven Backing
Product Number	20 oz Nonwoven Backing
Date of Manufacture	19-May-2022
Date of Collection	19-May-2022
Date of Shipment	19-May-2022
Date Received by Lab	20-May-2022
Date of Test Start	02-June-2022
As Received Sample Condition	Good Condition
Lab Sample ID	GRR2205200006

WORK REQUESTED/APPLICABLE DOCUMENTS

VOC Emissions Analysis: CDPH Standard Method v1.2
Intertek Quote: Qu-01214406

TEST RESULTS

MODELING SCENARIO	RESULT (PASS/FAIL)	TVOC (mg m ⁻³)
Private Office (PO)	PASS	0.2
School Classroom (SC)	PASS	0.1
Single Family Residence (R)*	PASS	0.6

*Note: The single family residence scenario is not yet a CDPH requirement. It is provided for informational purposes only.

SAMPLE DISPOSITION

At the completion of testing, samples were disposed of in a routine manner.

SECTION 3**CDPH STANDARD METHOD V1.2**

Date Received: 20-May-2022
Dates Tested: 02-June-2022 to 16-June-2022

DESCRIPTION OF SAMPLES:

Product Description: 20 oz Nonwoven Backing Wallcovering
Material Submitted: One (1) Piece of Wallpaper

ACCEPTANCE CRITERIA:

Referencing: CDPH Standard Method v1.2, Table 4.1
LEED v4 - Low Emitting Materials
LEED v4 - TVOC Ranges: $\leq 0.5 \text{ mg m}^{-3}$
 $0.5 \text{ to } 5.0 \text{ mg m}^{-3}$
 $\geq 5.0 \text{ mg m}^{-3}$

TEST NOTES OR DEVIATIONS:

Testing performed without deviation unless noted below.

TEST SUMMARY:

The emissions testing was performed according to "Standard Method for the Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers Version 1.2". A photograph of the tested sample is included herein. The sample was attached to a stainless-steel plate using strips of aluminized tape and placed into the test chamber with top surface exposed. Air samples were collected prior to the sample being placed in the test chamber (0 hours) and at 264, 288, and 336 hours after being placed in the test chamber. Samples analyzed for individual VOCs and TVOC were collected on multi-sorbent tubes containing glass wool, Tenax TA 35/60 and Carbograph 5 TD 40/60. These VOC samples were analyzed by thermal desorption-gas chromatography/mass-spectrometry, TD-GC/MS. TVOC was calculated through integration of the chromatogram from n-pentane through n-heptadecane using toluene as a surrogate. Individual VOCs were calculated using calibration curves based on pure standards unless otherwise noted. Samples analyzed for low molecular weight aldehydes were collected on cartridges treated with 2,4-di-nitrophenylhydrazine (DNPH). Low molecular weight aldehydes were analyzed using high performance liquid chromatography, HPLC.

Table 1: Conditioning and test timing

EXPERIMENT PHASE	START DATE	DURATION
Conditioning	02-June-2022	8 days
Chamber Testing	10-June-2022	6 days

RESULTS:**Table 2: Sample and Chamber Conditions during Test Period**

PARAMETER		SYMBOL	VALUE	UNITS
Sample Dimensions	Length	-	0.285	m
	Width	-	0.284	m
	Thickness	-	-	m
Exposed Sample Surface Area		A	0.081	m^2
Chamber Volume		V	0.116	m^3
Chamber Loading Factor		L	0.70	$m^2 m^{-3}$
Inlet Air Flow Rate		Q	0.116	$m^3 h^{-1}$
Air Change Rate		N_{ACH}	1.00	h^{-1}
Area Specific Flow Rate		q_A	1.43	$m h^{-1}$
Chamber Pressure (Range)		P	17.1 (10.7-20.8)	Pa
Average Temperature (Range)		T	23.5 (23.4-23.6)	$^{\circ}C$
Average Humidity (Range)		RH	50.0 (46.6-52.0)	% RH
Testing Duration		t	336	h

Table 3: Parameters of Conditioning

PARAMETER	VALUE	UNITS
Average Temperature (Range)	23.4 (23.0-24.4)	$^{\circ}C$
Average Humidity (Range)	50.8 (45.4-52.3)	% RH

Note: Conditioning air is passed through both particulate and activated charcoal filtration to remove background VOCs.

Table 4: Test chamber background VOC concentrations in $\mu g m^{-3}$.

COMPOUND	CAS No.	C_{i0}
Formaldehyde	50-00-0	0.5
TVOC	-	22.1

Table 5: Test chamber TVOC and formaldehyde concentrations in $\mu g m^{-3}$.

COMPOUND	CAS No.	264 H	288 H	336 H
Formaldehyde	50-00-0	< 2.0	< 2.0	< 2.0
TVOC	-	104	123	120

Table 6: Test chamber TVOC and formaldehyde emission factors in $\mu g m^{-2} h^{-1}$.

COMPOUND	CAS No.	264 H	288 H	336 H
Formaldehyde	50-00-0	< 2.2	< 2.2	< 2.2
TVOC	-	117	145	140

Individual emitted VOCs identified above the lower limits of quantitation are listed in Table 5; VOCs which are listed on chemical of concern lists or have CRELs are indicated.

The measured chamber concentrations and corresponding emission factors of identified individual VOCs and TVOCs are listed in Table 6.

In Tables 4, 6 and 7, emission factors were calculated using equation 3.1 in CDPH Standard Method V1.2:

$$EF_{Ai} = \frac{Q \times (C_{it} - C_{io})}{A_c}$$

The inlet flow rate, Q ($\text{m}^3 \text{h}^{-1}$), is the measured flow rate of air into the chamber. The chamber concentration, C_{it} ($\mu\text{g m}^{-3}$), is the concentration of a target VOC_i, formaldehyde and other carbonyl compounds measured at time t . The chamber background concentration, C_{io} ($\mu\text{g m}^{-3}$), is the corresponding concentration measured with the chamber operating without a test specimen. The exposed surface area of the test specimen in the chamber, A_c (m^2), is determined from the measurements made at the time of specimen preparation.

Table 7: VOCs detected above lower limits of quantitation in air samples at 336 hours.

VOC	CAS No.	SURROGATE ¹	CREL ² ($\mu\text{g m}^{-3}$)	CARB TAC ³	PROP 65 LIST ⁴
Alkene, Alcohol, or Cycloalkane	-	Yes	NA	NA	NA
Ester	-	Yes	NA	NA	NA
Ester	-	Yes	NA	NA	NA
Ester	-	Yes	NA	NA	NA
Neodecanoic acid	26896-20-8	Yes	NA	No	No
Ester	-	Yes	NA	NA	NA
Alkene, Alcohol, or Cycloalkane	-	Yes	NA	NA	NA
Pentadecane	629-62-9	Yes	NA	No	No
Butylated Hydroxytoluene	128-37-0	Yes	NA	No	No
Siloxane	-	Yes	NA	NA	NA

¹Indicates which non-listed VOCs were quantified using surrogate compounds, all other compounds were quantified using pure compounds.

²Chronic Reference Exposure Level (CREL) as defined by California Office of Environmental Health Hazard Assessment.

³Substance is listed on California Air Resource Board's (CARB) Toxic Air Contaminant (TAC) identification list.

⁴Substance known to the state of California to cause cancer or reproductive toxicity according to California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).

In total, 11 non-target compounds were detected above $2 \mu\text{g}/\text{m}^3$. Only the top 10 individual VOCs were identified per Section 4.1.4 of the test method.

Table 8: Measured chamber concentrations and corresponding emission factors of individual VOCs listed in Table 4-1 of CDPH 01350 V1.2. at 336 hours.

VOC	CAS No.	CHAMBER CONCENTRATION ($\mu\text{g m}^{-3}$)	EMISSION FACTOR ($\mu\text{g m}^{-2} \text{h}^{-1}$)
Formaldehyde	50-00-0	< 2.0	< 2.2
Acetaldehyde	75-07-0	< 3.9	< 5.6
Vinyl acetate	108-05-4	< 0.4	< 0.6
Epichlorohydrin	106-89-8	< 0.3	< 0.4
Ethanol, 2-methoxy-, acetate	110-49-6	< 0.4	< 0.6
Isopropyl Alcohol	67-63-0	< 0.4	< 0.6
Ethene, 1,1-dichloro-	75-35-4	< 0.3	< 0.5
Methylene chloride	75-09-2	< 0.9	< 1.4
Carbon disulfide	75-15-0	< 0.4	< 0.6
Methyl tert-butyl ether	1634-04-4	< 0.9	< 1.3
n-Hexane	110-54-3	< 0.4	< 0.5
Trichloromethane (Chloroform)	67-66-3	< 0.3	< 0.4
Ethanol, 2-methoxy-	109-86-4	< 1.0	< 1.4
Ethane, 1,1,1-trichloro-	71-55-6	< 0.3	< 0.4
Benzene	71-43-2	< 0.3	< 0.4
Carbon Tetrachloride	56-23-5	< 0.3	< 0.4
2-Propanol, 1-methoxy-	107-98-2	< 0.8	< 1.2
Ethylene glycol	107-21-1	< 20	< 28.6
Trichloroethylene	79-01-6	< 0.3	< 0.4
1,4-Dioxane	123-91-1	< 0.3	< 0.4
Ethanol, 2-ethoxy-	110-80-5	< 0.8	< 1.1
Toluene	108-88-3	< 0.3	< 0.4
Formamide, N,N-dimethyl-	68-12-2	< 0.3	< 0.4
Tetrachloroethylene	127-18-4	< 0.3	< 0.4
Benzene, chloro-	108-90-7	< 0.3	< 0.4
Ethylbenzene	100-41-4	< 0.3	< 0.4
Xylene (-m, -p, & -o)	108-38-3, 95-47-6, 106-42-3	< 0.3	< 0.5
Styrene	100-42-5	< 0.3	< 0.4
2-Ethoxyethyl acetate	111-15-9	< 0.4	< 0.5
Phenol	108-95-2	< 0.5	< 0.8
Benzene, 1,4-dichloro-	106-46-7	< 0.3	< 0.4
Isophorone	78-59-1	< 0.3	< 0.4
Naphthalene	91-20-3	< 0.3	< 0.4

Table 9: Measured chamber concentrations and corresponding emission factors of identified non-listed individual VOCs and TVOC at 336 hours.

VOC	CAS No.	CHAMBER CONCENTRATION ($\mu\text{g m}^{-3}$)	EMISSION FACTOR ($\mu\text{g m}^{-2} \text{h}^{-1}$)
Alkene, Alcohol, or Cycloalkane	-	3.6	5.1
Ester	-	3.2	4.6
Ester	-	8.3	11.9
Ester	-	4.2	6.0
Neodecanoic acid	26896-20-8	11.3	16.2
Ester	-	3.9	5.6
Alkene, Alcohol, or Cycloalkane	-	8.2	11.8
Pentadecane	629-62-9	2.2	3.2
Butylated Hydroxytoluene	128-37-0	3.5	5.0
Siloxane	-	2.4	3.4
TVOC	-	120	140

Exposure Scenario Modeling and Evaluation:

Estimated building concentrations for the listed scenarios were calculated using equation 3.2a of CDPH Standard Method V1.2:

$$C_{Bi} = \frac{EF_{Ai} \times A_B}{Q_B}$$

The area specific emission rate EF_A at 336 hours (14 days) total exposure time is multiplied by the ratio of the exposed surface area of the installed material in the building, A_B (m^2), to the flow rate of outside ventilation air, Q_B ($\text{m}^3 \text{h}^{-1}$).

The modeling parameters used for the given scenarios are listed in Table 8. The modeled concentrations of identified individual VOCs are listed in Tables 9 & 10. Whether the modeled concentrations meet the maximum allowable concentration requirements specified in Table 4.1 of CDPH Standard Method V1.2 are also indicated.

Table 10: Standard modeling parameters for wallcovering.

PARAMETER	SYMBOL	VALUE	UNITS
Exposed Surface Area Installed in <i>Private Office (PO)</i>	A_B	33.4	m^2
Air flow rate of <i>Private Office (PO)</i>	Q_B	20.7	$\text{m}^3 \text{h}^{-1}$
Exposed Surface Area Installed in <i>Classroom (SC)</i>	A_B	94.6	m^2
Air flow rate of <i>Classroom (SC)</i>	Q_B	191	$\text{m}^3 \text{h}^{-1}$
Exposed Surface Area Installed in <i>Residence (R)</i>	A_B	562	m^2
Air flow rate of <i>Residence (R)</i>	Q_B	127	$\text{m}^3 \text{h}^{-1}$

Table 11: Modeled concentrations of individual VOCs specified in Table 4-1 of CDPH 01350 V1.2.

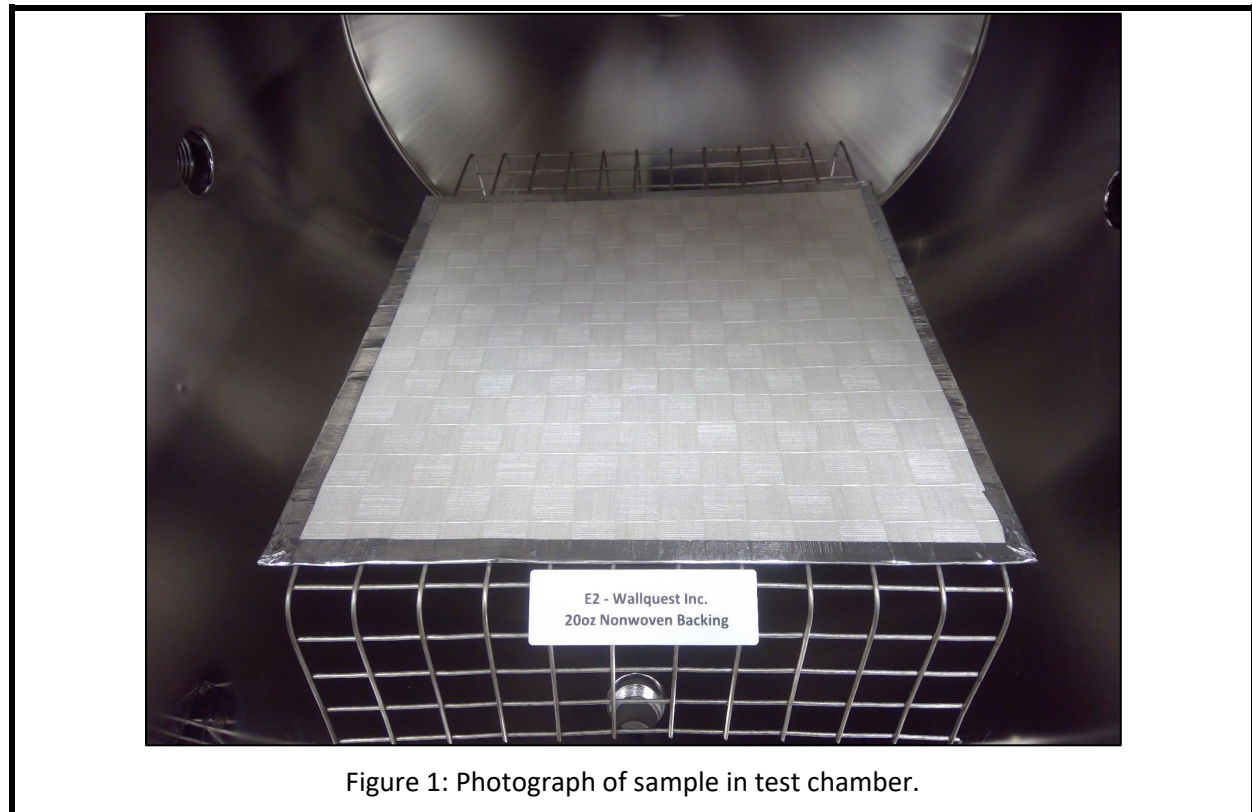
VOC	CAS NO.	MODELED CONCENTRATION ($\mu\text{g m}^{-3}$)			CONC. LIMIT ($\mu\text{g m}^{-3}$)	RESULT Pass (P) /Fail (F)		
		PO	SC	R		PO	SC	R
Formaldehyde	50-00-0	< 4.6	< 1.4	< 12.7*	9	P	P	P
Acetaldehyde	75-07-0	< 9.0	< 2.8	< 24.8	70	P	P	P
Vinyl acetate	108-05-4	< 0.9	< 0.3	< 2.6	100	P	P	P
Epichlorohydrin	106-89-8	< 0.6	< 0.2	< 1.6*	1.5	P	P	P
Ethanol, 2-methoxy-, acetate	110-49-6	< 0.9	< 0.3	< 2.5	45	P	P	P
Isopropyl Alcohol	67-63-0	< 0.9	< 0.3	< 2.6	3,500	P	P	P
Ethene, 1,1-dichloro-	75-35-4	< 0.8	< 0.2	< 2.1	35	P	P	P
Methylene chloride	75-09-2	< 2.2	< 0.7	< 6.0	200	P	P	P
Carbon disulfide	75-15-0	< 1.0	< 0.3	< 2.8	400	P	P	P
Methyl tert-butyl ether	1634-04-4	< 2.1	< 0.6	< 5.7	4,000	P	P	P
n-Hexane	110-54-3	< 0.8	< 0.2	< 2.2	3,500	P	P	P
Trichloromethane (Chloroform)	67-66-3	< 0.6	< 0.2	< 1.6	150	P	P	P
Ethanol, 2-methoxy-	109-86-4	< 2.3	< 0.7	< 6.4	30	P	P	P
Ethane, 1,1,1-trichloro-	71-55-6	< 0.6	< 0.2	< 1.6	500	P	P	P
Benzene	71-43-2	< 0.6	< 0.2	< 1.6*	1.5	P	P	P
Carbon Tetrachloride	56-23-5	< 0.6	< 0.2	< 1.6	20	P	P	P
2-Propanol, 1-methoxy-	107-98-2	< 1.9	< 0.6	< 5.3	3,500	P	P	P
Ethylene glycol	107-21-1	< 46.2	< 14.2	< 127	200	P	P	P
Trichloroethylene	79-01-6	< 0.6	< 0.2	< 1.6	300	P	P	P
1,4-Dioxane	123-91-1	< 0.6	< 0.2	< 1.6	1,500	P	P	P
Ethanol, 2-ethoxy-	110-80-5	< 1.8	< 0.5	< 4.8	35	P	P	P
Toluene	108-88-3	< 0.6	< 0.2	< 1.6	150	P	P	P
Formamide, N,N-dimethyl-	68-12-2	< 0.6	< 0.2	< 1.6	40	P	P	P
Tetrachloroethylene	127-18-4	< 0.6	< 0.2	< 1.6	17.5	P	P	P
Benzene, chloro-	108-90-7	< 0.6	< 0.2	< 1.6	500	P	P	P
Ethylbenzene	100-41-4	< 0.6	< 0.2	< 1.6	1,000	P	P	P
Xylene (-m, -p, & -o)	108-38-3, 95-47-6, 106-42-3	< 0.8	< 0.2	< 2.2	350	P	P	P
Styrene	100-42-5	< 0.6	< 0.2	< 1.6	450	P	P	P
2-Ethoxyethyl acetate	111-15-9	< 0.9	< 0.3	< 2.4	150	P	P	P
Phenol	108-95-2	< 1.2	< 0.4	< 3.4	100	P	P	P
Benzene, 1,4-dichloro-	106-46-7	< 0.6	< 0.2	< 1.6	400	P	P	P
Isophorone	78-59-1	< 0.6	< 0.2	< 1.6	1,000	P	P	P
Naphthalene	91-20-3	< 0.6	< 0.2	< 1.6	4.5	P	P	P

*Individual VOC of concern is below lower LOQ for modeled scenario.

Table 12: Modeled concentrations of identified non-listed individual VOCs.

VOC	CAS NO.	MODELED CONCENTRATION ($\mu\text{g m}^{-3}$)		
		PO	SC	R
Alkene, Alcohol, or Cycloalkane	-	8.2	2.5	22.5
Ester	-	7.5	2.3	20.5
Ester	-	19.2	5.9	52.5
Ester	-	9.6	2.9	26.3
Neodecanoic acid	26896-20-8	26.1	8.0	71.6
Ester	-	9.0	2.8	24.8
Alkene, Alcohol, or Cycloalkane	-	19.0	5.8	52.1
Pentadecane	629-62-9	5.2	1.6	14.2
Butylated Hydroxytoluene	128-37-0	8.0	2.5	21.9
Siloxane	-	5.5	1.7	15.1
TVOC _{Toluene}	-	226	69.5	621

PHOTOGRAPHS:



SECTION 4

FACILITIES AND EQUIPMENT:

GCMS

INSTRUMENTATION USED:	Markes TD-100 Thermal Desorption Agilent 7890A GC Agilent 5975C MS
COLUMN USED:	AGILENT HP-5MS (GC)

HPLC

INSTRUMENTATION USED:	Agilent 1260 Infinity Series
COLUMN USED:	Poroshell 120 EC-C18

SECTION 5
CHAIN OF CUSTODY

	Ship To: Attn: VOC Laboratory 4700 Broadmoor Ave SE Suite 200 Kentwood, MI 49512 Phone: 616-656-7401	Chain of Custody for Chemical Testing Intertek Quotation Number: QV-01214406-0 Purchase Order (Enter Company and Number): [REDACTED]		
	Customer Information Company: [REDACTED] Street Address: [REDACTED] City/State/Postal code: [REDACTED] Country: [REDACTED] Contact Name & Title (for reporting): [REDACTED] Contact Name: [REDACTED] Contact Phone/Fax Numbers: [REDACTED] Contact E-mail Address: [REDACTED] Industrially Responsible To: [REDACTED]	Shipping Details Packed & Shipped By: [REDACTED] Shipping Date: 5/19/22 Carrier/Airbill Number: [REDACTED]	Requested Testing Test to be performed: CDPH 01350	
Manufacturer Information (If Different) Company: [REDACTED] City/State/Country: [REDACTED] Contact Name/Title: [REDACTED] Phone Number/E-mail Address: [REDACTED]		Customer Request for Certification Clean Air™ Certification: ☒ YES		
Sample Details Product Commercial Name*: 2002 Nonwoven Backing Product Commercial Part No. (if not part of the name)*: 2002 Nonwoven Backing Manufacturer Sample Tracking ID: [REDACTED] Date Manufactured*: 5/19/22 Product Category & Use*: Wallcovering Sample Construction Materials*: [REDACTED] Plant Name & Location: [REDACTED] Collection Location within Plant: Manufacturing press Date & Time Collected*: 10 AM 5/19/22 Number of Sample Pieces*: 1 Sample Collected by*: [REDACTED] Phone/Fax Number*: [REDACTED] E-mail Address*: [REDACTED]		Special Customer Instructions [REDACTED]		
Intertek Use Only Condition of Shipping Package: Good Condition of Sample: Good Sample ID: GKK225520006 GIN: 6105069741 *Indicates required field		Customer Authorizes Laboratory to Submit Copies of Test Reports To: Contact: [REDACTED] Email Address: [REDACTED] Organization: [REDACTED] Contact: [REDACTED] E-mail Address: [REDACTED]		
Sample Handling*				
	Printed Name*	Signature*	Date*	Company*
Relinquished By:	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Received by:	Aminda Torger	Aminda Torger	20-May-2022	Intertek



June 2019

LEED CREDIT CONTRIBUTION

The following [REDACTED] Wallcovering commercial products have attributes that can be applied toward LEED credentials:

15 Oz Commercial Vinyl Wallcovering, Non-woven Backed

- LEED CI – MR Credit 5.1 – Regional Materials*
 - * Applies to sites within 500 miles of [REDACTED].
- LEED NC, CI, Schools – MR Credit 6 – Rapidly Renewable Materials
 - Backing is made of rapidly renewable materials
- LEED NC, CI, Schools – MR Credit 7 – Certified Wood
 - Backing is made of PEFC/FSC certified materials
- LEED NC, CI – IEQ Credit 4.1 – Low-Emitting Adhesives+
 - +Credit earned when installed with low-emitting primer & adhesives.
- LEED Schools – IEQ Credit 4.6 – Ceiling & Wall Systems
 - Wallcoverings compliant with California Department of Health Services Standard Practice.

20 Oz Commercial Vinyl Wallcovering, Non-woven Backed

- LEED CI – MR Credit 5.1 – Regional Materials*
 - * Applies to sites within 500 miles of [REDACTED].
- LEED NC, CI, Schools – MR Credit 6 – Rapidly Renewable Materials
 - Backing is made of rapidly renewable materials
- LEED NC, CI, Schools – MR Credit 7 – Certified Wood
 - Backing is made of PEFC/FSC certified materials
- LEED NC, CI – IEQ Credit 4.1 – Low-Emitting Adhesives*
 - * Credit earned when installed with low-emitting primer & adhesives.
- LEED Schools – IEQ Credit 4.6 – Ceiling & Wall Systems
 - Wallcoverings compliant with California Department of Health Services Standard Practice.

20 Oz Osnaburg Vinyl Wallcovering

- LEED NC, CI, Schools – Credit MR 5.1 – Regional Materials*
 - *Applies to sites within 500 miles of [REDACTED]
- LEED NC, CI – Credit IEQ 4.1 – Low-Emitting Adhesives+
 - +Credit earned when installed with low-emitting primer & adhesives
- LEED SCHOOLS – Credit IEQ 4.6 – Ceiling & Wall Systems
 - Wallcoverings compliant with California Department of Health Services Standard Practice.