Stellar Unity
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Technical Information Sheet

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Silicone Modified Prepolymers

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Product Category	• Hydroxyl-modified Silicone Prepolymer • Isocyanate-modified Silicone Prepolymer • Acrylate-modified Silicone Prepolymer • Carboxyl-modified Silicone Prepolymer • Alkoxy-modified Silicone Prepolymer
Application	• Polyester or unsaturated polyester synthesis • Resins for adhesive and sealant • Resins for paints and coating • Resins for medical devices
Key Function(s)	• Improve adhesion • Enhance flexibility, smooth surface, and soft feeling to touch • Increase heat resistance function • Impart anti-fouling and anti-graffiti properties • Boost up anti-blocking and anti-sticking performance

A **modified silicone prepolymer** is a type of silicone-based reactive group which has small or intermediate molecules that could be reacted or further polymerized. When backbone of polymers have been chemically altered or "modified" to introduce new properties or enhance existing characteristics. Silicone prepolymers are intermediate materials in the synthesis of fully cured silicone elastomers or other silicone-based products. The modification process typically involves attaching functional groups, which can improve the prepolymer's adhesion, flexibility, stability, or other specific attributes depending on the intended application.

Here are some key points about modified silicone prepolymers:

Silicone Base: These prepolymers are primarily composed of silicon atoms bonded to oxygen atoms in a repeating structure called a siloxane backbone (Si–O). This backbone is highly stable, flexible, and resistant to heat, moisture, and chemicals.

Modification Process: Modification usually involves incorporating other chemical groups, such as acrylates, hydroxyl, alkoxy, isocyanate, into polymer backbone. These groups alter the behavior of the material, enabling it to better suit specific applications.

For more information of product

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Properties: The modification can result in enhanced properties such as improved adhesion to different substrates (like metals, plastics, or glass), better processability, or increased resistance to temperature, weathering, and chemicals. For example:
Increased surface reactivity: This makes the silicone easier to bond with other materials.

Improved flexibility: This can lead to materials with more stretch or impact resistance.

Increased hardness or rigidity: In some cases, modified prepolymers can be tailored to create tougher, more rigid materials.

Polymer backbone can be modified in various ways to enhance its properties or tailor it to specific applications. The modification of silicone typically involves introducing functional groups, cross-linking agents, or other chemical changes that affect its behavior, such as its hardness, flexibility, adhesion, or resistance to various environmental factors. Here are the main types of modification that can be made by silicone-modifier prepolymer:

Introduction of Reactive Groups

Adding functional groups to the silicone backbone can alter its chemical reactivity and improve adhesion, surface interaction, or cure speed. Common functional groups include:

Amines: Improve adhesion to metals and certain plastics.
Acrylates or Methacrylates: Provide the ability for UV curing and improve the bond with substrates.
Epoxides: Increase cross-linking capabilities and improve chemical resistance.
Isocyanates: Used to increase hardness or create cross-linked networks for specific mechanical properties.
Hydroxyl Groups: Enhance curing properties and adhesion to various substrates.
Alkyl Groups: Improve water and chemical resistance.

Applications

Sealants and adhesives: For their superior bonding properties, especially in harsh environments.
Paint and Coatings: Modified silicones can form durable coatings for electronics, automotive parts, and industrial equipment.
Medical devices: Some modified silicones are biocompatible and used in medical-grade products like implants or wound care materials.
Electronics and electrical insulation: Due to their resistance to temperature extremes and electrical properties.

At Stellar Unity, our silicone-modified prepolymer manufacturer could provide guideline formulation and samples for customers to have an internal evaluation. Our supplier has been rewarded as one of the Innovative Organization by Chinese authority.