

DELO-MONOPOX® MK055

Heat-curing adhesive for electronics

Base

- modified epoxy resin
- one-part, heat curing, solvent-free, not filled

Use

- for fast, high-strength bonding of electronic and miniature components
- especially suitable as no-flow-underfiller for flip chip with Pd- and stud bumps for smart label and smart card
- fast curing at moderate temperatures
- high reliability at the test +85 °C / 85 % relative humidity by the low water absorption
- very good adhesion on PET, FR 4, PBT, LCP, PA, copper, aluminium and silver et al.
- high glass transition temperature (+146 °C)
- minimal extractable ionic content, chloride, fluoride, sodium and potassium, each < 10 ppm
- meets the requirements of the thermal vacuum outgassing test for the screening of space materials according to ECSS Q-70-02

Processing

- the adhesive is ready-for-use on delivery, processing time at room temperature is 2 weeks
- the adhesive will be applied through dispensing or stencil printing
- the process steps when used as no-flow-underfiller are as follows:
 1. Application of adhesive to the substrate. It must be ensured that the adhesive layer has no bubbles.
 2. Placing the semiconductor into the adhesive.
 3. At a temperature of +150 to +210 °C at the adhesive, press the semiconductor with a thermode and a defined pressure.
 4. By specifically high demands, a post-curing of 2 min at +140 °C is recommended.
- the surface areas which are to be bonded must be dry, free of dust and grease as well as of other contaminants

Curing

- using a thermode: the curing process needs e. g. 6 to 19 seconds at +150 to +210 °C at the adhesive
- higher temperatures decrease, lower temperatures prolong the curing process and may possibly change the properties of the cured product
- the minimum curing temperature is +90 °C
- the actual curing times at respective temperatures are dependent on the time it takes to heat-up the joint parts, the heating time of the components must be added to the curing time of the adhesive
- for curing times at recommended temperatures, see the technical data

Technical data

Color cured	beige
Density [g/cm ³] at room temperature (approx. 23 °C)	1.2
Viscosity [mPas] at 23 °C, rheometer, shear stress 100 Pa	40000
pressing time [s] at 200 °C adhesive temperature	6
compression/shear strength ABS/ABS [MPa] standard DELO 5 curing: 1 h at +100 °C	12
compression/shear strength LCP/LCP [MPa] standard DELO 5 curing: 1 h at +100 °C	13
compression/shear strength PA/PA [MPa] standard DELO 5 curing: 1 h at +100 °C	24
compression/shear strength PBT/PBT [MPa] standard DELO 5 curing: 1 h at +100 °C	12
compression/shear strength PC/PC [MPa] standard DELO 5 curing: 1 h at +100 °C	7
tensile strength [MPa] DIN EN ISO 527	50
elongation at tear [%] DIN EN ISO 527	1.2
Young modulus [MPa] DIN EN ISO 527	3200
glass transition temperature [°C] rheometer	146
coefficient of elongation [ppm/K] in a temperature range of +30 to +100 °C	64
coefficient of elongation [ppm/K] in a temperature range of +130 to +160 °C	186
water absorption [weight %] corresponding to DIN EN ISO 62, 24 h at room temperature (approx. 23 °C)	0.3
Recommended long-term temperature range of use [°C]	-40 to +150
temperature resistance [°C]	+200
Short-term temperature of use [°C]	+180
ion content Na+ [ppm] extraction	< 10
ion content K+ [ppm] extraction	< 10
ion content Cl- [ppm] extraction	< 10

ion content F- [ppm] extraction	< 10
specific heat capacity [J/gK]	1.85
thermal conductivity [W/m·K] laser flash method	0.21
Specific volume resistance [Ω cm] VDE 0303, part 3	3.6xE16
surface resistance [Ω] VDE 0303, part 3	9.3xE13
Dielectric strength [kV/mm] DIN IEC 60243-1 at 50 Hz	14.0
Dielectric constant RF-IV method, 1 MHz	3.3
Dielectric constant RF-IV method, 10 MHz	3.3
Dielectric constant RF-IV method, 100 MHz	3.2
Dielectric constant RF-IV method, 1 GHz	3.1
Storage life at room temperature (approx. 23 °C) in unopened original container	2 weeks
storage life at $\leq +8$ °C in unopened original container	6 months

Instructions and advice

General

The data and information provided are based on tests performed under laboratory conditions. Reliable information about the behaviour of the product under practical conditions and its suitability for a specific purpose cannot be concluded from this.

It is the user's responsibility to test the suitability of the product for the intended purpose by considering all specific requirements. Type and physical and chemical properties of the materials to be processed with the product, as well as all actual influences occurring during transport, storage, processing and use, may cause deviations in the behaviour of the product compared to its behaviour under laboratory conditions. All data provided are typical average values or uniquely determined parameters measured under laboratory conditions.

The data and information provided are therefore no guarantee for specific product properties or the suitability of the product for a specific purpose.

Instructions for use

The instruction for use is available under following address: www.DELO.de. If requested we will also be pleased to send it to you.

Occupational health and safety

see material safety data sheet

Specification

see quality assurance test report