

Interpon[®]
POWDER COATINGS

 **Architectural**

Guidance Note 12

Comparison of PVDF vs Powder Coatings



AkzoNobel

Overview

This guidance note summarizes comparison of PVDF liquid paints with FEVE-based powder coatings.

In general, there are three performance levels for architectural coatings. The strongest performance standard in the world is the American Architectural Manufacturers Association (AAMA) 2605 specification. This calls for a 10-year exposure test in South Florida on coated panels facing the sun.

The highest quality buildings require the highest quality coatings. Fluoropolymers are among the strongest types of organic polymers, resisting attack from UV rays as well as atmospheric pollution, humidity and airborne particles. Only fluoropolymers have been found to have sufficient durability to meet AAMA2605.

There are two main types of fluoropolymers used in coatings:

- Polyvinylidene difluoridene – known by its acronym PVDF – a thermoplastic system widely used in liquid coatings.
- Fluoroethylene vinyl ether (FEVE), a thermosetting system (there is a chemical reaction in the oven) which is widely used in powder coatings. Interpon D powder coatings use FEVE system.

Both liquid and powder versions can meet AAMA2605 if formulated correctly. It is important for specifiers to recognize this, and to specify by performance, not by chemistry.

The main difference between liquid and powder is simply how they are delivered to the substrate.

Key Performance Requirements

The key requirements of AAMA2605 are shown below, along with the type of coating that can meet the performance. Further details on types on the performance of different coating is given on the subsequent pages.

Test	Requirement	Coating types meeting this requirement
Dry film hardness	Pencil hardness F	Polyester powder coating
Abrasion resistance	Coefficient 40	PVDF liquid
Cyclic corrosion test (ASTM G85)	2000 hours – Rating 7 on scribe and cut edges 8 on other areas (10=No blisters)	PVDF powder FEVE powder
Weathering Resistance	10 years of South Florida Gloss Retention >50% of original value Color Retention <5DE _H units Chalking Rating 8 or higher	PVDF powder FEVE powder PVDF liquid

Taber Abrasion Testing

Taber abrasion test involves application of a weighted revolving wheel fitted with abrasive pads. As the coated panel is rotated horizontally under the wheel, the wheel turns and applies abrasive force to the coating. In such testing, liquid PVDF (AAMA2605-compliant) coatings have shown faster abrasion of film, and even wear down to the substrate. See below images.



Test was performed at an environment having temperature of 23°C and relative humidity of 50%. Number of cycles: 1000 & 500 rotations, Abrasive disks: CS-10 & 17 as quoted. Weight used: 1000g.

$$\text{Calculation of wear index: } I = \frac{(A-B) \times 1000}{C}$$

- A: Weight of test specimen before abrasion, mg
- B: Weight of test panel after abrasion, mg
- C: Number of cycles of abrasion recorded

A higher number means faster / more severe abrasion.

Test Results

Sliding abrasion (Taber)	70%PVDF – Spray Grade	Interpon D3000 Series	Interpon D2000 Series
Number of cycles and Abrasive disk used	500 cycles - CS17 Index: 40.8	1000 cycles – C17 Index: 15.8	--
		1000 cycles – CS10 Index: 29	1000 cycles – CS10 Index: 35

Interpon D3000 series fluoropolymer coating is more abrasion resistant than both liquid PVDF and Interpon D2000 series polyester coatings. Powder coatings are recommended even by suppliers of liquid PVDF systems for areas of high traffic and likely human contact, owing to their superior hardness.

Performance and Application Comparison

Sliding abrasion (Taber)	FEVE powder coating eg. Interpon D3000 series	PVDF liquid and powder eg. Trinar
Application areas/ locations	Commercial, landmark buildings especially exterior	Commercial, landmark buildings especially exterior
Available colours	Wide range of solid colours, mica metallics	Wide range of bright colours and metallics
Available gloss & finishes	Matt (up to 40% gloss), texture	Matt only (up to 40% gloss)
Damage Resistance (scratch, rub, mar)	Good (minimum pencil hardness F, but often H/2H)	Good (minimum pencil hardness F, but often H/2H), maybe more susceptible to mar
Third-party certifications	Qualicoat Class-3 AAMA2605 test reports	Independent test reports available on request
Warranty (decorative)	Up to 20 Years	Up to 20 Years
Repair and Maintenance	Liquid repair coatings available to match original	Liquid repair coatings available to match original
Resistance to fire	EN13501-1, A2-s1,d0 (50-70µm)	TBA
Solvent content	0%	Up to 65%
VOC when curing	Few VOCs (~3%)	Up to 65%* <small>*Heat from VOC destruction can be used to operate the curing oven</small>
Number of coats	1	2-4 (typically 2)
Track record	Since 2002	Since 1968

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