



SOLVAY COMPATIBILITY TECHNICAL BULLETIN

Chemical Resistance Testing of Solvay Plastics with Metrex™ Surface Disinfectants

The purpose of this study is to determine the chemical resistance of six Solvay Specialty Polymers with three Metrex surface disinfectant products.

TEST SAMPLES

Metrex Products

Three products – CaviWipes™, CaviWipes™ Bleach, CaviWipes™ 2.0 were used in this study. Table 1 shows the active ingredients in each formulation, as well as the contact times and EPA registration numbers.

Product	Active Ingredient	Contact Time	EPA Registration Number
CaviWipes™	Quaternary Ammonium, <20% Alcohol	3 min	46781-8
CaviWipes™ Bleach	Sodium Hypochlorite	3 min	46781-14
CaviWipes™ 2.0	Quaternary Ammonium, <20% Alcohol	2 min	46781-17

Table 1. Metrex surface disinfectants and corresponding details.

Solvay Products

Six products were used in this test. Table 2 shows an overview of the materials. [1-3]

Product	Polymer	Classification	Color	ISO 10993	USP Class VI
Amodel®	Polyphthalamide	Semi-crystalline, glass filled	Opaque		
Ixef®	Polyarylamide	Semi-crystalline, glass filled	Opaque	✓	✓
Kalix®	High-Performance Polyamide	Semi-crystalline, glass filled	Opaque		
Radel®	Polyphenylsulfone	Amorphous, unfilled	Transparent	✓	✓
Udel®	Polysulfone	Amorphous, unfilled	Transparent	✓	✓
Veradel®	Polyethersulfone	Amorphous, unfilled	Transparent	✓	✓

Table 2. Solvay products and corresponding details. ✓ denotes meeting the acceptance criteria of tests referenced [1-3].

TEST METHOD AND CRITERIA

Tensile and Color:

ASTM D638 Type I tensile bars were put under 0.91% flexural strain as shown in Figure 1, and the gauge (middle) portion was wiped manually with disinfectant products for a total of 60 wipe cycles. Each cycle consisted of one back-and-forth wipe motion. There was at least 6 minutes of waiting time in between each wipe cycle to allow for air-drying. Each plastic and disinfectant combination had 5 repeats. A separate control group was also subjected to the same strain for the same amount of time. All tensile bars were then rinsed with DI water and dried overnight. Tensile test was then performed according to ASTM D638.

Additional Udel® and Veradel® tensile bars were also put under 0.45% flexural strain and wiped using the same method above.

Additionally, color measurements were taken for tensile bars of Amodel®, Ixef® and Kalix® using a spectrophotometer before and after exposure to chemical agent. Color difference was subsequently calculated.



Figure 1. Tensile bars under flexural strain.

Impact:

ASTM D790 flexural bars were put under 1.5% strain, and the middle portion was wiped manually with disinfectant products for a total of 30 cycles with at least 6 minutes of waiting time in between each wipe cycle. Each cycle consisted of one back-and-forth wipe motion. Each plastic/ disinfectant combination had 4 repeats. A separate control group was also subjected to the same strain for the same amount of time. All flexural bars were then rinsed with DI water and dried overnight. Impact test was performed according to modified ASTM D256.

The criteria for compatibility, applicable only to this test, are shown in Table 3 below.

	Acceptance Criteria
Color:	$\Delta E^*_{ab} \leq 2$ (Opaque samples only)
Tensile:	Average strength retention $\geq 90\%$
Impact:	Average impact strength retention $\geq 90\%$

Table 3. Acceptance criteria for compatibility tests.

Visual inspections were performed for all the test samples. Sample exposures and color measurements were done in-house by Metrex, and mechanical tests were performed in-house by Solvay.

RESULTS

Tensile

Tables 4 to 6 shows the results for tensile bars, impact bars and color evaluations of the samples respectively. A check mark (✓) indicates that the average measurement of samples met the acceptance criteria as defined in Table 3.

Product	CaviWipes™	CaviWipes™ Bleach	CaviWipes™ 2.0
Amodel®	✓	✓	✓
Ixef®	✓	✓	✓
Kalix®	✓	✓	✓
Radel®	✓	✓	✓
Udel®	✓	✓	✓
Veradel®	✓	✓	✓

Table 4. Results of tensile test. ✓ denotes meeting the acceptance criteria.

Impact

Product	CaviWipes™	CaviWipes™ Bleach	CaviWipes™ 2.0
Amodel®	✓	✓	✓
Ixef®	✓	✓	✓
Kalix®	✓	✓	✓
Radel®	✓	✓	✓
Udel®	✓	✓	✓
Veradel®	✓	✓	✓

Table 5. Results of impact test. ✓ denotes meeting the acceptance criteria.

Color

Product	CaviWipes™	CaviWipes™ Bleach	CaviWipes™ 2.0
Amodel®	✓	✓	✓
Ixef®	✓	✓	✓
Kalix®	✓	✓	✓

Table 6. Results of color evaluation. ✓ denotes meeting the acceptance criteria.

References

[1] "Chemical Resistance of Specialty Polymers for Medical Equipment Housings." Version 1.1. August 2018. Solvay Specialty Polymers.

Website: www.solvay.com/sites/g/files/srpend221/files/2018-08/Healthcare-Chemical-Resistance-of-SP-for-Medical-Equipment-Housings_EN_v1.1_0.pdf

Accessed: December 11th, 2020

[2] "High-Performance Polymers for Medical Equipment." Version 2.0. January 2019. Solvay Specialty Polymers.

Website: www.solvay.com/sites/g/files/srpend221/files/2019-02/Healthcare-Medical-Equipment_EN-v2.0_0.pdf

Accessed: December 11th, 2020

[3] "Single-Use Pharmaceutical and BioProcessing Technologies." Biopharmaceutical Processing.

Website: www.solvay.com/en/chemical-categories/specialty-polymers/healthcare/biopharma-processing

Accessed: December 11th, 2020