Lumiflon® resins for Ultra Durable coatings

Ben Runhaar
Product & Marketing Manager Lumiflon
What is LUMIFLON

- Fluoropolymer resin
- Coating?

Why use LUMIFLON

- durability
- colorfulness

30 years Track records
LUMIFLON® = FEVE (Fluoro-Ethylene / Vinyl Ether copolymer)

Perfect Alternative Sequence

- **Fluoroethylene Segment**
  1. Weatherability
  2. Durability
  3. Chemical resistance

- **Vinyl Ether Segments**
  - R1 = Clarity, Gloss, Hardness
  - R2 = Flexibility
  - R3 = Crosslinking site (-OH)
    Solubility
<table>
<thead>
<tr>
<th>Product</th>
<th>(PC)</th>
<th>(Coatings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>intel</td>
<td>AGC</td>
</tr>
<tr>
<td>Key Technology</td>
<td>intel inside</td>
<td>LUMIFLON®</td>
</tr>
<tr>
<td></td>
<td>(CPU)</td>
<td>(Polymer Resin=Fluoro-polymer)</td>
</tr>
<tr>
<td>Customer</td>
<td>PC makers</td>
<td>Paint makers</td>
</tr>
<tr>
<td></td>
<td>DELL, SONY, TOSHIBA, FUSU, lenovo, ASUS, acer</td>
<td>AkzoNobel, valspar, DuluxGroup, JOTUN, TIGER, DAI NIPPON TORYO, NIPPON PAINT</td>
</tr>
</tbody>
</table>
Paints/Coatings

- Resins
  - * Colorants
  - * Extender Pigment
  - * Metal Pigment

- Pigments
  - * Dispersing Agent
  - * Leveling Agent
  - * Deformer Agent
  - * Hardener

- Additives
  - * Water
  - * Xylene
  - * Toluene
  - * Mineral turpentine spirits

- Solvents

---

Lumiflon® a resin for Topcoats

Topcoat (Lumiflon)

Under & Middle Coat

Substrate (Metal, Concrete, etc)

UV

Moisture

Salt
The most **flexible** Fluoro Resin

- Available as solvent, water-based and powder grade.
  - Example: combine a coil coated panel with a powder coated window frame

- Can be cured at room temperature up to 250°C
  - You can perform onsite maintenance on a Lumiflon based system. (Bridge coatings, façade refurbishment)

- Available for 1 and 2 K systems
  - Crosslinking with isocyanate or melamine

- Can be blended with other resins.
  - Acrylic, Polyester, Polyurethane, etc

- Compatible with a wide range of pigments

- Can achieve a wide gloss range (10 – 90 % at 60°)
What is LUMIFLON
  • fluoropolymer resin
  • coating?

Why use LUMIFLON
  • durability
  • colorfulness

30 years Track records
Weather-ability of Lumiflon® Coatings

Accelerated Exposure Test

QUV-A (ASTM D4587)

Gloss Retention, %

0 20 40 60 80 100 120

0 3000 6000 9000 12000 15000

Hours of QUV-A Exposure

Lumiflon
Polyester Urethane
Acrylic Urethane
Siloxane

Excellent Weather-ability
Weathering test result

Lumiflon has superior weatherability than PVdF
Proven Durability in
Heavy Duty Coatings
Test Panels exposed for 5 years near by the Pacific Ocean

Chlorinated rubber:
- Partially Corroded

Alkyd:
- Completely Corroded

Lumiflon:
- Not Corroded!

WASHED

UNWASHED
Preservation of color and gloss

- **Lumiflon® coated bridge over 26 years**
  
  Tokiwa Bridge in Hiroshima, Japan

<table>
<thead>
<tr>
<th></th>
<th>Gloss Retention</th>
<th>Color Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washed Surface</td>
<td>100%</td>
<td>2.3 ΔE</td>
</tr>
<tr>
<td>Unwashed Surface</td>
<td>92%</td>
<td>3.5 ΔE</td>
</tr>
</tbody>
</table>

In 1988 | In 1993 | In 2007 | In 2014
Life Cycle Cost (LCC)

LCC Evaluation Index

- Repaint term
  - every 5 years
  - every 8 years
  - every 12 years
  - over 30~60 years

Initial Costs for Coatings

Polyurethane

Lower Life Cycle Costs

Life Cycle Cost

Coating Cost Index

(100)

(94)
Proven Colorfulness in Architectural Coating
**Gloss:**
- From low to high gloss
- 10 – 85 % at 60 degree
- >50% gloss retention after 10 years Florida

**Colour:**
- Compatible with a wide range of pigments
- Including organic pigments
- Delta E below 5 after 10 years Florida
<table>
<thead>
<tr>
<th>Specifications/Standards</th>
<th>1 year Florida</th>
<th>3 year Florida</th>
<th>5 year Florida</th>
<th>10 year Florida</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualicoat I</td>
<td>Qualicoat II</td>
<td>AAMA 2604-02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gloss retention</td>
<td>Qualicoat: ≥ 50%</td>
<td>≥ 50%</td>
<td>≥ 30%</td>
<td>≥ 50%</td>
</tr>
<tr>
<td>GSB: ≥ 50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color variation</td>
<td>Qualicoat: ≥ spec.</td>
<td>Qualicoat: ≥ spec.</td>
<td>≤ 5 ΔE</td>
<td>≤ 5 ΔE</td>
</tr>
<tr>
<td>GSB: ≥ spec.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>competitor</td>
<td>Polyurethane</td>
<td>PVdF 50%</td>
<td>PVdF 50%</td>
<td>PVdF 70%</td>
</tr>
</tbody>
</table>

LUMIFLON® coatings and panels meet the most severe specification, AAMA2605 and Qualicoat Class III.
Lumiflon coated panel pass 10 year Florida test (AAMA2605, Qualicoat 3)
Contents

- Who is AGC
- What is LUMIFLON
  - fluoropolymer resin
  - coating?
- Why use LUMIFLON
  - durability
  - colorfulness
- 30 years Track records
Notable & Prestigious Projects
by
Lumiflon® Coatings
Project: Burj Al Arab (1999)
Location: Dubai, UAE
Supplier: Alpolic
Project: Ferrari World
Location: Abu Dhabi, UAE
Supplier: Akzo Nobel and Beckers
Project: Vigo Hospital
Location: Vigo, Spain
Supplier: Monopol Colors
Project: IBG and Belastingdienst
Location: Groningen
Supplier: Alpolic
Project: Mahler 4
Location: Amsterdam
Supplier: Alpolic
Project: EYE Film Institute
Location: Amsterdam
Supplier: Alpolic
Project: Akashi Strait Bridge
Location: Kobe, Japan
Supplier: DNT, Nippon Paint, Kansai Paint

- Worlds’ longest suspension bridge-
Project:  Tokyo Skytree (634 m)
Location: Tokyo, Japan
Supplier: DNT
Conclusion

• FEVE(LUMIFLON) is flexible Fluoro-Resins which will allow you to create paints with Ultra Durability.
  - Powder, Solvent and Water
  - Wide temperature curing range
  - Wide gloss and colour range

• For over 25 years, FEVE coatings have been used extensively in Architectural and Heavy Duty applications.

• For Low Life Cycle Costs while retaining its appearance (colour, gloss) over long period of time.
Questions?
Booth: 274