LS1-6140

Optically clear silicone elastomer

DESCRIPTION

- Two-part, optically clear silicone system
- Based on a methyl silicone polymer
- Low viscosity
- 1:1 Mix Ratio (Part A:B)
- Requires heat to cure

APPLICATION

- For bonding, casting or compression molding of high performance optical components
- For applications requiring index matching at 1.40
- For photonics applications requiring low volatility silicone to avoid contamination

PROPERTIES

Typical Properties	Average Result	Standard	NT-TM
Uncured:			
Appearance	Colorless and Transparent	ASTM D2090	002
Viscosity, Part A	3,450 cP (3,450 mPas)	ASTM D1084, D2196	001
Viscosity, Part B	2,500 cP (2,500 mPas)	ASTM D1084, D2196	001
Viscosity, Mixed (V1) within 30 minutes of catalyzation	3,200 cP (3,200 mPas)	ASTM D1084, D2196	001
Viscosity, Mixed (V2) 24 hours after catalyzation	3,600 cP (3,600 mPas)	ASTM D1084, D2196	001
Viscosity, (V2/V1) 24 hours after catalyzation	1.1	ASTM D1084, D2196	001
UV/Visible Spectrophotometry at 400nm	99 %T	ASTM E275	100
Cured: 60 minutes at 150°C (302°F)			
Specific Gravity	1.02	ASTM D792	003
Durometer, Type A	50	ASTM D2240	006
Tensile Strength	900 psi (6.2 MPa)	ASTM D412	007
Elongation	90%	ASTM D412	007
Lap Shear Strength (primed with LS1-3200)	270 psi (1.9 MPa)	ASTM D1002	010
Volume Resistivity*	1.3 X 10^{15} ohm•cm minimum	ASTM D257	153
Dielectric Strength*	630 V/mil (13.8 kV/mm)	ASTM D149	-

Typical Properties	Average Result	Standard	NT-TM
Ionic Content, Cl*	<5 ppm	MIL-STD-883E	-
Ionic Content, K *	<2.5 ppm	MIL-STD-883E	-
Ionic Content, Na *	<2.5 ppm	MIL-STD-883E	-
Glass Transition Temperature (Tg)*	-115 °C (-175°F)	ASTM D3418	-
Coefficient of Linear Expansion (-150 °C to -120°C)*	99 ppm/°C (99 µm/(m°C))	ASTM E831	-
Coefficient of Linear Expansion (-100°C to 100°C)*	330 ppm/°C (330µm/m°C)	ASTM E831	-
Refractive Index, 589 nm	1.40	ASTM D1218, D1747	018
Transmittance vs. Wavelength (25°C)*	See Appendix	-	-
Refractive Index vs. Wavelength (25°C)*	See Appendix	-	-
Refractive Index vs. Temperature by Wavelength*	See Appendix	-	-

*These properties NOT tested on a lot-to-lot basis. Please contact NuSil Technology for assistance and recommendations in establishing particular specification

INSTRUCTIONS FOR USE

Mixing

Thoroughly mix in a convenient 1:1 mix ratio by weight prior to use.

Vacuum Deaeration

Remove air entrapped during mixing by common vacuum deaeration procedure, observing all applicable safety precautions. Slowly apply full vacuum to a container rated for use and at least four times the volume of the material being deaerated. Hold vacuum until bulk deaeration is complete.

Note: Some bonding applications may require the use of a primer. NuSil Technology's LS1-3200 and LS4-3200 are recommended.

Substrate Considerations

Cures in contact with most materials common to biomedical assemblies. Exceptions include: sulfur-cured organic rubbers, latex, chlorinated rubbers, some RTV silicones and unreacted residues of some curing agents.

Adjustable Cure Schedule

Product cures at a wide range of cure times and temperatures to accommodate different production needs. Contact NuSil Technology for details.

Packaging

50 Gram Kit
50 mL SxS Kit
500 Gram Kit
2 Pint Kit (0.91 kg)
2 Gallon Kit (7.28 kg)

Warranty

12 Months

OPERATING TEMPERATURE

The operating temperature range of a silicone in any application is dependent on many variables, including but not limited to: temperature, time of exposure, type of atmosphere, exposure of the material's surface to the atmosphere, and mechanical stress. In addition, a material's physical properties will vary at both the high and low end of the operating temperature range. This type of silicone typically remains flexible at extremely low temperatures and has been known to perform at -50°C (-58°F) as well as resist breakdown at elevated temperatures up to 200°C (392°F). The user is responsible to verify optical and mechanical performance of a material in a specific application.

ROHS AND REACH COMPLIANCE

Please contact NuSil Technology's Regulatory Compliance department with any questions or for further assistance.

SPECIFICATIONS

Do not use the properties shown in this technical profile as a basis for preparing specifications. Please contact NuSil Technology for assistance and recommendations in establishing particular specifications.

WARRANTY INFORMATION

The warranty period provided by NuSil Technology LLC (hereinafter "NuSil Technology") is 12 months from the date of shipment when stored below 40°C in original unopened containers. Unless NuSil Technology provides a specific written warranty of fitness for a particular use, NuSil Technology's sole warranty is that the product will meet NuSil Technology's then current specification. NuSil Technology specifically disclaims all other expressed or implied warranties, including, but not limited to, warranties of merchantability and fitness for use. The exclusive remedy and NuSil Technology's sole liability for breach of warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted. NuSil Technology expressly disclaims any liability for incidental or consequential damages.

WARNINGS ABOUT PRODUCT SAFETY

NuSil Technology believes, to the best of its knowledge, that the information and data contained herein are accurate and reliable. The user is responsible to determine the material's suitability and safety of use. NuSil Technology cannot know each application's specific requirements and hereby notifies the user that it has not tested or determined this material's suitability or safety for use in any application. The user is responsible 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. NuSil Technology has completed no testing 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, review the latest Material Safety Data Sheet and contact NuSil Technology with any questions about product safety information.

Do not use any chemical in a food, drug, cosmetic, or medical application or process until having determined the safety and legality of the use. The user is responsible 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, the user is advised to obtain available product safety information and take the necessary steps to ensure safety of use.

PATENT / INTELLECTUAL PROPERTY WARNING

NuSil Technology disclaims any expressed or implied warranty against the infringement of any domestic or international patent/intellectual property right. NuSil Technology does not warrant the use or sale of the products described herein will not infringe the claims of any domestic or international patent/intellectual property right covering the product itself, its use in combination with other products, or its use in the operation of any process.

APPENDIX

The data represented below is from a limited sample population and is qualitative only. The batch tested was determined to represent the typical procedures and properties of this product. These tests are not performed on a lot to lot basis and are not intended to be used as specifications.

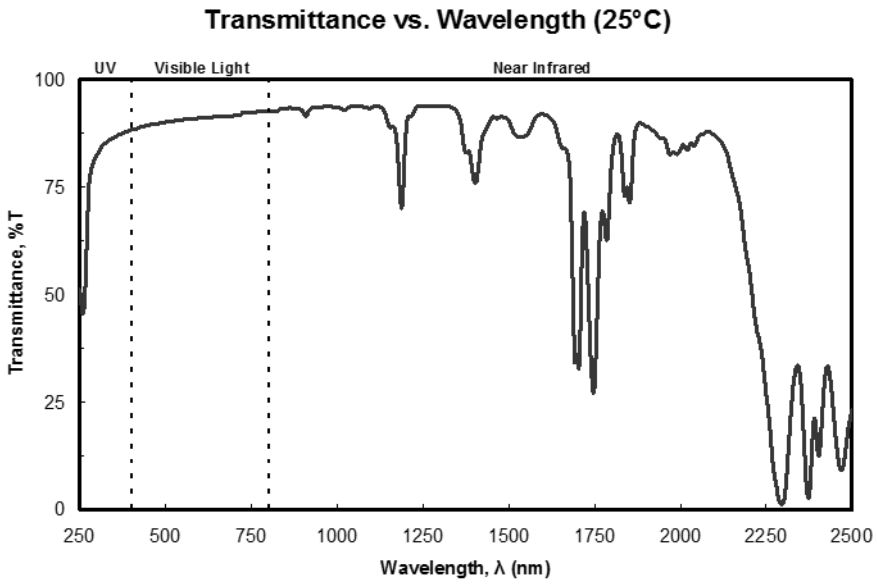


Figure 1. Transmittance spectrum of cured LS1-6140 at a nominal thickness of 0.075" (2 mm)

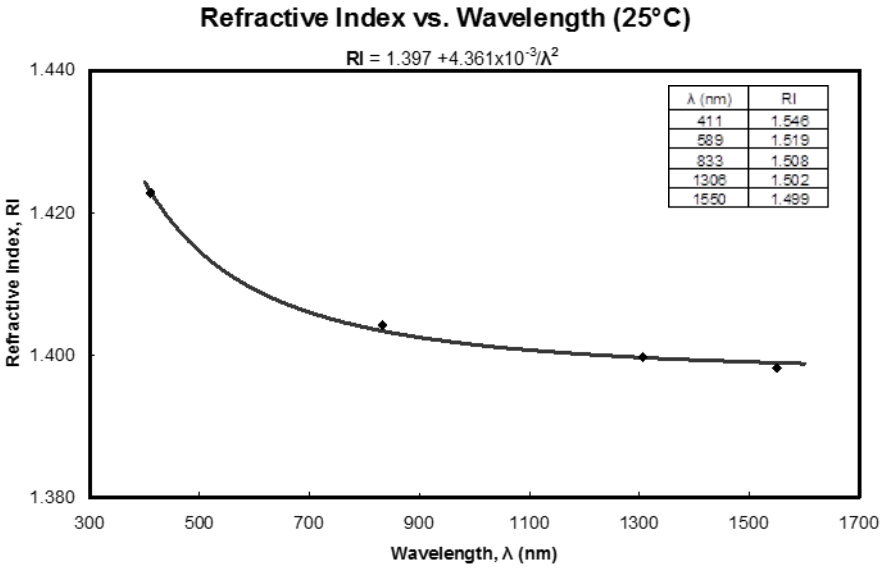
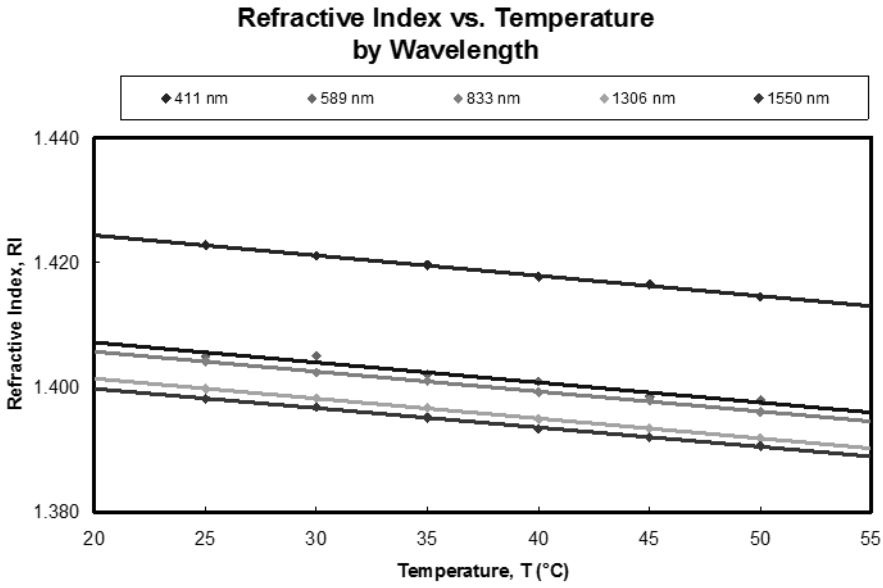


Figure 2. Dispersion curve fit for Refractive Index vs. Wavelength at 25°C



$RI_\lambda(T_\lambda)$ Equations
$RI_{411} = -3.245x10^{-4}xT_{411} + 1.431$
$RI_{589} = -3.211x10^{-4}xT_{589} + 1.414$
$RI_{833} = -3.192x10^{-4}xT_{833} + 1.412$

$RI_{1306} = -3.194x10^{-4}xT_{1306} + 1.408$
$RI_{1550} = -3.104x10^{-4}xT_{1550} + 1.406$

Figure 3. Linear Regression for Refractive Index vs. Temperature at various wavelengths