

Part A – TuffGrip® HP 11-90 Iso – Part # 60254-1  
 Part B – TuffGrip® HP 11-90 Resin – Part # 60255-1  
 Part B – TuffGrip® HP 11-90 Resin Black – Part # 60256-1

**DESCRIPTION:** TuffGrip® HP 11-90 system is a one to one ratio, two-component, 100% solids (no VOCs, no solvents), exothermic, rapid curing, elastomeric hybrid polyurea lining. Lining thickness can vary from a minimum of 1/16" (62.5 mils; 1.5mm) for non-load bearing or abrasion-resistant linings up to unlimited thickness.

**TYPICAL USES:**

- Excellent protective lining for abrasion, impact and corrosion resistance
- Spray-on application creates a monolithic, seamless lining which conforms to any shape and size.
- Elastomeric properties allow for application to surfaces subject to: vibration, expansion, contraction, movement, flexing, abrasion and impact.
- Stable from -40° to 175°F (-40° to 79.4°C)
- Withstands light vehicular and foot traffic
- Aggressive non-slip performance can be achieved with aggregate integrated into lining.

**FEATURES & BENEFITS:**

- Excellent abrasion and impact resistance
- Very good slip resistance
- Excellent weather resistance
- Excellent corrosion resistance
- Good chemical resistance
- Reduces noise from vibration and impact

**CHEMICAL PROPERTIES:**

	Test	Isocyanate (A)	Resin (B)
Specific Gravity (grams/cc)	ASTM D-792	1.13	1.03
Viscosity, CPS at 77°F (25°C)		350 – 550	500 – 600
Solids by Volume		100%	100%
Volatile Organic Compounds		0 lbs/gal	0 lbs/gal
Mix Ratio, Parts per Volume		1	1
Gel Time, seconds		4 – 5	
Tack Free Time, seconds		8 – 10	
Recoat, max		≤ 4 hrs	
Cure Time		72 hrs	
Theoretical Coverage DFT		1600 sqft @ 1 mil/gal	
Odor		mild	amine
Shelf Life - Unopened Containers		12 months	6 months
Base Color		yellow or light-straw	opaque

**TYPICAL PHYSICAL PROPERTIES:**

	Test	Result
Hardness (Shore A)	ASTM D-2240	90±5
Tensile Strength (psi)*	ASTM D-412	1100 – 1500
Tear Resistance (pli)* Die C	ASTM D-624	200 – 250
Elongation (%)*	ASTM D-412	150 – 200
Compressive Strength (psi)	ASTM D-695-96	800
Taber Abrasion Resistance (mg of loss/1000 cycles) CS17 Wheel; 1000 grams weight	ASTM D-4060	55 – 70
Ross Flex (% crack growth per 50,000 cycles)	ASTM FIA-308	0

**TUFFGRIP® HP 11-90 (continued):**  
**TYPICAL PHYSICAL PROPERTIES:**

	Test	Result
Coefficient of Friction on Steel		
Static	ASTM D-1894-95	.85
Kinetic	ASTM D-1894-95	.78
Water Absorption (%)	ASTM D-570	≤1.6
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 of TuffGrip® polyurethane lining, 1/8" (125 mils), (3.18 mm) thick stock.

**PROCESSING CHARACTERISTICS:**

Equipment Used	Process Pressure	Spray Gun	Mix Module
Graco Reactor E-XP2	2000 psi (static)	Fusion - Air Purge or Mechanical Purge	AR2929 or greater

**Process Temperatures:** The system settings required to achieve quality spray application will vary depending on environmental and substrate conditions. The following recommended parameters will help ensure optimum lining quality.

Iso Component	Resin Component	Hoses	Substrate Surface
140° – 160°F (60° – 71°C)	140° – 150°F (60° – 66°C)	140° – 160°F (60° – 71°C)	40° – 120°F (4° – 49°C)

**DRY FILM THICKNESS RANGE:** Varies based on application. Lining thickness can vary from a minimum of 1/16" (62.5 mils; 1.5mm) for non-load bearing or abrasion-resistant linings up to unlimited thickness.

**NOT RECOMMENDED FOR:**

- Sustained temperatures below -40° F (-40° C) or above 175° F (79.4° C)
- Application to high density polyethylene or thermo plastics

**CHEMICAL RESISTANCE:** Good resistance to many routine chemicals such as: weak acids, weak alkalis, oils and cleaning agents. For specific applications and/or information, consult with a Rhino Linings® representative.

**SUBSTRATES:** Metals, wood, concrete, fiberglass and geotextiles

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

**HOW SUPPLIED:** Net weight per set is 910 pounds (412.7 kg). A set of TuffGrip HP 11-90 consists of one (1) 55 gallon (208 L) drum of 'A' component and one (1) 55 gallon (208 L) drum of 'B' component.

**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.

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