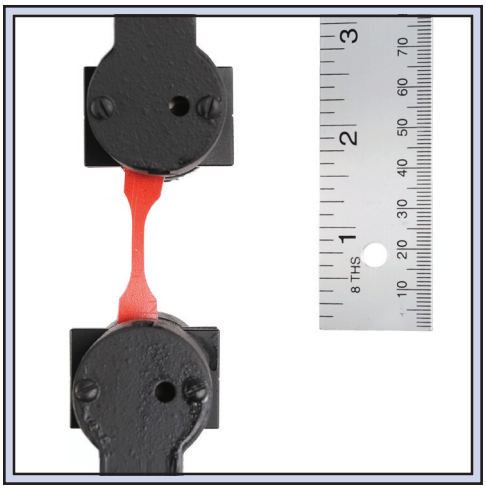
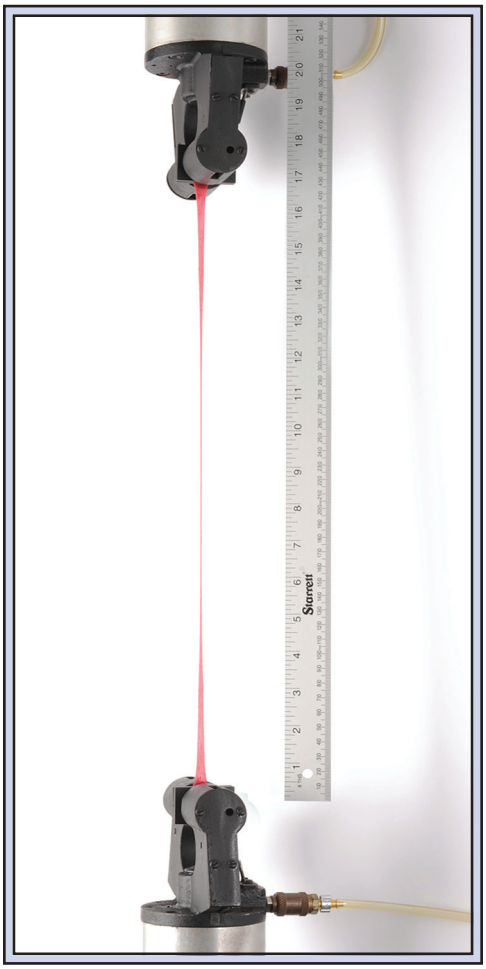
Gelest® ExSil® 100

High Elongation Elastomer – Molding Grade





Gelest® ExSil® 100 is a two-component ultra high elongation silicone elastomer with tear resistant properties.

Typical Properties

Note: The values below are typical and are not intended for use in preparing specifications. Please contact a Gelest representative when writing specifications.

Cured Properties	Units	Value
Elongation	%	5000
Tensile Strength	**MPa**	**6-7**
Tear Strength	**kN/m**	**42**
Elongation @ Tear Failure	%	2000
Durometer	Shore A	15
Specific Gravity (Part A)	g/mL	1.12
Refractive Index (n_D^{25})		1.41
Volatiles (4 hours/150°C)	wt%	≤ 0.1
Critical Surface Tension	mN/m	23 - 24
Contact Angle, Water	°	105 - 100
Volume Resistivity	ohm*cm	2.90E+14

Features & Benefits

- Self-sealing
- High elongation
- High recovery
- Low extractables
- High tear strength
- Flowable and moldable
- High oxygen permeability
- Long-term thermal stability

Applications

- Diaphragms
- Microfluidics
- Vibration damping
- High performance seals
- Septa with easy penetration and good resealability
- Optical and electrical interconnects

Gelest, Inc.
11 East Steel Road
Morrisville, PA 19067
(215) 547-1015

ExSil® 100
5 June 2018
Rev. 2.0

ExSil® 100 Part	Viscosity (cSt)	Silicone Elastomer	Extractables (wt%)
Base (Part A)	12,000 - 14,000	Resin Reinforced Silicone	4.2
Activator (Part B)	800 - 1,000	Silicone - 100°C Strip	3.1
Activated Mix	12,000 - 14,000	Gelest® ExSil® 100	0.2

Figure 1. Stress Strain Curves of ExSil® 100 (blue) compared to resin reinforced silicone (black)

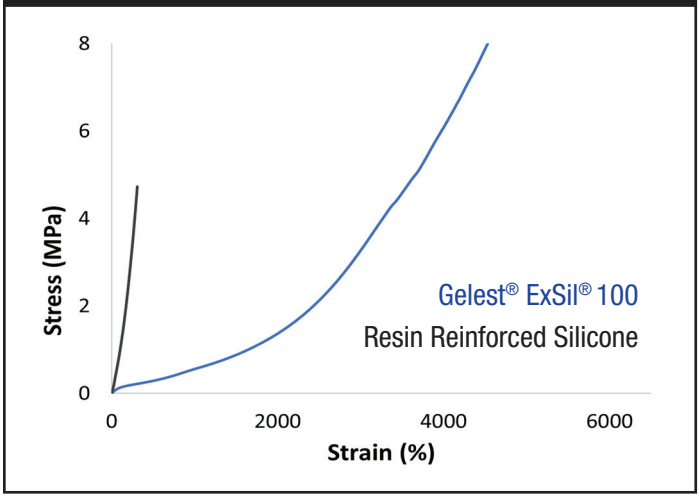


Figure 2. TGA thermograms of ExSil® 100 (blue) compared to resin reinforced silicone (black)

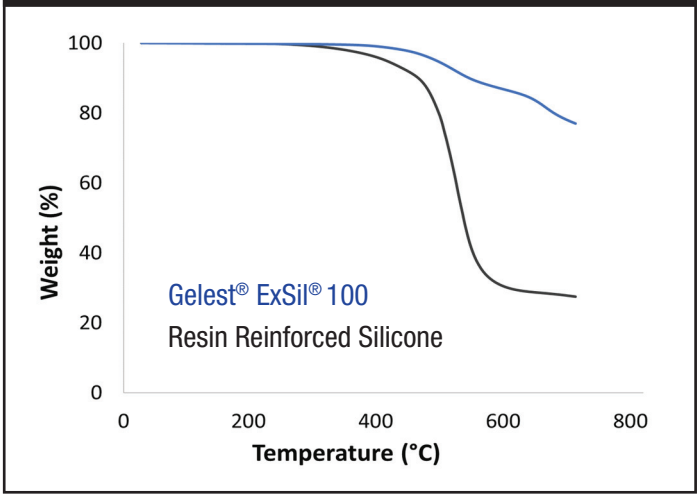
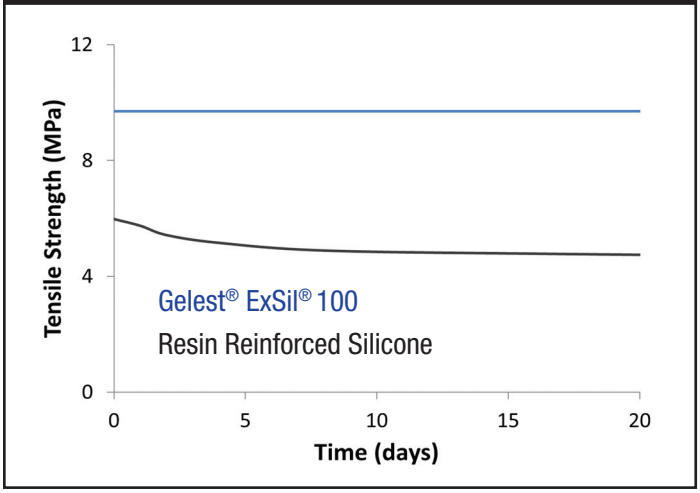
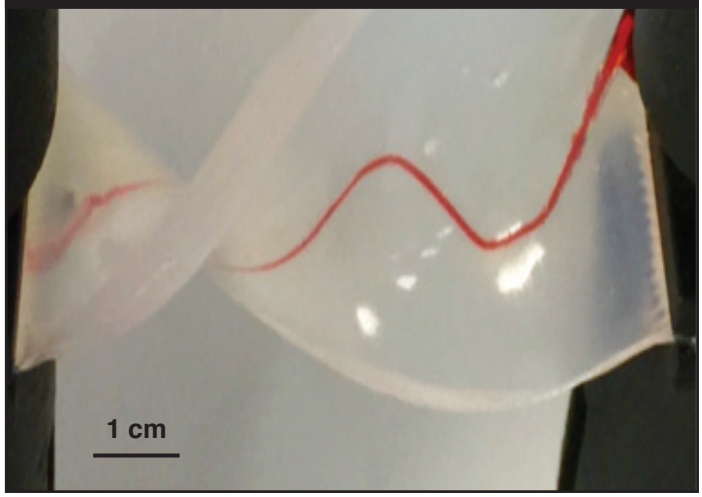


Figure 3. Heat Aging ExSil® 100 (blue) vs. conventional resin reinforced silicone (black)



ExSil® 100 microfluidic device with filled channels showed no device failure during tortuous extension



Processing & Fabrication:

Thoroughly mix Part A and Part B in a 100:1 ratio. Try to avoid introducing bubbles. For critical applications, de-air mix under vacuum. The pot-life is **24 hours at 25°C**. Avoid entrapping air during transfer and casting. Cure at **100°C for 8 hours** or **at room temperature for 72 hours**. ExSil® 100 can be self-bonded by exposure to oxygen plasma and pressing surfaces together in a dry atmosphere.

Gelest, Inc.
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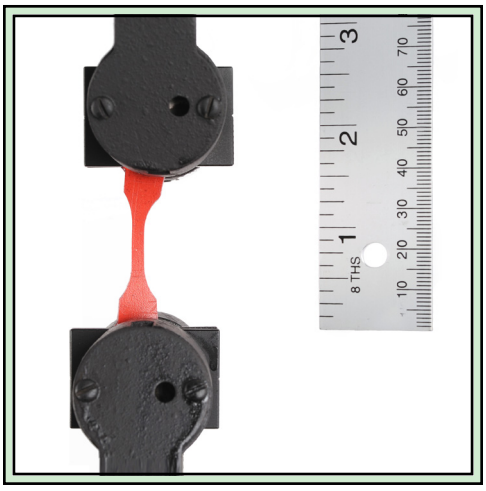
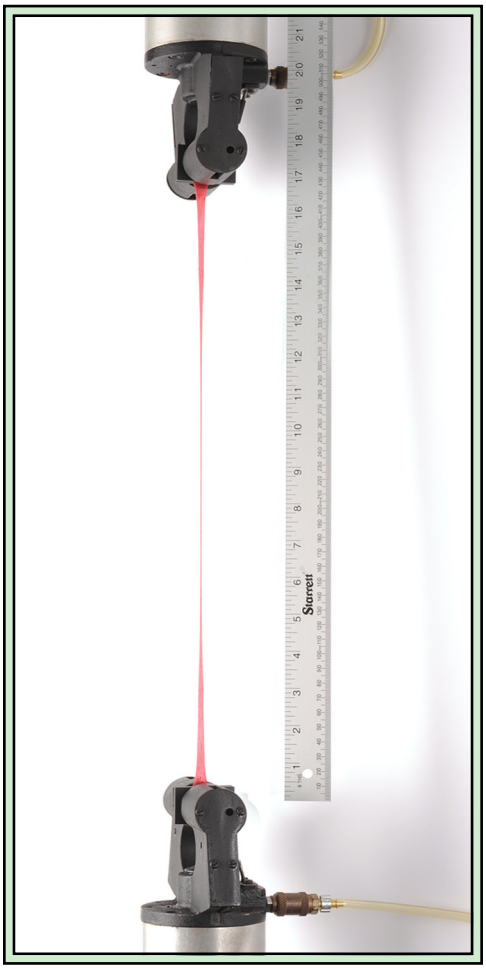
Gelest® ExSil® 50

High Elongation Elastomer – Medical Grade





Gelest® ExSil® 50 is a two-component high elongation silicone elastomer developed for medical applications.

Typical Properties

Note: The values below are typical and are not intended for use in preparing specifications. Please contact a Gelest representative when writing specifications.

Cured Properties	Units	Value
Elongation	%	6000
Tensile Strength	**MPa**	**3**
Tear Strength	**kN/m**	**5-7**
Elongation @ Tear Failure	%	1000 - 1500
Durometer	Shore A	5
Specific Gravity (Part A)	g/mL	1.06
Refractive Index (n_D^{25})		1.41
Volatiles (4 hours/150°C)	wt%	≤ 0.1
Critical Surface Tension	mN/m	23 - 24
Contact Angle, Water	°	105 - 100
Volume Resistivity	ohm*cm	2.90E+14

Features & Benefits

- Self-sealing
- High elongation
- High recovery
- Low extractables
- High tear strength
- Flowable and moldable
- High oxygen permeability
- Long-term thermal stability

Applications

- Diaphragms
- Microfluidics
- Vibration damping
- High performance seals
- Septa with easy penetration and good resealability
- Optical and electrical interconnects

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11 East Steel Road
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ExSil® 50
5 June 2018
Rev. 2.0

ExSil® 50 Part	Viscosity (cSt)	Silicone Elastomer	Extractables (wt%)
Base (Part A)	500 - 700	Resin Reinforced Silicone	4.2
Activator (Part B)	800 - 1,000	Silicone - 100°C Strip	3.1
Activated Mix	500 - 700	Gelest® ExSil® 50	0.5

Figure 1. Stress Strain Curves of ExSil® 50 (green) compared to resin reinforced silicone (black)

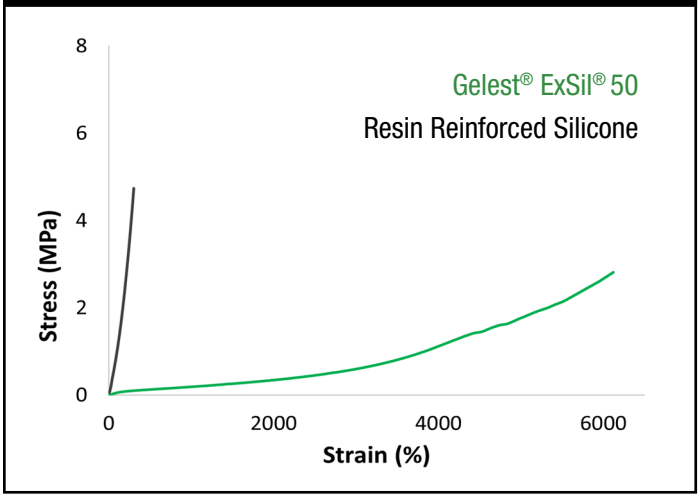
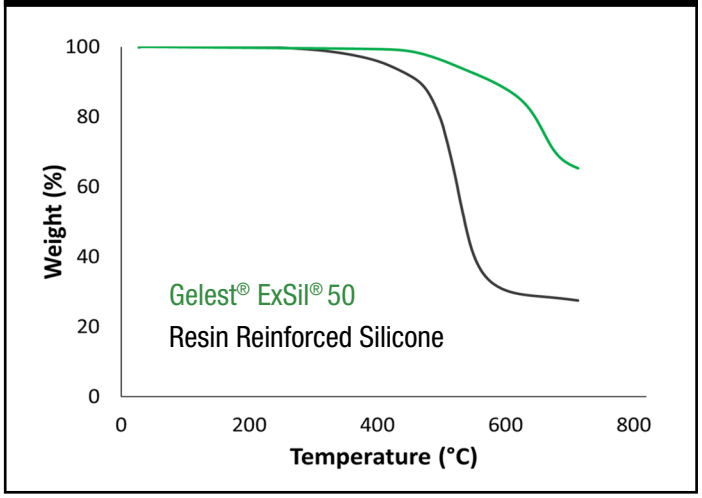
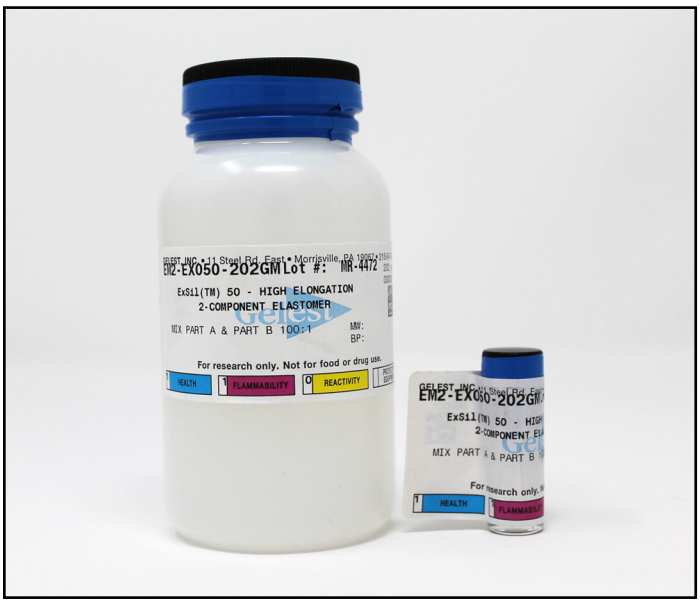
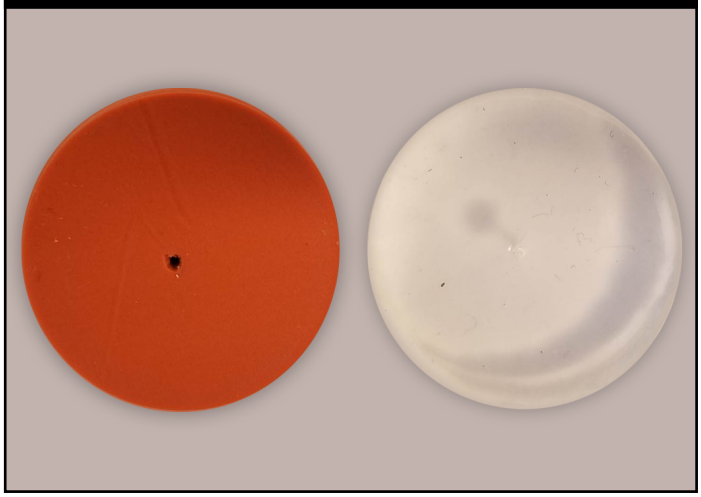


Figure 2. TGA thermograms of ExSil® 50 (green) compared to resin reinforced silicone (black)





Silicone rubber septum w/ 1mm core (left)
ExSil® 50 septum w/ self-healing 1mm core (right)



Processing & Fabrication:

Thoroughly mix Part A and Part B in a 100:1 ratio. Try to avoid introducing bubbles. For critical applications, de-air mix under vacuum. The pot-life is **24 hours at 25°C**. Avoid entrapping air during transfer and casting. Cure at **100°C for 8 hours** or **at room temperature for 72 hours**. ExSil® 50 can be self-bonded by exposure to oxygen plasma and pressing surfaces together in a dry atmosphere.

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Gelest
Enabling Your Technology

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Gelest® PP2-TC02

High Elongation Thermally Conductive Gap Filler

Gelest® PP2-TC02 is a two-part ultra high elongation thermally conductive silicone gap filler. The extreme elongation of this product reduces mechanical as well as thermal stress, creating new fabrication and assembly options. For applications requiring adhesion, use of primers and other options allow for bonding.

Typical Properties*, **	Units	Value
Mix Ratio A:B		100:1
Color Part A		White-Grey
Color Part B		Clear
Color Mixed		White-Grey
Viscosity, Uncured Mix	cP	30,000
Thermal Conductivity	W/mK	1.15
Elongation	%	1200
Tensile Strength	MPa	0.5
Durometer	Shore A	30
Specific Gravity		2.47
Volume Resistivity	ohm-cm	4.05 E+13
Dielectric Strength	kV/mm	13
Dielectric Constant (100kHz)		3.1
Dissipation Factor (100kHz)		0.008

* The properties reported are typical values and are intended as a guide for design and not intended for use in establishing specifications.
** Cured at 100°C/16h

Features & Benefits

- Thermally conductive
- Soft & compressible
- High elongation at break
- Flowable and heat curable
- No cure by-products
- Platinum addition cure

Applications

- Thermal transfer for electronic and battery modules
- Cure in place thermal pad
- Vibration damping
- Flexible electronics

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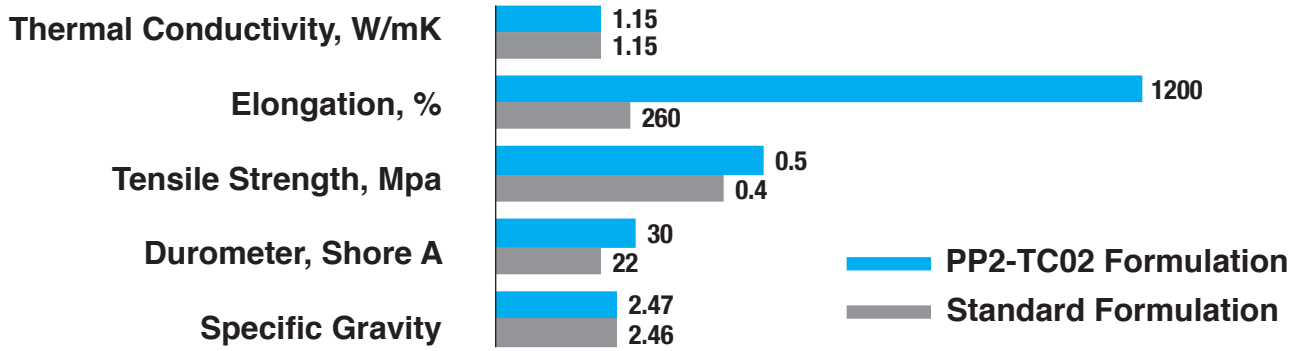
PP2-TC02
05/21
Rev. 1.0

Comparison of Thermally Conductive Silicone Gap Fillers



Processing, Fabrication, and Handling

MIXING AND DEAIRING

At the specified mix ratio by weight, weigh Parts A & B into a wide mouth mixing container. Then mix manually or via a mechanical method such as centrifugal mixing. Generation of too much heat during the mixing process may initiate cure of the product.

For lab use: Alternative mixing methods can be used, but as an example we suggest first mixing the Parts A & B manually followed by mixing on a centrifugal mixer at 800 rpm, 10-25 mm Hg pressure for 105 seconds followed immediately by 15 seconds at 1500 rpm. After mixing the product should be poured carefully into the mold or electronic enclosure to avoid air entrapment. A further deairing step may be needed when pouring material over electronic modules as air can sometimes be trapped due to the 3D geometry of the module.

CURING

Recommended cure of the product is 1 hour at 100°C in a forced air oven. NOTE: Pouring into a heavy enclosure or mold containing a component of high mass may require longer cure time to allow internal components to heat up.

POT LIFE

When using the product, pot life based on snap time is typically 10 hours at 25°C. The maximum expected pot life at this temperature has not yet been determined.

COMPATIBILITY

Some chemicals, cured polymeric materials, and plasticizers can cause cure inhibition for this product. Examples may include exposure to sulfur containing materials such as polysulfides or polysulfones, phosphorus containing materials, organotin containing materials, plasticizers leached out from lab gloves by solvent, solder flux residues, and nitrogen containing chemicals like primary or secondary amines. If any chemical or material is suspected of retarding or impacting cure of the product, it is recommended that the product be cured in absence of the suspected chemical, plastic, surface, etc. to determine if there is an interaction impacting cure.

HANDLING AND SAFETY

Users should refer to the safety data sheet for any hazards associated with this product. Proper PPE should be used with this product including, at minimum, safety glasses and disposable lab gloves.

USABLE LIFE AND STORAGE

It is estimated that this product will have at least 6 months of shelf life when stored at 25°C and humidity levels below 65% with containers tightly closed. Partially used or filled containers purged with dry nitrogen after opening should ensure the longest shelf life for this product.

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Gelest® PP2-TC03

Thermally Conductive Gap Filler

Gelest® PP2-TC03 is a two-part ultra-high elongation thermally conductive silicone gap filler. The excellent thermal conductivity of this product increases thermal transfer between an electronic component and its heat sink. This product has some adhesion to substrates, but a primer is recommended at times for adhesion.

Features & Benefits

- Thermally conductive
- Soft & compressible
- Low flow and heat-curable
- No cure by-products
- Platinum addition cure

Applications

- Thermal transfer for electronic devices and battery modules
- High power electrical devices
- Cure in place thermal interlayer
- Flexible electronics

Typical Properties*, **	Units	Value
Mix Ratio A:B		1:1
Color Part A		Black
Color Part B		Black
Color Mix		Black
Viscosity, Uncured Mix	cP	Paste
Thermal Conductivity	W/mK	3.1
Elongation	%	41.4
Tensile Strength	MPa	0.61
Durometer	Shore A	50
Specific Gravity		2.8

* The properties reported are typical values and are intended as a guide for design and not intended for use in establishing specifications.** Cured at 100°C/1h

Gelest® PP2-TC03

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Processing, Fabrication, and Handling

MIXING AND DEAIRING | Using a clean spatula, hand mix Part A prior to weighing our product for use. Make sure that the filler is fully dispersed. Repeat this process for Part B.

At the specified mix ratio by weight, weigh Parts A & B into a wide-mouth mixing container. Then mix manually or via a mechanical method such as centrifugal mixing. The generation of too much heat during the mixing process may initiate the cure of the product.

> *For lab use*: Alternative mixing methods can be used, but as an example, we suggest first mixing the Parts A & B manually followed by mixing on a centrifugal mixer at 800 rpm, 10-55 mm Hg pressure for 1 minute and 45 seconds followed immediately by 15 seconds at 1500 rpm. After mixing the product should be deposited carefully into place avoiding air entrapment. If used between and electronic device and a heat sink, apply pressure between the two as necessary to allow flow of the paste between the two.

CURING | Recommended cure of the product is 1 hour at 100°C in a forced-air oven. NOTE: Pouring into a heavy enclosure or mold containing a component of high mass may require a longer cure time to allow internal components to heat up.

POT LIFE | When using the product, pot life based on snap time is typically > 2 hours at 25°C. The maximum expected pot life at this temperature has not yet been determined.

COMPATIBILITY | Some chemicals, cured polymeric materials, and plasticizers can cause cure inhibition for this product. Examples may include exposure to sulfur-containing materials such as polysulfides or polysulfones, phosphorus-containing materials, organotin-containing materials, plasticizers leached out from lab gloves by solvent, solder flux residues, and nitrogen-containing chemicals like primary or secondary amines. If any chemical or material is suspected of retarding or impacting the cure of the product, it is recommended that the product be cured in absence of the suspected chemical, plastic, surface, etc. to determine if there is an interaction impacting the cure.

HANDLING AND SAFETY | Users should refer to the safety data sheet for any hazards associated with this product. Proper PPE should be used with this product including, at minimum, safety glasses, and disposable lab gloves.

USABLE LIFE AND STORAGE | It is estimated that this product will have at least 6 months of shelf life when stored at 25°C and humidity levels below 65% with containers tightly closed. Partially used or filled containers purged with dry nitrogen after opening should ensure the longest shelf life for this product.

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