



Tedlar® SP

polyvinyl fluoride film

Properties and Maintenance of High-Gloss Tedlar® SP Film in Laminate Applications

Introduction

High-gloss *Tedlar*® SP polyvinyl fluoride (PVF) films provide an attractive and highly durable surface in a full complement of colors that can be used as an alternative to paint and other coating materials. The films provide thorough protection to light-sensitive substrates and display high distinctness-of-image (DOI) normally associated with automotive quality paints. Careful testing of pigments and the use of polyvinyl fluoride resin has shown that resistance of *Tedlar*® SP films to color fade and gloss loss is generally equal to or superior to high-quality plastic surfacing materials.

Initial Aesthetics

Prior to thermoforming, high-gloss *Tedlar*® SP films will typically exceed a DOI of 85 without any orange peel. DOI retention after thermoforming is dependent upon thermoforming conditions, mold contour, and mold surface characteristics, as well as the construction of the film. *Tedlar*® SP films can usually be custom designed to meet particular project considerations.

Automotive Tests

In comparison tests to OEM automotive paints, *Tedlar*® SP film laminated to steel and TPU substrates has equivalent ratings in gravelometer tests. Mandrel bend tests show that *Tedlar*® film laminated to TPU does not crack when bent over a 1/4-in pipe at -40°C (-40°F).

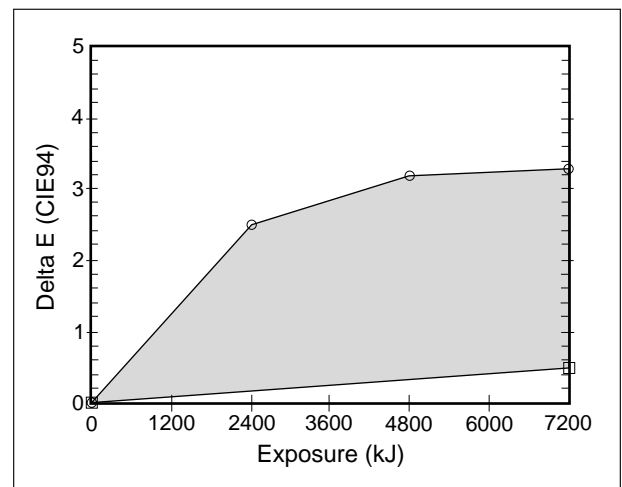
High-gloss *Tedlar*® SP film laminated to properly primed metal or to thermoplastic substrates will pass 96-hour, 60°C (140°F) humidity chamber testing and 500 hours of salt spray without failures.

In Taber abrasion tests, *Tedlar*® SP films have measured between 2 to 6 mg of film loss per 1,000 cycles of a 125-g wheel.

Accelerated Weathering

As with many materials, color retention of *Tedlar*® SP films is dependent upon the color being tested. **Figure 1** indicates the typical color change range that can be expected when a variety of pigmented *Tedlar*® SP film samples are exposed in a xenon arc weatherometer using SAE J1960 protocol.

Figure 1. Color Change Range of *Tedlar*® SP Films after Exposure in Xenon Arc Accelerated Weatherometer (SAE J1960 Conditions)



High-gloss *Tedlar*[®] SP films have been found to perform similarly to OEM basecoat/clearcoat paints for gloss retention in xenon arc weathering, and provide superior gloss retention to other high-gloss films, refinish paints, and coextrusions as shown in **Figures 2 and 3**.

Figure 2. Gloss Retention of Refinish Paint, Gel Coat, and *Tedlar*[®] SP Film after Exposure in Xenon Arc Accelerated Weatherometer (SAE J1960 Conditions)

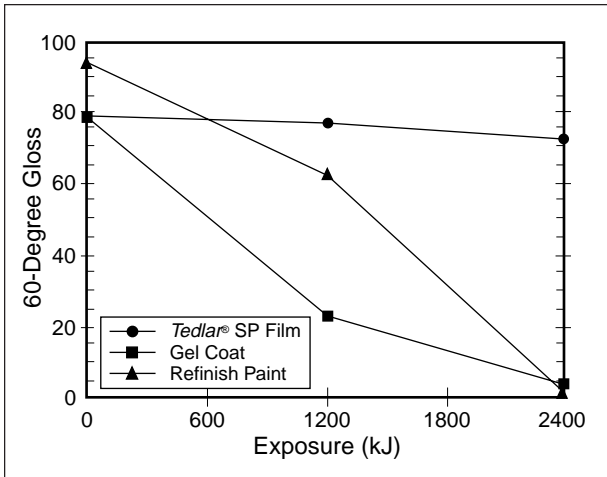
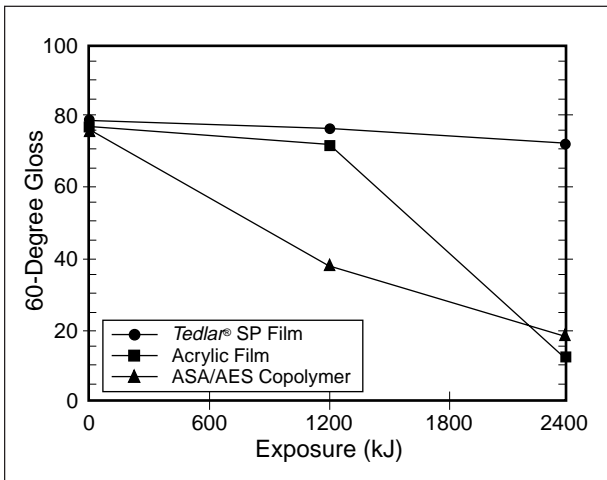


Figure 3. Gloss Retention of Acrylic Film, ASA/AES Copolymer, and *Tedlar*[®] SP Film after Exposure in Xenon Arc Accelerated Weatherometer (SAE J1960 Conditions)



Repair and Care Procedures for Plastic Laminates Clad with *Tedlar*[®] SP Films

The chemical inertness of *Tedlar*[®] SP film makes it an extremely stain-resistant and durable finish. In addition, this inertness permits the use of strong cleaners to remove tough stains from the film. *Tedlar*[®] SP film with a high-gloss finish is designed for outdoor durability when it is maintained properly. **Table 1** lists typical stains that can be removed from this film, as well as some of the solvents that will not affect the appearance or integrity of the film after direct contact for 24 hours.

**Table 1
Typical Stains and Solvents Not Affecting *Tedlar*[®] SP Film**

Staining Agent	Solvent
Spray paint	Methanol
Permanent marker pens	Acetone
Silicone rubber caulking	Benzene
Roof tar	Kerosene
Iodine	Methyl Ethyl Ketone
Mercurochrome	Toluene
Grease	Hydrochloric acid (10%)
Grape juice	Sulfuric acid (10%)
Yellow mustard	Nitric acid (10%)
Catsup	Gasoline
Lipstick	Turpentine
Fingernail polish	Brake fluid
Crayon	
Coffee	
Cola	

Cleaning Instructions

Any cleaning material that dissolves or releases the dirt or stain from the surface can be used to clean *Tedlar*[®] SP film. In most situations, water or a mild detergent dissolved in water will remove the dirt. Solvents may be used when more aggressive cleaning is necessary, although care should be taken to avoid contact of solvents with unprotected plastic so that distortion of these surfaces does not occur.

The procedures for removing stains can be divided into three categories, depending on the staining agent. In all cases, cleaners should be applied generously using a soft cloth with minimal pressure to avoid micro-scratching the stained area. Do not use abrasives such as rubbing compounds or cleansers.

Easy Procedures (Wet Cloth Only)

Many staining agents can simply be wiped from the *Tedlar*[®] SP film using a nonabrasive cloth that has been moistened with water.

Mild Procedures (Soaps, Household Detergents)

Some staining agents require the use of warm, full-strength solutions of standard detergents, such as Fantastik¹. These stains should be removed with a soft cloth and detergent solution and given a final rinse with clear water to effect maximum stain removal.

Moderate Procedures (Solvents or Solvent-Based Cleaners)

Exterior Applications

Many staining agents, especially those with heavy oil grease bases, will require the use of a solvent for removal. To remove asphalt, tar, road oil, grease, or fresh paint from *Tedlar*[®] SP film, use a good grade of mineral spirits, kerosene, naphtha, turpentine, or commercial automotive or road-oil removal agent. Follow the procedure with a detergent rinse and a clear water rinse. For the most stubborn stains, solvents such as acetone, toluene, or methyl ethyl ketone (MEK) may be used.

Interior Applications

Cleaning of bus, train, and aircraft interiors usually does not permit the use of full-strength solvents such as those listed for exterior applications. In such cases, solvent-based cleaners such as Pro Graffiti Remover², Big Orange³, D.W.R. II⁴, or Aero Clean X-200⁵ may be used. Check local regulations and the corresponding Material Safety Data Sheets to verify suitability for use.

Repair Instructions

For fine scratches, plastic finishing compounds such as Novus 2⁶ can be used. Apply a quarter-size dab of compound to the work area. Rub the compound using a soft cloth until dry. Then use a clean cloth to remove the dry residue. Do not use a buffing wheel or orbital sander on laminates clad with *Tedlar*[®] SP film as they will permanently scratch the surface.

For scratches, nicks, and gouges where the *Tedlar*[®] SP film has been punctured, the use of color-matched automotive air-dry paints to repair the entire panel is advised. Full panel repair is recommended to maintain visual uniformity. The procedure is as follows:

1. Wipe the panel to be repaired using DuPont 2319S plastic surface cleaner to dissolve any grease or oil that might be on the surface.
2. Wet sand the entire panel using 600-grit paper.
3. Wipe the area with 2319S plastic surface cleaner to remove any sanding sludge.
4. Apply DuPont 2322S adhesion promoter to the work area using the paint instructions.
5. After a 5-minute flash, a single-stage topcoat such as Imron[®] 5000⁷ or Centari[®] 5000⁸ should be sprayed on per the paint instructions. For improved smoothness and better performance, color-coded DuPont Prime 'N Seal (2600S, 2610S, 2640S, 2680S, or 2690S) can be applied after the 2322S adhesion promoter.

Call your local DuPont representative to obtain the paint materials for this procedure.

¹Texize Inc., Greenville, SC

²BAF Industries, Santa Ana, CA

³ZEP Mfg., Co., Atlanta, GA

⁴Chemique, Inc., Moorestown, NJ

⁵Zip-Chem Products, San Jose, CA

⁶Novus, Inc., Minneapolis, MN

⁷Imron[®] is a DuPont registered trademark

⁸Centari[®] is a DuPont registered trademark

For more information on *Tedlar*[®] SP PVF films: (800) 255-8386

DuPont *Tedlar*[®]
P.O. Box 88
Sheridan Drive and River Road
Buffalo, NY 14207-0088

FAX: (716) 879-4545

Europe

DuPont de Nemours Int'l SA
2, chemin du Pavillon
P.O. Box 50
CH-1218 Le Grand-Saconnex
Geneva, Switzerland
(022) 7175111

Canada

DuPont Canada, Inc.
P.O. Box 2200, Streetsville
7070 Mississauga Road
Mississauga, Ontario, Canada
L5M 2H3
(800) 263-2742

Japan

DuPont Kabushiki Kaisha
Tedlar[®] PVF Film
4th Floor Chiyoda Honsha Bldg.
5-18, Sarugaku-cho 1-chome
Chiyoda-Ku, Tokyo 101 Japan
(011) 81-3-5281-3428

Asia Pacific

DuPont Asia Pacific Ltd.
TST P.O. Box 98851
1122 New World Office Bldg.
(East Wing)
Salisbury Road, TST
Kowloon, Hong Kong
(011) 852-3-734-5345

DuPont Singapore PTE Ltd.
1 Maritime Square #07-01
World Trade Center
Singapore 099253
65-273-2244

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