



TECHNICAL DATA SHEET

SUPERGRADE METAL LP

Product Codes: 501,502, 504

Metal Repair & Rebuilding Composite, Longer Working Time - Paste Grade

PRODUCT DESCRIPTION

SUPERGRADE METAL (LP) is a two component composite made with modified curing agents and a selected blend of various metal alloys rich in steel to provide a longer working time in hot weather and higher temperature plant conditions for in-situ repairs. This strong, solvent free, non-rusting, non shrink, fully machinable formulation is a sag-free formula that can be applied vertically and overhead to 1/2" inch thicknesses. Exhibits tenacious bond to all metals and resistance to most MRO chemicals. Sectors: Industrial, commercial & marine. *LP signifies longer pot life/longer working time.

INTENDED USES

- Repair scored/worn shafts & scored hydraulic rams, worn keyways
- Excellent for worn bearing housing repairs
- Excellent for resurfacing flange faces
- Sealing transformer leaks, cracked engine blocks, sumps, etc.
- Repair of welds and joints / tank seam repair
- Repair leaking tanks & pipes
- Critical shimming application that requires a longer pot life or working time
- Restoring stripped threads
- Repair cracked pump & valve casing
- All metal repairs patching, rebuilding, filling, sealing and bonding metal to metal

BENEFITS

- Long working time or pot life for large applications, hot weather or high heat environment conditions
- Can be fully machined, drilled, tapped, sanded and coated over.
- Easy mix ratio, no special tools required
- No hot work involved
- Highly chemical & corrosion resistant
- Excellent bonding to carbon steel, aluminum, copper, brass, stainless steel and some plastics
- Sold as a kit containing mixing board, applicators, spatula set & Fiberzite Reinforcement Fabric.

PRODUCT SPECIFICATIONS

Performance Data	#501	#502
Color	Dark Grey	Dark Grey
Adhesive Tensile Shear(ASTM D1002)	3200psi	2500
Compressive Strength (ASTM D685)	13750 psi	15500 psi
Cured Hardness Rating (Shore D)	87	87
Coverage per kit @ 1/4" Note: account for waste & surface roughness	47.5 sq in/kit (6"x8"x1/4") or (12"x8"x1/8")	47.5 sq in/kit (6"x8"x1/4") or (12"x8"x1/8")
Dielectric Strength (ASTMD 149)	93 volts/mil	45 volts/mil
Flexural Strength (ASTM D790)	7200 psi	8300 psi
Initial Cure	10 Hours @ 75F/24C	4 hours @ 75C/24C
Full Cure	24 Hours @ 75F/25C	24 hours @ 75C/24C
Full Immersion	60 hours @ 75F/25C	48 hours @ 75C/24C



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Machinable @ 75F Cure Time	10 hours	5 hours and < 22 hours
Pot Life (Working Time)	40 min @ 75F	20 min @ 75C
Pull of adhesion (ASTM D4541)	2430 psi	3100 psi
Ratio Mix by Volume	1:1	3:1
Shrinkage	0%	0%
Temperature Resistance Dry	360F/182C	350F/176C
Temperature Resistance Wet (Immersion)	145F/63C	150F/66F

***Cure Time:** Industrial Metal cures faster with warmer temperatures and slower with colder temperatures. Temperatures will affect the pot life, initial cure, full and immersion cure rates of the product as well. However, product performance after cure is un-affected. Please consult with EMP Inc.

Optimum Performance Requirement:

Supergrade Metal will fully cure at room temperature (75F/24F) within 24 hours and post heat curing is *not* required. For higher tolerances in specialized applications where stronger mechanical, thermal and chemical resistances are required, it may be post cured as follows: After 4 hours initial cure, raise temperature slow to 212F/100C for 4 hours. (This can highly enhance compressive, flexural, pull of adhesion and thermal properties can be enhanced. Consult with EMP Technical for specification # PC-ME-41970 if post curing is desired.

SURFACE PREPARATION

1) Surfaces must be clean, dry and free from foreign matter. Remove any rust or oxidation. Metals must be prepared properly using a grinding wheel with a metal disc or grit blasting if available to a white metal finish. For best results, a surface profile of 5 mil is ideal. Proper profiling creates a tenacious mechanical bond and durability. Score the metal in a cross hatch pattern.

Certain conditions and fluids may call for manual surface preparation to the existing metal or substrate and thus wire brushes, metal files, hack saws will be the tools of choice to manually prepare the surface. Such tools may be used for surface preparation, cleaning and profiling to create a "tooth" or cross hatch pattern so that epoxy can anchor onto the substrate mechanically and chemically for a powerful bond.

If crack repair is being conducted, make sure to "V" out the crack. Drill and tap crack at the ends to stop crack propagation. For longer cracks, it may be necessary to drill and tap at every 2-4" for strength and stability of the repair.

2) Blow off, vacuum or wipe off any dust from surface preparation.

3) Using a stiff bristle brush (paint brush), clean and wash area vigorously with the quick evaporating, non-residue forming E.M.P. Metal Cleaner #701. Repeat twice and allow to dry properly. Begin application of epoxy immediately on the newly prepared surface.



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EMP Release Agent PN# 1126 can be used in areas where Industrial Metal shouldn't adhere to. (eg: forming mold, etc.)

Additional information: Please consult with our technical department for proper guidelines for surface preparation. Training and consultation are available on all E.M.P. Inc. products.

Mixing

*This product is conveniently packaged in pre-measured kits ready to mix and apply. Each kit contains hardener and resin. Remove the appropriate amounts by volume of resin and hardener to be used on the non absorbing mixing board supplied in the kit. Lay both parts side by side to determine the measurement by volume. Mix both parts using the large spatula supplied in the kit. Lift all the material to be mixed and spackle down on the mixing board. Continue this process until a streak free, even and smooth consistency is reached.

Note: Mixing full kits is always recommended for proper cure, however, small batches can be mixed with appropriate volume measurements. Be sure to always check the ratios on the product containers. Small mixing spoons and cups may be used for accurate volume mixes. (For eg: If volume measurement of a product is 3:1, then fill 3 filled cups of Resin to 1 cup of hardener, remove all the contents to a mixing board and mix to an even, smooth, streak free consistency.

Application Method

Application Instructions:

Temperature Considerations

If product is being stored in cold conditions, please move tubs to warm area to soften epoxy before use. Store product at 75F/23C before for use. For best results always apply at 40F or above. Heaters may be used by enclosing area with plastic to elevate the temperature for proper application.

It is recommended to apply a thin layer first using a short bristle brush supplied in the kit. Brush material with firm pressure by rubbing it into the metal. Be careful not to have any air pockets under the product. Once this process is complete, immediately apply a thicker layer on top less than 1/4" and allow to dry.

For cracks, holes and gouge repairs, use Fiberzite reinforcement tape as follows:

- 1) Apply a thin layer using a stiff bristle brush
- 2) Apply 1/16 layer of Industrial Metal
- 3) Cut Fiberzite reinforcement tape to size of area to be built or sealed (approx 3" away and around the damage)
- 4) Saturate the fabric tape by using the applicator or spatula and firmly press a thin layer of Industrial metal on both sides



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- 5) Affix Fiberzite on the previously applied layer using a brush with a dabbing and brushing motion making sure there are no air pockets between the fabric and the Supergrade Metal.
- 6) Apply final coat of Industrial Metal at 1/16" over the Fiberzite fabric.
- 7) Allow to dry as per instructions

ACTIVE LEAK REPAIRS:

Active low pressure leaks can be plugged with LEAKLOX EPOXY first and then abrade the area and apply ALLZITE as specified above.

PATCHING:

For all other repairs, standard procedures of surface prep, mixing and application remain the same.

SHAFTS & BEARING HOUSING REPAIRS, FLANGE FACE REPAIRS, SCORED HYDRALIC RAMS, WORN KEY WAYS & OTHER SPECIALTY REPAIRS : Consult E.M.P Inc. guidelines & specifications or contact EMP Technical Department for assistance. Our field engineers will guide you through your specific repairs step by step for proper procedures and techniques for in-situ as well as off line instructions.

COMPATIBILITY:

Supergrade Epoxy can be used as a standalone system for metal refurbishment. It may also be used in conjunction with other E.M.P. systems as the final protection or main bonding layer. All E.M.P. Inc metal repair systems are designed to be compatible to one another to produce a homogeneous system.

Vertical & overhead surface applications:

Industrial Metal may be applied at 1/2" thickness (per coat) on vertical/overhead applications and thus completely sag free. It may be built up to the thickness desired.

Horizontal surface applications:

Industrial Metal Epoxy may be applied as thick as required by building up layers. Please contact EMP Inc technical department for specific application requirements and questions.

Lathing & Machining

Supergrade Metal is fully machinable. Please consult with E.M.P. Inc technical department for lathe specifications for Supergrade Metal specification # 501LM, 502M-LM, 503LM

Storage & Handling



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Store at room temperature in a cool, dry place. Keep containers tightly closed after use. If long term storage is required after use, encase the resin and hardener in a plastic bag, remove all air and store. Vacuum packaging via plastic bags increases the shelf life.

Packaging

SUPERGRADE METAL , PN# 501

454 gram/Kit (Hardener & Epoxy)

- 1 - Mixing Board
- 1 - Fiberzite Reinforcement Tape
- 1 - Spatula Set
- 1 - Paddle
- 1 - Applicator
- 1 - Stiff Bristle Brush

SUPERGRADE METAL , PN# 501B

(same as above without Mixing board, Fiberzite, spatula, paddle, applicator & stiff bristle brush)

SUPERGRADE METAL, PN# 502

454 grams/Kit (Hardener & Epoxy)

- 1- Mixing Board
- 1 -Fiberzite Reinforcement Mesh
- 1 -Spatula Set
- 1- Paddle
- 1- Applicator
- 1 -Stiff Bristle Brush

SUPERGRADE METAL , PN# 502B

(same as above without Mixing board, Fiberzite, spatula, paddle, applicator & stiff bristle brush)

SUPERGRADE METAL EPOXY, PN 504 - Customized Formulation, Specification 74182

Optional, Additional Products:

E.M.P. Metal Repair System Applicator Tool Kit, Part # TK220 (Also sold separately))

E.M.P. Metal Cleaner #701 - Non-Residue forming, metal surface prep cleaner. Fast evaporation.

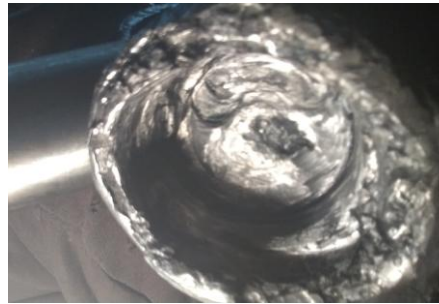
EMP Release Agent PN# 1126 - can be used in areas where Industrial Metal and other epoxies shouldn't

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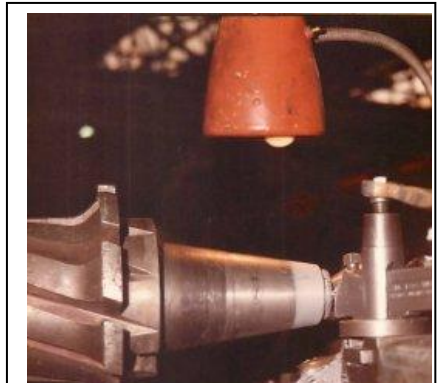
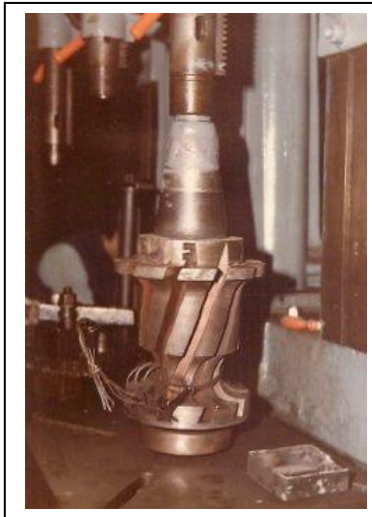
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adhere to. (eg: forming casting metal components/molds etc)



Bearing Housing Repair conducted on a tractor bucket loader, wheel rotator, bottom bearing hinge assembly. Void was egg shaped. E.M.P. Inc. SUPERGRADE METAL was installed, metal rebuilt and void brought back to original.



Shaft Repair with E.M.P. Inc. SUPERGRADE METAL, application, cure & lathing. In-Situ shaft repairs can also be made with Supergrade.



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Safety Information, Warranty & Limited Liability Information



SAFETY PRECAUTION: READ MATERIAL PRODUCT SAFETY DATA SHEETS BEFORE USING PRODUCT. Our products are intended for use by experienced professional only. Suitable chemical resistant gloves, safety glasses or full face shields, protective clothing and respirators must be worn as per product safety data sheet while conducting surface preparation and applying product. Do not smoke or drink while using product. Keep away from open flames and sparks.

EMPCORR warrants their product from defects. Because the application, handling or storing of our products is beyond our control, EMPCORR will not be held liable and in any form whatsoever for the results obtained after usage. To the best of our knowledge, the technical data contained herein is accurate on the date of publication and is subject to change without prior notice. Purchasers shall conduct their own tests to determine the suitability of our products for their particular purpose. Product properties, performance data and contents of this technical data sheets should not be constructed as specifications. User must contact EMPCORR to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. EMPCORR assumes no responsibility for coverage, performance or injuries resulting from use. No other warranty or guarantee of any kind is made by EMPCORR, express or implied, statutory, by operation of law, or otherwise, including merchantability and fit for a particular purpose

Liability, if any, is limited to replacement of products or net selling price of the product; EMPCORR shall not be liable for incidental or consequential damages, direct or indirect including but not limited to lost profits, down time, damages to property of the purchaser or other persons, bodily harm or injuries to purchaser or other persons, or damages for which the purchaser may be liable to other persons, whether or not occasioned by EMPCORR's negligence. Acceptance of delivery of our product means that you have accepted the terms of this notice, warranty and liability whether or not orders or other documents state terms that vary from this warranty. Our products contain chemicals that may cause serious physical injury. Before using, read the safety data sheet and follow all safety precautions, and use proper protective equipment (PPE) to prevent bodily harm before using the product.