ATROX® 590-4HT1

Electrically and Thermally Conductive Die Attach Adhesion

DESCRIPTION

ATROX 590-4HT1 is a low stress thermosetting conductive die attach with high thermal conductivity designed for high power semiconductors and exposed pad semiconductor packages. **ATROX 590-4HT1** die attach has excellent adhesive strength to Cu, NiPdAu lead-frames and solder-mask surfaces. **ATROX 590-4HT1** has low out gassing which minimizes oven contamination and is ideal for excellent MSL performance.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

TYPICAL PROPERTIES

Material Properties	Method	Value	Remarks
A. Uncured			
Chemical type		Thermosetting	
Color	Visual	Grey	
Viscosity at 25 °C at 0.5 RPM	ASTM D2196-99	~47,000 cps	Brookfield Spindle 51
Viscosity at 25 °C at 5.0 RPM	ASTM D2196-99	~ 10,500 cps	Brookfield Spindle 51
Thixotropic index (0.5 RPM/5.0 RPM)	ASTM D2196-99	4.5	Brookfield Spindle 51
Pot Life @ 23 °C (Elapsed time for 25% increase in viscosity)	ISO 10364:1993	>24 hours	Brookfield Spindle 51
Storage Temperature		-40 °C	
Shelf Life @ -40 (°C/°F)		6 months	
B. Cured			
Glass Transition (Tan δ Max)	DMA	132 °C	
Modulus at 25 ºC	DMA	3.5 GPa	
Modulus at 260 ºC	DMA	0.48 GPa	

Material Properties	Method	Value	Remarks
CTE 1 (below Tg)	TMA	21 ppm	
CTE 2 (below Tg)	TMA	147 ppm	
Thermal Conductivity: Bulk	Laser Flash	20.8 W/mK	
Volume Resistivity	4-Point Probe	0.00008 Ohm-cm	
Bond Joint Resistance	nVoltmeter	0.0004 Ohms/0.5in^2	
% Moisture Absorption	72 hrs. @ 85%RH/85 °C	0.29%	
Thermal Stability at 300 °C	TGA of cured sample- Ramp to 450 °C	0.07 %	
TGA Weight Loss during Cure	TGA (175 °C/1hour)	0.8 %	

DIE SHEAR STRENGTH (1.8 mm x 2.5 mm)

A. Bare Si Die (1.8 mm x 2.5 mm)

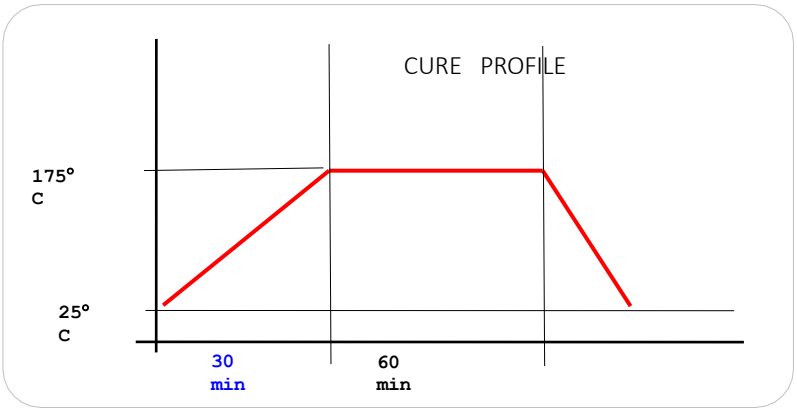
Lead Frame	Cure Condition	Measuring Temperature	Value
PPF	175 °C/4hr	260 °C	2.0 Kg
PPF	175 °C/4hr + 24 hr. PCT	260 °C	1.7 Kg
Cu	175 °C/4hr	260 °C	1.9 Kg
Cu	175 °C/4hr + 24 hr PCT	260 °C	1.7 Kg
Solder-mask	175 °C/4hr	260 °C	>3 Kg
Solder-mask	175 °C/4hr + 24 hr PCT	260 °C	>3 Kg

MATERIAL APPLICATION

ATROX 590-4HT1 is formulated to be applied using a time pressure pump equipped on most die bonders. The material should be consistently dispensed over time. Equipment settings need to be optimized for desired material deposition response based on model and configuration.

CURE

ATROX 590-4HT1 cures in ~60 minutes at 175 °C. For box oven cure, it is recommended that the cure schedule includes at ramp at 5 to 10 °C and a controlled cooling cycle to minimize thermal stresses. Depending on thermal mass of application cure times may vary and should be optimized by the end user.



CLEAN-UP

Uncured material may be cleaned from dispenser components and surfaces with a variety of solvents, including IPA, acetone, MEK, methylene chloride, etc. Always wash and dry thoroughly prior to re-use of the dispenser components. The cleaning technique should be active cleaning of the components – flush, wash or wipe, followed by a drying step to ensure a clean, dry surface. Do not soak since this can solubilize the hardener within the uncured resin and curing (very difficult to remove). Contact your equipment supplier to ensure the solvent is compatible with their components. Clean and maintain dispense valves as recommended by the equipment manufacturer.

PACKAGING SIZES

ATROX 590-4HT1 is available in 5 or 10 cc EFD or Musashi syringes.

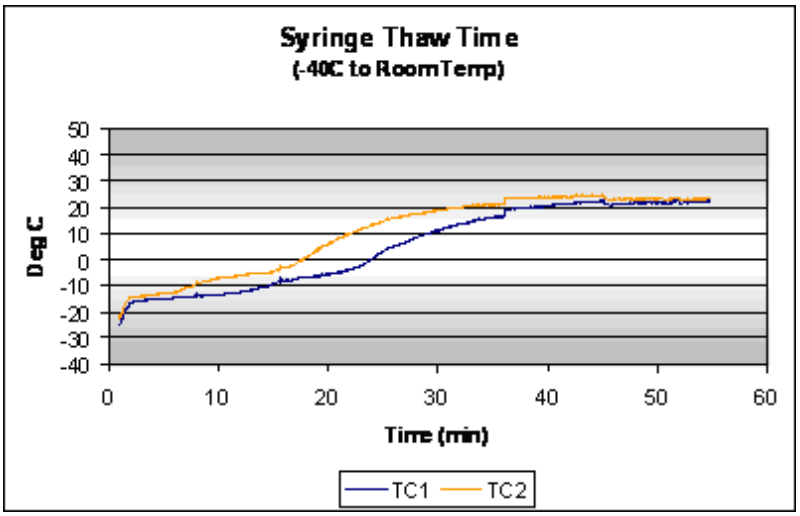
SAFETY & WARNING

It is recommended that the company/operator read and review the Safety Data Sheets for the appropriate health and safety warnings before use. **Safety Data Sheets are available.**

SHIPPING & STORAGE

Material is normally shipped in insulated boxes using dry ice to ensure that the ATROX 590-4HT1 maintains all its properties. On receipt, it must be ensured that dry-ice remnants are present in the insulated shipping box. If there is no dry ice, or if the material is not cold, then please contact MacDermid Alpha Electronics Solutions immediately. Exposing to elevated temperatures during shipment and storage will compromise on the performance aspect of the material adversely.

It is recommended to store the syringes of material at -40 °C for a maximum shelf life of 6 months. It is recommended that the material be allowed to thaw before usage. Typical thawing times for 5cc and 10cc syringes are presented in chart below. Remove the syringe from freezer and set aside, allowing it to thaw at room temperature, until it reaches room temperature (90 minutes maximum for 30cc syringe). To prevent contamination of unused product, do not return any material to its original container



CONTACT INFORMATION

To confirm this document is the most recent version, please contact techinfo@MacDermidAlpha.com

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Also read carefully warning and safety information on the Safety Data Sheet. This data sheet contains technical information required for safe and economical operation of this product. READ IT THOROUGHLY PRIOR TO PRODUCT USE. Emergency safety directory assistance: US 1 202 464 2554, Europe + 44 1235 239 670, Asia + 65 3158 1074, Brazil 0800 707 7022 and 0800 172 020, Mexico 01800 002 1400 and (55) 5559 1588