



# SilFORT\* UVHC3000

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weatherable abrasion-resistant hardcoat

### Description

SilFORT UVHC3000 is a clear, solvent-based, UV radiation cured coating which provides protection to parts made out of clear polycarbonate against abrasion, chemical damage, degradation caused by ultraviolet radiation and weathering. The hardcoat is ideally suited for protecting clear polycarbonate in outdoor applications. UVHC3000 complies with the ECE automotive Regulations for European forward lighting applications and is AMECA listed for three years Florida and Arizona Exposure.

### Key Features and Benefits

When correctly applied and processed, UVHC3000 hardcoat provides excellent:

- Ultraviolet resistance
- Abrasion and mar resistance
- Solvent/chemical resistance
- Optical clarity
- Primerless adhesion to polycarbonate
- A simple, single coating process step

### Typical Physical Properties

Nominal Solids Content (% by weight)	45
Carrier Solvent	1-methoxy-2-propanol
Recommended Reducing Solvents	1-methoxy-2-propanol
Optional Reducing Solvents	isopropanol, n-butanol, isobutanol (Please contact your Momentive representatives for details)
Density (g/cm <sup>3</sup> )	1.02 (1,020 kg/m <sup>3</sup> )
Viscosity (cstk @ 25°C, Ostwald Tube)	10

TYPICAL PERFORMANCE DATA: (UVHC3000 applied at 8 - 12 microns on clear polycarbonate)

Typical Taber Abrasion, 500 cycles with CS10F (Gen. IV type) wheels <sup>(1)</sup>	<10 % Δ Haze
Water Immersion @ 65°C <sup>(2)</sup>	Minimum 10 days
Outdoor 45-deg Florida/Arizona exposures	Passed DOT FMVSS #108

Typical property data values should not be used as specifications.

Assistance and product specification are available from Momentive Performance Materials.

(1) Taber Abrader with 500g load per wheel. % Haze measured according to ASTM D1003. Higher haze indicates higher abrasion.

(2) Scribed tape pull adhesion test with no delamination (ASTM D3359).

### General Equipment and Filtration Requirements

The coating area should be clean, dust-free (Class 10,000 or better), well-ventilated and with the relative humidity typically controlled to below 50 % (depending on application, processing, and performance requirements, it is possible to apply the coating at 65% RH maximum). It may be necessary for parts to be wiped clean prior to coating. This may be safely done with isopropyl alcohol, a mild detergent solution and clean water rinse, or ultrasonic bath followed by a filtered air and a final ionized air blow-off.

All material handling equipment should be made of solvent resistant materials, preferably stainless steel or polyethylene, and the coating supply should be shielded from light at all times (do not use transparent pipework). The coating solution should be filtered prior to use with a 5 – 8 µm pre-filter followed by a 0.5 – 1.0 µm fine gel removal type filter.

UVHC3000 is light sensitive and should be protected from all light sources to avoid the risk of curing. Lighting and windows in the application area should be fitted with UV and/or yellow filters.

#### ANNEALING

The annealing of parts is occasionally carried out to reduce residual molding stress before the application of a coating solution. In practice this procedure is generally not necessary when coating with UVHC3000. Consult your polycarbonate supplier for recommendation.

#### APPLICATION - GENERAL

The UVHC3000 solution may be applied to clean parts by dip, spray, spin or flow coating. Coating application should be carried out ideally at 20 - 30°C. It is recommended to maintain the relative humidity at least to below 50% (depending on application, processing, and performance requirements, it is possible to apply the coating at 65% RH maximum) during the application and flash-off periods to avoid any possible cosmetic surface defects.

The non-volatile contents of the coating can be adjusted if desired to meet the requirements of the coating process using one or more of the recommended reducing solvents (normally UVHC3000 will be adjusted with 1-methoxy-2-propanol which maintains a one-solvent system). As a starting point, this coating can be spray coat processed at 45% solids and reduced to 37% solids for flowcoat process.

#### PROCESSING – FLASH-OFF

After coating application, the solvent(s) must be allowed to flash-off at room temperature for at least 1 - 2 minutes. Air flow-rates and temperatures play an important role in flash-off efficiency, so the rate of solvent evaporation may vary from installation to installation. Larger flow-coated parts may need more flash off time due to the larger surface area.

#### PROCESSING – PRE-HEATING

After the room temperature flash-off, the coating should be heated to establish adhesion, improve levelling and drive off residual solvent, prior to UV curing. This pre-heating phase can be accomplished by either infrared and/or convection air oven (electric or indirect-gas fired). Note that the pre-heat area should also conform to clean-room standards to avoid dust contamination of the uncured coating.

Pre-heat surface temperatures may range from 65°C to a maximum of 95°C. As an example, in an Infrared system, the coating may need to be heated for 2 minutes, while for a convection system, the coating may need to be heated for 6 minutes. This residence time will vary depending upon process and equipment design. Certain systems may use a combination of infrared and convection oven which may further influence the residence time.

It is recommended to maintain part temperature above 60°C between the pre-heating and UV curing phases.

Note that differences in production systems, part designs and performance required may effect the pre-heat flash conditions. Momentive Performance Materials' Technical Team is always available to assist customers in achieving a total application and curing regime, which satisfies their individual needs.

#### PROCESSING – CURING

As a minimum, it is recommended to use medium powered arc or microwave fired lamps for UV curing. Suitable lamp types, for example, include the Fusion F300 and F600 with Fusion Type H or H+ bulbs. Other acceptable UV lamps are medium or high pressure non-doped Hg lamps. These lamp types all have very similar spectral distributions, and all values quoted are measured in the UV-A range (measured with EIT Power Puck).

UVHC3000 will cure upon exposure to UV radiation. To achieve optimal performance, UVHC3000 requires the following cure parameters:

Dosage:	5.0 J/cm <sup>2</sup> minimum (UV-A wavelength only)
Irradiance:	0.6 W/cm <sup>2</sup> minimum (UV-A wavelength only)

Depending on application and performance requirements, lower dosage and intensity may be possible to use to cure UVHC3000 hardcoat.

Allow the parts to fully cool to room temperature before packing or carrying out any test procedures.

## Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute a 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

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## Limitations

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

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### Contact Information

For product prices, availability, or order placement, contact our customer service by visiting [www.momentive.com/Contacts](http://www.momentive.com/Contacts)

For literature and technical assistance, visit our website at: [www.momentive.com](http://www.momentive.com)

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