



Technical Data Sheet

DESCRIPTION

One part, solvent borne coating solution designed to impart excellent abrasion, scratch, and chemical resistance to polycarbonate (PC) and BOPET Film.

The cured coating is clear, flexible and does not discolor from exposure to sunlight. Sheets coated with this material can be formed without loss of performance properties. Suitable for dip and flow coating applications. For tinting, ophthalmic dyes can be added to the aqueous solution.

FEATURES

- Exceptional Abrasion, Scratch & Chemical Resistance
- Formable & Flexible
- Outstanding Optical Clarity
- Primer-Free Adhesion to PC & BOPET film
- Tintable at Room Temperature
- Does not discolor from exposure to sunlight

BENEFITS

- Can be stored at room temperature
- Long product service life reduces the need for frequent tank change outs.
- Streamlines manufacturing, enhancing yields and profitability.
- Can be coated over top or underneath Visgard® anti-fog coatings

FormGard® 4M

Formable Scratch & Chemical Resistant Coating



Premium Formable & Scratch Resistant Coating

Product Applications

ARCHITECTURAL & BUILDING

- Domes, Roof & Skylights, Lighting
- Protective Bus Shelters & Outdoor Signage

AUTOMOTIVE & TRANSIT

- Headlamps, Lighting & Windows
- Windscreens, Canopies & Sunroofs
- Instrument Clusters & Gauges

AVIATION & AEROSPACE

- Canopies, Cabin Windows & Lighting
- Cockpit Instruments & Navigation Systems

PROTECTIVE EYEWEAR

- Safety Visors, Face Masks, Shields & Goggles



Substrate Materials

- Polycarbonate (PC)
- BOPET Film



Product Overview

FormGard 4M formable coating delivers best-in-class abrasion, scratch, and exceptional chemical resistance.

Cured coating offers excellent optical clarity. Primer-free adhesion to Polycarbonate and BOPET film.



FormGard® 4M

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Operating Guidelines

PRODUCT SHIPPING & AVAILABILITY

Typical lead-time for shipment of FormGard 4M is four (4) weeks from confirmation of a purchase order. FSICT provides several shipping options. Please contact an FSICT representative to determine which option best fits your needs. All orders are shipped F.O.B. Additional shipment charges including customs clearance and fees (if applicable) are the responsibility of the customer.

HEALTH & SAFETY INFORMATION

Before using this product, read and understand the Safety Data Sheet, SDS, which provides information on health, physical, and environmental hazards, handling precautions and first aid recommendations. **For a copy of an SDS, contact an FSICT sales or customer service representative.**

HANDLING & SAFETY PRECAUTIONS

Avoid contact with skin and eyes. Do not take internally. Observe proper industrial hygiene, including splash goggles and impervious gloves. Provide adequate ventilation to prevent build-up of solvent vapors above threshold limit values. Otherwise, use self-contained breathing apparatus.

FormGard 4M contains flammable solvents and must be kept away from heat or sources of ignition. Ground all containers and do not re-use empty drums. Dispose of waste material solution including clean-up solvents in accordance with local, state and federal regulations.

WARRANTY & LIABILITY LIMITATIONS

This document does not constitute any warranty or representation regarding FSICT's product. Please refer to FSICT Coating Technologies Standard Terms and Conditions or to your purchase agreement with FSICT for the warranty coverage of FSICT's product.

Application & Cure Requirements

FormGard 4M is supplied at 22% solids and can be used as received, or diluted with 1-methoxy-2-propanol (Dowanol PM).

The best scratch resistance is obtained from coatings that are 5.0 to 7.0 microns (0.2 to 0.28 mils) dry thickness. This produces coverage of approximately 1,500 ft² per gallon (50 m² per liter).

Recommended withdrawal rate for dip coating is 2 to 5 in./min. (5 to 13 cm/min.) at 18% solids. For flow coating, dilution to 16-18% solids is recommended. Adjustments may be necessary to obtain proper dry coating thickness depending on part geometry and flash off time, etc.

To fully cure, parts should be oven cured at 130°C (266°F) for 45 to 60 min. FormGard 4M does not require a post cure, so once parts are cool enough to be handled they are ready for assembly or bagging. When under-cured, FormGard 4M will be attacked by solvents such as isopropyl alcohol (IPA) and methyl ethyl ketone (MEK). When fully cured (60 min. at 130° C) chemical resistance is exceptional.

Abrasion Resistance Properties

Resistance to scratching is determined by oven temperature, length of cure and coating thickness. Sensitive plastics can be cured as low as 110°C (230°F) for 120 min., but abrasion resistance will be reduced. At a curing temperature of 130° and greater, maximum scratch resistance is achieved at a cure time of 60 min.. Thicknesses of 5-7 µm will generate 5% or less Δ haze gain after Taber Abrasion (100 cycles at 500 g). Thicknesses of 4 µm or above can withstand scratching with a #0000 steel wool pad using light to moderate hand pressure.

Physical Characteristics

Appearance	Clear, colorless to light amber liquid, mild order
Density	0.987 g/cc
Solids Content (by weight)	22%
Solvents	<ul style="list-style-type: none"> • 1-methoxy-2-propanol • N-methyl-2-pyrrolidone • Diacetone Alcohol
Viscosity (Brookfield)	80 cps
Abrasion Resistance*	Less than 5% Δ Haze at 100 cycles

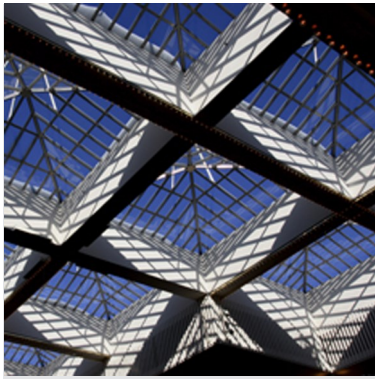
* Abrasion Resistance is determined using ASTM D-1044 test method. A copy of the test method can be provided upon request.

Chemical Resistance

FormGard 4M coatings are resistant to common solvents such as Isopropanol, methyl ethyl ketone, toluene and glycol ethers, and will protect sensitive plastics from brief exposure to these solvents—except in areas of high stress concentration. FormGard 4M coatings are unaffected by household and industrial detergents, glass cleaners, oil, grease and gasoline. The use of abrasive cleansers should be avoided.

Thermoforming

FormGard 4M coated plastics may be drape-formed, vacuum-formed, heat pressed or embossed into both simple and compound curves. Optimum results will be obtained using a combination of the lowest workable temperature and short cycle time. It is important to note that the degree of stretching must not exceed 30%. Deep draws and sharp right angle bends should be avoided. Overheating can result in coating cracks and/or tooling mark-off.



FormGard® 4M

Formable Scratch & Chemical Resistant Coating

Operating Guidelines (cont.)

Contact Information

**FSI Coating Technologies
Corporate Office - N.A.**
45 Parker, Suite 100
Irvine, California 92618 USA
Tel: +1-949-540-1140
Fax: +1-949-540-1150
technicalsupport@fsicti.com

**SDC Technologies - Americas
Corporate Headquarters**
45 Parker, Suite 100
Irvine, CA 92618 USA
800-272-7681 (Toll Free USA)
Tel: +1-714-939-8300
technicalsupport.ca@sdctech.com

SDC Technologies - Europe
Unit 7, Avondale Industrial Estate
Pontrhydryn, Cwmbran
NP44 1UG, Great Britain
Tel: +44-1633-627030
technicalsupport.eu@sdctech.com

SDC Technologies - China
No. 1585 Gumei Road
Xuhui District
Shanghai 200233
PR China
Tel: +86-21-61517768
customercare.cn@sdctech.com

**SDC Technologies- Singapore
SDC Technologies Asia Pacific, Pte. Ltd.**
27 Tuas South Street 1
Singapore 638035
Tel: +65-6210-6355
customercare.ap@sdctech.com

fsicti.com

Transportation & In-Transit Product Conditions

Product can be stored in ambient conditions during shipment from FSICT to the customer's site.

Shelf-Life

Two years in unopened containers stored at room temperature. Cooling will extend the shelf life while warm temperatures will shorten it. When stored below 70°F (21°C), FormGard 4M may become cloudy. Brief warming 122°F (50°C) will restore clarity. Cloudy solutions that do not become clear after warming should be properly discarded.



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