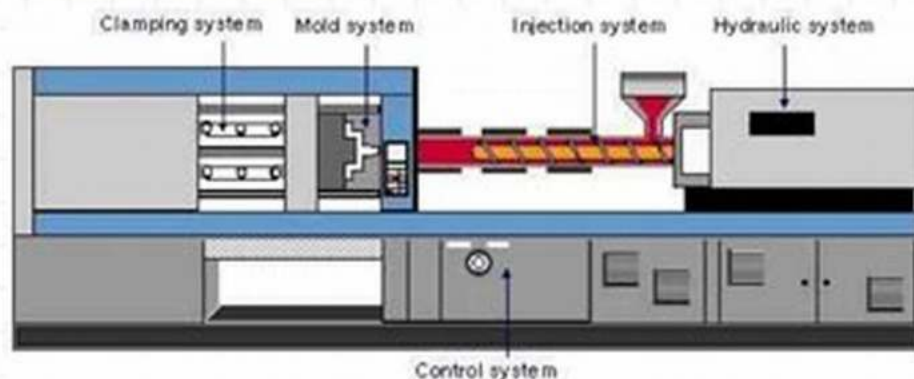


Discover the Fascinating Chemistry, Materials, and Processing of Liquid Silicone Rubber

The Marvelous World of Liquid Silicone Rubber (LSR)

Liquid Silicon Injection

- Actual machine
 - Hopper is replaced by hoses to drums with silicon parts separated

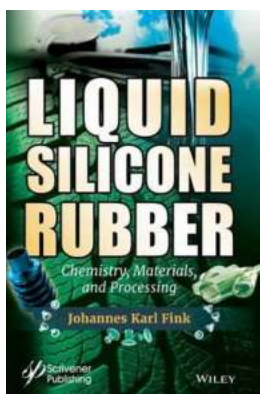


www.emachineshop.com/machines-molding/injection-molding.htm

Have you ever wondered how certain materials possess such remarkable properties? How they can be flexible, durable, heat resistant, and remain unaffected by harsh environments? Well, get ready to dive into the fascinating world of Liquid Silicone Rubber (LSR) where nature's wonders meet the marvels of advanced chemistry and engineering. In this article, we will explore the chemistry, materials, and processing techniques behind LSR that make it an invaluable substance in various industries.

The Chemistry behind LSR

LSR is a unique elastomer made from a combination of silicone polymers, fillers, additives, and catalysts. One of the key components is the presence of siloxane (-Si-O-) bonds, which give LSR its remarkable properties. These bonds provide the material with exceptional heat resistance, electrical insulation, and resistance to aging, UV radiation, and chemicals.



Liquid Silicone Rubber: Chemistry, Materials, and Processing by Johannes Karl Fink (1st Edition, Kindle Edition)

★★★★★ 5 out of 5

Language	: English
File size	: 14723 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Print length	: 318 pages
Lending	: Enabled



Furthermore, LSR can be customized by adding various functional groups to the polymer backbone during synthesis. This allows engineers to fine-tune the material's properties to meet specific application requirements. For example, the addition of vinyl groups can enhance the compatibility of LSR with other materials, making it ideal for overmolding processes.

Materials used in LSR



LSR is typically composed of three main materials: silicone polymers, fillers, and additives. Silicone polymers provide the base material with its elastomeric properties and can be customized to offer different mechanical strengths, elongation properties, and tear resistance. Fillers, such as silica or fumed silica, are added to improve the material's physical properties, including its hardness, modulus, and resistance to compression set. Finally, special additives like inhibitors, pigments, and flame retardants are incorporated to enhance the material's performance and visual appeal.

The LSR Processing Techniques

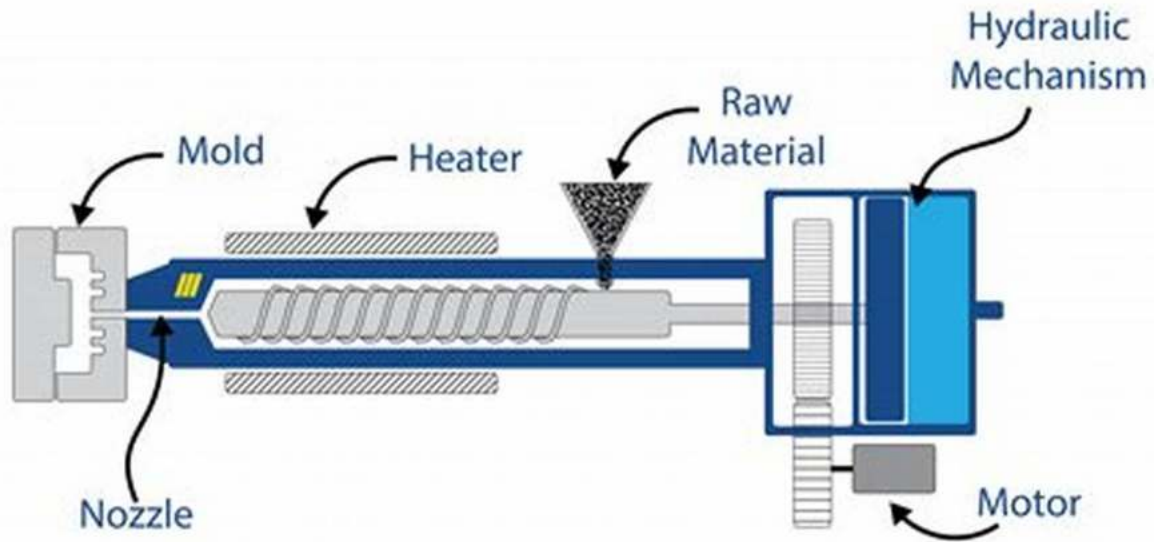


Fig. 1 - General injection molding system

LSR can be processed using various techniques, each offering its own advantages depending on the desired application. The most common processing methods include injection molding, compression molding, and overmolding.

Injection Molding: This technique involves injecting LSR into a closed mold under high pressure. It provides precise control over the final product's shape, size, and surface finish. Injection molding is commonly used for producing intricate parts with complex geometries.

Compression Molding: In this method, LSR is placed in an open mold and compressed between two plates under heat and pressure. Compression molding is suitable for manufacturing larger parts or parts with low volumes since it offers cost-effectiveness and requires simpler tooling.

Overmolding: Overmolding involves the encapsulation of a substrate with LSR, forming a strong bond between the two materials. This technique enables the

creation of products with enhanced functionality, such as combining rigid and flexible components within a single part.

The Applications of Liquid Silicone Rubber

LSR's unique properties and versatility make it a sought-after material in numerous industries:

- **Medical and Healthcare:** LSR's biocompatibility, heat resistance, and hypoallergenic nature make it ideal for medical devices such as catheters, seals, implantation parts, and respiratory masks. Its ability to withstand sterilization processes adds to its appeal in the medical field.
- **Automotive:** LSR's exceptional heat resistance, durability, and resistance to UV radiation and harsh chemicals make it an excellent choice for automotive components like gaskets, seals, connectors, and wire harnesses.
- **Consumer Goods:** LSR's soft touch, high-temperature resistance, and ease of color customization make it popular for consumer goods such as kitchen utensils, baby care products, phone cases, and fashion accessories.
- **Electrical and Electronics:** Due to its electrical insulation properties, LSR is widely used in electrical connectors, cables, insulators, keypads, and potting applications for electronic devices.

Unleashing the Potential of LSR

From its remarkable chemistry to its diverse applications, liquid silicone rubber continues to revolutionize industries around the globe. Its combination of exceptional properties, customizable composition, and various processing techniques make it an invaluable material to engineers and designers alike. So, whether you're looking to create the next breakthrough medical device or

designing innovative automotive components, remember that LSR is here to bring your visions to life!



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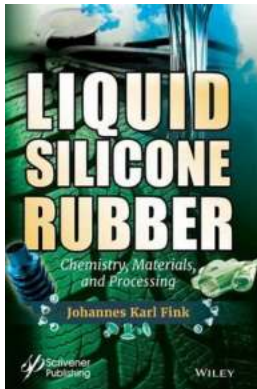
One of the very few books devoted to the chemistry, materials and processing of liquid silicone rubber

The scientific literature with respect to liquid silicone rubber is collected in this monograph. The text focuses on the fundamental issues such as properties, curing methods, special materials, as well as the latest developments, and provides a broad overview of the materials used therein. In particular, materials and compositions for liquid functional rubbers are discussed. Methods of curing and special properties are also described, such as tracking and erosion resistance, adhesion properties, storage and thermal stability. Methods of curing are precision casting, hybrid additive manufacturing, peroxide curing, ultraviolet curing, liquid injection moulding, or hot embossing. The book includes applications including automotive and underwater applications, electrical and optical uses, as well as medical uses.



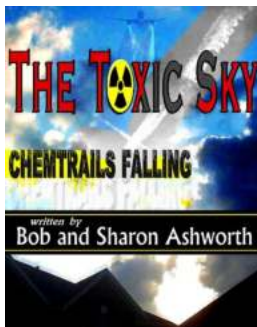
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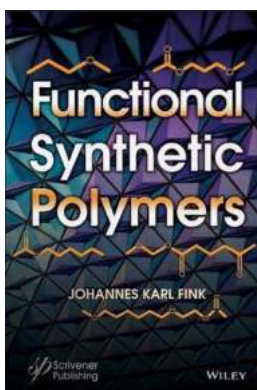
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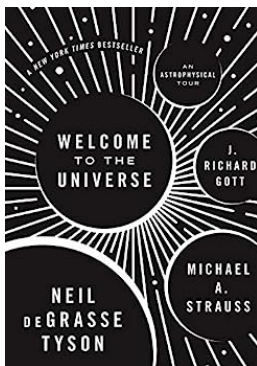
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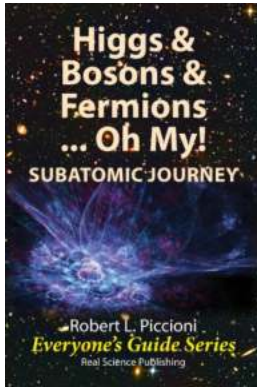
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