



# SILICONES

Facilitate Transition to  
a Carbon Neutral Economy

## WHAT ARE SILICONES?

Silicones are among the world's most important and adaptable materials, used in thousands of products and applications. The backbone of silicon and oxygen atoms is the foundation of silicone chemistry and allows for the formation of siloxanes. Siloxanes are raw materials based on silicon, oxygen, hydrogen and carbon and are the critical building blocks used to make silicone polymers. Silicones can be made to resist moisture, chemicals, heat, cold, and ultraviolet radiation. Silicones display a host of unique properties that can lubricate, seal, bond, release, defoam, spread, and encapsulate. Because of these and other properties, silicone polymers are utilized in thousands of products in applications such as construction, consumer products, electronics, energy, healthcare, and transportation.



## SILICONES SUSTAINABILITY IN ACTION

Silicones contribute to lower carbon emissions by



Contributing to  
increased energy  
efficiency



Reducing primary  
energy demand

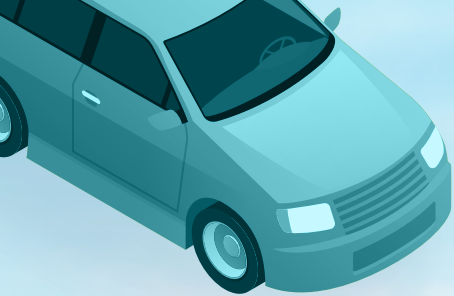


Decreasing the need for  
fossil and non-renewable  
energy sources.

• A recent Global Silicones Council life cycle assessment study shows that the use of silicone products can help save on average 14 times the amount of greenhouse gases required for production and end of life treatment of these products.

• The use of silicone materials can reduce primary energy demand as compared to the use of non-silicone-based alternative materials. Reducing the demand for non-renewable energy is key to avoiding adverse effects such as increased burning of fossil fuels.

• The use of silicones can lead to reduced consumption of fossil fuels and enables savings in heating energy while supporting the transition to renewable energies.



## AUTOMOTIVE

Silicone rubber, elastomers, sealants, lubricants, and plastic additives are used extensively in automotive components, and help contribute to reduced CO<sub>2</sub> emissions. Technologies that improve vehicle fuel efficiency are important for CO<sub>2</sub> emission reductions.

- Silicones contribute to efficient thermal management of lithium batteries which helps to extend the battery life. The growth of electric vehicles provides opportunity for substantial savings in fuel consumption and CO<sub>2</sub> emissions.
- Silicones are also used in the production of “green” tires. Green tires have less rolling resistance due to the addition of silicones and precipitated silica. The use of silicones in green tires helps to reduce the rolling resistance and fuel consumption resulting in less CO<sub>2</sub> emissions. Rolling resistance can account for up to 30% of a vehicle’s fuel consumption and a quarter of its CO<sub>2</sub> emissions.
- Lightweight vehicle construction can directly contribute to reducing fuel consumption and carbon emissions. The use of silicones in sealants and adhesives in vehicle components facilitates weight reduction.

## CONSTRUCTION

Silicones used in construction materials can contribute to sustainability and a reduced carbon footprint by reducing operating costs and energy demand. Buildings consume between 35% and 40% of primary energy, of which about 80% is for the operation of the building itself.

- Due to their durability, silicones can significantly reduce the carbon footprint of commercial construction over their lifetime. The use of silicone sealants and adhesives in construction can enhance the long-term resistance to degradation of buildings, delay the need for maintenance, and can protect and extend a building’s lifetime.
- A thinner window frame design leads to improved material efficiency.
- Material savings in the production phase and energy efficiency in the use phase are amongst the most important objectives in sustainable building design. New high performance silicone adhesive solutions allow slimmer connections and profile sections, which can result in significant material savings and reduce energy use and CO<sub>2</sub> emissions.
- The wide use of LEDs in buildings contributes to significant GHG emission reductions worldwide compared to other forms of lighting.

