



E1428

June 2010

PRODUCT DESCRIPTION

E1428 provides the following product characteristics:

Technology	Epoxy
Appearance	Black
Cure	Heat cure
Product Benefits	• Fast flow • Low temperature cure • Excellent adhesion • Reworkable • Improved moisture resistance • Passes Surface Insulation Resistance (SIR) test
Application	Underfill
Filler Type	Silica
Typical Assembly Applications	BGA, Chip scale packages and Solder Mask

E1428 underfill material is ideal for high volume assembly processes. It is designed to improve adhesion strength of devices during mechanical stress testing while not degrading the thermal cycle performance.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Viscosity @ 200 s⁻¹, TP-400, cP 700

Flow Rate @ 50°C, seconds:

@ 19 mm travel, 200µm gap 20

@ 10 mm travel, 200µm gap 8

Work Life @ 25°C, days >3

Shelf Life @ 3°C, months 6

Flash Point - See MSDS

TYPICAL CURING PERFORMANCE

Cure Schedule

30 minute ramp to 110°C + 10 minutes @ 110°C

Alternative Cure Schedule 1

30 minute ramp to 120°C + 5 minutes @ 120°C

Alternative Cure Schedule 2

30 minute ramp to 125°C + 3 minutes @ 125°C

To ensure optimal performance, it is recommended not to cure this product at temperatures at or above 160°C.

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

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:

Coefficient of Thermal Expansion TMA:

Below Tg, ppm/°C	64
Above Tg, ppm/°C	200

Glass Transition Temperature, Tan Δ Max, °C 87

Storage Modulus, DMA, MPa 2,300

Moisture Absorption @ Saturation, wt.%,
60°C/95% RH exposure for 72 hours 2.0

TYPICAL PERFORMANCE OF CURED MATERIAL

Reliability Performance:

Thermal shock and drop test performed using an 8-layered PCB, 12x12 mm CTBGA-228, 0.5 mm pitch daisy chained component.

Thermal Shock, cycles >1,000
1 followed by LLTS -40 to 125°C,
10 minute cycle

Drop Test (Improvement over board with no Underfill) >5x
1,500g @ 1msec pulse duration

Surface Insulation Resistance (SIR) Testing, Pass/Fail Pass
3 weeks/500 hrs testing, 45°C/95% RH, 24volts

GENERAL INFORMATION

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

DIRECTIONS FOR USE

1. E1428 flows under the area array device by capillary action.
2. While it is not essential, the underfill area should be cleaned of contaminants and obstructions to optimize the speed and quality of the underfill
3. E1428 flows best if the assembly is preheated at 50°C
4. Dispense a bead of the underfill using a syringe fitted with the appropriate gauge needle for the application on one (line) or two sides (L-shape) of the device perimeter.
5. Syringe tip heating is not needed, but can be used
6. Very large devices may require multiple beads of underfill, but for most no second or 'fillet pass' is required
7. Because of its low viscosity and outstanding wetting characteristics, E1428 is designed to 'self-fillet' the opposite sides of the device



Rework Procedure

1. E1428 is capable of being reworked by both contact and non-contact rework methods.
2. Remove the component from the substrate by using local application of heat onto the component.
3. The recommended heat profile is identical to the profile used during initial assembly.
4. Once the solder has reached temperatures above its reflow temperatures, lift the component off by using a slight twisting motion.
5. The site should be cleaned, removing any excess underfill and solder remaining on the PCB site.
6. Use appropriate flux remover or solvent.
7. The preferred method is with a non-contact rework machine which minimizes potential damage to the PCB and soldermask.
8. Total time required for component removal is about 5 to 7 minutes.

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.

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 Technical Service Center or Customer Service Representative.

Conversions

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$
 $\text{kV/mm} \times 25.4 = \text{V/mil}$
 $\text{mm} / 25.4 = \text{inches}$
 $\text{N} \times 0.225 = \text{lb}$
 $\text{N/mm} \times 5.71 = \text{lb/in}$
 $\text{N/mm}^2 \times 145 = \text{psi}$
 $\text{MPa} \times 145 = \text{psi}$
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$
 $\text{mPa}\cdot\text{s} = \text{cP}$

Note

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Reference 0.2