Technical Data Sheet

LOCTITE® ABLESTIK 84-1LMISR4

November 2019

PRODUCT DESCRIPTION

LOCTITE® ABLESTIK 84-1LMISR4 provides the following product characteristics:

Technology	Epoxy
Appearance	Silver
Cure	Heat cure
pH	6.0
Product Benefits	• Conductive • Box oven cure • Excellent dispensability, minimal tailing and stringing
Application	Die attach

LOCTITE® ABLESTIK 84-1LMISR4 electrically conductive die attach adhesive has been formulated for use in high throughput, automated die attach equipment. The rheology of LOCTITE® ABLESTIK 84-1LMISR4 adhesive allows minimum adhesive dispense and die put down dwell times, without tailing or stringing problems.

The unique combination of adhesive properties makes this material one of the most widely used die attach materials in the semiconductor industry.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Thixotropic Index (0.5/5 rpm)	5.6
Viscosity, Brookfield CP51, 25 °C, mPa·s (cP):	
Speed 5 rpm	8,000
Work Life @ 25°C, Physical worklife by % filler, hours	18
Shelf Life @ -40°C (from date of manufacture), days	365
Flash Point - See SDS	

TYPICAL CURING PERFORMANCE

Cure Schedule

1 hour @ 175°C

Alternate Cure Schedule

3 to 5 minute ramp to 175°C + 1 hour @ 175°C [1]

Weight Loss

10 x 10 mm Si die on glass slide, %	5.3

[1]The ramp was observed to yield reduced bondline voiding and increased strength.

The above cure profiles are guideline recommendations. Cure conditions (time and temperature) may vary based on customers' experience and specific application requirements, as well as customer curing equipment, oven loading and actual oven temperatures.

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Glass Transition Temperature, TMA penetration, °C		120
Coefficient of Thermal Expansion, TMA expansion:		
Below Tg, ppm/°C		40
Above Tg, ppm/°C		150
Thermal Conductivity @ 121ºC, C-matic Conductance Tester, W/(m-K)		2.5
Tensile Modulus, DMTA :		
@ -65°C	N/mm² (psi)	4,400 (640,000)
@ 25 °C	N/mm² (psi)	3,900 (570,000)
@ 150 °C	N/mm² (psi)	2,000 (290,000)
@ 250 °C	N/mm² (psi)	300 (44,000)
Extractable Ionic Content @ 100°C, :		
Chloride (Cl-)		<20
Sodium (Na+)		<10
Potassium (K+)		<10
Water Extract Conductivity, mS/m		≤2.0
Weight Loss @ 300ºC, TGA, %		0.35
Moisture Absorption @ Saturation, wt.%, @ 85ºC/85% RH		0.6

Electrical Properties

Volume Resistivity, ohms-cm	≤0.0002

TYPICAL PERFORMANCE OF CURED MATERIAL

Shear Strength

Lap Shear Strength	N/mm² (psi)	7.0 (995)
Die Shear Strength:		
2 X 2 mm (80 x 80 mil) Si die on Ag/Cu LF, Kg:		
@ 25°C		≥8.0
@ 150°C		≥2.8
3 X 3 mm (120 x 120 mil) Si die:		
Post Cure:		
On Ag/Cu LF, kg-f/die:		
@ 25°C		21
@ 200°C		2.9
@ 250 °C		1.7
On Bare Cu LF, kg-f/die:		
@ 25°C		11
@ 200°C		2.6
@ 250 °C		1.4

On Pd/Ni/Cu LF, kg-f/die:	
@ 25°C	27
@ 200°C	2.4
@ 250 °C	2.0
After 85ºC/85% RH exposure for 168 hours:	
On Ag/Cu LF, kg-f/die:	
@ 25°C	12
@ 200°C	1.8
On Bare Cu LF, kg-f/die:	
@ 25°C	10
@ 200°C	2.5
On Pd/Ni/Cu LF, kg-f/die:	
@ 25°C	23
@ 200°C	1.8

Miscellaneous

Chip Warpage vs Post Cure Thermal Process:	
0.38 mm thick Si die on 0.2 mm thick Ag/Cu LF:	
7.6 x 7.6 mm chip size, µm	19
10.2 x 10.2 mm chip size, µm	32
12.7 x 12.7 mm (500 x 500 mil) chip size, µm	51

Chip Warpage vs Post Cure Thermal Process:	
3 x 3 mm (120 x 120 mil) Si die:	
Post Cure, µm:	
On Ag/Cu LF	20
On Bare Cu LF	22
+ Wirebond (1minute @ 250°C):	
On Ag/Cu LF	29
On Bare Cu LF	30
+ Post Mold Bake (4hours @ 175°C):	
On Ag/Cu LF	28
On Bare Cu LF	28

TYPICAL ENVIRONMENTAL RESISTANCE

Outgassing Properties

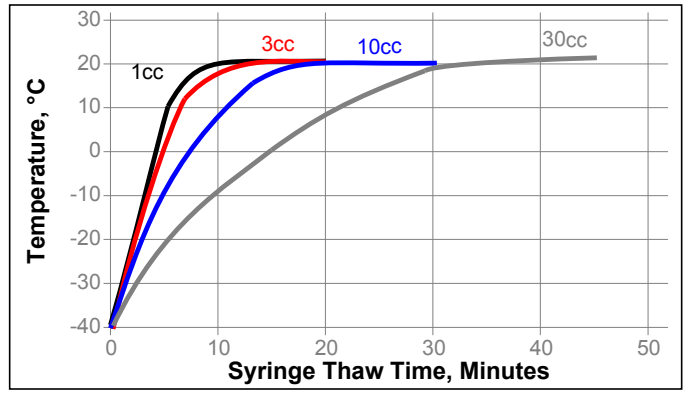
Outgassing , NASA Outgassing:	
TML, %	0.36
CVCM, %	<0.01
WVR, %	0.11

GENERAL INFORMATION

For safe handling information on this product, consult the Safety Data Sheet, (SDS).

THAWING:

1. Allow container to reach room temperature before use.
2. After removing from the freezer, set the syringes to stand vertically while thawing.
3. DO NOT open the container before contents reach 25°C temperature. Any moisture that collects on the thawed container should be removed prior to opening the container.
4. DO NOT re-freeze. Once thawed to 25°C, the adhesive should not be re-frozen.



DIRECTIONS FOR USE

1. Thawed material should immediately be placed on dispense equipment for use.
2. If the adhesive is transferred to a final dispensing reservoir, care must be exercised to avoid entrapment of contaminants and/or air into the adhesive.
3. Adhesive must be completely used within the product's recommended work life of 18 hours.
4. Silver-resin separation may occur if the adhesive is left out at room temperature, beyond the recommended work life.
5. Apply enough adhesive to achieve a 25 to 50 µm wet bondline thickness, dispensed with approximately 25 to 50 % filleting on all sides of the die.
6. Alternate dispense amounts may be used depending on the application requirements.
7. Star or crossed shaped dispense patterns will yield fewer bondline voids than the matrix style of dispense pattern.

Not for product specifications

The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on specifications for this product.

Storage

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

Optimal Storage: -40 °C. Storage below minus (-)40 °C or greater than minus (-)40 °C can adversely affect product properties.

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Henkel Representative.

Conversions

(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
N x 0.225 = lb/F
N/mm x 5.71 = lb/in
psi x 145 = N/mm²
MPa = N/mm²
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

Disclaimer

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Reference N/A