



Vitreflon

Engineered Fluoropolymer Coatings

Development of Vitreflon

A Brief Overview

The world's first solvent soluble fluoropolymer for coating was developed 37 years ago by Asahi Glass, and the same chemistry remains at the forefront of protective coating technology today due to the extremely durable nature of fluoropolymer coatings. Chemically a fluoropolymer coating is a fluoroethylene-vinyl ether alternating copolymer.

Lumiflon, manufactured by Asahi Glass is a coating resin, which when formulated into a conventional coating product exhibits very high levels of UV resistance and provides excellent durability when used as the topcoat in a corrosion resistant coating system. A & I Coatings' highest quality fluoropolymer, Vitreflon 700, is based on Lumiflon resin. Vitreflon coatings were originally released to the Australian market in 2001 and since then A & I Coatings have supplied enough Vitreflon to protect almost 1 million square metres of substrate.

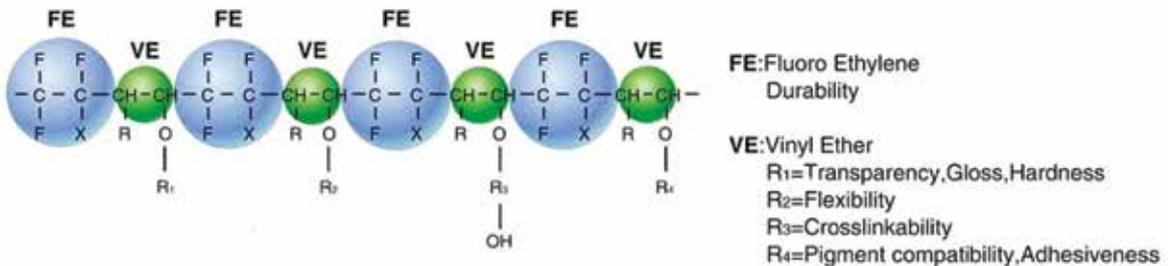
This amorphous resin can be cured by cross linking sites and creates tough coating films from room temperature to 250c. The alternating copolymer structure gives excellent durability and chemical resistance, making fluoropolymer the coating of choice for a wide range of applications.

The energy of the alternative main chain bond between fluoroethylene and vinyl ether is higher than the maximum UV energy of sunlight, and so in principal, it does not degrade. In contrast, other coatings such as polyurethane break down and deteriorate due to their low bond energy.

The Chemistry

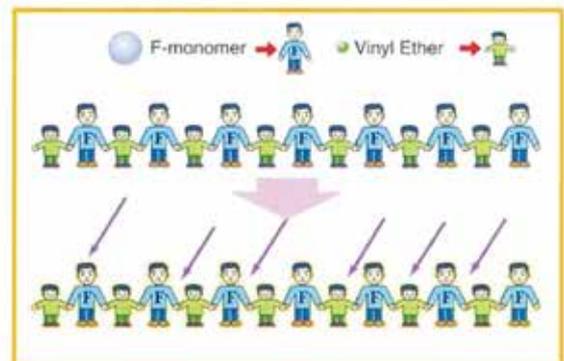
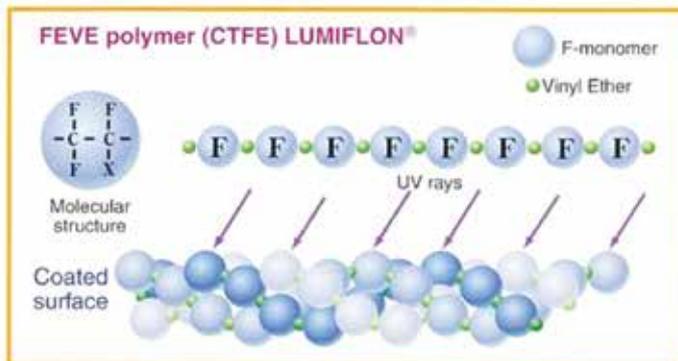
What is Fluoropolymer Technology?

The polymeric structure of a Fluoropolymer is a very systematic arrangement of fluoro-ethylene and vinyl-ether molecules. This image demonstrates the arrangement, and also shows that each fluoro ethylene molecule has 3 fluorine atoms as opposed to two in PVDF or PVF2 coatings.



Why is Fluoropolymer so durable?

1. The fluoroethylene molecule derives terrific integral strength from it's high frequency of fluorine atoms
2. The carbon-fluoride bond energy in fluoroethylene molecules is far greater than the energy of UV rays
3. The fluoroethylene and vinyl ether units are arranged in an alternating sequence – this means that the strong and stable fluoroethylene unit protects it's neighbouring vinyl ether unit – just like the father protecting his son below

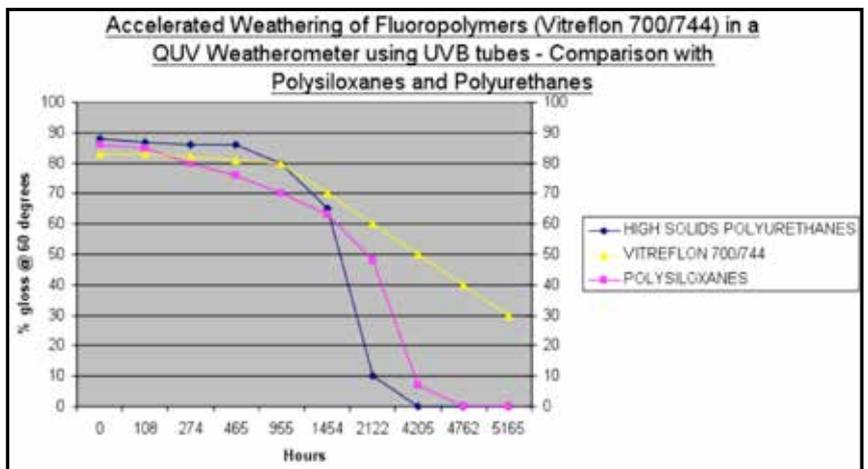


Durability

Data on Weatherability and Life Cycle Costs

UVB Accelerated Weathering

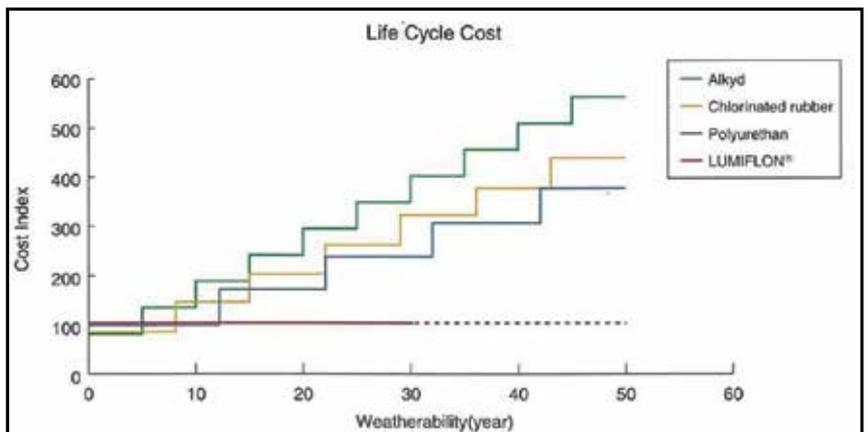
To the right are the results of an accelerated Weathering Test comparing Vitreflon with Polyurethanes and Polysiloxanes



Life Cycle Costs

The high weatherability of Vitreflon not only leads to long lasting and beautiful coatings but also dramatically reduces the life cycle cost of the coating due to a decrease in repainting when compared to other conventional coating systems. Simultaneously the level of VOC's released decreases thus conserving resources.

The graph below demonstrates the cost saving generated after 12 years by utilising a Fluoropolymer coating system.



Research

Research Conducted with Government Agencies by AGC



Tokiwa Bridge - Japan

This bridge was previously painted in chlorinated rubber and repainted after 8 years with fluoropolymer. The coating remains in good condition after 25 years.



Daiichi Mukaiyama Bridge - Japan

The first coating system applied to this bridge was a zinc rich primer followed by a fluoropolymer topcoat. The coating remains in good condition after 25 years.



Nikko River Bridge - Japan

The first coating system applied to this bridge was a zinc rich primer followed by a fluoropolymer topcoat. The coating remains in good condition after 20 years.

Images supplied by AGC

AGC Projects

Asahi Glass Project Achievements

Structures protected with fluoropolymer coatings



Akashi-Kaikyo Bridge 1998 - Japan



Tokyo Gate Bridge – 2012 - Japan



Landmark Tower – 1993 - Japan



Tokyo Skytree – 2008 - Tokyo

Images supplied by AGC

A&I Projects

Structural and Decorative Steel Projects Protected with Vitreflon 700



Picton Railway Station - 2009



Macarthur Railway Station - 2008



Turrumurra Railway Station - 2007

Some other steel projects protected with Vitreflon include:

1. Thirlmere Rail Museum
2. Cabramatta Railway Station
3. Newtown Railway Station
4. Linfield Railway Station
5. St James Railway Station
6. Seaford Rail Corridor

A&I Projects

Architectural Projects Protected with Vitreflon 700



Star City Casino – NSW – 2009



NAB Headquarters – Docklands - 2002



Australian Institute of Sport – ACT – 2005



Westfield Penrith - NSW - 2003

The A & I Coatings protect portfolio includes many other projects through all states of Australia, and overseas. A & I Coatings Vitreflon has now been used to protect and beautify almost 1 million square metres of substrate.



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