Product Datasheet

EPOPRO 220A Systems

Filled Epoxy Encapsulating and Casting systems

Typical Properties

(Not for specification purposes. All tests run at 25°C unless otherwise noted)

EpoPro 220A resin Properties

Appearance	Visual	Tan liquid
Specific Gravity	ASTM D-1475	1.45 g/cc
Viscosity	ASTM D-792	105,000 cP
Flash Point, closed cup	ASTM D-92	254°C (489°F)

Hardener 220B-Properties:

Appearance	Visual	Light amber liquid
Specific Gravity	ASTM D-1475	1.10 g/cc
Viscosity	ASTM D-792	2,200 cP
Flash Point, closed cup	ASTM D-92	165°C (329°F)

Hardener 951-Properties:

Appearance	Visual	Light yellow liquid
Specific Gravity	ASTM D-1475	0.98 g/cc
Viscosity	ASTM D-792	75 cP
Flash Point, closed cup	ASTM D-92	148°C (298°F)

Hardener 9615-Properties:

Appearance	Visual	Liquid
Specific Gravity	ASTM D-1475	0.95g/cc
Viscosity	ASTM D-792	33,000 cP
Flash Point, closed cup	ASTM D-92	>98°C (>208°F)

Mix Ratio:

Parts by weight (volume)

220A / B	100A:9B B (100A:12B)
220A / 951	100A:7B (100A:10.5B)
220A / 9615*	100A:70B B (100A:107B)

*The mix ratio of EpoPro 220A and hardener 9615 can be varied from 35-125 pbw of 9615 to 100 parts of the EpoPro 220A. The optimal ratio will depend on the level of flexibility and Shore Hardness desired.

EPOPRO 220A is a versatile filled epoxy resin that can be cured with a number of different hardeners to form a solid polymer with a variety of properties. The cured polymer exhibits excellent thermal and mechanical shock resistance, a low coefficient of thermal expansion, and good to excellent electrical properties.

Suggested Applications:

- **220A/B** - This heat-cured system exhibits a very low exotherm permitting the casting of masses up to several hundred pounds. When fully cured, it produces a tough, durable polymer with excellent electrical properties and good thermal resistance it is suitable for many encapsulation applications including uses in motor stators, transformers, power insulators, and bushings.
- **220A/951** - This system provides a medium viscosity system that sets up rapidly at room temperature. When fully cured it produces a semi-rigid polymer with excellent mechanical and electrical properties. Due to its high reactivity it is limited to casting or encapsulation thickness of approximately 1".
- **220A/9615** - This system is allows the user to control the hardness and flexibility of the finished polymer by adjusting the mix ratio of the system. The fully cured polymer can be semi-flexible to rigid depending on the mix ratio used and generally exhibits excellent resistance to thermal cycling, good performance at cryogenic temperatures, and the ability withstand the strains caused by mismatched coefficients of thermal expansion. It can be cast up to 6" thick.

Benefits:

- 100% solids (no solvents)
- Range of properties and processing parameters available based on hardener selection
- Cured product is generally tough and exhibits resistant to both impact & thermal shock
- Excellent mechanical & dielectric properties

Storage Guidelines:

Store these materials in a clean, dry environment in their tightly closed original containers. These products are not considered temperature sensitive, but should ideally be stored at 16-35°C (61-95°F). Under these conditions the products will have a minimum shelf-life of 12 months from the date of shipment. If upon opening, crystallization of the resin or hardeners is observed, heat the component to 40-60°C for several hours to melt the crystals. Allow the material to cool to room temperature before using.

Processing Guidelines:

This system can be mixed manually or using dynamic or static mixing systems. Whatever method is chosen, be sure to accurately weigh both the resin and the hardener prior to mixing them and ensure the correct mix ratio is used.

If mixing manually, mix 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, 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 within 5-10 minutes.

If processing in a humid environment, it may be advisable to fully cure within an oven at 40-60°C in order to prevent vapor absorption that can lead to streaks on the surface of the casting.

To reduce the viscosity of the mix system to allow better flow or pourability, it is possible to heat the mixed system to 40-60°C. This will significantly reduce the viscosity of the system but will significantly shorten the pot life of the EpoPro 220A/951 and 220A/9615 systems. The EpoPro 220A/B system can be heated to 40-60°C and still retain a pot life of 4 hours or longer.

Mix Properties:	**220A/B**	**220A/951**	**220A/9615 (70pbw)**
Initial mixed Viscosity, 100 g.			
at 25°C (77°F)	175,000 cP	30,000 cP	64,000 cP
at 65°C (150°F)	10,000 cP		15,000 cP
Gel-time (100 g. mass) at 25°C	16 hours	30-50 minutes	1½ - 3 hours
Recommended Cure Schedules	16 - 20 hours at 80°C or 4 - 8 hours at 95°C	24 hours at 25°C or 2 hours at 65°C	48-72 hours at 25°C or 2-4 hours at 65°C or 1-2 hours at 90°C
Cured Properties			
Appearance	Tan	Tan	Tan
Sp. Gravity	1.48	1.47	1.30 g/cc
Shore Hardness at 25°C	89 D	89 D	80 D
at 95°C	80 D	83 D	38 D
at 150°C	50 D	64 D	32 D
Tensile Strength at break	8,300	7,500	-
Tensile Elongation	1.4%	1.0%	-
Flexural Strength			
at 25°C	10,500 psi	10,100 psi	10,000 psi
a 95°C	2,200 psi	6,000 psi	low
Compressive strength	18,000	16,000	15,000
Izod Impact, ft-lb / in. of notch	0.27	-	-
Cure shrinkage	0.14%	0.14%	-
Heat Deflection Temp @ 264psi	80°C	-	-
Coefficient of Thermal expansion	41.4 x 10^{-6} / °C	43 x 10^{-6} / °C	56 x 10^{-6} / °C
Water absorption			
24 hrs at 25°C	0.14%	0.06%	0.30%
2 hrs. at 100°C	0.33%	0.55%	0.50%
Thermal Conductivity	0.33 W/mK	0.33 W/mK	0.28 W/mK
Weight loss			
24 hrs at 150°C	015%	0.11%	0.39%
48 hrs at 204°C	1.15%	1.10%	1.27%
Thermal Rating	Class B (130°C)	Class F (155°C)	Class A (105°C)
Arc Resistance	126	125	94
Dielectric Strength, 1/8"	420 volts/mil	420 volts/mil	410 volts/mil
Volume Resistivity			
25°C	7 x 10^{14} ohm-cm	7 x 10^{14} ohm-cm	1 x 10^{15} ohm-cm
50°C	1.2 x 10^{10} ohm-cm	2.4 x 10^{11} ohm-cm	1.1 x 10^{9} ohm-cm
150°C	7.8 x 10^{8} ohm-cm	2.0 x 10^{9} ohm-cm	1.2 x 10^{8} ohm-cm
After 96 hours at 23°C & 96% Rel. Humidity	5.1 x 10^{14} ohm-cm	6.2 x 10^{14} ohm-cm	-
Dielectric Constant / Dissipitation factor at 25°C			
at 60 Hz	4.9 / 0.025	5.0 / 0.029	3.6 / 0.007
at 1 KHz	4.7 / 0.018	4.7 / 0.029	3.5 / 0.013
at 1MHz	4.4 / 0.030	4.1 / 0.026	3.2 / 0.020

Handling Precautions:

Mandatory and recommended industrial hygiene procedures should be followed whenever these products are being handled and processed. For additional information please consult the corresponding material safety data sheets.

Personal Hygiene:

EpoPro 220A - CAUTION! 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.

EpoPro 220B – WARNING! 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.

Hardener 951 - **CORROSIVE!** Do not get in eyes, on skin, or on clothing. Keep away from heat, sparks, and flames. Wear splash goggles and impervious gloves when handling. Wash thoroughly after handling. Avoid breathing vapor. Keep containers closed when not in use. Use only with adequate ventilation. Do not take internally.

Hardener 9615 – WARNING! 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

First Aid

In case of contact:
Skin - Wash skin thoroughly with mild soap and water. Remove contaminated clothing and wash before reuse. Discard contaminated shoes and other articles made of leather
Eyes - Flush eyes with plenty of water for 15 minutes and get prompt medical attention.
Inhalation - Remove person to fresh air
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

Specialty Polymers & Services, Inc. (SP&S)
27822 Fremont Court
Valencia, CA 91355
Tel - 661-294-1790
Fax - 661-294-0640

Info.@spolymers.com
www.spolymers.com