

**LUMICRYL® U-721S
UV/EB CURABLE RESIN
FOR ENERGY CURABLE COATINGS**

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GENERAL DESCRIPTION

Lumicryl® U-721S is a UV/EB-curable acrylic macromer suitable for formulating coatings and inks for application on film, laminate, plastic, metal, wood, paper or other substrates. Cured coatings based on Lumicryl® U-721S have excellent abrasion, scratch and chemical resistance, and outstanding mechanical properties (e.g. adhesion and flexibility). Lumicryl® U-721S can be used to formulate clear, pigmented or highly filled systems.

Coatings utilizing Lumicryl® U-721S may be applied using conventional application equipment such as roller, spray, flexo, gravure, screen and others. Lumicryl® U-721S dries to a tack-free, dry-to-touch, film after the solvent is flashed off. The dried, but uncured coating remains in a thermoplastic state and can undergo intermediate processing such as stamping, forming, transfer laminating, thermal transfer, sanding, and re-coating prior to UV curing.

The addition of common photoinitiators during the formulating stage is generally sufficient to afford rapid cure of the coating after solvent removal. Cured film properties are dependent upon formulation, cure extent and cure conditions. Additional improvements in cured film physical properties are possible by utilization of appropriate additives in the fully formulated end-use product.

TYPICAL PROPERTIES*

Solids	60-70% in Butyl Acetate
Viscosity at 25°C	130-150 P
APHA Color	150 Max
Appearance	Clear Liquid
Specific Gravity, 25°C	1.04

* Not to be used for specification purposes

POSSIBLE APPLICATION AREAS

Coatings: Paper, wood, flooring, electronics, plastics, metal

Adhesives: UV/EB cure laminating

Graphic Arts: Inks, overprint varnish

SOLVENT COMPATIBILITY AND VISCOSITY REDUCTION

Lumicryl® U-721S is compatible with a variety of ketones, acetates and propionates but is not compatible with alcohols. Solution viscosities of less than 1 cP can be achieved with solids contents of 10%.

BLENDING

Lumicryl® U-721S can be blended with various UV/EB curable reactive diluents or oligomers to enhance certain coating attributes.

Blended With	% U-721S	Property Enhanced
EA	25%	<ul style="list-style-type: none">Gloss ValuesHoffman adhesion values (over cold rolled steel)
EA	75%	<ul style="list-style-type: none">Adhesion to Phosphate Treated Cold Rolled Steel
PA	25%	<ul style="list-style-type: none">Gloss ValuesAdhesion values (over cold rolled steel)
PA	50%	<ul style="list-style-type: none">Solvent Resistance

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PA	75%	<ul style="list-style-type: none"> Adhesion to Phosphate Treated Cold Rolled Steel
AUA	25%	<ul style="list-style-type: none"> Adhesion Values to Cold Rolled Steel Resistance to Coffee Staining
AUA	50%	<ul style="list-style-type: none"> Solvent Resistance Resistance to Mustard Staining Adhesion to Phosphate Treated Cold Rolled Steel

EA = Epoxy Acrylate

PA = Polyester Acrylate

AUA = Aliphatic Urethane Acrylate

EXAMPLE FORMULATION

Lumicryl® U-721S	25.00
n-Butyl Acetate	20.00
Genocure LTM	0.40
Genocure DMHA	0.40

APPLICATION AND CURING

The above formula was applied with a spiral bar to achieve a final cured film thickness of 0.5 mil. Following application, the films were allowed to flash off for a minimum of five minutes and a maximum of thirty minutes. All films were exposed to five passes through the FusionUV Model I-6 (approximately 8 J/cm²). Gloss readings were taken after 30 seconds of post-cure rest, and all other testing was after a minimum of one hour of post-cure rest (no maximum).

RESULTS

Properties	
20° Gloss Value	60.8
Hoffman Scratch Resistance (grams)	150
Solvent Resistance (MEK double rubs)	200
Adhesion Values*	
ABS	0
PC/ABS	0
HIPS	5
Chromate Treated Aluminum	5
Cold Rolled Steel	5
Phosphate Treated Cold Rolled Steel	5
Stain and Spot Resistance to:**	
3% Acetic Acid	5
5% Ammonia	5
40% Ethanol	5
Acetone	5
Distilled Water	5
Red Wine	5
Mustard	5
Coffee	5

* 0-5 Scale: 0=No Adhesion, 5=Excellent Adhesion

** 0-5 Scale: 0=Deep Staining, 5=No Effect on Film

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CURE CONDITIONS AND CURED FILM PROPERTIES*

**Lumicryl® U-721S photoinitiated with 1% Irgacure 651 and 1% Irgacure 819. Most free radical producing initiators may be used. Cured film thickness 0.2–0.4 mils.*

Coated sheets cured with a single 300 watt/in. Type “H” mercury lamp in 1 pass at a belt speed of 20.5 ft/min. (no preheat) had the following properties:

Test	Result
Solvent Resistance	200+ MEK double rubs
Antifreeze/Water Mix	4 hours, 95°C, No Effect
DOT#4 Brake Fluid	4 hours, 22°C, No Effect
DOT#5 Brake Fluid	4 hours, 22°C, No Effect
Pencil Hardness	5H
Adhesion to Steel	Cross Hatch / 5B
Adhesion to untreated polyester film	No Delamination**

** Pulled with 3M 845 Book Tape

BLOCKING RESISTANCE

Uncured coated sheets placed face-to-face under a 1.0 lb/in² weight and stored in an oven at 42°C for 24 hours show no evidence of film transfer or blocking.

DRYING CONDITIONS

As an example, sheets of untreated polyester films coated with Lumicryl® U-721S at a thickness of 0.2-0.4 mils can be sufficiently dried at 120°C for 5 minutes (or alternatively at 150°C for 2 minutes). Dry time can be optimized by a judicious choice of co-solvents (see Solvent Compatibility and Viscosity Reduction section).

REGULATORY LISTINGS

Lumicryl® U-721S is listed or exempt from listing for the following International Chemical Inventories: AICS (Australia), DSL (Canada), EINECS (Europe), and IECSC (China), NZIoC (New Zealand), TSCA (USA).

PACKAGING (NET WEIGHT)

44 lbs. / 20.0 kg in steel pail

440 lbs. / 199.6 kg in steel drum

PRODUCT AVAILABILITY

This product is commercially available but may require lead time.

STORAGE AND HANDLING

Store unopened containers Lumicryl® U-721S at or below 25°C (77°F) away from direct sunlight, ignition sources, and heat sources. Maintain an adequate air headspace in the product container and do not blanket or mix with inert gas as this may render the inhibitor ineffective. Use within 6 months of delivery. Properly stored material may have a longer useful shelf life, but Estron’s warranty period is 6 months from date of shipment. Unexpected or uncontrolled temperature excursions during shipping, transit storage, and final storage may adversely affect useful shelf life and is beyond the manufacturer’s control or responsibility.

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