Dynamic Small-Scale Chamber Emissions Testing

Compliance Report per
California Department of Public Health Standard Method
Version 1.1

Fabric-Backed Vinyl Wallcovering
MPLVOC

Prepared for:

Fidelity Industries, Inc.
559 Route 23
Wayne, NJ 07503

Submitted by:

Materials Analytical Services, LLC
3945 Lakefield Court
Suwanee, Georgia 30024

ACCREDITED
Testing Cert. #2925.01

February 20, 2012

MAS Project No: 1200074

MAS CERTIFIED GREEN for a healthier indoor environment

February 20, 2012

Yossi Friedman
Fidelity Industries, Inc.
559 Route 23
Wayne, NJ 07503

Subject: **Dynamic Small-Scale Chamber Emissions Testing**
Compliance Report per California Department of Public Health Standard Method Version 1.1
Fidelity Industries, Inc. Fabric-Backed Vinyl Wallcovering MPLVOC
MAS Project No.: 1200074

Dear Mr. Friedman:

Materials Analytical Services, LLC (MAS) is pleased to submit this report for emissions testing relative to potential VOC off-gassing from an application of Fidelity Industries, Inc. Fabric-Backed Vinyl Wallcovering MPLVOC submitted in January 2012. This report summarizes our testing procedures and the results of our analytical measurements.

This project was conducted in general accordance with the emission testing guidelines specified under ASTM D 5116-10. Specific testing parameters and VOC emission limits were based on the California Department of Public Health (CDPH) *Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Test Chambers Version 1.1* (Section 01350).

Based on our test results summarized herein, the Fabric-Backed Vinyl Wallcovering is **compliant** with the performance standards established for low-emitting wallcovering under the Collaborative for High Performance Schools (CHPS) and the LEED for Schools programs. As such, qualified project uses of the Fabric-Backed Vinyl Wallcovering may be eligible for 1 credit point under each program's Ceiling and Wall Systems criteria. Further, by successful conformance with the CHPS & LEED standards, the subject wallcovering also meets the criteria of the **MAS Certified Green®** Program.

MAS is pleased to have been of service to you. If you have any questions or comments, or if we can be of further assistance to you, please do not hesitate to contact us.

Sincerely,

MATERIALS ANALYTICAL SERVICES, LLC

Robert D. Schmitter
Manager, Emissions Group

William R. Stapleton
Senior Chemist

Appendices: Appendix A – Chain-of-Custody
Appendix B – General Testing Parameters and Data

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COMPLIANCE EMISSIONS TEST

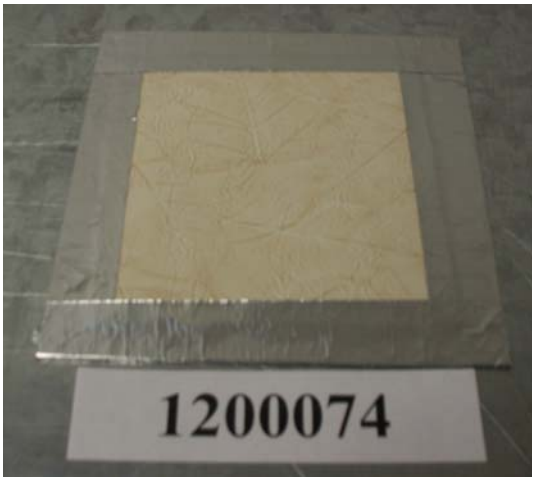
By California Dept. of Public Health Standard Method Version 1.1
Wallcovering Evaluation
MAS Project No.: 1200074

SAMPLE DESCRIPTION & TESTING PARAMETERS

On January 24, 2012, Fidelity Industries, Inc. of Wayne, New Jersey submitted an exemplar of their Fabric-Backed Vinyl Wallcovering to MAS for emissions testing (refer to photos below).

The sample was delivered to our Suwanee, Georgia office via United Parcel Service wrapped in aluminum foil and shipped within an outer cardboard box. The manufacturer and sample specifics as described in the accompanying chain-of custody (see Appendix A) and a timeline of milestones dates relative to sampling and analysis are summarized below.

Product Name: Fabric-Backed Vinyl Wallcovering	**MAS Assigned ID:** 1200074
Manufacturer: Fidelity Industries, Inc. 559 Route 23 Wayne, NJ 07503	**Product Description:** MPLVOC Fabric-backed vinyl, with water-base finish
Manufacture Date: January 20, 2012	**Testing Period:** Jan. 27 – Feb.10, 2012
Collection Date: January 24, 2012	**In-Chamber Sampling Dates:** Feb. 7 @ 24 hrs, Feb. 8 @ 48 hrs, and Feb 10 @ 96 hrs
Shipping Date: January 24, 2012	**Date of Sample Analysis:** Feb. 14, 2012
Laboratory Arrival Date: January 25, 2012	



Fidelity Industries Fabric-Backed Vinyl Wallcovering MPLVOC as submitted (left) and tested (right)

SAMPLE HANDLING & EMISSIONS TESTING

To prepare the wallcovering sample for emissions chamber testing, a 6 inch x 6 inch piece was cut from the sample, placed upon a glass plate, and an inert aluminized metal tape was used to secure the wallcovering, with edges masked by at least ¼ inch in accordance with the California Department of Public Health protocol. Immediately following preparation, the sample was placed inside one of MAS's small-scale (53 liter) stainless steel emissions chambers beneath a ceiling-mounted fan to facilitate even air circulation around the sample.

Off-gassed emissions from the subject sample were sampled and analyzed in general accordance with ASTM D 5116-10 *Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products*. The specific parameters for sample conditioning, collection of samples and analysis of compounds of interest were conducted in accordance with the California Department of Public Health (CDPH) *Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.1*, for comparison to the Leadership in Energy and Environmental Design (LEED) for Schools standard, and the Collaborative for High Performance Schools (CHPS) criteria for Low Emitting Materials; and the **MAS Certified Green®** Program standard chamber emissions testing procedures. General testing parameters and data are presented in Appendix B.

TESTING RESULTS

In order to compare the chamber-derived data to the standards established under CDPH Standard Method Version 1.1 and the CHPS criteria for Low Emitting Materials an airborne emission concentration for the tested sample is calculated based on the 96 hour test data following 10 days of in-chamber conditioning. This airborne concentration is then applied to a defined set of parameters for use of that product in a typical school classroom and/or private office environment accounting for the specified room sizes and ventilation rates.

CDPH modeling parameters define a typical classroom as having a total wall surface area of 94.6 square meters, and a typical private office has a total wall surface area of 33.4 square meters. The results of the modeling data are presented on the following page in Table I.

Table I

Emission Factors and Predicted 96-Hour Airborne Concentrations for the Fabric-Backed Vinyl Wallcovering MPLVOC in Typical Building Environments

VOC Name	Calculated Emission Factor ($\mu g/m^2/hr$)	Predicted Airborne Concentration ($\mu g/m^3$)		Reference OEHHA ½ CREL Values ($\mu g/m^3$)	Testing Comment
	96^{th} hour (4 days)	Classroom*	Private Office**		
Total VOCs (TVOC)	180	91	290	NA	NA
formaldehyde	3.7	1.8	6.0	9	**PASS/PASS**
acetaldehyde	8.1	4.1	13	70	**PASS/PASS**
isopropanol	<3.1	<1.6	<5.0	3500	**PASS/PASS**
1,1-dichloroethylene	<3.1	<1.6	<5.0	35	**PASS/PASS**
methylene chloride	<3.1	<1.6	<5.0	200	**PASS/PASS**
carbon disulfide	<3.1	<1.6	<5.0	400	**PASS/PASS**
MTBE	<3.1	<1.6	<5.0	4000	**PASS/PASS**
vinyl acetate	<3.1	<1.6	<5.0	100	**PASS/PASS**
hexane	<3.1	<1.6	<5.0	3500	**PASS/PASS**
chloroform	<3.1	<1.6	<5.0	150	**PASS/PASS**
2-methoxyethanol	<3.1	<1.6	<5.0	30	**PASS/PASS**
1,1,1-trichloroethane	<3.1	<1.6	<5.0	500	**PASS/PASS**
benzene	<3.1	<1.6	<5.0	30	**PASS/PASS**
1-methoxy-2-propanol	<3.1	<1.6	<5.0	3500	**PASS/PASS**
carbon tetrachloride	<3.1	<1.6	<5.0	20	**PASS/PASS**
1,4-dioxane	<3.1	<1.6	<5.0	1500	**PASS/PASS**
trichloroethylene	<3.1	<1.6	<5.0	300	**PASS/PASS**
epichlorohydrin	<0.80	<0.40	<1.3	1.5	**PASS/PASS**
2-ethoxyethanol	<3.1	<1.6	<5.0	35	**PASS/PASS**
n,n-dimethylformamide	<3.1	<1.6	<5.0	40	**PASS/PASS**
toluene	<3.1	<1.6	<5.0	150	**PASS/PASS**
2-methoxyethanol acetate	<3.1	<1.6	<5.0	45	**PASS/PASS**
tetrachloroethylene	<3.1	<1.6	<5.0	17.5	**PASS/PASS**
chlorobenzene	<3.1	<1.6	<5.0	500	**PASS/PASS**
ethylbenzene	<3.1	<1.6	<5.0	1000	**PASS/PASS**
m & p-xylene	<3.1	<1.6	<5.0	350	**PASS/PASS**
styrene	<3.1	<1.6	<5.0	450	**PASS/PASS**
o-xylene	<3.1	<1.6	<5.0	350	**PASS/PASS**
phenol	24	12	38	100	**PASS/PASS**
1,4-dichlorobenzene	<3.1	<1.6	<5.0	400	**PASS/PASS**

isophorone	<3.1	<1.6	<5.0	1000	**PASS/PASS**
naphthalene	<1.6	<0.81	<2.6	4.5	**PASS/PASS**

* Assumes a classroom size of 24’ x 40’ x 8.5’ with a ventilation rate of 0.82 h^{-1} as defined by CDPH/EHLB/Standard Method V.1.1
** Assumes a private office size of 10’ x 12’ x 9’ with a ventilation rate of 0.68 h^{-1} as defined by CDPH/EHLB/Standard Method V.1.1

CONCLUSIONS

Based on the emissions test data, MAS offers the following findings and conclusions:

- Formaldehyde, acetaldehyde, and phenol were the only California Department of Public Health (CDPH) regulated compounds measured above laboratory detection limits in the Fabric-Backed Vinyl Wallcovering MPLVOC (sample 1200074) at the 14-day test end point. Predicted air concentrations of these compounds in both a classroom and private office environment are **compliant** with the specified California Office of Environmental Health Hazard Assessment (OEHHA) ½ CREL limit (Table I).
- By virtue of the sample being compliant with the CDPH emission limits, the Fabric-Backed Vinyl Wallcovering manufactured by Fidelity Industries, Inc. and tested in February 2012 also **complies** the performance standards established for low-emitting materials under the Collaborative for High Performance Schools (CHPS) and the LEED for Schools programs. As such, qualified project uses of the Fabric-Backed Vinyl Wallcovering may be eligible for 1 credit point under CHPS EQ2.2.6 for Ceiling and Wall Systems, and 1 credit point under IEQ 4.6 for Ceiling and Wall Systems under the LEED for Schools Program. Further, by successful conformance with the CHPS & LEED standards, the subject wallcovering also meets the criteria of **MAS Certified Green®** Program.

LIMITATIONS

This report is intended for the use of Fidelity Industries, Inc. only. If other parties wish to rely on this report, please have them contact us so that a mutual understanding and agreement of the terms and conditions for our services can be established prior to their use of this information. This report shall not be reproduced, except in full, without the written approval of Materials Analytical Services, LLC.

It should be noted that emissions generally decay over time; as such the representativeness of the analytical data reported is directly dependant upon the age and conditions under which the tested sample was received.

All MAS-issued certifications for product emissions testing are valid for a period of one year from the date of this report. Compliance certifications are strictly limited to only the referenced product tested and/or specific variations explicitly referenced in this report.

APPENDIX A

Chain-of-Custody

MAS.

1200074

Materials Analytical Services LLC
3945 Lakefield Court
Suwanee, Georgia 30024
Phone: 770-866-3200
Fax: 770-866-3259

California Department of Public Health CDPH

Standard Method (section 01350)

Emission Testing
Chain-of-Custody

Client Information
Company: Fidelity Industries, Inc.
Street Address: 559Route 23
City/State: Wayne, NJ
Zip/Postal Code: 07503
Country: USA
Contact Name: Yossi Friedman
Title:
Phone Number: 973-777-2592
Fax Number:
Email Address: yossi@walloutlet.com

Testing Specifications (per MAS) check appropriate test below
☐ **R&D (custom):** Specify Details
☐ **24-hour Comparative R&D Test**
☐ **72-hour Comparative R&D Test**
X **14-day CDPH Compliance Test**

Manufacturer Information (if different than client)
Company:
City/State/Country:
Contact Name/Title:
Phone Number:

Construction Details (as applicable)
Covering Type: Fabric ☐ (Primary Fiber type: _____), Vinyl X, Leather ☐
Plastic Type(s): Nylon ☐, PVC X, PE ☐, PP ☐, PU ☐, PS ☐, PC ☐, ABS ☐, Acrylic ☐, Lexan ☐
Substrate Type(s): MDF ☐, Particle Board ☐, Plywood ☐, Solid Wood ☐, Other ☐
Outer Finish Type(s): Oil Base ☐, Water Base X, Catalyzed/Conversion Var ☐, Polyurethane ☐, Plastic Laminate☐, Melamine ☐, UV☐ , Other ☐
Foam Type: Polyurethane ☐, Memory ☐, Latex ☐, Evlon ☐, High Resilience ☐, High Density ☐
Paint Type: Latex ☐, Oil ☐, Low VOC ☐, No VOCs ☐, PowderCoat ☐, Chrome ☐

Sample Details
Unique Sample ID (if applicable): MPLVOC
Product Name & Catalog #: fabric backed vinyl
Product Type: Ceiling/Wall Panels ☐, Flooring ☐, Trim ☐, Wall Paint ☐, Wall Coverings X, Thermal Insulation ☐, Adhesives ☐, Ceiling Tiles ☐, Other ☐
Date of Product Manufacturing Completion: 1/20/12
Sample Location: Factory X Warehouse ☐, Production Stack/Roll ☐, Container ☐
Sample Submitted by: Yossi Friedman
Date of Sample Shipment : 1/24/12
Number of Boxes or Pallets: 1

Special Notes or Comments from Manufacturer:

Shipping Details
Packed By: Yossi Friedman
Shipping Date: 1/24/12
Carrier/Airbill Number:

Laboratory Receipt (to be completed by Laboratory Representative)
Received By:
Received Date:
Condition of Shipping Package:
Condition of Sample:
Remarks:

Sample Handling

Relinquished By	Company	Received By	Company	Date/Time
Laibel Karp	Fikelity Industries	Yossi Friedman	Fikelity Industries	1/20/12
		Ranjeet	MAS	1/25/12

APPENDIX B

General Testing Parameters and Data

GENERAL TESTING PARAMETERS AND DATA

Under the provisions of the testing method referenced in this report, testing consisted of the following procedural steps:

- Specific procedures for specimen receiving, handling, and preparation.
- Storage of test specimens in original shipping containers prior to emissions testing for up to 10 days in a ventilated and conditioned room maintained at a temperature of 23 ± 2°C and a relative humidity of 50% ± 15%.
- For quality assurance purposes the emission chamber was purged and the interior thoroughly cleaned to remove residual compounds prior to all new product tests. In addition, air samples were collected and analyzed from the chamber exhaust prior to loading to establish background levels.
- Collection of air samples at method-specified intervals from the chamber exhaust port utilizing mass flow controllers calibrated at 200 cc/min for VOCs and at 300 cc/min for aldehydes.
- Tenax TA® tubes (drawn in duplicate) are used for VOC analysis which is performed by thermal desorption gas chromatography/mass spectrometry (TD-GC/MS) using a modified EPA TO-17 method. Samples are also collected on DNPH tubes for aldehyde analysis which is performed using high performance liquid chromatography (HPLC) using a modified NIOSH 2016 method.
- Instrument calibration, analysis of quality control samples and quantitation of the of the CDPH target list of 35 chemicals of concern.
- Reporting and speciation of top 10 tentatively identified compounds.

The operational parameters for the small emission chamber utilized for this project included:

Parameter	Symbol	Units	Value
Chamber Volume	V	m^3	0.053
Loading Factor	L	unit/ m^3	0.425
Air Exchange Rate	a	h^{-1}	1.0 $\pm$ 0.05
Area Specific Flow Rate	q_A	m h^{-1}	2.4
Temperature	T	ºC	23 $\pm$ 1
Relative Humidity	RH	%	50 $\pm$ 5

The emissions testing protocol was designed to measure the release of volatile organic compounds from a given material over time. The results of the emissions testing are summarized in the tables presented on the following pages. The actual emissions measured are characterized as a concentration in micrograms per cubic meter (µg/m^3) and as an emission factor in micrograms emitted per square meter of material per hour (ug/m^2/hr).

Total volatile organic compounds (TVOC) are defined as the compounds eluting between hexane (*n*-C_5) and hexadecane (*n*-C_{17}) and in this protocol quantified as toluene *(note that there are no specific TVOC limits specified under CDPH).* The measured concentration of total volatile organic compounds (TVOC) obtained at each of the three sampling intervals is presented in Table B-I.

Table B-I

Total Volatile Organic Compounds (TVOC) between n-C_5 and n-C_{17} Measured by GC/MS*

Sample ID#	Sample Interval in hours	TVOC Concentration in µg/m^3	TVOC Emission Factor in µg/m^2 h
1200074	24	89	210
	48	80	190
	96	77	180

*TVOC values are background corrected

The measured concentrations of aldehydes (formaldehyde, acetaldehyde) obtained at each of the three sampling intervals are presented in Table B-II. This data indicates low levels of formaldehyde and acetaldehyde which increase slightly over the sampling period, but are generally indicative of steady state.

Table B-II

Formaldehyde and Acetaldehyde Concentrations as Measured by HPLC

Sample ID#	Sample Interval in hours	Target Compound	Concentration in µg/m^3	Emission Factor in µg/m^2 h
1200074	24	Formaldehyde	<1.5	<3.6
	48	Formaldehyde	<1.5	<3.6
	96	Formaldehyde	1.6	3.7
	24	Acetaldehyde	1.8	4.2
	48	Acetaldehyde	1.9	4.4
	96	Acetaldehyde	4.3	8.1

Ten individual volatile organic compounds (IVOC) were identified by GC/MS after 96 hours of off-gassing from the tested wallcovering. These are presented in Table B-III.

Table B-III

Speciation of all Tentatively Identified IVOCs* by GC/MS after 96 hours

Sample ID#	CAS Number	Tentatively Identified Compounds	Library Match %	Concent. (µg/m^3)	Emission Factor (mg/m^2 h)	Match Quality
1200074	108-95-2	phenol	NA	2.5	5.9	Confirmed
	149-57-5	2-ethylhexanoic acid	NA	<1.3	<3.1	Confirmed
	3522-94-9	hexane, 2,2,5-trimethyl-	64	3.9	9.1	Poor
	17312-83-3	undecane, 5,7-dimethyl-	72	3.6	8.4	Poor

	629-78-7	heptadecane	96	2.0	4.7	Good
	62016-14-2	octane, 2,5,6-trimethyl-	72	1.7	4.4	Poor
	62016-37-9	octane, 2,4,6-trimethyl-	59	1.7	4.1	Poor
	7225-67-4	heptane, 2,2,3,3,5,6,6-heptamethyl	14	1.6	3.8	Poor
	1120-21-4	undecane	NA	<1.3	<3.1	Confirmed
	62016-28-8	octane, 2,2,6-trimethyl-	72	1.5	3.6	Poor

*All IVOCs detected were identified using the average response factor of toluene calibration standards. Match qualities of less than **85%** are not considered to be proof of chemical identity per EPA protocols.

Please note, that in Table B-III, the Library Match Percent is a comparison of mass spectra by the library search algorithm of the Chemstation G1701DA mass spectrometry software package with the Wiley and NBS 75K mass spectral database. The search methods that we use apply a “match quality” to the search result, based upon a scale of 100%. MAS tentatively identifies compounds with a minimal match quality of $\geq$ 85%, and anything less than that value is flagged in red. Please note the sum concentration of the IVOCs does not necessarily correlate with the TVOC concentration under the analytical conditions.