

POLYMER COMPOSITES, INC.

Technical Bulletin

MAX CLR-HP A/B

High Performance Clear Liquid Resin

DESCRIPTION

MAX CLR-HP A/B is a two-part epoxy based system specially formulated to High Performance application that exhibits balance mechanical performance while maintaining crystal clarity and other aesthetic qualities. MAX CLR-HP provides the best performance at elevated temperatures as well as high impact properties. Its non-blushing characteristic allows MAX CLR- HP A/B to be an excellent choice for impregnating composite fabrics or lamination and filament winding applications that requires crystal clarity, gloss, chemical resistance and adhesion.

As an adhesive, MAX CLR-HP A/B performs well in bonding dissimilar variety of substrates such as composite materials, concrete and ceramic products, plastics, wood, glass, steel, aluminum and most soft metals.

MAX CLR-HP A/B is 100% solids and does not contain Ozone Depleting Chemicals (ODC), non-reactive plasticizers or solvent fillers.

MAX CLR-HP A/B performs well in a wider range of service temperature of up to 230°F under load and can withstand -100°C to 250°F continuous exposure. It demonstrates lower exothermic reaction and a very little shrinkage during and after cure.

MAX CLR-HP A/B is tough and impact resistant resin system capable of curing at low temperatures (-20°C). It is resistant to surface blushing cause by moisture interface with the surface of the applied resin.

MAX CLR-HP A/B is generally room temperature cured but can be snap-cured at elevated temperatures for a short period of time.

MAX CLR-HP A/B is a low ionic compound formulation that reduces the occurrence of oxidation in circuit board laminate manufacturing applications.

MAX CLR-HP A/B resists extreme and repeated thermal shocks making it well suited for bonding substrates with dissimilar expansion coefficients.

PHYSICAL PROPERTIES

Density	1.10 G/CC
Form and Color	Clear Liquid
Viscosity	1800 – 2,200 cPs @ 25°C Mixed
Mix Ratio	50 Parts "B" to 100 Parts "A" By Weight
Working Time	45 – 50 Minutes @ 25°C (100 gm mass)
Peak Exotherm	110°C (100 gram mass)
Handle Time	8 Hours
Full Cure Time	2 to 7 days @ 25°C or 8 hours at room temperature plus 2 hours at 100°C

MECHANICAL PROPERTIES

Hardness	80 ± 5 Shore D,
Tee-Peel Strength	5.7 Lbs. per inch Width
Tensile Shear Strength	1,900 psi @ 25°C 1,800 psi @ -40°C 950 psi @ 100°C
Elongation	3.0% @ 25°C
Flexural Strength	13,000 psi
Flexural Modulus	344,000 psi
Heat Deflection Temp.	110°C

ELECTRICAL PROPERTIES

Volume Resistivity	2.7×10^{12} Ohms-cm (Ω -cm)
Dielectric Strength	510 Volts/Mil @ 60 Hz.

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Chemical Resistance % Weight Change as a Function of Time full immersion at 30°C

REAGENT	3 days	28 days
Deionized Water	0.49	1.50
Sea Water	0.11	0.98
Methanol	7.93	-2.41
Ethanol	3.98	10.28
Toluene	0.40	2.86
Xylene	0.04	0.05
Butyl Cellosolve	16.63	5.31
MEK	Destroyed	Destroyed
10% Lactic Acid	1.81	5.42
10% Acetic Acid	0.11	0.45
70% Sulfuric Acid	0.08	0.14
50% Sodium Hydroxide	0	0
10% Sodium Hypochlorite	0.51	1.36

Specimens were cured for 36 hours at 25°C plus 1 hours at 100°C

APPLICATION and USAGE

Precaution: As with industrial chemicals of the same nature, avoid direct skin contact by using protective gloves and eyewear. Always practice safety first. Weigh out two parts "Part A" to one part "Part B" by weight or by volume in to a clean container. Mix by hand with a spatula or a low speed mixer. Mix gently and scrape the sides and bottom of the container. To insure complete mixing, transfer the mixed resin into another clean container and mix for another 30 seconds.

To use Max CLR HP A/B as a Liquid or impregnating resin for fiberglass or other composite fabrics:

Pre-cut or measure out the correct shape, length or pattern and the number of layers of fabric needed to achieve the desired thickness. Impregnate the fiberglass with mixed MAX CLR-HP to the optimum resin content and use platen press pressure or vacuum bag technique to consolidate the layers together and apply compression force. This will also remove any air pockets in the laminant. Clean the surface to be reinforced or laminated. Apply a thin layer of the mixed MAX CLR HP A/B unto the item to be reinforced. Apply a layer of fiberglass and aide the resin to wet-out the fiber glass using a brush or roller and apply subsequent layers of fabric sandwiching a layer of resin until the desire thickness is achieved. Use a rubber squeegee to remove excess resin and to apply compressive pressure to consolidate the layers of fiberglass together. Allow curing for 24 hours. Clean up excess resin run off before it has a chance to set-up using rag dampened with acetone or MEK. Cure at room temperature for 24 to 36 hours.

To use MAX CLR-HP A/B as coating

- Prepare the surface to be coated or sealed by degreasing and removing any surface contaminants.
- If coating a wood substrate as a base, seal the wood with MAX CLR HP thinned down with 50% acetone or MEK and allow to cure overnight. Upon cure, lightly sand the surface to remove any raised wood grain and then clean with a tack rag. Repeat if necessary until a smooth surface is achieved.
- If imbedding pictures or other items unto the tabletop, plaques or a decoupage projects, secure the items using MAX CLR-HP as an adhesive and allow to set-up before coating.
- Pour the mixed MAX CLR HP into another container and mix for another minute (this insures that no tacky spots caused by unmixed material will be applied) and pour or brush or foam roller (use foam roller for a lint free application) coat apply unto the substrate to be sealed. Allow the coating to flow out evenly and protect the surface from airborne dust and debris until it has set-up. If a thicker coating is desired, allow to set-up for at least 6 hours before applying subsequent coats. To remove stubborn surface bubbles, pass a flame from a propane torch over the surface very, very quickly and the air bubbles will pop.
- Allow the completed coating to cure for at least 24 hours before handling.
- Optional step for a supper high gloss finish: Upon full cure of the coating, lightly wet sand the surface using a 1800 grit then an a 2000 grit or finer polishing or rubbing compound and apply durable car polish.

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To use MAX CLR-HP A/B as a crystal clear casting resin.

- Clean the mold and apply a good quality release agent such as wax mold release or PVA mold release.
- Slowly pour the mixed MAX CLR HP into the on corner of mold cavity and allow the resin to fill the cavity allowing the entrapped air bubbles to rise to the surface. Remove any surface air bubbles using the torch technique described above.
- Allow curing at room temperature for 24 to 36 hours.
- De-mold the cured part.

To use MAX CLR-HP A/B as an electrical potting resin.

- Place the circuit board in the casing or cavity and secure all wiring leads to its desired position.
- Pour the mixed MAX CLR-HP into one corner of the cavity and fill to the top
- Cure at room temperature for at least 24 hours before putting in service

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PACKAGING AND STORAGE

MAX CLR-HP A/B is available in pints, quarts, gallon, 5 gallon and 55 gallon Kits. Use size kits and special packaging requests are also available. MAX CLR-HP A/B should be stored in a cool dry place. DO NOT store above 30°C for prolonged period.

MAX CLR-HP A/B is guaranteed for six months from the date of shipment. If stored in its original unopened container, MAX CLR-HP will maintain its properties for over 3 years. Store opened container in a cool and dry place with the caps securely replaced.

SAFETY NOTE

This product is for industrial use only. Please review all precautions before using this product. As with all products of the same nature, avoid prolonged inhalation and repeated skin contact. Always wear safety goggles and impervious rubber gloves when handling this material. Large mass curing of this product is not recommended for it may produce noxious fumes.

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