Product Datasheet

SP&S
Specialty Polymers and Services

EpoPro® 156A/B

RoHS 76/769/EEC

LOW VISCOSITY, EPOXY IMPREGNATION OR LAMINATING SYSTEM

EpoPro® 156A/B is 2-part, epoxy system that is ideal for making high performance composite parts. The mixed system is low in viscosity, has a long work-life and cures with heat to form a strong, rigid polymer with excellent heat and chemical resistance. It is designed for impregnating coils and windings and is excellent for impregnation fiberglass and for filament winding. The system has excellent adhesion to metals, wood, fiberglass, and most rigid plastics and is 100% solids and with no volatile organic content.

The EpoPro 156A/B system is available in a standard transparent, amber-brown color, but many other custom colors and other variations are available. For shorter pot lives and curing times and optional third component, EpoPro 156C, is available that accelerates the reaction without substantially changing the cured properties. Please contact us to discuss your application if you'd like to receive samples of a custom variant that would be suitable for your application.

SUGGESTED APPLICATIONS:

- Impregnation Wound Components
- Laminating, Filament winding and Bonding Fabrics, Filaments, and Fibers

HANDLING PROPERTIES	VALUE	TEST METHOD
EpoPro 156A		
Visual Appearance	Clear to light yellow liquid	
Density	1.16 g/cm³	ASTM E-201
Viscosity, Part A, @ 25ºC	10,000 cps	ASTM D-2393
EpoPro 156B		
Visual Appearance	Clear to light yellow liquid	
Density	1.22 g/cm³	ASTM E-201
Viscosity, Part B, @ 25ºC	300 cps	ASTM D-2393
EpoPro 156C		
Visual Appearance	Clear liquid	
Density	1.0 g/cm³	ASTM E-201
Viscosity, Part C, @ 25ºC	40 cps	ASTM D-2393
Mix Ratio (part by weight (pbw))	100A:100B (optional 0.5 – 1 pbw 156C)	
Mix Ratio (part by volume)	100A:100B (optional 0.5 – 1 pbv 156C)	
Mixed Viscosity @ 25ºC, initial	1900 cps	
Mixed Viscosity @ 40ºC, initial	450 cps	
Mixed Viscosity @ 60ºC, initial	120 cps	

Pot life vs. temperature (with no additional accelerator added)

Temperature	156A/B
25ºC	> 50 hours
40ºC	> 24 hours
60ºC	6-8 hours

Gel Time vs. temperature (thin film, hot plate testing)

Temperature	156A/B
120ºC	14- 16 minutes
140ºC	4 - 6 minutes
160ºC	1 – 2 minutes

Typical Cure Schedules*: 2 hours @ 120 ºC + 8 hours @ 180ºC **or**
2 hours @ 120 ºC + 2 hours @ 160ºC + 2 hours @ 180ºC

*Please note that cure time is the time at the indicated temperature, ramp up and ramp down times are not included. Please contact us for assistance if you'd like to consider an alternate cure schedule or for assistance in determining appropriate ramp times and temperatures.

PHYSICAL PROPERTIES (Tested at 25 ºC unless otherwise noted – cured 8 hours @ 180 ºC)

		TEST METHOD
Appearance	Amber to brown color	Visual
Density	1.12 g/cc	
Hardness, Shore D at 25°C	89D	
Tensile Strength	9,800 psi	ASTM D-638
Tensile Elongation	2.1%	
Tensile Modulus	420600	
Flexural Strength	17,400 psi	ASTM D-790
Flexural Modulus	435,000	
Glass Transition Temperature (Tg)	178ºC	ASTM D-648
Moisture Absorption (% weight gain)		ASTM D-570
24 hours @ 25°C	0.16%	
10 days @ 25°C	0.48%	
Thermal Conductivity	0.18 W/mK	ASTM D-2214
Thermal Rating	-55ºC to 200ºC	
Surface resistivity (ohms)	$>1.0 \times 10^{15}$	ASTM D-257
Volume Resistivity (ohm-cm)		Mil-I-46058C
@ 25ºC / @ 95°C	$>1 \times 10^{15}$ / 1×10^{14}	
Dielectric Strength (V/mil)	400	ASTM D-149

NOTE : Values are based on laboratory or average production results – not for specification purposes.

PROPERTIES OF FIBER REINFORCED COMPOSITES

(Tested at 25 ºC unless otherwise noted – cured 8 hours @ 180ºC)		TEST METHOD
Interlaminar Shear Strength Short beam: E-glass unidirectional specimen, 3.2 mm thick laminate, Fiber volume 59%-62%	10,800 psi	ASTM D 2344
Tensile Test, transverse stress - Unidirectionally wound tubes		
E-glass roving, 1200 tex, silane finish, 66% fiber volume, gelled at 100ºC.	10,000 psi	
Carbon Fiber roving, Torayca T300B, 58% fiber volume, gelled at 100ºC	11,740 psi	

PROCESSING AND APPLICATION INSTRUCTIONS:

Mix using meter-mix dispensing equipment, or manually. Whatever method is chosen, be sure to accurately weigh the components prior to mixing them and to ensure the correct mix ratio is used.

If mixing manually, weigh the desired amount of Part A into mixing container whose weight has been tared. Then weigh the desired amount of Part B into the mixing container. If desired the EpoPro 156A may be pre-heat to 30ºC – 50ºC prior to the addition of the room temperature EpoPro 156B. This warming step will reduce the initial mixed viscosity and may make hand mixing easier. Stir for at least 2 minutes and be sure to scrap the walls and bottom of the mixing vessel to be sure that all of the material is thoroughly mixed. To ensure a void free casting, it may be helpful to vacuum de-air the mixture after thorough mixing. A vacuum of 28 inches of mercury is generally sufficient to remove the vast majority of entrapped air from in just a few minutes.

If using an impregnating batch, we suggest heating the mixed material in the bath to 35ºC – 45ºC in order to ensure optimum fiber wetting. For filament winding, the mandrel should be heated to between 60ºC and 110ºC during the filament winding processing. The gelation temperature should be kept as low as possible to minimize shrinkage and internal stress in the finished parts.

For applications where wound components will be dipped or impregnating with the EpoPro 156, heat the components to 60ºC - 100ºC and then dip or flood with the fully mixed EpoPro 156A/B or 156A/B/C system. The mixed EpoPro 156 system may also be heated to up to 60°C, which will lower its viscosity significantly allowing for faster impregnations and wetting, but will also reduce the pot life of the system as indicated above.

PACKAGING AVAILABLE:

This product is available in a wide range of package sizes including quarts & 5-gallon pails. It can also be supplied pre-mixed and frozen in syringes or in custom kit sizes on request. Please contact us to discuss your preferred packaging if a custom packaging solution would be of interest.

STORAGE GUIDELINES:

Store the EpoPro 156A, 156B, and 156C in a clean, cool and dry environment in its tightly closed original containers. Protect from extended exposure to temperatures below 15ºC (59ºF) to prevent crystallization. If crystallization occurs, heat the entire container for 4 hours at 60ºC to re-liquefy the material. Also protect from exposure to extended moisture or high humidity by tightly re-sealing containers after use. If the

recommended storage conditions are observed the products will have a minimum shelf-life of 12 months from the date of shipment.

HANDLING PRECAUTIONS:

Follow all mandatory and recommended industrial hygiene procedures whenever these products are being handled and processed. For additional information please consult the corresponding material safety data sheets.

EpoPro 156A

Warning! May cause skin and eye irritation and possible allergic skin reaction. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated contact with skin. Avoid breathing vapor or mist. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

EpoPro 156B

Warning! Causes severe eye irritation and possible eye damage. Causes severe skin irritation and possible allergic skin reaction. Harmful if inhaled. Harmful if swallowed. DO NOT get in eyes, on skin, or clothing. Wear chemical splash goggles and impervious gloves when handling. Wash skin and clothing thoroughly after handling. Avoid breathing vapor or mist. Use only with adequate ventilation. Keep containers closed when not in use. DO NOT take internally.

EpoPro 156C

Warning! Corrosive to eyes, respiratory system & skin. May cause skin sensitization. Protect from heat, sparks, and open flame. Harmful if swallowed. Avoid contact with eyes, skin, or clothing. Wear eye protection and impervious gloves when handling. Wash thoroughly after handling. Avoid breathing vapor or mist. Keep containers closed when not in use. Use only with adequate ventilation. Do not take internally.

FIRST AID

In case of contact:

Skin – Immediately wash skin thoroughly with mild soap and water. Remove contaminated clothing and wash before reuse. Destroy contaminated shoes and other articles made of leather.

Eyes – Immediately flush eyes with plenty of water for 15 minutes and get prompt medical attention.

Inhalation - Remove person to fresh air. Administer oxygen or artificial respiration if necessary. Call a physician.

Ingestion - Do not induce vomiting. Dilute with plenty of water and contact physician immediately. Never give anything by mouth to an unconscious person.

DISCLAIMER:

IMPORTANT: The following supercedes Buyer's documents. **SELLER / MANUFACTURER MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE**. No statements herein are to be construed as inducements to infringe any relevant patent. Under no circumstances shall Seller / Manufacturer be liable for incidental, consequential or indirect damages for alleged negligence, breach of warranty, strict liability, tort or contract arising in connection with the product(s). Buyer's sole remedy and Seller's sole liability for any claims shall be Buyer's purchase price. Data and results presented are based on controlled or laboratory work and must be confirmed by Buyer by testing for its intended conditions of use. The product(s) has not been tested for, and is therefore not recommended for, uses for which prolonged contact with mucous membranes, abraded skin, or blood is intended; or for uses for which implantation within the human body is intended

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