Full Metal Jacket™

"Hybrid" Polyurea

Technical Data Sheet

The VersaFlex Companies®

686 S. Adams St | Kansas City, KS 66105 | (913) 321-9000 | www.versaflex.com

2410 104th St, Ct. S, Suite D | Lakewood, WA 98499 | (800) 627-0773 | www.specialty-products.com

Description

Full Metal Jacket™ (FMJ) is a fast set, rapid curing, 100% solids, flexible, two-component "hybrid" polyurea spray coating material that incorporates both polyurethane and polyurea. **FMJ** is moisture insensitive during application and is designed for spray-in bed liners and other, similar applications where a seamless, flexible system is essential. It creates an extremely tough monolithic membrane at a minimum thickness of just 20 mils.

Features, Uses, and Specification Data

Features

- 100% solid, no VOC's
- Made in the USA at a ISO 9001:2015 Certified Facility
- Tough, resilient, elastomeric membrane
- Fast set time and return to service
- Excellent adhesion to steel
- Remains flexible in cold temperatures.

Recommended Uses

- Pick-up truck bed liners
- Abrasion resistant coating for trailer or vehicle floors, rocker panels, bumper panels, vertical surfaces, walls, overhead surfaces, and more.
- Ambulance and utility box lining.
- Automotive undercoating material.
- Exterior protective coating on theatrical and theme foam props.
- Encapsulation of flotation foams.
- Encapsulation of rust on steel surfaces.
- Sound dampening and vibration deadening material.
- Protective coating for Industrial and commercial furniture.

Color & Stability (Limitations)

Standard colors are Black (VF1280), Tan (VF1223), Light Gray (VF1221), Red (VF1275), and Blue (VF1230).

Full Metal Jacket™ is an aromatic polyurea and discoloration from exposure to ultraviolet light may occur, however the physical properties are unaffected. **FMJ** should not be used for direct contact with extremely high or low pH levels.

Physical Properties (Typical) (Post cured at 225°F for 24 hours)

Description	Method	Result
Abrasion Resistance (mg loss/1 kg/1000 cycles)	ASTM D4060	**100.8 (C-17) 40.2 (H-18)**
Tensile Strength (psi)	ASTM D412/638	**2004**
Tensile Elongation (%)	ASTM D412/638	**226**
100% Modulus	ASTM D412/638	**1100**
200% Modulus	ASTM D412/638	**1650**
Die C Tear Strength (lb/in)	ASTM D624	**297**
Shore A Hardness	ASTM D2240	**97**
Shore D Hardness	ASTM D2240	**53**
Free Film Shrink	Internal Test	**1.45%**

Description	Result
Gel Time	**2-3 sec.**
Tack Free Time	**3-4 sec.**
Recoat*	**≤3 hours**
VOC (g/l)	**0**
Solid Content	**100%**

The value ranges stated in this Technical Data Sheet are based on system processing under controlled laboratory conditions. Equipment configuration and/or field application conditions may produce variances in the final system values.

* Complete polymerization to achieve final strength can take up to several days or weeks, depending on a variety of conditions.

Coverage Rate

Full Metal Jacket™ is designed for a variety of substrates and applications. Application method, substrate roughness, profile, and porosity will effect coverage rates.

Recommended Dry Film Thickness (Typical exposure)	
Concrete:	80-100+ mils dft.
Steel (Carbon)	60-80 mils dft.
High Abrasion Service:	60-80 mils dft.

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Substrate and Surface Preparation

General

Prior to coating, the substrate must be prepared in a manner that provides a uniform, clean, sound, neutralized surface suitable for the specified coating. The substrate shall be free of all contaminants, such as oil, grease, rust, scale or deposits. The substrate shall be free of all dirt, dust, debris, and deleterious material. Coating performance is dependent on the degree of surface preparation.

Bed Liner Surface

Clean and dry surface; remove the majority of the clear coat exposing the painted surface so the material will bond to the paint. Proper surface preparation is evidenced by removal of gloss and generation of a light powder on the surface Use following or equivalent: DA air sander with 60-80 grit paper; electric 4" grinder with 36 grit alum oxide pad, or 80 grit nylon filament cup brush.

On perimeter near Fiber Line tape—hand sand to edge of filament line with 120-180 grit paper. THIS AREA IS IMPORTANT AS INADEQUOTE PREP WILL BE THE FIRST LOSS OF ADHESION ON THE LINER. Using compressed air, blow OFF all prepped surface areas.

Steel (Atmospheric/Non-Immersion Service)

Visible deposits of oil, grease, or other contaminants shall be removed according to SSPC-SP 1. Prepare in accordance with SSPC-SP6/NACE No. 3 Commercial Blast Cleaning. Provide a sharp angular anchor profile of 3.0 or greater.

Non-Ferrous Metals

Reference SSPC SP-16 Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals. Only use non-metallic blast media.

Wood

Apply polyurea onto a clean, dry, and sanded surface; free from burrs, splinters and loose debris. (It is recommended to prime wood and other porous surfaces before application of heated, fast-set polyureas to reduce pin holing).

Recommended Primers	
Carbon Steel (Optional)	PW-1 AquataPoxy 190
Non-Ferrous Metals	PW-1
Polyurea Tie-In	Tack Coat
Wood & Fiberglass	VF-20

Note: Substrate composition and moisture, application temperature, exposure temperature, and site conditions may effect primer selection.

Mixing, Thinning and Pre-Warming

Components & Mix Ratio:

Mix ratio is 1:1 by volume

Thinning:

DO NOT THIN.

Pre-warming:

A and B components should be warmed to a minimum of 70°F prior to processing.

Mixing:

B Side component must be thoroughly agitated prior to use. Mix using a manufactures recommended 3-tier, collapsible blade power mixer through the center bung hole. Mixer diameter should be ⅓ diameter of the container. Mix for at least 30 minutes prior to processing. Color should be a consistent uniform color without striations.

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Application and Equipment Guidelines

Equipment

Full Metal Jacket™ must be installed using plural component, direct impingement mix application equipment.

Recommended Proportioners	
Graco	A-XP1 E-10HP E-XP1 & E-XP2 H-XP2 & H-XP3 Reactor 2 E-XP1 & E-XP2 Reactor 2 H-XP1 & H-XP2

Recommended Spray Gun Configuration		
Graco	Fusion AP	AR/AF 2929
		AR/AF 3737
		AR/AF 4242
	Fusion MP	XR/XF 2929
		XR/XF 3535
	Probler P2	00 - 02

Equipment other than those listed on this page may be used by configuring spray gun with different mixing components Minimum pressure and temperature requirements must be met to ensure adequate mixing and dispensing.

Recommend Equipment Operating Parameters	
A Side Primary Heat	160˚F
B Side Primary Heat	160˚F
Hose Heat	160˚F
Dynamic Pressure	2,000—2500 psi
Dynamic Pressure Differential	< 200 psi
Inlet Pressure	> 90 psi

- Material supply capacity should be 4x the material output of the selected spray gun configuration.
- Processing equipment should be capable of maintaining set temperatures and pressures at rest and during operation.
- Propper equipment selection and maintenance is critical to achieve material properties.
- Additional equipment manufacturers and set-ups are acceptable. Contact VersaFlex Technical Services for additional information and recommendations.

Application

Apply in a uniform manner to desired thickness. Application thickness is determined by spray gun configuration and speed of application. Lower output configurations are recommended for vertical and overhead applications to avoid runs, drips and sags. Excessive thickness does not negatively impact the material properties.

Application and Service Conditions

Environmental & Substrate Conditions

Substrate temperatures must be greater than -20°F. Lower substrate and ambient temperatures will reduce ultimate cure time.

Do not install over damp, wet, or saturated substrates. Concrete and masonry substrate moisture shall be less than 5% when measured with a Tramex CME meter. If the substrate is below freezing, tradition methods of determining moisture content are not effective. Additional steps should be taken to validate moisture readings.

The substrate must be 5°F above dew point and rising before application of coating materials.

Service Temperatures (Temperature Resistance):

Dry temperature resistance is -40°F to 250°F.

Limitations:

Full Metal Jacket™ is not recommended for direct contact with extremely high or low pH chemicals.

Full Metal Jacket™ is an aromatic based polyurea. Discoloration from exposure to ultraviolet light may occur without affecting the performance characteristics.

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Curing Schedule, Re-Coat Windows, and Top Coats

Cure Time

Return to service is determined by ambient temperature, and the service environment and exposures.

Top Coating

Full Metal Jacket™ can be built to thickness or touched up immediately during application.

Recoat Time (Maximum)

Full Metal Jacket™ can be recoated up to 3 hours after the initial application. If the re-coat window is exceeded, additional preparation is required. Before recoating over **FMJ**, the surface shall be clean, dry, and free of all dirt, dust, debris, and other contamination. Mechanical scarification and the use **VersaFlex Tack Coat, Raven 161 or SPI Prep Wipe** as re-activating, adhesion promoters are recommended.

Cleanup and Safety

Cleanup

Cured product may be disposed of without restriction. Excess liquid 'A' & 'B' material should be mixed together and allowed to cure, then disposed of in the normal manner. Product containers that are "drip free" may be disposed of according to local, state, and federal laws.

Safety

Consult the Safety Data Sheet (SDS) at www.versaflex.com for information concerning health and safety before using. Strictly follow all notices on the SDS and container label. If you do not fully understand the notices and procedures provided on the SDS or if you cannot strictly comply with them, do not use the product.

Packaging, Handling, and Storage

Packaging

FMJ is available in **110– and 550-gallon kits**. The containers are filled by weight.

Shelf-Life and Storage

One year from date of shipment, in original, unopened factory containers, stored in a sheltered area between 60°F - 95°F. Seal tightly after use to prevent introduction of moisture laden air. Store open 'A' side with a nitrogen cap after each use.

Warranty

Limited Warranty. Company warrants its goods to be free of manufacturing defects. Goods manufactured by Company will comply with all applicable federal, state and local laws and regulations. Company makes no warranty as to any parts or equipment manufactured by others. Customer shall look solely and only to the manufacturer of such parts or equipment with respect to any warranty claims. Company hereby assigns to Customer the original manufacturer's warranties to all such equipment and parts, to the full extent permitted. THE AFORESAID IS THE EXCLUSIVE WARRANTY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. SPECIFICALLY, THERE ARE NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

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