Chemical Contamination Survivability and Agent Resistance Evaluation of Selected Polymer Coatings

Final Report
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1. INTRODUCTION

CUBRC Inc. is pleased to provide Integument Technologies, Inc. with this technical report summarizing a series of laboratory experiments performed to evaluate the Chemical Contamination Survivability (CCS) and chemical agent resistance of selected chemical agent resistant coated (CARC) materials. Testing was performed under Prime Contract Numbers N00014-05-C-0018 and W9113M-04-C-0040.

2. OBJECTIVES AND TECHNICAL APPROACH

The purpose of this CCS project was to determine the residual inhalation and skin contact hazards posed by selected materials after contamination with chemical agents (HD, VX, and TGD) and subsequent decontamination using the military decontaminant DS2.

CARC tests were performed to determine the chemical agent resistance of select coatings after contamination with chemical agents (HD and GD) and subsequent rinsing with isopropyl alcohol to remove the residual chemical agent.

2.1 Technical Approach: Chemical Contamination Survivability Testing

CUBRC prepared a Standard Operating Procedure (SOP) using the guidance of TOP-8-2-510 entitled "NBC Contamination Survivability, Large Item Exteriors" dated 17 April 1998. The CCS protocol was slightly modified to accommodate existing test equipment located at CUBRC.

Following the SOP, test samples were sequentially contaminated with neat chemical agent (HD, VX, and TGD) at a challenge concentration of 10 g/m^2. Agents HD and VX were applied to the materials using 1-µl droplets and agent TGD was delivered using 5-µl droplets. All testing was conducted at 30°C and ambient relative humidity. Samples were then decontaminated using Decontamination Solution #2 (DS2), rinsed with water and then analyzed for residual inhalation and skin contact hazards.

2.2 Technical Approach: Chemical Agent Resistance Testing

CUBRC prepared an SOP using the guidance of MIL-C-46168D(ME), entitled "Military Specification - Coating, Aliphatic Polyurethane, Chemical Agent Resistant", and dated 21 May 1987. The protocol was slightly modified to accommodate existing test equipment.

Following the SOP, a 5-cm^2 area of each sample was contaminated with 50 µl of neat chemical agent (HD and GD). The neat agent was delivered in one large drop and then spread evenly across the 5 cm^2 sample area. All contamination was performed at 25°C and ambient relative humidity (<65%). After the contamination residence period, samples were rinsed with isopropyl alcohol and placed into desorption cells. Desorption measurements were performed at 25°C under dry nitrogen.

3.0 TEST MATRIX

Tables 1 and 2 present the test matrices for this program. An "X" marked in a box indicates that the referenced sample was processed through the activity described in the column heading. Table 1 represents samples used for the Chemical Contamination Survivability tests. For each material type, two test samples (one for desorption analysis and one for contact hazard analysis) were sequentially processed through each contamination/decontamination cycle (HD, VX, TGD). Table 2 presents the matrix for the chemical agent resistance materials. One sample for each material type was selected for the chemical agent resistance testing using agents HD and GD.

Table 1 – Sample Matrix for Chemical Contamination Survivability Tests

Sample ID	Sample Description	Desorption			Contact Hazard		
		HD	VX	TGD	HD	VX	TGD
E1-1	ECTFE 3mil	X	X	X			
E1-2	ECTFE 3mil				X	X	X
E2-1	ECTFE 3mil	X	X	X			
E2-2	ECTFE 3mil				X	X	X
E3-1	ECTFE 3mil	X	X	X			
E3-2	ECTFE 3mil				X	X	X
E4-1	ECTFE 3mil	X	X	X			
E4-2	ECTFE 3mil				X	X	X
E5-1	ECTFE 3mil	X	X	X			
E5-2	ECTFE 3mil				X	X	X
E6-1	ECTFE 3mil	X	X	X			
E6-2	ECTFE 3mil				X	X	X
F1-1	FEP	X	X	X			
F1-2	FEP				X	X	X
F2-1	FEP	X	X	X			
F2-2	FEP				X	X	X
PV1-1	PVDF	X	X	X			

PV1-2	PVDF				X	X	X
PV2-1	PVDF	X	X	X			
PV2-2	PVDF				X	X	X
PV3-1	PVDF	X	X	X			
PV3-2	PVDF				X	X	X
PV4-1	PVDF	X	X	X			
PV4-2	PVDF				X	X	X

Table 2 – Sample Matrix for Chemical Agent Resistance Tests

Sample ID	Sample Description	Desorption	
		HD	GD
E1-3	ECTFE 3mil	X	
E1-4	ECTFE 3mil		X
E2-3	ECTFE 3mil	X	
E2-4	ECTFE 3mil		X
E3-3	ECTFE 3mil	X	
E3-4	ECTFE 3mil		X
E4-3	ECTFE 3mil	X	
E4-4	ECTFE 3mil		X
E5-3	ECTFE 3mil	X	
E5-4	ECTFE 3mil		X
E6-3	ECTFE 3mil	X	
E6-4	ECTFE 3mil		X
F1-3	FEP	X	
F1-4	FEP		X
F2-3	FEP	X	
F2-4	FEP		X
PV1-3	PVDF	X	
PV1-4	PVDF		X
PV2-3	PVDF	X	
PV2-4	PVDF		X
PV3-3	PVDF	X	
PV3-4	PVDF		X
PV4-3	PVDF	X	
PV4-4	PVDF		X

4.0 EXPERIMENTAL PROCEDURES

4.1 Chemical Contamination Survivability Tests

A summary of the procedures is presented below, followed by more detailed descriptions of each process beginning in section 4.1.1

Chemical Contamination Survivability (CCS) Procedure Summary:

1. Baseline visual inspection with photographs.
2. HD contamination at 10 g/m^2; 1-hour contamination residence time
3. DS2 decontamination followed by 30-minute residence time
4. Tap water rinse and dry
5. 12-hour desorption measurements (off-gassing)
6. Contact Hazard analysis
7. Visual inspection with photographs
8. Repeat steps 2 through 7 for VX
9. Repeat steps 2 through 7 for TGD

4.1.1 Visual Inspections and Observations

All test samples were processed through visual inspections where digital photographs were taken prior to each contamination/decontamination cycle. All observations (surface cracking, discoloration, etc.) from these visual inspections were recorded into the laboratory notebook. Photos for these experiments are located in Appendix D of this report.

4.1.2 Contamination

Test samples were placed onto an elevated metal screen within a large stainless steel contamination pan as shown in Figure 1. Two contamination methods were used depending on the type of agent and specified test conditions. These methods are discussed in the paragraphs below.

A Hamilton gas-tight syringe, mounted into a Hamilton PB-600 repeating dispenser was used to deliver the agent droplets at a contamination density of 10 g/m^2. For HD and VX contamination, a 50-µL gas-tight syringe was used to deliver 1-µL droplets. Thickened GD contamination was conducted using a 250µL gas-tight syringe to achieve 5-µL droplets.

The calculated surface areas of the samples were used to determine the number of appropriately sized droplets that would be required for each sample to achieve a contamination

density of 10g/m^2. Table 3 presents the calculated surface areas, number of droplets, drop volume and resulting contamination density for each sample type.

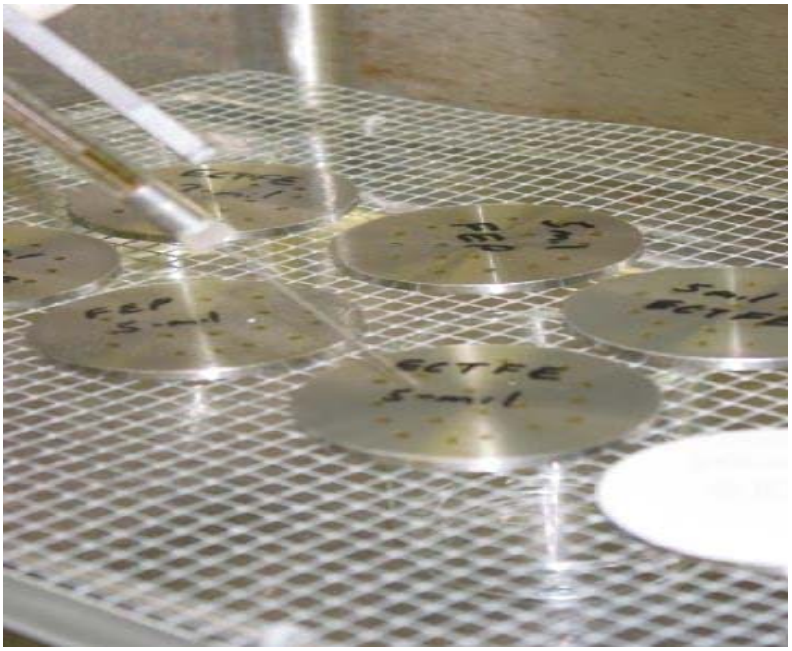


Figure 1 – Agent Contamination with Syringe

Table 3 – Surface Area and Contamination Densities for CCS Tests

Sample Type	Calculated Surface Area [cm^2]	Agent	Volume of agent drops [µL]	Number of Drops Applied	Calculated Contamination Density [g/m^2]
All Samples	25.65	HD	1	20	9.90
		VX	1	25	9.83
		TGD	5	5	9.94

The test method requires that the agent reside on the samples for one hour before beginning the decontamination process. A timer was started when the first agent droplet was applied to the sample. After the one-hour residence time, the samples were decontaminated with the proper decontamination solution.

4.1.3 Decontamination

The decontaminant used for the exterior condition (10g/m^2) tests was DS2. Once opened, DS2 cans are topped with a nitrogen headspace before storage to minimize degradation caused by exposure to air.

The test method requires that the decontamination step be 30 minutes in length. At the end of the 1-hour contamination residence time, the decontamination solution was applied to the test items from a squeeze bottle, while gently scrubbing with a medium-bristled brush for 2-5 minutes. Fresh decontaminant was applied frequently during the scrubbing process. Following the active decontamination process, the test items were allowed to sit in place for the remainder of the 30-minute period.

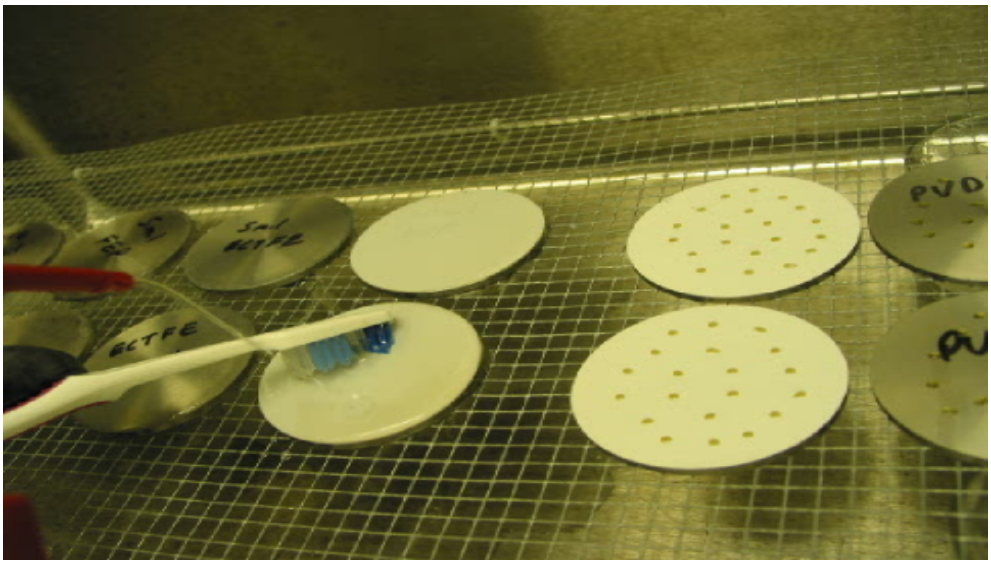


Figure 2 – Decontamination Scrub with DS2

Following decontamination, samples were rinsed with copious amounts of tap water. Samples were scrubbed with a medium-bristle brush during rinsing to facilitate removal of the decontaminant. After the rinse process was complete, the samples were allowed to air-dry for approximately 1 minute, and then patted with a lint-free paper towels.

4.1.4 Desorption Analysis

Desorption measurements were made on test samples to determine the materials ability to be decontaminated. The samples were mounted into specially designed desorption cells (Figure 3).

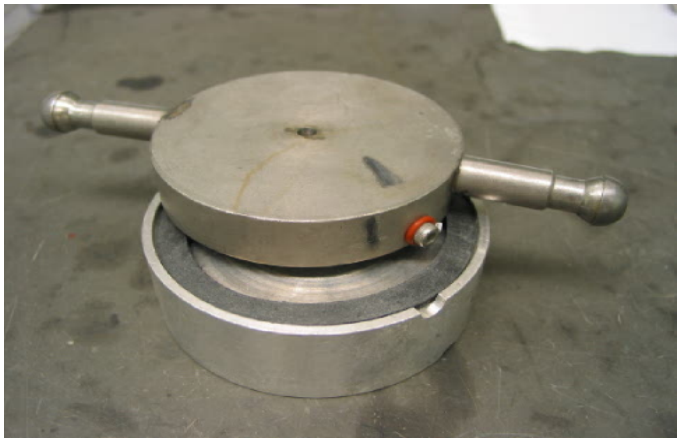


Figure 3 – Desorption Test Cell

The lower compartment is designed to hold the sample allowing the top surface to be fully exposed. The upper compartment, which has inlet and outlet ports allowing air to be drawn over the surface of the sample, seats onto the lower compartment and seals with an EPDM gasket.

The test cells are mounted into the desorption system and connected to a vacuum manifold (Figure 4). Critical orifices, located in the flow path between each test cell and the manifold, control the flow rate of fresh air through the upper compartment at approximately 6.6 SLPM resulting in a linear velocity of roughly 0.5 m/s over the surface of the sample. Portions of the effluent flow from the tests cells were periodically sampled and analyzed for chemical agent over the 12-hour desorption period. A description of the instrumentation is discussed in section 4.1.5.

Figure 4 – Cell Loaded into Desorption Test System

4.1.5 MINICAMS™

Miniature Chemical Agent Monitoring Systems (MINICAMS™) were used for the analysis of desorbed chemical agents during these experiments. The MINICAMS™ are automated gas chromatographs equipped with solid sorbent thermal desorption inlet systems and a flame photometric detectors. Chemical agent vapors are collected onto a pre-concentrator tube (PCT) during a sampling period and then thermally desorbed into the GC column for elution and detection. The MINICAMS™ computer software records various data including elapsed test time, sample flow rate, and agent mass detected, allowing for computation of desorption rates as a function of time for each test sample.

The MINICAMS™ is able to selectively sample the test cells at prescribed times using a Stream Selection System (SSS). This electronic sequencing multi-port valve is capable of sampling up to twelve different locations and was used in conjunction with the MINICAMS™ to sample the effluent of the desorption cells. Unless otherwise noted, a blank (laboratory air) was sampled between each coupon sample to remove potential carryover of agent between cycles.

Stock solutions having a concentration of 500ng/µL were prepared for each agent in the appropriate solvent. These solutions were serially diluted into calibration standards (50, 5, 0.5, and 0.05ng/µL) for the MINICAMS™. Calibration curves were generated prior to the start of each test. Post-test calibration curve verification was performed at the end of each test.

4.1.6 Desorption Detection Limits and Sampling Procedures

The cumulative desorbed mass data was calculated using 14 data points generated by the MINICAMS™. The MINICAMS™ can sample the test cell effluent for a specified period of time ranging from 10 to 180 seconds. Generally, when samples of unknown performance are tested, a short sampling period is used at the beginning of the test to protect the MINICAMS™ from receiving an extremely high mass of agent from a poor-performing material. This reduces the potential for carryover within the system, which in some cases can take up to 15 minutes to remove. If carryover agent is not adequately removed it will contribute to subsequent samples and falsely elevate results. In the case of samples that perform well, the short sampling period may result in a data point that falls below the MINICAMS™ detection limit. The sample period is then increased for the remainder of the test to obtain data within the dynamic range of the instrument calibration. Some samples that perform extremely well may never produce data within the detection limits of the MINICAMS™.

It is important to note that in cases where even one data point falls below or above the MINICAMS™ calibration curve, any calculated value which used that data must be designated "less than" or "greater than" respectively. An inherent element of integration (which is used to calculate total desorbed mass) is that the mathematical formulas use the preceding data point in each calculation. Therefore the "less than" or "greater than" designations must be carried through and accompany all subsequent calculated data points. Summary data tables are presented in Section 5.1.1 of this report and raw data tables are located in Appendix A. All data presentations have this information footnoted as appropriate.

4.1.7 Contact Hazard Analysis

Test samples were evaluated for contact hazard following decontamination by placing a skin simulant (25cm^2 of dimethyl silicone) onto the surface of the test coupon and applying a pressure of 65g/cm^2 for 30 seconds (Figure 5). The silicone samples were then extracted in 5mL of chloroform and analyzed using gas chromatography. Summary data tables are presented in Section 5.1.2 of this report and raw data tables are located in Appendix B.

Figure 5 – Contact Hazard Application

4.2 Chemical Agent Resistance Tests

A summary of the procedures is presented below, followed by more detailed descriptions of each process beginning in 4.2.1

Chemical Agent Resistance Test Procedure Summary:

1. Baseline visual inspection with photographs.
2. Contamination (HD or GD), 50µL of agent per 5cm^2 area (30-minute residence time)
3. Isopropyl alcohol rinse, 5 rinses lasting 5 seconds each
4. Desorption analysis (off-gassing)
5. Visual inspection with photographs

4.2.1 Visual Inspection and Observations

All test samples were processed through visual inspections where digital photographs were taken prior to each contamination/isopropyl alcohol rinse cycle. All observations (ex. surface cracking, discoloration, etc.) from these visual inspections were recorded into the laboratory notebook. At this time, each sample was given a 5cm^2 circular area mark in the center of the sample using a wax pencil (Figure 6). This designated sample area was used for the sample contamination and desorption calculations. Photos from these experiments are located in Appendix F.

Figure 6 – CARC Samples with 5cm^2 Wax Ring

4.2.2 Contamination

Test samples were placed onto a stainless steel spill tray inside of the fume hood and elevated off the surface of the spill tray using a thick butyl o-ring to allow easy manipulation with forceps. Contamination of the samples was performed at 25°C and at ambient relative humidity. The relative humidity had to be below 65% before contamination could begin.

A 50-µL Hamilton gas tight syringe was used to deliver 50µL of agent (HD or GD) into the interior of a wax ring drawn onto the sample surface. The agent was delivered in a single large drop and then spread evenly across the 5cm^2 surface area taking care to make sure that no liquid agent touched the edges of the wax ring. After the contamination of the sample was complete, a small glass Petri dish cover was placed over the contamination area and the sample remained this way for the 30-minute residence period.

4.2.3 Isopropyl Alcohol Rinse

When the 30-minute contamination residence period is over, the Petri dish cover was removed. The sample was picked up with stainless steel forceps and tilted at an angle over a toxic waste container. The sample was then rinsed for five seconds using reagent grade isopropyl alcohol which was dispensed from a wash bottle. A back and forth motion was used for the alcohol rinse to ensure that the entire area of the sample was rinsed properly. This rinse process was repeated five times for each sample. After the final rinse, the sample was monitored until all of the residual alcohol had evaporated.

4.2.4 Desorption Analysis

Desorption measurements were made on test samples to determine the material's ability to resist the absorption and subsequent desorption of chemical agents (HD and GD). The samples were mounted into specially designed test cells (Figure 3). The lower compartment of the test cells are designed to hold the sample allowing the top surface to be fully exposed. The upper compartment has inlet and outlet ports that allow air to be drawn over the surface of the sample and seals onto the lower compartment with an EPDM gasket.

The test cells were mounted into the desorption test system and connected to a vacuum manifold. Critical orifices, located in the flow path between each test cell and the manifold, control the flow rate ultra-high purity (UHP) nitrogen through the upper compartment at a volumetric flow rate of 200±20 mL/min. Portions of the effluent flow from the tests cells were periodically sampled and analyzed for chemical agent over the 24-hour desorption period. A description of the analytical instrumentation and sampling procedures are discussed in section 4.1.5 and 4.1.6 above. Raw data tables for these experiments are located in Appendix E.

5. RESULTS AND DISCUSSIONS

5.1 Chemical Contamination Survivability Results

5.1.1 Desorption Summary Results

The tables below present a summary of desorption measurement data for each material type. The data is presented as the average total mass of agent per unit area that desorbed from the material surface during the 12-hour analysis. This information can be used to make a general prediction of how a component manufactured from these materials might perform. Raw data for these chemical contamination survivability tests are located in Appendix A.

It is important to note that the intent of the Test Operating Procedure (TOP) is to evaluate full systems against the NBCCS requirement and determinations of "pass" or "fail" cannot be made for individual materials of construction. What can be determined from this test program is the quantitative contribution to the full-system off-gassing and contact hazard of each selected material. Using this data and combining it with other information, NBCCS engineers can determine the expected overall system performance.

Table 4 –Cumulative Desorption Summary (CCS)

Sample ID	Material Type	HD (µg/cm^2)	VX (µg/cm^2)	TGD (µg/cm^2)
E1	Clear 3mil ECTFE	<0.21	<0.02	<0.02
E2	Clear 5mil ECTFE	<0.21	<0.02	<0.02
E3	White 3mil ECTFE	<0.12	<0.02	<0.02
E4	White 5mil ECTFE	<0.13	<0.02	<0.02
E5	Gray 3mil ECTFE	<0.12	<0.02	<0.02
E6	Gray 10mil ECTFE	<0.16	<0.02	<0.02
F1	Clear 5mil FEP	<0.10	<0.02	<0.03
F2	White 10mil FEP	<0.11	<0.02	<0.04
PV1	Clear PVDF	<0.11	<0.02	<0.04
PV2	Clear 10mil PVDF	<0.15	<0.02	<0.02
PV3	White 3mil PVDF	<0.10	<0.01	<0.02
PV4	White 5mil PVDF	<0.12	<0.02	<0.02

5.1.2 Contact Hazard Summary Results

The data for contact hazard is presented differently depending on the type of agent in use. Because the effect of HD is localized, it is not appropriate to consider a specific dose of liquid HD as

the definitive threshold for an entire 70-kg man. Use of mass/body surface area (mg/cm^2) units to describe the dose for which negligible effects are observed is preferable with the provision that the location and surface area must be specified, since mild incapacitation depends on where the contamination exists and the extent of body surface involved[1]. Therefore, the negligible risk value for HD in units of mass/body surface area is $0.01 mg/cm^2$. The test results from this program are reported in milligrams of HD detected per square centimeter of material surface. This data can be used to determine the level of skin contamination that would be received by an unprotected person during various types of operations where the material is being handled.

The effect of VX and TGD (nerve agents) is systemic and the data are reported as the maximum area (A_{max}) that a 70-kilogram man would have to contact with their skin in order to reach the negligible risk exposure. The negligible risk values for liquid VX and TGD are 1.4 and 30 mg/70-kg man respectively. Raw data for contact hazard analyses are located in Appendix B.

Table 5 – Contact Hazard Summary

Sample ID	Material Type	HD (mg/cm^2)	VX A_{max} [m^2]	TGD A_{max} [m^2]
E1	Clear 3mil ECTFE	<0.0002	>56	167
E2	Clear 5mil ECTFE	<0.0002	>56	158
E3	White 3mil ECTFE	<0.0002	10	150
E4	White 5mil ECTFE	<0.0002	>56	150
E5	Gray 3mil ECTFE	<0.0002	>56	375
E6	Gray 10mil ECTFE	<0.0002	>56	375
F1	Clear 5mil FEP	<0.0002	>56	300
F2	White 10mil FEP	<0.0002	>56	158
PV1	Clear PVDF	<0.0002	>56	214
PV2	Clear 10mil PVDF	<0.0002	>56	120
PV3	White 3mil PVDF	<0.0002	>56	143
PV4	White 5mil PVDF	<0.0002	10	300

[1] Test Operations Procedure (TOP) 8-2-510, NBC Contamination Survivability, Large Items Exteriors, Table 1, Negligible Risk Values for NBC Contaminants, 17 April 1998, pp. B-10.

5.1.3 Discussion – Chemical Contamination Survivability

Prior to testing, all the materials types supplied to CUBRC by Integument Technologies, Inc. were tested for analytical background interference for both contact hazard analysis and desorption measurements. No interferences were detected for any of the material types.

In general, all the material types performed extremely well, with most of the desorption measurements falling below the calibration limits of the analytical instrumentation. The surfaces of these materials also held up very well against the destructive effects of the agents and the DS2. There was a slight dulling of the sample surface on all of the test materials, but it was much more pronounced on the PVDF materials. The PVDF experienced a darkening of the material surface with some streaking after each DS2 application (Figure 7). This effect is was more noticeable on the white PVDF materials (PV3 and PV4).

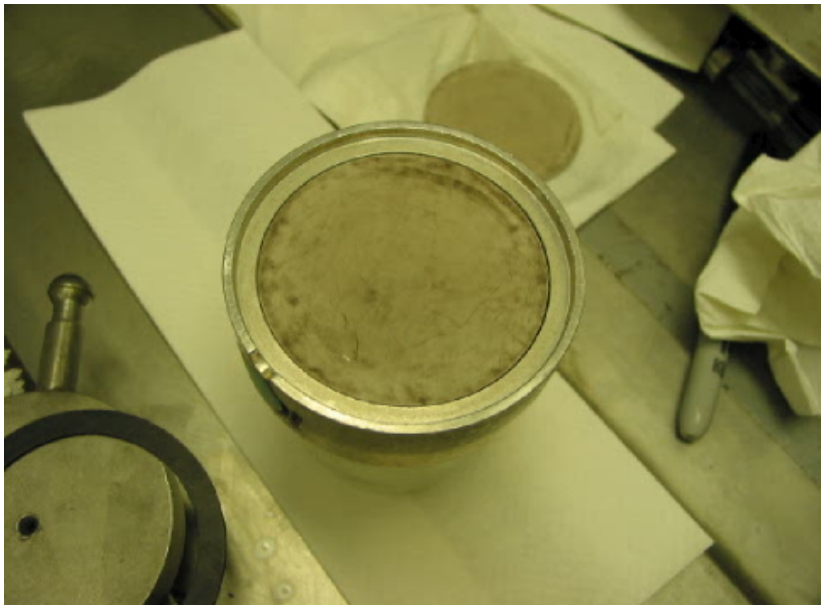


Figure 7 – Discoloration of White PVDF Material

The select materials also performed extremely well for the contact hazard analysis. Results indicate that an unprotected person would need to come into contact with a very large surface area to reach the negligible risk value for each respective agent (HD, VX, and TGD). Test specific observations and photos are contained in Appendix C.

5.2 Chemical Agent Resistance (CARC) Test Results

5.2.1 Desorption Summary Results

The tables below present a summary of desorption measurement data for each material type. The data is presented as the total mass of agent per sample desorbed from the material surface during the 24-hour analysis. The chemical agent resistance criteria specified in Military Specification MIL-C-46168D(ME) states that a coating should not desorb more than 40µg of agent GD and 180µg of agent HD. Raw data tables are located in Appendix E.

Table 6 – Cumulative Desorption Summary (CARC)

Sample ID	Material Type	HD (µg/sample)	TGD (µg/sample)
E1	Clear 3mil ECTFE	8.54	2.29
E2	Clear 5mil ECTFE	2.82	<0.11
E3	White 3mil ECTFE	17.2	<0.22
E4	White 5mil ECTFE	<2.93	3.32
E5	Gray 3mil ECTFE	<2.62	1.93
E6	Gray 10mil ECTFE	<5.10	<0.25
F1	Clear 5mil FEP	<1.72	4.22
F2	White 10mil FEP	<3.52	1.83
PV1	Clear PVDF	<4.95	4.85
PV2	Clear 10mil PVDF	8.34	11.7
PV3	White 3mil PVDF	12.2	18.1
PV4	White 5mil PVDF	7.22	13.4

5.2.2 Discussion – Chemical Agent Resistance

Prior to testing, all the materials types supplied to CUBRC by Integument Technologies, Inc. were tested for analytical background interference of desorption measurements. No interferences were detected for any of the material types.

The desorption data for the HD and GD chemical agent resistance test indicate that all of the material types performed extremely well. The cumulative mass desorbed from each material at the end of the 24-hour period desorption period was significantly below the resistance criteria specified in the Military Specification MIL-C-46168D(ME) section 3.6.14. All cumulative desorbed masses were well below 40µg for GD and 180µg for HD. There were no significant observations to discuss

during the contamination/isopropyl rinse (IPA) procedures. All of the material types showed no significant affects from the IPA rinse or from the agents themselves.

APPENDIX A – CHEMICAL CONTAMINATION SURVIVABILITY RAW DATA TABLES

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 3mil ECTFE, E1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.79	0.22	6.80	0.01	0.06
1.08	0.95	0.43	6.80	0.02	1.25
2.08	0.77	0.43	6.80	0.01	2.06
3.08	0.59	0.43	6.80	0.01	2.71
4.08	0.46	0.43	6.80	0.01	3.21
5.08	0.26	0.43	6.80	0.01	3.55
6.08	0.27	0.43	6.80	0.004	3.80
7.08	0.27	0.43	6.80	0.004	4.05
8.08	0.25	0.43	6.80	0.004	4.30
9.08	0.25	0.43	6.80	0.004	4.54
10.08	0.25	0.43	6.80	0.004	4.78
11.08	0.25	0.43	6.80	0.004	5.01
12.08	0.25	0.43	6.80	0.004	5.25
13.08	0.25	0.43	6.80	0.004	5.48

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 5mil ECTFE, E2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.59	0.22	6.80	0.01	0.05
1.08	0.79	0.43	6.80	0.02	0.97
2.08	0.73	0.43	6.80	0.01	1.69
3.08	0.57	0.43	6.80	0.01	2.31
4.08	0.50	0.43	6.80	0.01	2.82
5.08	0.43	0.43	6.80	0.01	3.26
6.08	0.38	0.43	6.80	0.01	3.64
7.08	0.25	0.43	6.80	0.005	3.94
8.08	0.25	0.43	6.80	0.004	4.18
9.08	0.28	0.43	6.80	0.004	4.43
10.08	0.25	0.43	6.80	0.004	4.68
11.08	0.25	0.43	6.80	0.004	4.92
12.08	0.25	0.43	6.80	0.004	5.16
13.08	0.25	0.43	6.80	0.004	5.39

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 3mil ECTFE, E3

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.77	0.44	6.35	0.01	0.03
1.08	0.29	0.43	6.35	0.01	0.49
2.08	0.25	0.43	6.35	0.004	0.73
3.08	0.25	0.43	6.35	0.004	0.95
4.08	0.25	0.43	6.35	0.004	1.17
5.08	0.25	0.43	6.35	0.004	1.39
6.08	0.25	0.43	6.35	0.004	1.61
7.08	0.25	0.43	6.35	0.004	1.83
8.08	0.25	0.43	6.35	0.004	2.05
9.08	0.25	0.43	6.35	0.004	2.27
10.08	0.25	0.43	6.35	0.004	2.49
11.08	0.25	0.43	6.35	0.004	2.71
12.08	0.25	0.43	6.35	0.004	2.93
13.08	0.25	0.43	6.35	0.004	3.15

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 5mil ECTFE, E4

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.70	0.43	6.60	0.01	0.03
1.08	0.25	0.43	6.60	0.01	0.46
2.08	0.25	0.43	6.60	0.004	0.70
3.08	0.25	0.43	6.60	0.004	0.93
4.08	0.25	0.43	6.60	0.004	1.16
5.08	0.25	0.43	6.60	0.004	1.39
6.08	0.25	0.43	6.60	0.004	1.62
7.08	0.25	0.43	6.60	0.004	1.85
8.08	0.25	0.43	6.60	0.004	2.08
9.08	0.25	0.43	6.60	0.004	2.31
10.08	0.25	0.43	6.60	0.004	2.54
11.08	0.25	0.43	6.60	0.004	2.77
12.08	0.25	0.43	6.60	0.004	3.00
13.08	0.25	0.43	6.60	0.004	3.23

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Gray 3mil ECTFE, E5

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.25	0.44	6.75	0.002	0.01
1.08	0.25	0.43	6.75	0.004	0.24
2.08	0.25	0.43	6.75	0.004	0.48
3.08	0.25	0.44	6.75	0.004	0.71
4.08	0.25	0.44	6.75	0.004	0.94
5.08	0.25	0.44	6.75	0.004	1.17
6.08	0.25	0.44	6.75	0.004	1.41
7.08	0.25	0.43	6.75	0.004	1.64
8.08	0.25	0.43	6.75	0.004	1.87
9.08	0.25	0.43	6.75	0.004	2.10
10.08	0.25	0.44	6.75	0.004	2.34
11.08	0.25	0.44	6.75	0.004	2.57
12.08	0.25	0.44	6.75	0.004	2.80
13.08	0.25	0.44	6.75	0.004	3.03

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Gray 10mil ECTFE, E6

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.72	0.43	6.70	0.01	0.03
1.08	0.63	0.43	6.70	0.01	0.66
2.08	0.52	0.43	6.70	0.01	1.20
3.08	0.44	0.43	6.70	0.01	1.65
4.08	0.25	0.43	6.70	0.01	1.98
5.08	0.25	0.43	6.70	0.004	2.21
6.08	0.25	0.43	6.70	0.004	2.45
7.08	0.25	0.43	6.70	0.004	2.68
8.08	0.25	0.43	6.70	0.004	2.91
9.08	0.26	0.43	6.70	0.004	3.15
10.08	0.25	0.43	6.70	0.004	3.39
11.08	0.25	0.43	6.70	0.004	3.63
12.08	0.26	0.43	6.70	0.004	3.87
13.08	0.26	0.43	6.70	0.004	4.11

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 5mil FEP, F1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.25	0.59	6.70	0.001	0.01
1.08	0.25	0.48	6.70	0.003	0.20
2.08	0.25	0.48	6.70	0.003	0.41
3.08	0.25	0.48	6.70	0.003	0.61
4.08	0.25	0.48	6.70	0.003	0.82
5.08	0.25	0.48	6.70	0.003	1.03
6.08	0.25	0.48	6.70	0.003	1.24
7.08	0.25	0.49	6.70	0.003	1.45
8.08	0.25	0.49	6.70	0.003	1.65
9.08	0.25	0.49	6.70	0.003	1.86
10.08	0.25	0.49	6.70	0.003	2.07
11.08	0.25	0.49	6.70	0.003	2.27
12.08	0.25	0.49	6.70	0.003	2.48
13.08	0.25	0.49	6.70	0.003	2.69

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 10mil FEP, F2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.25	0.24	6.70	0.003	0.02
1.08	0.25	0.48	6.70	0.01	0.33
2.08	0.25	0.48	6.70	0.004	0.54
3.08	0.25	0.48	6.70	0.004	0.75
4.08	0.25	0.48	6.70	0.004	0.96
5.08	0.25	0.48	6.70	0.003	1.17
6.08	0.25	0.48	6.70	0.003	1.38
7.08	0.25	0.48	6.70	0.003	1.59
8.08	0.25	0.48	6.70	0.003	1.80
9.08	0.25	0.48	6.70	0.003	2.01
10.08	0.25	0.48	6.70	0.003	2.22
11.08	0.25	0.48	6.70	0.003	2.43
12.08	0.25	0.48	6.70	0.003	2.64
13.08	0.25	0.48	6.70	0.003	2.85

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear PVDF, PV1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.32	0.48	6.80	0.002	0.01
1.08	0.25	0.48	6.80	0.004	0.26
2.08	0.25	0.48	6.80	0.004	0.47
3.08	0.25	0.48	6.80	0.004	0.68
4.08	0.25	0.48	6.80	0.004	0.89
5.08	0.25	0.48	6.80	0.004	1.11
6.08	0.25	0.48	6.80	0.004	1.32
7.08	0.25	0.48	6.80	0.004	1.53
8.08	0.25	0.48	6.80	0.004	1.74
9.08	0.25	0.48	6.80	0.004	1.95
10.08	0.25	0.48	6.80	0.004	2.17
11.08	0.25	0.48	6.80	0.004	2.38
12.08	0.25	0.48	6.80	0.004	2.59
13.08	0.25	0.48	6.80	0.004	2.80

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 10mil PVDF, PV2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.88	0.48	6.80	0.01	0.03
1.08	0.63	0.48	6.80	0.01	0.68
2.08	0.54	0.48	6.80	0.01	1.18
3.08	0.40	0.48	6.80	0.01	1.58
4.08	0.36	0.48	6.80	0.01	1.91
5.08	0.26	0.48	6.80	0.004	2.17
6.08	0.25	0.48	6.80	0.004	2.39
7.08	0.25	0.48	6.80	0.004	2.60
8.08	0.25	0.48	6.80	0.004	2.81
9.08	0.25	0.48	6.80	0.004	3.03
10.08	0.25	0.48	6.80	0.004	3.24
11.08	0.25	0.48	6.80	0.004	3.45
12.08	0.25	0.48	6.80	0.004	3.66
13.08	0.25	0.48	6.80	0.004	3.87

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 3mil PVDF, PV3

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.25	0.49	6.70	0.002	0.01
1.08	0.25	0.48	6.70	0.003	0.22
2.08	0.25	0.49	6.70	0.003	0.42
3.08	0.25	0.49	6.70	0.003	0.63
4.08	0.25	0.49	6.70	0.003	0.84
5.08	0.25	0.49	6.70	0.003	1.04
6.08	0.25	0.49	6.70	0.003	1.25
7.08	0.25	0.49	6.70	0.003	1.46
8.08	0.25	0.49	6.70	0.003	1.66
9.08	0.25	0.49	6.70	0.003	1.87
10.08	0.25	0.49	6.70	0.003	2.07
11.08	0.25	0.49	6.70	0.003	2.28
12.08	0.25	0.49	6.70	0.003	2.48
13.08	0.25	0.49	6.70	0.003	2.69

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 24 January 2006
Test Type: Mustard (HD) Desorption, 10 g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 5mil PVDF, PV4

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.46	0.48	6.70	0.003	0.02
1.08	0.39	0.48	6.70	0.01	0.37
2.08	0.30	0.48	6.70	0.005	0.66
3.08	0.26	0.48	6.70	0.004	0.89
4.08	0.25	0.48	6.70	0.004	1.10
5.08	0.25	0.48	6.70	0.003	1.31
6.08	0.25	0.48	6.70	0.003	1.52
7.08	0.25	0.48	6.70	0.003	1.73
8.08	0.25	0.48	6.70	0.003	1.93
9.08	0.25	0.49	6.70	0.003	2.14
10.08	0.25	0.48	6.70	0.003	2.35
11.08	0.25	0.49	6.70	0.003	2.56
12.08	0.25	0.49	6.70	0.003	2.76
13.08	0.25	0.48	6.70	0.003	2.97

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 3mil ECTFE, E1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.25	5.30	0.001	0.003
1.08	0.05	0.51	5.30	0.001	0.05
2.08	0.05	0.51	5.30	0.001	0.08
3.08	0.05	0.51	5.30	0.001	0.11
4.08	0.05	0.51	5.30	0.001	0.14
5.08	0.05	0.51	5.30	0.0005	0.17
6.08	0.05	0.51	5.30	0.0005	0.21
7.08	0.05	0.51	5.30	0.0005	0.24
8.08	0.05	0.52	5.30	0.0005	0.27
9.08	0.05	0.52	5.30	0.0005	0.30
10.08	0.05	0.52	5.30	0.0005	0.33
11.08	0.05	0.52	5.30	0.0005	0.36
12.08	0.05	0.52	5.30	0.0005	0.39
13.08	0.05	0.52	5.30	0.0005	0.42

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 5mil ECTFE, E2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.25	5.60	0.001	0.003
1.08	0.05	0.51	5.60	0.001	0.05
2.08	0.05	0.51	5.60	0.001	0.09
3.08	0.05	0.51	5.60	0.001	0.12
4.08	0.05	0.51	5.60	0.001	0.15
5.08	0.05	0.51	5.60	0.0005	0.18
6.08	0.05	0.51	5.60	0.0005	0.22
7.08	0.05	0.51	5.60	0.0005	0.25
8.08	0.05	0.52	5.60	0.0005	0.28
9.08	0.05	0.52	5.60	0.0005	0.31
10.08	0.05	0.52	5.60	0.0005	0.35
11.08	0.05	0.52	5.60	0.0005	0.38
12.08	0.05	0.52	5.60	0.0005	0.41
13.08	0.05	0.52	5.60	0.0005	0.44

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 3mil ECTFE, E3

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.25	5.25	0.001	0.003
1.08	0.05	0.51	5.25	0.001	0.05
2.08	0.05	0.51	5.25	0.001	0.08
3.08	0.05	0.51	5.25	0.001	0.11
4.08	0.05	0.51	5.25	0.001	0.14
5.08	0.05	0.51	5.25	0.0005	0.17
6.08	0.05	0.52	5.25	0.0005	0.20
7.08	0.05	0.52	5.25	0.0005	0.23
8.08	0.05	0.52	5.25	0.0005	0.26
9.08	0.05	0.52	5.25	0.0005	0.29
10.08	0.05	0.52	5.25	0.0005	0.32
11.08	0.05	0.52	5.25	0.0005	0.35
12.08	0.05	0.53	5.25	0.0005	0.38
13.08	0.05	0.53	5.25	0.0005	0.41

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 5mil ECTFE, E4

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.50	6.15	0.0003	0.002
1.08	0.05	0.51	6.15	0.001	0.04
2.08	0.05	0.51	6.15	0.001	0.07
3.08	0.05	0.51	6.15	0.001	0.11
4.08	0.05	0.51	6.15	0.001	0.15
5.08	0.05	0.51	6.15	0.0006	0.18
6.08	0.05	0.51	6.15	0.0006	0.22
7.08	0.05	0.51	6.15	0.0006	0.25
8.08	0.05	0.52	6.15	0.0006	0.29
9.08	0.05	0.52	6.15	0.0006	0.33
10.08	0.05	0.52	6.15	0.0006	0.36
11.08	0.05	0.52	6.15	0.0006	0.40
12.08	0.05	0.52	6.15	0.0006	0.43
13.08	0.05	0.52	6.15	0.0006	0.47

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Gray 3mil ECTFE, E5

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.51	6.35	0.0003	0.002
1.08	0.05	0.52	6.35	0.001	0.04
2.08	0.05	0.52	6.35	0.001	0.08
3.08	0.05	0.52	6.35	0.001	0.11
4.08	0.05	0.52	6.35	0.001	0.15
5.08	0.05	0.52	6.35	0.0006	0.19
6.08	0.05	0.52	6.35	0.0006	0.22
7.08	0.05	0.52	6.35	0.0006	0.26
8.08	0.05	0.52	6.35	0.0006	0.30
9.08	0.05	0.53	6.35	0.0006	0.33
10.08	0.05	0.52	6.35	0.0006	0.37
11.08	0.05	0.53	6.35	0.0006	0.40
12.08	0.05	0.53	6.35	0.0006	0.44
13.08	0.05	0.53	6.35	0.0006	0.48

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Gray 10mil ECTFE, E6

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.50	5.95	0.0003	0.001
1.08	0.05	0.51	5.95	0.001	0.04
2.08	0.05	0.51	5.95	0.001	0.07
3.08	0.05	0.51	5.95	0.001	0.11
4.08	0.05	0.51	5.95	0.001	0.14
5.08	0.05	0.51	5.95	0.0006	0.18
6.08	0.05	0.51	5.95	0.0006	0.21
7.08	0.05	0.52	5.95	0.0006	0.25
8.08	0.05	0.51	5.95	0.0006	0.28
9.08	0.05	0.52	5.95	0.0006	0.32
10.08	0.05	0.52	5.95	0.0006	0.35
11.08	0.05	0.52	5.95	0.0006	0.38
12.08	0.05	0.52	5.95	0.0006	0.42
13.08	0.05	0.52	5.95	0.0006	0.45

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 5mil FEP, F1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.27	5.45	0.001	0.003
1.08	0.05	0.54	5.45	0.001	0.05
2.08	0.05	0.54	5.45	0.001	0.08
3.08	0.05	0.54	5.45	0.001	0.11
4.08	0.05	0.55	5.45	0.001	0.14
5.08	0.05	0.55	5.45	0.0005	0.17
6.08	0.05	0.55	5.45	0.0005	0.20
7.08	0.05	0.55	5.45	0.0005	0.23
8.08	0.05	0.55	5.45	0.0005	0.26
9.08	0.05	0.55	5.45	0.0005	0.29
10.08	0.05	0.55	5.45	0.0005	0.32
11.08	0.05	0.55	5.45	0.0005	0.35
12.08	0.05	0.55	5.45	0.0005	0.38
13.08	0.05	0.55	5.45	0.0005	0.41

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 10mil FEP, F2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.27	6.20	0.001	0.003
1.08	0.05	0.54	6.20	0.001	0.05
2.08	0.05	0.54	6.20	0.001	0.09
3.08	0.05	0.54	6.20	0.001	0.12
4.08	0.05	0.54	6.20	0.001	0.16
5.08	0.05	0.54	6.20	0.0006	0.19
6.08	0.05	0.54	6.20	0.0006	0.23
7.08	0.05	0.54	6.20	0.0006	0.26
8.08	0.05	0.54	6.20	0.0006	0.30
9.08	0.05	0.54	6.20	0.0006	0.33
10.08	0.05	0.55	6.20	0.0006	0.36
11.08	0.05	0.55	6.20	0.0006	0.40
12.08	0.05	0.55	6.20	0.0006	0.43
13.08	0.05	0.55	6.20	0.0006	0.47

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear PVDF, PV1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.53	6.70	0.0003	0.002
1.08	0.05	0.54	6.70	0.001	0.04
2.08	0.05	0.54	6.70	0.001	0.08
3.08	0.05	0.54	6.70	0.001	0.11
4.08	0.05	0.54	6.70	0.001	0.15
5.08	0.05	0.54	6.70	0.0006	0.19
6.08	0.05	0.55	6.70	0.0006	0.23
7.08	0.05	0.54	6.70	0.0006	0.26
8.08	0.05	0.54	6.70	0.0006	0.30
9.08	0.05	0.54	6.70	0.0006	0.34
10.08	0.05	0.55	6.70	0.0006	0.37
11.08	0.05	0.55	6.70	0.0006	0.41
12.08	0.05	0.55	6.70	0.0006	0.45
13.08	0.05	0.55	6.70	0.0006	0.48

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 10mil PVDF, PV2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.53	5.35	0.0003	0.001
1.08	0.05	0.54	5.35	0.001	0.03
2.08	0.05	0.54	5.35	0.0005	0.06
3.08	0.05	0.54	5.35	0.0005	0.09
4.08	0.05	0.54	5.35	0.0005	0.12
5.08	0.05	0.54	5.35	0.0005	0.15
6.08	0.05	0.54	5.35	0.0005	0.18
7.08	0.05	0.54	5.35	0.0005	0.21
8.08	0.05	0.54	5.35	0.0005	0.24
9.08	0.05	0.54	5.35	0.0005	0.27
10.08	0.05	0.54	5.35	0.0005	0.30
11.08	0.05	0.55	5.35	0.0005	0.33
12.08	0.05	0.55	5.35	0.0005	0.36
13.08	0.05	0.55	5.35	0.0005	0.39

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 3mil PVDF, PV3

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.54	5.10	0.0002	0.001
1.08	0.05	0.54	5.10	0.0005	0.03
2.08	0.05	0.54	5.10	0.0005	0.06
3.08	0.05	0.54	5.10	0.0005	0.09
4.08	0.05	0.55	5.10	0.0005	0.11
5.08	0.05	0.55	5.10	0.0005	0.14
6.08	0.05	0.55	5.10	0.0005	0.17
7.08	0.05	0.55	5.10	0.0005	0.20
8.08	0.05	0.55	5.10	0.0005	0.23
9.08	0.05	0.55	5.10	0.0005	0.25
10.08	0.05	0.55	5.10	0.0005	0.28
11.08	0.05	0.55	5.10	0.0005	0.31
12.08	0.05	0.55	5.10	0.0005	0.34
13.08	0.05	0.56	5.10	0.0005	0.36

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 25 January 2006
Test Type: VX Desorption, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 5mil PVDF, PV4

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.54	6.35	0.0003	0.001
1.08	0.05	0.54	6.35	0.001	0.04
2.08	0.05	0.54	6.35	0.001	0.07
3.08	0.05	0.54	6.35	0.001	0.11
4.08	0.05	0.55	6.35	0.001	0.14
5.08	0.05	0.55	6.35	0.0006	0.18
6.08	0.05	0.55	6.35	0.0006	0.21
7.08	0.05	0.55	6.35	0.0006	0.25
8.08	0.05	0.55	6.35	0.0006	0.28
9.08	0.05	0.55	6.35	0.0006	0.32
10.08	0.05	0.55	6.35	0.0006	0.35
11.08	0.05	0.55	6.35	0.0006	0.38
12.08	0.05	0.55	6.35	0.0006	0.42
13.08	0.05	0.55	6.35	0.0006	0.45

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 3mil ECTFE, E1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.23	7.00	0.001	0.004
1.08	0.05	0.47	7.00	0.001	0.07
2.08	0.05	0.47	7.00	0.001	0.12
3.08	0.05	0.47	7.00	0.001	0.16
4.08	0.05	0.47	7.00	0.001	0.20
5.08	0.05	0.47	7.00	0.001	0.25
6.08	0.05	0.47	7.00	0.001	0.29
7.08	0.05	0.47	7.00	0.001	0.34
8.08	0.05	0.48	7.00	0.001	0.38
9.08	0.05	0.48	7.00	0.001	0.43
10.08	0.05	0.48	7.00	0.001	0.47
11.08	0.05	0.47	7.00	0.001	0.51
12.08	0.05	0.48	7.00	0.001	0.56
13.08	0.05	0.48	7.00	0.001	0.60

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 5mil ECTFE, E2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.46	7.00	0.0004	0.002
1.08	0.05	0.47	7.00	0.001	0.05
2.08	0.05	0.47	7.00	0.001	0.09
3.08	0.05	0.47	7.00	0.001	0.14
4.08	0.05	0.47	7.00	0.001	0.18
5.08	0.05	0.47	7.00	0.001	0.23
6.08	0.05	0.47	7.00	0.001	0.27
7.08	0.05	0.47	7.00	0.001	0.31
8.08	0.05	0.47	7.00	0.001	0.36
9.08	0.05	0.47	7.00	0.001	0.40
10.08	0.05	0.47	7.00	0.001	0.45
11.08	0.05	0.47	7.00	0.001	0.49
12.08	0.05	0.47	7.00	0.001	0.54
13.08	0.05	0.47	7.00	0.001	0.58

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 3mil ECTFE, E3

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.47	6.45	0.0003	0.002
1.08	0.05	0.47	6.45	0.001	0.04
2.08	0.05	0.47	6.45	0.001	0.08
3.08	0.05	0.48	6.45	0.001	0.12
4.08	0.05	0.47	6.45	0.001	0.17
5.08	0.05	0.48	6.45	0.001	0.21
6.08	0.05	0.48	6.45	0.001	0.25
7.08	0.05	0.48	6.45	0.001	0.29
8.08	0.05	0.48	6.45	0.001	0.33
9.08	0.05	0.48	6.45	0.001	0.37
10.08	0.05	0.48	6.45	0.001	0.41
11.08	0.05	0.48	6.45	0.001	0.45
12.08	0.05	0.48	6.45	0.001	0.49
13.08	0.05	0.48	6.45	0.001	0.53

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 5mil ECTFE, E4

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.47	6.90	0.0004	0.002
1.08	0.05	0.47	6.90	0.001	0.05
2.08	0.05	0.47	6.90	0.001	0.09
3.08	0.05	0.47	6.90	0.001	0.13
4.08	0.05	0.47	6.90	0.001	0.18
5.08	0.05	0.47	6.90	0.001	0.22
6.08	0.05	0.47	6.90	0.001	0.27
7.08	0.05	0.47	6.90	0.001	0.31
8.08	0.05	0.47	6.90	0.001	0.35
9.08	0.05	0.48	6.90	0.001	0.40
10.08	0.05	0.48	6.90	0.001	0.44
11.08	0.05	0.47	6.90	0.001	0.48
12.08	0.05	0.48	6.90	0.001	0.53
13.08	0.05	0.47	6.90	0.001	0.57

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Gray 3mil ECTFE, E5

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.47	7.00	0.0004	0.002
1.08	0.05	0.48	7.00	0.001	0.05
2.08	0.05	0.48	7.00	0.001	0.09
3.08	0.05	0.48	7.00	0.001	0.13
4.08	0.05	0.48	7.00	0.001	0.18
5.08	0.05	0.48	7.00	0.001	0.22
6.08	0.05	0.48	7.00	0.001	0.27
7.08	0.05	0.48	7.00	0.001	0.31
8.08	0.05	0.48	7.00	0.001	0.35
9.08	0.05	0.48	7.00	0.001	0.40
10.08	0.05	0.48	7.00	0.001	0.44
11.08	0.05	0.48	7.00	0.001	0.48
12.08	0.05	0.48	7.00	0.001	0.53
13.08	0.05	0.48	7.00	0.001	0.57

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Gray 10mil ECTFE, E6

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.47	7.00	0.0004	0.002
1.08	0.05	0.47	7.00	0.001	0.05
2.08	0.05	0.47	7.00	0.001	0.09
3.08	0.05	0.47	7.00	0.001	0.14
4.08	0.05	0.47	7.00	0.001	0.18
5.08	0.05	0.47	7.00	0.001	0.23
6.08	0.05	0.47	7.00	0.001	0.27
7.08	0.05	0.47	7.00	0.001	0.31
8.08	0.05	0.47	7.00	0.001	0.36
9.08	0.05	0.47	7.00	0.001	0.40
10.08	0.05	0.47	7.00	0.001	0.45
11.08	0.05	0.47	7.00	0.001	0.49
12.08	0.05	0.47	7.00	0.001	0.54
13.08	0.05	0.47	7.00	0.001	0.58

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 5mil FEP, F1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.24	7.00	0.001	0.004
1.08	0.09	0.48	7.00	0.001	0.09
2.08	0.08	0.48	7.00	0.001	0.16
3.08	0.11	0.49	7.00	0.001	0.24
4.08	0.08	0.49	7.00	0.001	0.32
5.08	0.04	0.49	7.00	0.001	0.38
6.08	0.08	0.49	7.00	0.001	0.43
7.08	0.05	0.49	7.00	0.001	0.48
8.08	0.05	0.49	7.00	0.001	0.53
9.08	0.08	0.49	7.00	0.001	0.58
10.08	0.05	0.49	7.00	0.001	0.64
11.08	0.05	0.49	7.00	0.001	0.68
12.08	0.05	0.49	7.00	0.001	0.72
13.08	0.05	0.49	7.00	0.001	0.77

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 10mil FEP, F2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.17	0.47	7.00	0.001	0.01
1.08	0.12	0.47	7.00	0.002	0.14
2.08	0.13	0.48	7.00	0.002	0.25
3.08	0.16	0.48	7.00	0.002	0.37
4.08	0.09	0.48	7.00	0.002	0.48
5.08	0.08	0.48	7.00	0.001	0.56
6.08	0.13	0.48	7.00	0.002	0.65
7.08	0.08	0.48	7.00	0.002	0.74
8.08	0.11	0.48	7.00	0.001	0.82
9.08	0.05	0.48	7.00	0.001	0.89
10.08	0.05	0.48	7.00	0.001	0.94
11.08	0.05	0.49	7.00	0.001	0.98
12.08	0.09	0.48	7.00	0.001	1.04
13.08	0.05	0.49	7.00	0.001	1.10

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear PVDF, PV1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.18	0.47	7.00	0.001	0.01
1.08	0.13	0.48	7.00	0.002	0.14
2.08	0.15	0.48	7.00	0.002	0.27
3.08	0.14	0.48	7.00	0.002	0.39
4.08	0.10	0.48	7.00	0.002	0.50
5.08	0.09	0.48	7.00	0.001	0.58
6.08	0.12	0.48	7.00	0.002	0.67
7.08	0.05	0.48	7.00	0.001	0.75
8.08	0.09	0.48	7.00	0.001	0.81
9.08	0.08	0.48	7.00	0.001	0.88
10.08	0.08	0.48	7.00	0.001	0.95
11.08	0.05	0.49	7.00	0.001	1.01
12.08	0.09	0.48	7.00	0.001	1.07
13.08	0.05	0.49	7.00	0.001	1.13

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: Clear 10mil PVDF, PV2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.47	7.00	0.0004	0.002
1.08	0.05	0.48	7.00	0.001	0.05
2.08	0.05	0.48	7.00	0.001	0.09
3.08	0.05	0.48	7.00	0.001	0.13
4.08	0.05	0.48	7.00	0.001	0.18
5.08	0.05	0.48	7.00	0.001	0.22
6.08	0.05	0.48	7.00	0.001	0.26
7.08	0.05	0.48	7.00	0.001	0.31
8.08	0.05	0.48	7.00	0.001	0.35
9.08	0.05	0.48	7.00	0.001	0.40
10.08	0.05	0.48	7.00	0.001	0.44
11.08	0.05	0.48	7.00	0.001	0.48
12.08	0.05	0.48	7.00	0.001	0.53
13.08	0.05	0.48	7.00	0.001	0.57

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 3mil PVDF, PV3

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.48	6.60	0.0003	0.002
1.08	0.05	0.48	6.60	0.001	0.04
2.08	0.05	0.48	6.60	0.001	0.08
3.08	0.05	0.48	6.60	0.001	0.12
4.08	0.05	0.49	6.60	0.001	0.17
5.08	0.05	0.49	6.60	0.001	0.21
6.08	0.05	0.49	6.60	0.001	0.25
7.08	0.05	0.49	6.60	0.001	0.29
8.08	0.05	0.49	6.60	0.001	0.33
9.08	0.05	0.49	6.60	0.001	0.37
10.08	0.05	0.49	6.60	0.001	0.41
11.08	0.05	0.49	6.60	0.001	0.45
12.08	0.05	0.49	6.60	0.001	0.49
13.08	0.05	0.49	6.60	0.001	0.53

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Chemical Contamination Survivability (CCS)
Test Date: 26 January 2006
Test Type: Thickened Soman (TGD) Desorption Test, 10g/m^2
Test Conditions: 30°C, Ambient RH
Sample ID: White 5mil PVDF, PV4

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.05	0.48	6.90	0.0004	0.002
1.08	0.05	0.48	6.90	0.001	0.04
2.08	0.05	0.48	6.90	0.001	0.09
3.08	0.05	0.48	6.90	0.001	0.13
4.08	0.05	0.49	6.90	0.001	0.17
5.08	0.05	0.48	6.90	0.001	0.22
6.08	0.05	0.49	6.90	0.001	0.26
7.08	0.05	0.49	6.90	0.001	0.30
8.08	0.05	0.49	6.90	0.001	0.34
9.08	0.05	0.49	6.90	0.001	0.39
10.08	0.05	0.49	6.90	0.001	0.43
11.08	0.05	0.49	6.90	0.001	0.47
12.08	0.05	0.49	6.90	0.001	0.51
13.08	0.05	0.49	6.90	0.001	0.56

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

APPENDIX B – CONTACT HAZARD RAW DATA TABLES

Amax in m^2 is the maximum area of the material that can be contacted without exceeding the negligible risk value for skin contact

HD

negligible risk, 0.01 mg/cm2	negligible risk value, mg/70kg man
	180

#	Sample Description	Sample ID	ng result	Injection volume (µL)	µg/ml	µg/cm^2	ng/cm^2	mg/m^2	mg/cm^2	Amax (m^2)
1	Clear 3mil ECTFE	E1	1	1	1	0.200	200.0	2.00000	0.00020	90
2	Clear 5mil ECTFE	E2	1	1	1	0.200	200.0	2.00000	0.00020	90
3	White 3mil ECTFE	E3	1	1	1	0.200	200.0	2.00000	0.00020	90
4	White 5mil ECTFE	E4	1	1	1	0.200	200.0	2.00000	0.00020	90
5	Gray 3mil ECTFE	E5	1	1	1	0.200	200.0	2.00000	0.00020	90
6	Gray 10mil ECTFE	E6	1	1	1	0.200	200.0	2.00000	0.00020	90
7	Clear 5mil FEP	F1	1	1	1	0.200	200.0	2.00000	0.00020	90
8	White 10mil FEP	F2	1	1	1	0.200	200.0	2.00000	0.00020	90
9	Clear PVDF	PV1	1	1	1	0.200	200.0	2.00000	0.00020	90
10	Clear 10mil PVDF	PV2	1	1	1	0.200	200.0	2.00000	0.00020	90
11	White 3mil PVDF	PV3	1	1	1	0.200	200.0	2.00000	0.00020	90
12	White 5mil PVDF	PV4	1	1	1	0.200	200.0	2.00000	0.00020	90

Shaded areas represent values that are less than reported due to the nanogram result falling below the instruments low detection limit

Amax in m^2 is the maximum area of the material that can be contacted without exceeding the negligible risk value for skin contact

VX

negligible risk value, mg/70kg man
1.4

#	Sample Description	Sample ID	ng result	Injection volume (µL)	µg/ml	µg/cm^2	ng/cm^2	mg/m^2	mg/cm^2	Amax (m^2)
1	Clear 3mil ECTFE	E1	0.025	2	0.0125	0.0025	2.50	0.0250000	0.0000025	56
2	Clear 5mil ECTFE	E2	0.025	2	0.0125	0.0025	2.50	0.0250000	0.0000025	56
3	White 3mil ECTFE	E3	0.14	2	0.07	0.0140	14.00	0.1400000	0.0000140	10
4	White 5mil ECTFE	E4	0.025	2	0.0125	0.0025	2.50	0.0250000	0.0000025	56
5	Gray 3mil ECTFE	E5	0.025	2	0.0125	0.0025	2.50	0.0250000	0.0000025	56
6	Gray 10mil ECTFE	E6	0.025	2	0.0125	0.0025	2.50	0.0250000	0.0000025	56
7	Clear 5mil FEP	F1	0.025	2	0.0125	0.0025	2.50	0.0250000	0.0000025	56
8	White 10mil FEP	F2	0.025	2	0.0125	0.0025	2.50	0.0250000	0.0000025	56
9	Clear PVDF	PV1	0.025	2	0.0125	0.0025	2.50	0.0250000	0.0000025	56
10	Clear 10mil PVDF	PV2	0.025	2	0.0125	0.0025	2.50	0.0250000	0.0000025	56
11	White 3mil PVDF	PV3	0.025	2	0.0125	0.0025	2.50	0.0250000	0.0000025	56
12	White 5mil PVDF	PV4	0.14	2	0.07	0.0140	14.00	0.1400000	0.0000140	10

Shaded areas represent values that are less than reported due to the nanogram result falling below the instruments low detection limit

Amax in m^2 is the maximum area of the material that can be contacted without exceeding the negligible risk value for skin contact

TGD

negligible risk value, mg/70kg man

30

#	Sample Description	Sample ID	ng result	Injection volume (µL)	µg/ml	µg/cm^2	ng/cm^2	mg/m^2	mg/cm^2	Amax (m^2)
1	Clear 3mil ECTFE	E1	0.18	2	0.09	0.0180	18.00	0.18000	0.000018	167
2	Clear 5mil ECTFE	E2	0.19	2	0.095	0.0190	19.00	0.19000	0.000019	158
3	White 3mil ECTFE	E3	0.2	2	0.1	0.0200	20.00	0.20000	0.000020	150
4	White 5mil ECTFE	E4	0.2	2	0.1	0.0200	20.00	0.20000	0.000020	150
5	Gray 3mil ECTFE	E5	0.08	2	0.04	0.0080	8.00	0.08000	0.000008	375
6	Gray 10mil ECTFE	E6	0.08	2	0.04	0.0080	8.00	0.08000	0.000008	375
7	Clear 5mil FEP	F1	0.1	2	0.05	0.0100	10.00	0.10000	0.000010	300
8	White 10mil FEP	F2	0.19	2	0.095	0.0190	19.00	0.19000	0.000019	158
9	Clear PVDF	PV1	0.14	2	0.07	0.0140	14.00	0.14000	0.000014	214
10	Clear 10mil PVDF	PV2	0.25	2	0.125	0.0250	25.00	0.25000	0.000025	120
11	White 3mil PVDF	PV3	0.21	2	0.105	0.0210	21.00	0.21000	0.000021	143
12	White 5mil PVDF	PV4	0.1	2	0.05	0.0100	10.00	0.10000	0.000010	300

APPENDIX C – CHEMICAL CONTAMINATION TEST OBSERVATIONS

HD CCS Test Observations

Date: 1/24/06 Decon Solution: DS2
Agent: HD Contamination Density 10 g/m^2

Sample ID	Observations	Photos Taken
E1	While decontaminating w/DS2 samples displayed signs of possible film deterioration. A cloudy residue showed up ~5min after sample was sitting with decon on it. After the rinse cycle, the film deterioration was apparently only the DS2 coagulating because after the water rinse, the film coating looked fine. First contact hazard sample had a contact duration of 1:00 instead of the 30 seconds. Slight dulling of surface.	Y
E2	Slight dulling of surface.	Y
E3	Slight dulling of surface.	Y
E4	Slight dulling of surface.	Y
E5	Slight dulling of surface.	Y
E6	Slight dulling of surface.	Y
F1	Slight dulling of surface.	Y
F2	Slight dulling of surface.	Y
PV1	Samples are becoming discolored (darkening) after the DS2 was rinsed off.	Y
PV2	Samples are becoming discolored (darkening) after the DS2 was rinsed off.	Y
PV3	Samples are becoming discolored (darkening) after the DS2 was rinsed off.	Y
PV4	Samples are becoming discolored (darkening) after the DS2 was rinsed off.	Y

VX CCS Test Observations

Date: 1/25/06 Decon Solution: DS2
Agent: VX Contamination Density 10 g/m^2

Sample ID	Observations	Photos Taken
E1	Samples have a slight dulling affect on the top surface	Y
E2	Samples have a slight dulling affect on the top surface	Y
E3	Samples have a slight dulling affect on the top surface	Y
E4	Samples have a slight dulling affect on the top surface	Y
E5	Samples have a slight dulling affect on the top surface	Y
E6	Samples have a slight dulling affect on the top surface	Y
F1	Samples have a slight dulling affect on the top surface	Y
F2	Samples have a slight dulling affect on the top surface	Y
PV1	Samples are continuing to darken after the DS2 rinsing	Y
PV2	Samples are continuing to darken after the DS2 rinsing	Y
PV3	Samples are continuing to darken after the DS2 rinsing	Y
PV4	Samples are continuing to darken after the DS2 rinsing	Y

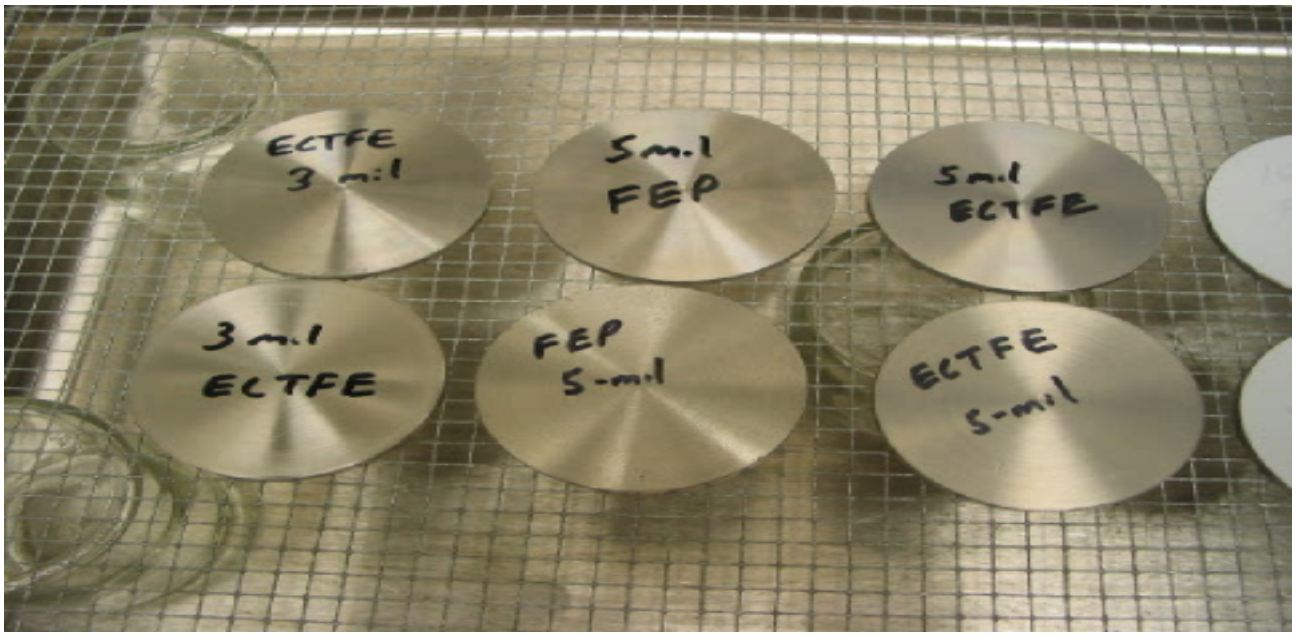
TGD CCS Test Observations

Date: 1/26/06 Decon Solution: DS2
Agent: TGD Contamination Density 10 g/m^2

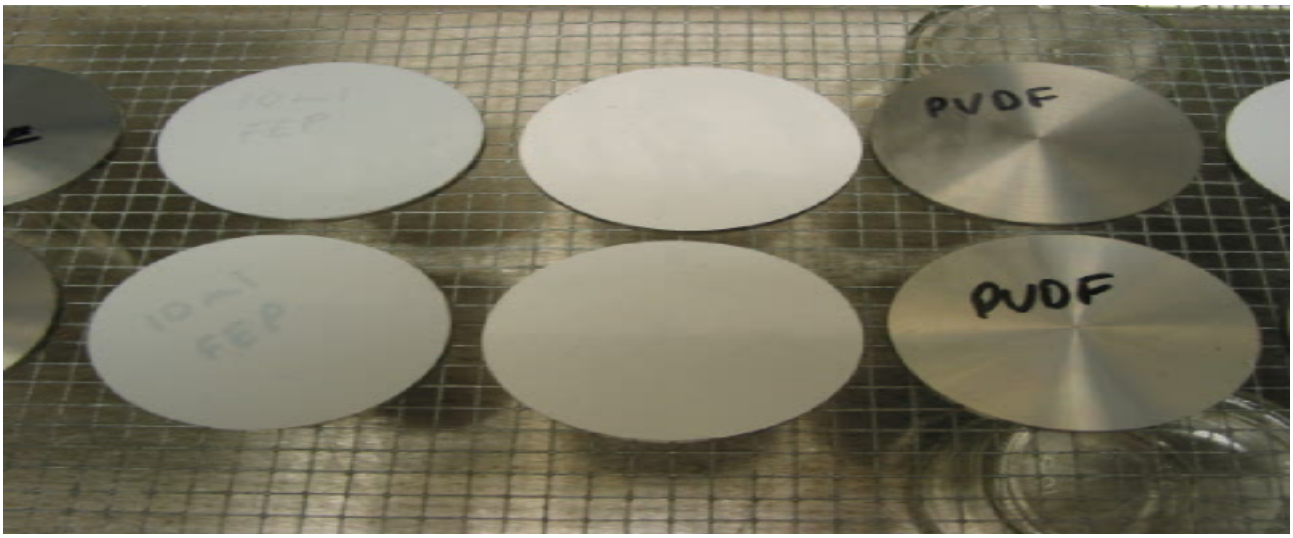
Sample ID	Observations	Photos Taken
E1	Samples have a slight dulling affect on the top surface	Y
E2	Samples have a slight dulling affect on the top surface	Y
E3	Samples have a slight dulling affect on the top surface	Y
E4	Samples have a slight dulling affect on the top surface	Y
E5	Samples have a slight dulling affect on the top surface	Y
E6	Samples have a slight dulling affect on the top surface	Y
F1	Samples have a slight dulling affect on the top surface	Y
F2	Samples have a slight dulling affect on the top surface	Y
PV1	Samples are continuing to darken after the DS2 rinsing	Y
PV2	Samples are continuing to darken after the DS2 rinsing	Y
PV3	Samples are continuing to darken after the DS2 rinsing	Y
PV4	Samples are continuing to darken after the DS2 rinsing	Y

APPENDIX D – CHEMICAL CONTAMINATION SURVIVABILITY TEST PHOTOS

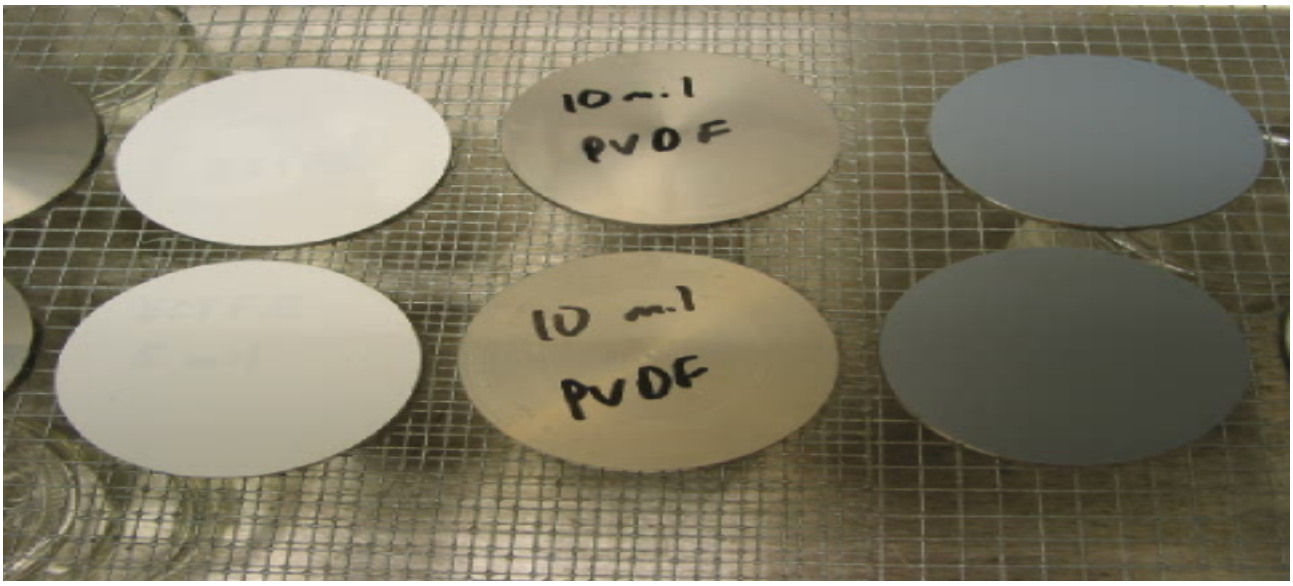
HD Chemical Contamination Survivability Photos



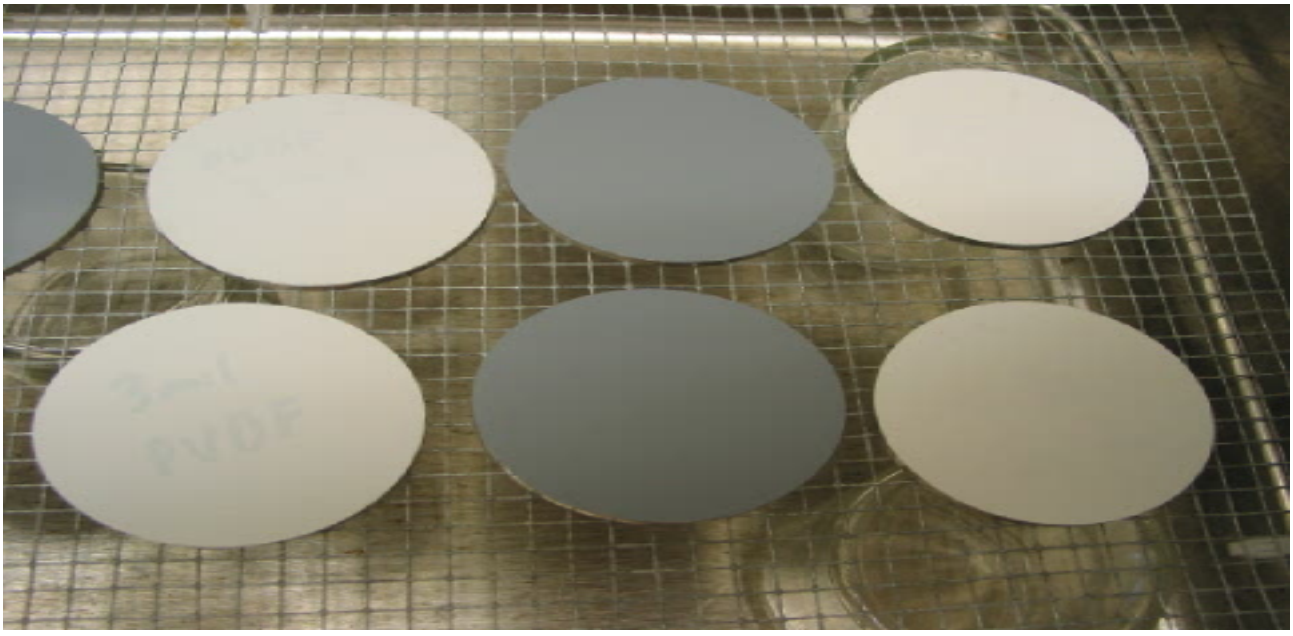
Photos 1 - Pre-test E1-F1-E2



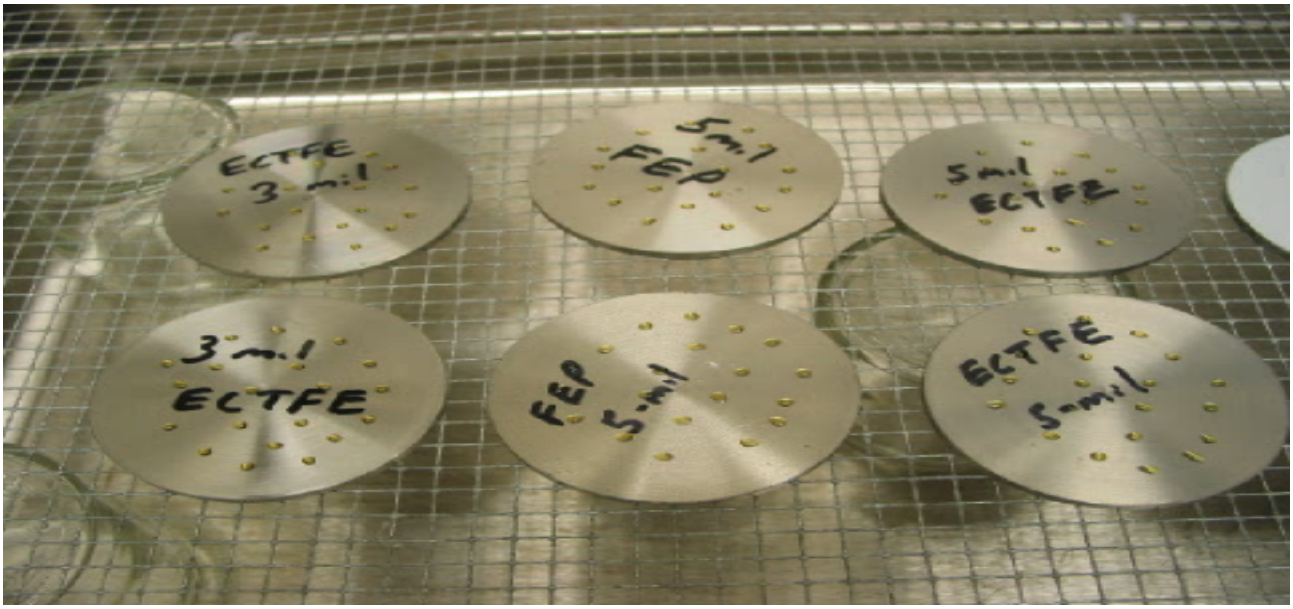
Photos 2 – Pre-test F2-E3-PV1



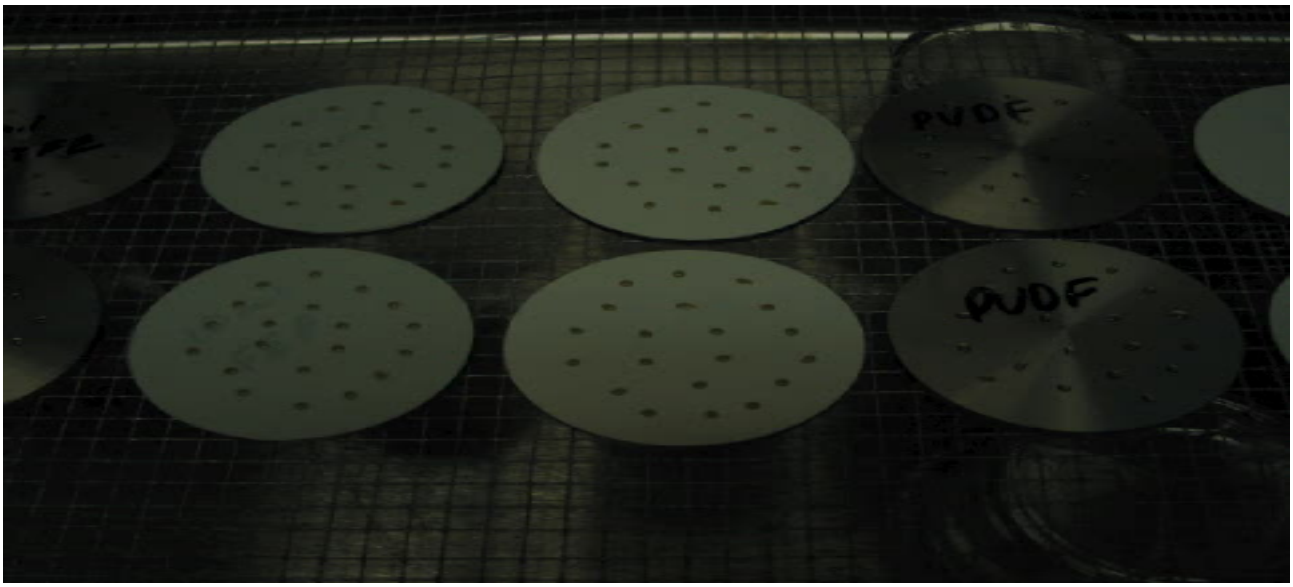
Photos 3 – Pre-test E4-PV2-E5



Photos 4 – Pre-test PV3-E6-PV4

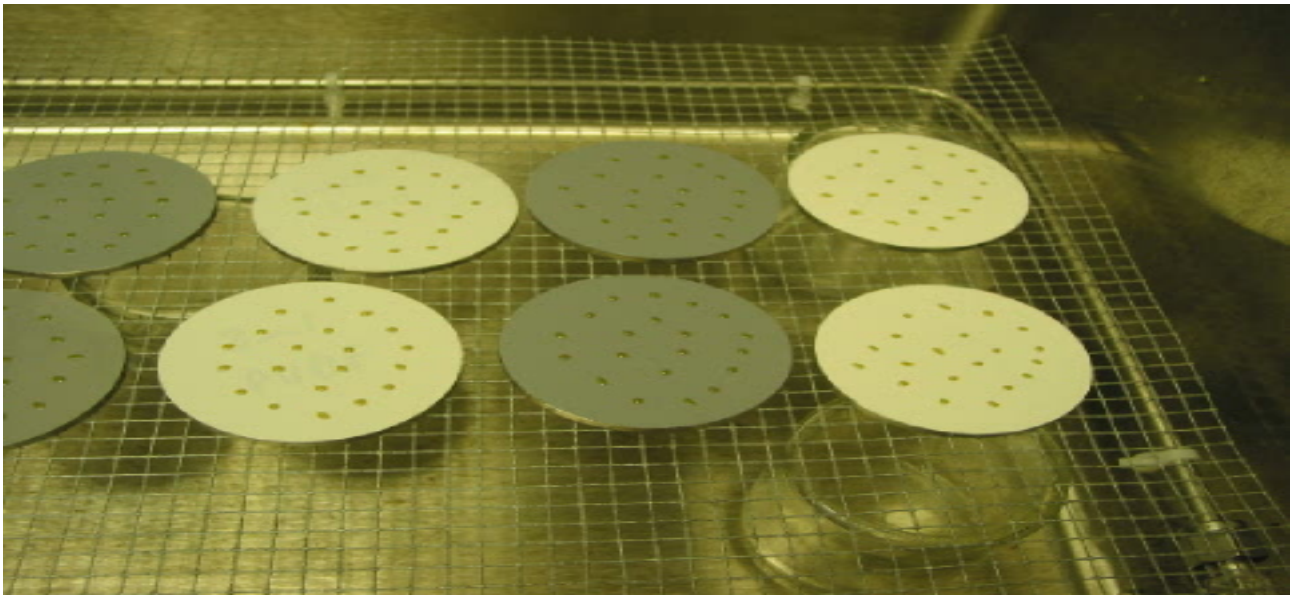


Photos 5 – HD Contamination E1-F1-E2

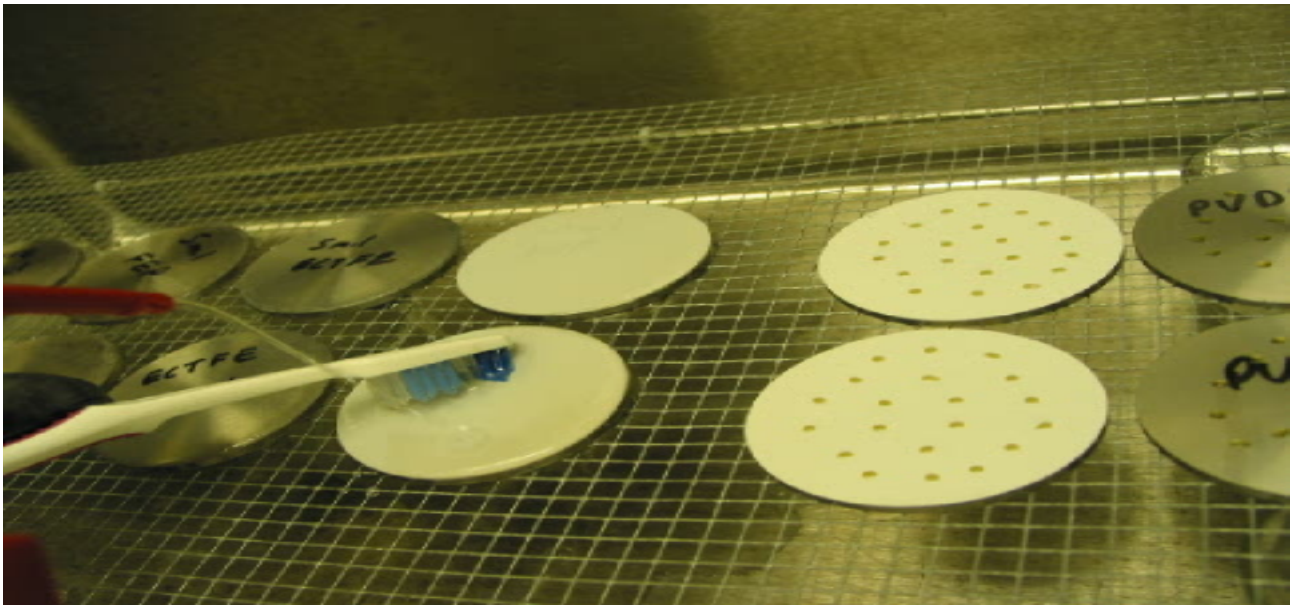


Photos 6 – HD Contamination F2-E3-PV1

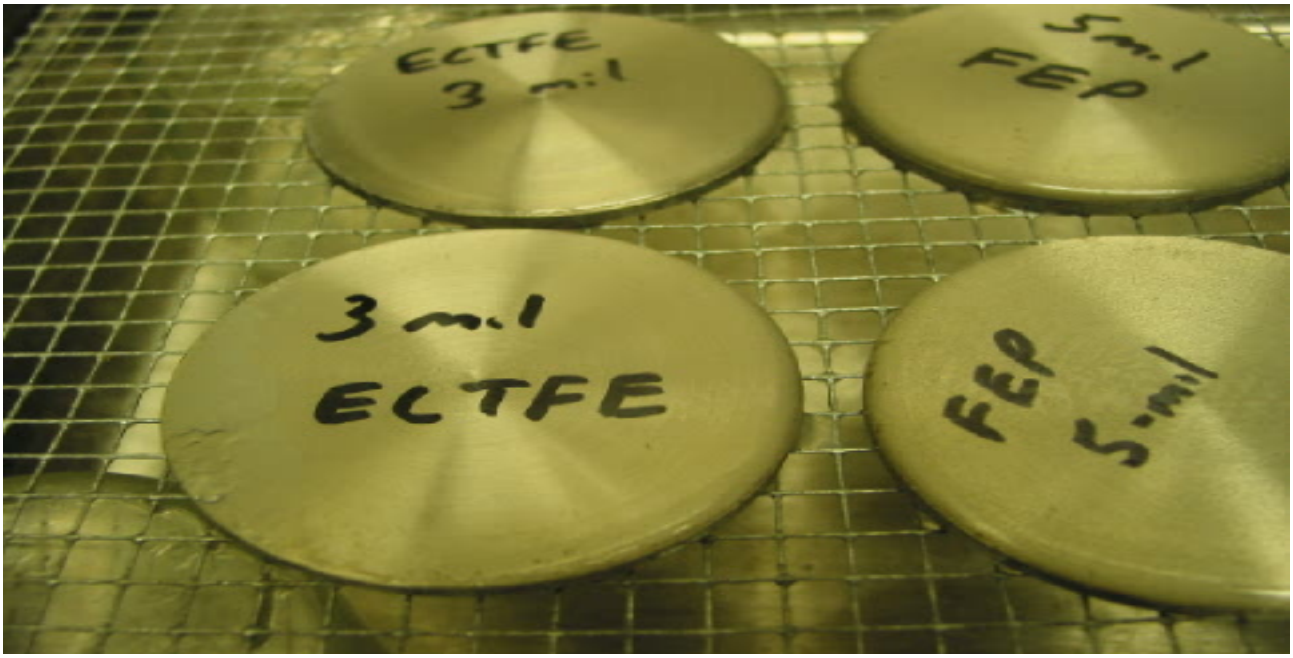
Photos 7 – HD Contamination E4-PV2-E5



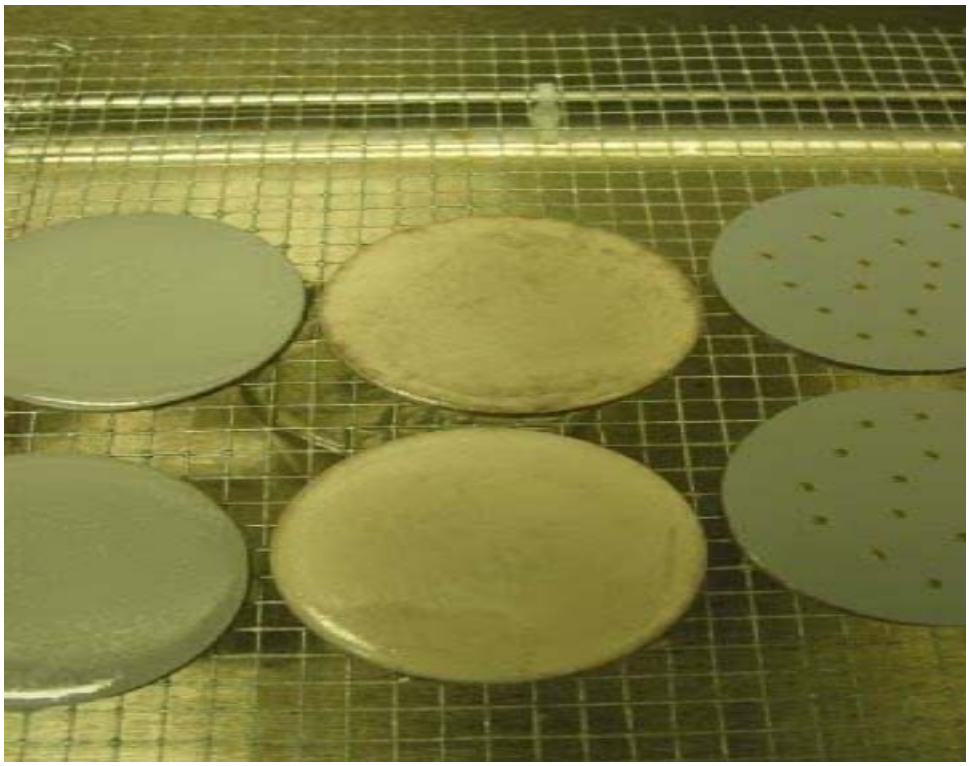
Photos 8 – HD Contamination E5-PV3-E6-PV4



Photos 9 – DS2 decon scrub of F2 material



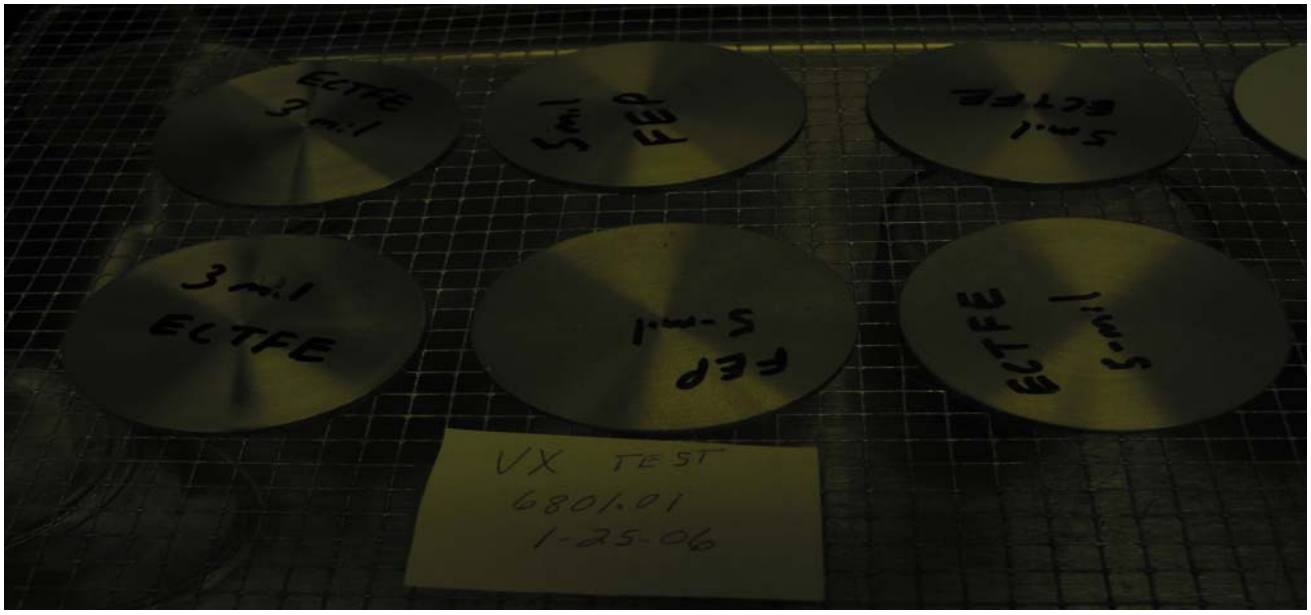
Photos 10 – Suspected peeling of film from E1 during DS2 residence (coating did not peel)



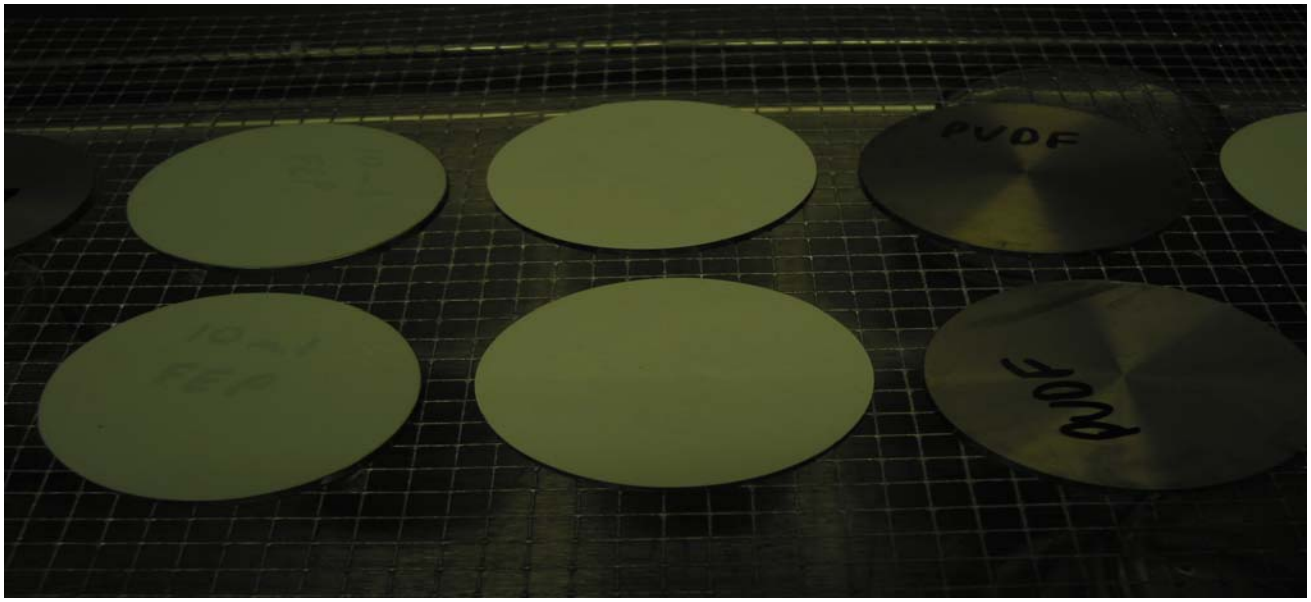
Photos 11 – DS2 affect on PV3 material

Photos 12 – Post test photo of PV3 material

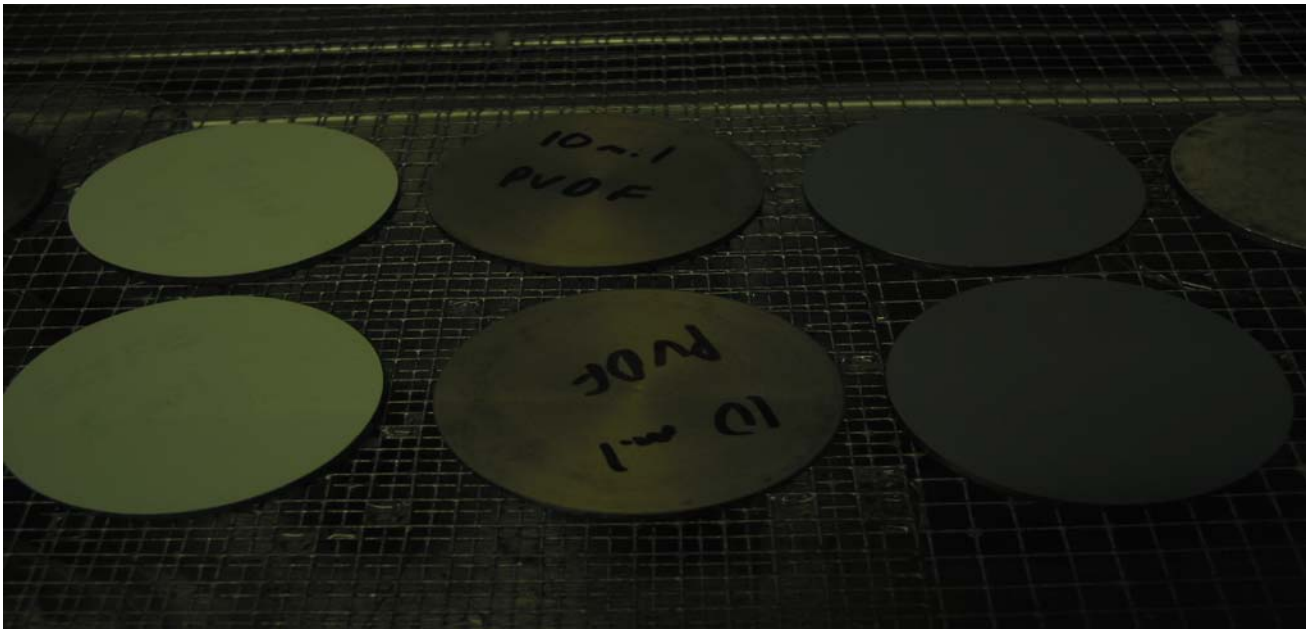
VX Chemical Contamination Survivability Photos



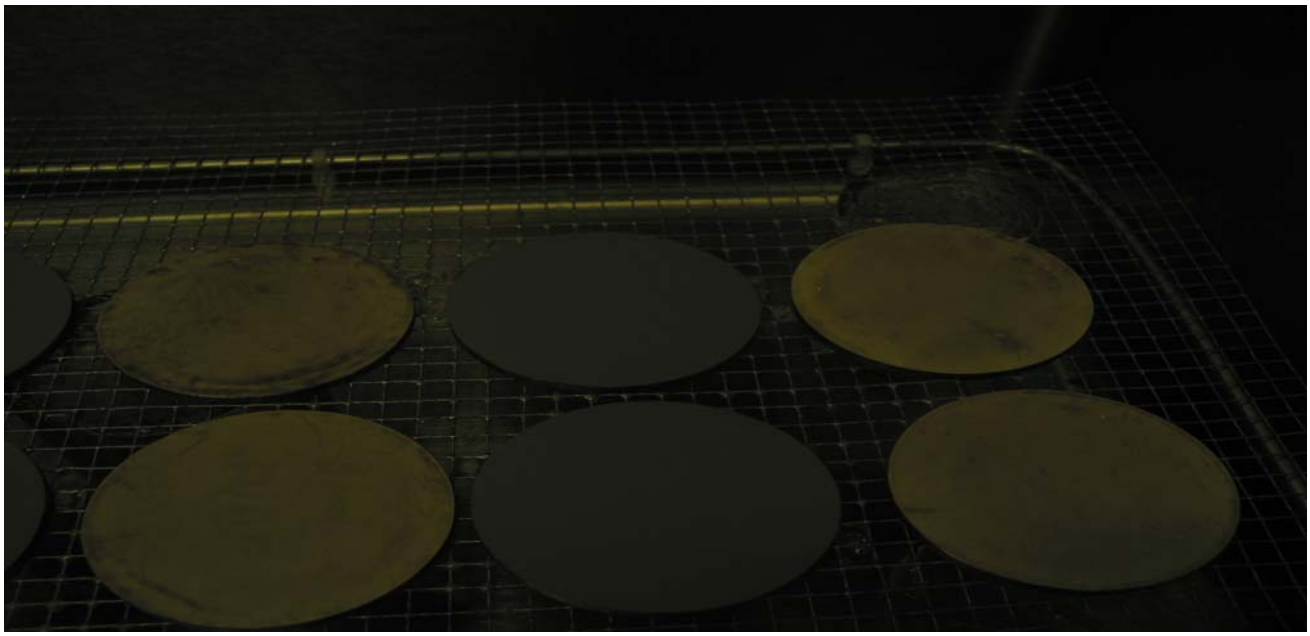
Photos 13 – Pretest E1-F1-E2



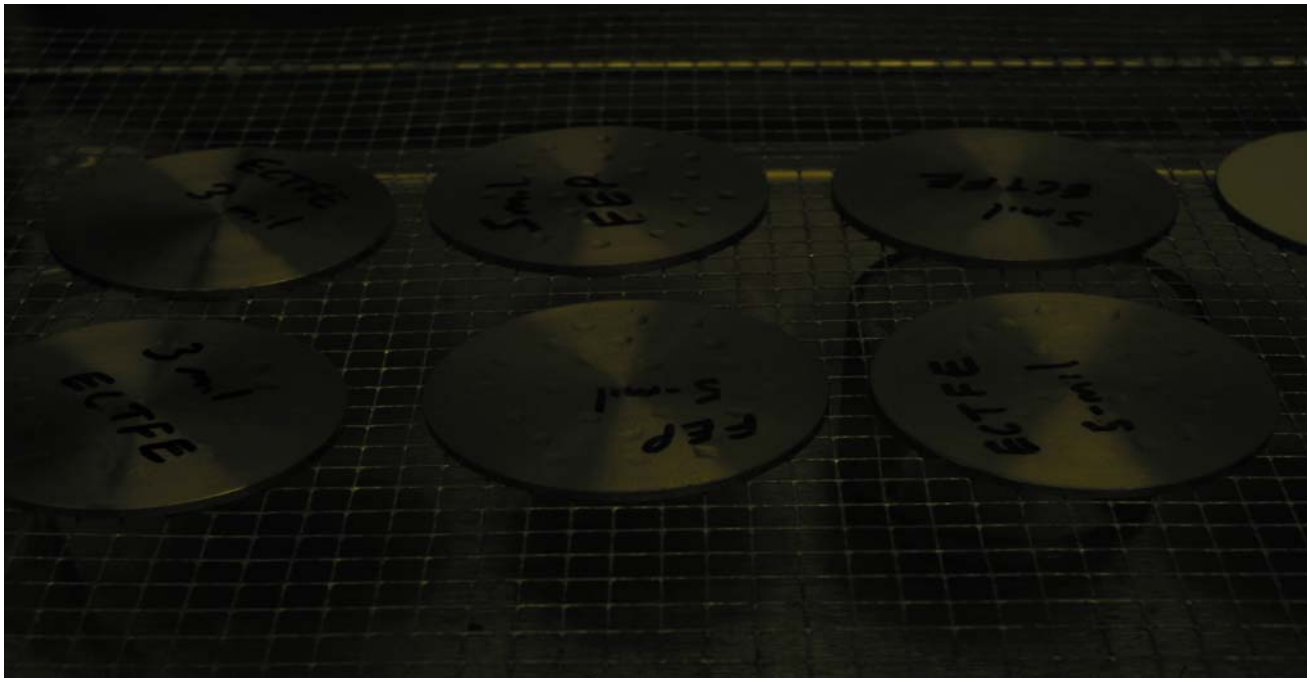
Photos 14 – Pretest F2-E3-PV1



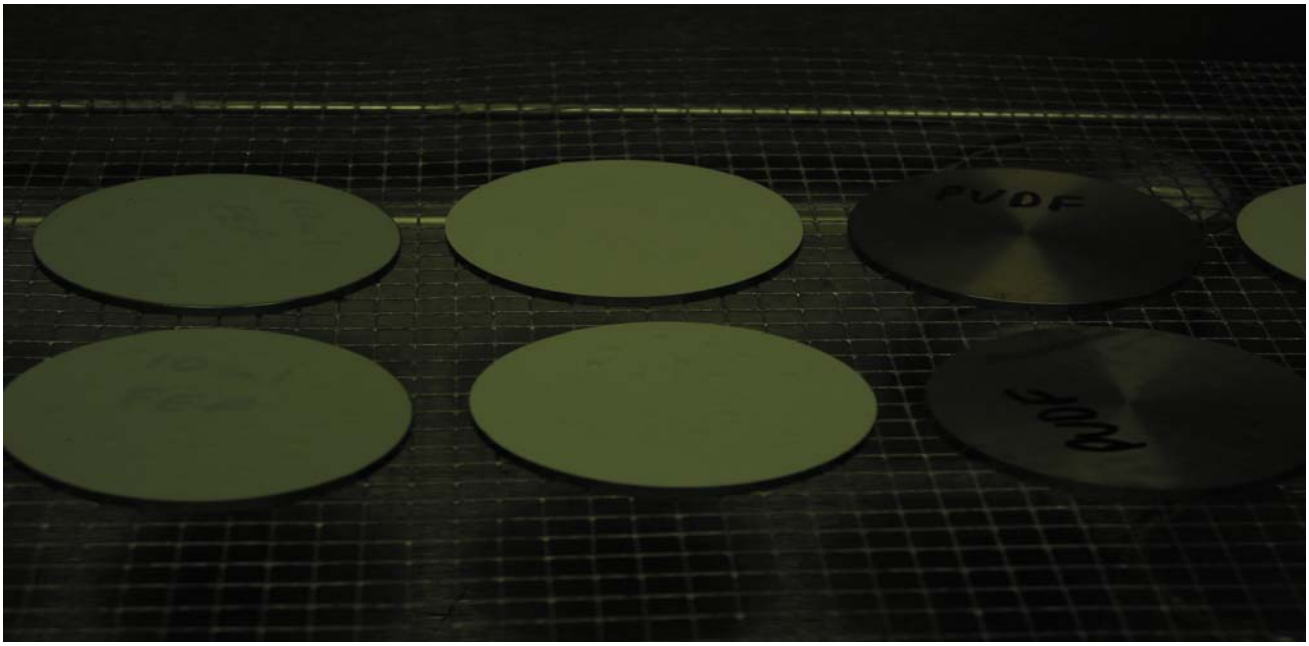
Photos 15 – Pretest E4-PV2-E5



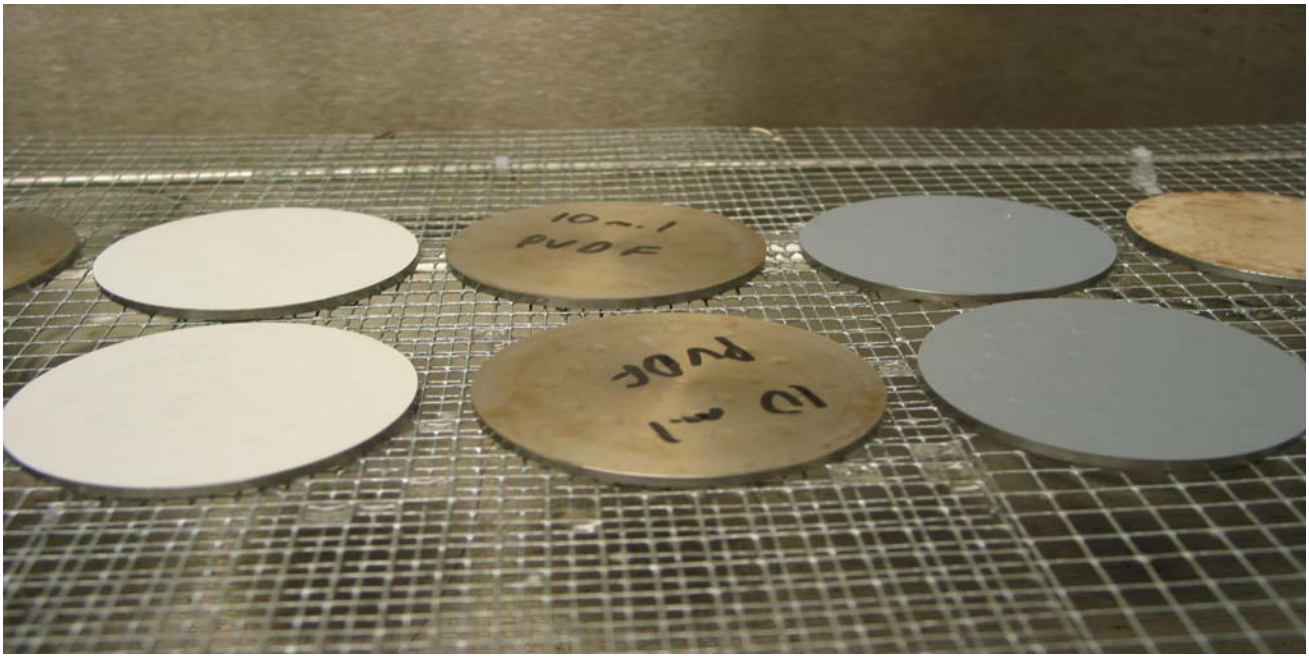
Photos 16 – Pretest PV3-E6-PV4



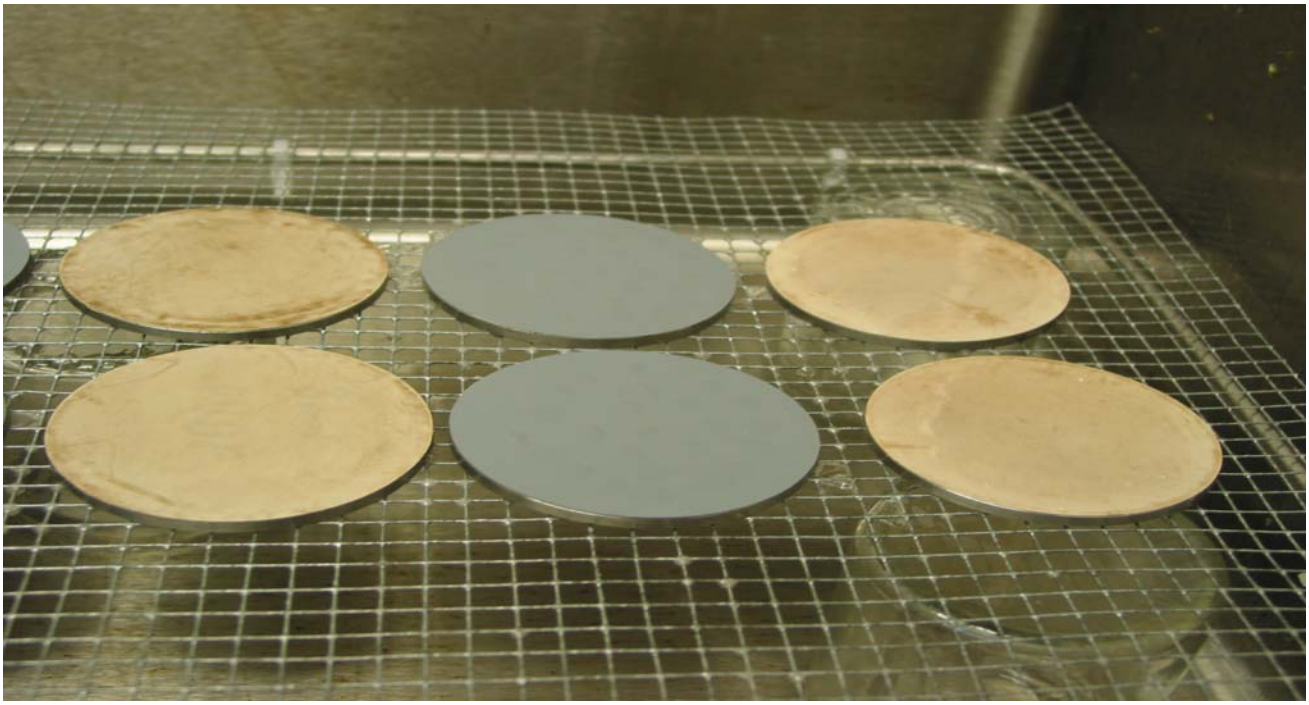
Photos 17 – VX contamination E1-F1-E2



Photos 18 – VX contamination F2-E3-PV1

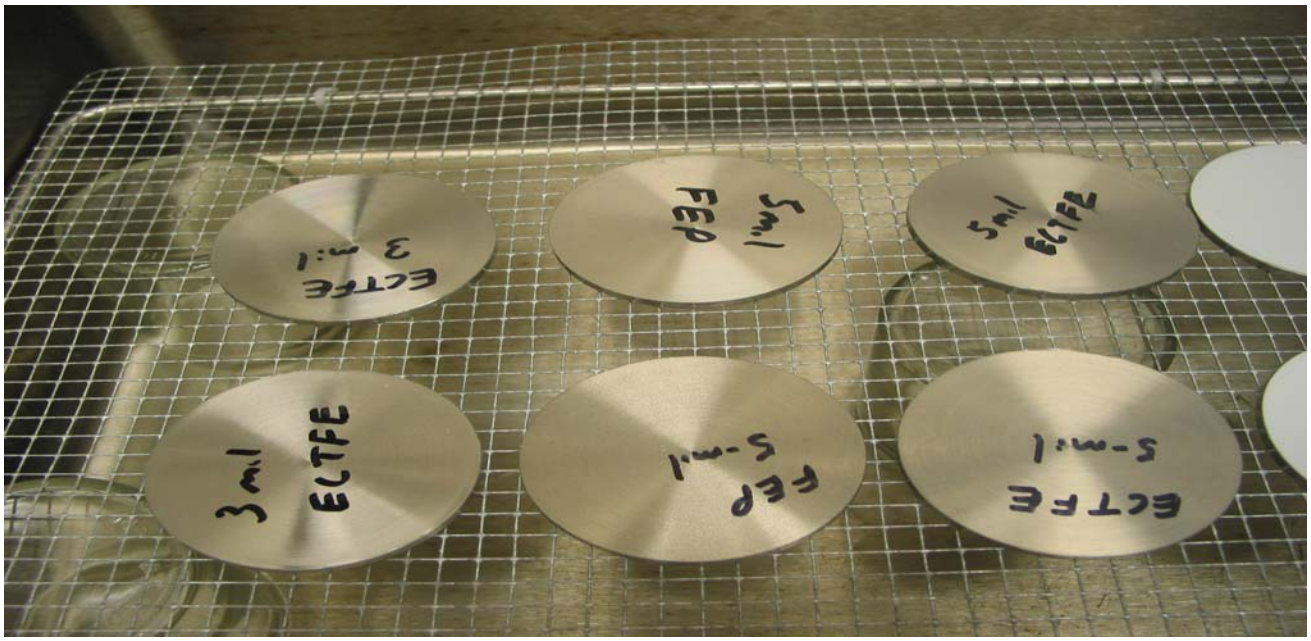


Photos 19 – VX contamination E4-PV2-E5

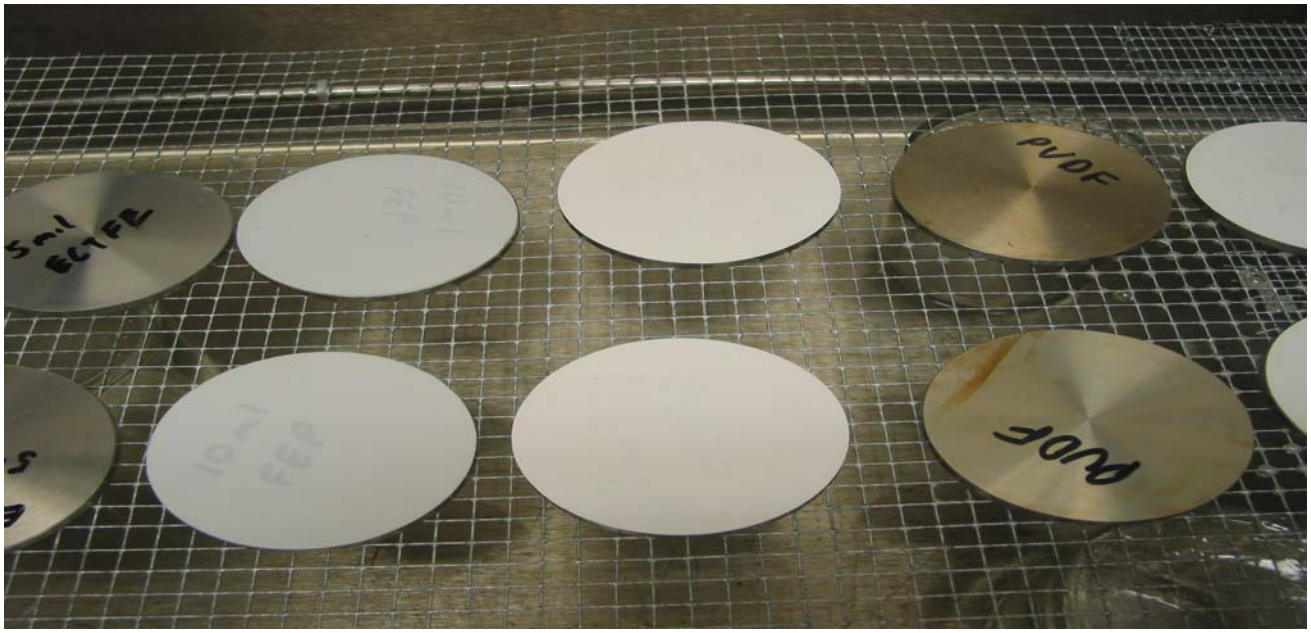


Photos 20 – VX contamination PV3-E6-PV4

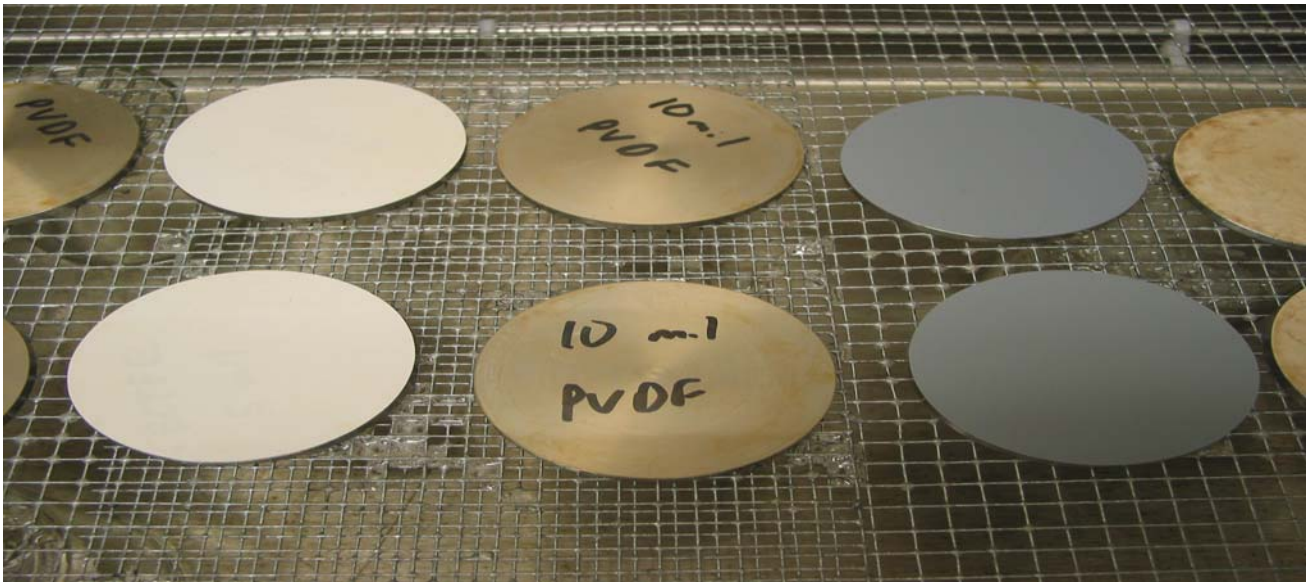
TGD Chemical Contamination Survivability Photos



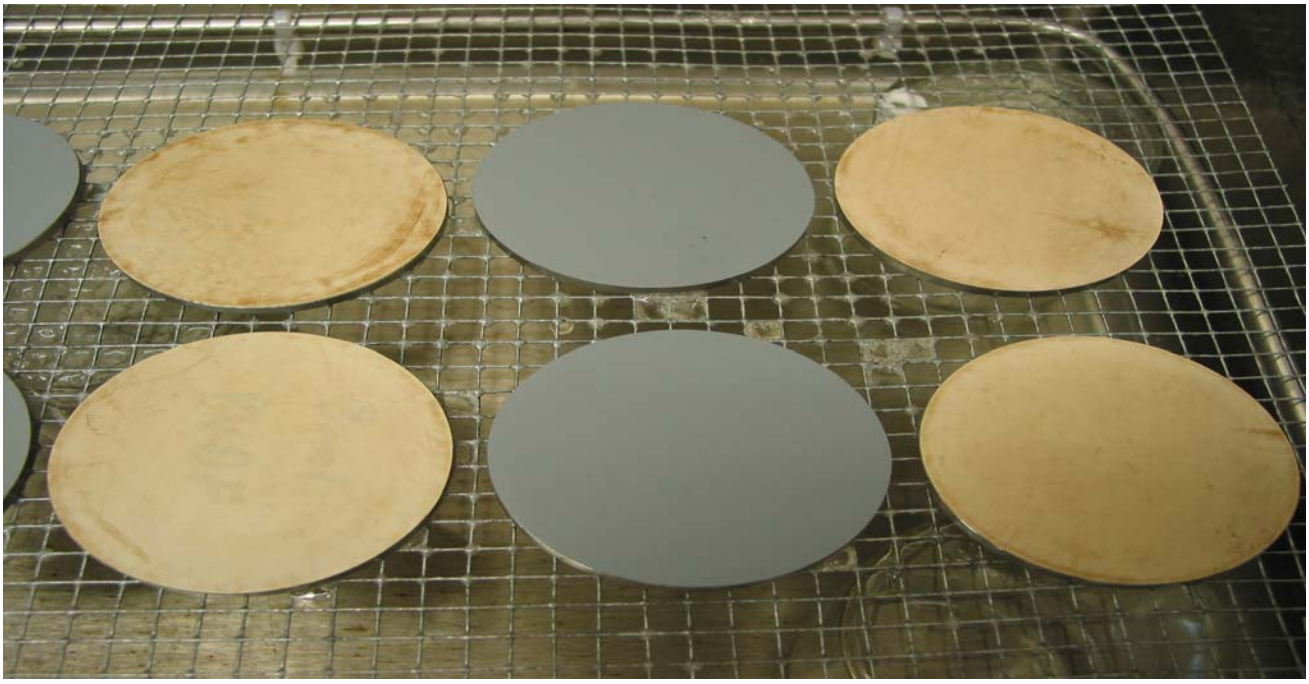
Photos 21 – Pretest E1-F1-E2



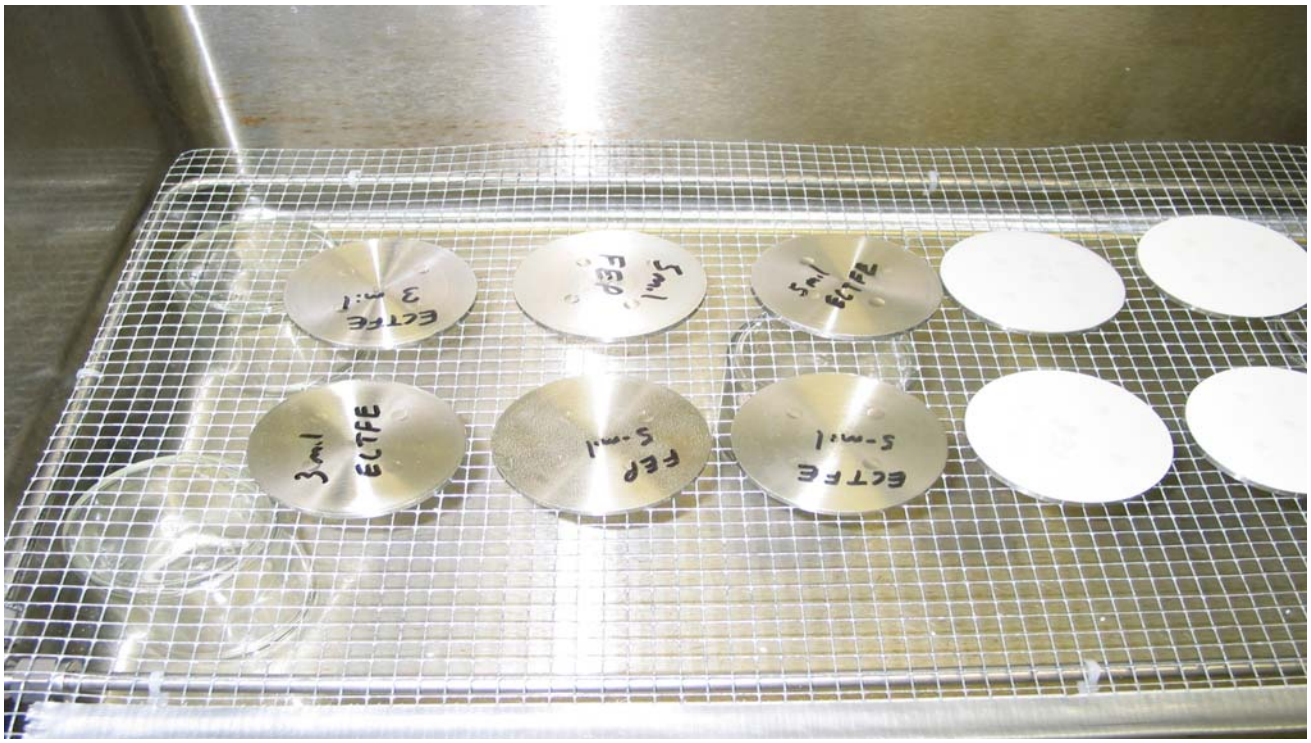
Photos 22 – Pretest F2-E3-PV1



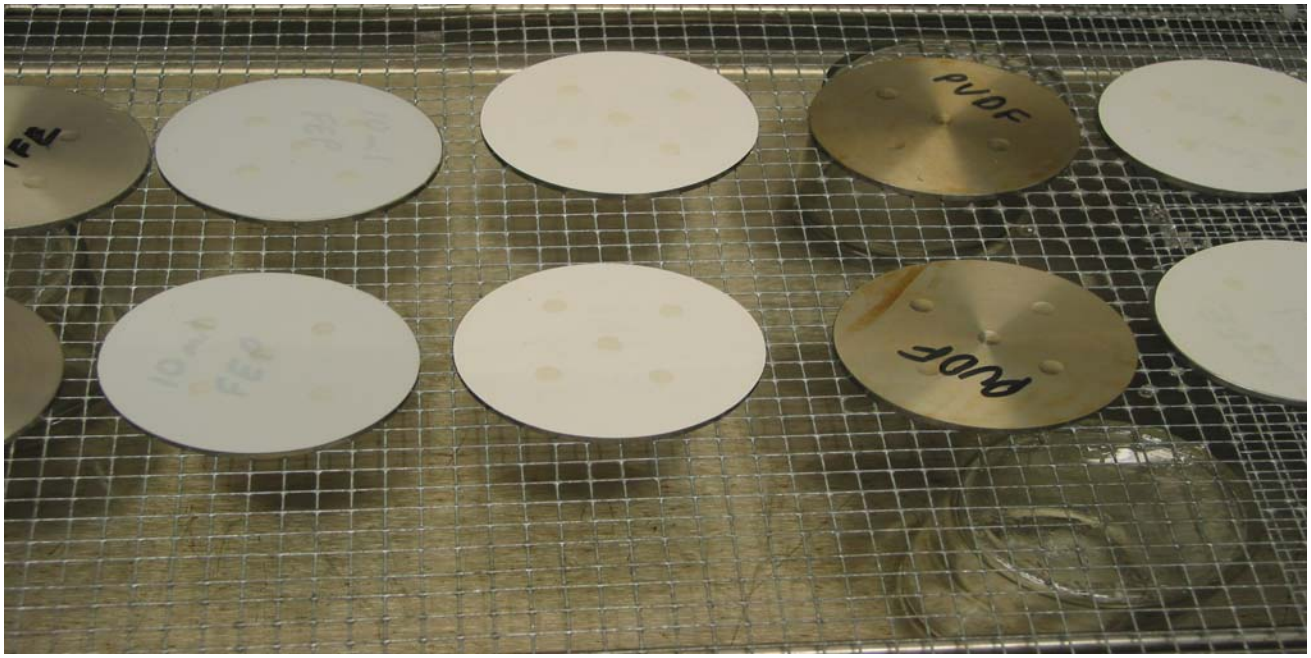
Photos 23 – Pretest E4-PV2-E5



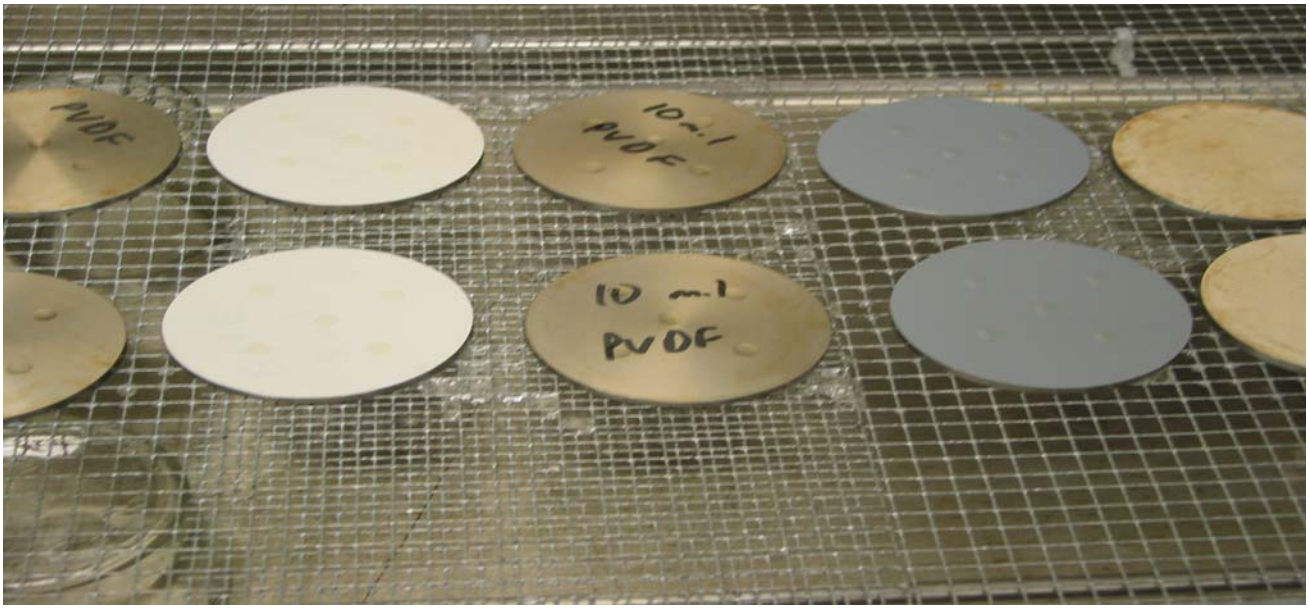
Photos 24 – Pretest PV3-E6-PV4



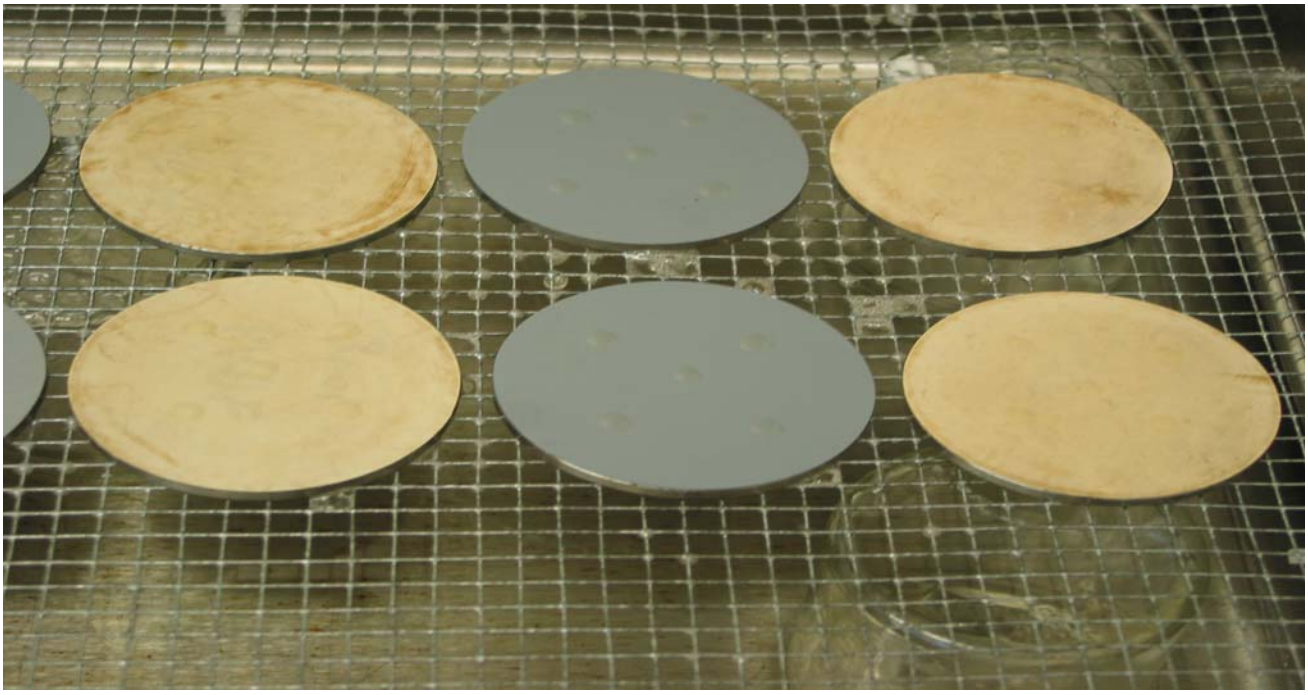
Photos 25 – TGD contamination E1-F1-E2



Photos 26 – TGD contamination F2-E3-PV1



Photos 27 – TGD contamination E4-PV2-E5



Photos 28 – TGD contamination PV3-E6-PV4

APPENDIX E – CHEMICAL AGENT RESISTANCE TEST RAW DATA TABLES

Integument Technologies, Inc.

Test Date: 16 January 2006

Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: Clear 3mil ECTFE, E1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	23.8	0.05	0.22	0.05	0.27
1.08	39.3	0.36	0.22	0.06	4.13
2.08	17.5	0.36	0.22	0.02	5.15
3.08	11.3	0.36	0.22	0.01	5.68
4.08	8.65	0.36	0.22	0.01	6.04
5.08	7.22	0.36	0.22	0.005	6.33
6.08	6.10	0.36	0.22	0.004	6.57
7.08	5.31	0.36	0.22	0.003	6.77
8.08	4.88	0.35	0.22	0.003	6.96
9.08	4.20	0.36	0.22	0.003	7.13
10.08	3.92	0.36	0.22	0.002	7.27
11.08	3.57	0.35	0.22	0.002	7.41
12.08	3.26	0.36	0.22	0.002	7.53
13.08	3.14	0.35	0.22	0.002	7.65
14.08	2.78	0.36	0.22	0.002	7.76
15.08	2.71	0.35	0.22	0.002	7.86
16.08	2.44	0.35	0.22	0.002	7.96
17.08	2.24	0.35	0.22	0.001	8.04
18.08	2.16	0.35	0.22	0.001	8.12
19.08	2.03	0.35	0.22	0.001	8.20
20.08	1.93	0.36	0.22	0.001	8.27
21.08	1.93	0.35	0.22	0.001	8.34
22.08	1.78	0.35	0.22	0.001	8.41
23.08	1.66	0.35	0.22	0.001	8.47
24.08	1.58	0.35	0.22	0.001	8.54

Integument Technologies, Inc.

Test Date: 16 January 2006

Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: Clear 5mil ECTFE, E2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	4.46	0.05	0.22	0.01	0.05
1.08	12.3	0.36	0.22	0.01	0.87
2.08	7.06	0.36	0.22	0.01	1.22
3.08	5.17	0.36	0.22	0.004	1.45
4.08	4.25	0.36	0.22	0.003	1.62
5.08	3.49	0.36	0.22	0.002	1.76
6.08	3.05	0.36	0.22	0.002	1.88
7.08	2.83	0.36	0.22	0.002	1.98
8.08	2.28	0.36	0.22	0.002	2.08
9.08	2.11	0.35	0.22	0.001	2.16
10.08	2.02	0.35	0.22	0.001	2.23
11.08	1.68	0.36	0.22	0.001	2.30
12.08	1.63	0.35	0.22	0.001	2.36
13.08	1.37	0.35	0.22	0.001	2.42
14.08	1.35	0.35	0.22	0.001	2.47
15.08	1.14	0.35	0.22	0.001	2.51
16.08	1.22	0.35	0.22	0.001	2.56
17.08	0.99	0.35	0.22	0.001	2.60
18.08	0.94	0.35	0.22	0.001	2.63
19.08	0.92	0.35	0.22	0.001	2.67
20.08	1.01	0.35	0.22	0.001	2.70
21.08	0.80	0.36	0.22	0.001	2.74
22.08	0.78	0.35	0.22	0.0005	2.76
23.08	0.79	0.35	0.22	0.0005	2.79
24.08	0.67	0.35	0.22	0.0005	2.82

Integument Technologies, Inc.

Test Date: 16 January 2006

Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: White 3mil ECTFE, E3

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	57.2	0.05	0.22	0.13	0.65
1.08	80.5	0.36	0.22	0.15	9.72
2.08	34.2	0.36	0.22	0.03	11.8
3.08	19.7	0.36	0.22	0.02	12.8
4.08	14.3	0.36	0.22	0.01	13.4
5.08	11.2	0.36	0.22	0.01	13.9
6.08	9.31	0.36	0.22	0.01	14.2
7.08	7.94	0.36	0.22	0.01	14.6
8.08	7.10	0.36	0.22	0.005	14.8
9.08	6.29	0.35	0.22	0.004	15.1
10.08	5.67	0.36	0.22	0.004	15.3
11.08	5.25	0.35	0.22	0.003	15.5
12.08	4.71	0.36	0.22	0.003	15.7
13.08	4.46	0.36	0.22	0.003	15.8
14.08	4.06	0.36	0.22	0.003	16.0
15.08	3.91	0.35	0.22	0.002	16.1
16.08	3.57	0.35	0.22	0.002	16.3
17.08	3.40	0.35	0.22	0.002	16.4
18.08	3.22	0.35	0.22	0.002	16.5
19.08	3.02	0.35	0.22	0.002	16.6
20.08	2.94	0.36	0.22	0.002	16.8
21.08	2.82	0.35	0.22	0.002	16.9
22.08	2.68	0.35	0.22	0.002	17.0
23.08	2.64	0.35	0.22	0.002	17.1
24.08	2.47	0.35	0.22	0.002	17.2

Integument Technologies, Inc.
Test Date: 16 January 2006
Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2
Test Conditions: 25°C, 0% RH (dry nitrogen)
Sample ID: White 5mil ECTFE, E4

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	7.89	0.05	0.22	0.02	0.09
1.08	11.7	0.36	0.22	0.02	1.37
2.08	6.44	0.36	0.22	0.01	1.70
3.08	4.76	0.36	0.22	0.003	1.91
4.08	3.59	0.36	0.22	0.003	2.06
5.08	3.06	0.35	0.22	0.002	2.18
6.08	2.42	0.36	0.22	0.002	2.29
7.08	2.11	0.35	0.22	0.001	2.37
8.08	1.77	0.35	0.22	0.001	2.44
9.08	1.52	0.35	0.22	0.001	2.50
10.08	1.45	0.35	0.22	0.001	2.56
11.08	1.19	0.36	0.22	0.001	2.61
12.08	1.00	0.35	0.22	0.001	2.65
13.08	0.94	0.36	0.22	0.001	2.68
14.08	0.88	0.35	0.22	0.001	2.72
15.08	0.70	0.35	0.22	0.0005	2.75
16.08	0.70	0.35	0.22	0.0004	2.77
17.08	0.63	0.35	0.22	0.0004	2.80
18.08	0.58	0.35	0.22	0.0004	2.82
19.08	0.44	0.35	0.22	0.0003	2.84
20.08	0.57	0.35	0.22	0.0003	2.86
21.08	0.50	0.35	0.22	0.0003	2.88
22.08	0.50	0.35	0.22	0.0003	2.90
23.08	0.50	0.35	0.22	0.0003	2.91
24.08	0.50	0.35	0.22	0.0003	2.93

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Test Date: 16 January 2006
Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2
Test Conditions: 25°C, 0% RH (dry nitrogen)
Sample ID: Gray 3mil ECTFE, E5

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	7.01	0.05	0.21	0.02	0.08
1.08	10.5	0.36	0.21	0.02	1.17
2.08	6.00	0.36	0.21	0.005	1.46
3.08	4.24	0.36	0.21	0.003	1.64
4.08	3.47	0.36	0.21	0.002	1.77
5.08	2.77	0.36	0.21	0.002	1.88
6.08	2.34	0.36	0.21	0.002	1.97
7.08	1.95	0.36	0.21	0.001	2.05
8.08	1.75	0.36	0.21	0.001	2.12
9.08	1.55	0.36	0.21	0.001	2.17
10.08	1.34	0.36	0.21	0.001	2.23
11.08	1.21	0.36	0.21	0.001	2.27
12.08	1.12	0.36	0.21	0.001	2.31
13.08	0.98	0.36	0.21	0.001	2.35
14.08	0.90	0.36	0.21	0.001	2.38
15.08	0.84	0.35	0.21	0.001	2.41
16.08	0.69	0.36	0.21	0.0005	2.44
17.08	0.70	0.35	0.21	0.0004	2.47
18.08	0.65	0.35	0.21	0.0004	2.49
19.08	0.63	0.36	0.21	0.0004	2.51
20.08	0.56	0.36	0.21	0.0004	2.53
21.08	0.68	0.35	0.21	0.0004	2.56
22.08	0.51	0.35	0.21	0.0004	2.58
23.08	0.50	0.35	0.21	0.0003	2.60
24.08	0.50	0.35	0.21	0.0003	2.61

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.

Test Date: 16 January 2006

Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: Gray 10mil ECTFE, E6

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	11.9	0.05	0.22	0.03	0.14
1.08	23.0	0.36	0.22	0.03	2.16
2.08	10.8	0.36	0.22	0.01	2.78
3.08	7.82	0.36	0.22	0.01	3.13
4.08	5.99	0.36	0.22	0.004	3.38
5.08	5.15	0.35	0.22	0.003	3.59
6.08	4.26	0.36	0.22	0.003	3.76
7.08	3.69	0.35	0.22	0.002	3.91
8.08	3.46	0.35	0.22	0.002	4.04
9.08	2.87	0.35	0.22	0.002	4.16
10.08	2.69	0.35	0.22	0.002	4.26
11.08	2.44	0.35	0.22	0.002	4.35
12.08	2.20	0.36	0.22	0.001	4.44
13.08	2.10	0.35	0.22	0.001	4.52
14.08	1.85	0.35	0.22	0.001	4.59
15.08	1.85	0.35	0.22	0.001	4.66
16.08	1.59	0.35	0.22	0.001	4.73
17.08	1.40	0.35	0.22	0.001	4.78
18.08	1.38	0.35	0.22	0.001	4.84
19.08	1.32	0.35	0.22	0.001	4.89
20.08	1.24	0.36	0.22	0.001	4.93
21.08	1.14	0.35	0.22	0.001	4.98
22.08	1.19	0.35	0.22	0.001	5.02
23.08	1.06	0.35	0.22	0.001	5.06
24.08	1.04	0.34	0.22	0.001	5.10

Integument Technologies, Inc.
Test Date: 16 January 2006
Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2
Test Conditions: 25°C, 0% RH (dry nitrogen)
Sample ID: Clear 5mil FEP, F1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	4.39	0.05	0.22	0.01	0.05
1.08	10.6	0.37	0.22	0.01	0.78
2.08	4.92	0.37	0.22	0.005	1.05
3.08	2.81	0.37	0.22	0.002	1.18
4.08	1.99	0.37	0.22	0.001	1.27
5.08	1.37	0.37	0.22	0.001	1.33
6.08	1.21	0.37	0.22	0.001	1.37
7.08	0.87	0.37	0.22	0.001	1.41
8.08	0.61	0.37	0.22	0.0004	1.43
9.08	0.58	0.37	0.22	0.0003	1.45
10.08	0.50	0.37	0.22	0.0003	1.47
11.08	0.50	0.37	0.22	0.0003	1.49
12.08	0.50	0.37	0.22	0.0003	1.51
13.08	0.50	0.37	0.22	0.0003	1.53
14.08	0.50	0.37	0.22	0.0003	1.54
15.08	0.50	0.37	0.22	0.0003	1.56
16.08	0.50	0.37	0.22	0.0003	1.58
17.08	0.50	0.37	0.22	0.0003	1.60
18.08	0.50	0.37	0.22	0.0003	1.61
19.08	0.50	0.37	0.22	0.0003	1.63
20.08	0.50	0.37	0.22	0.0003	1.65
21.08	0.50	0.37	0.22	0.0003	1.67
22.08	0.50	0.38	0.22	0.0003	1.68
23.08	0.50	0.38	0.22	0.0003	1.70
24.08	0.50	0.38	0.22	0.0003	1.72

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.

Test Date: 16 January 2006

Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: White 10mil FEP, F2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	8.76	0.05	0.21	0.02	0.09
1.08	19.0	0.37	0.21	0.02	1.48
2.08	10.0	0.37	0.21	0.01	1.98
3.08	7.00	0.37	0.21	0.005	2.27
4.08	4.95	0.37	0.21	0.003	2.48
5.08	4.31	0.37	0.21	0.003	2.64
6.08	3.17	0.37	0.21	0.002	2.77
7.08	2.78	0.37	0.21	0.002	2.87
8.08	2.40	0.37	0.21	0.001	2.96
9.08	1.90	0.37	0.21	0.001	3.03
10.08	1.76	0.37	0.21	0.001	3.10
11.08	1.46	0.37	0.21	0.001	3.15
12.08	1.30	0.37	0.21	0.001	3.20
13.08	1.15	0.37	0.21	0.001	3.24
14.08	1.02	0.37	0.21	0.001	3.28
15.08	1.04	0.36	0.21	0.001	3.32
16.08	0.83	0.37	0.21	0.001	3.35
17.08	0.73	0.37	0.21	0.0005	3.37
18.08	0.68	0.36	0.21	0.0004	3.40
19.08	0.64	0.37	0.21	0.0004	3.42
20.08	0.59	0.37	0.21	0.0004	3.44
21.08	0.58	0.37	0.21	0.0003	3.46
22.08	0.52	0.37	0.21	0.0003	3.48
23.08	0.53	0.37	0.21	0.0003	3.50
24.08	0.50	0.37	0.21	0.0003	3.52

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Test Date: 16 January 2006
Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2
Test Conditions: 25°C, 0% RH (dry nitrogen)
Sample ID: Clear PVDF, PV1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	12.38	0.05	0.22	0.03	0.14
1.08	24.3	0.37	0.22	0.03	2.22
2.08	13.6	0.37	0.22	0.01	2.89
3.08	9.32	0.37	0.22	0.01	3.30
4.08	7.19	0.37	0.22	0.005	3.59
5.08	5.56	0.37	0.22	0.004	3.81
6.08	4.46	0.37	0.22	0.003	3.99
7.08	3.79	0.37	0.22	0.002	4.14
8.08	3.01	0.37	0.22	0.002	4.26
9.08	2.62	0.37	0.22	0.002	4.36
10.08	2.23	0.37	0.22	0.001	4.44
11.08	1.83	0.37	0.22	0.001	4.51
12.08	1.67	0.36	0.22	0.001	4.58
13.08	1.38	0.37	0.22	0.001	4.63
14.08	1.29	0.37	0.22	0.001	4.68
15.08	1.06	0.37	0.22	0.001	4.72
16.08	0.95	0.36	0.22	0.001	4.75
17.08	0.82	0.37	0.22	0.001	4.79
18.08	0.73	0.36	0.22	0.0005	4.81
19.08	0.65	0.36	0.22	0.0004	4.84
20.08	0.63	0.37	0.22	0.0004	4.86
21.08	0.60	0.37	0.22	0.0004	4.88
22.08	0.68	0.37	0.22	0.0004	4.91
23.08	0.60	0.37	0.22	0.0004	4.93
24.08	0.50	0.37	0.22	0.0003	4.95

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.

Test Date: 16 January 2006

Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: Clear 10mil PVDF, PV2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	26.1	0.05	0.21	0.05	0.27
1.08	43.9	0.37	0.21	0.06	4.17
2.08	21.3	0.37	0.21	0.02	5.26
3.08	14.3	0.37	0.21	0.01	5.86
4.08	10.9	0.37	0.21	0.01	6.29
5.08	8.43	0.37	0.21	0.01	6.61
6.08	7.02	0.37	0.21	0.004	6.87
7.08	5.49	0.37	0.21	0.003	7.08
8.08	4.78	0.37	0.21	0.003	7.25
9.08	3.92	0.37	0.21	0.002	7.40
10.08	3.42	0.37	0.21	0.002	7.52
11.08	3.13	0.36	0.21	0.002	7.63
12.08	2.60	0.37	0.21	0.002	7.73
13.08	2.44	0.36	0.21	0.001	7.81
14.08	1.97	0.37	0.21	0.001	7.89
15.08	1.98	0.36	0.21	0.001	7.96
16.08	1.65	0.37	0.21	0.001	8.02
17.08	1.47	0.37	0.21	0.001	8.07
18.08	1.40	0.36	0.21	0.001	8.12
19.08	1.19	0.37	0.21	0.001	8.16
20.08	1.22	0.37	0.21	0.001	8.20
21.08	1.05	0.37	0.21	0.001	8.24
22.08	1.06	0.37	0.21	0.001	8.28
23.08	0.91	0.37	0.21	0.001	8.31
24.08	0.90	0.37	0.21	0.001	8.34

Integument Technologies, Inc.

Test Date: 16 January 2006

Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: White 3mil PVDF, PV3

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	34.9	0.05	0.22	0.08	0.38
1.08	61.1	0.37	0.22	0.09	5.89
2.08	27.7	0.37	0.22	0.03	7.45
3.08	19.2	0.37	0.22	0.01	8.27
4.08	14.7	0.37	0.22	0.01	8.87
5.08	11.7	0.37	0.22	0.01	9.33
6.08	9.74	0.37	0.22	0.01	9.71
7.08	8.47	0.37	0.22	0.01	10.0
8.08	7.13	0.37	0.22	0.005	10.3
9.08	6.27	0.37	0.22	0.004	10.5
10.08	5.67	0.37	0.22	0.003	10.7
11.08	4.87	0.37	0.22	0.003	10.9
12.08	4.45	0.37	0.22	0.003	11.1
13.08	3.86	0.37	0.22	0.002	11.2
14.08	3.58	0.37	0.22	0.002	11.4
15.08	3.18	0.37	0.22	0.002	11.5
16.08	3.00	0.37	0.22	0.002	11.6
17.08	2.70	0.37	0.22	0.002	11.7
18.08	2.46	0.37	0.22	0.002	11.8
19.08	2.46	0.37	0.22	0.001	11.9
20.08	2.16	0.37	0.22	0.001	12.0
21.08	2.24	0.38	0.22	0.001	12.0
22.08	2.00	0.38	0.22	0.001	12.1
23.08	1.96	0.37	0.22	0.001	12.2
24.08	1.81	0.37	0.22	0.001	12.2

Integument Technologies, Inc.

Test Date: 16 January 2006

Test Type: Mustard (HD) CARC Desorption, 50 µL/5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: White 5mil PVDF, PV4

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	20.3	0.05	0.22	0.04	0.22
1.08	34.9	0.37	0.22	0.05	3.42
2.08	18.4	0.37	0.22	0.02	4.36
3.08	12.3	0.37	0.22	0.01	4.91
4.08	9.77	0.37	0.22	0.01	5.30
5.08	7.37	0.37	0.22	0.01	5.60
6.08	6.15	0.37	0.22	0.004	5.84
7.08	4.80	0.37	0.22	0.003	6.03
8.08	4.21	0.37	0.22	0.003	6.19
9.08	3.79	0.37	0.22	0.002	6.34
10.08	3.00	0.37	0.22	0.002	6.46
11.08	2.68	0.37	0.22	0.002	6.56
12.08	2.25	0.37	0.22	0.001	6.65
13.08	2.12	0.37	0.22	0.001	6.72
14.08	1.79	0.37	0.22	0.001	6.79
15.08	1.73	0.37	0.22	0.001	6.86
16.08	1.40	0.37	0.22	0.001	6.91
17.08	1.30	0.37	0.22	0.001	6.96
18.08	1.18	0.37	0.22	0.001	7.00
19.08	1.14	0.37	0.22	0.001	7.05
20.08	1.14	0.37	0.22	0.001	7.09
21.08	1.01	0.38	0.22	0.001	7.12
22.08	0.98	0.37	0.22	0.001	7.16
23.08	0.82	0.38	0.22	0.001	7.19
24.08	0.85	0.37	0.22	0.0005	7.22

Integument Technologies, Inc.

Test Date: 18 January 2006

Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: 3mil ECTFE, E1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	6.00	0.07	0.21	0.01	0.05
1.08	4.62	0.20	0.21	0.01	0.77
2.08	6.05	0.39	0.21	0.004	1.02
3.08	4.49	0.39	0.21	0.003	1.20
4.08	3.64	0.39	0.21	0.002	1.33
5.08	3.09	0.39	0.21	0.002	1.44
6.08	2.71	0.40	0.21	0.002	1.54
7.08	2.32	0.40	0.21	0.001	1.62
8.08	2.11	0.40	0.21	0.001	1.69
9.08	1.91	0.40	0.21	0.001	1.75
10.08	1.72	0.40	0.21	0.001	1.81
11.08	1.54	0.40	0.21	0.001	1.87
12.08	1.45	0.40	0.21	0.001	1.91
13.08	1.36	0.40	0.21	0.001	1.96
14.08	1.28	0.40	0.21	0.001	2.00
15.08	1.18	0.40	0.21	0.001	2.04
16.08	1.10	0.40	0.21	0.001	2.08
17.08	1.01	0.40	0.21	0.001	2.11
18.08	0.95	0.40	0.21	0.001	2.14
19.08	0.86	0.41	0.21	0.0005	2.17
20.08	0.83	0.41	0.21	0.0004	2.20
21.08	0.78	0.41	0.21	0.0004	2.22
22.08	0.76	0.40	0.21	0.0004	2.25
23.08	0.71	0.40	0.21	0.0004	2.27
24.08	0.68	0.40	0.21	0.0004	2.29

Integument Technologies, Inc.
Test Date: 18 January 2006
Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2
Test Conditions: 25°C, 0% RH (dry nitrogen)
Sample ID: 5mil ECTFE, E2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	0.33	0.20	0.21	0.0002	0.001
1.08	0.22	0.20	0.21	0.0003	0.02
2.08	0.29	0.39	0.21	0.0002	0.03
3.08	0.24	0.39	0.21	0.0001	0.04
4.08	0.21	0.39	0.21	0.0001	0.05
5.08	0.21	0.39	0.21	0.0001	0.05
6.08	0.18	0.39	0.21	0.0001	0.06
7.08	0.15	0.40	0.21	0.0001	0.06
8.08	0.13	0.40	0.21	0.0001	0.07
9.08	0.12	0.40	0.21	0.0001	0.07
10.08	0.12	0.40	0.21	0.0001	0.08
11.08	0.11	0.40	0.21	0.0001	0.08
12.08	0.09	0.40	0.21	0.0001	0.08
13.08	0.09	0.40	0.21	0.00005	0.09
14.08	0.08	0.40	0.21	0.00004	0.09
15.08	0.07	0.40	0.21	0.00004	0.09
16.08	0.08	0.40	0.21	0.00004	0.09
17.08	0.07	0.40	0.21	0.00004	0.10
18.08	0.06	0.40	0.21	0.00003	0.10
19.08	0.06	0.41	0.21	0.00003	0.10
20.08	0.05	0.41	0.21	0.00003	0.10
21.08	0.05	0.40	0.21	0.00003	0.10
22.08	0.05	0.40	0.21	0.00003	0.11
23.08	0.05	0.40	0.21	0.00003	0.11
24.08	0.05	0.40	0.21	0.00003	0.11

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.
Test Date: 18 January 2006
Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2
Test Conditions: 25°C, 0% RH (dry nitrogen)
Sample ID: 3mil ECTFE, E3

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	1.32	0.20	0.21	0.001	0.004
1.08	0.67	0.20	0.21	0.001	0.07
2.08	0.79	0.39	0.21	0.001	0.10
3.08	0.55	0.39	0.21	0.0004	0.13
4.08	0.41	0.39	0.21	0.0003	0.14
5.08	0.32	0.40	0.21	0.0002	0.15
6.08	0.26	0.40	0.21	0.0002	0.16
7.08	0.22	0.40	0.21	0.0001	0.17
8.08	0.19	0.40	0.21	0.0001	0.18
9.08	0.16	0.40	0.21	0.0001	0.18
10.08	0.14	0.40	0.21	0.0001	0.19
11.08	0.12	0.40	0.21	0.0001	0.19
12.08	0.11	0.40	0.21	0.0001	0.20
13.08	0.10	0.40	0.21	0.0001	0.20
14.08	0.09	0.40	0.21	0.0001	0.20
15.08	0.08	0.40	0.21	0.00005	0.20
16.08	0.07	0.41	0.21	0.00004	0.21
17.08	0.07	0.40	0.21	0.00004	0.21
18.08	0.06	0.41	0.21	0.00003	0.21
19.08	0.05	0.41	0.21	0.00003	0.21
20.08	0.05	0.41	0.21	0.00003	0.21
21.08	0.05	0.40	0.21	0.00003	0.22
22.08	0.05	0.40	0.21	0.00003	0.22
23.08	0.05	0.40	0.21	0.00003	0.22
24.08	0.05	0.40	0.21	0.00003	0.22

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.

Test Date: 18 January 2006

Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: 5mil ECTFE, E4

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	55.0	0.20	0.22	0.03	0.15
1.08	10.6	0.39	0.22	0.03	2.15
2.08	5.65	0.39	0.22	0.005	2.42
3.08	3.95	0.39	0.22	0.003	2.58
4.08	3.02	0.39	0.22	0.002	2.70
5.08	2.53	0.39	0.22	0.002	2.79
6.08	2.13	0.39	0.22	0.001	2.87
7.08	1.78	0.40	0.22	0.001	2.93
8.08	1.50	0.40	0.22	0.001	2.99
9.08	1.29	0.40	0.22	0.001	3.03
10.08	1.15	0.40	0.22	0.001	3.07
11.08	1.00	0.40	0.22	0.001	3.11
12.08	0.87	0.40	0.22	0.001	3.14
13.08	0.77	0.40	0.22	0.0004	3.16
14.08	0.67	0.40	0.22	0.0004	3.19
15.08	0.63	0.40	0.22	0.0003	3.21
16.08	0.55	0.40	0.22	0.0003	3.23
17.08	0.48	0.40	0.22	0.0003	3.24
18.08	0.44	0.40	0.22	0.0002	3.26
19.08	0.39	0.40	0.22	0.0002	3.27
20.08	0.35	0.40	0.22	0.0002	3.28
21.08	0.32	0.40	0.22	0.0002	3.29
22.08	0.28	0.40	0.22	0.0002	3.30
23.08	0.25	0.40	0.22	0.0001	3.31
24.08	0.23	0.40	0.22	0.0001	3.32

Integument Technologies, Inc.
Test Date: 18 January 2006
Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2
Test Conditions: 25°C, 0% RH (dry nitrogen)
Sample ID: 3mil ECTFE, E5

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	19.9	0.20	0.21	0.01	0.05
1.08	8.52	0.39	0.21	0.01	0.82
2.08	4.68	0.39	0.21	0.004	1.04
3.08	3.23	0.40	0.21	0.002	1.16
4.08	2.44	0.40	0.21	0.002	1.25
5.08	2.03	0.40	0.21	0.001	1.32
6.08	1.74	0.40	0.21	0.001	1.38
7.08	1.57	0.40	0.21	0.001	1.44
8.08	1.40	0.40	0.21	0.001	1.48
9.08	1.28	0.40	0.21	0.001	1.53
10.08	1.18	0.40	0.21	0.001	1.56
11.08	1.09	0.40	0.21	0.001	1.60
12.08	1.06	0.40	0.21	0.001	1.63
13.08	1.00	0.40	0.21	0.001	1.67
14.08	0.93	0.41	0.21	0.001	1.70
15.08	0.90	0.41	0.21	0.0005	1.72
16.08	0.84	0.41	0.21	0.0004	1.75
17.08	0.82	0.41	0.21	0.0004	1.78
18.08	0.77	0.41	0.21	0.0004	1.80
19.08	0.74	0.41	0.21	0.0004	1.82
20.08	0.72	0.41	0.21	0.0004	1.85
21.08	0.70	0.41	0.21	0.0004	1.87
22.08	0.67	0.41	0.21	0.0004	1.89
23.08	0.65	0.40	0.21	0.0003	1.91
24.08	0.63	0.40	0.21	0.0003	1.93

Integument Technologies, Inc.
Test Date: 18 January 2006
Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2
Test Conditions: 25°C, 0% RH (dry nitrogen)
Sample ID: 10mil ECTFE, E6

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	3.79	0.20	0.22	0.002	0.01
1.08	1.17	0.39	0.22	0.002	0.16
2.08	0.48	0.39	0.22	0.0005	0.18
3.08	0.28	0.39	0.22	0.0002	0.20
4.08	0.21	0.39	0.22	0.0001	0.20
5.08	0.16	0.39	0.22	0.0001	0.21
6.08	0.12	0.40	0.22	0.0001	0.21
7.08	0.10	0.40	0.22	0.0001	0.22
8.08	0.08	0.40	0.22	0.00005	0.22
9.08	0.07	0.40	0.22	0.00004	0.22
10.08	0.07	0.40	0.22	0.00004	0.23
11.08	0.05	0.40	0.22	0.00003	0.23
12.08	0.05	0.40	0.22	0.00003	0.23
13.08	0.05	0.40	0.22	0.00003	0.23
14.08	0.05	0.40	0.22	0.00003	0.23
15.08	0.05	0.40	0.22	0.00003	0.23
16.08	0.05	0.40	0.22	0.00003	0.24
17.08	0.05	0.40	0.22	0.00003	0.24
18.08	0.05	0.40	0.22	0.00003	0.24
19.08	0.05	0.40	0.22	0.00003	0.24
20.08	0.05	0.40	0.22	0.00003	0.24
21.08	0.05	0.40	0.22	0.00003	0.24
22.08	0.05	0.40	0.22	0.00003	0.25
23.08	0.05	0.40	0.22	0.00003	0.25
24.08	0.05	0.40	0.22	0.00003	0.25

shaded areas represent values that are less than reported, as the quantity in nanograms detected was below the instrument's lowest detectable limit

Integument Technologies, Inc.

Test Date: 18 January 2006

Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: 5mil FEP, F1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	70.2	0.19	0.22	0.04	0.20
1.08	8.65	0.19	0.22	0.04	2.83
2.08	8.16	0.38	0.22	0.01	3.26
3.08	5.08	0.38	0.22	0.004	3.49
4.08	3.58	0.38	0.22	0.002	3.63
5.08	2.62	0.39	0.22	0.002	3.74
6.08	2.03	0.39	0.22	0.001	3.81
7.08	1.66	0.38	0.22	0.001	3.88
8.08	1.34	0.39	0.22	0.001	3.93
9.08	1.10	0.39	0.22	0.001	3.97
10.08	0.93	0.39	0.22	0.001	4.00
11.08	0.82	0.39	0.22	0.0005	4.03
12.08	0.69	0.39	0.22	0.0004	4.05
13.08	0.60	0.39	0.22	0.0004	4.08
14.08	0.55	0.39	0.22	0.0003	4.10
15.08	0.48	0.39	0.22	0.0003	4.11
16.08	0.44	0.39	0.22	0.0003	4.13
17.08	0.40	0.39	0.22	0.0002	4.14
18.08	0.36	0.39	0.22	0.0002	4.15
19.08	0.36	0.39	0.22	0.0002	4.17
20.08	0.32	0.39	0.22	0.0002	4.18
21.08	0.32	0.39	0.22	0.0002	4.19
22.08	0.28	0.39	0.22	0.0002	4.20
23.08	0.28	0.38	0.22	0.0002	4.21
24.08	0.25	0.38	0.22	0.0001	4.22

Integument Technologies, Inc.

Test Date: 18 January 2006

Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: 10mil FEP, F2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	16.9	0.19	0.21	0.01	0.05
1.08	5.69	0.19	0.21	0.01	0.79
2.08	6.08	0.37	0.21	0.005	1.08
3.08	3.77	0.38	0.21	0.003	1.24
4.08	2.67	0.37	0.21	0.002	1.35
5.08	2.01	0.38	0.21	0.001	1.43
6.08	1.56	0.38	0.21	0.001	1.49
7.08	1.24	0.38	0.21	0.001	1.53
8.08	1.06	0.38	0.21	0.001	1.57
9.08	0.93	0.38	0.21	0.001	1.60
10.08	0.79	0.38	0.21	0.0005	1.63
11.08	0.67	0.38	0.21	0.0004	1.66
12.08	0.58	0.38	0.21	0.0003	1.68
13.08	0.59	0.38	0.21	0.0003	1.70
14.08	0.51	0.38	0.21	0.0003	1.71
15.08	0.46	0.38	0.21	0.0003	1.73
16.08	0.42	0.38	0.21	0.0002	1.74
17.08	0.36	0.38	0.21	0.0002	1.76
18.08	0.36	0.38	0.21	0.0002	1.77
19.08	0.33	0.38	0.21	0.0002	1.78
20.08	0.30	0.38	0.21	0.0002	1.79
21.08	0.29	0.38	0.21	0.0002	1.80
22.08	0.27	0.38	0.21	0.0002	1.81
23.08	0.27	0.38	0.21	0.0001	1.82
24.08	0.24	0.38	0.21	0.0001	1.83

Integument Technologies, Inc.

Test Date: 18 January 2006

Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: PVDF, PV1

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	26.4	0.19	0.21	0.02	0.08
1.08	12.8	0.19	0.21	0.02	1.41
2.08	15.0	0.38	0.21	0.01	2.10
3.08	10.3	0.38	0.21	0.01	2.53
4.08	7.90	0.38	0.21	0.01	2.84
5.08	6.44	0.38	0.21	0.004	3.09
6.08	5.40	0.38	0.21	0.003	3.29
7.08	4.79	0.38	0.21	0.003	3.46
8.08	4.10	0.38	0.21	0.003	3.61
9.08	3.71	0.38	0.21	0.002	3.74
10.08	3.25	0.38	0.21	0.002	3.86
11.08	3.00	0.38	0.21	0.002	3.96
12.08	2.83	0.38	0.21	0.002	4.06
13.08	2.55	0.38	0.21	0.002	4.15
14.08	2.39	0.38	0.21	0.001	4.24
15.08	2.20	0.38	0.21	0.001	4.31
16.08	2.06	0.38	0.21	0.001	4.38
17.08	1.96	0.38	0.21	0.001	4.45
18.08	1.82	0.38	0.21	0.001	4.52
19.08	1.76	0.38	0.21	0.001	4.58
20.08	1.67	0.38	0.21	0.001	4.63
21.08	1.60	0.38	0.21	0.001	4.69
22.08	1.59	0.38	0.21	0.001	4.74
23.08	1.50	0.38	0.21	0.001	4.79
24.08	1.51	0.38	0.21	0.001	4.85

Integument Technologies, Inc.

Test Date: 18 January 2006

Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: 10mil PVDF, PV2

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	154	0.19	0.21	0.09	0.44
1.08	60.7	0.37	0.21	0.10	6.57
2.08	28.5	0.37	0.21	0.03	8.08
3.08	17.2	0.37	0.21	0.01	8.85
4.08	11.8	0.37	0.21	0.01	9.34
5.08	9.03	0.38	0.21	0.01	9.69
6.08	7.17	0.38	0.21	0.005	9.96
7.08	5.83	0.38	0.21	0.004	10.2
8.08	5.06	0.38	0.21	0.003	10.4
9.08	4.37	0.38	0.21	0.003	10.5
10.08	3.90	0.38	0.21	0.002	10.7
11.08	3.40	0.38	0.21	0.002	10.8
12.08	3.08	0.38	0.21	0.002	10.9
13.08	2.89	0.38	0.21	0.002	11.0
14.08	2.59	0.38	0.21	0.002	11.1
15.08	2.45	0.38	0.21	0.001	11.2
16.08	2.27	0.38	0.21	0.001	11.2
17.08	2.09	0.38	0.21	0.001	11.3
18.08	1.93	0.38	0.21	0.001	11.4
19.08	1.80	0.38	0.21	0.001	11.4
20.08	1.65	0.38	0.21	0.001	11.5
21.08	1.69	0.38	0.21	0.001	11.5
22.08	1.52	0.38	0.21	0.001	11.6
23.08	1.49	0.38	0.21	0.001	11.6
24.08	1.37	0.38	0.21	0.001	11.7

Integument Technologies, Inc.

Test Date: 18 January 2006

Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: 3mil PVDF, PV3

Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	182	0.19	0.22	0.10	0.52
1.08	91.2	0.38	0.22	0.13	8.19
2.08	45.2	0.38	0.22	0.04	10.5
3.08	30.8	0.38	0.22	0.02	11.8
4.08	22.8	0.38	0.22	0.02	12.7
5.08	18.3	0.38	0.22	0.01	13.4
6.08	14.9	0.38	0.22	0.01	14.0
7.08	13.0	0.38	0.22	0.01	14.4
8.08	11.4	0.39	0.22	0.01	14.8
9.08	10.0	0.39	0.22	0.01	15.2
10.08	8.82	0.39	0.22	0.01	15.5
11.08	8.02	0.39	0.22	0.005	15.8
12.08	7.54	0.39	0.22	0.004	16.1
13.08	6.81	0.39	0.22	0.004	16.3
14.08	6.31	0.39	0.22	0.004	16.5
15.08	5.82	0.39	0.22	0.003	16.7
16.08	5.39	0.39	0.22	0.003	16.9
17.08	5.07	0.39	0.22	0.003	17.1
18.08	4.74	0.39	0.22	0.003	17.2
19.08	4.53	0.39	0.22	0.003	17.4
20.08	4.39	0.39	0.22	0.002	17.5
21.08	4.21	0.39	0.22	0.002	17.7
22.08	4.04	0.38	0.22	0.002	17.8
23.08	3.84	0.38	0.22	0.002	18.0
24.08	3.74	0.38	0.22	0.002	18.1

Integument Technologies, Inc.

Test Date: 18 January 2006

Test Type: Soman (GD) CARC Desorption Test, 50µL / 5cm^2

Test Conditions: 25°C, 0% RH (dry nitrogen)

Sample ID: 5mil PVDF, PV4

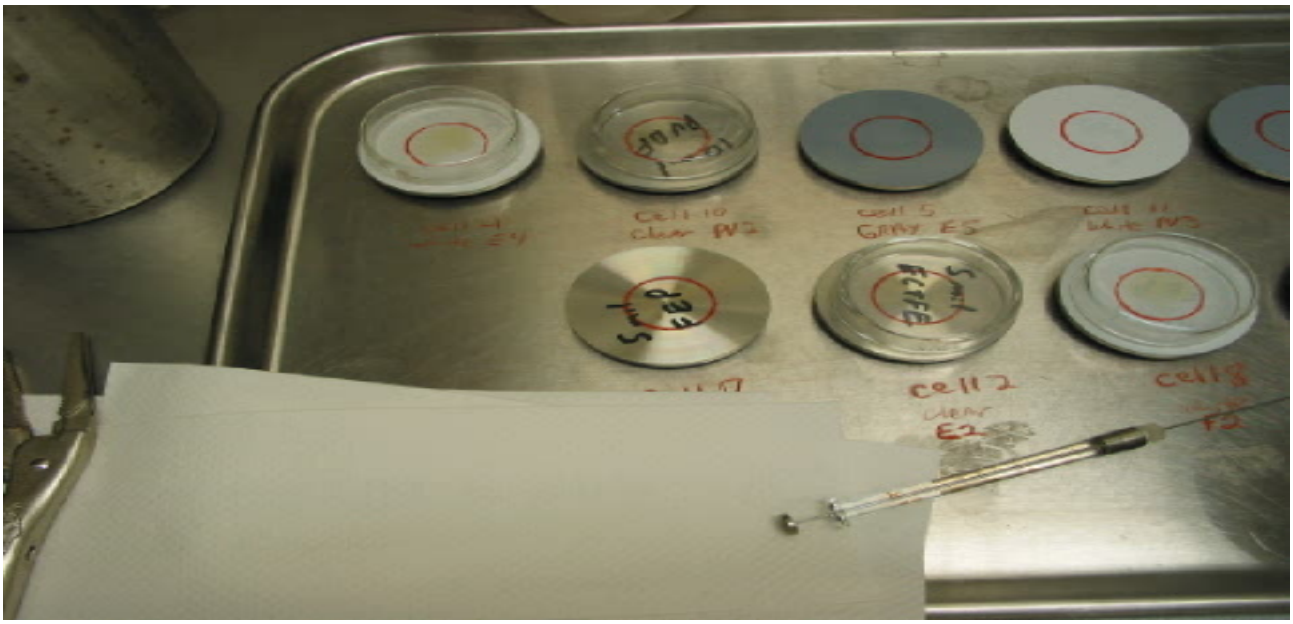
Elapsed Time [hours]	Detected Mass [nanograms]	Volume Sampled [liters]	Ventilation Rate [liters per minute]	Desorption Rate [micrograms per minute]	Cumulative Dose [micrograms per sample]
0.08	94.7	0.19	0.22	0.05	0.27
1.08	70.5	0.38	0.22	0.07	4.70
2.08	38.1	0.38	0.22	0.03	6.57
3.08	26.3	0.38	0.22	0.02	7.68
4.08	20.4	0.38	0.22	0.01	8.48
5.08	16.6	0.38	0.22	0.01	9.11
6.08	13.6	0.38	0.22	0.01	9.63
7.08	11.3	0.39	0.22	0.01	10.1
8.08	10.2	0.38	0.22	0.01	10.4
9.08	9.23	0.38	0.22	0.01	10.7
10.08	8.17	0.39	0.22	0.005	11.0
11.08	7.11	0.39	0.22	0.004	11.3
12.08	6.70	0.39	0.22	0.004	11.5
13.08	6.37	0.38	0.22	0.004	11.8
14.08	5.94	0.39	0.22	0.003	12.0
15.08	5.50	0.39	0.22	0.003	12.2
16.08	4.97	0.39	0.22	0.003	12.3
17.08	4.79	0.39	0.22	0.003	12.5
18.08	4.39	0.39	0.22	0.003	12.7
19.08	4.09	0.39	0.22	0.002	12.8
20.08	4.00	0.39	0.22	0.002	12.9
21.08	3.74	0.38	0.22	0.002	13.1
22.08	3.68	0.38	0.22	0.002	13.2
23.08	3.56	0.38	0.22	0.002	13.3
24.08	3.41	0.38	0.22	0.002	13.4

APPENDIX F – CHEMICAL AGENT RESISTANCE TEST PHOTOS

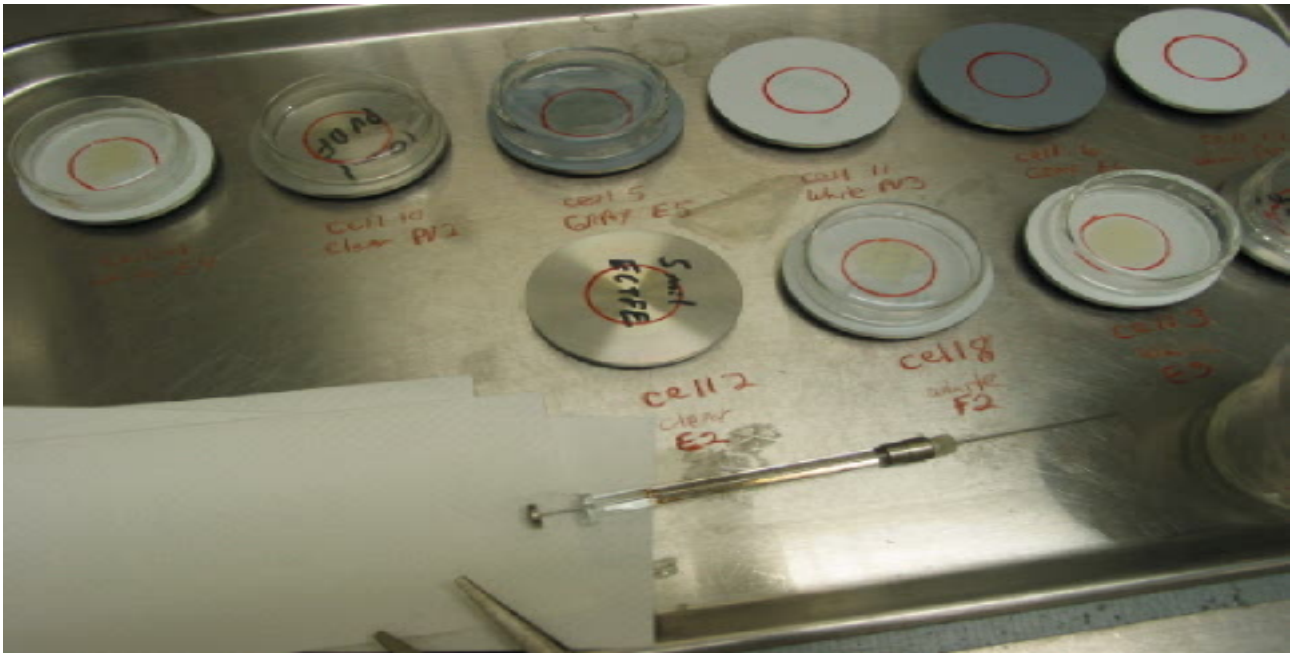
HD Chemical Resistance Photos

Photos 1 – HD contamination of E1 and F1

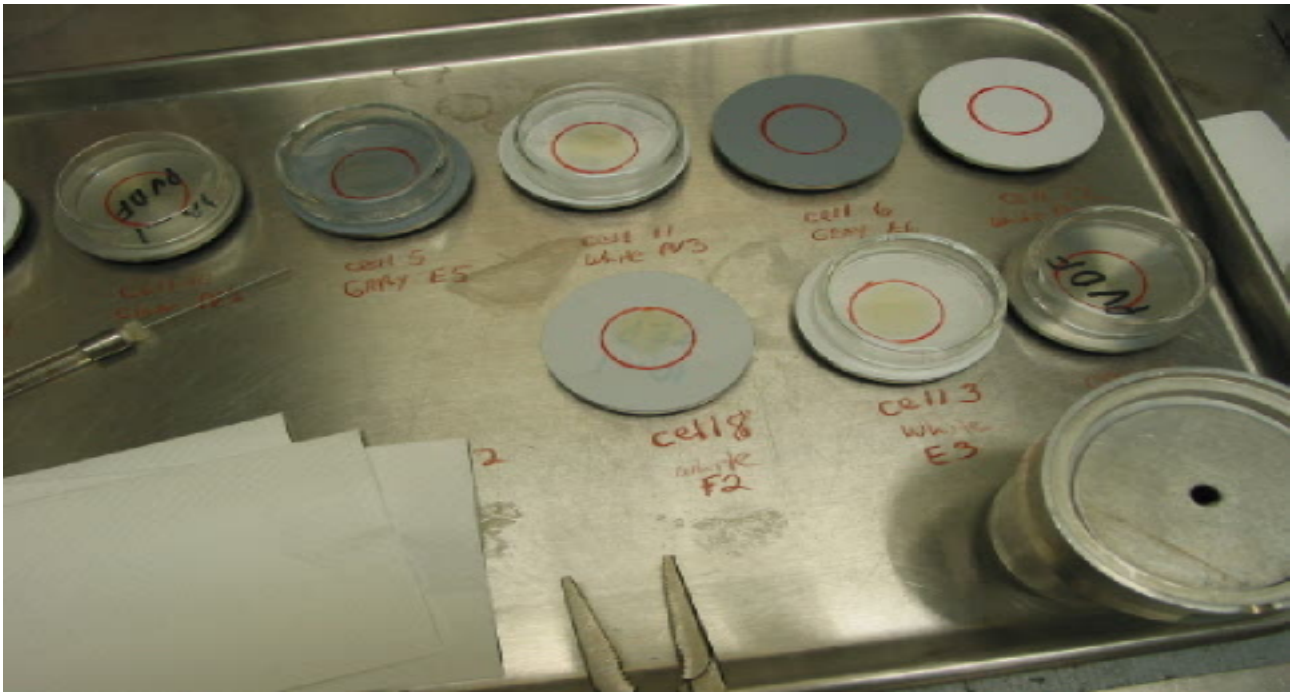
Photos 2 – Sample E1 at end of agent residence period



Photos 3 – Sample F1 at end of agent residence period



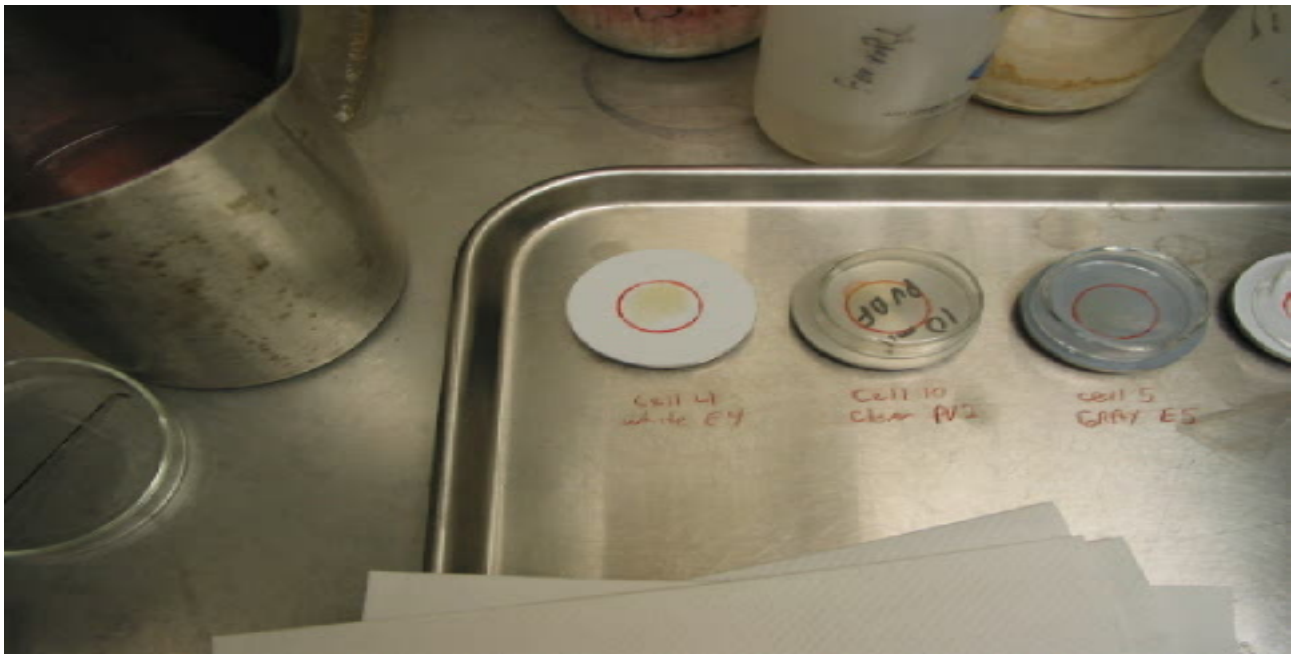
Photos 4 – Sample E2 at end of agent residence period



Photos 5 – Sample F2 at end of agent residence period

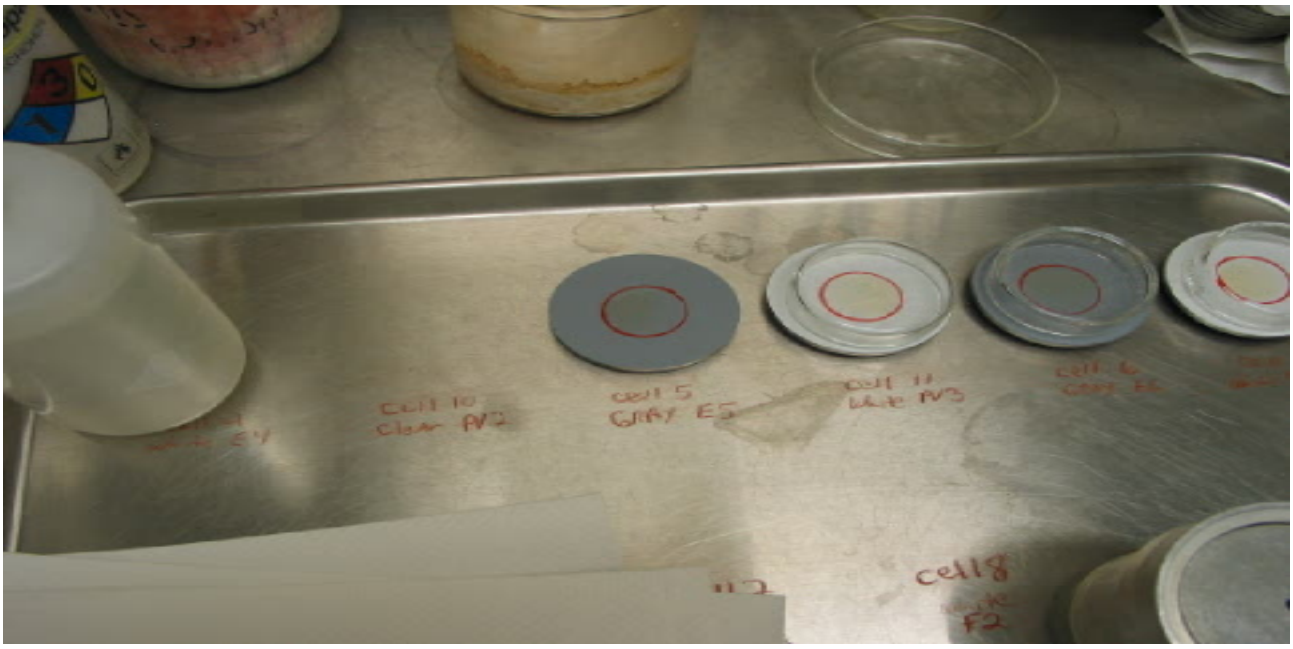
Photos 6 – Sample E3 at end of agent residence period

Photos 7 – Sample PV1 at end of agent residence period

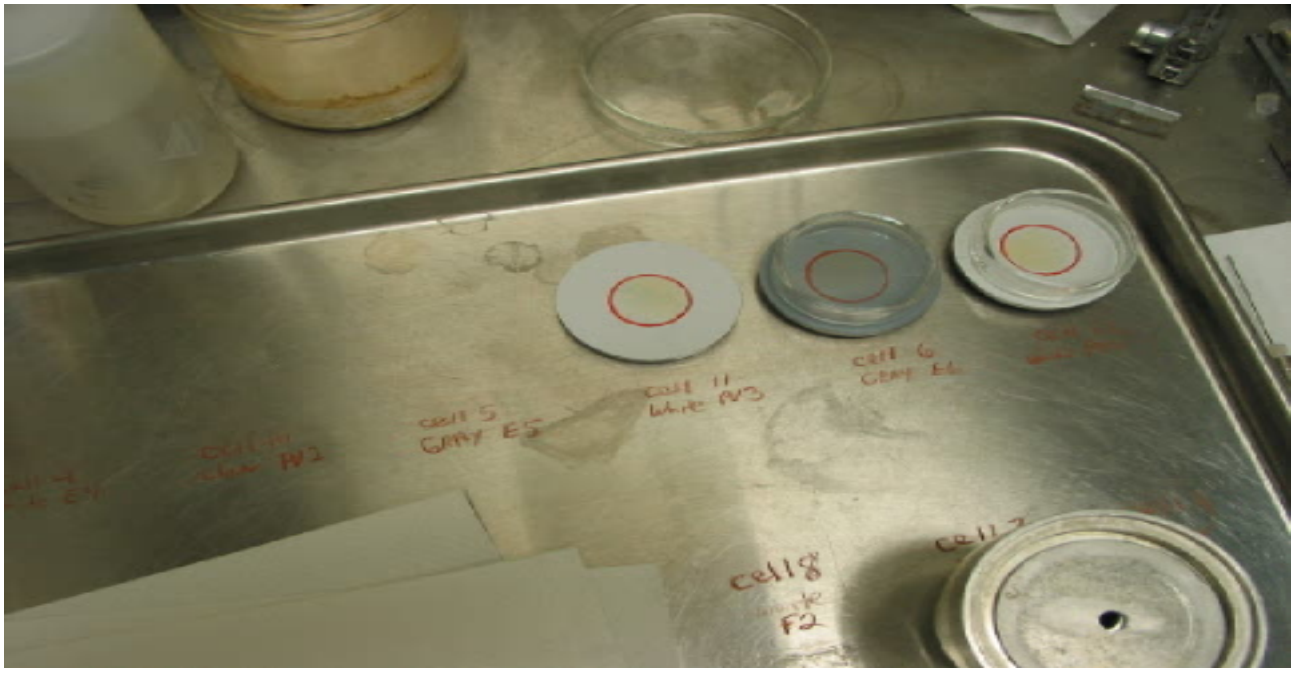


Photos 8 – Sample E4 at end of agent residence period

Photos 9 – Sample PV2 at end of agent residence period



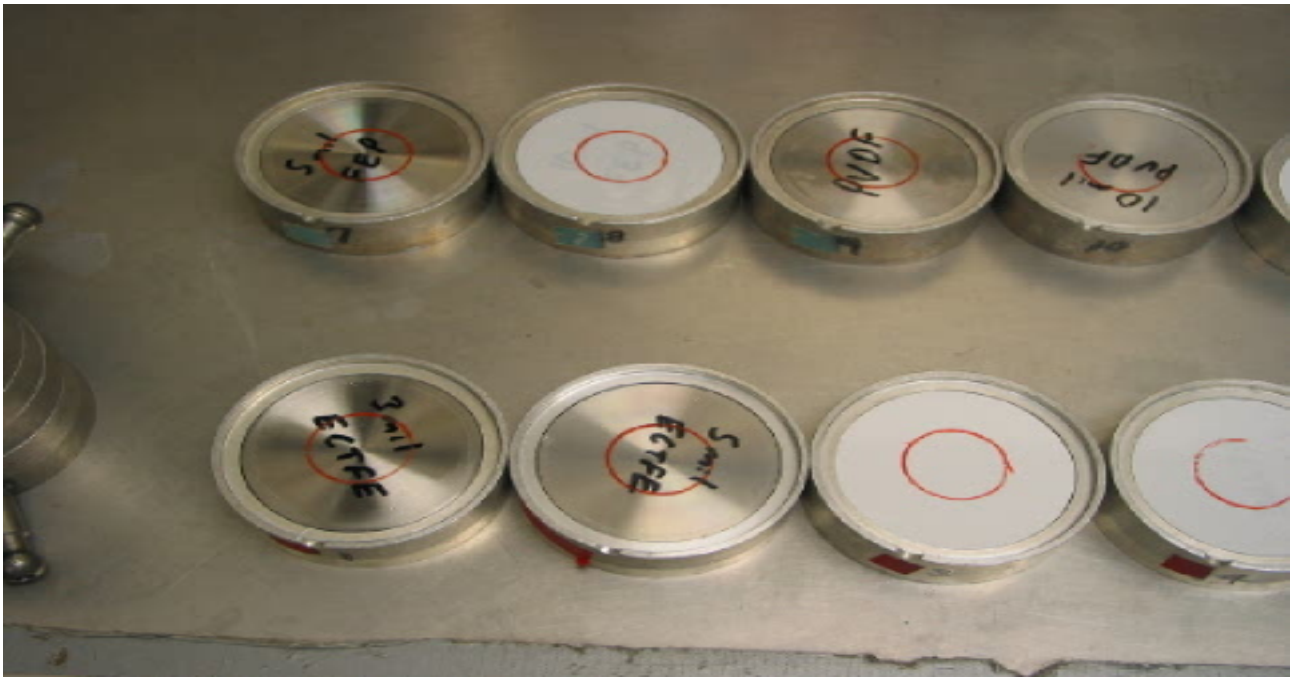
Photos 10 – Sample E5 at end of agent residence period



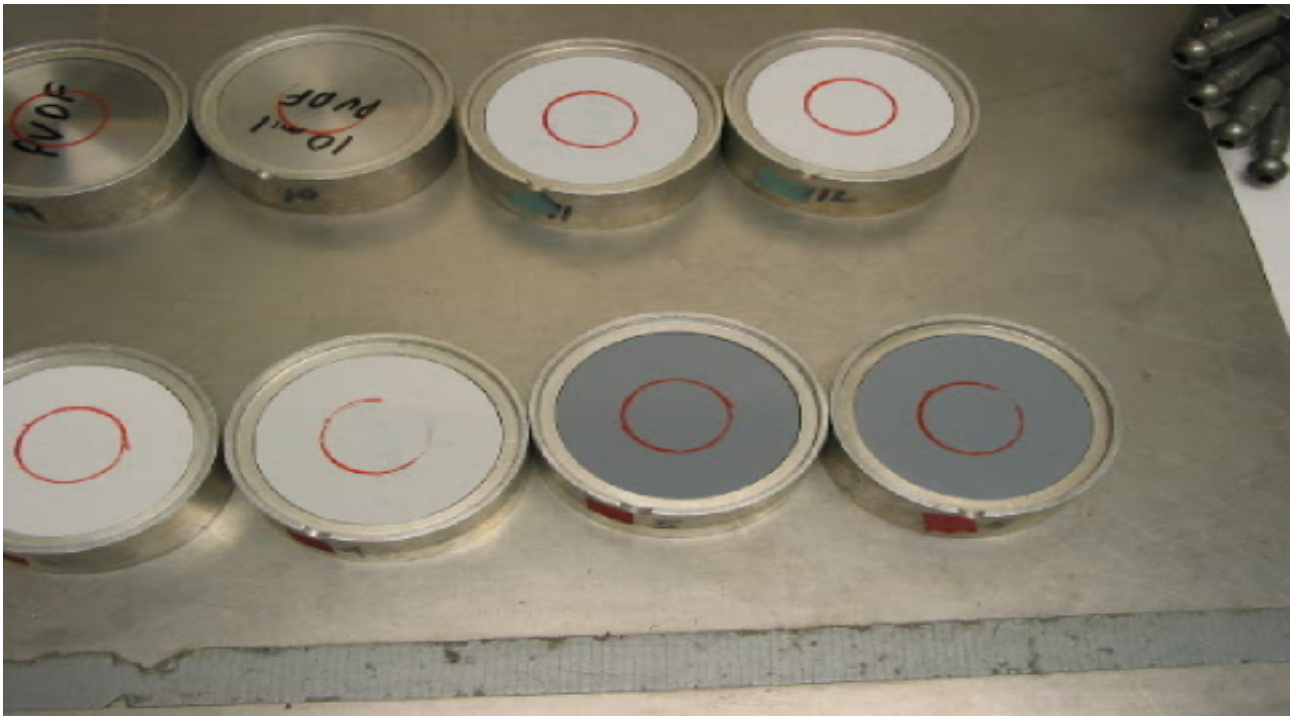
Photos 11 – Sample PV3 at end of agent residence period

Photos 12 – Sample E6 at end of agent residence period

Photos 13 – Sample PV4 at end of agent residence period

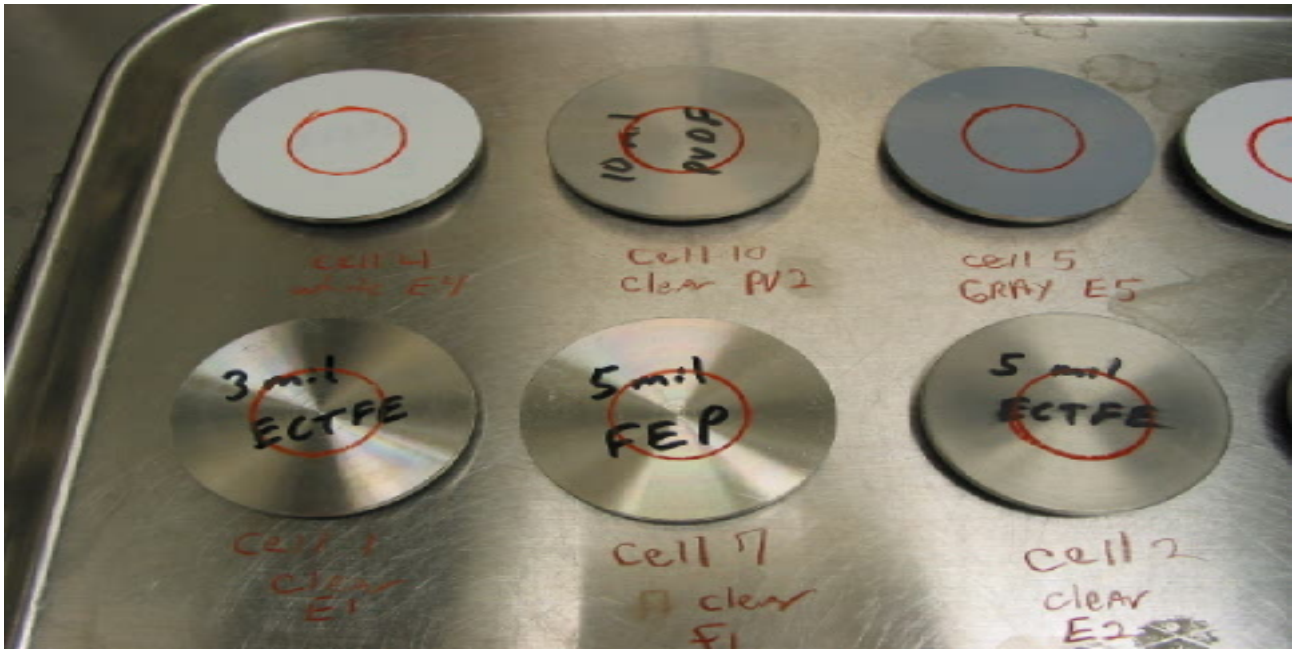


Photos 14 – Post Test: E1, E2, E3 (Front), F1, F2, PV1 (Back)

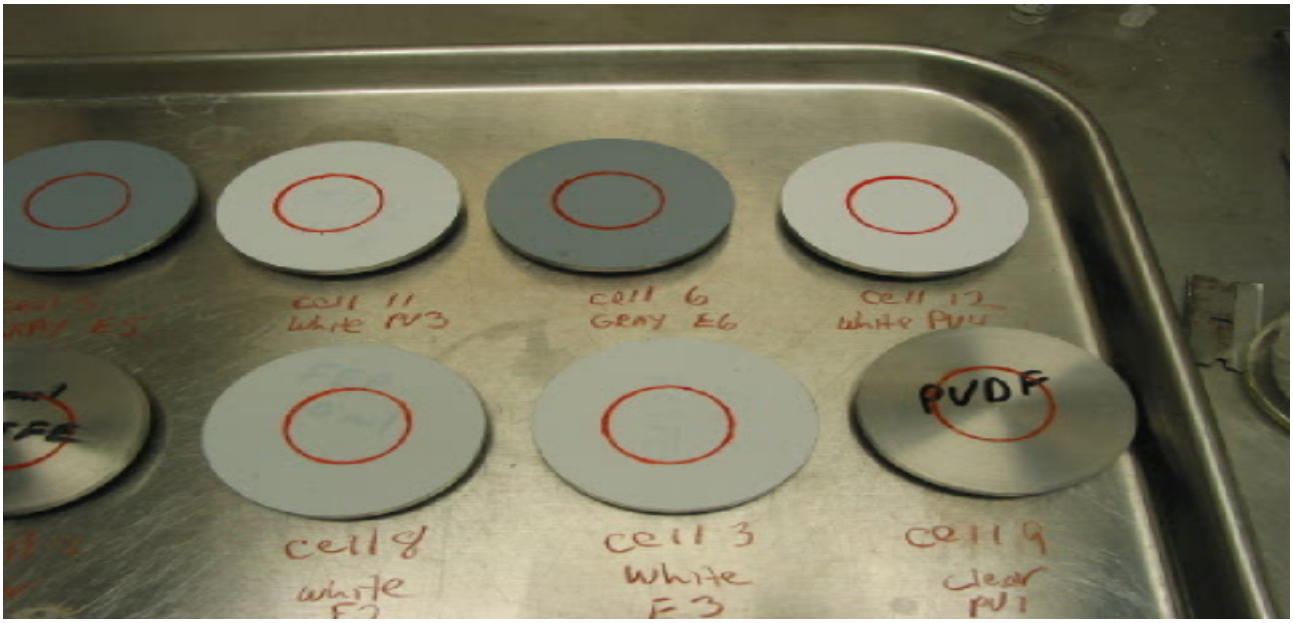


Photos 15 – Post Test: E4, E5, E6 (Front), PV2, PV3, PV4 (Back)

GD Chemical Resistance Photos



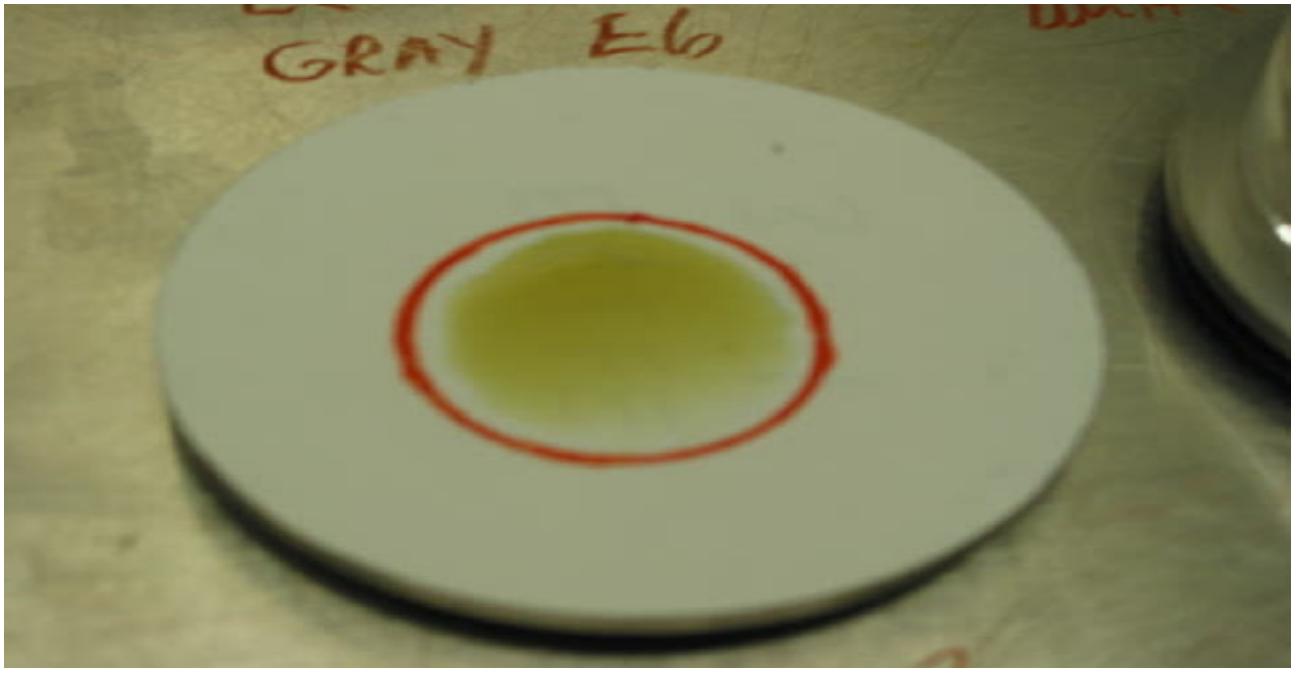
Photos 16 – Pretest photo: E1, F1, E2 (Front) – E4, PV2, E5 (Back)



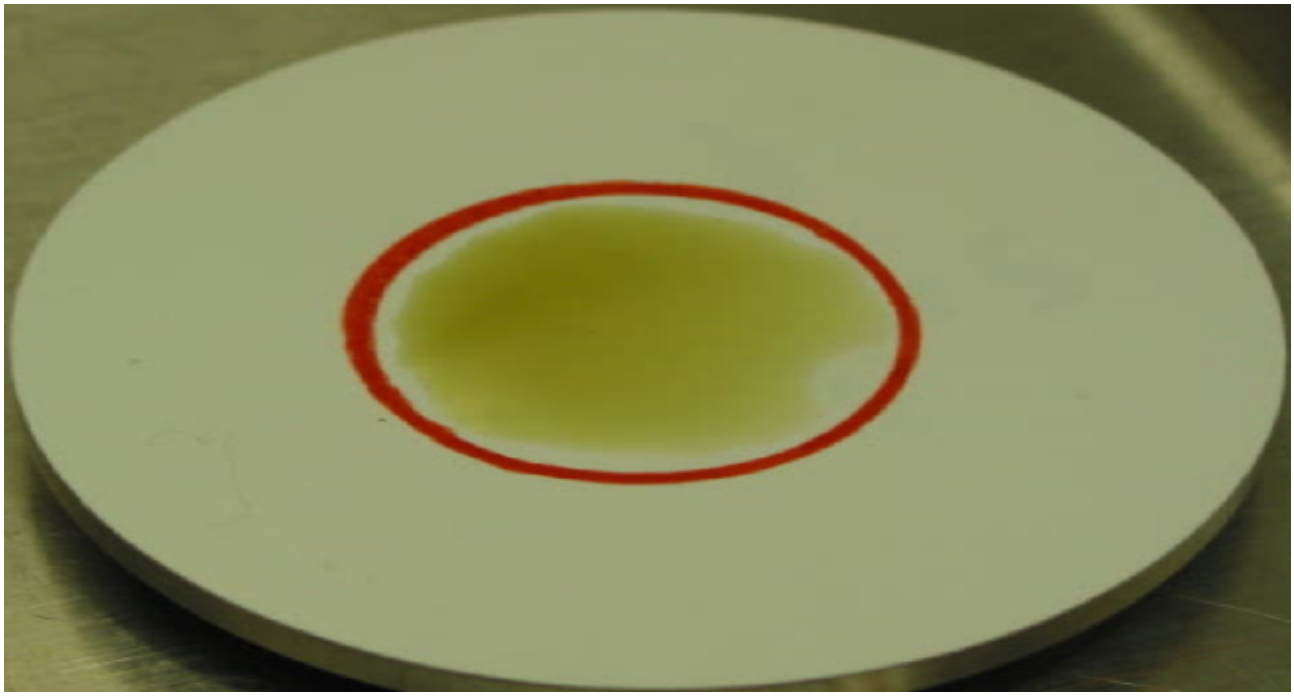
Photos 17 – Pretest photo: F2, E3, PV1 (Front) – PV3, E6, PV4 (Back)

Photos 18 – Sample E1 at end of agent residence period

Photos 19 – Sample E2 at end of agent residence period

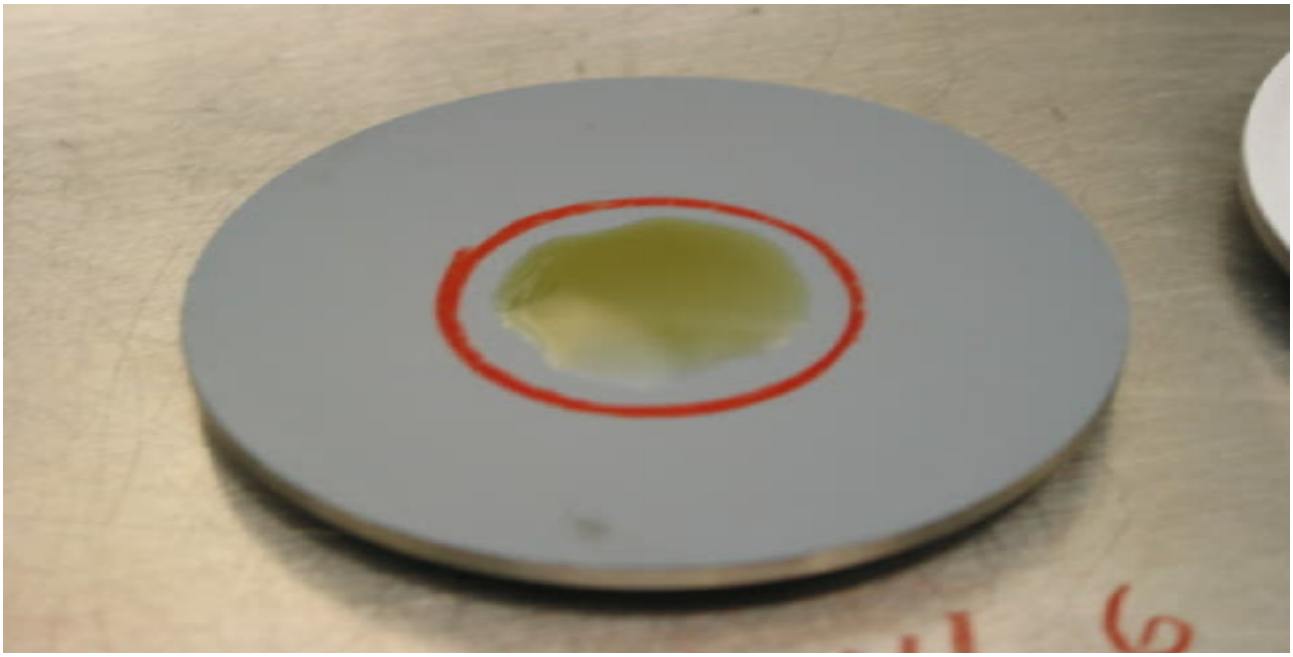


Photos 20 – Sample E3 at end of agent residence period



Photos 21 – Sample E4 at end of agent residence period

Photos 22 – Sample E5 at end of agent residence period



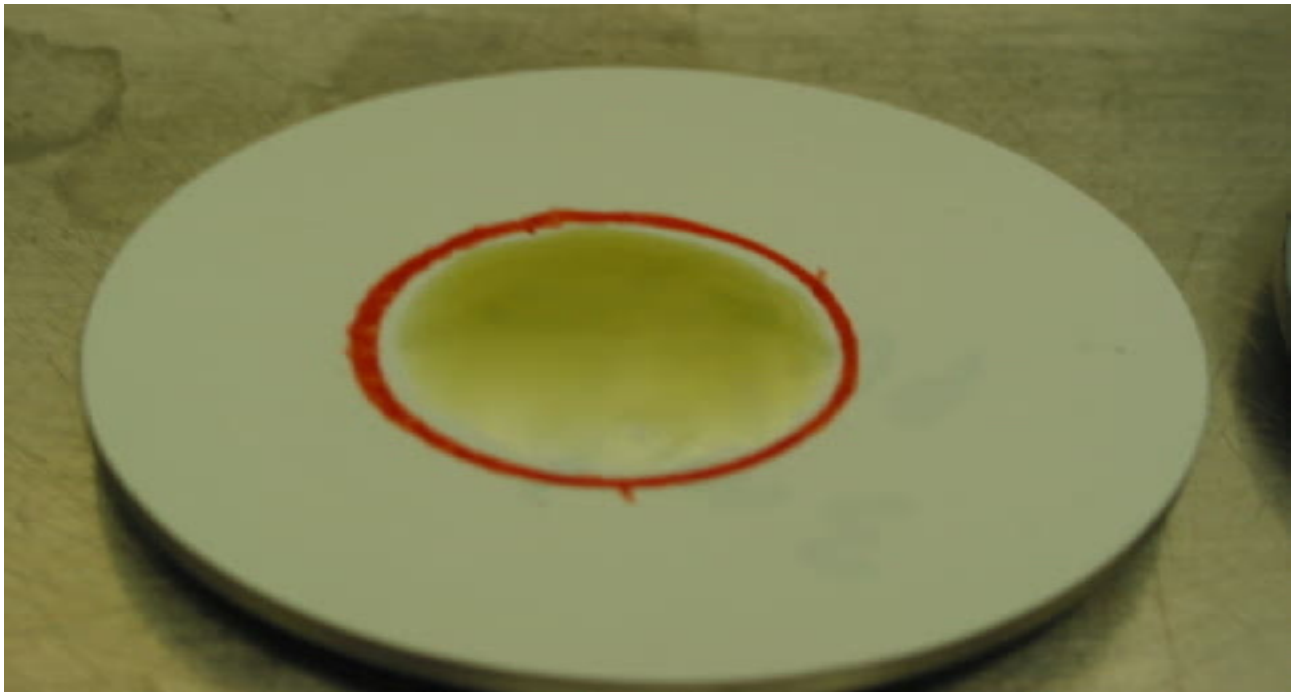
Photos 23 – Sample E6 at end of agent residence period

Photos 24 – Sample F1 at end of agent residence period

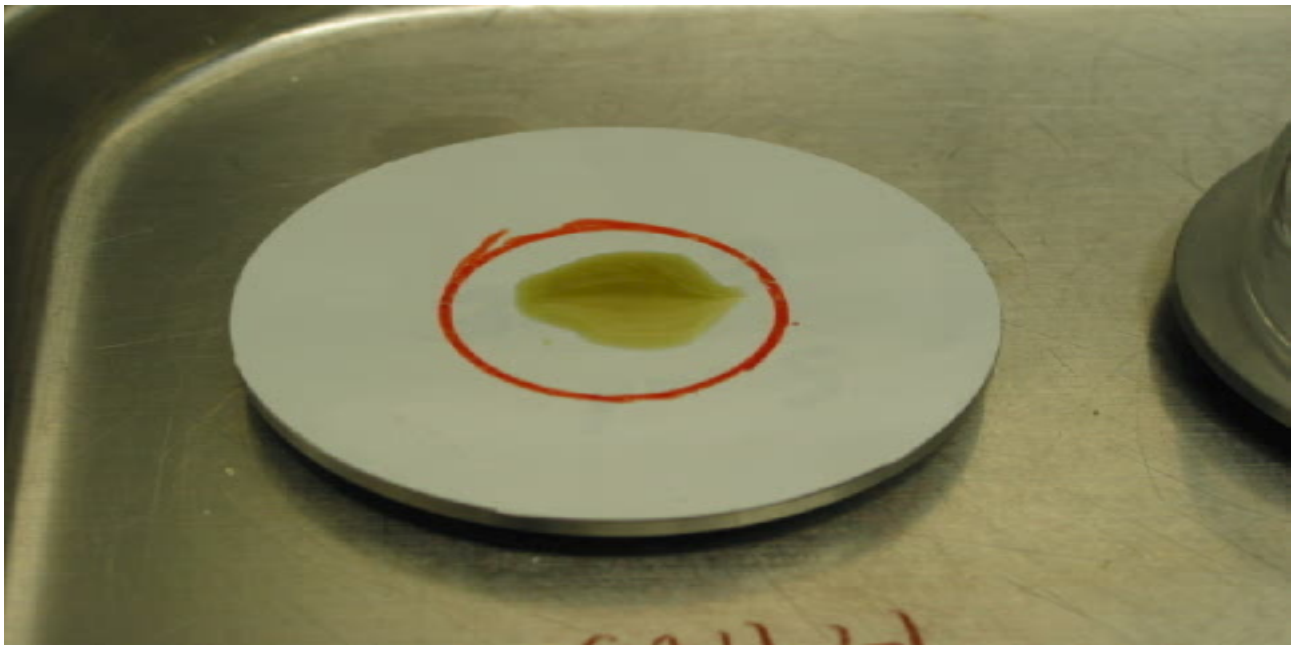
Photos 25 – Sample F2 at end of agent residence period

Photos 26 – Sample PV1 at end of agent residence period

Photos 27 – Sample PV2 at end of agent residence period

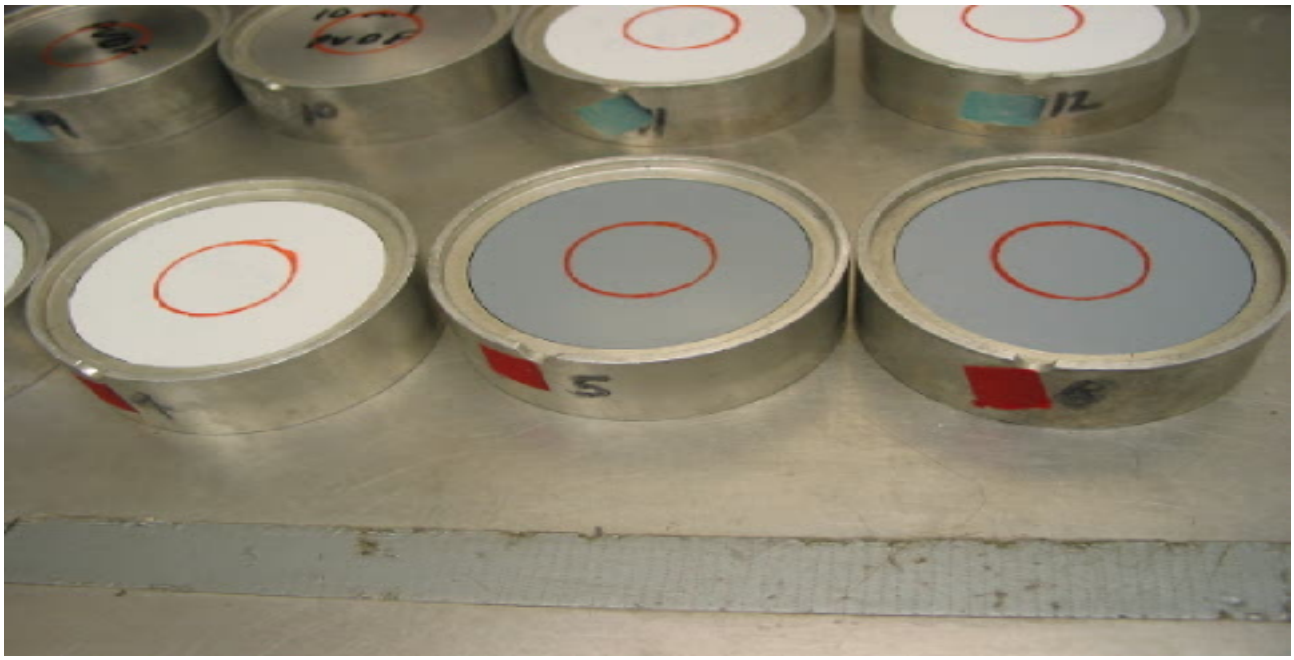


Photos 28 – Sample PV3 at end of agent residence period

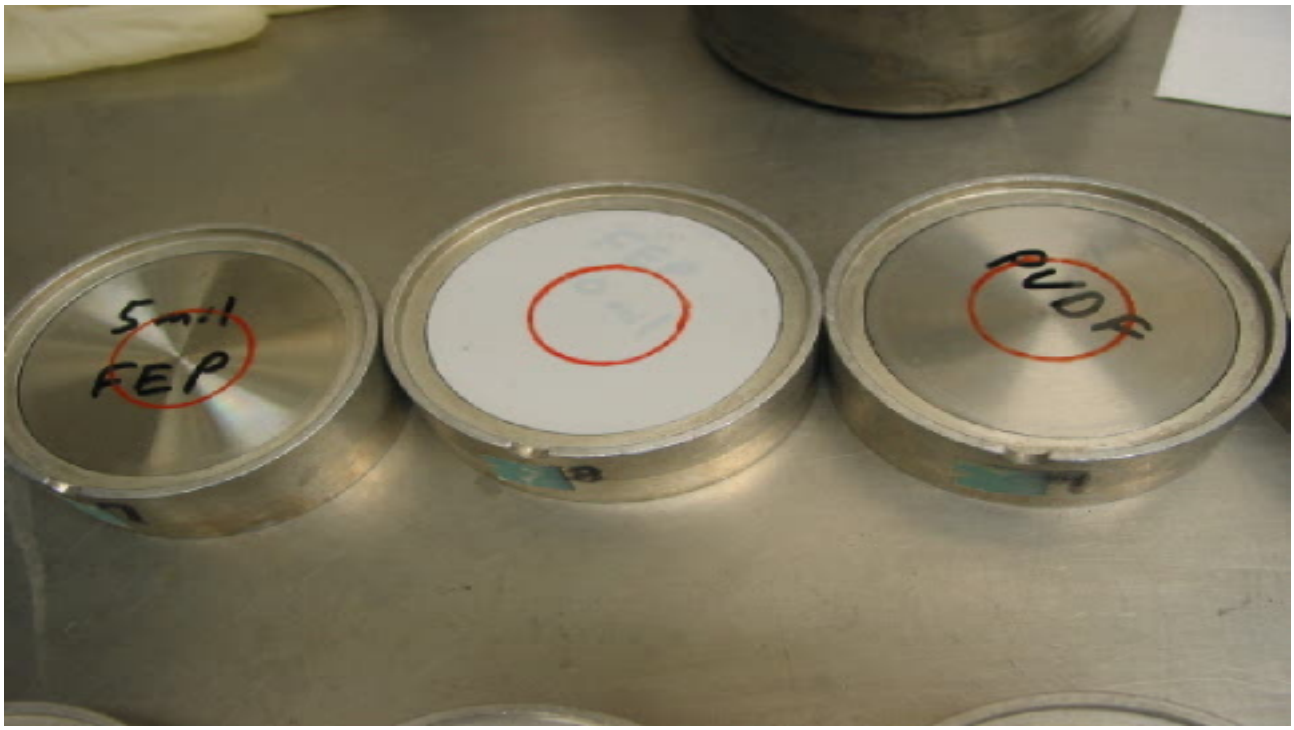


Photos 29 – Sample PV4 at end of agent residence period

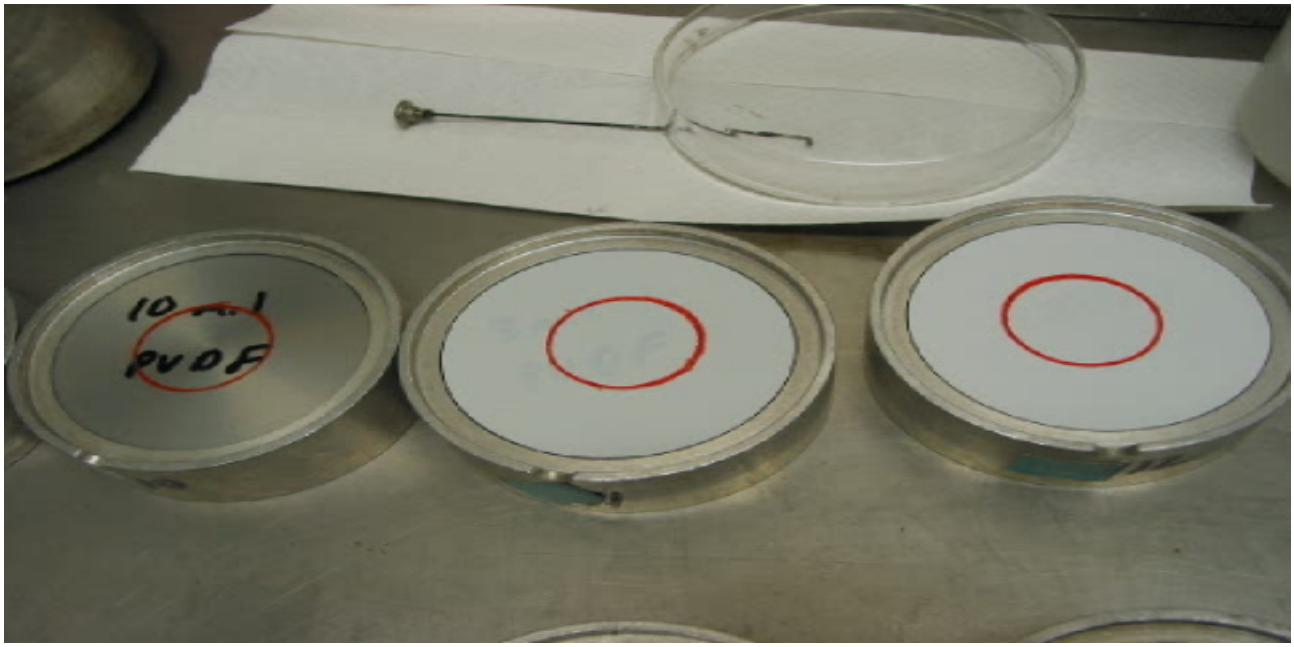
Photos 30 – Post Test photo – E1, E2, and E3



Photos 31 – Post Test photo – E4, E5, amd E6



Photos 32 – Post Test photo – F1, F2, and PV1



Photos 33 – Post Test photo – PV2, PV3, and PV4