



**Enabling Your Technology** 

# **Optically Clear Performance Products**



Gelest has a successful history of developing optical, reprographic, and gel formulations. Gelest, Inc. now offers new pre-formulated optical encapsulants and optical hard coating materials.



A thin film optical coating deposition on an optic imparts different behaviors. Silicone gels and elastomers as cladding/sealing materials have high optical transmission.



Optical coating materials containing silicon can be modified to have refractive indices matching those of the substrate. Visit gelest.com for more information about the products.



Optical Grade Silicone Encapsulants (Mix Ratio 1:1, 2-Part Platinum Addition)								
Product Code	<b>Refractive Index</b>	Tensile Strength (MPa)	Elongation (%)	Durometer (A)	Viscosity Mixed (cSt)	Specific Gravity	Cure Time/Temp	Potlife (hr)
Gelest <sup>®</sup> 0E39	1.39	0.05	1400-1600	5	3000-5000	1.03	4h/80°C	18
Gelest <sup>®</sup> 0E41	1.41	>2	140-200	15-30	1750-2500		4h/55°C	18
Gelest <sup>®</sup> 0E42	1.42	>1.5	90-150	10-25	1500-2000		4h/55°C	18
Gelest <sup>®</sup> 0E43	1.43	>1.5	75-100	5-15	800-1500		4h/55°C	18
Gelest <sup>®</sup> 0E46	1.46	0.25	30-50	10-20	1500-2500	1.05	4h/55°C	18
Gelest <sup>®</sup> 0E46.1	1.46	0.55	65-75	30-45	15,000	1.19	4h/55°C	18
Gelest <sup>®</sup> 0E46.2	1.46	1-1.5	200-250	45-50	30,000	1.22	4h/55°C	18
Gelest <sup>®</sup> 0E50	1.50	0.1	75-100	10-20	3000-5000	1.07	4h/55°C	12

Optical Grade Silicone Hard Resin Coatings (1-Part)							
Product Code	<b>Refractive Index</b>	Hardness	Viscosity (cSt)	Flash Point °C	Specific Gravity	Solids (wt%)	Cure Time/Temp
Optisil® 155A1	1.55		3-5	35	0.95	10	1h/25°C + 0.5h/240°C
Optisil <sup>®</sup> 155B2	1.54-1.56	120R	3-5	35	0.95	20	1h/25°C + 0.5h/240°C
Optisil <sup>®</sup> 156A1	1.56		3-5	35	0.92	10	1h/25°C + 0.5h/220°C
Optisil® 157A1	1.57		3-5	35	0.92	10	1h/25°C + 0.5h/220°C
Optisil <sup>®</sup> 157B2	1.56-1.58	110R	3-5	35	0.92	20	1h/25°C + 0.5h/220°C
Optisil <sup>®</sup> 158A1	1.58		3-5	35	0.92	10	1h/25°C + 0.5h/220°C
Optisil <sup>®</sup> 159A1	1.59		3-5	35	0.92	10	1h/25°C + 0.5h/220°C
Optisil <sup>®</sup> 164A1	1.64		2-3	35	0.95	10	1h/25°C + 0.5h/220°C

Gelest Headquarters Morrisville, PA 19067 (215) 547-1015 © 2020 Gelest, Inc. gelest.com info@gelest.com Optically Clear 01/2020 Rev. 1.0





**OPTICAL MATERIALS** 

Gelest

Optical Encapsulants

**Optical Hard Coatings** 

Refractive Index Matching Fluids

UV Active and Fluorescent Molecular Coatings



**Enabling Your Technology** 



# Gelest, Inc.

Telephone:

FAX: Internet: e-mail: Correspondence: General 215-547-1015 Order Entry 888-734-8344 Technical Service: 215-547-1016 215-547-2484 www.gelest.com sales@gelest.com 11 East Steel Rd. Morrisville, PA 19067

#### For further information consult our website at: www.gelest.com

#### In Europe:

Stroofstrasse 27 Geb.2901 65933 Frankfurt am Main, Germany Tel: +49-(0)-69-3800-2150 Fax: +49-(0)-69-3800-2300 e-mail: info@gelestde.com Internet: www.gelestde.com

#### In Japan:

#### AZmax Co. Ltd. Tokyo Office Matsuda Yaesudori, Bldg F8 1-10-7 Hatchoubori, Chuo-Ku

Tokyo 104-0032 Tel: 81-3-5543-1630 Fax: 81-3-5543-0312 e-mail: sales@azmax.co.jp on-line catalog: www.azmax.co.jp

#### In China:

#### Meryer Chemical Technology Shanghai Company No. 3636, Jiangcheng Road Shanghai, China 200245 Tel: +86-(0)-21-61259170 Fax: +86-(0)-21-61259169 email: pur02@meryer.com

#### In South-East Asia:

*Gulf Chemical* 39 Jalan Pemimpin Tai Lee Industrial Building #04-03 Singapore 577182 Tel: 65-6358-3185 Fax: 65-6353-2542 e-mail: support@gulfchem.com.sg

Sales of all products listed are subject to the published terms and conditions of Gelest, Inc.



# TABLE OF CONTENTS

# **Optical Grade Silicone Encapsulants**

Gelest <sup>®</sup> OE 39	1.39 RI flexible 2-part low temperature cure	. 2
Gelest <sup>®</sup> OE 41	1.41 RI flexible 2-part low temperature cure	. 3
Gelest <sup>®</sup> OE 42	1.42 RI flexible 2-part low temperature cure	. 4
Gelest <sup>®</sup> OE 43	1.43 RI flexible 2-part low temperature cure	. 5
Gelest <sup>®</sup> OE 46	1.46 RI flexible 2-part low temperature cure	. 6
Gelest <sup>®</sup> OE 46.1	1.46 RI flexible 2-part low temperature cure, medium strength	. 7
Gelest <sup>®</sup> OE 46.2	1.46 RI flexible 2-part low temperature cure, high strength	. 8
Gelest <sup>®</sup> OE 50	1.50 RI flexible 2-part low temperature cure	. 9

# **Optical Grade Hard Resin Coatings**

Optisil <sup>®</sup> 155A1	1.55 RI hard resin	)
Optisil <sup>®</sup> 155B2	1.55 RI hard resin	1
Optisil <sup>®</sup> 156A1	1.56 RI hard resin	2
Optisil <sup>®</sup> 157A1	1.57 RI hard resin	3
Optisil <sup>®</sup> 157B2	1.57 RI hard resin	4
Optisil <sup>®</sup> 158A1	1.58 RI hard resin	5
Optisil <sup>®</sup> 159A1	1.59 RI hard resin	6
Optisil <sup>®</sup> 164A1	1.64 RI hard resin	7

# Silicone Elastomer Fabrication Toolkit

UtenSil <sup>®</sup> Primer	silicone elastomer adhesive/primer solution18
UtenSil <sup>®</sup> Bonding Agent	silicone elastomer bonding agent
UtenSil <sup>®</sup> Wetting Agent	hydrophilic surface modification solution
UtenSil <sup>®</sup> Dissolution Agent	silicone digestion solution
UtenSil <sup>®</sup> Cure Retarder D1	cure moderator solution

#### 

Values reported in this brochure are intended as a description of material performance. They are not intended as specifications.

Silicon Materials for Optical Applications ©2015 Gelest, Inc.

Gelest<sup>®</sup> OE 39 1.39 Refractive Index 2-Part Silicone RTV Elastomer (1:1 kit)



#### Description

Gelest<sup>®</sup> OE 39 is an optically clear cladding, encapsulation and coating compound. Gelest<sup>®</sup> OE 39 can also be used to fabricate acoustic lenses. The moderate viscosity of the catalyzed mix, long potlife at room temperature and moderate cure temperature make this extremely useful in laboratory, prototype and small production run applications.

Cured Properties	
Refractive Index (25°C)	1.39
Tensile Strength	0.05 MPa
Elongation	1400-1600%
Durometer, Shore A	5
Specific Gravity	1.03

#### Uncured Properties of Gelest<sup>®</sup> OE 39

Viscosity (1:1) catalyzed: 3000-5000 cSt

#### **Application Methods**

Thoroughly mix Part A with Part B in a 1:1 ratio. De-air mix under vacuum for about 20 minutes. The pot-life is 18 hours at 25°C. Pot-life may be extended by storing at 5°C. Pour into mold or apply to substrate. Avoid entrapping air. Cure at 80°C for 4 hours.

#### **Standard Packaging**

PP2-OE39 Gelest<sup>®</sup> OE 39 200 g kit (100g OE39-A, 100g OE-B): \$290.00 Gelest<sup>®</sup> OE 41 1.41 Refractive Index 2-Part Silicone RTV Elastomer (1:1 kit)



#### Description

 $Gelest^{\mathbb{R}}$  OE 41 is a flexible, optically clear general purpose molding, encapsulation and coating compound. The low viscosity of the catalyzed mix, long pot-life at room temperature and moderate cure temperature make this extremely useful in laboratory, prototype and small production run applications.

#### **Cured Properties**



#### **Application Methods**

Thoroughly mix Part A with Part B in a 1:1 ratio. De-air mix under vacuum for about 20 minutes. The pot-life is 18 hours at 25°C. Pot-life may be extended by storing at 5°C. Pour into mold or apply to substrate. Avoid entrapping air. Cure at 55°C for 4 hours or at room temperature for 72 hours.

alobal time (min.)

#### **Standard Packaging**

PP2-OE41 Gelest<sup>®</sup> OE 41 1 kg kit (500g OE41-A, 500g OE41-B): \$84.00 6 kg kit (3000g OE41-A, 3000g OE41-B): \$384.00

#### **Application and Reference Data**

- 1. Lien, V. et al. IEEE Photon. Technol. Lett. 2004, 16(6), 1525.
- 2. Jeong, J. et al. Organic Electronics 2011, 12, 2095.

Gelest<sup>®</sup> OE 42 1.42 Refractive Index 2-Part Silicone RTV Elastomer (1:1 kit)



#### Description

Gelest<sup>®</sup> OE 42 is a flexible, optically clear molding, encapsulation and coating compound, offering improved adhesion to substrates compared to Gelest<sup>®</sup> OE 41. The low viscosity of the catalyzed mix, long pot-life at room temperature and moderate cure temperature make this extremely useful in laboratory, prototype and small production run applications.

Cured Properties	
Refractive Index (25°C)	1.42
Tensile Strength	>1.5 MPa
Elongation	90-150%
Durometer, Shore A	10-25
Tear Strength	0.90-1.75 kN/m

# Uncured Properties of Gelest<sup>®</sup> OE 42

Viscosity (1:1) catalyzed: 1500-2000 cSt

#### **Application Methods**

Thoroughly mix Part A with Part B in a 1:1 ratio. De-air mix under vacuum for about 20 minutes. The pot-life is 18 hours at 25°C. Pot-life may be extended by storing at 5°C. Pour into mold or apply to substrate. Avoid entrapping air. Cure at 55°C for 4 hours or at room temperature for 72 hours.

#### **Standard Packaging**

PP2-OE42 Gelest<sup>®</sup> OE 42 1 kg kit (500g OE42-A, 500g OE42-B): \$180.00 6 kg kit (3000g OE42-A, 3000g OE42-B): \$748.00

#### **Application and Reference Data**

Employed as core waveguide in fluidic-photonic integrated circuits. 1. Lien, V. et al. *Selected Topics in Quantum Electronics* **2005**, *11(4)*, 827. Gelest<sup>®</sup> OE 43 1.43 Refractive Index 2-Part Silicone RTV Elastomer (1:1 kit)



#### Description

Gelest<sup>®</sup> OE 43 is a flexible, optically clear molding, encapsulation and coating compound, offering improved adhesion to substrates compared to Gelest<sup>®</sup> OE 41. The low viscosity of the catalyzed mix, long pot-life at room temperature and moderate cure temperature make this extremely useful in laboratory, prototype and small production run applications.

Cured Properties	
Refractive Index (25°C)	1.43
Tensile Strength	>1.5 MPa
Elongation	75-100%
Durometer, Shore A	5-15
Tear Strength	0.90-1.75 kN/m

# Uncured Properties of Gelest<sup>®</sup> OE 43

Viscosity (1:1) catalyzed: 800-1500 cSt

#### **Application Methods**

Thoroughly mix Part A with Part B in a 1:1 ratio. De-air mix under vacuum for about 20 minutes. The pot-life is 18 hours at 25°C. Pot-life may be extended by storing at 5°C. Pour into mold or apply to substrate. Avoid entrapping air. Cure at 55°C for 4 hours or at room temperature for 72 hours.

#### **Standard Packaging**

PP2-OE43 Gelest<sup>®</sup> OE 43 1 kg kit (500g OE43-A, 500g OE43-B): \$180.00 6 kg kit (3000g OE43-A, 3000g OE43-B): \$748.00

#### **Application and Reference Data**

Employed in microfluidics waveguides. 1. Kee, J. et al. *Optics Express* **2009**, *17(14)*, 11739. Gelest<sup>®</sup> OE 46 1.46 Refractive Index 2-Part Silicone RTV Elastomer (1:1 kit)



#### Description

Gelest<sup>®</sup> OE 46 is a flexible, optically clear molding, encapsulation and coating compound. Refractive index of Gelest<sup>®</sup> OE 46 matches glass, allowing for fabrication with 'invisible' joints. The low viscosity of the catalyzed mix, long pot-life at room temperature and moderate cure temperature make this extremely useful in laboratory, prototype and small production run applications. This filler-free material offers the lowest transmission loss of the medium refractive index (1.46) elastomers.

#### **Cured Properties**

Refractive Index (25°C)	1.46
Tensile Strength	0.25 MPa
Elongation	30-50%
Durometer, Shore A	10-20
Specific Gravity	1.05

#### Uncured Properties of Gelest<sup>®</sup> OE 46

Viscosity (1:1) catalyzed: 1500-2500 cSt

#### **Application Methods**

Thoroughly mix Part A with Part B in a 1:1 ratio. De-air mix under vacuum for about 20 minutes. The pot-life is 18 hours at 25°C. Pot-life may be extended by storing at 5°C. Pour into mold or apply to substrate. Avoid entrapping air. Cure at 55°C for 4 hours or at room temperature for 72 hours.

#### **Standard Packaging**

PP2-OE46 Gelest<sup>®</sup> OE 46 200 g kit (100g OE46-A, 100g OE46-B): \$96.00 1 kg kit (500g OE46-A, 500g OE46-B): \$270.00





#### Description

Gelest<sup>®</sup> OE 46.1 is a flexible, optically clear molding, encapsulation and coating compound. Refractive index of Gelest<sup>®</sup> OE 46.1 matches glass, allowing for fabrication with 'invisible' joints. The long pot-life at room temperature and moderate cure temperature make this extremely useful in laboratory, prototype and small production run applications.

#### **Cured Properties**

Refractive Index (25°C)	1.46
Tensile Strength	0.55 MPa
Elongation	65-75%
Durometer, Shore A	30-45
Specific Gravity	1.19

#### Uncured Properties of Gelest<sup>®</sup> OE 46.1

Viscosity (1:1) catalyzed: 15,000 cSt

#### **Application Methods**

Thoroughly mix Part A with Part B in a 1:1 ratio. De-air mix under vacuum for about 20 minutes. The pot-life is 18 hours at 25°C. Pot-life may be extended by storing at 5°C. Pour into mold or apply to substrate. Avoid entrapping air. Cure at 55°C for 4 hours or at room temperature for 72 hours.

#### **Standard Packaging**

PP2-OE46.1 Gelest<sup>®</sup> OE 46.1 200 g kit (100g OE46.1-A, 100g OE46.1-B): \$126.00 1 kg kit (500g OE46.1-A, 500g OE46.1-B): \$365.00

# Gelest<sup>®</sup> OE 46.2 1.46 Refractive Index 2-Part Silicone RTV Elastomer, High Strength (1:1 kit)



#### Description

Gelest<sup>®</sup> OE 46.2 is a flexible, optically clear molding, encapsulation and coating compound. Refractive index of Gelest<sup>®</sup> OE 46.2 matches glass, allowing for fabrication with 'invisible' joints. The long pot-life at room temperature and moderate cure temperature make this extremely useful in laboratory, prototype and small production run applications.

#### **Cured Properties**

1.46
1-1.5 MPa
200-250%
45-50
1.22

#### Uncured Properties of Gelest<sup>®</sup> OE 46.2

Viscosity (1:1) catalyzed: 30,000 cSt

#### **Application Methods**

Thoroughly mix Part A with Part B in a 1:1 ratio. De-air mix under vacuum for about 20 minutes. The pot-life is 18 hours at 25°C. Pot-life may be extended by storing at 5°C. Pour into mold or apply to substrate. Avoid entrapping air. Cure at 55°C for 4 hours or at room temperature for 72 hours.

#### **Standard Packaging**

PP2-OE46.2 Gelest<sup>®</sup> OE 46.2 200 g kit (100g OE46.2-A, 100g OE46.2-B): \$126.00 1 kg kit (500g OE46.2-A, 500g OE46.2-B): \$365.00 Gelest<sup>®</sup> OE 50 1.50 Refractive Index 2-Part Silicone RTV Elastomer (1:1 kit)



#### Description

Gelest<sup>®</sup> OE 50 is a flexible, optically clear molding, encapsulation and coating compound. The higher refractive index of Gelest<sup>®</sup> OE 50 can act as cladding in optical waveguide applications. The low viscosity of the catalyzed mix, long pot-life at room temperature and moderate cure temperature make this extremely useful in laboratory, prototype and small production run applications.

Cured Properties	
Refractive Index (25°C)	1.50
Tensile Strength	0.1 MPa
Elongation	75-100%
Durometer, Shore A	10-20
Specific Gravity	1.07

#### Uncured Properties of Gelest<sup>®</sup> OE 50

Viscosity (1:1) catalyzed: 3000-5000 cSt

#### **Application Methods**

Thoroughly mix Part A with Part B in a 1:1 ratio. De-air mix under vacuum for about 20 minutes. The pot-life is 12 hours at 25°C. Pot-life may be extended by storing at 5°C. Pour into mold or apply to substrate. Avoid entrapping air. Cure at 55°C for 4 hours or at room temperature for 72 hours.

#### **Standard Packaging**

PP2-OE50 Gelest<sup>®</sup> OE 50 200 g kit (100g OE50-A, 100g OE50-B): \$126.00 1 kg kit (500g OE50-A, 500g OE50-B): \$365.00



# Optisil<sup>®</sup> 1.55A1 1.55 Refractive Index Silicone Resin Hard Coating

#### Description

Optisil<sup>®</sup> 1.55A1 is a primerless phenyl modified silicone dispersed in methoxypropanol for continuous use at temperatures up to  $360^{\circ}$ C

Film Properties	
Color c	lear
Refractive Index 1	.55
Solution Properties	
Form li	iquid
Solids 1	0%
Flashpoint 3	5°C
Specific gravity 0	.95
Viscosity 3	-5 cSt

#### **Application Methods**

Optisil<sup>®</sup> 1.55A1 is applied as a coating by spraying, dipping, or brushing. Material is allowed to dry for 1 hour and then cured at 240°C for 20-30 minutes. Thinner films may be prepared by diluting with methoxypropanol. Cure can be accelerated by adding 0.5% zinc 2-ethylhexanoate.

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

CAUTION: Use in well-ventilated area. Flammable. Avoid contact with skin and eyes.

#### **Standard Packaging**

PP1-OS155A1 Optisil<sup>®</sup> 1.55A1 100g/\$49.00 750g/\$360.00 10kg/commercial package Optisil® 1.55B2 1.55 Refractive Index Silicone Resin Hard Coating



#### Description

Optisil<sup>®</sup> 1.55B2 is a primerless phenyl modified silicone dispersed in methoxypropanol for continuous use at temperatures up to 360°C

Film Properties	
Color	clear
Refractive Index	1.54-1.56
Hardness, Rockwell 120F	
Solution Properties	
Form	liquid
Solids	20%
Flashpoint	35°C
Specific gravity	0.95
Viscosity	3-5 cSt

#### **Application Methods**

Optisil<sup>®</sup> 1.55B2 is applied as a coating by spraying, dipping, or brushing. Material is allowed to dry for 1 hour and then cured at 240°C for 20-30 minutes. Thinner films may be prepared by diluting with methoxypropanol. Cure can be accelerated by adding 0.5% zinc 2-ethylhexanoate.

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

CAUTION: Use in well-ventilated area. Flammable. Avoid contact with skin and eyes.

#### **Standard Packaging**

PP1-OS155B2 Optisil<sup>®</sup> 1.55B2 100g/\$42.00 750g/\$220.00 10kg/commercial package

#### **Application and Reference Data**

1. Leichle, T. et al, Sensors and Actuators B: Chemical, 2012, 161, 805.



#### Description

Optisil<sup>®</sup> 156A1 is a primerless modified phenyl silicone resin for continuous use at temperatures up to 325°C, dispersed in methoxypropanol.

clear
1.56
liquid
10%
35°C
0.92
3-5 cSt

#### **Application Methods**

Optisil<sup>®</sup> 156A1 is applied as a coating by spraying, dipping, or brushing. Material is allowed to dry for 1 hour and then cured at 220°C for 25-30 minutes. Thinner films may be prepared by diluting with methoxypropanol. Cure can be accelerated by adding 0.5% zinc 2-ethylhexanoate.

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

CAUTION: Use in well-ventilated area. Flammable. Avoid contact with skin and eyes.

#### **Standard Packaging**

PP1-OS156A1 Optisil<sup>®</sup> 1.56A1 100g/\$49.00 750g/\$260.00 10kg/commercial package 

 Optisil® 1.57A1 1.57 Refractive Index Silicone Resin Hard Coating

 Refractive Index

 Thickness
 Cure
 Hardness
 Type

 Image: Capsular Description:
 high
 thick-thin
 thermal
 high
 solvent-borne 1-part

#### Description

Optisil<sup>®</sup> 157A1 is a primerless modified phenyl silicone resin for continuous use at temperatures up to 325°C, dispersed in methoxypropanol.

clear
1.57
liquid
10%
35°C
0.92
3-5 cSt

#### **Application Methods**

Optisil<sup>®</sup> 157A1 is applied as a coating by spraying, dipping, or brushing. Material is allowed to dry for 1 hour and then cured at 220°C for 25-30 minutes. Thinner films may be prepared by diluting with methoxypropanol. Cure can be accelerated by adding 0.5% zinc 2-ethylhexanoate.

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

CAUTION: Use in well-ventilated area. Flammable. Avoid contact with skin and eyes.

#### **Standard Packaging**

PP1-OS157A1 Optisil<sup>®</sup> 1.57A1 100g/\$49.00 750g/\$260.00 10kg/commercial package

#### Optisil<sup>®</sup> 1.57B2 1.57 Refractive Index Silicone Resin Hard Coating



#### Description

Optisil<sup>®</sup> 157B2 is a primerless modified phenyl silicone resin for continuous use at temperatures up to  $325^{\circ}$ C, dispersed in methoxypropanol.

Film Properties		
Color	clear	
Refractive Index	1.56-1.58	
Hardness, Rockwell	110R	
Solution Properties		
Form	liquid	
Solids	20%	
Flashpoint	35°C	
Specific gravity	0.92	
Viscosity	3-5 cSt	

#### **Application Methods**

Optisil<sup>®</sup> 157B2 is applied as a coating by spraying, dipping, or brushing. Material is allowed to dry for 1 hour and then cured at 220°C for 25-30 minutes. Thinner films may be prepared by diluting with methoxypropanol. Cure can be accelerated by adding 0.5% zinc 2-ethylhexanoate.

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

CAUTION: Use in well-ventilated area. Flammable. Avoid contact with skin and eyes.

#### **Standard Packaging**

PP1-OS157B2 Optisil<sup>®</sup> 1.57B2 100g/\$42.00 750g/\$220.00 10kg/commercial package

#### Optisil<sup>®</sup> 1.58A1 1.58 Refractive Index Silicone Resin Hard Coating



#### Description

Optisil<sup>®</sup> 158A1 is a primerless modified phenyl silicone resin for continuous use at temperatures up to 325°C, dispersed in methoxypropanol.

<b>Film Properties</b>	
Color	clear
Refractive Index	1.58
<b>Solution Properties</b>	
Form	liquid
Solids	10%
Flashpoint	35°C
Specific gravity	0.92
Viscosity	3-5 cSt

#### **Application Methods**

Optisil<sup>®</sup> 158A1 is applied as a coating by spraying, dipping, or brushing. Material is allowed to dry for 1 hour and then cured at 220°C for 25-30 minutes. Thinner films may be prepared by diluting with methoxypropanol. Cure can be accelerated by adding 0.5% zinc 2-ethylhexanoate.

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

CAUTION: Use in well-ventilated area. Flammable. Avoid contact with skin and eyes.

#### **Standard Packaging**

PP1-OS158A1 Optisil<sup>®</sup> 1.58A1 100g/\$80.00 750g/\$420.00 1kg/commercial package

#### **Optisil® 1.59A1** 1.59 Refractive Index Silicone Resin Hard Coating



#### Description

Optisil<sup>®</sup> 159A1 is a primerless modified phenyl silicone resin for continuous use at temperatures up to 325°C, dispersed in methoxypropanol.

Film Properties	
Color	clear
Refractive Index	1.59
Solution Properties	
Form	liquid
Solids	10%
Flashpoint	35°C
Specific gravity	0.92

#### **Application Methods**

Optisil<sup>®</sup> 159A1 is applied as a coating by spraying, dipping, or brushing. Material is allowed to dry for 1 hour and then cured at 220°C for 25-30 minutes. Thinner films may be prepared by diluting with methoxypropanol. Cure can be accelerated by adding 0.5% zinc 2-ethylhexanoate.

#### **Shelf life**

Viscosity

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

CAUTION: Use in well-ventilated area. Flammable. Avoid contact with skin and eyes.

3-5 cSt

#### **Standard Packaging**

PP1-OS159A1 Optisil® 1.59A1 100g/\$68.00 750g/\$220.00 1kg/commercial package

#### **Optisil® 1.64A1** 1.64 Refractive Index Silicone Resin Hard Coating



#### Description

Optisil<sup>®</sup> 164A1 is a high refractive index resin that can be used to fabricate wave guides. It is a primerless modified 2-dimensional silicone resin for continuous use at temperatures up to 325°C, dispersed in methoxypropanol.

Film Properties	
Color	clear
Refractive Index	1.64
Solution Properties	
Form	liquid
Solids	10%
Flashpoint	35°C
Specific gravity	0.95
Viscosity	2-3 cSt

#### **Application Methods**

Optisil<sup>®</sup> 164A1 is applied as a coating by spraying, dipping, or brushing. Material is allowed to dry for 1 hour and then cured at 220°C for 25-30 minutes. Thinner films may be prepared by diluting with methoxypropanol. Cure can be accelerated by adding 0.5% zinc 2-ethylhexanoate.

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

CAUTION: Use in well-ventilated area. Flammable. Avoid contact with skin and eyes.

#### **Standard Packaging**

PP1-OS164A1 Optisil<sup>®</sup> 1.64A1 100g/\$68.00 750g/\$220.00 1kg/commercial package UtenSil<sup>®</sup> Primer P1 Adhesive/Primer for Reprographic Grade Silicones

#### Description

UtenSil<sup>®</sup> Primer P1 enhances the adhesion of reprographic silicones to a desired substrate.

#### **Solution Properties**

Form Solids Flashpoint Specific Gravity Viscosity clear, colorless 5-10 wt% -4°C 0.70 1.0-2.0 cSt

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

#### **Application Methods**

UtenSil<sup>®</sup> Primer P1 is applied as a coating by spraying, dipping or brushing. The solvent is removed by evaporation in an exhausted area. Moisture induced crosslinking occurs at room temperature over 1-2 hours at 35-85% relative humidity.

#### **Standard Packaging**

PP1-USP1 UtenSil<sup>®</sup> Primer P1 100 g: \$37.00 1 kg: \$260.00

## UtenSil<sup>®</sup> Bonding Agent B1

Bonding Agent for Reprographic Grade Silicones

#### Description

UtenSil<sup>®</sup> Bonding Agent B1 binds reprographic silicone surfaces together irreversibly.

#### **Solution Properties**

Form	opaque, white*
Solids	5-10 wt%
Flashpoint	-1°C
Specific Gravity	0.78
Viscosity	2.0-3.0 cSt
*Turns clear after deactivation	

#### Shelf life

6 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

#### **Application Methods**

UtenSil<sup>®</sup> Bonding Agent B1 is applied by spraying, dipping or brushing. The solvent is removed by evaporation in an exhausted area. Bonding of silicone surfaces occurs at 80°C over 4 hours. After bonding is complete the process is deactivated by heating to 140°C for 4 hours in a exhausted area. An amine odor is generated during the deactivation step.

#### **Standard Packaging**

PP1-USB1 UtenSil<sup>®</sup> Bonding Agent B1 100 g: \$34.00 1 kg: \$135.00 UtenSil<sup>®</sup> Wetting Agent W1 Hydrophilic Modification Solution for Reprographic Grade Silicones

#### Description

UtenSil<sup>®</sup> Wetting Agent W1 increases the wettability of reprographic silicone surfaces.

#### **Solution Properties**

Form Solids Flashpoint Specific Gravity Viscosity Contact Angle, water (1mm thickness) clear, colorless 5-7 wt% 6°C 0.88 1.0-2.0 cSt 20°

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

#### **Application Methods**

Immerse oxygen plasma treated reprographic silicone into UtenSil<sup>®</sup> Wetting Agent W1 for 1 hour. (Reprographic silicones with a thickness >1mm may require longer immersion time in UtenSil<sup>®</sup> Solution.) Dip the silicone into ethanol to remove excess material. Cure wetting agent on silicone surface at 100°C over 2 hours.

#### **Standard Packaging**

PP1-USW1 UtenSil<sup>®</sup> Wetting Agent W1 100 g: \$72.00 1 kg: \$432.00 UtenSil<sup>®</sup> Dissolution Agent D1 Digestion Solution for Reprographic Grade Silicones

#### Description

UtenSil<sup>®</sup> Dissolution Agent D1 is a cleaning solvent that chemically reacts and dissolves silicones.

#### **Solution Properties**

Form	amber-light brown
Solids	20-30 wt%
Flashpoint	93°C
Specific Gravity	0.85
Viscosity	5-10 cSt

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

#### **Application Methods**

Place silicone to be dissolved in a stainless steel or glass container which may be covered to reduce evaporation. Remove any water on the silicone by physical drying or heating in an oven. Immerse silicone in UtenSil<sup>®</sup> Dissolution Agent D1 solution at room temperature. Dissolution time depends on the type of silicone, thickness and surface area. A typical silicone with a 5 mm section thickness will dissolve in 4-8 hours. Dissolution can be accelerated by warming to 35-50°C. Spot dissolution can be achieved by deposition of Dissolution Agent D1 with a pipette and removing the dissolved material with a pipette, followed by a brief acetone and water rinse.

#### **Standard Packaging**

PP1-USD1 UtenSil<sup>®</sup> Dissolution Agent D1 100 g: \$29.00 1 kg: \$196.00

# UtenSil<sup>®</sup> Cure Retarder R1 Cure Moderator Solution for Reprographic Grade Silicones

#### Description

UtenSil<sup>®</sup> Cure Retarder R1 moderates the cure rate of vinyl-addition (platinum) cure silicones.

#### **Solution Properties**

Form	clear, colorless
Flashpoint	112°C
Specific Gravity	0.98
Viscosity	300-500 cSt

#### Shelf life

12 months when stored below 25°C in sealed containers. Keep container sealed after dispensing product.

#### **Application Methods**

UtenSil<sup>®</sup> Cure Retarder R1 is mixed with Part A of a 2-Part silicone RTV encapsulant formulation prior to throughly mixing with Part B. Increased concentrations of UtenSil<sup>®</sup> Cure Retarder R1 solution in Part A will increase the pot-life of the formulation at room temperature and slow the rate of the vinyl-addition (platinum) cure at elevated temperatures. In an exemplary procedure, mixing 1wt% UtenSil<sup>®</sup> Cure Retarder R1 solution with Part A of PP2-OE41 will increase the pot-life of the catalyzed mixture from 18 hours to 48 hours at room temperature. Performance of UtenSil<sup>®</sup> Cure Retarder R1 may differ between RTV formulations depending on platinum concentration.

#### **Standard Packaging**

PP1-USR1 UtenSil<sup>®</sup> Cure Retarder R1 100 g: \$45.00 1 kg: \$315.00



# **Silicone Fluids for Optical Applications**

Gelest offers pure silicone fluids (not blends) with a wide range of refractive indices. Listed below are fluids with refractive indices and viscosities. Fluids with the same product code prefix can be blended to exact refractive index requirements.

Product Code	Refractive Index@25° 589.3nm	Viscosity (cSt)@25°	Price/25g	Price/100g
SIB1120.0	1.335	7-10	\$190.00	-
SIB1816.0	1.336	6-7	\$98.00	\$320.00
SIB1709.0	1.340	3-4	\$72.00	\$234.00
FMS-411	1.365	8-12	\$48.00	\$156.00
FMS-736	1.375	6000	\$54.00	\$176.00
FMS-121	1.382	80-120	\$38.00	\$124.00
FMS-221	1.387	80-120	\$13.00	\$41.00
DMS-T12	1.400	20		\$10.00
DMS-T21	1.402	100		\$10.00
DMS-T22	1.403	200		\$10.00
SIO6711.5	1.413	3		\$68.00
PDM-0421	1.422	100		\$14.00
PDM-0431	1.428	1000		\$20.00
PTT-1117	1.428	70-75		\$32.00
DBE-224	1.430	400		\$16.00
PDM-0821	1.436	100-125		\$12.00
DES-T12	1.439	15-20		\$38.00
ALT-143	1.445	600-1000		\$14.00
DBE-814	1.452	40-50		\$12.00
APT-213	1.462	1200-1600		\$19.00
PMM-0011	1.470	10-20	\$28.00	\$90.00
APT-133	1.480	1000		\$19.00
PTT-1022	1.481	150-300	\$21.00	-
PDM-1922	1.490	160-230		\$22.00
APT-233	1.493	1500-2000		\$16.00
PMM-5021	1.500	125		\$21.00
SIT8662.0	1.501	15	\$78.00	-
PMM-6025	1.506	500-550		\$20.00
PMM-0021	1.520	100-200		\$78.00
PMM-0025	1.533	500		\$21.00
PMP-5025	1.543	400-500	\$35.00	\$130.00
PDM-7040	1.556	35-40		\$38.00
PDM-7050	1.588	170-175		\$52.00

(215) 547-1015

# **UV Active and Fluorescent Molecular Coatings**



	$\begin{array}{l} \text{SIM6502.0} \\ \text{O-4-METHYLCOUMARINYL-N-[3-(TRIETHOX C_{20}H_{29}NO_7Si} \\ \text{UV max: } 223, 281, 319.5 (vs) \\ \text{Soluble: THF} \\ \text{Immobilizeable fluorescent compound.}^1 \end{array}$	YSILYL)PROPYLJCARBAMAT 423.54	E (8	38-90°)	
NH OF OF OF					
	1. Arkles, B. U.S. Patent 4,918,200, 1990. [129119-78-4]	HMIS: 2-2-1-X	10g \$120.00		
	SIN6597.25 NITROVERATRYLOXYCARBONYLAMIDOPR <i>N-TRIETHOXYSILYLPROPYL-O-4,5-DIMETHO</i> C <sub>19</sub> H <sub>32</sub> N <sub>2</sub> O <sub>9</sub> Si UV max: 365 nm Photosensitive silane for lithography. <sup>1</sup>	OPYLTRIETHOXYSILANE, 10 XY-2-NITROBENZYLCARBAM 460.56	)% in tetrahydrofuran / <i>ATE</i> Flashpoint: -14°C (7°F)		NEW
	1. del Campo, A. et al. <i>Angew. Chem.</i> <b>2005</b> [188541-09-5]	HMIS: 3-4-1-X	1.0g \$280.00		
	SIT8186.2 7-TRIETHOXYSILYLPROPOXY-5-HYDROXYF C <sub>24</sub> H <sub>30</sub> O <sub>7</sub> Si Contains non-reactive dyestuffs LIV max: 350 nm	LAVONE, 50% in xylene 458.58	Flashpoint: 30°C (86°F)		
$\smile$	[945761-08-0]	HMIS: 2-3-1-X	1.0g \$48.00	5g \$192.00	
	SIT8187.0 N-(TRIETHOXYSILYLPROPYL)DANSYLAMID 5-DIMETHYLAMINO-N-(3-TRIETHOXYSILYLPF $C_{21}H_{34}N_2O_5$ SSi Viscous liquid UV max: 222(s), 256, 354 Fluorescent - employed as a tracer in UV ct Soluble in toluene, tetrahydrofuran	E ROPYL)NAPTHALENE-1-SULF 454.66 ure composites	ONAMIDE 115-9° / 0.1	1.12	1.5421
	Fluorescence probe for crosslinking in silico Employed in a chemically modified logic ga	ones. <sup>1</sup> te. <sup>2</sup>			
			M in THE		
1. Leezenberg, P. et al. <i>Chem. Mater.</i> <b>1995,</b> <i>7</i> , 1784. 2. Mu, L. et al. <i>Angew. Chem., Int. Ed. Engl.</i> <b>2009</b> , <i>48</i> , 3469. [70880-05-6] TSCA EC 274-980-5 HMIS: 2-1-1-X 1.0g \$152.00					
	SIT8191.0 3-(TRIETHOXYSILYLPROPYL)-p-NITROBENZ	ZAMIDE			
	C <sub>16</sub> H <sub>26</sub> N <sub>2</sub> O <sub>6</sub> Si UV max: 224, 260, 292(s) Used to prepare diazotizable supports for e	370.48 nzyme immobilization. <sup>1</sup>	(!	54-5°)	1.5127
		10*1	M In THE :		
	1. Weetall, H. U.S. Patent 3,652,761, 1972.	262 508 0 LIMIS: 2 1 1 Y	25a \$78.00		
			209 φι 0.00		
~ • >	$C_{30}H_{45}N_3O_5Si$ UV max: 236(s), 274, 324, 334 Fluorescent, optically active silane Soluble: warm toluene	571.79	(1	82-4°)	
	х 		on THEF		
	[200946-85-6]	HMIS: 2-1-1-X	5g \$126.00		
	info@gelest.com	(215) 547-1015	www.gelest.com		

**Gelest**, Inc.

# How To Use Gelest Silicone Elastomers



**WEIGHING:** Weigh A and B in the recommended ratios. Fill container only 1/3 full to allow for foaming during Step 3.



**MIXING:** Use a spatula to make a homogeneous mixture of A and B.



**DEAIRING:** Place the mixed silicone in a vacuum chamber (desiccator) and apply vacuum until foam collapes.



**POURING:** Pour mix into mold or form, avoid entrapment of air.



**CURING:** Follow the recommended cure schedule.



DEMOLDING THE FINISHED PART.

\* Use of polyethylene disposable gloves recommended. Latex gloves can retard cure if used.





#### Silicon Compounds: Silanes and Silicones

Detailed chemical properties and reference articles for over 3,000 compounds. The 600 page handbook of silane and silicone chemistry includes scholarly reviews as well as detailed application information.



#### Silicone Materials for Microfluidics

This brochure showcases a wide range of Reprographic and Optical grade PDMS-based elastomers that are used in the fabrication of microfluidic devices. Each PDMS elastomer has been designed to overcome specific problems of traditional PDMSmaterials. Reprographic Grade Silicones with increased hydrophilicity, oleophilicity, and oleophobicity and Optical Grade Silicones with refractive indices from 1.41 to 1.50 have been formulated.



#### **Reactive Silicones: Forging New Polymer Links**

The 64 page brochure describes reactive silicones that can be formulated into coatings, membranes, cured rubbers and adhesives for mechanical, optical, electronic and ceramic applications. Information on reactions and cures of silicones as well as physical properties shortens product development time for chemists and engineers.



#### Silicone Fluids: Stable Inert Media

Design and Engineering properties for conventional silicone fluids as well as thermal, fluorosilicone, hydrophilic and low temperature grades are presented in a 24 page selection guide. The brochure provides data on thermal, rheological, electrical, mechanical and optical properties for silicones. Silicone fluids are available in viscosities ranging from 0.65 to 2,500,000 cSt.



# Hydrophobicity, Hydrophilicity and Silane Surface Modification

Organosilanes are used extensively for modification of surface properties. This 80-page brochure describes silane surface modification with an emphasis on making surfaces hydrophobic or hydrophilic

# Gelest

Gelest, Inc. 11 East Steel Rd. Morrisville, PA 19067 Phone: (215) 547-1015 FAX: (215) 547-2484 www.gelest.com

Pt

Pt