BULLET LINER™

HIGH-PERFORMANCE INDUSTRIAL PROTECTIVE SPRAY COATINGS

CARLISLE POLYURETHANE SYSTEMS

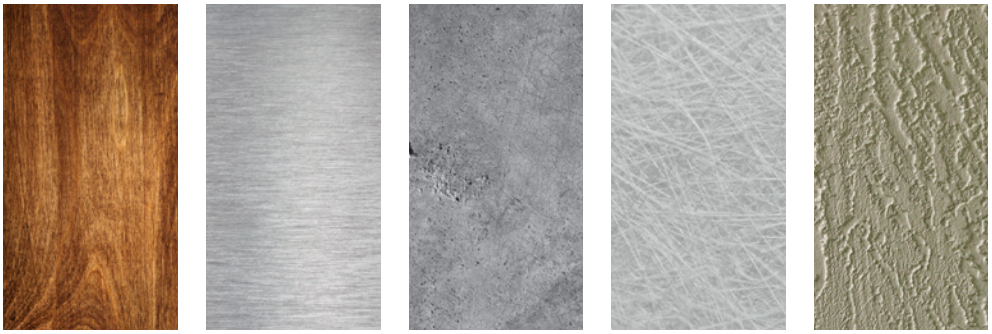
A COMPANY OF INNOVATION, TECHNOLOGY, AND EXPERIENCE

Bullet Liner International develops, manufactures, and markets high-quality impenetrable protective coating solutions for the light industrial, heavy industrial, construction, roofing, and industrial storage tank applications.

The bond that binds our protective spray coating products to virtually any metal, wood, rubber, plastic, or steel surface creates a seal so incredibly strong that the coated surface is completely safeguarded against a host of devastating elements. Engineered to be abrasion-proof and watertight, Bullet Liner protective spray coatings will not crack, flake, or peel.

PROTECTS A WIDE VARIETY OF SURFACES

Wood, Steel, Concrete, Aluminum, Fiberglass, Polystyrene, Concrete, Styrofoam, Drywall, and much more



TESTING AND CERTIFICATION

Bullet Liner 1 and Elite Shield 61 meet or exceed the highest standards set for testing and certification:

- NSF/ANSI 61 (Water Safety)
- EN ISO 2812-1:2008 (Paints and Varnishes)
- EN ISO 9227:2017 (Corrosion Tests)
- TUV DIN EN 71-3:2019 (Toy Safety)
- EN ISO 4624:2016 (Paints and Varnishes)
- EN ISO 4628-1:2016 (Paints and Varnishes)
- EN ISO 2808:2008 (Paints and Varnishes)
- EN ISO 6270-1:2002 (Paints and Varnishes)
- EN ISO 12944-1:2018 and EN ISO 12944-2:2018 (Paints and Varnishes)
- EN ISO 11925-2:2010 (Reaction to Fire Class)
- 10/2011/CE (Plasticized and Synthetic Materials)
- 1935/2004/CE (Contact with Food)

BULLET LINER ELITE SHIELD 61

ELITE SHIELD 61 is a 100% solid, no VOCs, rapid-curing pure polyurea coating that boasts impeccable physical properties. Designed to be used in potable water applications, this premier spray elastomer provides remarkable protection and durability while being drinking-water safe in water tank applications greater than 3,8 m^3, and in piping applications where the pipe diameter is greater than 13 cm. It offers excellent adhesion to most substrates and can be used in a range of other applications where premier-level performance is critical.

TYPICAL CURED PROPERTIES

PROPERTY	RESULT
COLOR	Neutral
DUROMETER (ASTM D2240)	65 Shore D
TENSILE STRENGTH (ASTM D412)	25 MPa
ELONGATION (ASTM D5034)	380%
DIE-C TEAR STRENGTH (ASTM D624)	600 PLI
ABRASION RESISTANCE (ASTM D624)	0.3% Loss @ 1,000 cycles
DOLLY ADHESION (ASTM D4541)	> 13,8 MPa

PROPOSED APPLICATIONS

Potable Water, Construction, Industrial, and Storage Tanks

POTABLE WATER, INDUSTRIAL, AND STORAGE TANKS

The bond that binds our Bullet Liner industrial-grade sealant to virtually any metal, wood, rubber, plastic, or steel surface creates a seal so incredibly strong that the coated surface is completely safeguarded against a host of devastating elements. Storage tanks for water and other liquids become well protected from the many damages caused by rust, corrosion, chemical usage, extreme heat or cold, along with the daily rigors of the most punishing industrial setting.

Bullet Liner International protective coatings are approved for use in applications with direct contact with drinking water and drinking water system components. Our Bullet Liner Elite Shield 61 has passed stringent testing and meets the regulatory requirements for use in public drinking water distribution systems, storage, and other potable water applications. Engineered to be abrasion-proof and watertight, Bullet Liner custom spray protective sealant is guaranteed not to crack, flake, or peel.

ROOFING & CONSTRUCTION

Weather and environment produce some of the most punishing treatment that outdoor equipment and buildings can suffer—whether it's the frigid cold of winter, the blistering heat of summer, or corrosion-generating rain, sand storms, or anything else Mother Nature can dish out.

Bullet Liner spray on environmental protectant is a unique formulation that instantly bonds to surfaces and seals out water and other detrimental elements. Left untreated, these conditions could cause erosion, leaks, and other unwanted damage to roofs and equipment. Bullet Liner's nonslip, tight-grip texture also provides additional safety to metal stairways, walkways, or other surfaces that could become slippery when wet. Our formulation has been real world tested in all parts of the globe and it will not crack, blister, or fade despite extreme degrees of temperature or fluctuation.

Protect your facilities' roof, siding, stairways, or equipment with Bullet Liner spray-on polyurethane protectant—an investment that will help improve the lifecycle and value of your assets and keep your operations running smoothly.

CONSTRUCTION MATERIALS ENGINEERING DEPARTMENT ITB

Stringent testing supports Bullet Liner Elite Shield 61 as having the following characteristics:

ELITE SHIELD 61 CHARACTERISTICS

SCOPE OF TESTS		TEST RESULTS	REQUIREMENTS ACCORDING TO PN-EN 1504-2:2006		REQUIREMENTS FULFILLED (CLASS)
PROPERTY	TEST METHOD				
IMPACT RESISTANCE	PN-EN ISO 6272-1:2011	After loading no cracks and delamination, 32 NM	After loading no cracks and delamination; Class I ≥ 4NM Class II ≥ 10NM Class III ≥ 20NM		Fulfilled for Class III
CHEMICAL RESISTANCE OF THE COATING AFTER 28 DAYS OF WATER WITH PH 4-4,5 EXPOSURE	PN-EN 13529:2005 (Method without pressure)	Increase in hardness 24h after the coating is removed from immersion in the test liquid (measured according to shore method) of 1,2%	Reduction in hardness of less than 50% when measured according to shore method 24h after the coating is removed from immersion in the test liquid		Fulfilled
SLIP/SKID RESISTANCE	PN-EN 13036-4:2001	PTV=33 (rough surface, wet test) PTV=71 (rough surface, dry test)	Class I > 40 units wet tested (inside wet surfaces) Class II > 40 units dry tested (inside dry surfaces) Class III > 55 units wet tested (outside)		Fulfilled for Class II
THERMAL COMPATIBILITY	PN-EN 13687-1:2008 PN-EN 13687-2:2002	No bubbles, cracks, and delamination, 2,4 MPA (2,3 MPA)	No bubbles, cracks, and delamination		Fulfilled for crack-bridging or flexible systems without trafficking and with trafficking
			Crack-bridging or flexible systems	Average (N/mm^2)	
			Without trafficking	≥0.8 (0.5)[B]	
			With trafficking	≥1.5 (0.5)[B]	
			[B] The value in brackets is the lowest accepted value of any reading		

An analysis of the results of the tests show that Bullet Liner Elite Shield 61 fulfills the requirements of the PN-EN 1504-2:2006 in relation to the following characteristics:

- Impact resistance for Class III
- Resistance to severe chemical attack for water with pH 4-4,5 for Class II
- Slip/skid resistance for Class II
- Thermal compatibility for outside application with de-icing salt influence for crack-bridging or flexible systems without trafficking and with trafficking

The description of test samples and detailed test results are included in the Test Report no. LZM00-01046/20/Z00NZM.

ELITE SHIELD 61 CHARACTERISTICS

SCOPE OF TESTS		TEST RESULTS	REQUIREMENTS ACCORDING TO PN-EN 1504-2:2006		REQUIREMENTS FULFILLED (CLASS)
PROPERTY	TEST METHOD				
ABRASION RESISTANCE (TABER TEST)	PN-EN ISO 5470-1:2017-02	Average weight loss after 1000 cycles abrading H22 and load 1000G – 409 MG	Weight loss after 1000 cycles less than 3000 MG abrading H22 and load 1000G		Fulfilled for Class III
CAPILLARY ABSORPTION AND PERMEABILITY TO WATER	PN-EN 1062-3:2008	0,0243 KG/M2H0.5	W<0,1 KG/M2H0,5		Fulfilled
PERMEABILITY TO WATER VAPOUR	PN-EN ISO 7783:2018-11 (Wet Cup Method)	SD=4,46M	Class 1 SD<5M	Permeable to water vapour	Fulfilled for Class I
			Class II SD ≥ 5M SD ≤ 50M	–	
			Class III SD > 50M	Not permeable to water vapour	
CARBON DIOXIDE PERMEABILITY	PN-EN 1062-6:2003 (Method A)	305 M	SD>50M		Fulfilled
CRACK BRIDGING ABILITY OF THE COATING FROM BULLET LINER ELITE SHIELD 61 IN TEMPERATURE -20° C, CRACK OPENING SPEED 0.5 MM/MIN	PN-EN 1062-7:2005 MET. A	The width of the crack at which the test was interrupted (without damage) µM Specimen 1-9 850 Specimen 2-9 850 Specimen 3-9 850	The width of the crack at which the first failure occurred ≥2 500 for Class A5		Fulfilled for Class A5 (-20° C)
BOND STRENGTH BY PULL-OFF	PN-EN 1542:2000	2,5 MPA (2,4 MPA)	Crack-bridging or flexible systems	Average (N/mm^2)	Fulfilled for crack-bridging or flexible systems without trafficking and with trafficking
			Without trafficking	≥0.8 (0.5)[B]	
			With trafficking	≥1.5 (0.5)[B]	
			[B] The value in brackets is the lowest accepted value of any reading		

An analysis of the results of the tests show that Bullet Liner Elite Shield 61 fulfills the requirements of the EN 1504-2:2006 in relation to the following characteristics:

- Abrasion resistance (Taber test)
- Capillary absorption and permeability to water
- Permeability to water vapour for Class I (permeable to water vapour)
- Carbon dioxide permeability
- Crack bridging ability after storage in accordance with point 4.1 of EN 1062-11:2003 + EN 1062-11:2003/AC:2005 for class A5 at -20° C
- Bond strength by pull-off for crack-bridging or flexible systems without trafficking and with trafficking

The description of test samples and detailed test results are included in the Test Report no. LZM00-01168/20/Z00NZM.

BULLET LINER 1

BULLET LINER 1 is a Gen II polyurea hybrid spray-on elastomer formulation which has low sensitivity to high humidity and moisture in the air or substrate. BULLET LINER 1 provides a flexible but extremely tough monolithic membrane. Exclusive to Bullet Liner dealers worldwide, this flagship formulation has unmatched spray-ability and fine grit, uniform finish. It exhibits excellent adhesion to most materials and is suitable as a protective-abrasive-impact liner for cementitious, wood, and/or metal surfaces. This Gen II renewable chemistry has excellent chemical and moisture resistance.

PHYSICAL PROPERTIES

PROPERTY	RESULT
SHORE A HARDNESS (ASTM D-2240)	88–90
DENSITY (PCF) (ASTM D-1622)	70
TENSILE STRENGTH (ASTM D-2370)	15,8 MPa minimum
ABRASION RESISTANCE (TABER) (D-4060)	0.3% per 1,000 cycles or less
ELONGATION % (ASTM D-2370)	150 % minimum
TEAR STRENGTH (ASTM D-1004)	400 pli minimum
MOISTURE VAPOR TRANSMISSION, PERMS (E96)	0.025 @ 30 MILS

PROPOSED APPLICATIONS

Corrosion Protection, Automotive, and Military Applications

SUPERIOR CORROSION PROTECTION

Bullet Liner spray-on protectant guards against the corrosive damage caused by severe environmental effects and most chemical compounds. The chart below demonstrates the technology's anti-corrosion protection ability for a steel substrate in various environmental settings. To learn about test results for Bullet Liner protection against a specific chemical, please contact us for more information at www.BulletLinerIntl.com

Bullet Liner BL1 Product was marked as:

- C5 M which means it can work in C5 environment (category) 7–15 years
- C4 H which means it can work in C4 environment (category) 15–25 years

BULLET LINER POLYURETHANE COATING

SCOPE OF TESTS		CLASSIFICATION ENVIRONMENT	CLASSIFICATION STANDARD
PROPERTY	TEST METHOD		
COATING THICKNESS > 1,70 MM	PN-ES ISO 4624:2016	C4 H C5 M	PN-EN ISO 12944-1:2018 PN-EN ISO 12944-2:2018
COATING ADHESION TO THE SUBSTRATE > 5 MPA	PN-EN ISO 4628-8:2013		
DEGREE OF CORROSION AROUND A SCRIBE < 3 MM	PN-EN ISO 4628-8:2013		
RESISTANCE TO NEUTRAL SALT SPRAY (1440 H) – NO DAMAGE	PN-EN ISO 9227:2017		
RESISTANCE TO HUMIDITY (720 H) – NO DAMAGE	PN-EN ISO 6270-1:2012		

Corrosion Categories:

- C1 very low (house interior)
- C2 low
- C3 medium
- C4 high
- C5 very high (sea and industrial environment)

Disclaimer:
The data presented herein is not intended for use by non-professional applicators, or those persons who do not purchase or utilize this product in the normal course of their business. The potential user must perform any pertinent test in order to determine the product's performance and suitability in the intended application; final determination of qualification for said product in any particular application is the responsibility of the buyer/user.

Call Bullet Liner International for technical questions. +49 231 534 679 – 100.

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CARLISLE POLYURETHANE SYSTEMS

BLI-13681 - "Construction and Industrial Brochure"