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Workorder: F140428044

Purchase Order: Check

Report Date: 05/07/2014

## **ANALYTICAL TEST REPORT**

### **Dynamic Headspace Outgassing**

*Prepared for:*

**Wayne A. Usadel**

**VPI Corporation**

### **Report Authorization**

Quality Controlled by

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Bryan Ba  
Analyst

Report Reviewed by

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Mark Eitel  
Lab Manager

*Note: Test results are confidential to ChemTrace and to the above referenced customer. This test report shall not be reproduced except in full with written approval of the laboratory. Results reported herein relate only to the sample(s) tested herein, and do not necessarily represent the lot from which they came.*

## Dynamic Headspace Outgassing

Requestor: Wayne A. Usadel  
 Company: VPI Corporation  
 Date Submitted: 04/28/2014  
 Report Date: 05/07/2014  
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Sample Type	Sample ID and Description:
Vinyl Tile	<b>Sample Description: VPI ESD Solid Vinyl Tile</b> <b>Manufacturer's Name: VPI Corporation</b> <b>Lot Number: N/A</b> <b>Expiration Date: N/A</b> <b>Instruction for use: ESD Floor Tile</b>

### Major Individual Organic Compounds

R.T. (min)	Adsorbed Organic Compounds	Concentration ng/cm <sup>2</sup>
6.05	Phenol	52
7.25	Acetophenone	196
7.52	Alkyl phenol	147
7.62	Hydrocarbon	41
8.08	Alcohol	61
8.15	Hydrocarbon	63
8.27	Alcohol	51
8.92	Hydrocarbons	23
10.81		21
10.87		22
11.03		33
11.31		89
11.41		28
11.83		Ether compound
11.98	Hydrocarbons	40
12.07		39
12.27		21
12.39		73
13.41	Organic acid ester	26
13.83	2,6-Di-t-butyl-4-sec-butyl phenol (Isonox 132)	180

All compounds > 20 ng/cm<sup>2</sup> are listed in the table.

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Controlled Chemicals	Sample Description: VPI ESD Solid Vinyl Tile Manufacturer's Name: VPI Corporation Lot Number: N/A Expiration Date: N/A Instruction for use: ESD Floor Tile	Specification ng/cm <sup>2</sup>
Sulfur Dioxide and Carbon Disulfide	ND	≤ 15
Siloxanes	ND	≤ 15
Amines (Tributylamine, N-phenyl Benzenamine)	ND	≤ 100
Ethyl Hexanol	15	≤ 1,000
Acrylic Acid and Methacrylic Acid	ND	≤ 1,200
2-Phenyl-2-Propanol (Dimethyl Benzene Methanol)	ND	≤ 4,000
Methacrylates/Alkyl Acrylates (HEMA, IBOMA, HPMA, Octyl Acrylate)	ND	≤ 1,100
BHT	ND	≤ 400
2-Ethyl Hexanoic Acid	ND	≤ 250
Amides (Acrylamide)	15	≤ 20
Organo Sulfur Compound (Benzothiazole)	8.3	≤ 30
Caprolactam	ND	≤ 1,500
Benzoic Acid	ND	≤ 1,000
Acetophenone (DMAP, CHAP)	196	≤ 1,300
Polyglycol, Dimethacrylate (TGDMA, PhDMA)	ND	≤ 3,000
Other esters (DOP, DBP)	28	≤ 700
Diocetyl Sebacate	ND	≤ 100
Sulfur	ND	≤ 10
Organometallics (Tributyltin Chloride)	ND	≤ 10
Hydrocarbons	988	≤ 20,000
Other Acids	6.7	≤ 1,250
Alcohols, >C7	136	≤ 400
Hydroxybenzenes	379	≤ 400
Glycol Ethers	ND	≤ 200
N-substituted Pyrrolidone	ND	≤ 100
Other Compounds	136	≤ 1,000
Total Outgassing	1,900	≤ 40,000

ND = not detected

## Test Method for Dynamic Headspace Outgassing

### Scope:

The test method covers the identification and quantitation of organic compounds using dynamic headspace outgassing.

### Experimental:

DHS Equipment:	Teflon Chamber
Desorption Condition:	50°C for 4 hr
Desorption Gas:	Nitrogen, 50 mL/min
External Standard:	Hexadecane
Analytical Equipment:	Perkin-Elmer Turbo Matrix 650, Agilent 7890 GC/5975 MS Detector
GC Carrier Gas:	Helium
GC Capillary Column Temp:	40 °C to 280 °C

### Data Processing and Calculation:

Mass Spectrum Identification:	Computer-aided search of NIST mass spectra library with 195,000 spectra. Best effort manual interpretation for unknowns.
Quantitation:	Semi-quantitation based on the response factor <i>n</i> -hexadecane.
Reporting Detection Limit:	0.1 ng/cm <sup>2</sup>