

# Silicone Rubber

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## Introduction

Silicone rubber is a family of highly stable, hybrid elastomers that offer exceptional performance in adverse environments. These materials function reliably under many conditions that cause organic rubber to fail or deteriorate prematurely. In addition, this family of rubber has properties which can be modified to meet specific needs.

Chemically, silicones are quite different from all other rubber like materials. It is this difference that gives them their unique combination of properties. Organic polymers are made up of a "backbone" of carbon-to-carbon atoms. These linkages are deteriorated easily by elevated temperatures and the effects of ozone. Silicones are made up of a "backbone" of silicone and oxygen atoms. This silicone-oxygen linkage is the same that is found in other high temperature materials such as quartz, glass and sand, hence the outstanding high temperature properties of silicones, and their general inertness toward many deteriorating effects such as ozone, corona, weathering and radiation.

## Why Use Silicone Rubber?

**Temperature Resistance** – The most outstanding property of silicone rubber is its great resistance to temperature extremes. Under normal operating conditions temperatures as high as 500°F/238°C and as low as -65°F/°C can be achieved. At elevated temperatures the tensile strength, elongation and abrasion resistance of silicone rubber is far superior to that of most organic rubber. The estimated useful life of silicone rubber is shown in the table below. Useful life is defined here as the period of time during which the rubber retains an elongation of 50% or more.

### Service Temperature

**250°F/121°C**  
**300°F/149°C**  
**400°F/204°C**  
**500°F/238°C**  
**500° - 600°F/316C**

### Useful Life

**10 to 20 Years**  
**5 to 10 Years**  
**2 to 5 Years**  
**3 mo to 2 Years**  
**1 wk to 3 Months**

Because silicone rubber provides such long life at high temperatures, it is easy to overlook the fact that silicone rubber offers almost unlimited life at normal operating temperatures, a value that a designer of rubber parts cannot afford to overlook.

### Silicone Calendered Sheet Specifications

ZZ-R-765 Class 2A & 2B, AMS 3301, 3302, 3303, 3304, ASTM-D 2000 M1GE 405, 505, 605, 705 Temperature Rating (-65 to +450° F)



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