

AAMA 2605 Finishes Comparison
70% PVDF (Polyvinylidene Fluoride) Liquid Coating
vs.
100% FEVE (Fluoroethylene Vinyl Ether) Powder Coating

The tables below show the performance characteristics of both 70% PVDF (Kynar® resin) and powder coatings based upon FEVE (Fluoroethylene Vinyl Ether). The main difference of these two coatings, besides their state of phase, is that the liquid coating is a thermoplastic and the powder coating is a thermoset. Thermoplastics do not undergo a permanent, one-way, infusible reaction as do thermosets. By virtue of this, thermosets are typically much harder and more scratch resistant, resulting in a tougher film versus their thermoplastic counterparts. Both varieties display excellent weathering and corrosion resistance. PVDF (70% Kynar® resin) liquid coatings are more recognized by their commercial names such as Kynar 500®, Fluoropon®, Duranar®, etc. Railcraft's AAMA 2605 powder coatings are based on FEVE technology which is an ultra-high-performance fluoropolymer molecule that is chemically crosslinked, surpassing the requirements of AAMA 2605.

Physical Properties of Coatings			
Property	Test Method	70% PVDF Liquid Coating	100% FEVE Powder Coating
Textures	N/A	No	Yes
Gloss Range (at 60°)	ASTM D523	20-35	20-65
Color Range ¹	N/A	Wide range of solids & metallics	Wide range of solids & metallics
Smoothness (PCI Scale) ²	PCI Tech Brief #20	6-8	6-8
Pretreatment, typ. ³	N/A	Tri/Hex Valent Chrome	Chrome-free dry-in-place
Impact Resistance (deformation)	ASTM D2794	3.0 mm	3.0 mm
Pencil Hardness ⁴	ASTM D3363	F	4H
Taber Abrasion (Wear Index) ⁵	ASTM D4060	140	100
Adhesion	ASTM D3359	5B	5B
100 Double Rubs MEK	PCI Method #8	PASS	PASS
Mandrel Bend	ASTM D522	¼"	¼"
Film Thickness	ASTM D7091	1.2 min	2.0 min
South Florida UV Resistance	Per AAMA 2604-17a	Up to 20 years, Gloss retention: 50%+, Color Retention: ΔE <5.0	Up to 20 years, Gloss retention: 50%+, Color Retention: ΔE <5.0
Salt Spray Resistance (ASTM B117)	ASTM B117	3000 hrs.	3000 hrs.
Cyclic Corrosion	ASTM G-85	2000 hrs.	2000 hrs.
Humidity Resistance	ASTM D2247	4000 hrs.	4000 hrs.

Chemical Resistance Properties of Coatings		
Chemical Reagent ⁶	70% PVDF Liquid Coating	100% FEVE Powder Coating
Sulfuric Acid 40%	5	5
Nitric Acid 20%	5	5
Phosphoric Acid 85%	5	5
Hydrochloric Acid 37%	5	5
Acetic Acid 40%	5	5
Sodium Hydroxide 40%	5	5
Ammonia Sol. 29%	5	5
Ethanol 95%	5	5
Methanol	5	5
Diesel	5	5
Formaldehyde	5	5
Vegetable Oil	5	5
Rating: 5=Unaffected 4=Color/Gloss change 3=Softens; recovers 2=Softens; no recovery 1=Blistered		

Footnote:

¹ Color ranges can be limited by high chromaticity which could facilitate the need for a clear top coat.

² PCI smoothness is directed by a set of 10 standard panels that vary in smoothness; 1 being the least smooth and 10 which represents nearly perfect smoothness.

³ Pretreatment chemicals for PVDF coatings typically contains either trivalent or hexavalent chrome. Chrome is a heavy metal and extremely hazardous. Gordon powder coatings are applied over chrome-free pretreated substrates and exhibit excellent performance.

⁴ Pencil Hardness Scale



⁵ Taber Wear Index - Indicates rate of wear, and is calculated by measuring the loss in weight (in milligrams) per thousand cycles of abrasion. The lower the wear index, the better the abrasion resistance.

⁶ Chemical Resistance Testing was carried out by an independent laboratory. Coating was exposed to 5 drops of each reagent applied to a cotton ball and placed under a watch glass for 150 hours. At the end of the test the coating was rinsed with water and evaluated.

Kynar[®] and Kynar 500[®] are registered trademarks of Arkema High Performance Polymers, Fluorpon[®] is a registered trademark of The Valspar Corporation, and Duranar[®] is a registered trademark of PPG Industries.