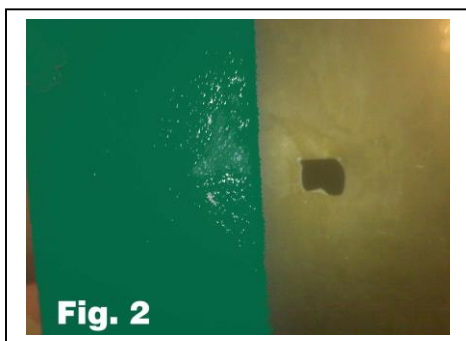


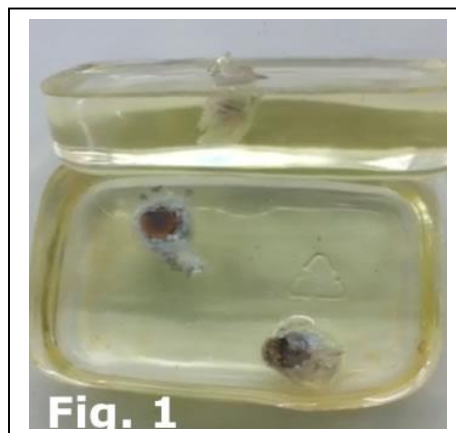
Ballistic SIM™

Ballistic SIM™ super-polymer technologies are designated into 3 groups: **BS-NEAT**, **BS-LAM** and **BS-SM**. **BS-NEAT** may be cast optically clear to a thickness of 1.25" (31mm) to handle intense hand gun fire at close range with fire-power from multiple rounds of 44 magnum, 9 mm and 45 caliber bullets. As shown in shown Fig. 1 a couple of 45 caliber bullets were stopped at a depth of .375" into BS-NEAT at close range. **BS-LAM** is specifically designed for composite builds using numerous inner members such as ultra hard steels, ceramics, Kevlar fabrics and ultra-dense engineered thermoplastics. **BS-SM** is an ultra-tough energy absorbing skin used primarily in shrapnel mitigation.



Ballistic SIM™ super-polymer materials are capable of absorbing very high impact energy, extremely high tear resistance and can withstand high heat capacities whereby demonstrating ultimate toughness. The spray version of Ballistic SIM™ (BS-SM) is used to strengthen a variety of military grade substrates used for transportation vehicles, armament assemblies and structural building reinforcement as shown in Fig. 2 where BS-SM is sprayed on a high strength very hard steel (Brinell 60-65) panel at a thickness of 3.6 mm. Shown from the back side, the left hand side shows the dark green BS-SM super-polymer coating strengthening the hard steel, keeping it from shattering into shrapnel and panel failure cracking.

TDS



Generally, Ballistic SIM™ super-polymers are used in some type of ballistic shielding applications. These materials may be applied to many types of structural substrates which include high strength steel, 6061 Aluminum, high-strength composites, wood laminates, reinforced masonry and concrete. These unique materials provide extreme protection for safe-houses, personnel vehicles, government buildings, armed outposts and special aircraft. For specific applications, please contact our technical support group.

Ballistic SIM™: Castable BS-Neat, BS-LAM Physical Properties		
Appearance	Visual	Optical Clarity
Flex Modulus	ASTM D790	390k psi
Tensile Strength	ASTM D412	5500 psi
Elongation	ASTM D412	50 %
Hardness (Shore D)	ASTM D785	85
Abrasion (Taber CS17)	ASTM D4060	50 mg/1k cycles
Tear Strength	ASTM D624	>400 lbs./lin. in.
Gel Time	Time	15 minutes
Mix Ratio	PBV	1A – 1B
Ballistic SIM™: Fast-Set Spray BS-SM Physical Properties		
Tear Strength	ASTM D624	550 lbs./lin. in.
Tensile Strength	ASTM D412	3610 psi
Elongation	ASTM D412	500 %
Hardness (Shore D)	ASTM D785	45-50
Abrasion (Taber CS17)	ASTM D4060	25 mg/1k cycles
Impact Strength	ASTM D2794	>300 in. lbs.
Gel Time	Time	30 seconds
Mix Ratio	PBV	1A – 1B



SPECIALIZED INDUSTRIAL MATERIALS

Adhesion Results of Typical Substrates per ASTM D-4541 Elcometer

Concrete – Primed	>300 psi	Cohesive Failure; Excellent Bonding
Steel – Primed	>1000 psi	Excellent Bonding
Wood – Primed	>250 psi	Wood Cohesive Failure; Excellent Bonding

TECHNICAL APPLICATION DATA

Physical application of spray Ballistic SIM™ BS-SM requires a 2-component high pressure liquid pumping machine. BS-NEAT and BS-LAM may be hand batch mixed for the casting process. Surfaces must be prepped for cleanliness and/or use an adhesion primers to acquire superior adhesion which is vital to contributing to the total energy absorption of the system. Application temperature ranges from 20°F to 150°F. For the hand mix materials, stir for 1 minute vigorously or mix with a hand drill jiffy mixer. Casting working time is 10 min. at 75°F. Full cure occurs within 24-48 hours for all Ballistic SIM™ super-polymer materials. Functional operation temperature ranges from -20°F to 250°F. Surface appearance is normally glossy and smooth for all grades. BS-LAM and BS-SM may be color-tinted if desired. Refer to MSDS for material and safety standard procedures.

Preparation of substrate surface prior to the application of a Specialized Industrial Materials, LLC is extremely important to achieve proper system bonding. Concrete must be fully cured and should be prepared with a sandblasting, diamond grinding or machine sanding depending on the severity of the concrete surface condition. Similar proper preparation must be performed for metals. Primers are also recommended for proper preparation. Always power clean using mild detergent prior to sanding, etc. Call Tech Support Group for assistance with selecting SIM application system. Also read the Application Page on this website. Composites substrates must be dry and free of dust before applying SPS as an inter-laminate bonding matrix material. It is always best to perform a test within a small section of the application area prior to full scale engagement. Please contact our Customer Service and Technical Support Group for any questions and to provide direction with specific selection of SIM material system for the application, questionable surface conditions, operational procedures, material dispensing equipment, spray/pour guns, safety protection gear and cleanup kits.