

M1 Structural Adhesive

Preliminary TDS Version 21-02



ADHESIVE DESCRIPTION

ACRAMAXX® M1 series structural adhesives are based on Methyl Methacrylate and formulated for superior metal bonding performance with little to no preparation, especially to galvanized metals. The M1-6BGRY is a single activator (Component B) that can be used with choice of three adhesives: M1-6A, M1-18A, or M1-35A adhesives (Component A) in a 1:1 volumetric mix ratio. These products are designed for room temperature curing with high strength and toughness to adhere to assemblies of thermoset composites, plastics, and are formulated to be primerless on most metal surfaces. (See all notes on back.) ACRAMAXX® adhesives are the latest in adhesive technology manufactured by Engineered Bonding Solutions, LLC., Our 1:1 ratio adhesives can be available in 50ml, 400ml, 600ml and 1500ml dual cartridges, as well as 5- and 50-gallon containers for application with meter-mix dispensing equipment.

KEY FEATURES

- Easy 1:1 mix ratio
- Two working times available: 6 and 18 minutes
- Up to 3,400 psi lap shear strength on most metals
- Excellent adhesion to: AL, CRS, SS, G90
- Good chemical resistance
- Excellent fatigue and shock load resistance
- Stable formulations with 6-month shelf-life

SUBSTRATES THAT CAN BE BONDED

Polyesters, vinyl esters, SMC, epoxies, acrylics, PVC/FPVC/CPVC, polycarbonate, ABS, styrenics, stainless steel, carbon steel, aluminum, coated metals, galvanized metals, and many other composites, thermoplastics, and metals.

NOT RECOMMENDED FOR BONDING

Polyolefins: TPO's, polyacetals and PTFE

CHEMICAL RESISTANCE

Cured adhesive is generally resistant to intermittent exposures of salt solutions, hydrocarbons, acids, and bases with a pH range from 3 to 10. See more important notes on chemical resistance on back page.

TEMPERATURE EXPOSURE

Temperature range for this product is from -40 to 180 °F (-40 to 82 °C), with intermittent exposure between -67 to 250 °F (-55 to 121 °C).

TYPICAL ADHESIVE WET PROPERTIES

Property	Comp A	Comp B
Color	CREAM	Gray
Viscosity (cP)	100K-200K	200K-400K
Mix ratio weight	1	1.05
Mix ratio volume	1 part	1 part
Density g/cc	.996	1.046
WPG lb/gal	8.3	8.72

CURED PHYSICAL PROPERTIES

	Typical Values psi (MPa)
Tensile strength	3,500-3,900 (27)
Modulus kpsi	160-190 (1310)
Elongation (max. %):	20-40
Lap Shear AL	2900-3400 (23.5)
Lap Shear AL, Bake 30min @380°F	3000-3500 (24.1)
Lap Shear CRS	2900-3400 (23.5)
Lap Shear SS 304	2900-3400 (23.5)
Lap Shear Galvanneal Bake 30min @ 380°F	3100-3600 (24.8)
Lap Shear G90, ASTM D1002	2,500-3200 (22)

All lap shear bonds ASTM D1002 using M1-6GRY and were bonded as received with no preparation or just dry wiping except CRS (light sand). Cure cycle 24hr @ RT followed by 1hr post-cure @ 179.6°F. Additional post bake oven exposure as indicated above prior to testing. Typical failure mode: mixed cohesive or thin film cohesive.

G90/Galvanized Metals vary by vendor and process, all galvanized bonding applications should be tested prior to bonding by the end user to determine suitability. See notes on back page.

1:1 MIX RATIO CARTRIDGE PRODUCTS

CARTRIDGE→	M1-6GRY	M1-18GRY	M1-35GRY*
Activator→ Comp B	M1-6BGRY	M1-6GRY	M1-6BGRY
Adhesive → Comp A	M1-6A	M1-18A	M1-35A
Typical Working Time	<u>5-8</u>	<u>16-22</u>	<u>30-40</u>
Fixture Time	<u>20-30</u>	<u>50-70</u>	<u>90-130</u>

***Note on M1-35: Due to the long working time of this version, user must still use AP-1 metal primer on Galvanized metals, but it is not necessary to use AP-1 on SS, AL, or CRS.**

SEE IMPORTANT INFORMATION AND NOTES ON PAGE 2

IMPORTANT INFORMATION

ACRAMAXX® is a trade name of Engineered Bonding Solutions, LLC (hereinafter referred to as “EBS”). All 1:1 ACRAMAXX® adhesives (Component A) and activators (Component B) are flammable. Using proper PPE (Personal Protective Equipment) is strongly recommended. Wear gloves and safety glasses to avoid skin and eye contact. Harmful if swallowed. Please always refer to both TDS and SDS before using any ACRALOCK adhesive product. Questions relative to handling and applications should be directed to 1-855-411-GLUE or email us at info@acralock.com

Adhesives are supplied in dual-component cartridges, 5-gallon pails, and 50-gallon drums to facilitate mixing through approved stainless steel meter mix dispensing equipment. Always use a static mixer with sufficient elements to ensure a homogeneous mix. We do not recommend mixing by hand. Please contact your EBS representative for questions about dispensing equipment manufacturers and approved seal and gasket materials. Automated equipment should be constructed of stainless steel. An exothermic chemical reaction occurs when components A and B are mixed and will generate heat. The amount of heat generated is relative to amount of mass of mixed product, and also the working time of the Components A and B are more relative to reactivity of product. Generally, faster curing products applied in larger beads or mixed product left in large quantities can cause rapid boiling of monomers under excessive heat of reaction. These vapors are flammable and harmful if inhaled. Cutting and scraping is advised. Avoid sanding and grinding as this can produce noxious smoke that could contain harmful constituents. In this case, consider a forced air breathing apparatus (PPE). After proper mixing of components, the VOC content of cured product will be less than 20 g/L (0.17 lbs/gal).

Use sufficient material to ensure the joint is completely filled when parts are mated and clamped. All adhesive application, part positioning, and fixturing should occur before the working time of the mix has expired. After indicated working time, parts must remain undisturbed until the fixture time is reached. The working time is the approximate time that the adhesive remains fluid and will still wet the surface of the adherend after mixing component A (adhesive) and component B (activator). The fixture time is the approximate time after mixing that the bonded assembly can be unclamped or moved. However, both working time and fixture time will increase or decrease depending on ambient temperatures and thickness of application. Thin applications in colder conditions can substantially increase fixture time. The reported data presented in the TDS are based on tests conducted under laboratory conditions of 75°F/24°C. For applications in hot or cold ambient conditions, please consult your EBS representative. Clean-up is easiest before the adhesive has cured with citrus terpene, N-methylpyrrolidone (NMP), polar solvents, or ketones. To avoid contaminating wet adhesive cosmetic surfaces with these cleaners, use masking tape, and remove after applying while adhesive is wet. If the adhesive has already cured, the most effective method of clean-up may be carefully removing by scraping with a sharp tool followed by a solvent wipe.

IMPORTANT NOTES:

Surface Preparation: The need for surface preparation must be determined by the user based on comparative testing of unprepared and prepared substrates to determine if strengths are adequate for application. Clean adhesive failure is not desired for long-term durable performance. In all cases initial shear strength tests must be followed up with simulated or actual durability tests to assure that surface conditions do not lead to degradation of the bond over time under service conditions. Subsequent changes in substrates or bonding conditions will require re-testing.

Most thermoplastics listed above can be bonded with no surface preparation other than a dry wipe or air blow-off. If contamination is visible or suspected, wipe with alcohol prior to bonding. Low surface energy plastics like polyolefins, thermoplastic polyesters and fluorocarbon plastics are generally not bondable.

Metals ACRAMAXX® M1 adhesives were primarily developed to bond as received aluminum, stainless, cold rolled steel and Galvanized steel including G90 with little to no preparation based on “as received” condition with the exception of M1-35 which must use AP-1 on Galvanized metals. If oxidation and/or surface contamination is present, then you should sand and clean to remove contamination before bonding. We recommend environmental testing on all substrates to determine the performance for your intended application and use.

Thermoset composites are generally bonded without preparation; however, mold releases and process can produce varied bonding performance and testing should be performed.

Elevated temperature cohesive strength at 180°F retains a minimum of 500 psi as measured on aluminum. Bonds can be exposed to intermittent temperatures up to 250°F, provided at the higher temperature range bonding assembly is in a fixture and not under shear load. User must determine suitability for all applications and operating conditions.

Chemical Resistance EBS strongly recommends laboratory and end-use testing representative of the environmental conditions and how the bonded assembly will be used. Bonds are generally resistant to the effects of heat, water and moisture, aqueous chemicals and some intermittent exposure of gasoline, motor oil and diesel fuel. Not recommended for immersion or long-term exposure to all hydrocarbons, concentrated acids or bases, or aggressive organic solvents such as toluene, ketones, and esters.

The shelf life of Components A and B in unopened containers is approximately six months from the date the product is manufactured from EBS facilities. Shelf life is based on steady state storage between 55°F and 80°F (13°C and 27°C). Exposure, intermittent or prolonged, above 80°F/27°C will result in a reduction of the stated shelf life. Shelf life of both components can be extended by air-conditioned or refrigerated storage between 55°F and 65°F (13°C and 18°C).

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