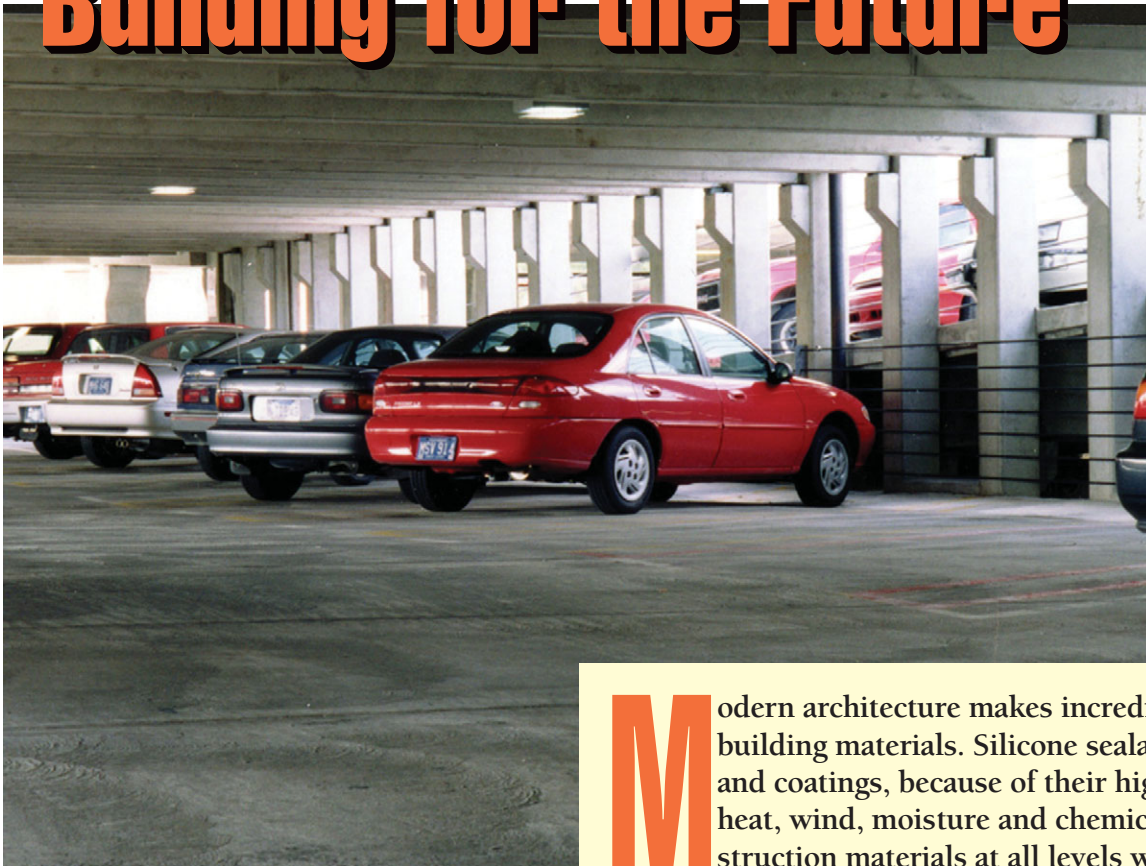


# The Role of Silicones in Parking Structures

## Building for the Future



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**M**odern architecture makes incredible demands on building materials. Silicone sealants, adhesives and coatings, because of their high resistance to heat, wind, moisture and chemicals, make construction materials at all levels work better and last longer.

Silicone sealants ensure materials stay affixed and absorb stress and movement from thermal expansion, wind and or earthquakes. Adhesives made with silicone can bond together materials as diverse as concrete, glass, granite, steel and plastics, allowing for innovative architecture and engineering.

Exposure to the elements remains the principal worry of architects and builders of industrial and commercial structures like parking garages. Whether silicone is manufactured with the construction material or applied to the finished surface, silicone can protect joints and materials and keep them essentially unaffected by the elements.



## Sealants

Being well above ground, a parking deck does not have the benefit of the earth's heat sink that a highway does. As temperature changes, the joints feel the movement, not just at the beginning, but daily for the entire lifetime of the deck. As a result, movement requirements for parking structure sealants are especially demanding.

Silicone sealants are a great choice for durable, long-term performance in parking structures because they retain their properties over time and result in building materials that are less susceptible to damage from weathering, aging, or just normal wear and tear.

While most agree that silicone sealants are essential for the top deck of a parking garage because of the high levels of UV exposure, they might not think them necessary for the rest of the structure. They would be wrong. The lower decks of parking structures are exposed to significant levels of UV light, heat and humidity. Silicone sealants remedy this problem because they remain flexible and perform well when exposed to UV light, heat and water—whether in the form of rain, ice and snow, or merely high humidity.

The advantages now commonly associated with silicone sealants apply to horizontal as well as vertical applications. Perhaps

because they are right under our feet, horizontal joints are sometimes easy to overlook as an opportunity to apply remarkable silicone chemistry to solve construction problems.

A variety of silicone sealants exists to cover the different joint sealing needs of parking structures. Silicones are available that are specially formulated to be used with concrete construction. Some sealants are formulated to be non sag and use moisture to cure to a low modulus, and are especially durable and flexible. These can be used to seal a curb, a grade greater than 6 percent, or horizontal joints. There are also one-part, self-leveling, ultra-low modulus silicone sealants that also offer outstanding movement capability. They are ideal for expansion and control joints with a grade of less than 6 percent, where rapid cure is not required. Finally, there are two-part, self-leveling, fast-curing, ultra-low modulus silicone sealants with exceptional movement capability. They are formulated for horizontal applications of 6 percent or less grade

where rapid cure is required, such as parking decks that are under restoration and still in use at the same time. Expansion joints and control joints that have surfaces of concrete, asphalt or metal-armored and experience a high degree of movement during curing are within the scope of this unique technology. These types of silicone materials will be able to accommodate joint movements up to +100 –50% of the original joint width. Original expansion joints that are failed and designed to 12 inches wide can be reconstructed to be 2 to 3 inches in width. Silicones have the low temperature flexibility unmatched by other sealant and gasket materials used today. The low temperature flexibility allows less stress on bond lines during joint expansion in the cold temperatures. Installing a joint sealing material that increases its stiffness in cold weather (when the joint experiences extension), increases the risk of joint failure. Using low modulus silicones reduces the risk of joint failure during joint movements induced by thermal dilation of the concrete structures.





paints, sealers and varnishes. Silicone coatings, which are available in “ready-to-use” water-based, powder and cream formulations, also work well in masonry, poured and pre-cast concrete, fluted block, brick, stucco and more.

Silicone resin emulsion paints and plasters are among the most modern and successful types of

Silicone in new and remedial horizontal joints not only increases the lifespan of parking garages, but highways, airport runways, bridges, shipping yards and residential streets. Silicone elastomeric joints withstand the extreme expansion and contraction that result from fluctuations in temperature, humidity, wind and other environmental effects. Also, they do not react with materials like salt, detergents, fuel, hydraulic oils and cleaning solvents that are ubiquitous on the surfaces of parking garages and busy industrial roadways.

## Coatings

Silicone elastomeric wall coatings can protect exterior vertical walls in parking structures without compromising appearance. Silicone coatings add a protective layer that strengthens the natural material, repels water, and allows it to “breathe.”

Silicones added to coatings for decorative and commercial uses help enhance the coating performance, remaining resilient to years of outdoor weathering. They are a convenient addition to a variety of coating materials, including powder paints, liquid

finishes for parking structure facades. The silicone resin binder makes pores water-repellent and strengthens their structure at the same time. Silicone primers also strengthen the underlying material and enhance the adhesion of the top finish.

Paints made with silicones offer exceptional adhesion, pigment dispersion, and chemical, weather and stain resistance. Newer silicone-enhanced paints keep the exterior coating flexible so it withstands freeze/ thaw cycles without cracking, chalking, peeling or blistering. Degenerative substances like oil, gasoline, salt spray and acid rain, are less likely to corrode surface treatments.

Thanks to advances in silicone technology, today’s exterior paints and coatings last longer and stand up to sun, salt, pollution and age, better than ever.

## Water Repellants

Water inflicts the most serious damage to buildings. Water and moisture can corrode facades, deplete the binding agents in joints, diminish the thermal insulation qualities of a structure, and increase health



in depth and form a silicone resin matrix onto the concrete structure, thereby eliminating chloride ion intrusion which would compromise the strength of the system due to steel corrosion.

Water repellent treatments are essential when working with normal and reinforced concrete, aerated concrete, natural stone, limestone, brickwork or sand-lime brick. Many varieties of silicone-based water repellents are available.

## Silicones Are the Answer

Silicones provide solutions to both ordinary and extraordinary problems. They make products stronger, more stable, more resilient, more aesthetically pleasing, easier to use and longer lasting. Building without silicone is like cooking without heat or driving a

risks by transporting harmful substances like bacteria into the heart of a building.

Silicone-based masonry water repellents provide excellent protection against water, chloride ion intrusion and extend the life of parking decks.

Unlike other coatings, silicone water repellents do not seal the pores but form a very thin layer on the pore walls, which reduces water intake without compromising the material's vapor permeability or "breathability." Water is prevented from penetrating the material from the outside while moisture that has accumulated inside can escape. Silane penetrants can penetrate up to 6mm

car with no treads; it can be done, but the results may not satisfy.

Building successfully in the 21st century means building with the newest technology and with all the available tools. Silicones are essential for today's construction because they help materials perform to the highest standards demanded by everyone in the parking structure industry. ☐

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