

## SILICONES IN TEXTILES – PART I

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### Introduction

Silicone technology has gained popularity in both fashion and industrial textile applications.

Silicone polymers or polydialkyl siloxanes are an important class of inorganic polymers that find many industrial uses. They are known for their outstanding temperature and oxidative stability, excellent low-temperature flexibility, and high resistance to weathering and many chemicals. These polymers also have low surface tension and are capable of wetting most surfaces.

The name **silicone** usually refers to linear polymers with the general structure  $-\text{Si}(\text{R}_2)\text{-O}-$  where  $\text{R} = -\text{CH}_3$  is called poly(dimethylsiloxane) which is abbreviated as PDMS.

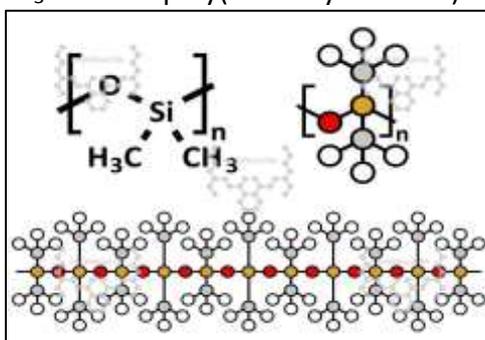


Fig 1.1: Structure of PDMS

Silicones are used at different stages of textile processing, right from the fiber production to the finishing. Silicones have some useful characteristics such as heat resistance, resistance to sunlight, moisture, chemicals and age. With the help of silicone technology, the textile manufacturers in the world can produce customized fabrics and clothing which complements the functional needs of modern lifestyle.

Manufacturing companies provide a range of silicone products for textile applications. Therefore, fabric manufacturers, produce clothes in accordance with the consumer need, like fabrics that repel water, prevent wrinkles, increase elasticity and resiliency.



The silicone coating is also used in apparel makes it breathable and comfortable. While in industrial applications like automotive, construction and sports goods, silicone coating gives strength, resistance from extreme temperature, moisture, UV rays and fire.

With the introduction of granular silicone softening technology, denim is made soft and comfortable to wear with less consumption of resources.

Below are the few areas where silicones are mainly used:

- Fiber Production
- Process Assistants
- Hydrophobic Agents
- Fabric Coatings
- Silicone as Fabric Softeners



### Silicones in Fiber Production

Due to heat stability and good lubrication properties of silicones, it reduces the dynamic coefficient of friction, hence, reducing the risk of fiber melting and breakage during production. During the manufacturing of man-made fibers, silicones can also be used as a lubricant to avoid adhesion of the thermoplastic fiber material to the spinneret.

A **Silanol-functional silicone**, a **reactive cross-linker** and a **condensation catalyst** are formulated together into a coating to encapsulate the fiber. Such treated fibers will lead to high thermal insulating textiles and filling material for fiberfill systems

To be continued...

Wishing you a great week ahead!

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