

## EpoPro<sup>®</sup> 245AF/B



### 2 PART MULTIPURPOSE EPOXY ADHESIVE SYSTEM

EpoPro<sup>®</sup> 245AF/B is a two part epoxy system that cures at room temperature or with heat into a tough adhesive compound. The EpoPro<sup>®</sup> 245A/B system is a black, mineral filled version of our standard EpoPro<sup>®</sup> 245A/B system . This system when cured produces a polymer composite that provides excellent mechanical and electrical properties and is resistant to moisture and many chemicals. The EpoPro 245AF/B system is an excellent adhesive and demonstrates excellent bond strength to most common materials including metals, wood, rubber, glass, and most rigid plastics.

A unique feature of this system is that the hardness of the cured polymer can be controlled by varying the mix ratio of the 245AF resin with the 245B curing agent. The cured polymer can be varied from a hard, rigid polymer to a softer, more semi-flexible state or even to a flexible elastomer simply by varying the mix ratio.

The EpoPro 245AF/B system can be supplied in other colors and viscosities by request. Please contact us to discuss your application if you'd like to receive samples of a custom color or to discuss the development of a custom variant that would be suitable for your application.

### SUGGESTED APPLICATIONS

- Multipurpose adhesive and potting compound – excellent for many uses
- Excellent for semi-flexible, and impact resistant bonds and sealing applications
- Complies with FDA 21 CFR 175.105 & 175.300 for use on food contact surfaces

<b>HANDLING PROPERTIES</b>	<b>VALUE</b>	<b>TEST METHOD</b>
<u>EpoPro 245AF (resin)</u>		
Visual Appearance	Tan Semi-Paste	Visual
Density, Part A	1.55 g/cm <sup>3</sup>	ASTM E-201
Viscosity, Part A, at 25°C	150,000 cps	ASTM D-2393
Flash Point	>93°C	ASTM D-92
<u>EpoPro 245B (hardener)</u>		
Visual Appearance	Amber viscous Liquid	Visual
Density,	0.97 g/cm <sup>3</sup>	ASTM E-201
Viscosity, Part B, @ 25°C	25,000 cps	ASTM D-2393
Flash Point	>93°C	ASTM D-92

# Product Datasheet

Mix Ratio (part by weight)	<b>100A:50B</b>	<b>100A:100B</b>	<b>100A:150B</b>	
Viscosity Mixed @ 25°C	40,000 cps	39,500 cps	35,000 cps	ASTM D-2393
Viscosity Mixed @ 65°C	3,000 cps	2,500 cps	2,300 cps	ASTM D-2393
Pot life (100 grams) @ 25°C	120 minutes	140 minutes	150 minutes	Gardner
Pot life (100 grams) @ 50°C	15 -20 minutes	15-20 minutes	20-25 minutes	Gardner

Cure Schedules: 24-48 hours at 25°C **or** 4 hours at 65°C **or** 2 hours at 80°C **or** 30 minutes at 100°C will provide good initial cure. At room temperature full curing may take 3-7 days. Heat cures will achieve full strength within the cure time listed + 24 hours at room temperature after the heat cure is complete. In many applications, allowing the adhesive to set for 4 hours or longer prior to curing will reduce curing shrinkage and provide the optimum bond strength.

<b>PHYSICAL PROPERTIES</b> (Tested at 25°C unless otherwise noted)				
Mix Ratio (parts by weight)	<b>100:50</b>	<b>100:100</b>	<b>100:150</b>	<b>TEST METHOD</b>
Appearance	Black Solid	Black Solid	Black Solid	Visual
Hardness, Shore	82D	63D	68A	ASTM D-2240
Tensile Strength	10,300 psi	8,500 psi	3,800 psi	ASTM D-638
Tensile Elongation	2.9%	7.5%	25%	ASTM D-638
Tensile Modulus	420,000 psi	310,000 psi	-	ASTM D-638
Flexural Strength	14,000 psi	11,000 psi	-	ASTM D-790
Flexural Modulus	350,000 psi	340,000 psi	-	ASTM D-790
Compressive Yield Strength	11,500	10,400 psi	-	ASTM D-695
Izod Impact Strength notched (Ft-lb)	0.75	1.42	-	ASTM D-256
Thermal Shock Cycle from 100°C to -55°C	Passes 3 cycles	Passes 8 cycles	Pass >10 cycles	Olyphant Washer
Curing Shrinkage (linear)	0.001%	0.001%	<0.001%	ASTM D-2566
Glass Transition Temperature (T <sub>g</sub> )	51°C	32°C	17°C	ASTM D-648
Coefficient of Thermal Expansion (CTE) below T <sub>g</sub> / above T <sub>g</sub> (ppm/°C)	74 / 156	84 / 170	94 / 230	ASTM E-831
Weight Loss after 48 hrs. at 150°C	0.02%	0.1%	-	ASTM D-495
Moisture absorption(24 hr. wt. gain)	0.20%	0.42%	-	ASTM D-570
Thermal Conductivity	0.35 W/mK	0.33 W/mK	0.30 W/mK	ASTM D-2214
Thermal Rating*	-40°C to 90°C	-55°C to 90°C	-55°C to 65°C	EIC 216
Fungus Resistance	Non-Nutrient	Non-Nutrient	Non-Nutrient	ASTM G-21
Insulation Resistance (ohms)	>5.0 x 10 <sup>15</sup>	3.0 x 10 <sup>15</sup>	>1.0 x 10 <sup>13</sup>	ASTM D-150
Volume Resistivity (ohm-cm) at 25°C	1.2 x 10 <sup>16</sup>	3.0 x 10 <sup>15</sup>	1.0 x 10 <sup>13</sup>	ASTM D-150
at 100°C	2 x 10 <sup>10</sup>	-	-	
Dielectric Strength (V/mil)	450	400	-	ASTM D-149
Dielectric Constant at 25°C at 60 Hz / 10 kHz / 1 MHz	3.3 / 3.2 / 3.0	3.5 / 3.3 / 3.1	4.7 / 3.8 / 3.4	ASTM D-150
Dissipation Factor at 25°C at 60 Hz / 10 kHz / 1 MHz	0.01 / 0.02 / 0.02	0.02 / 0.03 / 0.04	0.08 / 0.10 / 0.12	ASTM D-150

# Product Datasheet

Lap Shear Strength at 25°C (psi) (Mix ratio 100A:50B by weight)		ASTM D-1002	
Various Substrates:			
Concrete	1100*	Aluminum	2000
FR-4 laminate	3200*	Galvanized Steel	1800
Polyester laminate	2800*	Copper	1650
Wood (maple)	1800*		
*Indicates substrate failure			
Effect of Temperature: (Aluminum lap shear panels – mix ratio 100A:50B by weight)			
-40°F (-40°C)	2800	105°F (40°C)	1825
67°F (20°C)	2500	150°F (65°C)	1300
77°F (25°C)	2000	180°F (82°C)	1000

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

\*Thermal Rating is for best structural adhesive strength. For potting and some other applications such as staking where maximum adhesive strength is not required the practical usage range may be much wider.

## FDA STATUS

Fully cured bond lines and castings made from this system comply with the requirements of the Food & Drug Administration’s regulations 21 CFR 175.105 & 175.300 for the safe use on food contact surfaces under the conditions described in those sections.

## NASA OUTGASSING

(After 24 hours at 125°C and 10<sup>-6</sup> torr per ASTM E-595)

Results will vary with cure schedule & mix ratio used. In general, lower levels of the 104F-B and heat cures will produce the best results.

Mix ratio	Cure Schedule	Total Mass Loss (TML) %	Collectible Condensable Volatile Materials (CCVM), %	Water Vapor Release (WVR) %
100A:50B by weight	7 days at 25°C	0.26%	0.00%	0.30%
100A:50B by weight	30 days at 25°C	0.25%	0.00%	0.1%
100A:50B by weight	2 hours at 65°C	0.46%	0.20%	0.20%
100A:50B by weight	1 hours at 93°C	0.20%	0.01%	0.19%
100A :100B by weight	7 days at 25°C	0.80%	0.02%	0.40%
100 :100 by volume (100A :62.5B by weight)	1 hours at 93°C	0.46%	0.02%	0.28%
100 :150 by weight	7 days at 25°C	1.21%	0.10%	0.80%

## CHEMICAL RESISTANCE

(Samples made at 100A:50B mix ratio, cured for 7 days at 23°C then soaked 30 days in the fluids indicated at 23°C (75°F))

Ammonia	Excellent	Rubbing Alcohol	Fair
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# Product Datasheet

Vinegar (5% Acetic Acid)	Fair	(70% Isopropyl Alcohol & 30% Water)	
Hydrochloric Acid (10%)	Fair	Ethanol	Fair
Sodium Hydroxide (10%)	Good	Toluene	Fair
Sodium Hydroxide (50%)	Fair	Acetone	Fair
Sulfuric Acid (10%)	Poor	Paint Thinner/Mineral Spirits	Excellent
Boric Acid	Excellent	Turpentine	Good
Kerosene	Excellent	Chlorinated solvent (carbon tetrachloride)	Fair
Transmission Fluid (Type A & F)	Excellent	Water	Excellent
Power Steering Fluid	Excellent	Mineral Oil	Excellent
Brake Fluid	Fair	Corn Oil	Excellent
Simple Green cleaner (undiluted)	Excellent	Window Washer Fluid	Excellent

Excellent = Recommended for applications requiring long term immersion

Good = Recommended for applications with short term immersion or prolonged minor exposure (such as from spills, vapor, etc.)

Fair = Recommended only for short term spillage or other minor exposure applications

Poor = Not recommend (samples dissolved or dramatically weakened by exposure of more than a few minutes)

Please note that less rigid formulas will tend to have reduced chemical resistance, but against oil and water based materials may still perform very well. Resistance to acids, bases, and strong solvent is expected to be reduced for mix ratios with higher levels of the curing agent (245B).

## PROCESSING AND APPLICATION INSTRUCTIONS

To use, weigh (or proportion by volume) Part A and Part B in the ratio you have selected into a clean mixing container. Mixing containers should preferably be made of polypropylene, polyethylene, glass, or non-corroding metal. (Stainless steel, aluminum, etc.) Always use weighing equipment having accuracy that is  $\pm 1\%$  or less of the smallest quantity that you will be weighing. Blend Part A & B thoroughly by using a spatula or stirring stick for at least 2-3 minutes using a kneading motion. Scrape the bottom and sides of the mixing container carefully and frequently to produce a uniform mixture. Vacuum de-gassing after mixing may be helpful for best electrical and physical properties.

Apply to clean, dry surfaces. For best adhesion, abrade the surface with a wire brush, scouring pad, steel wool or coarse sandpaper. After abrasion, clean the surface of any loose material and degrease with solvent or detergent to remove any contaminants. The material may then be applied with any suitable application method include brushes, spatulas, trowels, etc.

## PACKAGING AVAILABLE

This product is available in a wide range of kits including pints, quarts, 1-gallons, 5-gallons, and drums.

In addition, pre-mixed and frozen syringes and cartridges are available in a wide variety of sizes (1ml, 3ml, 5ml, 10ml, 20ml, 30ml, 50ml and 55ml syringes, as well as 2.5 oz, 6 oz, and 12 oz cartridges) and styles (manual or air operated, EFD, Techcon, Semco, Iwashita, etc.)

Please call use with any special packaging requests, or for information on custom kitting.

## STORAGE GUIDELINES

Store these materials in a clean, cool, and dry environment in their tightly closed original containers. Protect from extended exposure to temperatures below 15°C (59°F). Crystallization may occur if the material is exposed to cold for extend periods. If this occurs, heat the entire container for 4 hours at 60°C to re-liquefy the material. Allow to cool to ambient temperature prior to using. Also protect the

# Product Datasheet



EpoPro® 245AF&B from exposure to moisture or high humidity. Tightly re-seal 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

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

See SDS for GHS warnings, handling, & precautionary statements.

## 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 supersedes 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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