PRODUCT BULLETIN

January 2023

STYPOL® LSP Series

Standard Product Laminating Resins

DESCRIPTION

Polynt Composites' STYPOL® LSP Series standard product laminating resins are pre-promoted, thixotropic resins containing styrene monomer. This series is designed for open mold processes where hand lay-up and spray-up applications are used with neat resin. STYPOL® LSP Series resins are ideal when high tensile elongation and tensile strength are desired. They are normally used with a premium skin coat system.

All STYPOL® LSP Series resins meet the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) for Reinforced Plastic Composites Production. The following STYPOL® LSP Series resins also meet the EPA NESHAP for Boat Manufacturing and California's SCAQMD Rule 1162: A-C, G-I, K and L.

BENEFITS & FEATURES

- Good surface cosmetics
- Improved tensile elongation provides better crack resistance
- Lower exotherm equals faster laminate buildup

STYPOL® LSP Series resins demonstrate high tensile elongation and tensile strength, providing resistance to cracking and a lower exotherm, which means faster production cycles. Along with these qualities, these resins yield good surface cosmetics, faster wet-out, and resistance to fiberglass pattern print-through.

PROPERTIES – LIQUID (at 77 °F)

The viscosity and cure properties of STYPOL® LSP Series resins are shown below. These values may or may not be manufacturing control criteria; they are listed for a reference guide only. Particular batches will not conform exactly to the numbers listed because storage conditions, temperature changes, age, and testing equipment (type and procedure) can each have a significant effect on the results. Products with properties outside of these readings can perform acceptably. Final suitability of these products is in the end use performance.

A. Viscosity Properties

STYPOL® LSP Series resins are available in three viscosity grades: regular, low, and high.

Regular Viscosity	Low Viscosity	High Viscosity
• Standard lamination with good wet-out	• Superior wet-out • Maximum fiber wetting with high glass content	• For lamination of large vertical surfaces • High ambient temperature application

Values for Viscosity Classification (A-L)

Type	Viscosity	Thixotropic Index
Regular (A-C)	500 cPs	2.8
Low (D-F)	400 cPs	3.2
High (G-I)	600 cPs	3.5
Low (K)	450 cPs	2.8 minimum
High (L)	575 cPs	3.0 minimum

B. Cure Properties

STYPOL® LSP Series resins are available with four cure profiles depending on laminate thickness and trimming requirements.

Cure Profile	Characteristics
Regular Cure (125-180 mils) (A, D, G)	• Moderate cure time • Single stage or multi-pass lamination • Moderate exotherm
Thin Cure (< 125 mils) (B, E, H)	• Quickest cure • Designed for multi-pass applications • Quick Barcol development • Made for high glass content applications
Thick Cure (> 180 mils) (C, F, I)	• Slower cure than regular • Single stage lamination • Reduced exotherm
Trim Cure (K, L)	• Slower cure and reduced exotherm compared to regular profile for longer trim time • Faster Barcol development than thick cure • More uniform cure with laminate thickness variations

Choose the desired gel time for your specific product. Gel times are available for products A-L. Mid-Range values are shown.

Standard Gel Times [1] (minutes)							
12	17	22	27	32	37	42	45

[1] 100 g resin mass with 1.25% by weight MEKP initiator

PROPERTIES – PHYSICAL

The physical properties of STYPOL® LSP Series resins are shown below. Properties are shown for both neat resins casting and for a glass fiber reinforced-laminates. These are typical values and are provided for reference only.

Note: The physical properties of thermoset resins evolve as the resin cures. The properties given below are for well cured castings and laminates. Resin and laminates at different stages of cure will have varying properties.

Property[1]	Unit	Neat Resin Casting[2]	Laminate[3]	Test Method
Tensile Strength	psi	7,000	12,000	ASTM D 638
Tensile Modulus	psi	600,000	1,310,000	ASTM D 638
Tensile Elongation	%	1.2	1.4	ASTM D 638
Flexure Strength	psi	10,000	24,000	ASTM D 790
Flexure Modulus	psi	540,000	1,200,000	ASTM D 790
Hardness, Barcol Model 934-1	HB	42	45	ASTM D 2583
Heat Distortion Point at 264 psi	°C/°F	80/176	N/A	ASTM D 648

1) Physical properties were determined using internal Polynt test methods that are similar to those listed above.
2) Neat resin casting—initiated with 1.25% Arkema Luperox® DDM-9. The casting cured for 16 hours at room temperature and was post cured for 6 hours at 150°F.
3) Laminate—Resin initiated with 1.25% Arkema Luperox® DDM-9. The laminate schedule was two plies of 1.5 ounce mat, 33% glass content. The panel was post cured for 16 hours at room temperature and post cured for 4 hours at 150°F.

APPLICATION

STYPOL® LSP Series resins can be used with a wide range of room temperature activated organic peroxide initiator, including MEKP (methyl ethyl ketone) peroxides, AAP (acetyl acetone) peroxides, and MEKP/CHP (cumene hydroperoxide) blends.

Standard STYPOL® LSP Series resins are quality control tested using Arkema Luperox® DDM-9 MEKP initiator. United Initiators Norox® MEKP-9 is expected to yield similar performance. Other MEKP peroxides such as Arkema Luperox® DHD-9, United Initiators Norox® MEKP-925, and Pergan HP®-90 may also be used but gel time will vary.

An AAP initiator (also known as 2,4-Pentanedione Peroxide) such as United Initiators Norox® Azox or Arkema Luperox® 224 should be considered if your fabrication process requires building thin laminates using regular or thick cure STYPOL® LSP resins. AAP type initiators should not be used with thin or trim cure STYPOL® LSP resins.

An MEKP/CHP blended initiator, such as United Initiators Norox® MCP-75, can be used to control exotherm if your fabrication process requires building thick laminates with thin or regular cure STYPOL® LSP Series resins. The use of an MEKP/CHP blended initiator is not recommended for thin sections, during cool weather conditions, or with thick cure STYPOL® LSP Series resins. The use of an MEKP/CHP initiator under these conditions can result in an inadequate cure. The use of straight CHP initiator is not recommended.

For MEKP peroxide initiators, the initiator level should not exceed 2.4% or fall below 0.9% for proper cure. An initiator level of 1.25% at 77°F is considered ideal. Contact your initiator supplier or your Polynt representative for acceptable catalyst ranges for AAP or MEKP/CHP blends.

These products should not be used when temperature conditions are below 60°F, as curing may be adversely affected.

Type	Viscosity	Cure
A	Regular	Regular
B	Regular	Thin
C	Regular	Thick
D	Low	Regular
E	Low	Thin
F	Low	Thick
G	High	Regular
H	High	Thin
I	High	Thick
K	Low	Trim
L	High	Trim

Adhesion
It is recommended that all laminates that have been heat-cured, exposed to direct sunlight, or allowed to cure for more than 72 hours at room temperature be sanded before the next laminate is applied.

CAUTION
Do not add any material, other than the recommended fillers and methyl ethyl ketone peroxide, to this product without the advice of a representative of Polynt.

Refer to Polynt's Composites Applications Guide ("Cookbook") for equipment and application recommendations. Each user must determine the suitability of this product to his/her particular mode of operation and intended end-use application. A Polynt representative will be available to assist in the proper selection of all Polynt-Reichhold products available for commercial use.

SHELF LIFE & STORAGE

The shelf life of STYPOL® LSP Series resins is 120 days from the date of manufacture from Polynt. To maximize usage life and maintain optimum properties, resins and gel coats should be stored in the original closed container at temperatures below 23°C/73°F and away from ignition sources and sunlight. Keep containers sealed to prevent moisture pick-up and monomer loss.

RELATED LITERATURE

MB-334 – Recommended Initiators for Polynt STYPOL® L-Series and ArmorStar® Series Laminating Resins

SAFETY & WARRANTY

To receive a copy of our safety and warranty information, please email safetyandwarranty@polynt.com.