



Tests & Certifications



Bullet Liner BL1

Bullet Liner BL1

Bullet Liner BL1 is a GenII polyurea spray-on bedliner formulation.

- Utilizes renewable resources making this product conform to green standards globally
- Provides a flexible but extremely tough monolithic membrane.

Product Application Parameters			
Property	Test Method	“A”	“B”
Specific Gravity	ASTM D-1638	1.15	1.08
Viscosity	Brookfield LVF	600 cps +100	1,000 cps +100
Mixing Ratio	By Volume	1	1
Mixing Ratio	By Weight	53	47
Pounds Per Gallon	From Spec. Gravity	9.6	8.5
Temp. at Spray Gun	N/A	145° F	145° F
Gel Time	String	3-4 sec	3-4 sec
Dry to Touch	N/A	8-10 sec	8-10 sec
Total Cure	N/A	24 hours	24 hours
Cured Film Working Temp	N/A	-40° F to 200° F	-40° F to 200° F
Relative Humidity	N/A	MAX 85%	MAX 85%

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- **TUV DIN EN 71-3:2019 - THE STANDARD HARMONISED UNDER TOY SAFETY DIRECTIVE – PASS**

legal limit values, regarding migration of elements, according to Directive 2009/48/EC, Directive (EU) 2017/738 and Directive (EU) 2018/725.

This document specifies requirements and test methods for the migration of heavy metals and toxic elements such as aluminium, antimony, arsenic, barium, boron, cadmium, Chromium (III), Chromium (VI), cobalt, copper, lead, manganese, mercury, nickel, selenium, strontium, tin, organic tin and zinc.

- **EN ISO 9227:2017, EN ISO 16773-2:2016 Paints and varnishes — Resistance and electrical capacity – THICKNESS < 1,7mm DIELECTRIC**

The standard gives guidelines for optimizing the collection of EIS data with focus on high-impedance systems. High impedance in the context of intact coatings refers to systems with an impedance greater than $10^9 \Omega \cdot \text{cm}^2$. This does not preclude measurements on systems with lower impedance. Coating is not conductive (DIELECTRIC)

- **EN ISO 2812-1:2008 - Paints and varnishes — resistance to liquids – NO BLISTERING, NO CRACKING, NO FLAKING, NO RUSTING**

The standard specifies general methods for determining the resistance of an individual-layer or multi-layer system of coating materials to the effects of corrosive liquids, other than water, or paste-like products (included implicitly in test liquids mentioned in the text). These methods enable the testers to determine the effects of the test liquid on the coating and, if necessary, to assess the damage to the substrate.

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- EN ISO 4624:2016 - Paints and varnishes — Pull-off test for adhesion - **COATING ADHESION TO THE SUBSTRATE > 5MPa**

The standard specifies three methods (i.e. one dolly or two dollies on a painted panel and two dollies, one as painted substrate) for determining the adhesion by carrying out a pull-off test on a single coating or a multi-coat system of paint, varnish or related product.

- EN ISO 9227:2017 - Corrosion tests in artificial atmospheres — Salt spray tests - **Resistance to neutral salt spray [1440 h]- no damage**

The standard specifies the apparatus, the reagents and the procedure to be used in conducting the neutral salt spray (NSS), acetic acid salt spray (AASS) and copper-accelerated acetic acid salt spray (CASS) tests for assessment of the corrosion resistance of metallic materials, with or without permanent or temporary corrosion protection.

- EN ISO 4628-1:2016 Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance - **NO BLISTERING, NO CRACKING, NO FLAKING, NO RUSTING**

Assessment of corrosion changes after 10 cycles of aging test according to EN ISO 12944-6:2018. The standard defines a system for designating the quantity and size of defects and the intensity of changes in appearance of coatings and outlines the general principles of the system used throughout ISO 4628. This system is intended to be used, in particular, for defects caused by ageing and weathering, and for uniform changes, for example yellowing.

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- EN ISO 12944-2:2018 Paints and varnishes - Corrosion protection of steel structures by protective paint systems. **CLASS C4H AND C5M**

The standard deals with the classification of the principal environments to which steel structures are exposed, and the corrosivity of these environments.

- defines atmospheric-corrosivity categories, based on mass loss (or thickness loss) by standard specimens, and describes typical natural atmospheric environments to which steel structures are exposed, giving advice on the estimation of the corrosivity,
- describes different categories of environment for structures immersed in water or buried in soil, and
- gives information on some special corrosion stresses that can cause a significant increase in corrosion rate or place higher demands on the performance of the protective paint system.

The corrosion stresses associated with a particular environment or corrosivity category represent one essential parameter governing the selection of protective paint systems.

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After testing, it is confirmed that Bullet Liner polyurethane coating, which is an anti-corrosion protection for steel substrates, has the following properties:

Product Name	The Scope of Tests		Classification Environment	Classification Standard
	Property	Test Method		
Bullet Liner Polyurethane Coating	Coating thickness ≥1.70 mm	PN-EN ISO 2808-2008	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 4624:2016		
	Degree of corrosion around a scribe ≤ 3mm	PN-EN ISO 4628-8:2013		
	Resistance to neutral salt spray [1,440 h] - No damage	PN-EN ISO 9227:2017		
	Resistance to humidity [720 h] -no damage	PN-EN ISO 6270-1:2002		

Corrosion Categories:

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

Bullet Liner BL1 product was marked as:

C5 M - can work in C5 environment (category) 7-15 years

C4 H - it can work in C4 environment (category) 15-25 years






Bullet Liner BL61

Bullet Liner BL61

Bullet Liner BL 61 is a two-component, hybrid polyurea elastomer spray system which is less sensitive to high humidity and moisture in the air or substrate. This product provides a flexible but extremely tough monolithic membrane with excellent water and chemical resistance, and can be sprayed even in cold climates.

	ISO Component	POLY Component		ISO Component	POLY Component
Typical Properties			Typical Cured Properties		
Brookfield Visc @78° F, 20 RPM	800 – 1,400 cps	800 – 1,100 cps	Color	Black	
Specific Gravity	1.11	1.02	Durometer (ASTM D2240)	95 – 100 Shore A	
Color	Clear Yellow	Black	Tensile Strength (ASTM D412)	1,600 psi	
Typical Processing Data			Elongation (ASTM D5034)	180%	
Mix Ratio (Parts by Volume)	50	50	Die-C Tear Strength (ASTM D624)	300 pli	
String Gel Time	3 – 5 seconds		Dolly Adhesion (ASTM D4541)	>1,500 psi	
Dry-to-Touch Time	5 – 8 seconds				

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Adhesion	ISO 2409	poziom 0	poziom 0 Level 0	
Drawability	ISO 1520	min. 5 mm	no cracks	
Zginanie Flexion	ISO 1519	max. 5 mm	no cracks	
Abrasion	ASTM D2794	22 inch-pound	no cracks	
Hardness	ISO 2815	min. 80	not measurable	

Elite Shield 61

Elite Shield 61

Elite Shield 61 is a 100% solid, no VOC's, 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 1,000 gallons, and in piping applications where the pipe diameter is greater than 5 inches.

	ISO Component	POLY Component		ISO Component	POLY Component
Typical Properties			Typical Cured Properties		
Brookfield Visc @78° F, 20 RPM	600 cps	1,000 cps	Color	Neutral or Black	
Weight/Gallon	9.42 lbs.	8.42 lbs.	Durometer (ASTM D2240)	65 Shore D	
Color	Clear Yellow	Black	Tensile Strength (ASTM D412)	3,700 psi	
Typical Processing Data			Elongation (ASTM D5034)	380%	
Mix Ratio (Parts by Volume)	1:1		Die-C Tear Strength (ASTM D624)	600 pli	
String Gel Time	5 seconds		Abrasion-Resistance (ASTM D624)	0.39% loss @ 1,000 cycles	
Dry-to-Touch Time	8 seconds				
Final Cure Time	72 hours				

Elite Shield 61

Name of Tested Item	Tested Characteristics	Test Method
Part 1		
Protective Coating	Abrasion resistance (Taber test)	PN-EN ISO 5470-1:2001
	Capillary absorption and permeability to water	PN-EN 1062-3:2008
	Crack bridging ability, met. A	PN-EN 1062-7:2005
	Pull-off test	PN-EN 1542:2000
	Permeability to CO ₂	PN-EN 1062-6:2003
	Permeability to water vapour	PN-EN ISO 7783:2012
	Impact resistance, weight of 1 or 2 kg, height up to 1 m	PN-EN ISO 6272-1:2011
	Resistance to severe chemical attack, method without pressure	PN-EN 13529-2005
	Slip/skid resistance	*) PN-EN 13036-4:2011
	Thermal compatibility – freeze salt cycling w/de-icing salt immersion	PN-EN 13687-1:2008
Thermal compatibility – thunder shower cycling (thermal shock)	*) PN-EN 13687-2:2002	

Elite Shield 61

The scope of tests		Results of Test	Requirements according to EN 1504-2:2006	Requirements fulfilled (class)
Properties	Test Methods			
Impact resistance	EN ISO 6272-1:2011	After loading no cracks and delamination, 32 Nm	After loading no cracks and delamination. Class 1 \geq	Fulfilled for Class III
Chemical resistance of the coating after 28 days of water with pH 4-4,5 exposure	EN 13529:2005 (method without pressure)	Increase in hardness 24 hours 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 24 hours after the coating is removed from immersion in the test liquid	Fulfilled
Slip/skid resistance	EN 13036-4:2011	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

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Elite Shield 61

The scope of tests		Results of Test	Requirements according to EN 1504-2:2006		Requirements fulfilled (class)
Properties	Test Methods		Crack-bridging or flexible systems	Average [N/mm ²]	
Thermal compatibility	EN 13687-1:2008 EN 13687-2:2002	No bubbles, cracks and determination, 2,4 MPa (2,3 MPa)	No bubbles, cracks and delamination		Fulfilled for Class III
			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 relations 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.

Elite Shield 61

The scope of tests		Results of Test	Requirements according to EN 1504-2:2006		Requirements fulfilled (class)
Properties	Test Methods				
Abrasion resistance (Taber test)	EN ISO 5470-1:2017-02	Average weight loss after 1,000 cycles abrading H22 and load 1,000g – 409 mg	Weight loss after 1,000 cycles less than 3,000 mg abrading H22 and load 1,000g		Fulfilled
Capillary absorption and permeability to water	EN 1062-3:2008	0,0243 kg/m ² h ^{0,5}	w<0,1 kg/m ² h ^{0,5}		Fulfilled
Permeability to water vapour	EN ISO 7783:2018-11	s _D =4.46 m	Class 1 s _D < 5 m	Permeable to water vapour	Fulfilled for Class I
			Class 1 s _D ≥ 5 m s _D ≥ 50 m	-	
			Class III s _D ≥ 50 m	Not permeable to water vapour	
Carbon dioxide permeability	EN 1062-6:2003 (method A)	305 m	s _D ≥ 50 m		Fulfilled

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Elite Shield 61

The scope of tests		Results of Test		Requirements according to EN 1504-2:2006		Requirements fulfilled (class)
Properties	Test Methods					
Crack bridging ability of the coating from Elite Shield 61 in temperature – 20°C, crack opening speed 0,5 mm/min	EN 1062-7:2005 met.A	The width of the crack at which the test was interrupted (without damage)		Weight loss after 1,000 cycles less than 3,000 mg abrading H22 and load 1,000g		Fulfilled
		Specimen 1	9 850			
		Specimen 2	9 850			
		Specimen 3	9 850			
Bond strength by pull-off	EN 1542:2000	2,5 MPa (2,4 MPa)		Crack-bridging or flexible systems	Average [N/mm²]	Fulfilled for crack-bridging or flexible systems without trafficking and with trafficking
				Without trafficking	≥ 0,8 (0,5) _b	
				With trafficking	≥ 0,8 (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 Elite Shield 61 fulfills the requirements of the EN 1504-2:2006 in relations to the following characteristics:

- Abrasion resistance (Taber test),
- Capillary absorption and permeability to water,
- Carbon dioxide permeability
- Permeability to water vapour for class 1 (permeable to water vapour,
- 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.

Questions?