## Silicone Rubber Adhesive/Sealant


One-component elastomer cures to a tough, rubbery solid when exposed to moisture in the air. Designed to fulfill industrial and electronic service sealing and bonding requirements, this sealant has excellent adhesive strength, high elongation and outstanding insulation and heat resistance qualities. Develops primerless adhesion to a variety of materials, including metal, glass, most wood, silicone resin, vulcanized silicone rubber, ceramic, natural and synthetic fibers; most plastics and painted surfaces. Resists weathering, vibration and exposure to oil, moisture, ozone, and temperatures from sub-zero to 400°F. Cures to a tack-free surface in 10 minutes. Full cure, 24 hours. Ideal for many sealing, bonding and insulating applications, including general electrical insulation, potting exposed electronic components, bonding gaskets for heating and refrigeration units, formed-in-place gaskets for gear boxes, compressors, pumps and outdoor motor covers, pressure sealing of aircraft cabins and cockpits, caulking sheet metal stacks, ductwork and equipment housings, and as an anti-abrasion coating.

As Cured—Electrical
ASTM D 257 Volume Resistivity, ohm-cm – 6 X $10^{14}$
ASTM D 149 Dielectric Strength, volts/mil – 635
ASTM D 150 Dielectric Constant, at 60 Hz – 2.8 at 100 Hz – 2.8 at 100 kHz –2.8
ASTM D 150 Dissipation Factor, at 60 Hz – 0.0015 at 100 Hz – 0.0015 at 100 kHz – 0.0015

Silicone Rubber Sealant meets the following requirements:
FDA: FDA regulation No. 21 CFR 175.105 when fully cured and washed.
UL: Recognized for service to 302°F (150°C) where elongation is not necessary.
Meets Mil. Spec. Mil-A-46106A Type 1,
Meets Fed. Spec. TT-S-001543A, Class B, TT-S-0230C, Type 2, Class B

| | |
|---|---|
| Part No. 10-150 | 3 fl. oz. Tube w/Dispensing Nozzle, Clear |


Part No. 19-155


Part No. 19-158


Part No. 19-159

## Electronic Grade Silicone Sealant/Adhesive

One part non-corrosive, neutral cure electronic grade silicone sealant. Will remain flexible from -70° F to +400° F. (-57° C to +204° C) An excellent adhesive for many electrical and electronic applications where corrosion to metals is a problem. Good dielectric properties, high surface resistivity and resists electrical tracking. Meets the requirements of Mil-A-46146A-Type 1; meets the requirements of FDA status, FDA regulation #177.2600

| | |
|---|---|
| Part No. 19-155 | 3 fl. oz. Color: Clear |
| Part No. 19-158 | 10.2 fl. oz. Caulk Tube, Color: White |
| Part No. 19-159 | 2.8 fl. oz. Syringe Color: ~~White~~ Clear |

## Silicone Quick Reference Guide

| Description | 10-150 | 19-155 | | 19-158 | 19-159 |
|---|---|---|---|---|---|
| Non Corrosive | - | X | | X | X |
| High Temperature | - | - | | - | - |
| Extreme High Temp | - | - | | - | - |
| Low Temperature | X | X | | X | X |
| Extreme low temp | X | X | | X | X |
| Thermal Conductivity | - | - | | - | - |
| High Strength | X | - | | - | - |
| Super High Strength | - | X | | X | X |
| High Voltage | - | X | | X | X |
| Paste | X | X | | X | X |
| Flowable | - | - | | - | - |
| One Part | X | X | | X | X |
| Primerless | X | X | | X | X |
| Translucent | X | X | | - | - |
| Red | - | - | | - | - |
| White | - | - | | X | X |
| Adhesive | X | X | | X | X |
| Sealant | X | X | | X | X |
| Potting | - | - | | - | - |
| Encapsulating | - | - | | - | - |
| Elect. Insulation | X | X | | X | X |
| Form In Place Gasket | X | X | | X | X |
| Food Grade | X | X | | X | X |
| Marine | X | - | | - | - |
| Mil Spec | X | X | | X | X |

Product Data Sheets on Following pages



All quantities are single; BU's are packages of 10 Unless otherwise noted.

## EPOXY CEMENTS (Cont.)




### GC Electronic Grade Self Leveling Potting Silicone Sealant

RoHS

Electronic Grade Self Leveling Silicone is a one-component, RTV (room temperature vulcanizing) product that uses new cross-linking mechanism as a cure method. No acetic or other corrosive by-products are generated during the curing process. It can be used in corrosion sensitive electrical or electronic equipment with no adverse effect and cures at room temperature.

| | |
|---|---|
| Temperature Range (after cure): | -57°C to +204 °C (-70°F to + 400°F) |
| Dielectric Strength: | 452 V/mil (173 KV/cm) |
| Thermal Expansion Coefficient: | $9 \times 10^{4}$ 1/K 0°C to 100°C (32°F to 212°F) |
| Volume Resistivity: | $>2.19 \times 10^{15}$ Ohm/cm |

| Part No. 19-160 | 10.2 fl. oz. Caulk Tube, Clear |
|---|---|

Product Data Sheets on Following pages

## CYANOACRYLATE ADHESIVES & DEBONDERS

"Instant bonding" cyanoacrylate adhesives cure in seconds, do not depend on evaporation of solvents and require no clamping. They are colorless and moisture resistant. They are ideal for bonding metals, plastics, rubber, glass and ceramics to each other or to dissimilar materials. Bonding strength up to several thousand psi is possible making them among the strongest adhesives available. These adhesives are economical, as only a drop is required. The best type should be determined by experimentation. Use them to repair broken plastic cabinets and other plastic items, attaching nameplates and rubber feet to panels and chassis, cementing broken ceramic glass and rubber items, repairing jewelry, etc. Porous surfaces may be bonded with Gelweld No. 19-0117. The average setting time is between 10 and 100 seconds, after which the cemented articles can be handled. These adhesives may even be used to bond surfaces which are normally difficult to cement, such as teflon, polyethylene, vinyl, silicone rubber and glass.


### GC Super Glue Regular Formula

Ethyl Cyanoacrylate Adhesive

RoHS

Medium viscosity formula for efficient wicking action, faster curing time. Excellent for bonding any combination of plastic, rubber or metal parts. This grade is ideal for small or fine work on non-porous, smooth surfaces. It fills gaps of .003-.005". Highly resistant to acid, alkali, alkali water, solvents and fungus. Non-toxic.

Meets Mil. spec. MIL-A-46050B Type 1 Class 2.

| Part No. 10-120 | 0.075 fl. oz. Tube |
|---|---|

GC™ ELECTRONICS

# PRODUCT SPECIFICATIONS SHEET

| CAT NO. | PRODUCT NAME |
|---|---|
| 19-158 | GC Electronic Grade Silicone Sealant Adhesive |
| 19-159 | |

## DESCRIPTION:

GC Electronic Grade Silicone Sealant/Adhesive is a one-part, moisture-curing RTV (room temperature vulcanizing) silicone sealant/adhesive that is non-slump and cures to form a tough, permanently flexible rubber.

The non-corrosive curing system of these products makes it ideally suited for protecting, sealing and insulating corrosion-sensitive electronic and electrical materials such as copper, brass, silver, etc.

It has been specifically formulated for use in electrical/electronic production and assembly because it

- has good dielectric properties
- has high surface resistivity
- resists electrical tracking
- repels water to protect electrical properties

These products are a neutral-cure silicone that emits no objectionable odors during cure and is ideally suited for use in confined areas. However, adequate ventilation should be provided when they are used in large-scale production.

These products are 100% silicone and have excellent resistance to:

- ozone
- UV
- airborne chemicals
- temperature changes from -57°C to +204°C (-70°F to +400°F)

## TYPICAL USES:

19-158 and 19-159 are excellent sealants/adhesives for many electrical and electronic applications where corrosion to metals, particularly copper, brass, silver, etc., is a problem. Such applications include:

- lead-wire entries
- conduit terminal boxes
- component mounting
- electrical connections
- conduit ends
- splices
- cover plates
- coaxial cable connectors
- printed circuit boards
- conductor entry holes

**SURFACE PREPARATION;**

All surfaces should be clean and dry. It is recommended that bonding surfaces be solvent wiped with oil-free solvents such as xylol, toluol naphtha or non-flammable chlorinated solvents. Do not wipe with oil-based solvents such as Varsol. Allow surface to dry thoroughly before applying sealants.

**DIRECTIONS:**

19-158 and 19-159 are ready to use and require no mixing or additives. The cure mechanism begins as soon as the sealant comes in contact with the air. At conditions of 25°C (77°F) and 50% relative humidity, the sealant will skin in 15 minutes and fully cure within 48 hours (1/8" bead).

Higher humidity accelerates cure. Tooling should be done before skinning takes place.

In applications where partial total confinement of sealant is prevalent, the time required for proper cure is lengthened by the degree of confinement.

**PRIMING:**

Priming of these products is normally not required for application to most substrates.

Unprimed adhesion can be readily tested by applying a small trial bead and allowing 7 days for maximum adhesion to occur.

**COLORS:**

These products are available in white.

**MILITARY SPECIFICATIONS:**

19-158 and 19-159 meet the requirements of MIL-A-46146A Type 1.

**FDA STATUS:**

19-158 and 19-159 are permitted under regulations of the Food and Drug Administration where incidental food contact might be involved. FDA Regulation number is 177.2600.

**TYPICAL PROPERTIES:**

| CHARACTERISTIC | TEST METHOD | RESULTS |
|---|---|---|
| Shore A Hardness | ASTM D2240 | 30 ± 2 |
| Tensile @ Break | ASTM D412 | 250 ± 25 psi |
| Elongation @ Break | ASTM D412 | 400 ± 25% |
| Modulus @ 100% Elongation | ASTM D412 | 90 ± 10 psi |
| Tear Strength | ASTM 624 (Die B) | 30 ± 10 ppi |
| Adhesion Strength (Peel) | TT-S-001543, 3.5.9 | |
| Glass | | 10 ± 2 ppi |
| Aluminum (Primed) | | 8 ± 2 ppi |
| Mortar (Primed) | | 12 ± 2 ppi |
| Sag, or Slump | TT-S-001543, 3.5.2 | Nil |
| Shrinkage (Weight Loss) | TT-S-001543, 3.5.5 | <5% |
| Extrusion Rate | 1/8" orifice @ 50 psi | 130 ± 5 gm/min |

| CHARACTERISTIC | TEST METHOD | RESULTS |
|---|---|---|
| Service Temperature | | -18°C to +50°C<br>0°F to + 120°F |
| Tack Free Time | TT-S-001543, 3.5.6 | 15 minutes |
| Time to Full Cure (1/8" Bead) | | 48 hours |
| Joint Movement Capability | 4:1 Safety Factor | ± 25% |
| Chemical Resistance | List Available | Excellent |
| Color Retention | | Excellent |
| Weatherability | | Excellent |
| Reactivity of Byproducts | | Non-corrosive to Most substrates |
| Electrical Properties @ 72°F (22°C) | | |
| Dissipation Factor | ASTM D150 | 50 Hz – 0.0009<br>1 kHz – 0.0004<br>1 MHz – 0.0002 |
| Dielectric Constant | ASTM D150 | 50 Hz – 2.7<br>1 kHz – 2.7<br>1 MHz – 2.7 |
| Volume Resistivity, Ω.cm | ASTM D257 | $2 \times 10^{14}$ |
| Surface Resistivity, Ω | ASTM D257 | $3 \times 10^{15}$ |
| Dielectric Strength, KV/mm | ASTM D149 | 18 |

**SAFETY PRECAUTIONS:**

Since GC Electronic Grade Sealant/Adhesive is a neutral-cure system, no acetic or objectionable byproducts are evolved during cure. On direct contact, uncured sealant may irritate eyes. Flush well with water and call physician if irritation persists. Avoid prolonged contact with skin.

**STORAGE:**

GC Electronic Grade Sealant/Adhesive,should be stored in original unopened container at or below 32°C (90°F),.

**SHELF LIFE, CLOSED CONTAINERS:**

12 months

GC™ ELECTRONICS

# PRODUCT SPECIFICATIONS SHEET

## CAT NO. PRODUCT NAME

19-160 GC Electronic Grade Self-Leveling Potting Silicone Sealant

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**DESCRIPTION:**

Electronic Grade Self-Leveling Silicone is a one-component, RTV (room temperature vulcanizing) product that uses a new cross-linking mechanism as a curing method. No acetic acid or other corrosive by-products are generated during its cure. Thus, 19-0160 can be used in corrosion-sensitive electrical and/or electronic equipment with no adverse effect.

Supplied ready to use, 19-160 cures at room temperature to form a tough, high-modulus rubber.

**TYPICAL USES:**

19-160 is primarily used in applications where a flowable, self-leveling silicone sealant is required to fill small gaps or voids. Applications include potting electrical terminals and coating electrical devices.

Since no undesirable odors are released during cure, 19-160 is ideal where applications must be done under confined conditions. Adequate ventilation should be provided with extensive use of this product.

**DIRECTIONS:**

19-160 is ready to use and requires no mixing or additives. The cure mechanism begins as soon as the sealant comes in contact with the air. Uncured sealant will flow until a cured skin is formed.

At conditions of 25°C (77°F) and 50% relative humidity, the sealant will skin in 30 minutes and cure within 24 hours (1/8” thickness). Higher humidity accelerates cure.

In applications where partial or total confinement of sealant is prevalent, the time required for proper cure is generally lengthened by the degree of confinement.

**SURFACE PREPARATION;**

All surfaces should be clean and dry. It is recommended that bonding surfaces be solvent wiped with a naphtha, ketone or chlorinated solvent. Suitable solvents include xylol, toluol and mineral spirits. Do not solvent wipe with alcohols or oil-containing solvents such as Varsol. Allow surface to dry thoroughly before applying sealant.

**PAINTING:**

19-160 should not be applied to surfaces that will be painted, as painting over sealant is not recommended. The paint film does not stretch and the adhesion of paint to 19-0160 is not adequate.

**COLORS:**
19-160 is available in clear.

**FDA STATUS:**

19-160 is permitted under regulations of the Food and Drug Administration where incidental food contact might be involved. FDA Regulation number is 177.2600.

**MILITARY SPECIFICATIONS:**

19-160 meets the requirements of MIL-A-46106A Type II.

**TYPICAL PROPERTIES:**

**UNCURED:**

| | |
|---|---|
| Type | One-part, self-levelling RTV |
| Appearance | Smooth, thick liquid |
| Specific Gravity | Clear 1.02 |
| Application Temperature Range | -18°C to +50°C (0°F to +120°F) |
| Cure Method | Neutral, non-corrosive, moisture cure |
| Skin Over Time | 40 minutes |
| Cure Time | 24 hours (1/8" thickness) |
| Slump/Sag | Flowable |

**CURED:**

| | |
|---|---|
| At 25°C (77°F) and 50% R.M. for 7 days (1/8" thick) | |
| Durometer Hardness (shore A) (ASTM D2240) | 25 |
| Tensile Strength (ASTM D412) | 230 psi (1.6 MPa) |
| Elongation at Break (ASTM D412) | 400% |
| Tear Resistance (ASTM D624, Die B) | 6 ppi (4.6 kN/m) |
| Temperature Range After Cure | -57°C to 204°C (-70°F to +400°F) |
| Shrink Factor | Nil |
| Thermal Expansion Coefficient | $9 \times 10^{-4}$ 1/K<br>0°C to 100°C (32°F to 212°F) |
| Dielectric Strength (ASTM D149) | 452 V/mil (173 KV/cm) |
| Volume Resistivity (ASTM D257) | $>2.19 \times 10^{15}$ ohm/cm |
| Dissipation Factor (ASTM D150) | 0.00106 at 10 kHz<br>0.00022 at 100 Hz |
| Dielectric Constant (ASTM D150) | 71 at 100 Hz<br>2.71 at 10 kHz |

**SAFETY PRECAUTIONS:**

19-160 is a neutral cure system, no acetic acid is released during cure.

**STORAGE:**

19-160 should be stored in original unopened container at or below 32°C (90°F).

**SHELF LIFE, CLOSED CONTAINERS**

12 months

GC™ ELECTRONICS

# PRODUCT SPECIFICATIONS SHEET

| CAT NO. | PRODUCT NAME |
|---|---|
| ~~19-161~~ | ~~GC Thermal Conductive Potting Epoxy and Adhesive~~<br>8 oz. Kit (2 – 4 oz. Containers) |

Discontinued

## DESCRIPTION:

GC Thermal Conductive Potting Epoxy and Adhesive is a highly filled, medium viscosity black casting resin designed for applications requiring a high degree of thermal conductivity, flexibility and a low CTE. It was especially formulated to a 1:1 mix ratio for use in MMD equipment. It contains abrasive aluminum oxide filler which can introduce wear considerations for wetted components. Cure is normally achieved at room temperature although an elevated cure schedule can be used to reach final properties quickly. This product was designed to be cured in less than 2 hours at 65°C for ease of processing and also to reduce viscosity.

It was especially formulated to a 1A:1B volume mix ratio for use in side-by-side dispensing cartridges and meter/mix and dispense equipment. Times and temperatures from 3 hours at 65°C to 30 minutes at 100°C are typical for small castings (less than 50 grams).

## TYPICAL PROPERTIES:

| | | |
|---|---|---|
| Color | | Black |
| Viscosity | Part A | 44,000 cPs (Low Shear)<br>35,000 cPs (High Shear) |
| | Part B | 34,000 cPs (Low Shear)<br>25,500 cPs (High Shear) |
| | Mixed | 39,000 cPs (Low Shear)<br>30,000 cPs (High Shear) |
| Specific Gravity | Part A | 1.92 |
| | Part B | 1.98 |
| | Mixed | 1.95 |
| Pot Life | | 120 minutes |
| Mass | | 200 grams |

## CURED PHYSICAL PROPERTIES:

| | |
|---|---|
| Hardness | 75 Shore-D |
| Lap Shear | 1500 psi |

Discontinued

| | |
|---|---|
| Tensile Strength (Yield) | 450 psi |
| Elongation @ Break | 15% |

| **Compressive** | **PSI** |
|---|---|
| Yield Strength | 1,500 |
| Ultimate Strength | 7,500 |
| Modulus | 24,000 |
| Coefficient of Thermal Expansion | 45*ppm/°C (below Tg) |
| Thermal Conductivity (Btu*in/ft$^2$ hr°F) | 7.2 |
| Temperature Range ** | -40° to 150°C |
| Onset Temperature | 55°C |
| Exothermic Energy | 63.3 J/g |
| Glass Transition Temperature | 26°C |

**ELECTRICAL PROPERTIES:**

| | |
|---|---|
| Dielectric Constant (25°C, 100 Hz) | 5.0* |
| Dielectric Strength | 400 v/mil* |
| Volume Resistivity | 7.6 x $10^{13}$ Ohm-Cm* |

**MIX RATIO: (Part A to B)**

| | |
|---|---|
| By Weight | 1 to 1 |
| By Volume | 1 to 1 |

**CURE SCHEDULE:** 24 – 72 hours at 25°C
Or 3 hours @ 65°C
30 minutes @ 100°C

**SHELF LIFE, CLOSED CONTAINERS:** 12 months

**INSTRUCTIONS:**

1) Bring both components to room temperature and stir individually before use. Mix equal parts A and B thoroughly.

2) Weigh and mix parts A and B accurately and thoroughly, scraping sides of container often. Do not pour from mixing container; transfer to a new container as residual unmixed material may cause a tacky spot on the surface of casting.

Discontinued

3) Allow product to cure undisturbed until it is fully gelled or tack-free to the touch.

4) Clean up uncured resin with a suitable organic solvent such as MEK, acetone or other organic solvent.

*Asterisk denotes values considered typical to associated resin systems or extrapolated from other test results.

**General use guideline, based on weight loss at elevated temperature.

Notes: Values presented above are considered to be typical properties, not to be used for specification purposes. Many epoxy resin systems are prone to crystallization as epoxy resin is a super-cooled fluid. This condition may give the product a gritty or grainy appearance (or hazy in clear products). Products in this state will not usually cure to normal and expected properties. In extreme cases it may appear solid and cured. Fluctuating temperatures (within 5-50°C) may aggravate this phenomena. Heating the individual component to 50 to 60°C while stirring can usually restore the product to original state. Storage at 25+/-10°C is optimum for most products.

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