Technical Data Sheet

SilFORT™ SHP401

SilFORT* SHP401

Description

SilFORT AS4000 Hard Coat

AS4000 premium-performance hard coat is a clear, non-yellowing silicone coating which provides optimal protection against deterioration from weather, including ultraviolet rays, heat, cold, rain, snow and ice. It also resists damage from sand and dirt.

SilFORT SHP401 Primer

SHP401 primer is used as an adhesion promoter for AS4000 hard coat on polycarbonate parts. It can be applied by flow, dip or spray coating. The primer is designed to air dry and should be tack free in about 10 minutes.

The AS4000/SHP401 coating system passes the requirements of the DOT FMVSS#108 and is included in the AMECA List of Acceptable Plastics for Optical Lenses and Reflectors Used on Motor Vehicles. It also complies with the ECE Automotive Regulations for European forward lighting applications.

Key Features and Benefits

AS4000 Hard Coat

- Ultraviolet resistance
- Thermal resistance
- Abrasion and mar-resistance
- Good clarity

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- Solvent/chemical resistance

SHP401 Primer

- No thermal cure required
- Improves coating adhesion
- Improves water resistance
- Improves ultraviolet resistance

Typical Physical Properties

Property	**AS4000 Hard Coat Values**	**SHP401 Primer Values**
Solids Content, %	20 ± 1	2.1 ± 0.2
Solvent	Methanol, n-butanol, isopropanol	1-Methoxy-2-propanol, diacetone alcohol
Flash Point, Penske-Martens Closed Cup	19.4°C (67F)	36.1°C (97°F)
Density, lbs/gal (g/cc)	7.6 ± 0.1 (0.91)	7.7 ± 0.1 (0.925)
pH	7.0 ± 0.5	-
Warranty Period in original sealed containers	3 months at < 10°C (50°F)	6 months at ambient temperature
Viscosity, cstk @ 25°C	4-7	4-7
VOC, g/l	728	907

Cured Properties:

SHP401 Primer/AS4000 Hard Coat on Lexan®† Polycarbonate (0.5 micron primer/5.0 microns top coat)

Taber Abrasion[1]	< 10 d% Haze
Water Immersion[2]	> 250 Hrs.
UV-B[3]	> 3,000 Hrs.
#0000 Steel Wool[4]	No visual scratches
Impact Resistance[4]	No fracture or chipping
Heat/Humidity/Cold Cycle Test[5]	Passed 15 cycle (90 days)

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1 Taber Abrader with 500g load, CS10F wheels at 500 cycles. Haze measured per ASTM D1003. Higher haze indicates greater abrasion. Humidity during coating and Taber wheel variability will affect final values.
2 Temperature = 65°C.
3 Exposure data on UV instrument manufactured by Q Panel Corp. Cycle is 8 hours, FS 40 lamps on at 70°C and 4 hours off with condensing humidity at 50°C.
4 FMVSS 108
5 GM MG5060

Chemical/Solvent Resistance

Ethylene Glycol Antifreeze	Windshield Washer Fluid
Heavy Duty Brake Fluid (Glycol)	Tar Remover
Gasoline (Leaded) or Petrol	Power Steering Fluid
Wax Remover	Sulfuric Acid (0.1N)
Heavy Duty Detergent 10W40 Motor Oil	Sodium Hydroxide (0.1N)

Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

Product Safety, Handling and Storage

CAUTION:

Compatibility of Momentive Performance Materials hard coat and polycarbonate resins is dependent on a number of factors including operational stresses, chemical exposure, temperature levels, impact and exposure to ultraviolet light. While it is up to the end user to determine what application specific testing is appropriate, it is suggested that all polycarbonate resin applications be tested for at least thirty (30) days for compatibility and crazing with this hard coat use. There is no dependable substitute for careful testing of prototypes of production parts in typical operating environments.

AS4000 Hard Coat

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Refrigeration is required.The warranty period is 3 months from date of shipment from Momentive Performance Materials if stored in the original unopened container at 10°C or lower.

SHP401 Primer

Store and ship at ambient temperature, approx. 2-43°C. When stored in original sealed containers, SHP401 primer will have a warranty period of 6 months. Exposure to low temperatures may cause some solid precipitation. If this occurs, the precipitate may be re-dissolved by submerging the closed container in a water bath. Mix until homogeneous.

Customers should review the latest Safety Data Sheet (SDS) and label for product safety information, safe handling instructions, personal protective equipment if necessary, emergency service contact information, and any special storage conditions required for safety. Momentive Performance Materials (MPM) maintains an around-the-clock emergency service for its products. SDS are available at www.momentive.com or, upon request, from any MPM representative. For product storage and handling procedures to maintain the product quality within our stated specifications, please review Certificates of Analysis, which are available in the Order Center. Use of other materials in conjunction with MPM products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

Processing Recommendations

General Requirements

Coating area should be clean, dust-free (Class 10,000 or better),well-ventilated and with the relative humidity controlled to 40 ± 10%. If necessary, parts should be washed or wiped clean with isopropyl alcohol, a mild detergent solution and clean water rinse, followed by a filtered-air blow-off and a final ionized-air blow-off. Cleanliness is critical for the production of good parts. Both primer and hard coating solutions should be filtered continuously or just prior to use to approximately 0.5 to 1.0 micron, using a 3 to 5 micron prefilter. Electric or indirect gas-fired ovens with good convection and air exchange are recommended.

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AS4000 Hard Coat

The hard coat can be applied to primed parts by dip, spray, or flow coating. For spray applications and large-part flow coating, the coating can be reduced to 15% solids with an appropriate solvent (e.g. n-butanol or IPA). Topcoat should be applied to result in a cured film thickness of 4.5 to 6.5 microns or thicker, depending on application. The coating should be allowed to dry at room temperature until tack free, 10 to 20 minutes. After the part reaches a temperature of 130°C, AS4000 cures to an abrasion resistant hard coat in 30 to 60 minutes.

SHP401 Primer

The primer can be applied by dip, spray or flow coating to polycarbonate parts that have an initial stress level under 1000 psi. If a higher stress level is found to exist, the tool and molding conditions should be adjusted to reduce residual stress on parts. Alternatively, parts can be annealed to reduce stress, (for example, 30 minutes at 130°C for each 2,5 mm of part thickness.) If necessary, primer solids content may be reduced by adding 1-methoxy-2-propanol/diacetone alcohol (85/15) or pure 1-methoxy-2-propanol. The primer should be applied to obtain a dry film thickness of approximately 0.5 micron. After application, the primer should air dry until tack free (approximately 10 minutes). Recirculate the primer through a 1 micron or better filter.

Limitations

Customers must evaluate Momentive Performance Materials products and make their own determination as to fitness of use in their particular applications.

†Lexan is a trademark of Sabic Innovative Plastics B.V.

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