New fluoropolymer latex technology for cool materials solutions across an expanded color space
The C-F bond is one of the strongest known.

KYNAR 500®, the PVDF homopolymer is universally known within the architectural community as the world’s most weatherable coatings resin.
KYNAR 500® PVDF-based Finishes

Commerce Center
Nashville, TN
Window Extrusions
Residential Roofing
Allentown, PA
70% PVDF vs. Competitive Coatings

Commercially coil coated KYNAR 500 and competitive coatings after 17 years of Florida exposure.
Color stability of KYNAR 500® based paints

Taiyo Steel, Funabashi, Japan
Retention of Solar Reflectance for PVDF-based paints in South Florida (south 45º)

Data from the report by Dr. William Miller of the Oak Ridge National Laboratories; [www.coolmetalroofing.org/pdf/arr.pdf](http://www.coolmetalroofing.org/pdf/arr.pdf).
9 Years of Florida Exposure, SR Retention

Kynar® based coated metal roof with 0.80 Total Solar Reflectance

Elastomeric Acrylic over PVC with 0.55 Total Solar Reflectance
Resin contribution to Solar Reflectance

TSR as function of PVDF:acrylic ratio, on aluminum Tint blue coatings at constant pigment volume concentration
Enhanced Reflectance of PVDF Coatings

Film thickness is 1.4 mils

- neat PVDF tint blue paint
- neat acrylic tint blue paint

Measured with a UV-VIS-NIR Spectrometer with an integrating sphere (Perkin-Elmer Lambda 19).
Conventional KYNAR 500 Formulating

1. Latent Solvent
2. Dispersed KYNAR 500® Powder
3. Dispersed Pigment in Acrylic Solution

KYNAR ACRYLIC

Blend to Make Paint

Apply Paint to Substrate

Bake the Painted Substrate
Kynar Aquatec® Latex Technology
– New platform for waterborne coatings

- **Stage 1: KYNAR® PVDF Polymerization**

- **Stage 2: Seeded Acrylic Emulsion Polymerization**
  - Hybrid PVDF/acrylic dispersion
  - Final latex at about 50 wt% solids
  - Formulates and applies like acrylic latex
  - Field or factory-applied coatings
Kynar Aquatec® latex paint - application options

- Flexible/Rigid non-metal Roof Coatings
- Metal Roof Coatings
- Water-based
- Air Dry
- Low VOC
- Concrete Coatings
- Fabrics
- Paints
- Window Frames
- Stains and Varnishes
Kynar Aquatec® latex paints Florida performance

6.5 years Florida S45 color retention
KYNAR Aquatec latex paints:
Solar Reflectance retention and dirt pickup resistance

<table>
<thead>
<tr>
<th>Color</th>
<th>TSR Retention After 5 years Florida S45 exposure</th>
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<tbody>
<tr>
<td>White</td>
<td>97%</td>
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<tr>
<td>Yellow</td>
<td>96%</td>
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<tr>
<td>Light brown</td>
<td>95%</td>
</tr>
<tr>
<td>Light blue</td>
<td>97%</td>
</tr>
<tr>
<td>Light Green</td>
<td>97%</td>
</tr>
<tr>
<td>Green</td>
<td>98%</td>
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</tbody>
</table>

Commercial elastomeric acrylic paint
Paint based on Kynar Aquatec™

Original color
Iron oxide slurry
Stain blocking of asphalt species

*Paints applied on SBS asphalt substrate; air-dried then baked at 60 C for one week*

- Acrylic basecoat/Kynar Aquatec® latex–based topcoat
  - 10 + 2 mils dry-film thickness

- Commercial elastomeric acrylic paint- 10 mils dry-film thickness

- Single coat, paint based on Kynar Aquatec® latex- 2 mils dry-film thickness

*Original paint colors*
Boosting cool roof properties by a basecoat/topcoat approach

“Cool pigment”/ KYNAR Aquatec topcoat (Minimal pigment for visual hiding)

High solar reflectance, opaque basecoat (KYNAR Aquatec or acrylic latex paint)

Substrate

Solar reflectance boost from:
- Cool pigment technology
- PVDF resin effect
- Basecoat contribution
Estimated cost of coatings, factory application

Option 1

- Topcoat: 1.5 mils D.F.T.
- Basecoat: 1.5 mils D.F.T.
- Substrate: Acrylic

Option 2

- Topcoat: 1.5 mils D.F.T.
- Basecoat: Acrylic

Coating Material Cost, ft²

Option 1:
- Topcoat: $0.30
- Basecoat: $0.30
- Total: $0.60

Option 2:
- Topcoat: $0.30
- Basecoat: $0.06
- Total: $0.36
Solar Reflectance properties of concept samples

**Option 1**
- Topcoat 1.5 mils D.F.T.
- Basecoat 1.5 mils D.F.T.
- Granulated asphalt

**Option 2**
- Topcoat 1.5 mils D.F.T.
- Basecoat 1.5 mils D.F.T.
- Off-white acrylic

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**Arkema rho values using D&S reflectometer:**

<table>
<thead>
<tr>
<th>Color</th>
<th>$\rho$ No basecoat</th>
<th>$\rho$ Option 1</th>
<th>$\rho$ Option 2</th>
<th>Estimated SRI potential</th>
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</thead>
<tbody>
<tr>
<td>Chocolate brown</td>
<td>0.331</td>
<td>0.281</td>
<td>0.299</td>
<td>35</td>
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<tr>
<td>Barn red</td>
<td>0.449</td>
<td>0.483</td>
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<td>55</td>
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<tr>
<td>Forest green</td>
<td>0.213</td>
<td>0.331</td>
<td>0.284</td>
<td>35</td>
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<tr>
<td>Bluish gray</td>
<td>0.267</td>
<td>0.288</td>
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<td>29</td>
</tr>
</tbody>
</table>
The performance of KYNAR 500® with…

- Low VOC, Low Water Pickup, Dirt and Stain Repellant, Fire Retardant
- Air Dry, No Bake – Non bakeable substrates possible
- Field Applied or OEM
- KYNAR® Brand Name – Instant Recognition in the Architectural Community (Siding, Lineals, Roofing…)
- Cutting Edge Technology