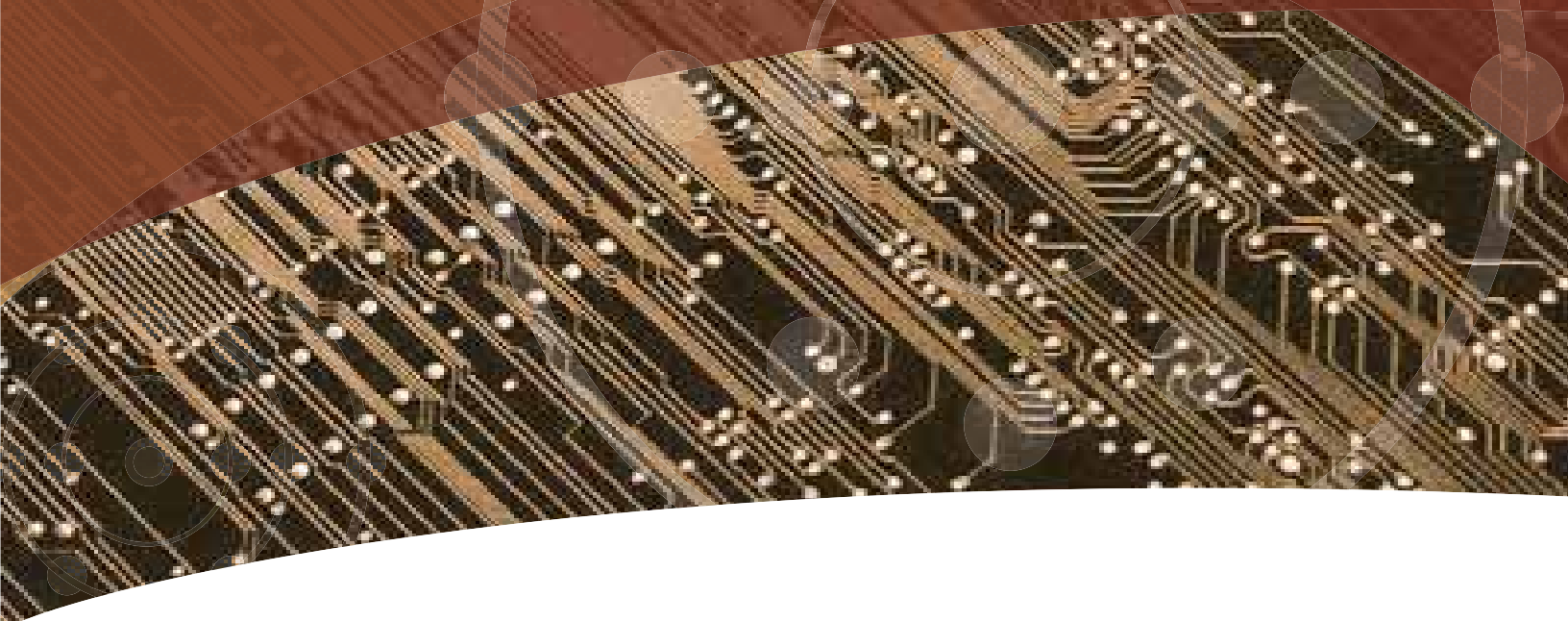


Silicones: Overview I

September 2004

Meeting the Demands of Modern Society



Modern society expects technological innovation and product development to help us live longer, healthier, better lives. Silicones help make this possible.

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A wide variety of products that we rely on every day have silicones as an important component or ingredient. Airbags, sealants, intravenous tubes, microchips, paint, hand-held computer devices, ultraviolet resistant sun lotion and gas masks are just a few examples.

Silicones provide solutions to ordinary and extraordinary problems. They make products stronger, more stable, more resilient, more aesthetically pleasing, easier to use or apply and longer lasting. They help materials perform to the high standards that businesses and consumers demand.



From Agriculture to Aviation

Silicones improve our quality of life. They enable us to maximize resources. They provide solutions to important consumer and business needs. They help turn pioneering visions into reality. In everything from agriculture to aviation, silicones enhance existing materials and make possible new ones. And, silicones enable new technologies that streamline production, saving time and reducing cost and environmental impact.

Enable Top Performance ●●●

Silicones facilitate the highest quality, innovative products on the market. In every application – from the tight protecting seal on a microwave door to the lifesaving respirator in an intensive care unit – silicones work to enhance performance and provide the most desirable outcome imaginable.

- Agricultural products that fertilize and protect crops utilize silicones' foam control and spreading and penetrating properties. This helps maximize spray coverage and soil absorption, which contributes to crop growth and production.
- Silicones insulate highly sensitive electronics ranging from compact microchips in computers, cell phones and pagers to superconductors for utility cable, industrial motors, locomotives, satellites and aircraft engines.
- Silicones ensure construction materials stay fixed and absorb stress and movement so structures are strong and safe. Wooden floors, swimming pools, concrete bridges and glass-fronted skyscrapers all benefit in this way.
- Silicones are used to cover, seal, weatherproof and coat virtually every joint and gasket of automobiles, ocean vessels, planes and spacecraft. Because the parts stay intact, the vehicles can operate at high speeds and under extreme conditions (wind, water and atmosphere) without compromised function or safety.
- Silicones have wetting and spreading qualities that provide for smooth and even application of make-up, lotions and cleansers. With silicones, "long-lasting" make-up retains its color and luster and shampoos and conditioners add better shine, body and softness to hair.



- Silicones have helped revolutionize the textile industry. They impart a variety of "feel" properties such as softness to woven, knit and nonwoven fabrics. Silicones applied to fabrics improve their physical properties such as tear strength, abrasion resistance, stretch recovery, wrinkle recovery, water repellency and ability to stay pressed. Fabrics coated with silicone are used to make everything from clothes to sails, parachutes and hot air balloons.
- Silicone rubber is used to make cake pans, ice cube molds, oven mitts and spatulas that can be used in the freezer, oven, microwave or dishwasher without affecting the quality of the product or the food.

Strengthen and Protect ●●●

- Silicones provide industrial applications the needed "industrial strength" to withstand the rigors of human activity and Mother Nature. Silicone sealants and adhesives increase the life span of bridges, ships, office buildings, airport runways and highways. Silicone rubber insulates and protects utility and power line cables.
- Silicone seals keep joints airtight but elastic. They allow large skyscrapers to withstand seismic activity, and bridges and runways to endure years of heavy traffic and stress without compromised function or safety.
- Silicones help protect building structures and edifices from erosion and water damage. Silicone-enhanced sealants, adhesives and structural glazes keep windows, doors, joints, roofs, paneling and foundations impervious to damage from the sun, wind, rain, ultraviolet radiation and pollution. Buildings last longer and require less maintenance.
- Automobiles are safe and reliable modes of transportation thanks to silicones. Silicones used in airbags, engines, radiators, sunroofs and transmissions help make travel dependable, enjoyable and affordable.
- Silicones used in polyurethane additives provide cushioning and protective shock absorption qualities to helmets, knee guards, car seats and mattresses.
- Silicones – because of their strong resistance to ultraviolet radiation – are used in the manufacture of sunscreens, sunglasses and car windows to protect consumers from damaging ultraviolet rays.

Preserve the Features and Reliability of Materials ●●●

Silicones have great durability, eliminating the need for costly repair and replacement and allowing for conservation of limited resources.

- Silicones extend the service life of exterior coatings and finishes on cars, boats, houses, office buildings, manufactured products, electronics and appliances. Paints and finishes are more resistant to water, heat, atmospheric exposure, chemicals and time.
- Silicone rubber used in underground cable, medical tubing, tires and moldings remains durable and elastic under temperature and other environmental stresses.

- Personal care products and household goods last longer when made with silicones. Lotions retain texture, appliances require less repair and cleaning agents keep floors clean longer.
- Silicones used in conservation can restore sandstone or limestone churches, bridges and other historical landmarks to their original strength without compromising the physical characteristics of the stone or structure. Silicones help prevent erosion and decay caused by water and other natural elements.
- Silicone sealants and adhesives help retain airtight seals in everything ranging from swim goggles and snorkel masks to sailboats and ocean liners.

Provide Efficiency and Economy ●●●

Silicones contribute significantly to our ability to manufacture, build and use products that require less energy, produce less unwanted byproduct and maximize both natural and manmade resources.

- These days, speed – in the form of a faster Internet connection, a handheld computer device, a faster car or a more efficient production assembly line – is a top priority for consumers and professionals. Silicones enable the creation of cables, small computers and efficient manufacturing so we can move faster and more efficiently.



- Manufacturers have more efficient production lines and less material waste when using silicones. Silicones are ideal for sturdy and flexible molds. Silicones enhance lubricants in industrial processes. Silicone rubber compounds are easy to process, do not require expensive equipment and can be cured and processed at various rates and temperatures.
- In process industries – including textiles, oil and gas, food processing and pulp and paper processing – silicones' outstanding foam control enables easier manufacturing of large quantities of material.
- In the household, silicones impart anti-foaming properties to shampoos, laundry detergents and cleaning agents. This helps with foam control and prevents unwanted bubbles.
- Silicones save energy. They enable us to engineer smaller computer, electrical and car parts. Glass panels sealed with silicones are excellent insulators and reduce energy loss.

Improve Lifestyle ●●●

Silicones offer what consumers and industry desire – an unbeatable combination of qualities: ease of use, flexibility, cost effectiveness.

- Silicones in medical products help save lives and increase the comfort of patients' treatment. Silicones enable medical devices to be used comfortably and without producing an allergic or negative body reaction.
- Silicones are a household necessity. Homeowners protect houses from water damage, mildew and heat loss with silicone sealants and adhesives. Silicone materials last longer and cost less to clean and maintain.
- Silicones create many of the positive qualities we associate with gentle and effective personal care products and household products – luxuriant texture, lasting color, silky smoothness, luster and smooth spreading.
- Silicones enable societies to design and erect buildings that display artistic and engineering ingenuity and hold important cultural significance.
- Silicones used in medicines and medical devices convey a variety of properties including anti-foaming and lubrication (particularly useful in syringes).

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