



# Rhino™

## Rhino™ 1401-21T / 4101-23 Thixotropic Epoxy System for Hand Laminating at Ambient Cure Data Sheet



ISO 9001:2000  
FM62236

Resin – Part # 1401-21T  
Hardener – Part # 4101-23

### DESCRIPTION:

Multifunctional epoxy and cycloaliphatic-amine blend hardener for high performance composite parts. One hour pot life, with fast cure development at typical ambient temperatures. Thixotropic resin will not drain from laminate. Excellent combination that provides good thermal resistance, excellent fatigue and inter-laminar shear strength with rapid wetting of E-glass fiber reinforcements. Rhino Linings 1401-21T Epoxy Resin is formulated for highly increased E-glass fiber compatibility. Low toxicity, low odor system. no VOCs, 100% solids.

### SUGGESTED USES:

Hand lay-up of composite fiberglass reinforced structures.

### SYSTEM LIQUID PROPERTIES:

Viscosity 1401-21T Resin, 77°F	2,500 – 3,000 cps (thixotropic)
Viscosity 4101-23 Hardener, 77°F	150 cps
Mix Ratio, Resin to Hardener	100:30 by weight
Mixed Viscosity, 77°F	700 cps
Gel Time, 130 grams, 77°F	60 – 65 mins (Venus Gel Timer)
Pot Life, 200 grams, 77°F	50 – 60 mins (Time to reach 45°C in an unstirred mass)
Weight Per Gallon, 1401-21T Resin	9.5 lbs
Weight Per Gallon, 4101-23 Hardener	8.1 lbs

### HOW TO USE BASICS:

Condition epoxy resin and hardener to 20°C – 30°C (68°F – 85°F) to ensure proper mixed viscosity. Mix resin and hardener at the ratio of 100 parts 1401-21T resin to 30 parts 4101-23 hardener by weight. Introduce mixed material onto reinforcement(s), and roll to release air from laminate. In the case of hand lay-up, continue rolling until there are no “white” areas indicating incomplete fiberglass wet-out. A post cure of 12 hours at 130°F will bring the composite to full cure. A cure schedule of 12 hours at 135°F or 7 days at ambient will accomplish maximum HDT. Optimum cure time(s) versus temperature(s) will depend on parameters such as part thickness or size:

### REINFORCEMENT TYPES:

Rhino Linings 1401-21T Epoxy Resin is specially formulated for highly increased compatibility with E-glass reinforcements.

### ADVANTAGES OF RHINO 1401-21 EPOXY RESIN:

Rhino Linings Epoxy 1401-21T Epoxy Resin is formulated to improve the intimate bond between the epoxy resin and E-glass fiber reinforcements. This formulation technique results in increased physical properties as follows:

- Fiber Pull-Out Strength
- Tensile Strength and Modulus
- Flexural Strength and Modulus
- Compressive Strength
- Impact Resistance
- Inter-Laminar Shear Strength

Of equal, if not greater significance is the retention of the above properties after exposure to heat, cycle fatigue, water, expected adverse environmental reagents such as salt spray, acid rain, etc. The formulation of Rhino Linings Epoxy 1401-21T Epoxy Resin results in minimal degradation of the cured composite’s physical properties as compared to epoxy resin systems not containing the proprietary formulation constituents of Rhino Linings Epoxy 1401-21T Epoxy Resin. The benefit to the composite fabricator is increased product life and longevity.

# Rhino™ 1401-21T / 4101-23

## CURED PHYSICAL PROPERTIES OF COMPOSITE:

A-260 E-glass (epoxy compatible rovings) with Rhino Linings 1401-21T Epoxy Resin and 4101-23 Epoxy Hardener (65:35 glass to resin ratio). Cure schedule – 2 hours at 77°F (wet out) / 12 hours at 135°F (basic cure) / 7 days at ambient temperature.

PROPERTY	RESULT	TEST METHOD
Tensile Strength	83,00 psi	ASTM D-638
Tensile Modulus	5,250,000 psi	ASTM D-638
Flexural Strength	86,000 psi	ASTM D-790
Flexural Modulus	2,490,000 psi	ASTM D-790
Izod Impact	44.5 ft/lb/in	ASTM D-256-A
Water Absorption	0.09%	ASTM D-570
Cured Specific Gravity	1.92	ASTM D-790
Barcol Hardness	64	RHINO

## CURED PHYSICAL PROPERTIES OF NEAT RESIN:

Rhino Linings 1401-21T Epoxy Resin, 100 parts, Rhino Linings 4101-23 Epoxy Hardener, 30 parts. Cure schedule – 2 hours at 77°F (wet out) / 12 hours at 135°F (basic cure) / 7 days at ambient temp.

PROPERTY	RESULT	TEST METHOD
Shore D Hardness	88D	RHINO
Heat Distortion Temperature	>175°F	RHINO
Elongation at Tensile Strength	4.5 – 5.0%	RHINO
Ultimate Elongation	7.5 – 8.5%	RHINO
Ultimate Compressive Strength	14,500 psi	RHINO

## HOW SUPPLIED:

5 Gallon Pails, 55 Gallon Drums, Intermediate Bulk Containers (IBC's), Mfg by Rhino Linings Epoxy Division, San Diego, CA..

## SAFETY PRECAUTIONS:

**Health Considerations: Consult the Rhino Linings® Material Safety Data Sheets.**

This chemical system requires the use of proper safety equipment and procedures. Please follow the Rhino Linings® product MSDS and Safety Manual for detailed information and handling guidelines.

### For Your Protection:

The information and recommendations in this publication are, to the best of our knowledge, reliable. Suggestions made concerning the products and their uses, applications, storage and handling are only the opinion of Rhino Linings Corporation. Users should conduct their own tests to determine the suitability of these products for their own particular purposes and of the storage and handling methods herein suggested. The toxicity and risk characteristics of products made by Rhino Linings Corporation will necessarily differ from the toxicity and risk characteristics developed when such products are used with other materials during a manufacturing process. The resulting risk characteristics should be determined and made known to ultimate end-users and processors. Because of numerous factors affecting results, **Rhino Linings Corporation makes no warranty of any kind, express or implied**, other than that the material conforms to its applicable current Standard Specifications. Rhino Linings Corporation hereby disclaims any and all other warranties, including but not limited to those of merchantability or fitness for a particular purpose. No statements made herein may be construed as a representation or warranty. The liability of Rhino Linings Corporation for any claims arising from or sounding in breach of warranty, negligence, strict liability, or otherwise shall be limited to the purchase price of the material.

©2009 Rhino Linings Corporation. All rights reserved.



### Rhino Linings Corporation

9151 Rehco Road, San Diego, CA 92121  
858-450-0441 • Fax 858-450-6881  
1-800-422-2603  
www.rhino linings.com

Rhino Linings Australasia Pty Ltd ..... +61 7 5585 7000  
(Asia and Australia)

Rhino Linings Canada, Inc ..... 1-866-447-1471

Rhino Linings Europe ..... +49 6103 936474  
(Africa, Europe and Middle East)

Rhino Linings Latin America ..... +52 55 5632 0195  
(Mexico, Caribbean, Central and South America)