

Silicones: Overview II

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Sophisticated Chemical Building Block



Silicones are a fundamental building block of modern life. They have an exceptional breadth of chemical and physical qualities, making them the material of choice for industries ranging from aviation to textiles.

Silicones are astonishingly versatile because adding different molecules and compounds to the core molecular structure will enhance or modify the silicone properties. The result is a readily adaptable material that can be manufactured in more than 2,000 different forms such as solids, liquids, oils, greases, semi-viscous pastes, antifoams, impregnating agents, release agents, silicone rubber and more.



Natural Origins

Silicones are a family of polymers that include siloxanes and silanes – all compound variations of the natural element silicon, which is the second most common element in the earth's crust.

Here are some of the important industries that use silicones: ●●●

- Automotive
- Aviation and aerospace
- Construction
- Cosmetics
- Domestic appliances
- Electronics
- Food
- Healthcare
- Mechanical engineering
- Paper
- Rubber
- Surface coatings
- Textile and leather

Businesses, consumers and craftspeople have sophisticated needs and require quality materials that help provide creative and economical solutions. ●●●

Stable. Silicones are remarkably stable compounds. They have outstanding resistance to weathering and aging and tolerate extreme temperature and climate changes. Silicones resist interaction with chemicals. They resist atmospheric influences like salt, wind, water and radiation. They have exceptional insulation features.

Clean. Silicones can be used with, or applied to, chemicals and materials often without producing unwanted byproduct or odor. Silicones are water resistant and are not a good host to bacteria and fungus. Products made with silicones are easy to clean. In building materials, silicones help prevent damage from moisture and mildew. Medical devices made with silicones can be kept sterile without difficulty.

Durable. Silicones withstand a tremendous amount of wear and tear. Unlike many synthetic materials, they retain their fundamental chemical and physical properties when exposed to stressful environments over time. Silicones are reliable and improve the life span of many materials.

Adaptable and Versatile. Silicones are convenient, relatively easy to produce and easy to work with in many industries. Used in advanced manufacturing and processing, silicones are often the impetus for new technology that streamlines production. Silicones are used to make products we use every day:

- Airbags
- Adhesives
- Agricultural products
- Air filters
- Baby care products
- Bakeware
- Cable insulation and sheathing
- Coatings
- Cosmetics
- Electronic devices
- Fabric finishes
- Fiberglass fabrics/laminates
- Glass receptacles
- Hair care and skin care products
- Home care products
- Hydraulic fluids
- Ink
- Lubricants
- Medical tubing
- Medicine
- Paints
- Pipes
- Polyurethane foam
- Prosthetics
- Sealants
- Sewing-thread lubricants
- Shoe soles
- Tires
- Toys
- Transformers
- Vehicle gaskets and hoses



Many silicones have the following physical and chemical characteristics ●●●

- Outstanding weathering and aging resistance
- Thermostability
- High water repellency
- Extremely strong adhesion qualities
- Can withstand long-term exposure to the atmosphere
- Resistance to UV and IR radiation
- Extremely low volatility
- Inert (non-reactive with most materials)
- Chemical resistance
- Long-term elasticity, pliability and flexibility
- Excellent electrical insulation
- Tensile strength
- Anti-foaming properties
- Microbial resistance