

### **DELOMONOPOX® MK055**

Heat-curing adhesive for electronics

#### **Base**

- modified epoxy resin
- one-component, heat-curing, solvent-free, unfilled

#### **Use**

- for the fast, high-strength bonding of electronic and miniature components
- especially suitable as no-flow-underfiller for flip-chips with Pd and stud bumps for the smart card and smart label sector
- fast curing at moderate temperatures
- the storage temperature may not fall below -21 °C
- low water absorption and, therefore, high reliability in the test +85 °C / 85 % relative humidity
- very good adhesion to PET, FR4, PBT, LCP, PA, copper, aluminum, silver, etc.
- high glass transition temperature (+146 °C)
- minimal extractable ionic content; chloride, fluoride, sodium and potassium, < 10 ppm each
- the cured product is normally used in a temperature range of -40 °C to +150 °C; depending on the application, other limits may be more reasonable
- meets the requirements of the thermal vacuum outgassing test for the screening of space materials according to ECSS Q-70-02
- compliant with RoHS directive 2015/863/EU
- halogen-free according to IEC 61249-2-21
- 

#### **Processing**

- the adhesive is supplied ready for use, in case of cool or refrigerated storage, it must be ensured that the container is conditioned to room temperature before use
- the containers are conditioned at room temperature (max. +25 °C); the conditioning time is approx. 0.5 h for containers up to 10 ml, approx. 1 h for containers up to 50 ml and approx. 2 h for containers up to 310 ml; additional heat addition is not allowed
- the adhesive is applied by dispensing, jetting or stencil- and screen printing
- dosing valves and product leading parts have to be cleaned deeply immediately after usage of the adhesive
- the surfaces to be bonded must be dry as well as free of dust, grease and other contaminations
- use DELOTHEN cleaners for the cleaning of bonding surfaces

## **Curing**

- curing proceeds, e. g., at temperatures between +150 and +210 °C at the adhesive in 6 to 19 seconds using a thermode
- increased temperatures shorten the curing process, lower temperatures extend it, and can change the properties of the cured product
- the minimal curing temperature is +90 °C
- the actual curing times at the respective temperatures are dependent on the heating time of the components, the heating time of the components must be added to the curing time of the adhesive
- the curing times of the adhesive at the curing temperatures recommended can be drawn from the technical data

## **Technical data**

<i>Color</i>	beige
Density [g/cm <sup>3</sup> ] at room temperature (approx. 23 °C)	1.2
<i>Viscosity</i> [mPas] at 23 °C, rheometer, shear rate 10 1/s	23000
Pressing time [s] at 200 °C adhesive temperature	6
Curing time with air convection oven [min] at +120 °C adhesive temperature	12
<i>Compression shear strength Al/Al</i> [MPa] DELO Standard 5 curing: 30 min at +130 °C	35
Compression shear strength ABS/ABS [MPa] DELO Standard 5 curing: 1 h at +100 °C	12
Compression shear strength LCP/LCP [MPa] DELO Standard 5 curing: 1 h at +100 °C	13
Compression shear strength PA/PA [MPa] DELO Standard 5 curing: 1 h at +100 °C	24
Compression shear strength PBT/PBT [MPa] DELO Standard 5 curing: 1 h at +100 °C	12
Compression shear strength PC/PC [MPa] DELO Standard 5 curing: 1 h at +100 °C	7
Tensile strength [MPa] according to DIN EN ISO 527	50
Elongation at tear [%] according to DIN EN ISO 527	1.2
Young's modulus [MPa] according to DIN EN ISO 527	3200
Glass transition temperature [°C] rheometer	146
Coefficient of linear expansion [ppm/K] in a temperature range of +30 to +100 °C	64

Coefficient of linear expansion [ppm/K] in a temperature range of +130 to +160 °C	186
Water absorption [weight %] according to DIN EN ISO 62, 24 h at room temperature (approx. 23 °C)	0.3
Shrinkage [%] DELO Standard 13	1.8
<i>Ion content Na+</i> [ppm] extraction	<10
<i>Ion content K+</i> [ppm] extraction	<10
<i>Ion content Cl-</i> [ppm] extraction	<10
<i>Ion content F-</i> [ppm] extraction	<10
Specific heat capacity [J/gK]	1.85
Thermal conductivity [W/m·K] laser flash method	0.21
Specific volume resistance [ $\Omega$ cm] VDE 0303, part 3	>1xE13
Surface resistance [ $\Omega$ ] VDE 0303, part 3	>1xE13
Dielectric strength [kV/mm] DIN IEC 60243-1 at 50 Hz	14
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 (max. 25 °C) in unopened original container	2 weeks
Storage life at 0 °C to +10 °C in unopened original container	4 months
storage life at -18 °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 behavior of the product under practical conditions and its suitability for a specific purpose cannot be concluded from this. It is the customer'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 behavior of the product compared to its behavior under laboratory conditions. The data and information provided are therefore no guarantee for specific product properties or the suitability of the product for the intended purpose.

Nothing contained herein shall be construed to indicate the non-existence of any relevant patents or to constitute a permission, encouragement or recommendation to practice any development covered by any patents, without permission of the owner of this patent.

All products provided by DELO are subject to DELOs' General Terms of Business. Verbal side agreements are not permitted. This document is subject to change.

### **Instructions for use**

The instructions for use of DELOMONOPOX are available on: [www.DELO.de](http://www.DELO.de). We will be pleased to send them to you on demand.

### **Occupational health and safety**

see material safety data sheet

### **Specification**

The properties in italics are part of the specification. Ranges with clear limits are defined for them and others, where applicable. In the course of the QA test, each batch is tested for these properties and the maintenance of the limits is ensured. The measuring methods used can deviate from those specified in the data sheet. Details can be found in the QA test report.