NAGASE Group

# ELECTRONIC MATERIALS SERIES
## *Adhesives, Inks and Encapsulants*

**Printed Electronics**

- Conductive Inks
- Non-Conductive Inks
- Stretchables

**Microelectronic Assembly**

- Electrically Conductive Adhesives
- Non-Conductive Adhesives
- UV Cure Adhesives
- Encapsulants

**Negative Photoresists**

- Liquid Photoresists
- Dry Film Photoresists
- Silane Adhesion Promoters

**Photovoltaics**

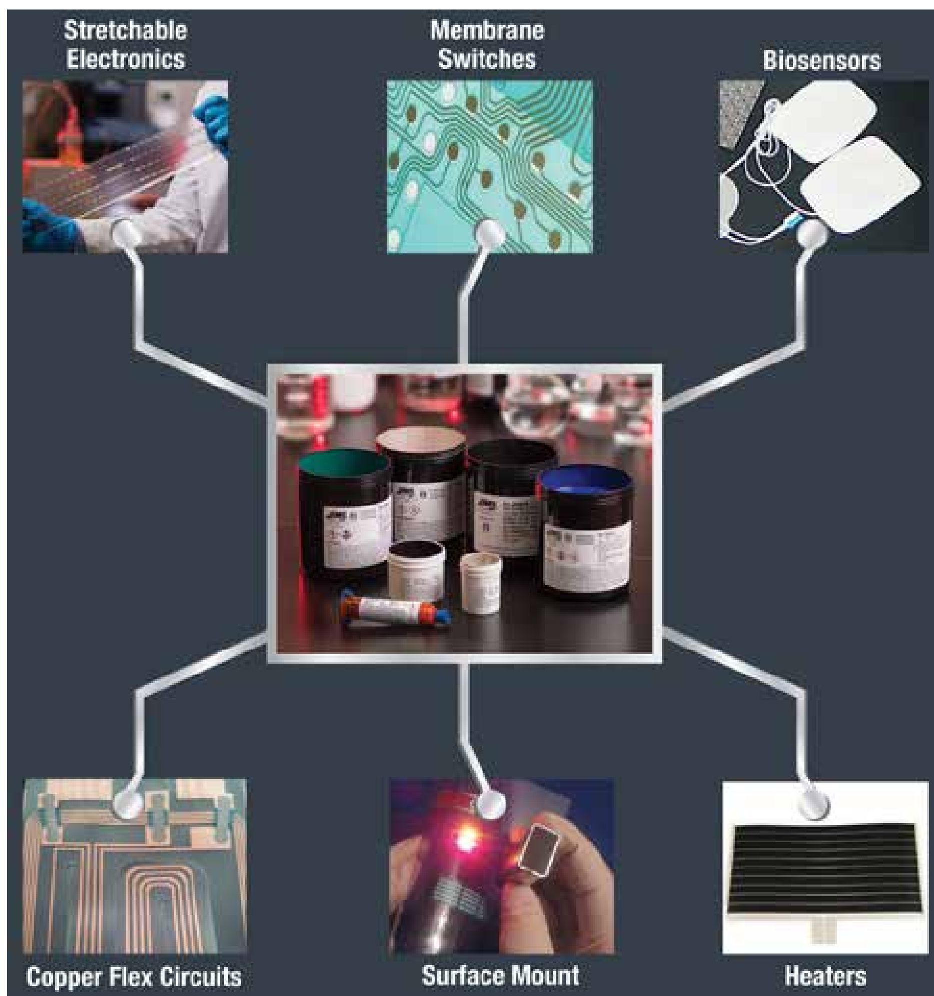
- Stringing
- Shingling
- Back Contact

### About Engineered Materials Systems

Engineered Materials Systems, Inc. (EMS) technology focus is on electronic materials for semiconductor, printed electronics, circuit assemble, photovoltaic, printer head, camera module, disk drive and photonics assembly product lines. The company creates continual improvements that will guide its customers into the future. For more information, visit www.emsadhesives.com.

# Inks for Membrane Switches, Sensors, Heaters, etc.

- Conductive
- Flexible
- Dielectric
- Fine Line
- Membrane Switch
- Sensors
- Heaters
- Surface Mounting
- EMI/ESD
- Capacitive Touch




## TYPICAL APPLICATIONS

| PRODUCT | FEATURE | CUSTOMER BENEFIT |
|---|---|---|
| CI-1001 Silver/Vinyl | Highly conductive, flexible, <0.015 Ω/sq/mil | Low Ω/sq, low cost |
| CI-1028 Silver/Polyester | Fineline, wear resistant, fast dry, <0.020 Ω/sq/mil | Low Ω point-point, fine line resolution, low energy processing |
| CI-1036 Silver/Proprietary Resin | Durable, crease resistant, highly conductive, <.010 Ω/sq/mil | Low Ω/sq, durable at tail creasing, |
| CI-2001 Carbon/Vinyl | Silver top-coat, mix with CI-1001, <20 Ω/sq/mil | Coat over Ag contact area. Ω blend with CI-1001 |
| CI-5001 Nickel/Proprietary | Wear resistant, <10 Ω/sq/mil | Resists ZIF connector wear |
| DI-7542 UV-Cure Insulator | Highly moisture resistant, excellent intercoat adhesion with conductive inks | No latent field failure due to moisture ingress |
| DI-7050 Heat Cure Insulator | Good inter-layer compatibility | Use when UV cure is not available |
| DB-1569 Silver/Epoxy SMT Adhesive | Dot dispensable with minimal viscosity drift, fast cure, fine dot dispensable. | Faster processing, higher yields, low cost. Low temp cure |
| UF-1569 Staking Compound | Fine dot dispensing, long syringe life, insulation and bond strength | Robust, reliable SMT joint, no silver shorting or migration |
| EC-9519 UV-Cure Encapsulant | Excellent adhesion to PET, low stress. Protects SMD. | Added SMD joint integrity |

# Inks for Medical Applications, Wearables, & Miscellaneous

- **Stretchable**
- **Ag/AgCl**
- **Durable**
- **Specialty**

*MimoBaby motion/heat sensor*

## Medical Electrodes

### TYPICAL APPLICATION

- ECG/EKG/EEG pads
- Glucose sensors
- Drug delivery (iontophoresis) patches
- Cosmetic patches
- TENS
- Sensors – heat, moisture, chemical, etc

| PRODUCT | FEATURE | CUSTOMER BENEFIT |
|---|---|---|
| CI-4001 Silver/Silver Chloride/Vinyl | 45/55% ($Ag/AgCl^-$) ratio | Use for iontophoresis and where high $AgCl^-$ content required |
| CI-4025 Silver/Silver Chloride/Vinyl | 80/20% ($Ag/AgCl^-$) ratio *(custom ratios available)* | Use for EKG pads or sensing electrodes |
| CI-5003 Zinc/Proprietary | Anode for battery function | Printed-in battery for iontophoretic devices |

## Miscellaneous

| PRODUCT | FEATURE | CUSTOMER BENEFIT |
|---|---|---|
| DI-7506 UV Spacer | Designed for thick deposit and fast UV cure | Print spacers onto print-treated PET, Kapton and ECM insulators |
| DI-7801 UV-Cure Pressure Sensitive Adhesive | Selectively screen print, excellent tack and peel, water clear | Apply PSA only where needed, eliminate die or laser cut PSA laminate |
| CI-2042 Series Resistor Blends | Stable resistor value, can blend to target resistance from 10 to 100k ohms | No drift on resistance value once cured |
| CI-1201 | Low silver content conductive, <0.040/ Ω/sq/mil | Stable low pricing, low migration |
| CI-1075 Silver | Durable, polycarb compatible | In-mold 3D electronics |

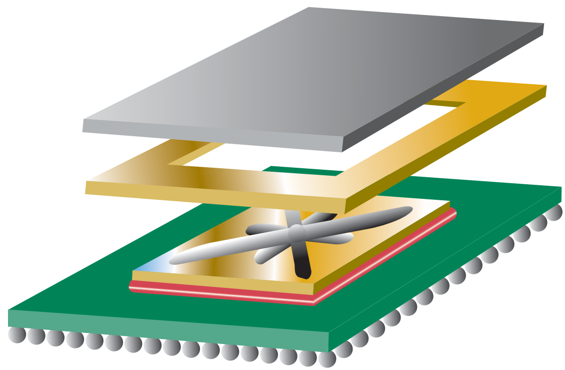
## Stretchable/Smart Fabric

### TYPICAL APPLICATIONS

- Wearable technology
- Soft, pliable electronic interface
- Capacitive sensing
- TPU film compatible

| PRODUCT | FEATURE | CUSTOMER BENEFIT |
|---|---|---|
| CI-1036 Silver/Proprietary resin | Durable, stretchable, low ohms | Integrate electronics into user-friendly fabrics |
| CI-2051 Carbon/Proprietary resin | Stretchable silver top coat | Protect silver at contact points |
| DI-7540 UV-cure insulator | Durable, stretchable, compatible | Protect silver circuitry and maintain stretch properties |
| CI-4040 Silver/Silver Chloride/ Proprietary resin | Durable, stretchable, chloride ions | For bio-sensing in Smart Fabrics |

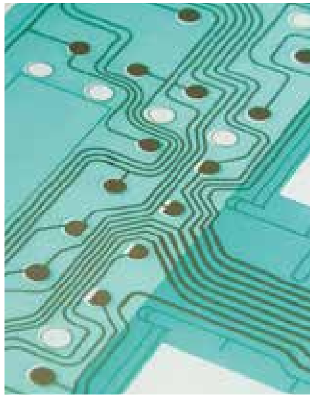
# Electrically Conductive Die Attach



- **Rigid (small die)**
- **Flexible (large die)**
- **Low Cost**
- **Low Temp Cure**

| PRODUCT | DESCRIPTION | RESISTIVITY (ohm•cm) | Tg (˚C) TAN DELTA | VISCOSITY cP (5.0 rpm) | APPLICATION METHOD |
|---|---|---|---|---|---|
| **Electrically Conductive Die Attach Adhesives** | | | | | |
| 561-147-1 | Low cost, moderate Tg, snap cure, low bleed on cell surfaces. 80°C cure capable. | $4 \times 10^{-4}$ | 90 | 11,000 | Needle, jet, screen print |
| CA-105 | High Tg, low cost die attach for small die and LED's | $3 \times 10^{-4}$ | 135 | 11,000 | Dispense |
| CA-177 | Low cost conductive die attach. Good for small die and tantalum capacitors, fast cure | $7 \times 10^{-4}$ | 93 | 13,000 | Dispense |
| CA-177-S | Low cost conductive die attach formulated to prevent galvanic corrosion on tin and solder surfaces | $1 \times 10^{-3}$ | 87 | 13,000 | Dispense |
| CA-180 | Low temperature cure (cured 30 minutes at 80⁰C), snap cure at 150⁰C plus (10 seconds at 150°C) | $6 \times 10^{-5}$ | 50 | 12,000 | Dispense |
| CA-181 | Low temperature cure (cured 60 minutes at 80⁰C), higher Tg than CA-180 | $2 \times 10^{-4}$ | 72 | 11,000 | Dispense |
| CA-183 | Low temperature cure (80°C) flexible ECA | $9 \times 10^{-4}$ | 20 | 20,000 | Dispense |
| DA-5845-GB | Chip on board, meets NASA outgassing requirements | $2 \times 10^{-4}$ | 65 | 25,000 | Dispense |
| DA-5100 | General purpose chip on board die attach adhesive | $5 \times 10^{-4}$ | 115 | 17,000 | Dispense |
| **High Thermal Conductivity, Electrically Conductive Die Attach Adhesives** | | | | | |
| DA-5933A | High thermal conductivity, ionically clean die attach for power devices and LED's, 21W/m⁰K | $9.0 \times 10^{-5}$ | 107 | 7,500 | Pin transfer Dispense |
| DA-5990-1 | High thermal conductivity, ionically clean die attach for power devices and LED's, 20W/m⁰K | $5.0 \times 10^{-4}$ | 140 | 10,000 | Pin transfer Dispense |
| CA-142 | High thermal conductivity, ionically clean, flexible, low stress solution for large die, 10W/m°K | $2.0 \times 10^{-4}$ | 5 | 22,000 | Dispense |
| CA-192 | High thermal conductivity, low cost, ionically clean, 20W/m⁰K | $1.0 \times 10^{-4}$ | 145 | 10,000 | Pin transfer Dispense |
| CA-193 | High thermal conductivity, flexible, low cost, ionically clean, 20W/m⁰K | $1.0 \times 10^{-4}$ | 170 | 10,000 | Pin transfer Dispense |

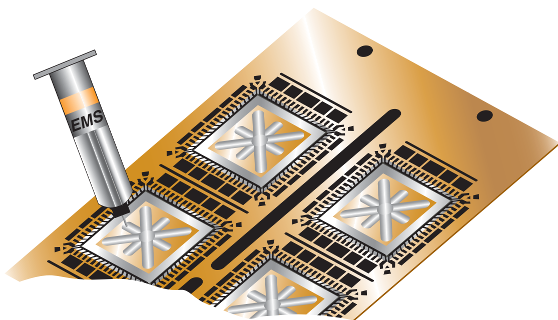
# Electrically Conductive Miscellaneous



- **Rigid**
- **Flexible**
- **Low Cost**
- **Low Temp Cure**

| PRODUCT | DESCRIPTION | RESISTIVITY (ohm•cm) | Tg (˚C) Tan Delta | Viscosity cP (5.0 rpm) | Application Method |
|---|---|---|---|---|---|
| **Conductive Adhesives for Circuit Assembly** | | | | | |
| 618-15 | Two part room temperature cure conductive adhesive | $8 \times 10^{-4}$ | 30 | low | needle/static mixer |
| 618-34 | Two part conductive with longer work life than 618-15 | $6 \times 10^{-3}$ | 60 | low | needle/static mixer |
| DB-1538-2 | 2 part, 2 min @180˚C cure | $2 \times 10^{-4}$ | 50 | 11,000 | Meter-mix Dispense |
| DB-1541-S10 | Flexible, high peel strenth | $1 \times 10^{-4}$ | 0 | 20,000 | Dispense |
| DB-1541-LTC | Low temperature cure version (100C) for temperature sensitive devices, moderate Tg, high peel | $2 \times 10^{-4}$ | 50 | 17,000 | Dispense |
| 529-144 | Carbon filled conductive adhesive for static drain applications | $2 \times 10^{1}$ | 20 | 20,000 | Dispense |
| **Low Cost Electrically Conductive Adhesives (reduced silver content)** | | | | | |
| 561-147-2 | Low cost, snap cure at elevated temperature, flexible, low bleed, large die/components, can cure at 80°C in 60 minutes | $3.2 \times 10^{-4}$ | 16 | 19,000 | Dispense |
| CA-150-L | Low cost, snap cure at elevated temperature, flexible, low bleed, large die/components, high peel strength | $5 \times 10^{-4}$ | -10 | 10,000 | Dispense, Jet Screen print |
| CA-165-1 | Die attach recommended for small die, high strength | $2 \times 10^{-4}$ | 105 | 15,000 | Dispense |
| CA-175 | Die attach for small die. High strength,snap cure | $2 \times 10^{-4}$ | 130 | 18,000 | Dispense |
| CA-176 | Die attach for small die, low bleed, snap cure | $2 \times 10^{-4}$ | 115 | 30,000 | Dispense |
| DB-1588-4 | Flexible, low cost, excellent adhesion and $85^{0}$C/85%RH performance on OSP treated copper | $4 \times 10^{-4}$ | 0 | 35,000 | Stencil Print |

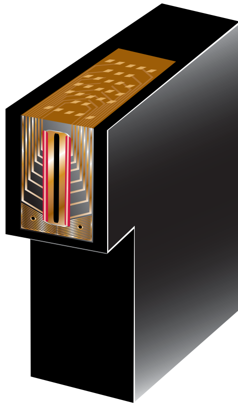
# Thermally Conductive




- Power
- LED
- Thermal Interface
- Laser

| PRODUCT | DESCRIPTION | RESISTIVITY (ohm•cm) | Tg - DMA ($^0$C) | VISCOSITY (cP) | THERMAL CONDUCTIVITY W/m$^0$K |
|---|---|---|---|---|---|
| **Thermally Conductive / Electrically Insulating** | | | | | |
| 504-85 | 2-part thermally conductive silicone | N/A | -121 | 5,000 | 1 |
| TM-6162 | Electrically insulating, low outgassing die attach with good viscosity stability | N/A | 75 | 25,000 | 2.2 |
| TM-6183 | Electrically insulating, non silicone thermal interface material | N/A | -14 | 31,000 | 2.8 |
| TM-6700 | High thermal conductivity silicone thermal grease | N/A | N/A | 106,000 | 4.5 |
| **High Thermal Conductivity, Electrically Conductive Die Attach Adhesives** | | | | | |
| CA-105 | High Tg, low cost die attach for small die and LED's | $3 \times 10^{-4}$ | 135 | 11,000 | 3.5 |
| CA-142 | High thermal conductivity, ionically clean, flexible, low stress solution for large die | $2.0 \times 10^{-4}$ | 5 | 22,000 | 10 |
| CA-190-2 | High thermal conductivity, low cost, ionically clean | $1.0 \times 10^{-4}$ | 145 | 10,000 | 20 |
| CA-190-3 | High thermal conductivity, low cost, ionically clean | $1.0 \times 10^{-4}$ | 170 | 10,000 | 20 |
| DA-5990-1 | High thermal conductivity), ionically clean die attach for power devices and LED's | $5.0 \times 10^{-4}$ | 140 | 10,000 | 20 |
| DA-5933A | High thermal conductivity, ionically clean die attach for power devices and LED's | $9.0 \times 10^{-5}$ | 107 | 7,500 | 21 |

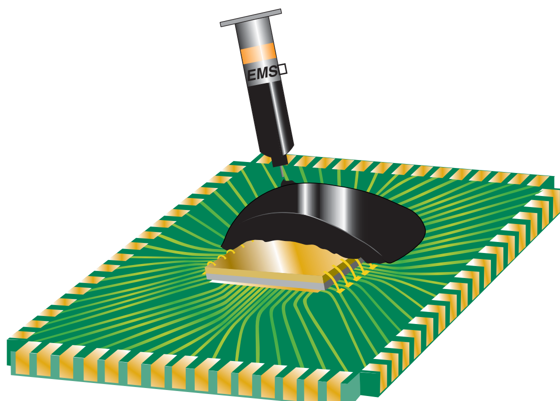
# Circuit Assembly – Non-Conductive



- **Flex Circuits**
- **Camera Modules**
- **Printer Heads**
- **Smart Cards**

| PRODUCT | DESCRIPTION | VISCOSITY (cps) | Tg - DMA | CURE | POT LIFE AT 25°C (hrs) |
|---|---|---|---|---|---|
| **Flex Circuit and Printer Head Assembly Adhesives** | | | | | |
| 357-346-5 | White, low viscosity adhesive, encapsulant, bonding FR4 to kapton, high fracture toughness, high ink and moisture resistance | 20,000 | 60 | 60 min @ 80$^{0}$C<br>3 min @ 150$^{0}$C | 72 Hours |
| 357-348 | White, low viscosity adhesive, encapsulant, bonding FR4 to kapton, high fracture toughness, high ink and moisture resistance | 9,500 | 50 | 60 min @ 80$^{0}$C<br>5 min @ 150$^{0}$C | 72 Hours |
| 357-284 | White, high thixotropy adhesive, encapsulant, bonding FR4 to kapton and stainless steel high fracture toughness, high ink and moisture resistance | 110,000 | 65 | 40 min @ 80$^{0}$C<br>1 min @ 150$^{0}$C | 72 Hours |
| 451-107-4 | Low viscsity, electrically insulating die attach adhesive | 3,500 | 50 | 60 min @ 80$^{0}$C<br>15 min @ 120°C | 48 Hours |
| EN-7150 | Tan, low viscosity adhesive, encapsulant, bonding FR4 to kapton and stainless steel high fracture toughness, high ink and moisture resistance, high Tg | 15,000 | 106 | 30 min @ 110$^{0}$C | 72 Hours |
| **Camera Module Assembly Adhesives for Lens Holder Assembly** | | | | | |
| 631-28 | Designed for lens holder bonding in camera modules can be used for any assembly process requiring UV tack plus thermal cure | 27,000 | 107 | UV and/or<br>15 min @ 110° | Dispense<br>Stencil Print |
| 631-39 | low shrinkage adhesive designed for lens holder bonding and other micro assembly applications | 33,000 | 92 | UV and/or<br>15 min @ 110° | Dispense<br>Stencil Print |
| 631-68 | Extremely low CTE, low shrinkage adhesive designed for lens holder bonding and other micro assembly applications. High Tg | 80,000 | 140 | UV and/or<br>15 min @ 110° | Dispense<br>Stencil Print |
| **UV Cure Chip Encapsulants** | | | | | |
| 451-268 | Dam material for dam and fill chip encapsulation. Good for smart cards and general circuit assembly applications | 10,000 | 112 °C | UV and/or<br>30 min @ 150°C | 72 Hours |
| 451-269 | Fill material for dam and fill chip encapsulation or cavity fill. Good for smart cards and general circuit assembly applications | 2,000 | 72 °C | UV and/or<br>30 min @ 150°C | 73 Hours |

# Chip Encapsulants




- **Glob Top**
- **Cavity Fill**
- **Dam and Fill**
- **MCM Encapsulation**

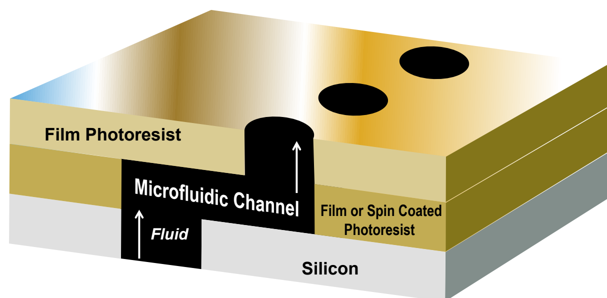
| PRODUCT | DESCRIPTION | VISCOSITY (cps) | Tg - DMA | CURE | POT LIFE AT 25°C (hrs) |
|---|---|---|---|---|---|
| **Chip on Board Encapsulants** | | | | | |
| EN-7826 | Glob top encapsulant. User friendly pot life (> 2 days), superior environmental protection with enhanced moisture resistance and internal stress relief. CTE = 18ppm below Tg | Controlled flow, domed appearance | 140°C | 30 min @ 150$^{0}$C | >48 Hrs |
| EN-7826FF | Fine filler version of EN-7826 for encapsulating fine pitch wirebonds | 31,000 | 155°C | 20 min @ 150$^{0}$C | >48 Hrs |
| DE-7826 | Dam fill material. Matches cavity properties. User friendly pot life (>2 days), superior environmental protection with enhanced moisture resistance and internal stress relief. CTE = 18ppm below Tg | Smooth thixotropic paste | 140 °C | 30 min @ 150$^{0}$C | >48 Hrs |
| CE-7826 | Cavity fill material. Matches dam properties. Excellent flow properties, user friendly pot life (> 2 days), superior environmental protection with enhanced moisture resistance and internal stress relief. CTE = 18ppm below Tg | Self leveling liquid | 140 °C | 30 min @ 150$^{0}$C | >48 Hrs |
| CE-7510-S | Silicone cavity fill material. Matches dam properties. Excellent flow properties, room temperature stable, excellent adhesion and very good tear properties. | 750 | -121 °C | 30 min @ 150$^{0}$C | 3 months |
| **UV Cure Chip Encapsulants** | | | | | |
| 451-268 | Dam material for dam and fill chip encapsulation. Good for smart cards and general circuit assembly applications | 10,000 | 112 °C | UV and/or 30 min @ 150°C | 72 Hours |
| 451-269 | Fill material for danm and fill chip encapsulation. Good for smart cards and general circuit assembly applications | 2,000 | 72 °C | UV and/or 30 min @ 150°C | 73 Hours |

# UV Cure Adhesives and Encapsulants

- Camera Modules
- Circuit Boards
- Disk Drive
- Flex Circuits

| PRODUCT | DESCRIPTION | VISCOSITY (cps) | Tg - DMA (°C) | CURE | THERMAL CONDUCTIVITY W/m°K |
|---|---|---|---|---|---|
| UV Cure Assembly Adhesives and Encapsulants | | | | | |
| 535-32 | Low viscosity epoxy adhesive/encapsulant, contains secondary thermal cure | 1,200 | 2 | UV + 20 min @ 110°C | 0.3 |
| 535-11M-7 | Dispensible epoxy adhesive/encapsulant, contains secondary thermal cure | 12,000 | 5 | UV + 20 min @ 110°C | 0.3 |
| 535-18M-62 | Medium viscosity developed for damping and general adhesive applications | 75,000 | 30 | UV | 0.3 |
| UV-9108 | UV cured acrylate, low viscosity, rapid cure, good adhesion to PVC, polycarbonate | 1,400 | 40 | UV | 0.3 |
| UV Cure Chip Encapsulants | | | | | |
| 451-268 | Dam material for danm and fill chip encapsulation. Good for smart cards and general circuit assembly applications | 10,000 | 112 °C | UV and/or 30 min @ 150°C | 72 Hours |
| 451-269 | Fill material for danm and fill chip encapsulation. Good for smart cards and general circuit assembly applications | 2,000 | 72 °C | UV and/or 30 min @ 150°C | 73 Hours |
| Camera Module Assembly Adhesives for Lens Holder Assembly | | | | | |
| 631-28 | Designed for lens holder bonding in camera modules can be used for any assembly process requiring UV tack plus thermal cure | 27,000 | 107 | UV and/or 15 min @ 110° | Dispense Stencil Print |
| 631-39 | Low shrinkage adhesive designed for lens holder bonding and other micro assembly applications | 33,000 | 92 | UV and/or 15 min @ 110° | Dispense Stencil Print |
| 631-68 | Extremely low CTE, low shrinkage adhesive designed for lens holder bonding and other micro assembly applications. High Tg | 80,000 | 140 | UV and/or 15 min @ 110° | Dispense Stencil Print |

# Liquid and Dry Film Resists, Adhesion Promoters



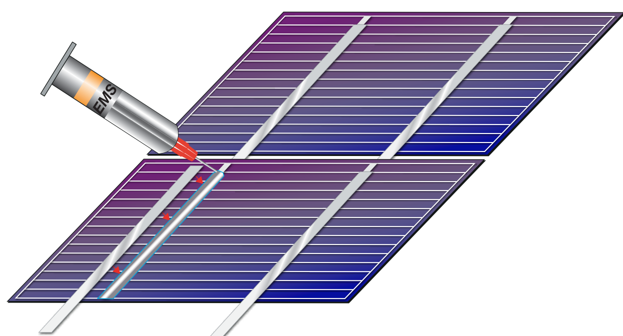

- **Microfluidics**
- **Via Sealing**
- **Metalization**
- **IC Cooling**

| VISCOSITY (CPS) | NR-2000 SERIES CONSISTENT PHOTOSPEED +/- 3% CRITICAL DIMENSION TARGET |
|---|---|
| **Liquid Photoresists** | |
| 500 | NR-2050 |
| 1,000 | NR-2100 |
| 2,000 | NR-2200 |
| 3,000 | NR-2300 |
| 4,000 | NR-2400 |
| 5,000 | NR-2500 |
| 7,000 | NR-2700 |

| THICKNESS (um) | DF-1000 SERIES | DF-2000 SERIES CONSISTENT PHOTOSPEED +/- 3% CRITICAL DIMENSION | DF-3000 SERIES ANTIMONY FREE (Lower Tg) | DF-3500 SERIES ANTIMONY FREE (SIMILAR TO 2000 SERIES) | DF-4000 SERIES EXTREMELY HYDROPHOBIC (> 90° CONTACT ANGLE) |
|---|---|---|---|---|---|
| **Dry Film Resists** | | | | | |
| 5 | DF-1005 | DF-2005 | DF-3005 | DF-3505 | N/A |
| 10 | DF-1010 | DF-2010 | DF-3010 | DF-3510 | N/A |
| 14 | DF-1014 | DF-2014 | DF-3014 | DF-3514 | DF-4014 |
| 20 | DF-1020 | DF-2020 | DF-3020 | DF-3520 | DF-4017 |
| 25 | DF-1025 | DF-2025 | DF-3025 | DF-3525 | N/A |
| 50 | DF-1050 | N/A | DF-3050 | DF-3550 | N/A |
| 90 | DF-1090 | N/A | DF-3090 | DF-3590 | N/A |
| Films up to 120um thick have been manufactured | | | | | |

| ADHESION PROMOTERS | |
|---|---|
| 412-17 | Silane based Adhesion Promoter distilled to high purity at EMS to enable higher adhesion of the Photoresists to themselves and other substrates |

# Stringing, Shingling and Back Contact




- **Stringing**
- **Back Contact**
- **Shingling**
- **Concentrated PV**

| PRODUCT | DESCRIPTION | RESISTIVITY (ohm•cm) | Tg (˚C) TAN DELTA | VISCOSITY cP (5.0 $s^{-1}$) | APPLICATION METHOD |
|---|---|---|---|---|---|
| **Conductive Ribbon/Stringer Attach Adhesives for Thin Film** | | | | | |
| DB-1543-S10 | Low cost version of DB-1541-S3 with similar reliability, conductivity. Designed for stringing | 2 x $10^{-4}$ | 22 | 23,000 | Needle Dispense |
| **Low Cost Conductive Adhesives for Shingling and Stringing** | | | | | |
| 561-147-1 | Low cost, moderate Tg, snap cure, low bleed on cell surfaces. Recommended for stringing or shingling. 80°C cure capable. | 4 x $10^{-4}$ | 90 | 11,000 | Needle, jet, screen print |
| 561-147-2 | Low cost, low Tg, snap cure, low bleed on cell surfaces. Recommended for stringing or shingling. 80°C cure capable. | 3 x $10^{-4}$ | 16 | 19,000 | Needle, jet, screen print |
| 561-401 | Low cost, very low Tg, snap cure, low bleed on cell surfaces. Recommended for shingling cells | 6.0 x $10^{-4}$ | -11 | 15,000 | Needle, jet, screen print |
| CA-150-L | Low cost, low Tg, snap cure, low bleed on cell surfaces. Recommended for stringing or shingling | 5 x $10^{-4}$ | -10 | 10,000 | Needle, jet, screen print |
| CA-150-M | Low cost, low Tg, snap cure, low bleed on cell surfaces. Recommended for stringing or shingling | 5 x $10^{-4}$ | -10 | 15,000 | Needle, jet, screen print |
| CA-150-H | Low cost, low Tg, snap cure, low bleed on cell surfaces. Recommended for stringing or shingling | 5 x $10^{-4}$ | -10 | 25,000 | Stencil Print |

| PRODUCT | DESCRIPTION | RESISTIVITY (ohm•cm) | Tg (˚C) TAN DELTA | VISCOSITY cP (5.0 $s^{-1}$) | APPLICATION METHOD |
|---|---|---|---|---|---|
| **Conductive Adhesives for Back Contact Applications** | | | | | |
| CA-150-H | Low cost, low Tg, snap cure, low bleed on cell surfaces. Recommended for stringing or shingling | 5 x $10^{-4}$ | -10 | 25,000 | Stencil Print |
| DB-1588-4 | Lowest cost of the DB-1588-series materials. Faster cure for fast cure EVA encapsulants | 2 x $10^{-4}$ | 0 | 35,000 | Stencil Print |
| DB-1588-6 | Lowest cost, flexible, excellent damp heat performance on OSP treated copper. | 4 x $10^{-4}$ | 5 | 10,000 | Dispense Jet |
| FE-106 | Low cost, flexible, excellent damp heat performance on OSP treated copper. Formulated for Formula E manufacturing lines | 4 x $10^{-4}$ | 4 | 11,000 | Dispense Jet |

# EMS – Custom Formulated Electronic Materials

## What We Do:

- Our EMS sales and technical team works with you to understand the application requirements
- We recommend the best solution from our comprehensive product line or react quickly with custom formulations
- Your products are manufactured and quality tested under ISO/TS 16949
- Our product line is focused on solutions for Printed Electronics fabrication and assembly, and for your exact needs

## How We Do It:

- Seasoned field engineers and a seasoned technical team provide thorough understanding of these applications
- Field application engineering service to work on your production line
- Teamwork and communication between EMS and our customers
- Making sure we build solid relationships with our customers and their manufacturing sites

*EMS Manufacturing and R&D Center in Delaware, Ohio*

## EMS Services:

EMS has a seasoned staff of polymer chemists, formulators and applications engineers to assist with your most difficult application problems.

EMS has a full compliment of laboratory and analytical equipment for developing electronic materials and supporting customers.

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