



*“A World of Adhesive Solutions”*

## TECHNICAL DATA BULLETIN

### **ManuSpec MS4310A / MS9235B** Structural Laminating Adhesive

#### PRODUCT DESCRIPTION:

MS4310A / MS9235B, is a two part, epoxy compound that is designed for composite laminate repair at temperatures up to 440°F. MS4310A / MS9235B has a long working life of ~60-90 minutes at 25°C (75°F), for 100g of mixed product. When exposed to higher temperature, substrates and applications, MS4310A / MS9235B retains its' designed strength properties with a shortened work life. Please note that the working life is significantly decreased when masses greater than 1 lb are mixed before application.

The mix ratio of MS4310A / MS9235B resin to hardener is 100:26 by weight and 100:33 by volume. When fully cured, the material produces a durable, resilient bond that has strong environmental resistance to strong acids, bases and aggressive solvents. MS4310A / MS9235B was designed primarily for composite repairs to ferrous and aluminum substrates.

#### INSTRUCTIONS FOR USE:

Combine the proper proportions of resin and hardener in a clean container. Mix both components thoroughly until a uniform mixture is achieved. The work life of the mixture will vary with temperature and the quantity of material. **CAUTION: Mixed material evolves significant heat when quantities greater than 1 lb are mixed well, not applied, and remain in a concentrated mass.** Consult MSDS for additional safety measures.

#### Properties of Materials As Supplied:

(All tests are conducted at 25°+/- 2°C, unless otherwise indicated.)

#### Part A MS4310A Resin:

Property	Test Method	Unit	Value
Chemical Type	---	---	Epoxy
Appearance	Visual	---	Pale Yellow
Density	ASTM D792	g /cc (lb/gal)	~1.16 (9.66)
Brookfield Viscosity	ASTM D2393	cP	~675 - 750

# ManuSpec Company, Inc.

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## Part B MS9235B Hardener:

Property	Test Method	Unit	Value
Chemical Type	---	---	Amine
Appearance	Visual	---	Clear
Density	ASTM D792	g /cc (lb/gal)	~0.97 (8.1)
Brookfield Viscosity	ASTM D2393	cP	50 - 65

## Properties of Mixed Material:

Property	Test Method	Unit	Value
Chemical Type	---	---	
Appearance	Visual	---	Clear
Density	ASTM D792	g /cc (lb/gal)	~1.11
Brookfield Viscosity	ASTM D2393	cP	~500-600
Pot Life (100g mass @25°C)	---	minutes	~60-90

## Cure Schedule:

Cure Schedule	Option 1	Option2
*7 days@25°C		X (S)
24hr@25°C	X (S)	
8hr@66°C	X (S)	X (U)
6hr@82°C		X (S)
4hr@93°C	X (S)	X (U)
2hr@121°C	X (S)	X (U)
2hr@149°C	X (S)	X (U)
2hr@177°C	X (S)	X (U)

\*For full cure at ambient temperature, S = Supported U=Unsupported

## Properties of Cured Material:

Note: Values indicated are evaluated in an unsupported mode at ambient lab temperature (25°+/-2°C) unless otherwise indicated:

Property	Test Method	Unit	Cure Cycle	Value
Compressive Strength	ASTM D-695	psi	8hr@66°C	14,700
Yield Modulus		ksi		725
Yield Modulus	ASTM D-695	psi	2hr@121°C	16,500
Modulus		ksi		13,200
				12,000
				725

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Tensile Strength and Percent Elongation	ASTM D-638	psi %	4hr@66°C	8,500 3.8
		psi %	2hr@121°C	13,000 3.5
Glass Transition (Tg)		°C	4hr@66°C	88
CTE (<Tg)	TMA (10°C/min)	e-06/°C		26
CTE (>Tg)		e-06/°C		181

*Additional specific cured properties of MS4310A / MS9235B may be supplied upon request.*

**STORAGE AND HANDLING:**

The shelf life of MS4310A / MS9235B is 12 months at 25<sup>o</sup> C. MS4310A / MS9235B exhibits no signs of crystallization For best results, store in original, tightly closed containers in a cool, dry place out of direct sunlight. Containers should be loosely covered during the heating process to avoid pressure buildup. Allow contents to return to room temperature before mixing resin and hardener.

**PACKAGING:**

MS4310A / MS9235B is packaged in pints, quarts, gallons, pails, and drums. The hardener is packaged according to the container size of the resin. Specialty packaging options are available on request. Contact customer service for additional information at 281 351-9889 or [sales@manuspec.net](mailto:sales@manuspec.net)

**GENERAL INFORMATION:**

Recommendations for the use of products are based upon tests believed by us to be reliable. However, since the handling and use of our products under user’s conditions are beyond our control, no warranty, expressed or implied, including but not limited to merchantability or fitness for a particular use, is made concerning this product. The user assumes all risks of use or handling, whether or not in accordance with any directions or suggestions of the supplier. Seller shall not be liable to purchaser or any other person for loss or damage directly or indirectly arising from the use of our products, from breach of any warranty or any other cause, the exclusive remedy against the seller being to require replacement or repair of defective goods. If the purchaser does not accept products on such items, they are to be returned at once, unopened. **This material is for professional and industrial use only.**

*PRODUCT INFORMATION CONTAINED HEREIN IS INTENDED FOR REFERENCE ONLY. MATERIAL SAFETY DATA INFORMATION AVAILABLE AT (281)351-9889.*