

### **DELO® KATIOBOND® 4670**

UV-curing encapsulant for Smart-Card technology, fill for Dam&Fill

#### **Base**

- modified epoxy resin
- one-component, solvent-free, UV-curing

#### **Use**

- encapsulation of chip modules in the Dam&Fill method as Fill compound. We recommend DELO KATIOBOND DF698 as Dam compound forming a homogeneous unit with DELO KATIOBOND 4670
- especially suitable for smart card technology, e. g., phone or health insurance cards
- the Dam&Fill system DELO KATIOBOND 4670 / DF698 has become globally accepted as a standard system in the field of UV-curing encapsulation compounds for smart card modules
- the system enables extremely short cycle times and, therefore, an increase in productivity and a decrease in production costs
- is highly tension-equalizing and, therefore, has a favorable effect in case of bending stress
- for many years this system has proven to be highly reliable
- low corrosion potential due to high ion purity
- positively tested according to UL 94 HB
- 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 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. 6 h for containers up to 1,000 ml; additional heat addition is not allowed
- filler sedimentation is possible
- store in a cool place (0 °C to +10 °C) and homogenize during conditioning by tumbling at 1 - 2 rpm before use
- the maximal processing time in the system is 24 h; then, tumbling must be repeated; tumbling time at room temperature (max. 25 °C): 3 h at 1 - 2 rpm
- an integrated agitator can be used in case of processing from pressure tanks
- a variation of the flow properties is possible by a dispensing valve heating
- for further information please refer to our brochure "Smart Card"

#### **Curing**

- curing with UVA light in a recommended wavelength range of 320 - 400 nm
- high initial strength after irradiation; therefore, complete protective function
- after irradiation curing until final strength within 24 h at room temperature
- increased temperatures accelerate the reaction, lower temperature decelerate it
- increased intensities shorten the required irradiation time, lower intensities prolong it

## **Curing parameters**

- dependent on the layer thickness of the encapsulation compound, lamp type and irradiation intensity

## **Technical data**

<i>Color</i> cured in a layer thickness of approx. 0.1 mm	transparent
<i>Color</i> cured in a layer thickness of approx. 0.5 mm	light gray translucent
<i>Color</i> cured in a layer thickness of approx. 2 mm	light gray translucent
Filler content [weight %]	43
Filler particle size [ $\mu\text{m}$ ] d 98	$\leq 32$
Density [ $\text{g}/\text{cm}^3$ ] DELO Standard 13 at room temperature (approx. 23 °C)	1.4
<i>Viscosity</i> [mPas] at 23 °C, Brookfield spindle/rpm 4/5	4800
Minimal irradiation time [s] DELO Standard 37, DSC UVA intensity: 55 - 60 mW/cm <sup>2</sup> DELOLUXcontrol, at 30 °C	9
Recommended irradiation time [s] UVA-intensity: 55 - 60 mW/cm <sup>2</sup> DELOLUXcontrol	60
Recommended irradiation time [s] LED 365 nm, intensity: 150 - 160 mW/cm <sup>2</sup> DELOLUXcontrol; at approx. 70 °C	30
Curing time until final strength [h] at room temperature (approx. 23 °C) after irradiation	24
<i>Compression shear strength glass/glass</i> [MPa] DELO Standard 5 UVA intensity: 55 - 60 mW/cm <sup>2</sup> , DELOLUXcontrol, irradiation time: 60 s curing time: 24 h at room temperature (approx. 23 °C)	35
<i>Compression shear strength glass/Al</i> [MPa] DELO Standard 5 UVA intensity: 55 - 60 mW/cm <sup>2</sup> , DELOLUXcontrol, irradiation time: 60 s curing time: 24 h at room temperature (approx. 23 °C)	10
<i>Compression shear strength glass/FR4</i> [MPa] DELO Standard 5 UVA intensity: 55 - 60 mW/cm <sup>2</sup> , DELOLUXcontrol, irradiation time: 60 s curing time: 24 h at room temperature (approx. 23 °C)	35
Tensile strength [MPa] DIN EN ISO 527	30
Elongation at tear [%] DIN EN ISO 527	6
Young's modulus [MPa] DIN EN ISO 527	1700
<i>Shore hardness D</i> according to DIN EN ISO 868	79
Decomposition temperature [°C] DELO Standard 36	280

<b>Glass transition temperature [°C]</b> rheometer	62
<b>Coefficient of linear expansion [ppm/K]</b> TMA, in a temperature range of +30 to +150 °C	150
<b>Water absorption [weight %]</b> according to DIN EN ISO 62, 24 h at room temperature (approx. 23 °C)	0.19
<b>Shrinkage [vol. %]</b> DELO Standard 13	3
<b>Thermal conductivity [W/(m·K)]</b> flash method standardised by ASTM E 1461 at 25 °C; layer thickness: 0.5 mm	0.40
<b>Specific heat capacity [J/gK]</b> flash method standardised by ASTM E 1461 at 25 °C	1.27
<b>Ion content Na+ [ppm]</b> extraction	<10
<b>Ion content K+ [ppm]</b> extraction	<10
<b>Ion content Cl- [ppm]</b> extraction	<10
<b>Ion content F- [ppm]</b> extraction	<100
<b>Specific volume resistance [Ωcm]</b> VDE 0303, part 3	>1xE13
<b>Surface resistance [Ω]</b> VDE 0303, part 3	>1xE13
<b>Dielectric constant</b> RF-IV method, 1 MHz, at 25 °C +/- 3 °C	3.3
<b>Dielectric constant</b> RF-IV method, 10 MHz, at 25 °C +/- 3 °C	3.3
<b>Dielectric constant</b> RF-IV method, 100 MHz, at 25 °C +/- 3 °C	3.2
<b>Dielectric constant</b> RF-IV method, 1 GHz, at 25 °C +/- 3 °C	3
<b>Creep resistance CTI</b> VDE 0303, part 1, IEC 112	600 M
<b>Storage life at 0 °C to +10 °C</b> 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 a product for the intended purpose by considering all specific requirements and by applying standards the customer deems suitable (e. g. DIN 2304-1). Type, 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. 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.

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 DELO's General Terms of Business. Verbal ancillary agreements are deemed not to exist.

### **Instructions for use**

The instructions for use of DELO KATIOBOND 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.