SIO-9261 Acrylic-Modified Polysilazane

Product Description

SIO-9261 is an acrylic-modified polysilazane resin based on a polysilazane backbone grafted with acrylate functional groups. After curing, the coating film exhibits extremely high pencil hardness, excellent yellowing resistance, outstanding weatherability, and superior mechanical performance.

The product is suitable for medium- and low-temperature bonding applications, bridge and construction bonding systems, weather-resistant anti-corrosion coatings, insulating heat-resistant electrical components, and protective coatings for machinery and industrial equipment.

The coating is UV-curable and can form covalent chemical bonds with substrates through amino functional groups after curing, significantly improving the mechanical strength and adhesion performance of the coating layer. Adhesion can also be further enhanced by adjusting the surface energy compatibility between the coating and substrate.

Suitable Substrates

Applicable for bonding and coating on:

- Carbon steel
- Stainless steel
- Cast iron
- Aluminum alloy
- Titanium alloy
- Heat-resistant alloy steel
- Microcrystalline glass
- Ceramics
- Plastics
- Cement
- Stone materials

Notes

Different substrates may require different adhesive or coating formulations. Within a certain range, substrate affinity can be improved by adjusting surface energy compatibility. Under suitable conditions, amino groups may also chemically bond with the substrate surface.

Service Temperature

Suitable for:

- Long-term outdoor service below 300°C

- Short-term exposure up to 500°C

The actual heat resistance of the coating system may vary depending on the thermal stability of the substrate itself. The coating also demonstrates excellent thermal shock and heat-cold cycling resistance.

Coating Properties

Test Item	Specification	Test Method
Appearance	Colorless transparent	GB/T 1721-79
Solid Content	100%	GB/T 1725-2007
Density	1.05 ± 0.02 g/mL	GB/T 6750-2007
Pencil Hardness	≥6H	GB/T 6739-2006
Adhesion	Grade 0	GB/T 9286-1998
Neutral Salt Spray Resistance	＞500 h	GB/T 1771-2007
Water Contact Angle	≥110°	GB/T 26490-2011
Artificial Weathering Resistance	No rust, chalking, or cracking after 3 days; slight discoloration only	GB/T 1865-2009
Dielectric Strength	≥10^5 V/mm	ASTM D149
Electrical Resistivity	≥10^{13} Ω·m	GB/T 35856-2018
Continuous Service Temperature	300°C	GB/T 1735-2009
Maximum Instantaneous Temperature	500°C	—

Basic Application Parameters

Item	Specification	Item	Specification
Solid Content	100%	Volatility	None
Coating Color After Application	Colorless transparent	Curing Method	UV curing
Dry Film Thickness	4–150 µm	Curing Time	~0.5 min
Reactive Diluents	HDDA, TPGDA, or compatible polysilazane grafted diluents	Recommended Application Temperature	25–90°C

Item	Specification	Item	Specification
Pot Life	Unlimited without UV exposure	Flash Point	＞90°C
Storage Temperature	0–35°C	Viscosity	500–1000 mPa·s
Appearance	Colorless transparent liquid (slightly hazy in some cases)	—	—

Notes

This resin is a solvent-free system and can generally be sprayed directly under standard spray-gun airflow conditions without dilution.

If dilution is necessary, only the dedicated reactive diluents supplied or recommended by our company should be used.

Special Instructions

This product is a one-component UV-curable material. During storage and application, it must be protected from ultraviolet exposure.

Avoid exposure to:

- Direct sunlight
- Window-side UV exposure
- Fluorescent lighting with UV output
- Other strong UV environments

For best performance:

- Apply in a single coating pass whenever possible
- Recommended dry film thickness should not exceed 150 µm
- Excessive thickness may reduce coating performance

Standard Application Procedure

Surface Cleaning → Surface Roughening → Cleaning & Air Blowing → SIO-9261 Spraying → UV Curing

UV Curing Procedure for the Coating

1. Defoaming

After spraying, place the coated panel horizontally to allow bubbles to dissipate naturally. Any remaining bubbles may be manually removed if necessary.

2. UV Pre-Curing

Place the coated substrate flat inside the UV curing equipment:

- Initial irradiation distance: ＞15 cm
- Irradiation time: 1 minute

After preliminary curing, inspect the hardness. If additional curing is required:

- Adjust irradiation distance to approximately 3 cm
- Irradiate for another 1 minute

3. Recommended UV Lamp Specifications

- Main wavelength: 365 nm or 405 nm
- Recommended lamp power: 2 kW

Process Instructions

1. Surface Roughening

Before coating, sand or sandblast the substrate surface to remove rust, dust, contaminants, and oxide scale.

Surface preparation greatly influences coating performance.

Recommended surface cleanliness:

- Optimal: Sa3
- Minimum: St3 without oxide scale
  (GB/T 30790.4-2014)

2. Cleaning

Use dedicated cleaning agents or degreasers to remove residual oil, dust, and contaminants.

3. Substrate Drying

Ensure the substrate surface is clean and completely dry before coating.

4. Resin Mixing

The system consists of resin and photoinitiator.

Recommended mixing ratio:

- Resin : Photoinitiator ≈ 100 : 3–4

Mix thoroughly and filter through a 120-mesh filter before use.

Important: Mixing and filtration must be performed under light-protected conditions.

5. Coating and Bonding

Apply the material onto the bonding surface and perform UV curing. After curing, the coating surface exhibits hydrophobic and oleophobic properties.

Storage Instructions

1. Store according to national regulations in a dry, cool, and well-ventilated environment away from heat and ignition sources.
2. Keep containers tightly sealed.
3. Recommended storage temperature: 5–35°C.
4. Shelf life: 12 months from production date.
5. Unused material should be resealed immediately after use.
6. Mixed but unused material should be stored in opaque sealed containers away from light, such as black plastic containers.
7. Contaminated or unrecoverable materials should be disposed of according to local regulations.
8. Expired products may only be used after passing quality inspection.