Rhino Linings®

Tuff Stuff® FR 21-85-15
Data Sheet

Part A – TuffGrip™ 21-90 Iso – Part # 60016
Part B – Tuff Stuff® FR 21-85-15 Resin – Part # 60055

DESCRIPTION: Tuff Stuff® FR is a two component, flame retardant, elastomeric polyurethane coating system. Its flame retardence makes it an ideal coating for numerous applications that require a flammability rating. Because of the large number of flammability ratings and the large array of surfaces that can be coated, it is highly recommended that testing, certification and approval be considered prior to any application of this coating. Note: Ultimate flame retardence is dependent upon coated substrate, thickness and density.

FEATURES & BENEFITS:

- Maximum thickness – unlimited
- Excellent abrasion resistance.
- Excellent impact resistance
- High tensile strength, elongation and tear strength
- Excellent fire retarding-self extinguishing, low dripping
- Excellent weather resistance
- Excellent corrosion resistance
- Excellent casting material
- Good chemical resistance
- Provides vibration and acoustic dampening

APPLICATIONS:

- Excellent fire retardent protective lining for abrasion, impact and corrosion resistance.
- Spray-on application creates a monolithic, seamless lining which conforms to any shape and size.
- Tough, durable lining for military applications such as:
  - Tactical vehicles and equipment requiring abrasion, corrosion and impact protection.
  - Foot traffic areas requiring non-slip surfaces.
- Excellent blast mitigation properties for military barracks, vehicles, temporary structures and buildings.
  - High tensile and elongation properties contains and reduces schrapnel in vehicles and buildings.
- Can withstand tracked vehicle traffic and heavy loads with proper thickness build.
- Reduces noise from vibration and impact.
- Spray-on application creates a monolithic, seamless lining which conforms to any shape and size.
- Can withstand vehicle forklift traffic and heavy loads with proper thickness build.

CHEMICAL PROPERTIES:	Standard Test	Isocyanate (A)	Resin (B)
Specific Gravity (grams/cc)	ASTM D-792	1.19	1.12
Viscosity, CPS at 77°F (25°C)		175 – 225	900 – 1000
Solids by Volume/Weight		100%	100%
Volatile Organic Compounds		0 lbs/gal	0 lbs/gal
Mix Ratio, Parts per Volume		1	2
Mix Ratio, Parts per Weight		60	100
Gel Time*, Seconds		15 ± 5 (low pressure) | 10 – 12 (high pressure)	
Tack-free*, Seconds		60 – 120 (low pressure) | 60 (high pressure)	
95 – 99% Cure*		24 hours	
Theoretical Coverage (dft)		1600 sqft/gal at 1 mil thick	
Shelf Life - Unopened Containers		6 months	12 months
Base Color		clear amber	pale yellow opaque

*Tested in cups 160 gms combine at 75° – 85°F (24° – 29°C)

TYPICAL PHYSICAL PROPERTIES:	Test	Result
Hardness (Shore D)	ASTM D-2240	85±5
Tensile Strength (psi)*	ASTM D-412	800 – 1100
Flexural Modulus	ASTM D-790	5600 – 6400
Tear Resistance (pli)* Die C	ASTM D-624	140 – 150
Elongation (%)*	ASTM D-412	325 – 375
Taber Abrasion Resistance (mg of loss/1000 cycles) CS17 Wheel; 1000 grams weight	ASTM D-1044	10 – 15
Ross Flex (% crack growth per 50,000 cycles)	FIA-308	0
Water Absorption (%) - 24 hours	ASTM D-570	1.0%

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TYPICAL PHYSICAL PROPERTIES *(continued)*:		**Test**	**Result**
Flammability	Note: Small-scale flammability tests are an indication of behavior; however, they do not necessarily predict performance in a real life situation.	MVSS FMV-302 Cal 117 UL-94	Does not ignite Pass Pass (Uncertified) V-O
Dielectric Strength (volts/mil)		ASTM D-149	300
Volume Resistancy (ohm/inches)		ASTM D-257	6 X 10 (12)
Dielectric Constant (MHz)		ASTM D-150	5.4
Dissipation Factor (MHz)		ASTM D-150	0.058
Cathodic Disbonding		ASTM G-8	Pass

*Properties were checked on lining, 1/8" (125 mils), (3.18 mm) thick stock.

PROCESSING CHARACTERISTICS:

Component - Low Pressure	Component - High Pressure	Hoses - High Pressure	Substrate Surface
75º – 85ºF (24° – 29°C)	120º – 150°F (49° – 66°C)	140ºF (60°C)	60° – 110°F (15° – 43°C)

DRY FILM THICKNESS RANGE: Varies based on application, typically used at a minimum of 1/16" (62.5 mils; 1.5 mm) up to unlimited thickness

CHEMICAL RESISTANCE: Guidelines only: Fume, splash, spillage as noted. Individual testing required for immersion.

Acetic Acid to 10% . . . . . .Excellent
Formic Acid to 5% . . . . . .Excellent
Sulfuric Acid to 10% . . . . . .Excellent
Tannic Acid to 20% . . . . . .Excellent
Solvents . . . . . .Moderate
Ammonia to 5% . . . . . .Excellent
Caustic Soda Lye to 50% . . . .Excellent
Potash Lye to 20% . . . . . .Excellent
Oils . . . . . .Excellent

Properties were check on lining, 1/8" (125 mills), (3.18mm) thick stock.

SUBSTRATES: Metals, wood, concrete, fiberglass, geotextiles and most plastics

COLOR OPTIONS: Full color range available. Standard colors - black, indigo blue, graphite and flame red. Custom colors are available by special order.

STORAGE AND HANDLING: Part A (Isocyanate) like other organic isocyanates, can react with water to form insoluble ureas and carbon dioxide gas with can result in a pressure buildup inside closed containers. Therefore, extreme care must be taken to assure containers used for Part A remain dry. Part A should be stored at temperatures between 75° F and 80° F under a dry nitrogen atmosphere. **Part B (Resin)** is hygroscopic and should be stored in sealed containers to prevent ingress of moisture. If stored at temperatures between 75° F and 80°F, the storage life of this product is 12 months. Part B will separate upon storage. This material must be thoroughly mixed just prior to use. For additional information, refer to Rhino Linings Material Safety Data Sheet.

SAFETY PRECAUTIONS: Health Considerations: Consult the Rhino Linings® Safety Data Sheets (SDS)

This chemical system requires the use of proper safety equipment and procedures. Please follow the Rhino Linings® product SDS 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.

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