



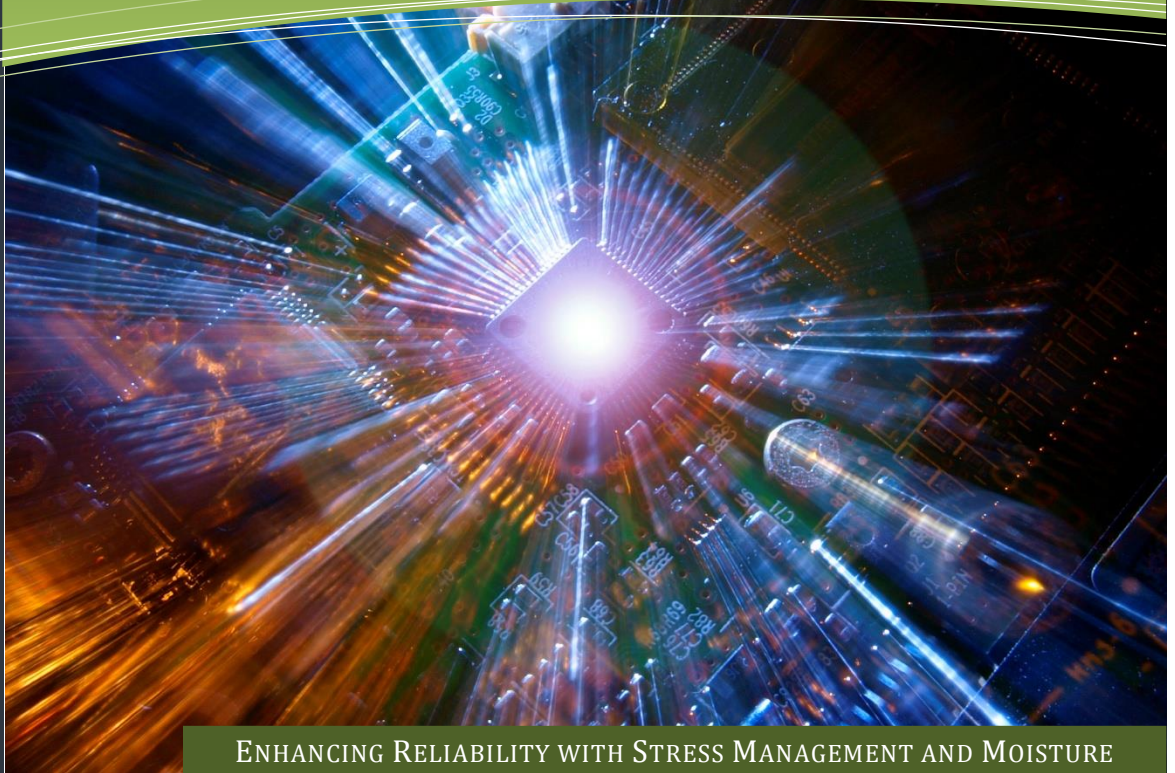
# UNDERFILL, GLOB-TOP, LID-SEAL AND CONFORMAL COATING

FOR  
CHIP, COMPONENT, BOARD AND SYSTEM LEVEL PROTECTION

## Powering Performance for Advanced Electronic Packaging Materials

With over 30 years of experience in inventing and formulating specialty adhesives for electronic applications, AIT is known to provides some of the most unique film and paste adhesives, thermal interface materials, encapsulants and coatings for the electronic protection and performance requiring extreme reliability. This brochure summarized the groups of materials for protecting integrity of electronics with barrier to moisture and related degradation media, provide stress absorption, electrical and mechanical protection.

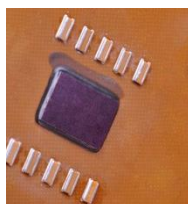
- Underfills and glob-tops that proven to perform at temperatures beyond normal range of 150°C to as high as 300°C
- Lid-seal films and pastes that passes fine and gross leaks for close to hermetic performance
- Conformal coatings that allows electronics to function when submerged in water
- UV-blocking protective coating for electronics, plastics and metals under direct sun exposure



## ENHANCING RELIABILITY WITH STRESS MANAGEMENT AND MOISTURE

What distinguishes AIT's Underfills, Glob-Tops, Lid-Seals and Conformal Coatings are their unparalleled ability in managing stress while providing outstanding moisture barrier. These capabilities are achieved with unconventional polymer engineering and designs. They have been proven for higher performances demanded for the larger devices that processed and used at higher temperatures.

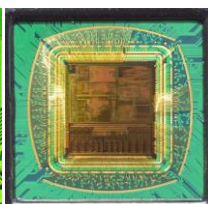
- Underfills and Glob-tops proven for use at high temperature of 200-300°C beyond and besides the traditional 150°C applications.
- Lid-Seals in either B-stageable dispensed paste or preform arrays for heat-lamination applications.
- The proven moisture insensitivity and low moisture absorption afford the possibility to meet up to the level 1 in JEDEC component applications.
- Moisture and salt-fog immune conformal coating for extreme application requirements
- UV-blocking and moisture barrier electronic system coating for long-term usage under direct sun exposure.
- RoHS, REACH and WEEE compliant to meet UL94V-0 rating.



Underfills for High Temperature and Stress Reduction



Glop-Top for Chip-On-Board Extreme Moisture and Stress Management



Lid-Seal with B-Stageable or Preform Epoxies Passing Fine and Gross Leaks



Conformal Coating for Protection Against Moisture and Salt Fog Exposure



UV Blocking Moisture Barrier for Sensitive Electronics



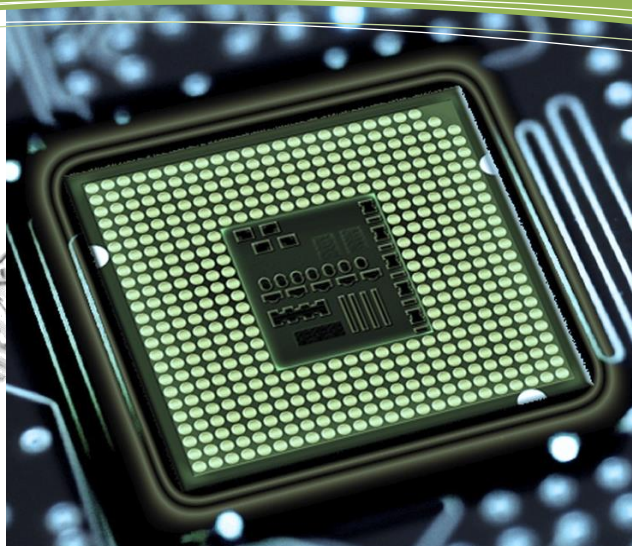
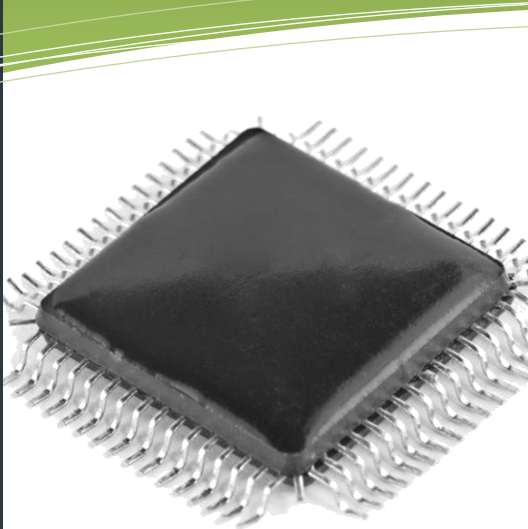
# GLOB-TOP AND LID-SEALS FOR CHIP PROTECTION

## WITH SECOND GENERATION OF MODIFIED EPOXY COMPOUNDS

### LID-SEALING ADHESIVES AND GLOB-TOP ENCAPSULATION WITH PROVEN RECORDS OF LONG-TERM RELIABILITY

Even though AIT lid-sealing adhesives including B-stageable and preform adhesive have been used extensive for cavity package protection for over 20 years, the focus on glob-top encapsulation is more recently with emphasis with the more advanced electronics requiring high temperature and thermal dissipation requirements. Some of the unique performances include the following:

- All of the proven lid-sealing film adhesives are available in B-stageable film-forming paste format that can be dispensed onto the lids.
- Some of the Lid-Seal adhesives have been proven to pass both the fine leak and gross leak testing
- AIT glob-top encapsulants have ultra-high Tg of 175-240°C to suit the lead-free soldering processing
- All of the AIT glob-top encapsulants also provides additional thermal dissipation capability besides mechanical protection and moisture barrier.



ELECTRO-MECHANICAL AND MOISTURE PROTECTION

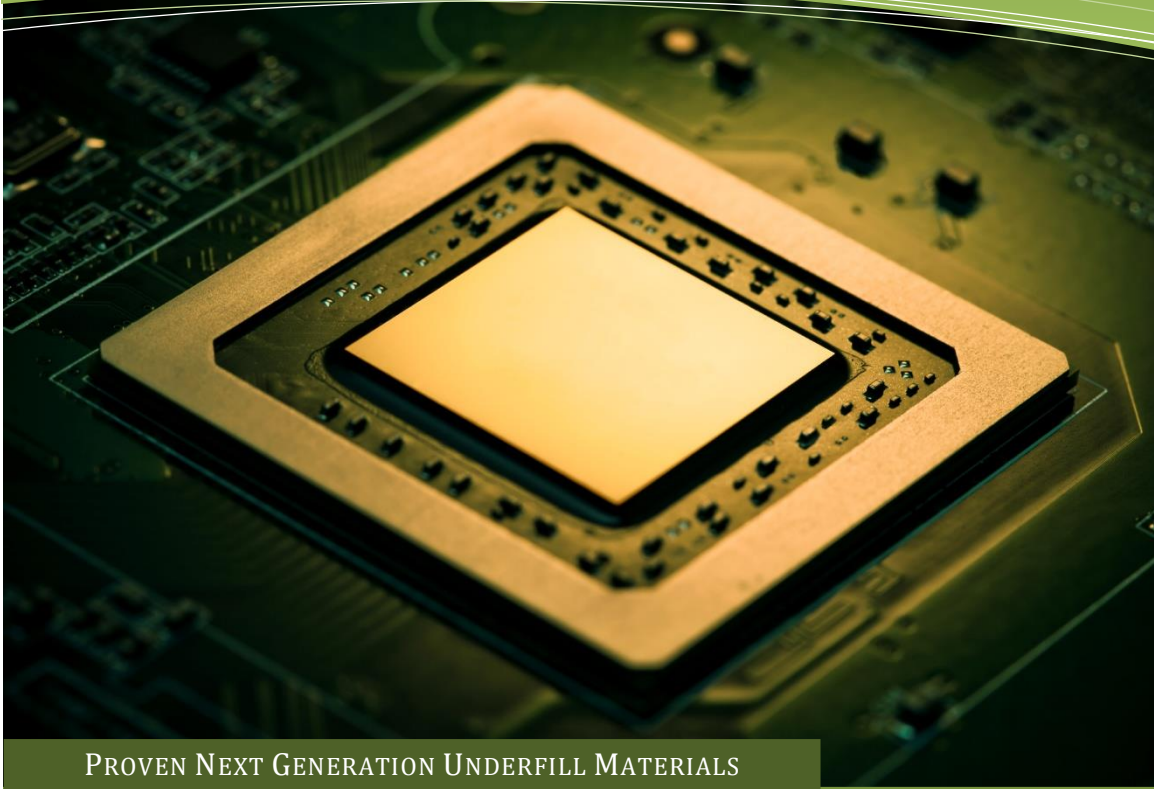
### Properties of Lid-Seal Adhesives and Glob-Top Encapsulants

PROPERTY	MC7865-GT (Glob-Top Encapsulant)	MC7685-GTS (Glob-Top Encapsulant)	LESP7670-HF (ESP7670-HF) (Lid-Sealing)	LRTK7660-HF (RTK7660-HF) (Lid-Sealing)
<b>Electrical Resistivity</b>	>2X10 <sup>14</sup> Ω-cm	>2X10 <sup>14</sup> Ω-cm	>5X10 <sup>14</sup> Ω-cm	>2X10 <sup>15</sup> Ω-cm
<b>Viscosity @5.0 rpm /Thixotropic Index</b>	60,000 cps/2.5	60,000 cps/2.5	65,000 cps/4.0	65,000 cps/4.0
<b>Material Form Factors</b>	Syringe and Frozen Storage	Syringe and Frozen Storage	B-Stageable at 50- 70°C to dry preform	B-Stageable at 50- 70°C to tacky preform
<b>Customizable Parameters</b>	Viscosity and Thixotropic Index	Viscosity and Thixotropic Index	Conductive and/or Thermally Conductive	Conductive and/or Thermally Conductive
<b>Glass Transition Tg (°C)</b>	240	175	130	165
<b>Device Push-off Strength (psi)</b>	>3500	>4000	>3000	>4000
<b>Hardness (Type)</b>	~ 90D	~ 90D	~ 90D	~ 85D
<b>Cured Density of Conductive Adhesive Portion (gm/cc)</b>	2.5	2.5	1.6	1.6
<b>Thermal Conductivity</b>	> 2.0 W/m-°K	> 1.8 W/m-°K	> 0.20 W/m-°K	> 0.20 W/m-°K
<b>Thermal Expansion Coefficient (ppm/°C)</b>	18 (X-Y=Z, Isotropic)	19 (X-Y=Z, Isotropic)	35 (X-Y=Z, Isotropic)	35 (X-Y=Z, Isotropic)
<b>Maximum Continuous Operation Temperature (°C)</b>	> 250	> 200	150	150
<b>Decomposition Temperature @5% weight loss (°C)</b>	>450	>450	>450	>450
<b>Recommended Curing Temperature/Time (°C/min.)</b>	>125/60	>125/120	>150/30	>150/30



# NEW GENERATION OF ULTRA HIGH Tg UNDERFILL

WITH GLASS TRANSITION OF OVER 240°C FOR ULTIMATE FLIP-CHIP AND COMPONENT STRESS MANAGEMENT



## Liquid Underfills with Ultra-high Glass

### Transition (Tg):

- This modified cyanate ester underfill cures to ultra-high glass transition while engineered still to provide stress relief.
- Outstanding thermal conductivity and low thermal resistance affords ease of thermal dissipation from powerful chip to both side of the package.
- Proven for the most stringent civilian and military applications

## High Melt-Flow Film

### Underfill for FOW:

- Outstanding flow and wetting for flow-over-wire stack-chip applications
- Ability to cure at lower temperature for stress reduction
- Ideal for large area module to device enclosure

## High Melt-Flow Preform Film Underfills:

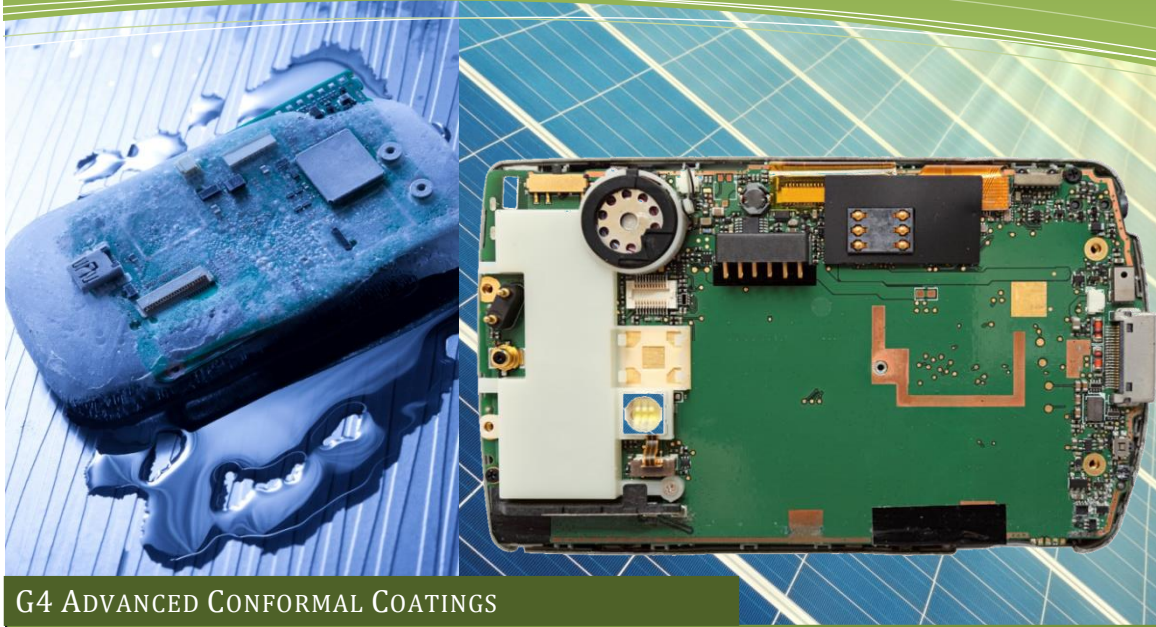
- Preform with specific thickness to accommodate the flip-chip or ball-grid of parts with preformed holes to allow the film adhesive to flow around during reflow process.

## Underfill Liquids and Film Adhesives

FUNCTION	AIT PART#	THERMAL, ELECTRICAL, & other RELEVANT PROPERTIES
Stress and Thermal Management	MC7866-UF	<ul style="list-style-type: none"><li>• Tg ~240°C to ensure minimal stress during lead-free soldering</li><li>• Low curing temperature and low CTE to achieve lower stresses</li><li>• Outstanding thermal conductivity and low interface resistance</li></ul>
Stress and Thermal Management	MC7863-UF	<ul style="list-style-type: none"><li>• Tg ~240°C to ensure minimal stress during lead-free soldering</li><li>• Low curing temperature to achieve lower stresses</li><li>• Lowest CTE for internal stress reduction</li></ul>
Stress Management	MC7686-UF	<ul style="list-style-type: none"><li>• Tg ~220°C to ensure minimal stress during lead-free soldering</li><li>• Low curing temperature and low CTE to achieve lower stresses</li><li>• Outstanding thermal conductivity and low interface resistance</li></ul>
Flow-Over-Wire Underfill Film Adhesive	ESP7660-FOW	<ul style="list-style-type: none"><li>• Tg ~175°C to ensure minimal stress during reflow soldering</li><li>• High flow at low curing temperature of 100-150°C to achieve lower internal stresses</li><li>• High flow at minimal pressure of less than 2 psi for flow-over-wire for stack-chip encapsulation and bonding</li></ul>
Flow-Over-Wire Underfill Film Adhesive	CXP7860-FOW	<ul style="list-style-type: none"><li>• Tg ~240°C to ensure minimal stress during reflow soldering</li><li>• High flow at low curing temperature of 100-150°C to achieve lower internal stresses</li><li>• High flow at minimal pressure of less than 2 psi for flow-over-wire for stack-chip encapsulation and bonding</li></ul>
Preform Underfill for Thermal and Stress Management	CXP7686-UF	<ul style="list-style-type: none"><li>• Tg ~220°C to ensure minimal stress during reflow soldering</li><li>• High flow at minimal pressure of less than 2 psi for flow-over-wire for stack-chip at low curing temperature of 100-150°C to achieve lower internal stresses</li><li>• Outstanding thermal conductivity and low thermal interface resistance</li></ul>
Preform Underfill for Thermal and Stress Management	ESP7666-FOW	<ul style="list-style-type: none"><li>• Tg ~175°C to ensure minimal stress during reflow soldering</li><li>• High flow at minimal pressure of less than 2 psi for flow-over-wire for stack-chip at low curing temperature of 100-150°C to achieve lower internal stresses</li><li>• Outstanding thermal conductivity and low thermal interface resistance</li></ul>

# CONFORMAL AND UV-BLOCKING COATINGS

WITH ENGINEERED MOLECULAR STRUCTURE FOR PROVEN PERFORMANCE



G4 ADVANCED CONFORMAL COATINGS

AI Technology, Inc. (AIT) offers one of the most comprehensive lines of advanced materials for packaging from chip to board levels:

- Die attach film and dicing die-attach film adhesive for chip stacking and high power devices
- Die-Attach films and pastes for extreme high temperatures, extreme stress management requirements and extreme high power applications
- Thermal interface materials including greases, gels, adhesive, patented compressible phase-change pads, high compressibility and conforming "gum-pads".
- EMI/RFI mitigation material solutions with Conductive caulks and adhesives
- Advanced flexible and Insulated Metal Circuit Substrates for camber-free modules
- Insulated metal substrate for high temperature and high power modules

AIT has an ISO9001:2000 certified manufacturing and R&D facility on a 16-acre campus in Princeton Junction, NJ.

## Conformal Coatings and UV Protection Coatings

FUNCTION	AIT PART#	Moisture, Water, Electrical other Relevant Properties
Conformal Coating for PWB	CC7090-E	<ul style="list-style-type: none"><li>• Conforms to properties in IPC-CC-830, IPC-TM-650, MIL-I-46058, ASTM-D-1005, UL 94</li><li>• Brush and spray coating for applications below 90°C</li></ul>
Higher Temperature Conformal Coating	CC7130-E	<ul style="list-style-type: none"><li>• Designed to also conform to NASA-STD-8739.1</li><li>• Brush and spray coating for applications below 130°C</li></ul>
Transparent UV Blocking Coating	SC7130-UVB	<ul style="list-style-type: none"><li>• Optically transparent but UV blocking coating</li><li>• Outstanding protection for moisture, salt-fog and UV for exposed plastics and protecting metals from tarnishing and rust</li></ul>
Non-Transparent UV Blocking Coating	SC7133-"X"	<ul style="list-style-type: none"><li>• Optically opaque and UV blocking coating with "X" colors</li><li>• Outstanding protection for moisture, salt-fog and UV for exposed plastics and protecting metals from tarnishing and rust</li></ul>
Transparent UV Transparent Coating	SC7130	<ul style="list-style-type: none"><li>• Optically transparent and UV blocking coating</li><li>• Outstanding protection for moisture, salt-fog and UV for exposed plastics and protecting metals from tarnishing and rust</li></ul>

## About AI Technology, Inc. in Chip to Board Protection

Since pioneering the use of flexible epoxy technology for electronic packaging in 1985, for more than 28 years, AI Technology (AIT) has been one of the leading forces in developing advanced materials and adhesive solutions for electronic interconnection and packaging.

AIT has not participated in the areas of flip-chip underfill or glob-top or conformal coating actively up till recently. AIT has taken up the challenges in the development of modified epoxies and modified cyanate esters for the new generation of chip and component level packaging that must withstand the lead-free soldering.

In successfully developed patented solar applicable materials and solutions (US8,394,650 and others pending), AIT is now bringing its proven technologies for electronic board level and system level protection against moisture, salt-fog, water immersion and UV block and UV transparent protective coatings.