LS-3140

Optically clear encapsulation gel

DESCRIPTION

- Two-part, low outgassing, clear silicone gel
- 1.40 refractive index
- Low modulus
- Cures at room temperature or rapidly with heat
- 1:1 Mix Ratio (Part A: Part B)

APPLICATION

- For protection of sensitive photonics assemblies from mechanical shock, thermal shock, dust, and ambient atmosphere
- As an embedding or potting compound for environmental protection of electronic assemblies and components, such as LEDs
- For applications requiring low outgassing and minimal volatile components to avoid contamination in sensitive devices
- Extended work time allows voids in complex assemblies to fill in and permits time for any trapped air bubbles to float to the fluid surface and escape
- UV and heat resistant
- Handles stress during thermal cycling without cracking or delaminating
- For applications requiring an operating temperature range of -65°C to 240°C (-85°F to 464°F)

PROPERTIES

Typical Properties	Average Result	Metric Conv.	Standard	NT-TM
Uncured:				
Appearance	Transparent	-	ASTM D2090	002
Viscosity, Part A	16,000 cP	16,000 mPas	ASTM D1084, D2196	001
Viscosity, Part B	8,500 cP	8,500 mPas	ASTM D1084, D2196	001

Typical Properties	Average Result	Metric Conv.	Standard	NT-TM
Work Time (<2x viscosity)	24 hours minimum	-	-	-
Volume Resistivity, Part A	1 x 10^{14} ohm·cm minimum	-	ASTM D1169	024
Volume Resistivity, Part B	1 x 10^{14} ohm·cm minimum	-	ASTM D1169	024
UV/Visible Spectrophotometry at 400 nm, 1 cm path length	90 %T minimum	-	ASTM E275	100
Refractive Index	1.40	-	ASTM D1218, D1747	018
Cured: 30 minutes at 150°C (302°F)				
Penetration*	0.4 mm	-	-	017
Dielectric Strength	350 V/mil	13.8 kV/mm	ASTM D149	-
Weight Loss (1 hr at 275°C)	0.8%	-	-	-
Moisture Absorption, % gain after 168 hour exposure at 85°C (185°F) / 85% R.H.	0.20 %	-	-	202
Ionic Content, Cl	< 5ppm	-	-	-
Ionic Content, K	< 1ppm	-	-	-
Ionic Content, Na	< 2 ppm	-	-	-
Glass Transition (Tg)	-126°C	-	ASTM E831	-
Durometer, Type 000	53	-	ASTM D2240	006
Coefficient of Linear Thermal Expansion (0°C to 260°C)	411 ppm/°C	411 µm/m/°C	ASTM E831	-
Refractive Index vs. Temperature, 589 nm	-3.85 x 10^{-4}/°C	-	ASTM D1218, D1747	018
Refractive Index vs. Wavelength	See Appendix	-	-	-
Optical Absorption vs. Wavelength	See Appendix	-	-	-
Optical Transmission vs. Wavelength, after UV exposure	See Appendix	-	-	-
Optical Transmission vs. Wavelength, after 12 days at 150°C	See Appendix	-	-	-

*GCA Precision Penetrometer, 19.5 gram shaft, ¼" diameter, 5 seconds

INSTRUCTIONS FOR USE

Thoroughly mix Part A with Part B in a 1:1 ratio by weight or volume. Mixing this product at other than a 1:1 ratio is not recommended

Vacuum Deaeration

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

Cure Inhibition

LS-3140 cures in contact with most properly cleaned substrate materials including optical glasses, optical plastics, and photonic semiconductors. Adhesion to fluoroplastic substrates is generally poor but may be improved with chemical etching or plasma etching of the substrate. Substrates to avoid include certain butyl, nitrile, chlorinated, and EPDM elastomers, certain plastics with leachable plasticizers, and the cure residues of certain adhesives including UV-cured epoxies and amine-cured epoxies.

Substrate Preparation

Substrates should be free of dust, oil, and fingerprint soils. Clean substrates using suitable industrial techniques for cleaning electro-optics. If using hydrocarbon solvent cleaning (e.g. acetone, toluene), a final rinse with reagent grade isopropanol is recommended. If using aqueous detergent cleaning, multiple final rinses with de-ionized water or a single rinse with reagent grade isopropanol is recommended. Obtain improved gel adhesion to some substrates using suitable primers such as NuSil Technology LS-3200 series Optical Primers. Adhesion to fluoroplastic substrates is generally poor but may be improved with chemical etching or plasma etching of the substrate.

Adjustable Cure Schedule

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

Clean-Up

Remove from surfaces by first wiping off excess gel with a suitable, dry, lint-free wipe and then by wiping down the surface with a lint-free wipe soaked with acetone. If the surface material is incompatible with acetone, use isopropanol. Complete the clean-up process with a final rinse with reagent grade isopropanol if removal of acetone residues is necessary. The user is responsible for compliance with all applicable regulations governing disposal of waste materials as indicated in the MSDS.

Packaging	Warranty
50 mL SxS Kit 50 Gram Kit 100 Gram Kit 500 Gram Kit 2 Pint Kit (910 g	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.

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.

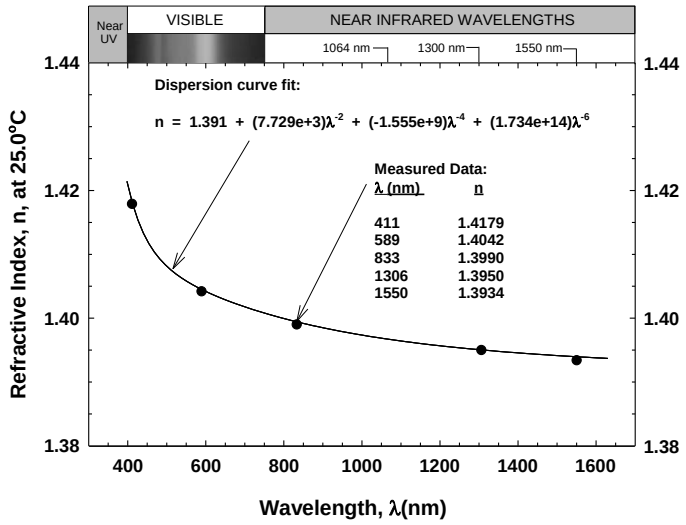
PATENT / INTELLECTUAL PROPERTY WARNING

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.

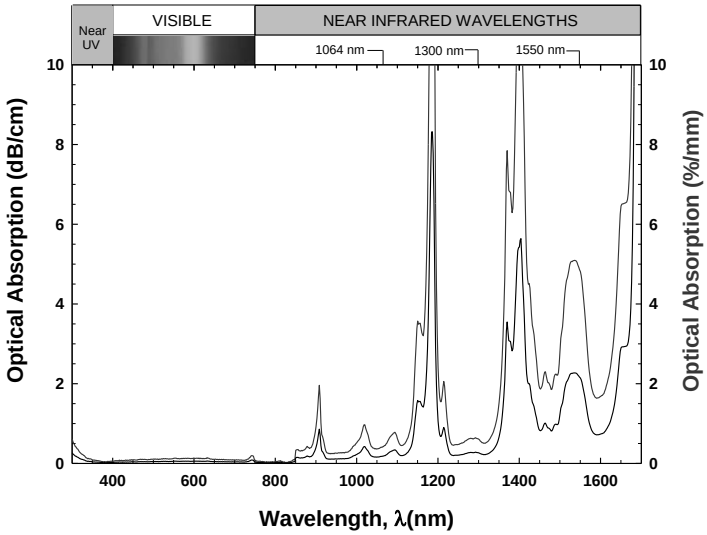
APPENDIX

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.

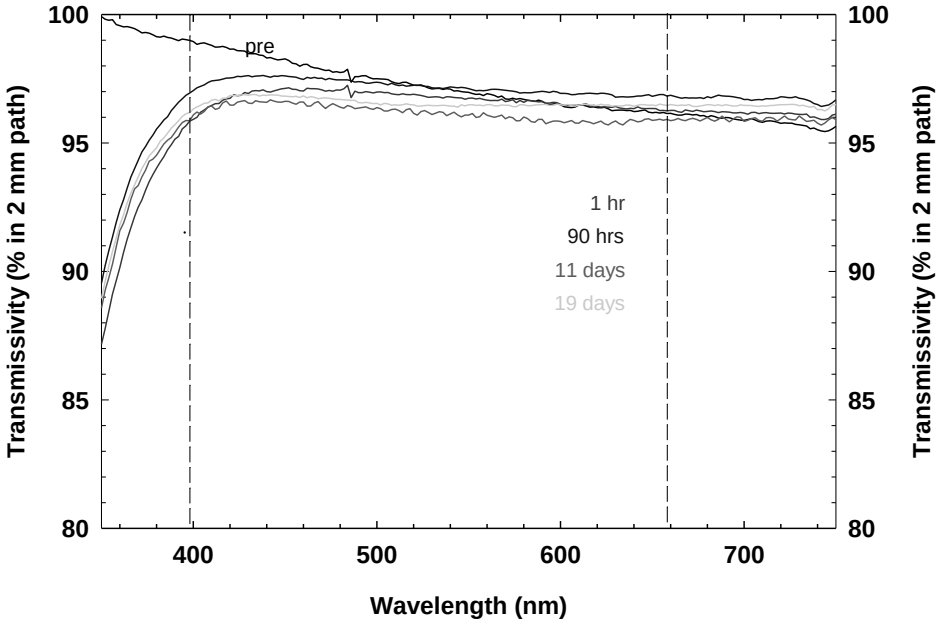
Refractive Index vs. Wavelength (25°C)
Lightspan Optical Gel
LS-3140



Optical Absorption vs. Wavelength (25°C)
Lightspan Optical Gel
LS-3140



Optical Transmission vs. Wavelength,
UV exposure of 680 J/cm2 Total Radiation
LS-3140



Optical Transmission vs. Wavelength,
After exposure to 150°C
LS-3140