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Product Profile

MED4-4515 & MED4-4516 Silicone Elastomers

Description:

MED4-4515 and MED4-4516 Silicone Elastomers are fully compounded materials consisting of a dimethyl methylvinylsiloxane copolymer, amorphous reinforcing silica and peroxide catalyst (PD50-S). MED4-4515 Silicone Elastomer is a medium durometer material. MED4-4516 Silicone Elastomer has a medium - high durometer. Some other important features of the materials are as follows:

- Blendable to modify durometer
- Compounded for fabrication versatility
- High gas permeability
- Heat-stable and Autoclavable
- Sterilizable by most standard processes

MED4-4515 and MED4-4516 Silicone Elastomers are thermosetting material suitable for a wide variety of fabrication techniques including; molding, calendaring and extruding. MED4-4515 and MED4-4516 Silicone Elastomers have been strained through fine mesh stainless steel screens.

IT IS THE USER'S RESPONSIBILITY TO THOROUGHLY TEST PRODUCTS MADE IN PART OR OTHERWISE INCORPORATING THESE ELASTOMERS TO DETERMINE THE SAFETY AND ACCEPTABILITY OF THE PRODUCTS' PERFORMANCE IN THE INTENDED APPLICATION.

Typical Vulcanized Properties:

	<u>MED4-4515</u>
Appearance	Translucent Gray
Specific Gravity	1.15
Durometer Hardness, Type A,	52
Tensile Strength, psi / MPa	1350 / 9.3
Elongation, percent	450
Stress @ 200%, psi / Mpa	380 / 2.6
	<u>MED4-4516</u>
Appearance	Translucent Gray
Specific Gravity	1.21
Durometer Hardness, Type A,	72
Tensile Strength, psi / MPa	1175 / 8.1
Elongation, percent	370
Stress @ 200%, psi / Mpa	600 / 4.1

Test Methods:

	<u>ASTM</u>	<u>NTM⁽¹⁾</u>
Appearance		002
Specific Gravity	D792	003
Durometer Hardness,		
Shore A,	D2240	006
Tensile Strength, psi	D412	007
Elongation, percent	D412	007
Stress @ 200%, psi	D412	007

Physical properties tested from 0.075 inch-thick slabs molded 5 minutes at 116°C (240°F) and oven post cured for 2 hours at 249°C (480°F).

Instructions For Use:

The unvulcanized elastomer is a soft, translucent material that typically will crepe-harden with time. This phenomenon is reversible, and the elastomers may be "re-softened" by two-roll milling. In general, freshly softened elastomers have better processing characteristics, therefore, milling to a smooth consistency before use is advised regardless of the age of the elastomer. It is important to minimize heating of the material when milling to prevent premature partial curing. This can be accomplished by maintaining the elastomer at less than 43°C (109°F) during milling.

Intermediate hardness and other physical properties may be obtained by thoroughly cross-blending various ratios of the two elastomers on a two-roll compounding mill. Addition of other fillers and pigments can also be accomplished on the mill.

CAUTION: CARE SHOULD BE TAKEN TO AVOID FOREIGN ORGANIC MATERIAL ABSORPTION THROUGH CONTACT OR VAPOR AND CONTAMINATION FROM HANDLING OR PROCESSING EQUIPMENT.

Molding:

The thermosetting elastomer can be molded by the standard techniques of compression, transfer or injection molding. Molding cycle times are dependent on the mold temperature and cross-sectional thickness of the part.

It is best to use highly polished, chrome-plated or stainless steel molds for these operations. Other polished metals may be used, but these will normally require release agents to prevent sticking. If release agents are used, the parts should be cleaned prior to use.

IT IS RECOMMENDED THAT THE VULCANIZED PARTS BE ADEQUATELY POSTCURED.

Calendering:

The elastomer may be calendered into sheeting with or without reinforcement. Sheetting is usually made by calendering onto a laminate such as Mylar¹ or polyethylene for vulcanized and unvulcanized

sheeting, respectively. If Mylar is the laminate, it is stripped off after vulcanization while the sheet is still hot; if polyethylene is the laminate, it must be stripped off before vulcanization. The recommended vulcanization temperature is 116°C. The usual vulcanizing time is 3 to 10 minutes for a flat sheet of 0.125-inch thickness and an additional 3 minutes for each additional 0.125 inch.

Long lengths of the Mylar laminated sheeting can be calendered on a core and vulcanized in a hot air oven or steam autoclaved.

IT IS RECOMMENDED THAT THE VULCANIZED SHEETING BE ADEQUATELY POSTCURED.

Extrusion:

The elastomer can be extruded through an unheated die to make rod, tubing and coated wire. Vulcanization with this fabricating technique is normally accomplished by passing the extrusion through a horizontal or vertical heated chamber. The residence time in the chamber will vary with the size of the extrusion. For example, an extruded rod 0.125-inch in diameter will cure in a 10-foot-long preheated chamber at a temperature of approximately 275°C (527°F) with a throughput rate of 10 feet per minute.

IT IS RECOMMENDED THAT THE VULCANIZED TUBING BE ADEQUATELY POSTCURED.

For maximum uniformity, the elastomer should be resoftened on a two-roll mill the same day it is to be extruded.

Post-Curing:

The peroxide vulcanized elastomer contains 2,4-dichlorobenzoyl peroxide. The post-cure serves two purposes:

- Post-curing removes the volatile components and other residuals generated from the decomposition of the peroxide during vulcanization.
- Post-curing stabilizes and enhances the physical properties of the elastomers.

Post-curing is accomplished by heating the vulcanized material in a hot air circulating oven to a predetermined temperature for the required length of time. The oven must have an exhaust system of sufficient capacity to prevent volatiles from reaching an explosive level. The exhaust system should be vented so as to prevent worker exposure.

The time required for post-curing at a given temperature depends upon the rate at which the volatiles can escape from the elastomer, which in turn depends upon the thickness of the part, the exposed surface area and the oven loading.

As an example, a standard ASTM slab (0.075-inch-thick) should be post-cured at 177°C. (351°F) for a minimum of 2 hours or 200°C (392°F) for a minimum of 1.5 hours. Ultimate post-cure conditions for the specific parts must be determined by the user.

Caution:

During vulcanization, oven-curing, and post-curing, vapors containing polychlorinated biphenyl (PCB), and other residual volatile byproducts of vulcanization may be released in small amounts, which may be harmful. Work areas must be well ventilated, and workers should avoid inhalation of vapors. Review the Material Safety Data Sheets for specific information.

Shipping Limitations:

None.

Packaging:

MED4-4515 and MED4-4516 Silicone Elastomers are supplied in sealed-double-poly-wrapped bundles.

One Pound Kit
Five Pound Kit
Twenty-Five Pound Kit

FDA Master File:

Master Files for MED4-4515 and MED4-4516 have been filed with the U.S. Food and Drug Administration. The Master File will contain the results of applicable chemical and mechanical equivalency tested as well as confirmatory biological

testing. Customers interested in authorization to reference these files must contact NuSil Technology.

Warnings About Product Safety:

NuSil Technology believes that the information and data contained herein is accurate and reliable; however, it is the user's responsibility to determine suitability and safety of use for these materials. NuSil Technology can not know the specific requirements of each application and hereby makes the user aware that it has not tested or determined that these materials are suitable or safe for any application. It is the user's responsibility to adequately test and determine the safety and suitability for their application and NuSil Technology makes no warranty concerning fitness for any use or purpose. There has been no testing done by NuSil Technology to establish safety of use in any medical application.

NuSil Technology has tested this material only to determine if the product meets the applicable specifications. (Please contact NuSil Technology for assistance and recommendations when establishing specifications.) When considering the use of NuSil Technology products in a particular application, you should review the latest Material Safety Data Sheets and contact NuSil Technology for any questions about product safety information you may have.

No chemical should be used in a food, drug, cosmetic, or medical application or process until you have determined the safety and legality of the use. It is the responsibility of the user to meet the requirements of the U.S. Food and Drug Administration (FDA) and any other regulatory agencies. Before handling any other materials mentioned in the text, you should obtain available product safety information and take the necessary steps to ensure safety of use.

Specifications:

The typical properties shown in this technical profile should not be used as a basis for preparing specifications. Please contact NuSil Technology for assistance and recommendations in establishing particular specifications.

Patent Warning:

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