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Workorder: F140528044

Report Date: 6/9/2014

## **ANALYTICAL TEST REPORT**

### **SEM/EDX Analysis**

*Prepared for:*

**Wayne A. Usadel**

*VPI Corporation*

### **Report Authorization**

Report Prepared by

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James Mackenthun  
Lab Supervisor

Report Reviewed by

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Mark Eitel  
Lab Manager

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## SEM/EDX Analysis

Requestor: Wayne A. Usadel  
Company: VPI Corporation  
Sample Receipt: 5/28/2014  
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### Analysis Requested

SEM/EDX analysis of particles for Talc

### Sample Information

**Sample Description** VPI ESI Solid Vinyl Tile  
**Manufacturer** VPI Corporation  
**Lot Number** N/A  
**Expiration Date** N/A  
**Instruction for Use** ESD Floor Tile/[REDACTED] Projects

**Sampling** Sampling was performed according to [REDACTED] procedure.  
**Sample Condition** The sample was received wrapped in foil.  
**Analysis Location** Fremont, CA

### Sample Preparation

**Preparation** The conductive carbon tape was affixed to an SEM sample mount and analyzed without coating.

### Instrument Analysis

**Instrumentation** SEM/EDX analysis was performed with a Tescan Vega3 XMH SEM with an iXRF SDD EDXS.

**Calibration** SEM magnification was calibrated with a 40µm grid Ni specimen for dimensional accuracy. The EDX energy was calibrated using Cu and Al standards.

### Results and Discussion

Table 1 shows the distribution of particle compositions for 50 particles. The quantitative results are expressed as weight percentage. The peak for C includes contribution from the tape background. Particles were counted from at least two fields to make up the 50 particle total, and where necessary to determine the particle count, the entire active area of the tape (except for edge exclusion) is counted for total particles at 200X magnification.

The sample had no particles identified as Talc. A very large number of particles were found, and nearly all of the particles were identified as hardness, probably calcium carbonate. Possibly the tile substrate is lifted as particles from this sample.

These results are summarized in Table 2.

Figure 1 shows an SEM image of the particles and the EDX spectra of representative particles.

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Particle Details

	Area µm <sup>2</sup>	C Wt%	O Wt%	Na Wt%	Mg Wt%	Si Wt%	S Wt%	Cl Wt%	Ca Wt%
Hard	4.09	56.06	31.32	--	--	--	--	--	12.62
Hard	2.05	50.34	30.71	3.23	--	--	--	1.54	14.17
Hard	2.05	53.68	35.29	--	--	--	--	--	11.03
Hard	8.18	32.58	43.97	--	--	--	--	--	23.44
Hard	4.09	69.64	22.00	--	--	--	--	--	8.36
Hard	2.05	66.01	26.98	--	--	--	--	--	7.01
Hard	10.23	55.91	32.90	--	--	--	--	--	11.19
Unclassified	2.05	69.05	22.03	--	--	--	8.92	--	--
Hard	2.05	52.30	36.00	--	--	--	--	--	11.70
Hard	12.27	66.18	27.53	--	--	--	1.38	--	4.90
Hard	6.14	62.30	28.86	--	--	--	--	--	8.84
Hard	14.32	51.12	33.78	--	--	--	1.12	--	13.98
Hard	2.05	51.83	31.12	--	1.86	--	--	--	15.20
Hard	108.39	58.08	24.59	--	--	--	--	8.42	8.92
Org	2.05	78.72	21.28	--	--	--	--	--	--
Hard	6.14	62.37	24.72	--	--	--	--	2.61	10.30
Hard	4.09	66.85	26.91	--	--	--	--	--	6.24
Org	4.09	75.47	24.53	--	--	--	--	--	--
Hard	4.09	48.78	37.78	--	--	--	--	--	13.45
Hard	4.09	58.01	34.37	--	--	--	--	--	7.62
Hard	12.27	57.93	35.04	--	--	--	--	--	7.03
Org	2.05	85.04	14.96	--	--	--	--	--	--
Hard	4.09	66.52	28.38	--	--	--	--	--	5.10
Hard	2.05	52.08	31.68	--	--	1.07	--	--	15.17
Hard	47.04	45.56	37.84	--	--	--	--	--	16.60

Particle Details

	Area µm <sup>2</sup>	C Wt%	O Wt%	Al Wt%	Cl Wt%	Ca Wt%
Hard	2.05	75.61	17.92	--	--	6.47
Hard	2.05	65.09	29.38	--	--	5.52
Hard	57.26	42.15	39.03	--	--	18.82
Hard	8.18	56.39	36.15	--	--	7.46
Hard	4.09	52.83	37.87	--	--	9.30
Hard	4.09	70.71	19.48	--	--	9.80
Hard	42.95	36.01	43.46	--	--	20.53
Hard	47.04	40.60	31.92	15.10	--	12.37
Hard	12.27	57.22	29.26	--	--	13.53
Hard	67.49	33.69	43.79	--	--	22.51
Hard	2.05	9.28	46.82	--	--	43.90
Hard	2.05	49.82	27.60	--	--	22.58
Hard	4.09	71.90	24.89	--	--	3.20
Hard	8.18	58.14	31.61	--	--	10.24
Org	6.14	77.47	22.53	--	--	--
Hard	32.72	29.55	42.61	--	--	27.84
Hard	2.05	41.77	38.04	--	--	20.18
Hard	51.13	24.08	32.68	--	--	43.23
Hard	10.23	49.82	35.79	--	--	14.39
Org	2.05	82.25	17.75	--	--	--
Org	4.09	83.94	16.06	--	--	--
Hard	4.09	24.60	43.08	--	--	32.32
Hard	4.09	47.24	38.33	--	1.15	13.28
Hard	16.36	43.67	36.79	--	--	19.54
Hard	2.05	57.78	33.82	--	--	8.40

**Table 1. Distribution of Particle Composition in Sample**

## **SEM/EDX Analysis**

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	Paint
Talc	0
Organic	6
Hard	43
Unclass.	1
Talc	0%
Talc / sqin	<0.5

**Table 2. Summary of Particle Identifications**

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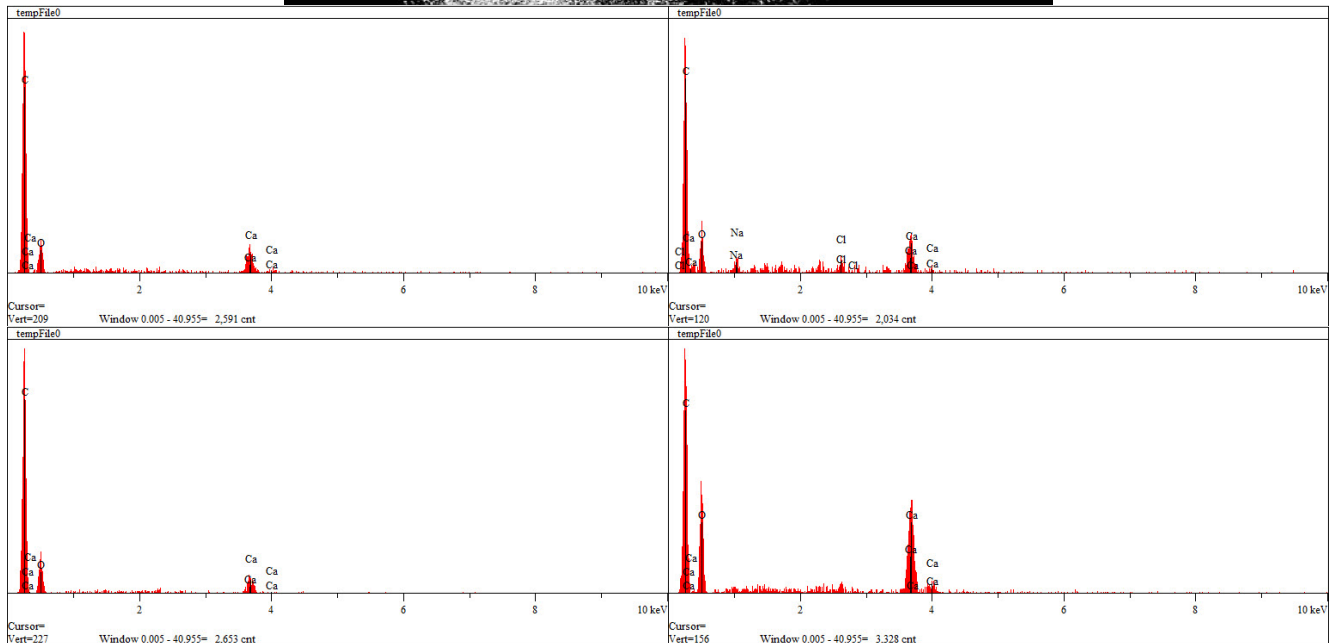
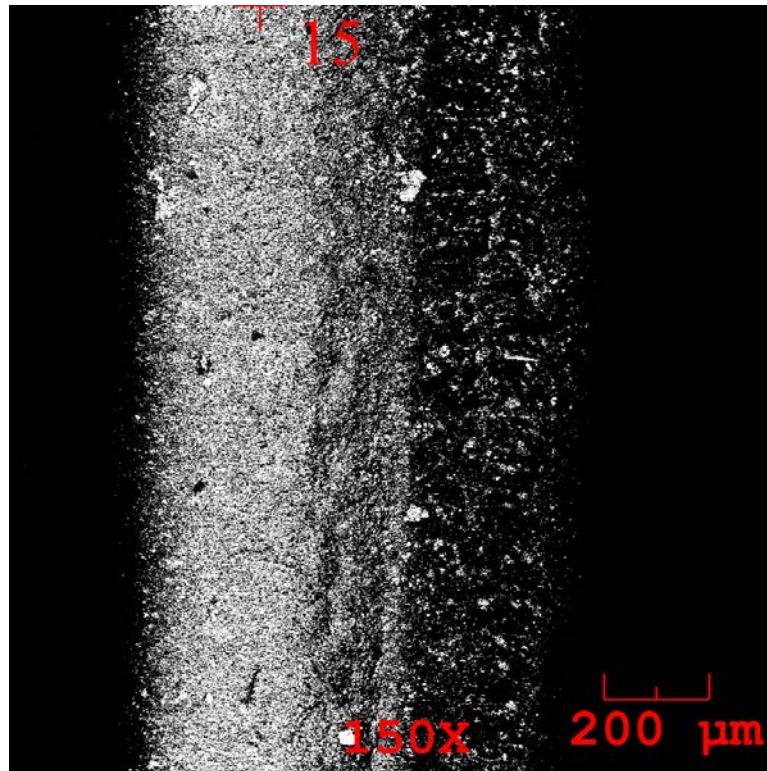


Figure 1. –SEM image and EDX spectra of particles from Sample