iFlex is made from silicone rubber and as a result brings along a range of benefits:

Silicone structure and its rich features

Silicone rubber is a synthetic rubber, it is synthesized by modifying silicon. Its primary molecular structure consists of silicon atoms with alternating oxygen atoms as depicted below:

SILICONE MOLECULAR STRUCTURE

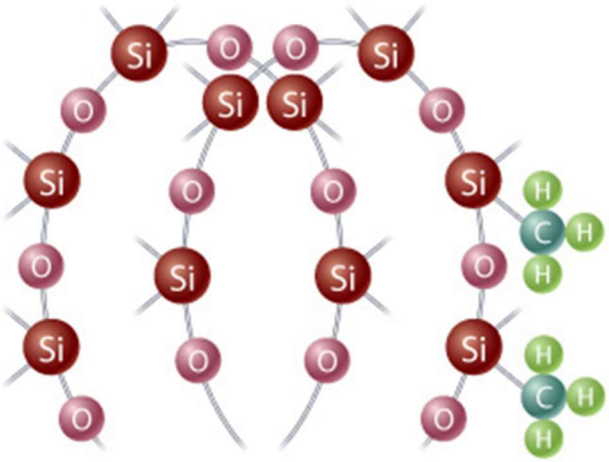


Image source

This varied structure of silicone makes it rich on features such as:

1. Thermal resistance: Heat from your device won't damage iFlex
2. Bacteria resistance:
3. Water repellency: iFlex won't hold on to moisture that could damage your device
4. High-voltage resistance: In case anything goes wrong with your device and it becomes conductive, iFlex will protect you from electric shock
5. Ozone resistance: Ozone exposure won't cause damage to your iFlex
6. Radiation resistance: All electronic devices emit radiation, the level of radiation is especially high while traveling in as the device works hard to capture signal from different towers as we move. With silicone's radiation resistance, iFlex won't suffer any damage even when you place your device on it while traveling
7. Weather resistance: Come rain, snow or sunlight, your iFlex will continue to retain its appearance and integrity
8. Fungus resistance: Fungus won't easily settle on your iFlex, if you keep it clean
9. Physiological inertia: iFlex won't move easily, which means you can place it on your car's dashboard or even on surfaces with mild slope without worrying about it falling off
10. High air permeability: iFlex will continue to remain odor-free
11. Food grade: Your iFlex is non-toxic
12. Excellent vibration damping: iFlex will protect your device from falling off due to vibrations (when on vibration mode)

13. Fatigue resistance, and elongation: In case it accidentally comes under heavy weight then it will not deform
14. Flex resistance: iFlex will not crease easily even when folded by applying immense pressure
15. Elongation: Made of iFlex can elongate up to 1.6 times without breaking

Silicone is in general better for the planet

SILICONE VS. PLASTIC CHARACTERISTICS COMPARISON

Characteristics	Silicone	Plastic
Ocean Safety?	YES Reists degradation of sun and sea.	NO Billions of microfragments litter seas.
Food Safety?	YES Comprised primarily of inert silicone (sand) and oxygen.	NO Petroleum-based with estrogen-mimicking chemicals.
Durability?	YES Endures for decades unchanged.	NO Cracks, degrades, stiffens with age.
Recyclable?	LIMITED Call your local recycling center. Safe to incinerate.	LIMITED Curbside recycling is available for some plastics, but global market's tightening.
Easy Care?	YES Dishwasher safe. Or by hand!	NO Hand wash only. Not heat safe.
Oven Safe?	YES	NO
Healthy for People & Planet?	YES Exceeds EU and USA food safety standard & won't degrade into microfragments in our oceans.	NO Even BPA-free plastics contain estrogen-mimicking chemicals like BPS. Is creating toxic mess in our oceans.

Image Source: ECOlunchboxes

Thermal resistance of silicone

Silicone offers excellent high and low temperature resistance, which makes your iFlex product durable and capable across wide temperature ranges. It will keep performing seamlessly at extreme temperatures – low or high. Your iFlex can withstand up to 220 degrees Celsius temperature.

TEMPERATURE CAPABILITIES OF ELASTOMERS

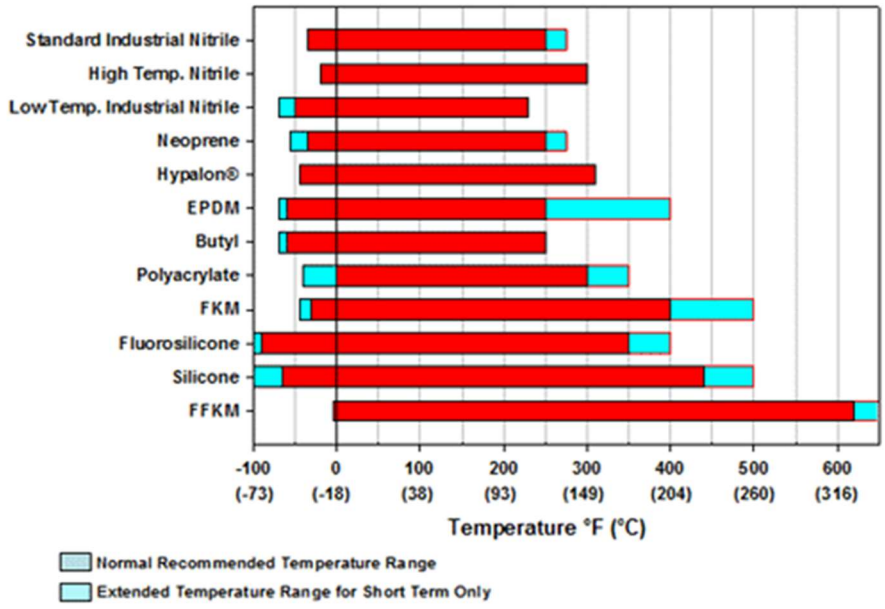


Image Source: From the "Sheet Rubber Handbook - Gasket and Packing Materials" publication #IP-40 of the Rubber Manufacturers Association (RMA).

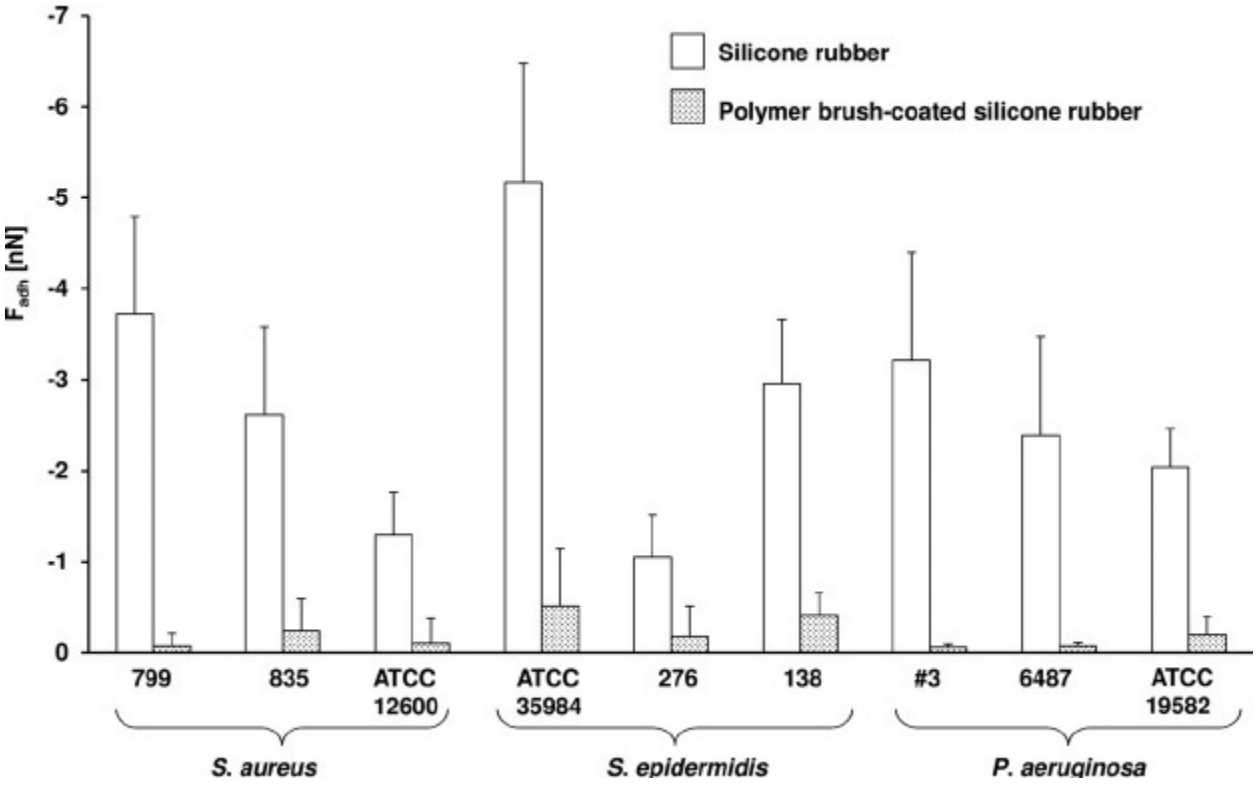
Bacteria resistance

Silicone is non-porous by nature which makes it naturally resistant to bacteria build up. And hence it is used in food and beverage applications, medical applications and infant care products. Being resistant to bacteria it is easy to sterilize. iFlex's silicone is made of vinyl terminated polydimethylsiloxane (PDMS), which further reduces bacteria attachment to its surface. In 2011, a group of scientists* used residual Si−H groups at the surface of PDMS to covalently graft a vinyl-terminated polymer that resulted in a 91% reduction in bacterial attachment. iFlex also contains silicone oil, which is proven to have an antimicrobial activity against S. aureus, S. epidermidis, P. aeruginosa, C. albicans, and Aspergillus spp., which are common endophthalmitiscausing agents.^

**Mussard, W.; Kebir, N.; Kriegel, I.; Esteve, M.; Semetey, V.` Facile and Efficient Control of Bioadhesion on Poly(dimethylsiloxane) by Using a Biomimetic Approach. Angew. Chem., Int. Ed. 2011, 50 (46), 10871−10874*

^In vitro antimicrobial activity of silicone oil against endophthalmitis-causing agents - ÖZDAMAR, AKIF MD; ARAS, CENGIZ MD*; OZTURK, RECEP MD†; AKIN, EMINE MS†; KARACORLU, MURAT MD*; ERCIKAN, CELAL MD**

As mentioned earlier, iFlex is made of vinyl terminated polydimethylsiloxane (PDMS) and as a result has much better bacteria adhesion than pure silicone rubber:



Source: Bacterial Adhesion Forces with Substratum Surfaces and the Susceptibility of Biofilms to Antibiotics, June 2012 – by Agnieszka K Muszanska, Reza Nejadnik, Yun Chen, and Willem Norde

Given the bacteria resistance properties of silicone it has been used in applications to reduce bacteria build up:

Applications

Coating on materials to reduce bacterial colonization

In 2018, scientists, Margrith Meier, Valentin Dubois, and Stefan Seeger conducted a study to investigate Bacterial colonization on the different silicone nanostructures was investigated and it observed reduced bacterial colonization on surfaces that were coated with silicone nanostructures.

Source

Solar water-heating panels

Due to its thermal and bacterial resistance properties, silicone rubber is been used even in solar water-heating panels. In these panels, it is used to withstand extreme temperatures and reduce potential as a food source for dangerous waterborne bacteria such as Legionella.
Source: Chemistry, Technology and Properties of Synthetic Rubber: By D. Beskrovniy, I. Davletbaeva, O. Gumerova

REFERENCES

Silicone a special synthetic rubber

Silicone rubber is a special synthetic rubber, places an important position in the rubber family. Because of its special structure, it has excellent performance, such as heat resistance, low temperature, high voltage resistance, ozone resistance, radiation resistance, weather resistance, physiological inertia and high air permeability, as well as lubricants and other media show excellent chemistry inert, its application is very extensive.

https://siliconecloth.com/index.php/research-progress-of-heat-resistance-of-silicone-rubber/

Silicone's backbone makes it resistant to heat and fungus

Silicone is a synthetic rubber. It is synthesized by modifying silicon. Silicone consists of a backbone of silicon atoms with alternating oxygen atoms. As silicone has high energy silicon-oxygen bonds, it is more resistant to heat than other rubbers or elastomers. Unlike in other elastomers, the inorganic backbone of silicone makes its resistance to fungus and chemicals higher. In addition, silicone rubber is resistant to ozone and UV attacks because the silicon oxygen bond is less susceptible to these attacks than the carbon- carbon bond of the backbone in other elastomers.

Source: Difference Between Rubber and Silicone: 2016-02-18

https://www.elbex-us.com/sites/default/files/General%20Properties%20of%20Elastomers.pdf

Silicone rubber uses in applications requiring high temperature-resistance and bacteria-resistance properties

Solar water-heating panels

Silicone rubber has demonstrated excellent temperature resistance and bacteria resistance properties and as a result has found applications that involve extreme temperature fluctuations. For example, in a 2013 Russia's Kazan, KNRTU publication / tutorial, Chemistry, Technology and Properties of Synthetic Rubber, mention an example of solar water-heating panels where silicone /synthetic rubber is used to withstand extreme temperatures and reduce potential as a food source for dangerous waterborne bacteria. The tutorial mentions that:

"*Freeze-tolerant solar water-heating panels exploit the elasticity of silicone to repeatedly accommodate the expansion of water on freezing, while its extreme temperature tolerance maintain a lack of brittleness below freezing and excellent tolerance of temperatures in excess of 150 °C (302 °F). Its property of not having a carbon backbone, but a chemically robust silicon backbone instead, reduces its potential as a food source for dangerous waterborne bacteria such as Legionella".*

Source: Chemistry, Technology and Properties of Synthetic Rubber: By D. Beskrovniy, I. Davletbaeva, O. Gumerova

Reduction in bacterial attachment with vinyl-terminated polymer

Recently, residual Si−H groups at the surface of PDMS were used to covalently graft a vinyl-terminated polymer that resulted in a 91% reduction in bacterial attachment.

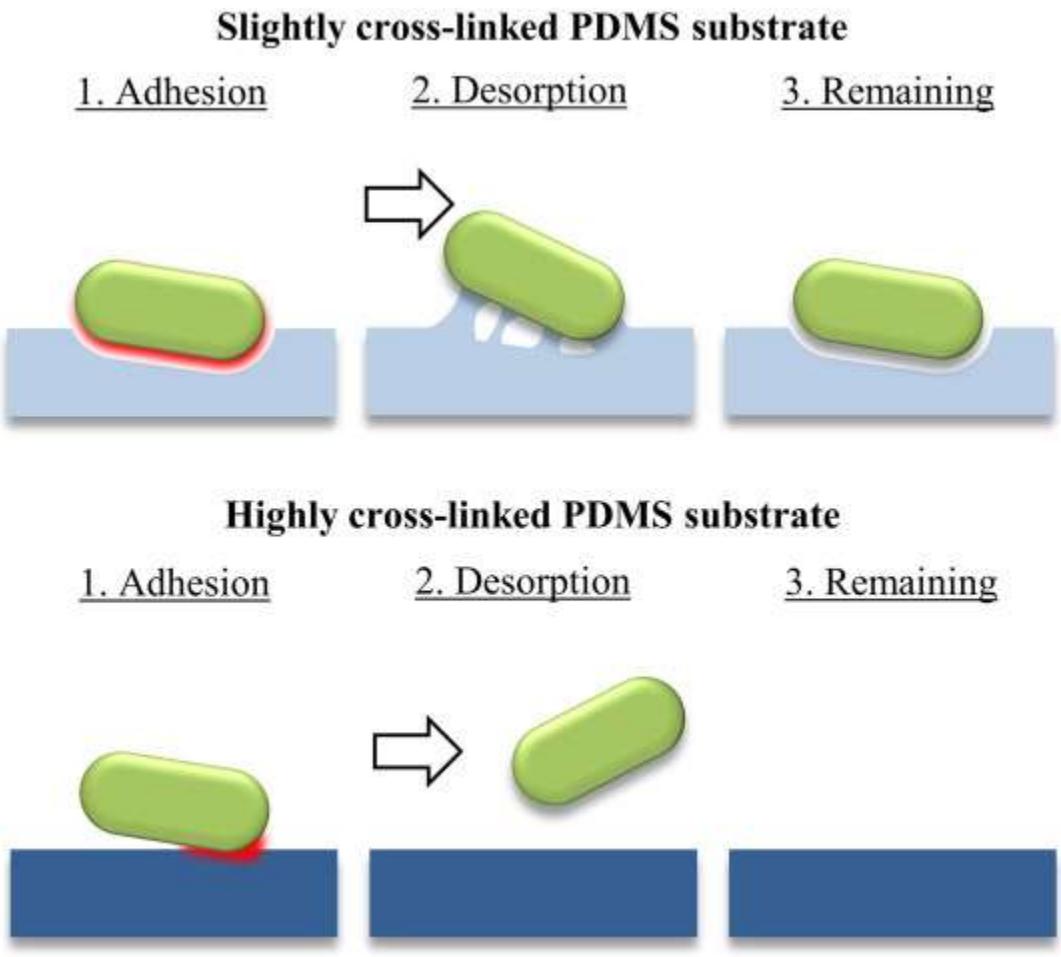
Source: Mussard, W.; Kebir, N.; Kriegel, I.; Esteve, M.; Semetey, V.` Facile and Efficient Control of Bioadhesion on Poly(dimethylsiloxane) by Using a Biomimetic Approach. Angew. Chem., Int. Ed. 2011, 50 (46), 10871−10874

Medical applications and infant care products made with silicones satisfy the highest quality standards demanded by health care professionals, patients and families. **Resistant to bacteria, silicones are easy to sterilize.** They do not react with other materials and do not irritate the body. Used externally, internally, or intravenously, silicone materials do not generate unwelcome byproducts or trigger allergic reactions.

Source: American Chemical Council

Have you ever wondered why so many kitchen utensils are made of silicone? Well, that's because another advantage of silicone rubber is its non-porous nature. This makes it resistant to bacterial build-up, making silicone particularly useful in food and beverage applications, where food-grade compounds can provide total peace of mind. Silicone is also non-toxic, water-repellent and recyclable at specialized plants.

Source: Martins Rubber Company



Source: Substrate viscosity plays an important role in bacterial adhesion under fluid flow - Jules D.P.Valentinab1Xiao-HuaQina12ClaudiaFesseleaHervéStraubaHenny C.van der MeibMatthias T.BuhmannaKatharinaManiura-WeberaQunRena