

Product data sheet

ZEFFLE SE-600

High Performance Waterborne Fluoropolymer Emulsion for Coatings

ZEFFLE SE-600 is a water-based 1K fluoropolymer emulsion for thin film applications on metal. It provides excellent weatherability for coatings. Typical applications include industrial coil or extrusion coatings.

Characteristics

- Amorphous type polymer consisting of a VdF copolymer and an acrylic polymer
- Directly applicable to galvanized steel and phosphate treated metal (aluminum, steel) with very thin DFT
- Dries at room temperature or high temperatures

Coatings using ZEFFLE SE-600

- show excellent weatherability, corrosion protection & chemical resistance
- can be applied using conventional methods like spray, brush, roll or coil coating

Physical Properties

Appearance	milky white liquid
Solid content	40 ± 1 mass%
Viscosity	5 - 100 mPa·s (BM type viscometer, 25°C)
pH	~ 8
MFT (minimum film forming temperature)	~ 30°C
Tg	20~30°C (Differential Scanning Calorimeter)
Ionic character	Anionic / non-ionic
Particle size	140~250nm (dynamic light scattering)
Storage stability	OK (4 weeks at 50°C)
Mechanical stability	OK (5000rpm, 1 min. in a homo mixer)
Low temperature stability	OK (below 200% of viscosity increase; 1 cycle = 16 hours at 0°C, 12 hours at 20°C)

Table 1: Typical properties are not suitable for specification purposes.

Application

ZEFFLE SE-600 is a „ready-to-use“ clear fluoropolymer emulsion including a coalescent agent. It is directly applicable to galvanized steel and phosphate treated metal.

1. Additives

Depending on the application, additives should be added:

- Coalescent agent¹: In case of film drying up at ambient - medium temperatures (<~100°C), add approx. 5-10 PHR (mass parts per hundred parts resin-solid) of coalescent agent.
- Defoamer², thickener³, TiO₂ pigment⁴, pigment dispersant⁵
- Anti-corrosion agents and adhesion promoters can also be added, although they are not essential

2. Application method

ZEFFLE SE-600 base coating can be applied by general methods such as coil coating, extrusion, spray, brush, roller, etc.

3. Drying condition

As a rough guide, in industrial applications, SE-600 base coating can be dried for 6 seconds at 400°C (120-140°C PMT) at a wind velocity of 4.5 m/sec.

When drying at ambient temperature, SE-600 base coating can be dried for 7-10 days at room temperature or for 3-4 days at 40°C in a convection oven.

Film performance

Representative data: clear film, coated on galvanized steel panel

A) Weathering test by outside exposure

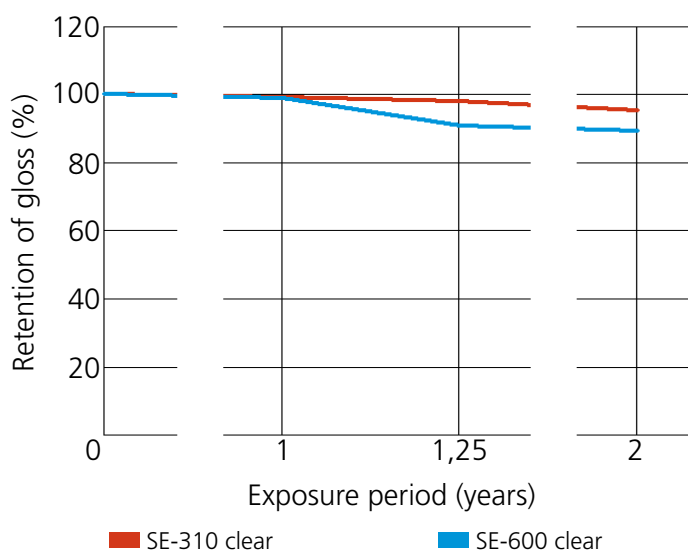


Figure 1: Weather resistance. Outdoor exposure at Miyakojima Island (Japan).

Miyakojima shows a subtropical climate similar to Florida and is an internationally recognised location for exposure tests.

¹Coalescent agent examples:

- DBE-IB, Chemours
- Di-ethyl Adipate
- Texanol, Eastman
- PGDA
- DEDG
- Rhodiasolv RPDE, Solvay
- Rhodiasolv DIB, Solvay
- Rhodiasolv IRIS, Solvay

²Defoamer examples:

- Surfynol DF-110D, Air Products
- Byk 019, Byk 028, Altana
- Dapro DF 7580, Elementis
- TEGO AIREX 902W, Evonik

³Thickener examples:

- Byk 425, Altana
- Acrysol RM-8W, Dow Chemical

⁴Rutile type TiO₂ pigments:

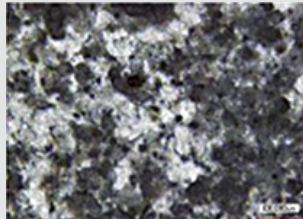
- Kronos 2310, KRONOS TITAN
- D2667, Sakai Trading Europe
- Tipaque CR-97, Ishihara Sangyo

⁵Dispersant examples:

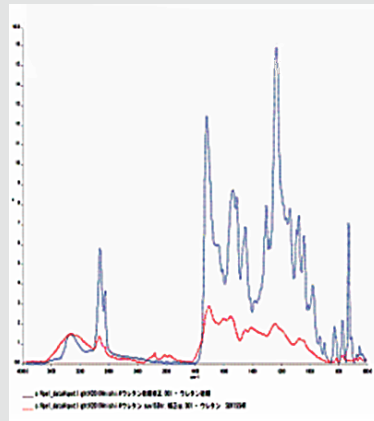
- Disperbyk 190, 199, 2010, Altana
- Nuosperse FX610, Elementis

B) Weathering test by super accelerated weathering

Urethane polymer
 SUV 155 hours
 ≈2,5 years outdoor exposure



Visible degradation
 (flaking, roughening)

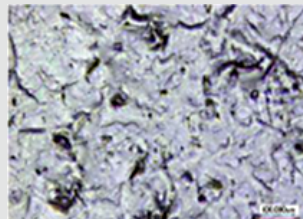


Before SUV testing
 After SUV testing

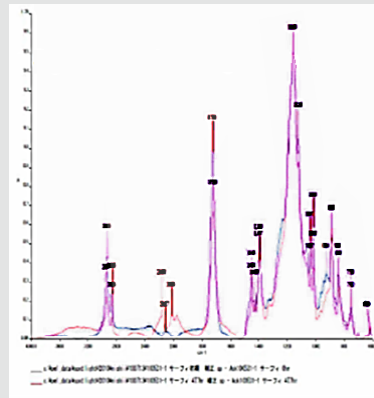
Spectra change is visible;
 the base urethane polymer has highly degraded

Figure 1.1: Surface scan of Urethane polymer by FT-IR before and after SUV testing (super accelerated weathering test with UV, heat, humidity and rain exposure)

SE-600
 SUV 477 hours
 ≈8 years outdoor exposure



Almost no change

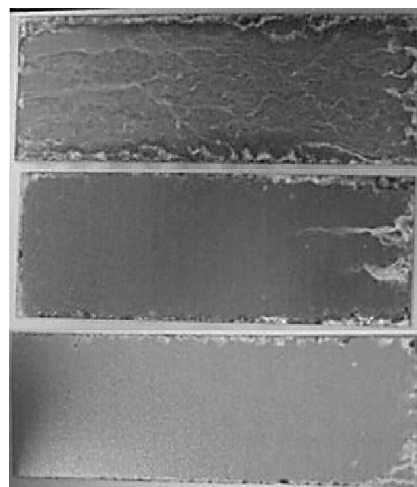


Before SUV testing
 After SUV testing

Almost no spectra change (no degradation)

Figure 1.2: Surface scan of SE-600 by FT-IR before and after SUV testing (super accelerated weathering test with UV, heat, humidity and rain exposure)

C) Corrosion resistance test by salt spray test for 3 days on galvanized steel



Uncoated
 Severe corrosion

Urethane 2µm
 Corrosion progressing from the edges

SE-600 2µm
 No change

Figure 3: Corrosion resistance comparison against PU & uncoated galvanized steel

Storage

- Store ZEFFLE SE-600 inside at temperatures between 10 and 35°C (<40°C)
- Prevent freezing.
- Keep ZEFFLE SE-600 away from heat, sparks and open flames

Safety

Please use body protection, protective work clothing and protective gloves. Please wear safety glasses to protect your eyes.

Before using this product, please read the current Material Safety Data Sheet and the precautionary statement on the product package.

The information is based on practical experience and is intended for information and guidance only. No liability can be accepted.

Packaging

ZEFFLE SE-600 is available in 180kg drums.

ISO 14001 certification

Daikin Chemical Europe GmbH and all its suppliers within the Daikin Group have obtained the ISO 14001 certification, an international standard concerning the environmental management system in our factories. ISO 14001 is a standard established by the International Organization for Standardization which applies to environmental preservation activities. Activities, products and services of our fluorochemicals plants have been certified as being environmentally sound by an internationally recognized certification body.

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