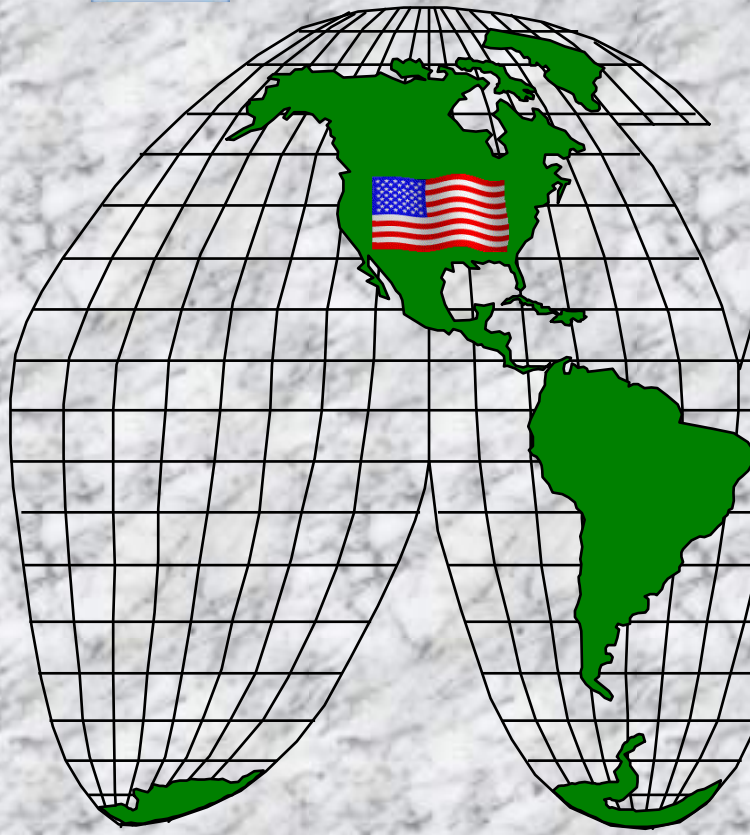
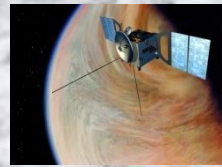
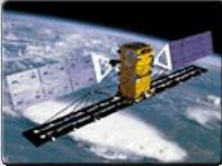




# MICROCOAT TECHNOLOGIES



Prosper, Texas, Cheshire, CT, Cary, NC USA  
<http://www.m-coat.com>



MicroCoat Technologies, a coatings, and adhesives development company was formed in 1996 by Sam Forman a veteran of over 60 years in polymer and thick film materials. He is a Founding and Charter Member, Fellow of the Society and Life Member of IMAPS, and also the recipient of the IMAPS Lifetime Achievement and Daniel C. Hughes awards.

The Company specializes in advanced conductive, non-conductive, and UV cure adhesives and coatings formulations for the electronics, microelectronics, and semiconductor industries that supply products to the Aerospace, Defense, Medical, Opto-electronics, Telecommunications, Down-hole, and also the commercial sector of assemblies. With over 150 combined years of polymer expertise, MicroCoat has developed unquestionably the finest fine-line no-bleed conductive adhesives and "sintered" silver adhesives with a TC of >150W/mK. Our non-conductive sealing adhesives have passed **MSL1** testing for many companies. The Company ships several thousand syringes each month of conductive and non-conductive die attach adhesives, globtop, dam, and fill formulations for semiconductor assemblies and MCM's worldwide. MicroCoat's "B" staged conductive and non-conductive films and liquids are used extensively for both die attach and package sealing.

#### *Epoxy Ring Bleedout Issues Solved*

With substrate real estate shrinking to "I can barely see it" dimensions, die placement very close to active wirebond areas was a major issue as pretty much all available adhesives had epoxy ring runout of as much 300-500um. Wirebonding down from a die or to a die with lines and wire placement as close as 250um is now pretty much standard. MicroCoat Technologies has developed their MiniDot technology with <50um bleed-out for conductive and non-conductive die-attach adhesives as the adhesives of choice for very small die, micro BGA's, MCM, etc. placement/attachment.

Our library of over 3000 UV cure coatings is specifically formulated for the PCB Assembly/SMT, Medical, and Optoelectronics industries. MicroCoat UV cure or UV/Heat cure, globtops, dams, and fills are filled or unfilled. MicroCoat satisfies the most stringent of adhesives requirements.

#### **Contact Information:**

Sales - General:	<a href="mailto:sales@m-coat.com">sales@m-coat.com</a>
Purchasing – General	<a href="mailto:Purchasing@m-coat.com">Purchasing@m-coat.com</a>
Technical Sales;	<a href="mailto:AddisonP@m-coat.com">AddisonP@m-coat.com</a>
	<a href="mailto:KylieG@m-coat.com">KylieG@m-coat.com</a>
Manufacturing;	<a href="mailto:LoganB@m-coat.com">LoganB@m-coat.com</a>
R&D;	<a href="mailto:JoeseephP@m-coat.com">JoeseephP@m-coat.com</a>
Quality;	<a href="mailto:NoahD@m-coat.com">NoahD@m-coat.com</a>
Purchasing;	<a href="mailto:JenniferW@m-coat.com">JenniferW@m-coat.com</a>
Marketing;	<a href="mailto:VanessaJ@m-coat.com">VanessaJ@m-coat.com</a>

#### **Corporate:**

David Martin – VP Operations;	<a href="mailto:DavidM@m-coat.com">DavidM@m-coat.com</a>
Liberta Trimboli - Finance Director;	<a href="mailto:Liberta@m-coat.com">Liberta@m-coat.com</a>
Sam Forman – President/CEO;	<a href="mailto:Sam.Forman@m-coat.com">Sam.Forman@m-coat.com</a>

# MicroCoat Technologies, LLC

Formulating & Packaging  
UV Cure Products  
Cheshire, CT  
6500 Sq. ft.

Formulating & Packaging  
Conductive & Non-conductive  
Research Triangle Park, NC  
12K sq. ft.

Employees:  
~23-28  
1 Ph.D/Sc.D  
2 Ph.D  
1 MS Chem Eng  
3 Ch.E.

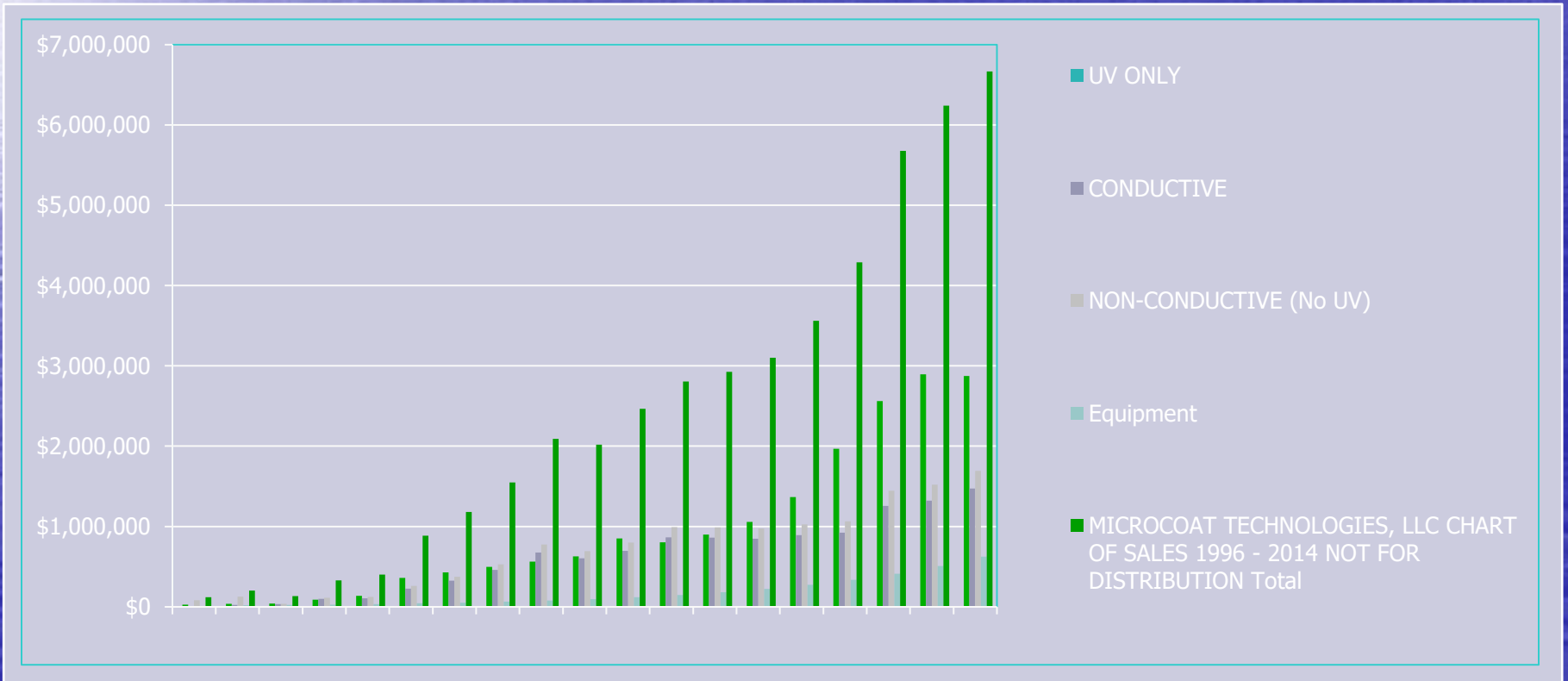
All facilities ISO 9001/2008

R&D & Syringe Filling  
Conductive & Non-Conductive  
Industrial Drive McKinney, TX  
4500 Sq ft

MCT closed 2012 at US\$3.90M and will close 2013 at a realistic target of US\$5.85M

# MicroCoat Technologies 1996 – 2019

## Sales; UV Products, Conductive Adhesives, Non-Conductive Adhesives, Equipment Total Sales

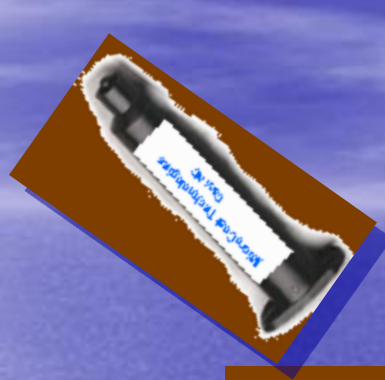


# M-Coat Org Chart



# Just like an old friend, we can do it all

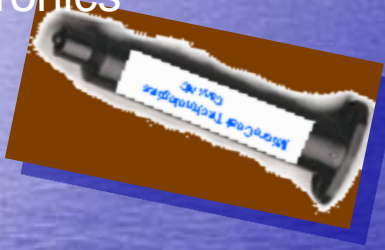
Military



Microelectronics



Electronics



Medical



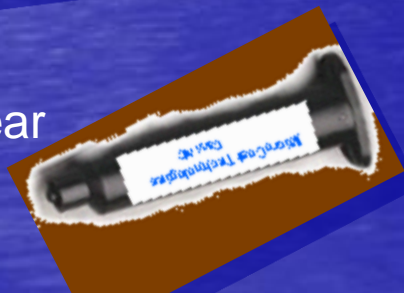
Conductive silvers



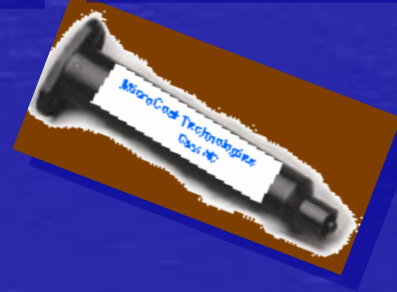
Encapsulants



Optically clear



Conformal coatings



Glass Bonders



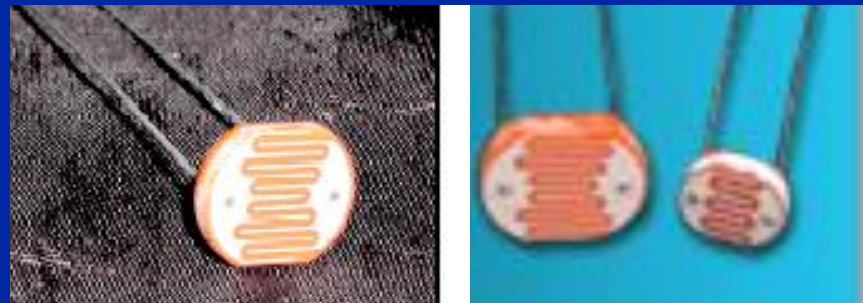
# Optically Clear Glob Tops for IC's, LED's, EPROMS, Etc.

## Without Silicone

- Refractive Index 1.49 - 1.91!!!!!!
- Transmissivity @ 990nm 99%
- R-I 1.9 @ 850 nm
- Operating Temperature Range  
of -55C to +150C

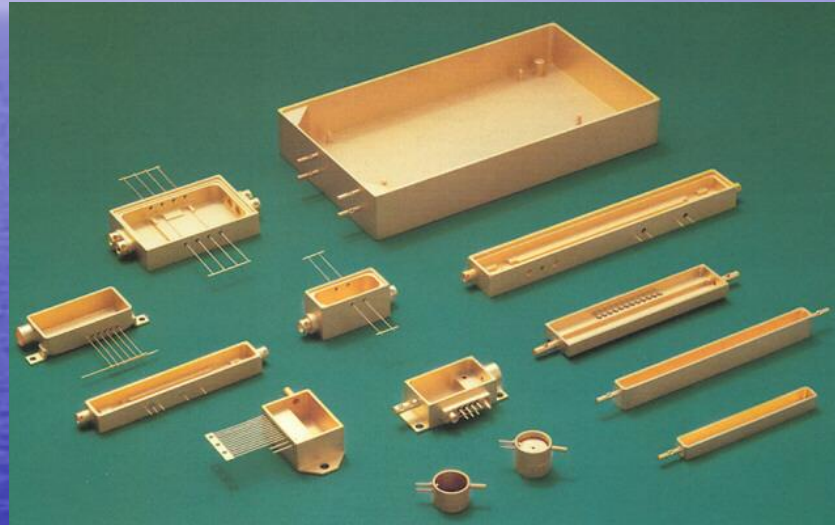
UV Curable in < 20 seconds !

# Optically Clear UV Cured Photo Cell Coatings





# Optically Clear Coatings and Adhesives for;



Picture of Sinclair Manuf. Packages

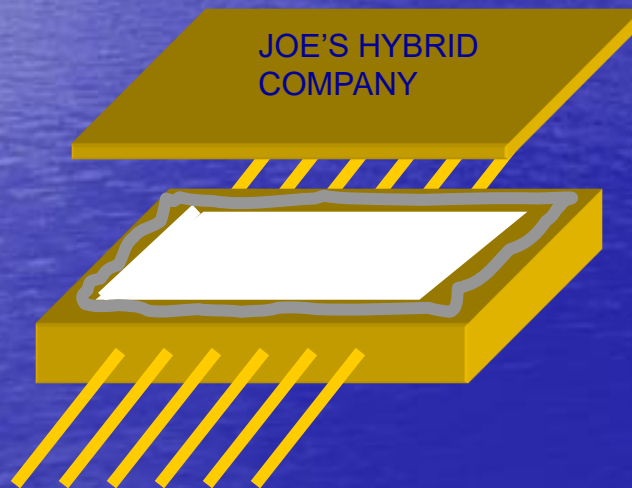
- WADM Modules
- Modulators
- Attenuators
- Pump Lasers
- Switches
- Amplifiers

# Epoxy Sealing of Hybrids and Power Devices

Non-conductive adhesives for lid sealing, die attach, etc.

Passes gross leak, temp cycle, temp shock.

Withstands die attach to >340C



MCT 3417  
Hi Temp Sealing  
Passes 340C Die Attach 5 minutes  
Passes 350 Cycles -65C- +150C  
Passes 85/85  
Passes Gross Leak

# MicroCoat Technologies

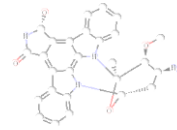
1316 Somerset Drive McKinney, TX 75070 [www.m-coat.com](http://www.m-coat.com) +1-972-678-4950 Fax +1-214-257-8890

*Unparalleled in Polymer Coatings and Adhesives Technology™*



## Product Data Sheet

### MicroCoat 3417-HT3



#### **A Single Component, Toughened, Microelectronic Grade Package Sealant with a Service Temperature of <math>-65^{\circ}\text{C}</math> to Over <math>>340^{\circ}\text{C}</math> and Meets NASA Low Outgassing Specifications**

MicroCoat 3417-HT3 features a unique blend of performance properties including both high shear and peel strengths along with convenient handling and high/low temp properties. This is a one component system formulated to cure at elevated temperatures.

3417-HT3 has a number of outstanding processing advantages;

- No mixing is necessary prior to use
- This material is ***not*** "Pre-mixed and Frozen"
- The viscosity remains constant with time (i.e. it will not thicken over time)
- Working life is unlimited at room temperature, and the material is room temperature storable
- No cleanup required in-between shifts

MicroCoat 3417-HT3 forms high strength bonds for service over the remarkably wide temperature range of <math>-65^{\circ}\text{C}</math> to over <math>300^{\circ}\text{C}</math> and is used for Microelectronic Package Sealing for Kovar/Ceramic, Ceramic/Ceramic, Ceramic/Thick Film Gold, Pd/Au, Pt/Pd/Au, etc sealing. As a toughened system, 3417-HT3 offers superior resistance to impact, thermal shock, vibration and stress fatigue cracking. It is 100% reactive and does not contain any diluents or solvents. Used in several "down-the-hole" environments at >2K meters.

3417-HT3 is remarkably resistant to severe thermal cycling and many chemicals including water, oil, fuels and most organic solvents even upon prolonged exposures. Adhesion to metals, glass, and ceramics is excellent. The cured epoxy is a superior electrical insulator and is colored tan. MicroCoat Polymer System 3417-HT3 high performance coupled with its convenient handling make it widely used in a variety of applications in the aerospace, electronic, microelectronics, electrical, automotive and chemical industries. MicroCoat 3417-HT3 will meet NASA low outgassing specifications. For substrate attach to heatsink a 3 mil minimum bondline is suggested

#### **Product Advantages**

- A single component system; no mixing required prior to use, no viscosity changes over time.
- Room temperature storable; not premixed and frozen!
- Versatile cure schedules.
- High shear and peel strength to similar and dissimilar substrates over the remarkably wide temperature range of <math>-65^{\circ}\text{C}</math> – <math>340^{\circ}\text{C}</math>. (Note: Color changes to slightly amber ><math>300^{\circ}\text{C}</math>)
- Passes Gross Leak – Seal Integrity - Mil-Std-883 Method 5005 Sub Group 3 Mil-Std-883 1014 2) Gross Leak Test
- Passes Gross Leak after 500 cycles <math>-65^{\circ}\text{C}</math> to <math>+150^{\circ}\text{C}</math>
- Good electrical insulating properties and chemical resistance.
- Superior thermal shock, impact and stress cracking fatigue resistance,
- Will meet NASA low outgassing per ASTM E-595, NASA MSFC 1443, Mil-Std-883 5011.4 (3.8.6)
- RoHS Compliant

# Conductive, Non-Conductive, and Thermally Conductive Die Attach Adhesives

In electronics, thermal management is crucial in both the design of circuit-board assemblies and in the production of semiconductor materials. For PC boards a crucial aspect can be the heating or cooling power required to keep a circuit within its specified operating temperature range. In the manufacturing of silicon wafers it is important to maintain a very uniform temperature distribution across the wafer in order to achieve quality production processes and high yields.

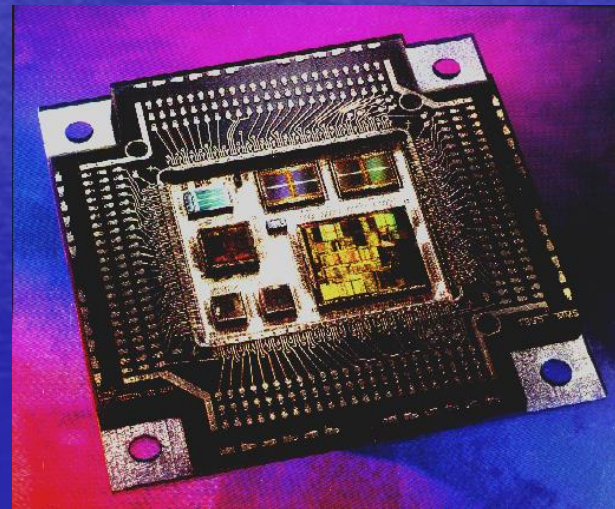
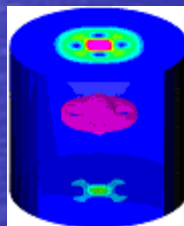
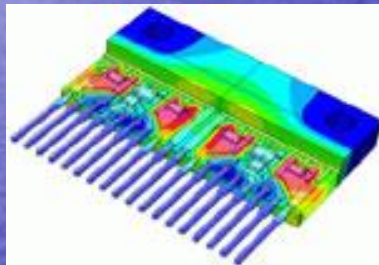
$\text{Al}_2\text{O}_3$

AlN

BoN

Diamond

Ag



# Conductive Adhesives

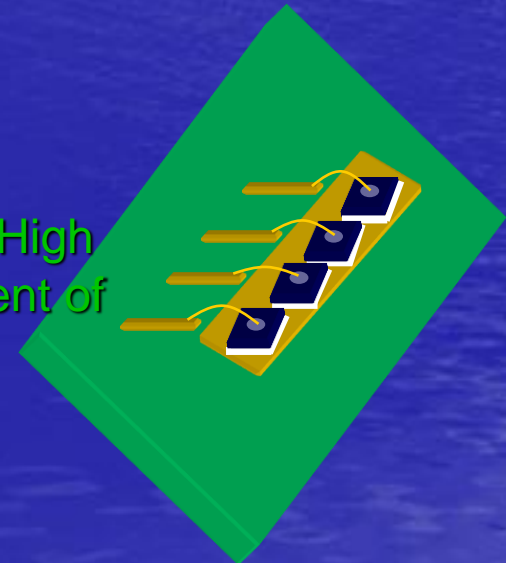
- SMD Attach To PCB and Ceramic
- Screen Printing Traces
- Die Attach
- Solder Replacement
- Flex Silver Traces
- Flex Carbon Traces
- Anti-Static
- Chip Component Termination
- Tantalum Capacitor Termination
- Static Discharge
- Platable For SMD Components
- Quick-Set PCB Repair
- Bio-Sensors
- Silver Spray-On



Low Outgassing Die Attach Adhesives



UV/Heat Cure for High Accuracy Placement of Opto Devices





## ***Conductive Die Attach Adhesive MCT 3715-2SE***

A Military and Medical Microelectronic Devices die attach adhesive, MicroCoat 3715-2SE is a 100% solids one part conductive thermosetting conductive epoxy designed primarily for die attaching large or very small die with mismatched thermal expansions in Military, Medical, "down-the-hole" hybrids, optoelectronics, automotive sensors, etc. A "Sister" formulation to MCT's 2-0404/33 this material is a thixotropic paste which may be applied by stencil printing or syringe. It is 100% solids, and possesses good handling and storage properties. This silver-filled conductive die attach adhesive is designed to bond ICs and components to advanced substrates such as ceramic, PBGAs, CSPs, LCP, and array packages with *virtually no bleed*. Hydrophobic and stable at high temperatures, the adhesive produces a void-free bond line with excellent interfacial adhesion strength to a wide variety of organic and metal surfaces including solder mask, BT, FR4, LCP, polyimide, gold, Kapton and Mylar. This material is formulated to provide high cohesive energy, adhesive strength, *stress absorbing for large die*, and elongation at break.

Short term at >300°C (2-3 minutes for Pb free reflow) if cured at 150°C for 60 minutes



## Conductive Die Attach Adhesive MCT 3715-2SE vs 84-1

<b>Composition Properties</b>	<b>3715</b>	<b>84-1</b>
Filler Contents:	85% Silver	80-83%
Viscosity:	25-35 K cps @ 10 RPM	30K
Thixo Ratio at above viscosity parameters	3.80	4.0
Average Particle Size:	<.70 – 1.25 microns	2.4 – 4.1 microns
<b>Typical Cured Properties<sup>2</sup> at Minimum Bond Line of 32 Microns</b>		
**Volume Resistivity:	<0.00055 Ω-cm	.0005 Ω-cm
**Thermal (Interfacial) Conductivity	2.67 W/mK	1.9-2.2
**T <sub>g</sub> °C	190	103
CTE Below T <sub>g</sub> ppm°C	62	55
Above T <sub>g</sub> ppm°C	160	150
Die Shear Kg (150C 1 hour cure)	>19.7 @ RT	19
Die Shear Kg (150C 1 hour cure)	>14.46 after 200C	
Die Shear Kg (150C 1 hour cure)	>13.86 after 280C	
Shore "D" Hardness	75 – 80	80-85
**Post Cure Ionics 883/5011.3.8.7	Cl <sup>-</sup> =<6ppm, Na <sup>+</sup> =<3.3ppm, K <sup>+</sup> =<1.1ppm	Cl <sup>-</sup> <20, Na <sup>+</sup> <20K <sup>+</sup> <10
<b>Modulus:</b>		
@65C =	5595 MPa	
@25C =	5510 MPa	
@150C =	925 MPa	
@250C =	310 Mpa	
**Bleedout	Never!	Many times
**Re-freeze Syringes	Yes	No
**Tends to settle in Syringe	No	Yes



## MicroCoat 36190 SERIES

**A Single Component, Toughened, Microelectronic Grade non-Conductive Die Attach Adhesive with a Service Temperature of  $<-65^{\circ}\text{C}$  to Over  $>340^{\circ}\text{C}$  and Meets NASA Low Outgassing Specifications**

The 36190 is a die attach adhesive that features a unique blend of high performance properties including both high shear and peel strengths along with convenient handling and high/low temp properties. This is a one component system formulated to cure at elevated temperatures. 36190 has a number of outstanding processing advantages;

No mixing is necessary prior to use

This material is ***not*** "Pre-mixed and Frozen"

The viscosity remains constant with time (i.e. it will not thicken over time)

Working life is unlimited at room temperature, and the material is room temperature storable

No cleanup required in-between shifts

MicroCoat 36190 forms high strength bonds for service over the remarkably wide temperature range of  $<-65^{\circ}\text{C}$  to over  $300^{\circ}\text{C}$  and is used for die attach on virtually any substrate material. As a toughened system, 36190 offers superior resistance to impact, thermal shock, vibration and stress fatigue cracking. It is 100% reactive and does not contain any diluents or solvents and may be used in "down-hole" environments at  $>2\text{K}$  meters.





## ***Conductive Flexible Adhesive 22-102-32***

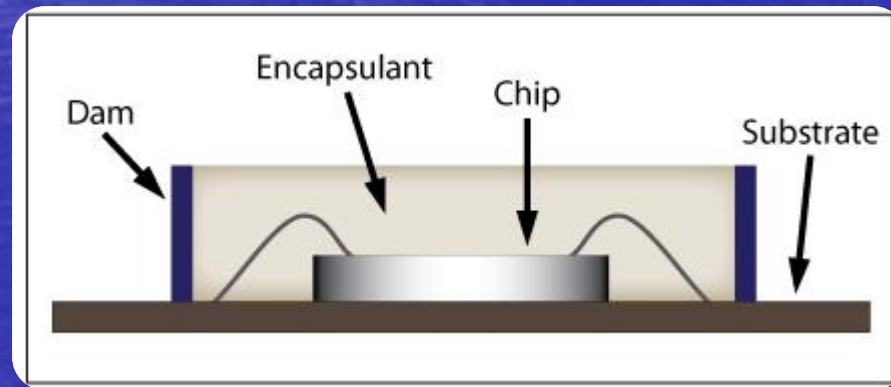
### **FLEXIBLE, HIGH TEMPERATURE, ELECTRICALLY CONDUCTIVE ADHESIVE**

22-102-32 is a flexible, electrically conductive, silicone pressure sensitive adhesive. The overall balance of peel strength, cohesion, lap shear strength and high temperature holding power provides a versatility that makes this product useful in a wide range of fastening and bonding applications. This product is very resistant to flexing and creasing. Some applications for 22-102-32 include, but are not limited to, EMI/RFI shielding of polyimide flexible circuits, polymer thick film circuitry, gaskets, and electrical attachments for stress sensitive devices. 22-102-32 is one of the few conductive adhesives that can bond to silicone substrates and surfaces. In addition, it can be bonded to some types of Teflon® surfaces and clean aluminum and stainless steel as well.

## MCT- GTH5088/94

### A THERMALLY CURED, *NON-FROZEN* EPOXY GLOB TOP DAM FILL FOR SEMICONDUCTOR DEVICES

**DESCRIPTION:** MCT GTH5088/94 is a one component, heat cure, fast curing, low stress, glob top prepared for >45Ghz applications. The material features *exceptional* resistance to thermal cycling and is primarily used for encapsulating of dissimilar materials such as devices on ceramic substrates to LCP, metal, or ceramic packages. The glob top is designed to work from -50C to 185C and will withstand short term high temperature excursions for lead free soldering at 240°C.



- **MCT 341107P**

**A Single Component NON Solvent Bearing, NON Frozen Polyimide Glob Top with a Service Temperature of  $<-65^{\circ}\text{C}$  to Over  $>340^{\circ}\text{C}$  and Meets NASA Low Outgassing Specifications**

MicroCoat MCT 341107P features a unique blend of performance properties including both high shear and peel strengths along with convenient handling and high/low temp properties. This is a one component system formulated to cure at elevated temperatures.

341014HTGT has a number of outstanding processing advantages;

No mixing is necessary prior to use

NO VOC's!

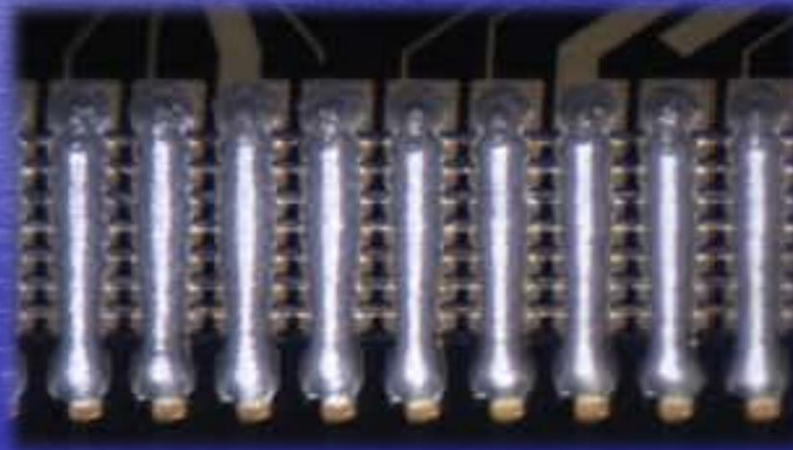
This material is ***not*** "Pre-mixed and Frozen"

The viscosity remains constant with time (i.e. it will not thicken over time)

Working life is unlimited at room temperature, and the material is room temperature storable

No cleanup required in-between shifts

We ARE 3D™



\*Photo courtesy of Vertical Circuits, Inc.



## Application Note:

10, May 2013

### GPD Global Vertical Interconnects with MicroShot Dispensing and MicroCoat Technologies

The push for size reduction is reaching the segment of vertical interconnects. Current technology has a lower limit of approximately 0.150mm (0.006") with pump and materials being the limiting factor. GPD Global through cooperation with MicroCoat Technologies have developed a process to dispense vertical interconnects at line widths from 0.075 to 0.100 mm. A combination of fluid formulation and pump development has resulted in the ability to dispense these line widths.

Dispensing vertically requires precise control of the dispensing tip. Angling the nozzle towards the product ensures strong tacking of the fluid to the stack. Precise alignment of the dispense tip through calibration and vision algorithms ensures consistent results. The resultant lines were 75 to 100 micron in width and were achieved with a 50micron nozzle.

MicroCoat SD0802/31 with ultra-pure formulation and particle size  
Vertically dispensed lines

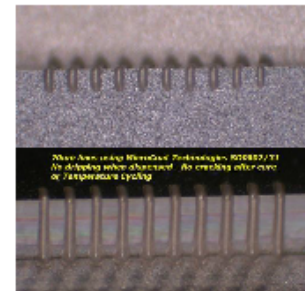
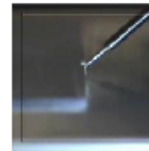
Silicon height –

0.5mm Line

width –

0.85mm

Line Rate – 1,900 lines per hour



Notice the uniformity of line width and uniform starts and ends. GPD Global pump technology eliminates "snake heads" that are common with other technologies.

Dot dispensing is also optimized with exceptional control of small volumes using the same MicroCoat material. Dot sizes of 75micron are achievable. The MicroDot Technologies fluid exhibits exceptional properties that allow the fluid to break cleanly from the nozzle tip. For these small volumes dot rates are in excess of 10,000 dph.



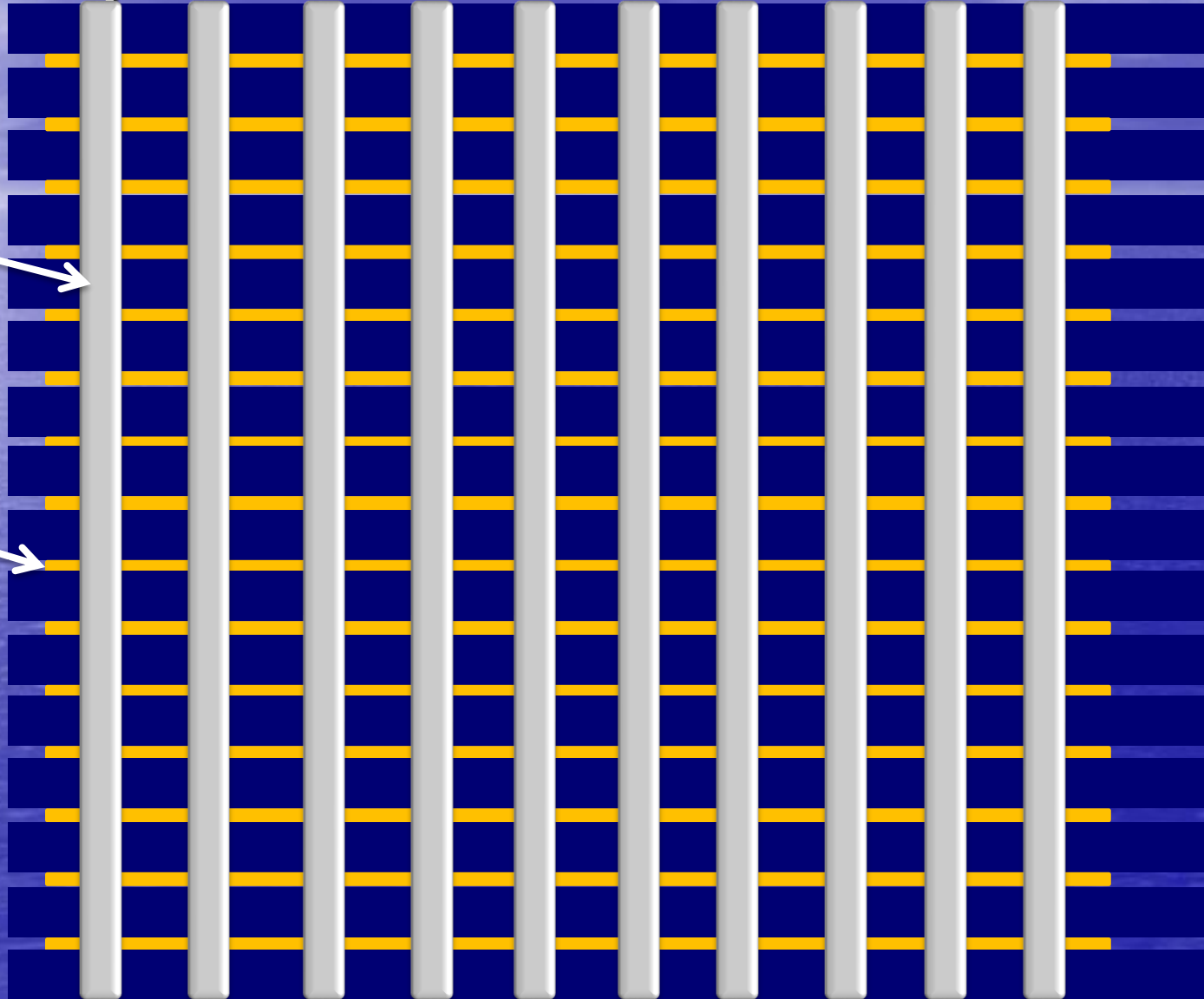
Deposits are formed by filling a metering chamber then evacuating the chamber with a piston of adjustable stroke. Because a chamber is filled and evacuated, the volumetric repeatability is exceptional. The chamber size is controlled by the size of nozzle and metering rod. These two parts are matched to achieve a dot size. Lines are formed by dispensing a series of dots close to each other that will stitch together. A wide range of dot sizes can be achieved by doing multiple shots in one location.

# 16 Layer Stacked Die With SD0802C

MCT SD0802C  
TC = >7.0

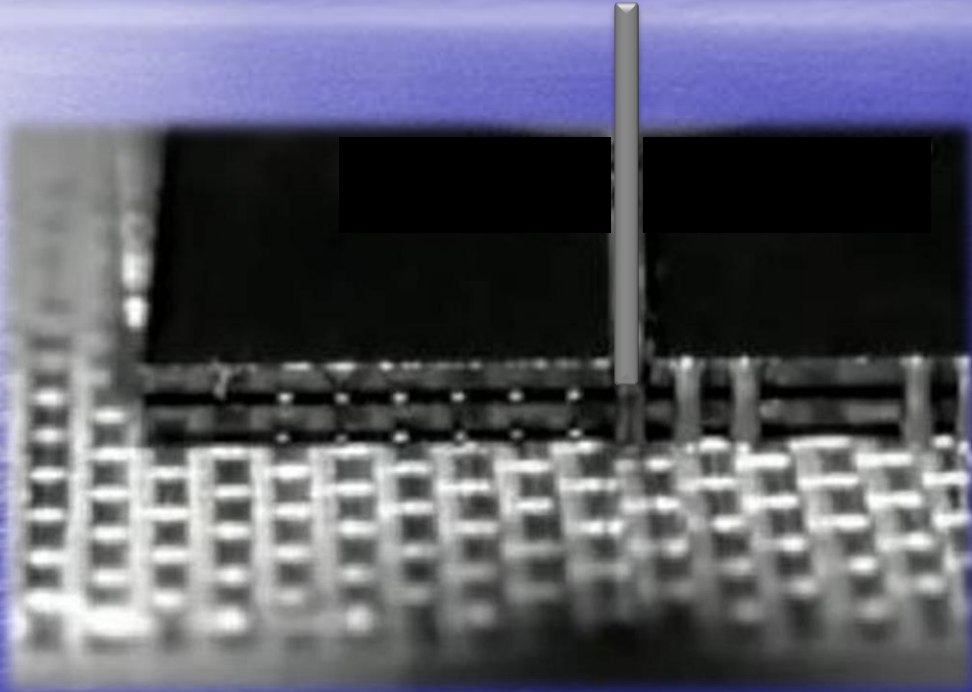


MCT 3417  
Adhesive  
TC = >3.0



# MicroCoat SD0802C

## Dispensing Die Stacking Conductive Adhesive



# MicroCoat Technologies

1316 Somerset Drive McKinney, TX 75070 [www.m-coat.com](http://www.m-coat.com) Tel +1-972-678-4950 Fax +1-214-257-8890

*Unparalleled in Polymer Coatings and Adhesives Technology™*

## PRODUCT DATA SPECIFICATION



### MCT SD0802C A High Performance

#### **Single Component, Refrigerated, High Thermal Conductivity, Very Low Resistivity** **Conductive Epoxy for Inter-Connecting Silicon Stacked Die Layers**

MicroCoat Technologies announces the arrival of their new low resistivity – high thermal conductivity die-stacking interconnect conductive adhesive MCT SD0802C. Many companies that are manufacturing stacked flash devices have gone to very fine line dispensed conductive adhesive instead of wirebonding to make the connections from layer to layer. MCT has developed a magnificent solution. It can be a dispensed bead or using high speed jet dispensing of conductive adhesive, the material can be applied at 50 microns wide with no sag or slump to 16+ flash layers (tested to date) with a 4 day room temperature working life. Besides the cost and space savings compared to wirebonding the conductive paths provide an ground-breaking method for helping to cool the device(s) with the high thermal conductivity of the epoxy acting as cooling fins. *It is shown that a 32MB 3D stacked DRAM cache can reduce the cycles per memory access of a twothreaded RMS benchmark on average by 13% and as much as 55% while increasing the peak temperature by a negligible 0.08°C. Off-die BW and power are also reduced by 66% on average. It is also shown that a 3D floorplan of a high performance microprocessor can simultaneously reduce power 15% and increase performance 15% with a small 14°C increase in peak temperature. Voltage scaling can reach neutral thermals with a simultaneous 34% power reduction and 8% performance improvement. [Bryan Black, et al, Intel Corporation.](#)*

This adhesive is a thixotropic silver filled conductive non-frozen adhesive capable of dispensed line widths of 50 microns. It is 100% solids, and posses' good handling and storage properties. This silver-filled conductive adhesive is designed to bond from IC to IC on Silicon with either gold or aluminum pads. It also bonds ICs and components to advanced substrates such as ceramic, PBGAs, CSPs and array packages with virtually no bleed. Hydrophobic and stable at high temperatures, the adhesive produces a void-free line with excellent interfacial adhesion strength. This material is formulated to provide high cohesive energy, adhesive strength, and elongation at break. Operating temperature range - 55°C – 225°C; Short term to 300°C.

#### **Composition Properties**

Filler Contents:	85% Silver
Viscosity:	20-35 Kcps @ 10 RPM Brookfield HBT CP51 cone and plate.
Thixo Ratio at above viscosity parameters	~1.89 – 2.30
Average Particle Size:	.70 – 1.25 microns

#### **Typical Cured Properties**

Volume Resistivity:	.00015 - .00008mohms (Dispensed)
Thermal Conductivity	7.1-7.9 W/m-K
CTE Alpha 1 ppm/°C	50
CTE Alpha 2 ppm/°C	200
Tg°C	117
Die Shear psi	>8000
Shore "D" Hardness	75 - 80
Post Cure Ionics 883/5011.3.8.7	Cl=<6ppm, Na+=<3.3ppm, K+=<1.1ppm
Teflon Flask 5 gm sample using 20-40 mesh, 50 gm DI H <sub>2</sub> O, 100°C for 24 hours	

#### Modulus:

@65C = 5595 MPa, @25C = 5510 MPa, @150C = 925 MPa, @250C = 310 MPa

**Processing Procedures:** Mixing: The material should be lightly stirred prior to use if used from a jar. Not required if in a syringe

**Application:** The material may be applied by screen printing or syringe dispense

**Curing:** Cure at 150°C for 45 minutes. Optimum conditions will vary depending upon application and will need to be determined experimentally.

**Storage** MicroCoat SD0802C should be stored in sealed containers away from heat or flames. It has a shelf life of 4 days at a storage temperature of 25°C, 3 months at -10°C or 6 months at -40°C. Material **may** be returned to refrigerator/freezer after using partial syringes or jars.

**Packaging:** 3cc, and 10cc syringes **Shipped Unfrozen** next day delivery only

10242011

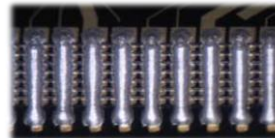
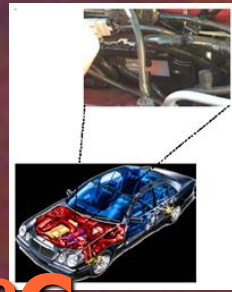


Photo Courtesy Vertical Circuits, Inc.

The information contained herein, is, to the best of our knowledge accurate. However, MicroCoat Technology does not assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of the suitability of any material is the sole responsibility of the user. The information contained herein is considered typical properties and is not intended to be used as specifications for our products. This information is offered solely to assist purchasers in selecting the appropriate products for purchaser's own testing. All products may present unknown risks and should be used with the proper precautions. Although certain hazards are described herein and in the Material Safety Data Sheets, we cannot guarantee that these are the only hazards that exist. Repeated and prolonged exposure to epoxy resins can cause sensitization or other allergic responses.





# SUPER HIGH TEMPERATURE CONDUCTIVE DIE ATTACH ADHESIVE TO $>650^{\circ}\text{C}$

- 85% Ag – NO ORGANICS
- NO Outgassing – NONE!, NADA!, ZIPPOT!, LING!, NULL!, REI!

LAUNCH PAD

DOWN HOLE

**Wirebonded Die**

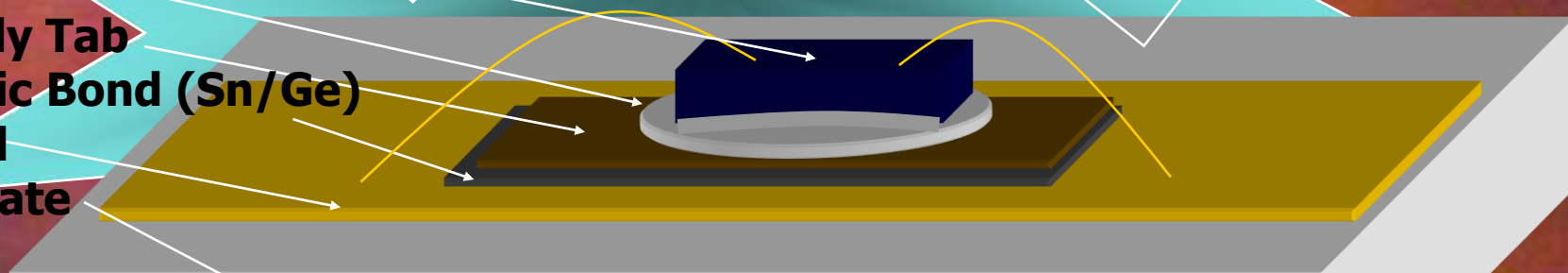
**A795-VHT**

**Ni/Moly Tab**

**Eutectic Bond (Sn/Ge)**

**Au Pad**

**Substrate**



**APPROVED FOR A HARD LANDING ON VENUS!!!!!!!**





## Product Data Sheet

### MCT A795-VHT

**APPROVED FOR A LANDING ON VENUS AT 450°C**

**An Electrically and Thermally Conductive, Silver Filled, Inorganic One-Part Adhesive for Use to >550°C**

**\*\*MAY NOT BE DIRECT BONDED TO GOLD**

- Low Cure Temperature
- \*\*Semiconductor Die Attach with Moly Tab for "Down the Hole Hybrids" or attach to Headers, Ag, Ni, Pd/Ag, Al, etc.
- Silicon die (no gold on back) to power headers
- Ceramic-to-Ceramic Heat Sink Bonding
- Substrate Attach to Nickel Plated Packages

Silver: 80% - 85% ~28 Micron

Viscosity: Thixotropic Paste

Pot Life: NA

**Recommended Cure: 2 Hours Room Temperature Followed by 2 hours at 120C.**

***For Vacuum Sealing Applications:*** ALL moisture is released between 300C-400C. After that there is absolutely no outgassing. Prior to final bake at temperature there are <.01ppm H2O moisture given off. It appears from lab testing that if you cure the product for an additional 2 hours at 150C (after 1-2 hours at 120C) this will eliminate any further moisture release

Temperature Resistance: 1200°F (649°C)

CTE, in/in/°F X 10<sup>-8</sup> (°C) 9.6 (17.3)

Thermal Conductivity,

Btu-in/hr-ft<sup>2</sup>-°F 63.1 (9.14 W/m-K)

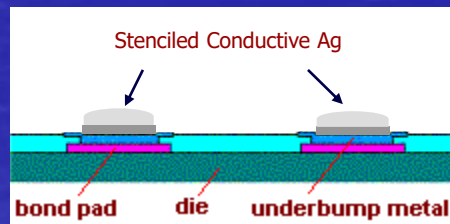
Volume Resistivity (ohms-cm) .0002

032406

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# Flip Chip Bumping Using Conductive Silver

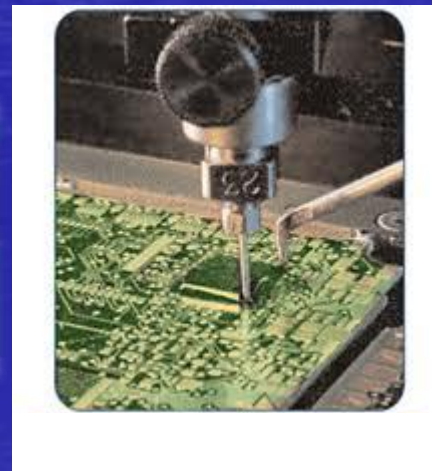
- **Adhesive bumping** is a flip-chip bumping process that stencils electrically conductive adhesive over an under-bump metallization placed over the bond pad. The stenciled adhesive serves as the bump after it has been cured. Mounting of adhesive-bumped flip-chips also uses conductive adhesives.



## MCT 9116-04CUFL

# Extremely Thermally Conductive Flowable Flip Chip & BGA Underfill

MCT-9116-04CUFL is a nitride filled, single component, epoxy compound for BGA and flip chip underfill applications with a TC of  $>2.88\text{W/mK}$ . This product is designed to release entrapped air rapidly during cure resulting in a smooth, pinhole free surface. The viscosity is such that this material will flow nicely under the component and around the solder or conductive epoxy balls. Adhesion to Si, GaAs, GaN, glass, epoxy molded components, is excellent.





Thanks Very Much

Questions?