



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 1 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

BACKGROUND:

The client submitted one sample for compatibility testing per EPA Method 9090A. The sample arrived on 10/11/2010 via customer supplied courier. Visual inspection was performed on 10/11/2010 and no product defects were noted. Testing in accordance with client advance #23423 and P.O. #JW091410-JW1 received on 09/20/2010. Additional information is provided:

CRT order entry log date: 10/11/2010 / **Report due date:** 03/23/2011

Sample description: VF/PV380 Geo-Fabric with Barrier Film

PREPARATION:

Synthetic blend B.O.D. solution – 7.9.1 EPA Method 9090A-92, Rev-1, Reference Toxicology Characteristic Leaching Procedures (TCLP), Federal Register June 29, 1990, Vol.: 55, No. 126 (activated tri-blend formula)

Conditioning, Set-up & Preparation – EPA Method 9090A / CRT methods

TEST PROCEDURES:

Test Method for Compatibility Test for Wastes and Membrane Liners – EPA Test Method 9090A

TESTS PERFORMED:

- ASTM D 751, Procedure B – Strip tensile
- ASTM D 751, Procedure B – Tongue Tear resistance
- ASTM D 751, Procedure A (Method 1) – Hydrostatic resistance
- ASTM D 751, Procedure B – Bursting strength
- ASTM D 3431 – Extractable contents
- ASTM D 2240 – 1-sec Shore hardness, Type A
- ASTM E 1131 – Compositional analysis
- ASTM D 7426 – Glass Transition temperature
- ASTM D 3418 - Melting point (DSC)
- ASTM D 1252 – Identification of Organic Compounds by FT-IR (Infrared)
- EPA Method 9090A - Dimensional Properties @ 23°C and 50°C (0, 30, 60, 90, 120 days Leachate exposure)

TEST RESULTS:

Final results are reported in data tables 1A through 7C. In addition, a summary of all results are shown in tables 6A through 7C.

DISCUSSION:

EPA 9090A Test Method does not contain requirements (see page 9090A-16, 7.8). Therefore, the results shown in this report is for client information only.

Specimen retain bin: R&D (30 day hold only unless otherwise specified)

CRT LABORATORIES, INC.

UL Registered Firm / UL-ISO 9001:2008 Certified / ISO-IEC 17025:2005 Certified

Ken A. Le Jeune
CEO / Laboratory Director

Raul Gonzalez
Laboratory Technician

Jeffrey A. Blackford
Senior Laboratory Manager



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 2 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 1A

Scope: Method EPA Method 9090A

Sample ID: VF/PV380 Geo-Fabric with Barrier Film

Baseline (Unexposed) data only

ASTM D 751 Procedure B Tensile Strength (lbs/in)														
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.					
MD	118.7	114.4	127.1	129.5	129.5	123.8	7	114.4	129.5					
TD	135.2	112.9	123.6	126.0	119.9	123.5	8	112.9	135.2					
ASTM D 751 Procedure B Elongation at Break (%)														
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.					
MD	160.0	136.2	143.2	163.4	128.3	146.2	15	128.3	163.4					
TD	234.3	198.1	216.4	273.3	234.7	231.4	28	198.1	273.3					
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)														
Direction	1	2	3	4	5	6	7	8	9	10	Avg	Std. Dev.	Min.	Max.
MD	32.0	38.0	24.0	31.0	36.0	28.0	31.0	34.0	37.0	25.0	32.0	5	24.0	38.0
TD	22.0	20.0	23.0	35.0	24.0	38.0	25.0	26.0	24.0	24.0	26.0	6	20.0	38.0
ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)														
1	2	3	4	5	6	7	8	9	10	Avg	Std. Dev.	Min.	Max.	
310.0	300.0	290.0	340.0	330.0	300.0	310.0	310.0	300.0	300.0	309.0	15	290.0	340.0	
ASTM D 751 Bursting strength (MD) (lbs) - 4"x 4" specimens pierced with a 1" ball tip probe at 12"/min														
1	2	3	4	5	6	7	8	9	10	Avg	Std. Dev.	Min.	Max.	
271.4	360.4	343.9	355.2	320.5	302.0	310.4	360.8	347.9	347.1	332.0	30	271.4	360.8	
ASTM D 3421 Determination of Extractables Content %														
1				2				Avg	Std. Dev.	Min.	Max.			
3.02				3.02				3.02	0.00	3.02	3.02			



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 3 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 1B

Scope: Method EPA Method 9090A

Sample ID: VF/PV380 Geo-Fabric with Barrier Film

Baseline (Unexposed) data only

ASTM D2240 Hardness, Type A Durometer @ 23°C								
1	2	3	4	Avg	Std. Dev.	Min.	Max.	
88.3	87.5	87.0	88.0	87.7	1	87.0	88.3	
ASTM D2240 Hardness, Type A Durometer @ 50°C								
1	2	3	4	Avg	Std. Dev.	Min.	Max.	
89.3	89.0	88.0	91.3	89.4	1	88.0	91.3	
ASTM E 1131 Composition % (Fabric)								
POLYMER		ASH		Avg	Std. Dev.	Min.	Max.	
99.90		0.10		-	-	-	-	
ASTM E 1131 Composition % (Liner)								
POLYMER	ASH	COMBUSTIBLE	HIGH VOLATILE	Avg	Std. Dev.	Min.	Max.	
87.98	1.54	7.95	2.55	-	-	-	-	
ASTM D 1252 Identification of organic compounds by Fourier Infrared Spectroscopy (FTIR)								
The Fabric thermograph showed similarities with the properties of Polypropylene; and the Liner showed similarities with the properties of Polyurethane								
ASTM D 3418 Melting Point Temperature °C								
1	2	Avg	Std. Dev.	Min.	Max.			
324.62	324.52	324.57	0.07	324.52	324.62			
ASTM D 7426 Glass Transition Temperature °C								
Scan Rate: 5 °C/min. from -20 °C to 350 °C				Result: 61				
Scan Rate: 5 °C/min. from -40 °C to 400 °C				Result: 60				
EPA Method 9090A Dimensional Properties @ 23°C								
Determination	1	2	3	4	Avg	Std. Dev.	Min.	Max.
Weight (g)	22.46	20.97	23.13	20.67	21.81	1.2	20.67	23.13
Thickness (mils)	91.10	85.70	97.10	84.40	89.58	5.8	84.40	97.10
Length (MD) (in)	4.011	4.014	4.013	4.013	4.013	0.001	4.011	4.014
Length(TD) (in)	4.008	4.009	4.008	4.008	4.008	0.000	4.008	4.009
EPA Method 9090A Dimensional Properties @ 50°C								
Determination	1	2	3	4	Avg	Std. Dev.	Min.	Max.
Weight (g)	18.58	18.64	17.42	17.17	17.95	0.8	17.17	18.64
Thickness (mils)	77.70	81.50	71.70	73.60	76.13	4.4	71.70	81.50
Length (MD) (in)	4.007	4.005	4.007	4.009	4.007	0.001	4.005	4.009
Length(TD) (in)	4.017	4.016	4.011	4.012	4.014	0.003	4.011	4.017



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867
(714) 283-2032 • Fax (714) 283-1365
www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



TEST REPORT

PAGE 4 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 2A

Scope: Method EPA Method 9090A
Sample ID: VF/PV380 Geo-Fabric with Barrier Film
30 Days Exposed @ 23°C

ASTM D 751 Procedure B Tensile Strength (lbs/in)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	115.2	104.9	103.5	105.9	111.9	108.3	5	103.5	115.2
TD	86.9	97.9	106.0	110.7	102.6	100.8	9	86.9	110.7
ASTM D 751 Procedure B Elongation at Break (%)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	130.8	120.2	126.5	116.9	77.3	114.3	21	77.3	130.8
TD	182.2	185.5	246.9	213.5	230.8	211.8	28	182.2	246.9
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	27.0	31.5	20.5	30.2	29.0	27.6	4	20.5	31.5
TD	22.6	20.8	26.0	19.8	24.8	22.8	3	19.8	26.0
ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)									
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.	
230.0	240.0	230.0	240.0	240.0	236.0	5	230.0	240.0	
ASTM D 751 Bursting strength (MD) (lbs) - 4"x 4" specimens pierced with a 1" ball tip probe at 12"/min									
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.	
319.7	297.2	273.0	278.2	256.1	284.8	24	256.1	319.7	
ASTM D 3421 Determination of Extractables Content %									
1	2	Avg	Std. Dev.	Min.	Max.				
4.04	3.80	3.92	0.17	3.80	4.04				
ASTM D 2240 Hardness, Type A Durometer									
1	2	3	4	Avg	Std. Dev.	Min.	Max.		
81.3	81.3	81.8	81.8	81.5	0	81.3	81.8		
EPA Method 9090A Dimensional Properties									
Determination	1	2	3	4	Avg	Std. Dev.	Min.	Max.	
Weight (g)	22.36	20.88	22.03	20.57	21.46	0.9	20.57	22.36	
Thickness (mils)	91.78	86.00	97.20	86.13	90.28	5.3	86.00	97.20	
Length (MD) (in)	4.010	4.008	4.009	4.009	4.009	0.001	4.008	4.010	
Length(TD) (in)	4.006	4.005	4.003	4.005	4.005	0.001	4.003	4.006	

The liability of CRT Labs with respect to the work and report covered herein, shall in no event exceed the amount of the invoice. We recommend consideration that correlative data be generated by other laboratories in matters of litigation. CRT will retain tested samples for 30 days after testing is completed, unless other arrangements are agreed upon at the time order is placed. This report, whether in whole or in part, any logo, etc., in advertising or publicity must have CRT's written permission prior to use. This test data is for exclusive use of the client to who it is addressed and results apply only to sample(s) tested and does not apply to similar or identical products. This report shall not be reproduced except in full. Testing performed in accordance with ISO 17025. Form Q.S. 43



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 5 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 2B

Scope: Method EPA Method 9090A

Sample ID: VF/PV380 Geo-Fabric with Barrier Film

30 Days Exposed @ 50°C

ASTM D 751 Procedure B Tensile Strength (lbs/in)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	113.9	122.2	103.3	100.7	111.4	110.3	9	100.7	122.2
TD	116.6	105.9	108.5	109.2	114.2	110.9	4	105.9	116.6
ASTM D 751 Procedure B Elongation at Break (%)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	109.2	139.1	132.2	120.2	116.5	123.4	12	109.2	139.1
TD	205.3	159.4	173.1	193.1	208.3	187.8	21	159.4	208.3
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	35.0	31.0	37.3	27.6	31.4	32.5	4	27.6	37.3
TD	22.6	28.1	23.2	25.3	19.7	23.8	3	19.7	28.1
ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)									
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.	
220.0	215.0	220.0	215.0	220.0	218.0	3	215.0	220.0	
ASTM D 751 Bursting strength (MD) (lbs) - 4"x 4" specimens pierced with a 1" ball tip probe at 12"/min									
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.	
302.8	257.8	248.1	252.1	254.5	263.1	22	248.1	302.8	
ASTM D 3421 Determination of Extractables Content %									
1	2	Avg	Std. Dev.	Min.	Max.				
4.24	4.27	4.25	0.03	4.24	4.27				
ASTM D 2240 Hardness, Type A Durometer									
1	2	3	4	Avg	Std. Dev.	Min.	Max.		
80.3	79.8	80.0	80.3	80.1	0	79.8	80.3		
EPA Method 9090A Dimensional Properties									
Determination	1	2	3	4	Avg	Std. Dev.	Min.	Max.	
Weight (g)	18.48	18.53	17.32	17.07	17.85	0.8	17.07	18.53	
Thickness (mils)	77.53	81.58	71.40	73.35	75.96	4.5	71.40	81.58	
Length (MD) (in)	3.998	3.992	3.993	3.998	3.995	0.003	3.992	3.998	
Length(TD) (in)	4.005	4.002	4.001	4.002	4.002	0.002	4.001	4.005	



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 6 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 3A

Scope: Method EPA Method 9090A

Sample ID: VF/PV380 Geo-Fabric with Barrier Film

60 Days Exposed @ 23°C

ASTM D 751 Procedure B Tensile Strength (lbs/in)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	99.3	110.2	105.6	103.8	100.9	104.0	4	99.3	110.2				
TD	109.0	122.8	111.1	117.0	105.8	113.1	7	105.8	122.8				
ASTM D 751 Procedure B Elongation at Break (%)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	114.4	142.9	122.4	126.3	121.9	125.6	11	114.4	142.9				
TD	216.2	183.6	190.6	200.9	214.9	201.3	14	183.6	216.2				
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	35.2	20.7	22.0	47.4	17.4	28.5	13	17.4	47.4				
TD	19.7	24.9	21.0	22.8	18.9	21.5	2	18.9	24.9				
ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)													
1	2	3	4	5	6	7	8	9	10	Avg	Std. Dev.	Min.	Max.
210.0	220.0	230.0	230.0	240.0	220.0	210.0	210.0	220.0	220.0	221.0	10	210.0	240.0
ASTM D 751 Bursting strength (MD) (lbs) - 4" x 4" specimens pierced with a 1" ball tip probe at 12"/min													
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.					
240.8	294.0	277.9	298.8	298.9	282.1	25	240.8	298.9					
ASTM D 3421 Determination of Extractables Content %													
1				2				Avg	Std. Dev.	Min.	Max.		
1.79				1.83				1.81	0.03	1.79	1.83		
ASTM D 2240 Hardness, Type A Durometer													
1	2	3	4	Avg	Std. Dev.	Min.	Max.						
81.0	80.8	80.0	81.3	80.8	1	80.0	81.3						
EPA Method 9090A Dimensional Properties													
Determination	1	2	3	4	Avg	Std. Dev.	Min.	Max.					
Weight (g)	22.26	20.78	21.93	20.47	21.36	0.9	20.47	22.26					
Thickness (mils)	91.83	86.20	97.20	86.15	90.34	5.3	86.20	97.20					
Length (MD) (in)	4.010	4.008	4.009	4.009	4.009	0.001	4.008	4.010					
Length(TD) (in)	4.006	4.005	4.003	4.005	4.005	0.001	4.003	4.006					

The liability of CRT Labs with respect to the work and report covered herein, shall in no event exceed the amount of the invoice. We recommend consideration that correlative data be generated by other laboratories in matters of litigation. CRT will retain tested samples for 30 days after testing is completed, unless other arrangements are agreed upon at the time order is placed. This report, whether in whole or in part, any logo, etc., in advertising or publicity must have CRT's written permission prior to use. This test data is for exclusive use of the client to whom it is addressed and results apply only to sample(s) tested and does not apply to similar or identical products. This report shall not be reproduced except in full. Testing performed in accordance with ISO 17025. Form Q.S. 43



Committed to Quality

CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product TestingFOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 3B

Scope: Method EPA Method 9090A

Sample ID: VF/PV380 Geo-Fabric with Barrier Film

60 Days Exposed @ 50°C

ASTM D 751 Procedure B Tensile Strength (lbs/in)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	107.9	88.3	107.4	87.3	105.4	99.2	11	87.3	107.9				
TD	111.0	99.9	107.7	106.0	105.1	105.9	4	99.9	111.0				
ASTM D 751 Procedure B Elongation at Break (%)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	110.6	89.0	105.6	90.7	115.2	102.2	12	89.0	115.2				
TD	172.1	162.1	169.6	184.6	118.8	161.4	25	118.8	184.6				
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	28.5	41.7	28.2	36.3	23.2	31.6	7	23.2	41.7				
TD	25.6	23.0	26.3	29.2	23.9	25.6	2	23.0	29.2				
ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)													
1	2	3	4	5	6	7	8	9	10	Avg	Std. Dev.	Min.	Max.
230.0	220.0	220.0	210.0	230.0	210.0	200.0	200.0	210.0	215.0	214.5	11	200.0	230.0
ASTM D 751 Bursting strength (MD) (lbs) - 4"x 4" specimens pierced with a 1" ball tip probe at 12"/min													
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.					
253.7	283.7	277.1	261.0	250.0	265.1	15	250.0	283.7					
ASTM D 3421 Determination of Extractables Content %													
1			2			Avg	Std. Dev.	Min.	Max.				
1.99			2.00			1.99	0.01	1.99	2.00				
ASTM D 2240 Hardness, Type A Durometer													
1	2	3	4	Avg	Std. Dev.	Min.	Max.						
80.3	80.5	81.3	80.5	80.6	0	80.3	81.3						
EPA Method 9090A Dimensional Properties													
Determination	1	2	3	4	Avg	Std. Dev.	Min.	Max.					
Weight (g)	18.37	18.42	17.21	16.96	17.74	0.8	16.96	18.37					
Thickness (mils)	77.25	81.73	71.63	73.40	76.00	4.5	71.63	81.73					
Length (MD) (in)	3.997	3.992	3.992	3.997	3.995	0.003	3.992	3.997					
Length(TD) (in)	4.005	4.002	4.001	4.002	4.002	0.001	4.001	4.005					

**CRT LABORATORIES, INC.**

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product TestingFOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 4A**Scope: Method EPA Method 9090A****Sample ID: VF/PV380 Geo-Fabric with Barrier Film****90 Days Exposed @ 23°C**

ASTM D 751 Procedure B Tensile Strength (lbs/in)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	109.7	104.5	117.6	119.6	115.1	113.3	6	104.5	119.6				
TD	119.7	125.4	124.3	128.9	117.5	123.2	5	117.5	128.9				
ASTM D 751 Procedure B Elongation at Break (%)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	91.0	106.7	100.1	91.0	99.5	97.7	7	91.0	106.7				
TD	161.0	156.0	168.5	143.5	135.2	152.9	13	135.2	168.5				
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	26.9	33.2	19.2	19.9	20.6	24.0	6	19.2	33.2				
TD	21.5	21.0	22.3	14.2	17.9	19.4	3	14.2	22.3				
ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)													
1	2	3	4	5	6	7	8	9	10	Avg	Std. Dev.	Min.	Max.
220.0	210.0	220.0	230.0	220.0	230.0	210.0	210.0	220.0	230.0	220.0	8	210.0	230.0
ASTM D 751 Bursting strength (MD) (lbs) - 4"x 4" specimens pierced with a 1" ball tip probe at 12"/min													
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.					
285.9	306.8	275.8	289.7	277.0	287.0	13	275.8	306.8					
ASTM D 3421 Determination of Extractables Content %													
1	2	Avg	Std. Dev.	Min.	Max.								
0.96	1.84	1.40	0.63	0.96	1.8								
ASTM D 2240 Hardness, Type A Durometer													
1	2	3	4	Avg	Std. Dev.	Min.	Max.						
81.8	80.5	80.0	83.0	81.3	1	80.0	83.0						
EPA Method 9090A Dimensional Properties													
Determination	1	2	3	4	Avg	Std. Dev.	Min.	Max.					
Weight (g)	22.15	20.66	21.81	20.36	21.25	0.9	20.36	22.15					
Thickness (mils)	91.85	86.08	97.35	86.15	90.36	5.4	86.08	97.35					
Length (MD) (in)	4.010	4.008	4.009	4.009	4.009	0.001	4.008	4.010					
Length(TD) (in)	4.006	4.005	4.003	4.005	4.005	0.001	4.003	4.006					



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 9 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 4B

Scope: Method EPA Method 9090A

Sample ID: VF/PV380 Geo-Fabric with Barrier Film

90 Days Exposed @ 50°C

ASTM D 751 Procedure B Tensile Strength (lbs/in)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	91.8	98.7	98.9	98.6	98.5	97.3	3	91.8	98.9				
TD	115.4	95.2	100.2	99.7	116.3	105.3	10	95.2	116.3				
ASTM D 751 Procedure B Elongation at Break (%)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	106.7	86.7	76.4	88.7	82.0	88.1	11	76.4	106.7				
TD	132.9	119.7	121.3	111.3	144.6	126.0	13	111.3	144.6				
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)													
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.				
MD	41.7	34.9	33.9	19.4	23.7	30.7	9	19.4	41.7				
TD	25.5	28.8	22.6	20.2	19.7	23.4	4	19.7	28.8				
ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)													
1	2	3	4	5	6	7	8	9	10	Avg	Std. Dev.	Min.	Max.
210.0	220.0	220.0	220.0	210.0	230.0	220.0	210.0	210.0	220.0	217.0	7	210.0	230.0
ASTM D 751 Bursting strength (MD) (lbs) - 4"x 4" specimens pierced with a 1" ball tip probe at 12"/min													
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.					
266.6	286.6	275.6	281.1	300.0	282.0	12	266.6	300.0					
ASTM D 3421 Determination of Extractables Content %													
1	2	Avg	Std. Dev.	Min.	Max.								
2.04	2.02	2.03	0.01	2.02	2.04								
ASTM D 2240 Hardness, Type A Durometer													
1	2	3	4	Avg	Std. Dev.	Min.	Max.						
79.8	80.8	80.3	79.8	80.1	0	79.8	80.8						
EPA Method 9090A Dimensional Properties													
Determination	1	2	3	4	Avg	Std. Dev.	Min.	Max.					
Weight (g)	18.24	18.29	17.08	16.83	17.61	0.8	16.83	18.29					
Thickness (mils)	77.53	81.75	71.63	74.68	76.39	4.3	71.63	81.75					
Length (MD) (in)	3.997	3.992	3.992	3.997	3.995	0.003	3.992	3.997					
Length(TD) (in)	4.005	4.002	4.001	4.002	4.002	0.002	4.001	4.005					

The liability of CRT Labs with respect to the work and report covered herein, shall in no event exceed the amount of the invoice. We recommend consideration that correlative data be generated by other laboratories in matters of litigation. CRT will retain tested samples for 30 days after testing is completed, unless other arrangements are agreed upon at the time order is placed. This report, whether in whole or in part, any logo, etc., in advertising or publicity must have CRT's written permission prior to use. This test data is for exclusive use of the client to who it is addressed and results apply only to sample(s) tested and does not apply to similar or identical products. This report shall not be reproduced except in full. Testing performed in accordance with ISO 17025. Form Q.S. 43



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 10 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 5A

Scope: Method EPA Method 9090A

Sample ID: VF/PV380 Geo-Fabric with Barrier Film

120 Days Exposed @ 23°C

ASTM D 751 Procedure B Tensile Strength (lbs/in)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	100.1	109.6	103.3	119.3	95.3	105.5	9	95.3	119.3
TD	130.0	127.3	115.7	103.3	105.7	116.4	12	103.3	130.0
ASTM D 751 Procedure B Elongation at Break (%)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	103.8	111.2	109.0	158.7	112.3	119.0	22	103.8	158.7
TD	227.4	207.2	207.1	213.4	210.5	213.1	8	207.1	227.4
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	33.3	24.8	29.7	27.9	35.3	30.2	4	24.8	35.3
TD	26.1	26.9	21.2	23.7	22.9	24.2	2	21.2	26.9
ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)									
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.	
240.0	235.0	235.0	245.0	230.0	237.0	6	230.0	245.0	
ASTM D 751 Bursting strength (MD) (lbs) - 4"x 4" specimens pierced with a 1" ball tip probe at 12"/min									
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.	
227.1	292.4	270.6	273.8	249.0	262.2	25	227.1	292.4	
ASTM D 3421 Determination of Extractables Content %									
1	2	Avg	Std. Dev.	Min.	Max.				
1.83	1.82	1.83	0.01	1.82	1.83				
ASTM D 2240 Hardness, Type A Durometer									
1	2	3	4	Avg	Std. Dev.	Min.	Max.		
81.3	81.8	82.0	80.3	81.3	1	80.3	82.0		
EPA Method 9090A Dimensional Properties									
Determination	1	2	3	4	Avg	Std. Dev.	Min.	Max.	
Weight (g)	22.02	20.54	21.69	20.23	21.12	0.9	20.23	22.02	
Thickness (mils)	91.80	86.05	97.33	86.13	90.33	5.4	86.05	97.33	
Length (MD) (in)	4.010	4.008	4.009	4.009	4.009	0.001	4.008	4.010	
Length(TD) (in)	4.006	4.005	4.003	4.005	4.005	0.001	4.003	4.006	



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867
(714) 283-2032 • Fax (714) 283-1365
www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 11 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 5B

Scope: Method EPA Method 9090A
Sample ID: VF/PV380 Geo-Fabric with Barrier Film
120 Days Exposed @ 50°C

ASTM D 751 Procedure B Tensile Strength (lbs/in)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	103.8	95.4	105.3	109.9	114.9	105.9	7	95.4	114.9
TD	130.0	110.7	99.0	95.7	120.8	111.2	14	95.7	130.0
ASTM D 751 Procedure B Elongation at Break (%)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	165.5	103.7	114.6	171.7	146.0	140.3	30	103.7	171.7
TD	217.7	208.1	197.8	151.6	158.1	186.7	30	151.6	217.7
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)									
Direction	1	2	3	4	5	Avg	Std. Dev.	Min.	Max.
MD	29.3	41.2	44.1	47.7	44.0	41.2	7	29.3	47.7
TD	27.6	32.1	30.5	28.6	27.9	29.3	2	27.6	32.1
ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)									
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.	
250.0	275.0	235.0	240.0	240.0	248.0	16	235.0	275.0	
ASTM D 751 Bursting strength (MD) (lbs) - 4"x 4" specimens pierced with a 1" ball tip probe at 12"/min									
1	2	3	4	5	Avg	Std. Dev.	Min.	Max.	
323.0	295.6	255.3	277.1	277.1	285.6	25	255.3	323.0	
ASTM D 3421 Determination of Extractables Content %									
1	2	Avg	Std. Dev.	Min.	Max.				
2.00	2.02	2.01	0.01	2.00	2.02				
ASTM D 2240 Hardness, Type A Durometer									
1	2	3	4	Avg	Std. Dev.	Min.	Max.		
79.8	80.8	80.0	79.3	79.9	1	79.3	80.8		
EPA Method 9090A Dimensional Properties									
Determination	1	2	3	4	Avg	Std. Dev.	Min.	Max.	
Weight (g)	18.10	18.15	16.94	16.70	17.47	0.8	16.70	18.15	
Thickness (mils)	77.55	81.73	71.63	74.65	76.39	4.3	71.63	81.73	
Length (MD) (in)	3.997	3.992	3.992	3.997	3.995	0.003	3.992	3.997	
Length(TD) (in)	4.005	4.002	4.001	4.002	4.002	0.001	4.001	4.005	



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 12 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 6A

Scope: Method EPA Method 9090A

Sample ID: VF/PV380 Geo-Fabric with Barrier Film

Summary @ 23°C

ASTM D 751 Procedure B Tensile Strength (lbs/in)			
Time Exposed	Direction	Average	% Change with respect of unexposed results
Unexposed	MD	123.8	
	TD	123.5	
30 Days	MD	108.3	-13
	TD	100.8	-18
60 Days	MD	104.0	-16
	TD	113.1	-8
90 Days	MD	113.3	-9
	TD	123.2	-0.3
120 Days	MD	105.5	-15
	TD	116.4	-6
ASTM D 751 Procedure B Elongation at Break (%)			
Time Exposed	Direction	Average	% Change with respect of unexposed results
Unexposed	MD	146.2	
	TD	231.4	
30 Days	MD	114.3	-22
	TD	211.8	-8
60 Days	MD	125.6	-14
	TD	201.3	-13
90 Days	MD	97.7	-33
	TD	152.9	-34
120 Days	MD	119.0	-19
	TD	213.1	-8
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)			
Time Exposed	Direction	Average	% Change with respect of unexposed results
Unexposed	MD	31.6	
	TD	26.1	
30 Days	MD	27.6	-13
	TD	22.8	-13
60 Days	MD	28.5	-10
	TD	21.5	-18
90 Days	MD	24.0	-24
	TD	19.4	-26
120 Days	MD	30.2	-4
	TD	24.2	-7



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 13 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 6B

Scope: Method EPA Method 9090A

Sample ID: VF/PV380 Geo-Fabric with Barrier Film

Summary @ 23°C Continued

ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)		
Time Exposed	Average	% Change with respect of unexposed results
Unexposed	309.0	
30 Days	236.0	-24
60 Days	221.0	-28
90 Days	220.0	-29
120 Days	237.0	-23
ASTM D 751 Bursting strength (MD) (lbs) - 4" x 4" specimens pierced with a 1" ball tip probe at 12"/min		
Time Exposed	Average	% Change with respect of unexposed results
Unexposed	332.0	
30 Days	284.8	-14
60 Days	282.1	-15
90 Days	287.0	-14
120 Days	262.6	-21
ASTM D 3421 Determination of Extractables Content %		
Time Exposed	Average	% Change with respect of unexposed results
Unexposed	3.02	
30 Days	3.92	30
60 Days	1.81	-40
90 Days	1.40	-54
120 Days	1.83	-39
ASTM D 2240 Hardness, Type A Durometer		
Time Exposed	Average	% Change with respect of unexposed results
Unexposed	87.7	
30 Days	81.5	-7
60 Days	80.8	-8
90 Days	81.3	-7
120 Days	81.3	-7



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 14 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 6C

Scope: Method EPA Method 9090A

Sample ID: VF/PV380 Geo-Fabric with Barrier Film

Summary @ 23°C Continued

EPA Method 9090A Dimensional Properties		
Time Exposed	Average Weight (g)	% Change with respect of unexposed results
Unexposed	21.81	
30 Days	21.46	-1.6
60 Days	21.36	-2.1
90 Days	21.25	-2.6
120 Days	21.12	-3.1
Time Exposed	Average Thickness (mil)	% Change with respect of unexposed results
Unexposed	89.58	
30 Days	90.28	0.8
60 Days	90.34	0.9
90 Days	90.36	0.9
120 Days	90.33	0.8
Time Exposed	Average Length (MD) (in)	% Change with respect of unexposed results
Unexposed	4.013	
30 Days	4.009	-0.1
60 Days	4.009	-0.1
90 Days	4.009	-0.1
120 Days	4.009	-0.1
Time Exposed	Average Length (TD) (in)	% Change with respect of unexposed results
Unexposed	4.008	
30 Days	4.005	-0.1
60 Days	4.005	-0.1
90 Days	4.005	-0.1
120 Days	4.005	-0.1



CRT LABORATORIES, INC.

1680 North Main Street, Orange, CA 92867
(714) 283-2032 • Fax (714) 283-1365
www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ISO 9001:2000



Committed to Quality

TEST REPORT

PAGE 15 OF 17

FOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 7A

Scope: Method EPA Method 9090A
Sample ID: VF/PV380 Geo-Fabric with Barrier Film
Summary @ 50°C

ASTM D 751 Procedure B Tensile Strength (lbs/in)			
Time Exposed	Direction	Average	% Change with respect of unexposed results
Unexposed	MD	123.8	
	TD	123.5	
30 Days	MD	110.3	-11
	TD	110.9	-10
60 Days	MD	99.2	-20
	TD	105.9	-14
90 Days	MD	97.3	-21
	TD	105.3	-15
120 Days	MD	105.9	-15
	TD	111.2	-10
ASTM D 751 Procedure B Elongation at Break (%)			
Time Exposed	Direction	Average	% Change with respect of unexposed results
Unexposed	MD	146.2	
	TD	231.4	
30 Days	MD	123.4	-16
	TD	187.8	-19
60 Days	MD	102.2	-30
	TD	161.4	-30
90 Days	MD	88.1	-40
	TD	126.0	-46
120 Days	MD	140.3	-4
	TD	186.7	-19
ASTM D 751 Procedure B Tongue Tear Resistance (lbs)			
Time Exposed	Direction	Average	% Change with respect of unexposed results
Unexposed	MD	31.6	
	TD	26.1	
30 Days	MD	32.5	3
	TD	23.8	-9
60 Days	MD	31.58	-0.1
	TD	25.6	-2
90 Days	MD	30.7	-3
	TD	23.4	-10
120 Days	MD	41.2	31
	TD	29.3	12

**CRT LABORATORIES, INC.**

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product TestingFOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116

LWR NO.: 18473-R1 DATE: April 14, 2011

TABLE 7B**Scope:** Method EPA Method 9090A**Sample ID:** VF/PV380 Geo-Fabric with Barrier Film**Summary @ 50°C Continued**

ASTM D 751 Method A Procedure 1 Hydrostatic Resistance (psi) (Mullen Type Hydrostatic Tester)		
Time Exposed	Average	% Change with respect of unexposed results
Unexposed	309.0	
30 Days	218.0	-29
60 Days	214.5	-31
90 Days	217.0	-30
120 Days	248.0	-20
ASTM D 751 Bursting strength (MD) (lbs) - 4"x 4" specimens pierced with a 1" ball tip probe at 12"/min		
Time Exposed	Average	% Change with respect of unexposed results
Unexposed	332.0	
30 Days	263.1	-21
60 Days	265.1	-20
90 Days	282.0	-15
120 Days	285.6	-14
ASTM D 3421 Determination of Extractables Content %		
Time Exposed	Average	% Change with respect of unexposed results
Unexposed	3.02	
30 Days	4.25	41
60 Days	1.99	-34
90 Days	2.03	-33
120 Days	2.01	-33
ASTM D 2240 Hardness, Type A Durometer		
Time Exposed	Average	% Change with respect of unexposed results
Unexposed	89.4	
30 Days	80.1	-10
60 Days	80.6	-10
90 Days	80.1	-10
120 Days	79.9	-11

**CRT LABORATORIES, INC.**

1680 North Main Street, Orange, CA 92867

(714) 283-2032 • Fax (714) 283-1365

www.crtlabs.com • e-mail: ken@crtlabs.com

ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product TestingFOR: VersaFlex, Inc.
87 Shawnee Avenue
Kansa City, KS 66105
Tel: (913) 321-9000 / Fax: (913) 321-1490
ATTN: Mr. John W. Winfrey, 116LWR NO.: 18473-R1 DATE: April 14, 2011**TABLE 7C****Scope:** Method EPA Method 9090A**Sample ID:** VF/PV380 Geo-Fabric with Barrier Film**Summary @ 50°C Continued**

EPA Method 9090A Dimensional Properties		
Time Exposed	Average Weight (g)	% Change with respect of unexposed results
Unexposed	17.95	
30 Days	17.85	-0.6
60 Days	17.74	-1.2
90 Days	17.61	-1.9
120 Days	17.47	-2.7
Time Exposed	Average Thickness (mil)	% Change with respect of unexposed results
Unexposed	76.13	
30 Days	75.96	-0.2
60 Days	76.00	-0.2
90 Days	76.39	0.3
120 Days	76.39	0.3
Time Exposed	Average Length (MD) (in)	% Change with respect of unexposed results
Unexposed	4.007	
30 Days	3.995	-0.3
60 Days	3.995	-0.3
90 Days	3.995	-0.3
120 Days	3.995	-0.3
Time Exposed	Average Length (TD) (in)	% Change with respect of unexposed results
Unexposed	4.014	
30 Days	4.002	-0.3
60 Days	4.002	-0.3
90 Days	4.002	-0.3
120 Days	4.002	-0.3