

## Instructions for Use & General Information on the Product Group

### DELO® KATIOBOND®

Preactivated, UV-/light-curing  
and UV-curing epoxy resin adhesives



### Areas of use

DELO KATIOBOND adhesives are predominantly used in semiconductor packaging, microelectronics, electrical engineering, optoelectronics, organic electronics, automotive and hard disk drives for bonding, coating, fixing, casting and sealing.

They are characterized by the possibility of preactivation, low outgassing, dry surface, high reliability, chemical and temperature resistance.

The suitability and strength of the adhesive are to be verified on original components under application-specific conditions.

### Preparation of the components to be bonded

For optimal bond strength, the surfaces to be bonded must be free of humidity, oil, grease, separating agents and other contaminations. We recommend cleaning agents of the DELOTHEN series for cleaning. The Technical Information "Cleaning Agents" provides more details.

When using aqueous cleaners with alkaline properties, these must be removed from the bonding surfaces after cleaning through appropriate rinsing cycles.

When using alkaline cleaning agents, a neutralization of the surface must be ensured. Alkaline surfaces can inhibit adhesive curing, resulting in poor or even no establishment of adhesion at all. In addition to wet-chemical cleaning, adhesion can be further improved by

a suitable chemical and physical surface pretreatment. You can find further information in the technical information "Surface Pretreatment".

It is advantageous to preheat the two components for reducing condensation or surface humidity. Furthermore, a warm surface can improve establishment of adhesion to the surface, and therefore reduce the time until functional strength is achieved.

## **Preparation of the adhesive**

The products are usually supplied ready for use.

In case of cool storage, the containers must be conditioned to room temperature before use to prevent condensation during adhesive application. Heat addition is not permitted. The conditioning times depend on the container size and the storage time.

DELO KATIOBOND adhesives, which tend to sedimentation (see Technical Data Sheet), must be homogenized in the container before use.

You can find detailed, product-specific information on adhesive preparation in the specific Technical Data Sheet.

## **Processing**

After conditioning to room temperature and maybe homogenization, the products can be directly applied from the container or via dispensing units.

We recommend using dispensing valves and product-bearing elements made of inert and totally opaque material. Suitable materials include PE, HDPE, PP, PTFE and stainless steel. PE, HDPE, PP, PTFE and stainless steel. Other materials require compatibility assessment. We do not recommend using polyurethanes, polyamides and non-ferrous metals.

All parts in contact with the product must be cleaned thoroughly with e.g. isopropanol or acetone. Suitable cleaning agents for removing DELO KATIOBOND residues can be found in the Technical Information "Cleaning Agents".

We recommend dispensing from the original container. When exchanging the container, the adhesive must not be exposed to scattered light as this triggers polymerization. If adhesive must be refilled due to system-related circumstances, it must be ensured that the adhesive does not get contaminated by foreign substances or humidity.

In addition, the adhesive must be completely protected against light in the specific spectrum relevant for curing. It is recommended that the adhesive is refilled under dark room conditions or that light is kept out by using appropriate filter foils.

DELO KATIOBOND adhesives are intended to be used at temperatures between +18 °C and +25 °C and a relative air humidity between 20 % to 65 % (normal room climate). So far there are no known negative effects during processing under these conditions. So far, the products could be processed very well under laboratory conditions and no impairment of the processing properties could be recognized.

Detailed information about how to handle the products can be found in the specific Technical Data Sheet.

## Curing of the adhesive

Curing is initiated by exposure to light in the suitable wavelength range with sufficient intensity for a sufficient period of time. Afterwards, the adhesive cures until final strength at room temperature without further irradiation.

The light intensity is one parameter important for curing. As the intensity decreases over the lifetime of the light source or can be impaired by other factors (e.g. contamination of the lamp), the intensity must be checked at regular intervals and readjusted when necessary.

Curing of the adhesive layer is also influenced by environmental conditions, such as temperature and humidity. When designing bonding processes, seasonal fluctuations of the room climate must be considered and should be evaluated in the qualification phase, particularly when bonding humidity-absorbing component (e.g. polyamide).

Post-crosslinking can normally be achieved through subsequent heat input. This changes the physical parameters, and can have a positive effect on the achievable strength and reliability of bonds. The same effect can also be achieved through preheating of components or heat input during curing.

Depending on the application, the user can choose from two handling sequences for DELO KATIOBOND products:

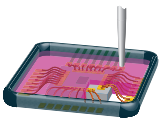
- Direct irradiation of the adhesive until initial strength
- Preactivation of the adhesive followed by joining

### Direct irradiation of the adhesive until initial strength

The adhesive is directly irradiated in case of open bonding, coating, sealing, casting, or when bonding and sealing opaque components. Curing can only be completed if the entire adhesive volume is reached by light of the corresponding wavelength with sufficient intensity.

### Open bonding, coating, sealing or casting

1. Preparation of the adhesive and the components
2. Adhesive application
3. Curing with the appropriate light spectrum



*Adhesive application*

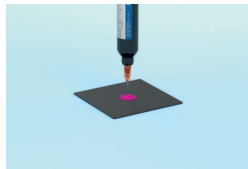


▶ *Direct curing of the adhesive*

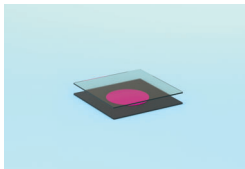
When curing open bonds, it must be kept in mind that the light intensity decreases with increasing penetration depth. The maximum curable layer thickness depends on the adhesive and is a function of the light spectrum (wavelength) and the light intensity. Reference values for the max. curable layer thickness can be found in the specific Technical Data Sheet.

## Bonding or sealing of opaque components

1. Preparation of the adhesive and the components
2. Adhesive application
3. Joining
4. Direct curing through the transparent component with the appropriate light spectrum



Adhesive application



Join



Direct curing of the adhesive

Due to the adhesive-specific curing wavelength, the transmission of the components in the required wavelength range must be checked before bonding optically transparent materials (e. g. plastic). When irradiating the adhesive through a transparent component, the intensity of the light source after transmission through the component must be determined.

## Preactivation of the adhesive followed by joining

DELO KATIOBOND that can be preactivated enable a light curing process for opaque substrates. The reaction starts upon preactivation (irradiation), enabling an open time within which the components should be joined. That means that after irradiation an open time is available in which the components must be joined. You can find details about the suitability for preactivation in the corresponding data sheet



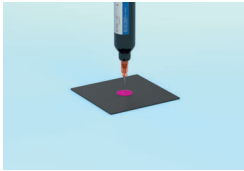
The preactivation time is a reference value for a practicable open time (usually 20 s). After irradiation, the adhesive remains liquid for some time. The preactivation time and the open time vary in dependence of substrate, irradiation parameters and adhesive layer geometry, and must be individually determined on original components under production conditions for every application.

After sufficient preactivation, the adhesive completely cures within 24 h to 7 d at room temperature without further irradiation. You can find detailed information on the curing time in the specific Technical Data Sheet. Complete curing can only be achieved if the entire adhesive volume has been irradiated by light of the suitable wavelength at a sufficiently high intensity. The light intensity decreases with increasing penetration depth. The maximum layer thickness that can be preactivated depends on spectrum (wavelength) and intensity of the irradiated light. We recommend preactivation for fully automated processes only. Functional strength of preactivated products is usually achieved within a few minutes (1–10 minutes).

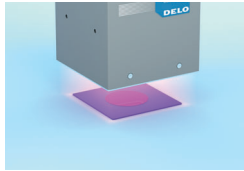
During this period of time, the bonding must remain fixed. Heat addition accelerates this process, heat dissipation (e.g. by metal components) decelerates it. Extensive details about preactivation can be found in the Technical Information “Preactivation”.

### Bonding of opaque components by preactivation

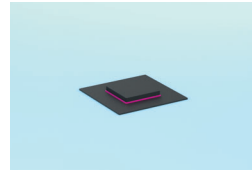
1. Preparation of the adhesive and the components
2. Adhesive application
3. Initiation of curing (preactivation) with the appropriate light spectrum
4. Joining of the components within the open time



*Adhesive application*



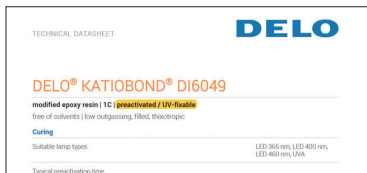
*Initiation of curing*



*Joining within the open time, curing without further irradiation*

### DELO KATIOBOND DI adhesives

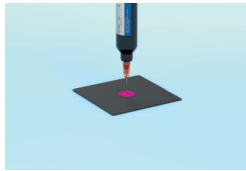
The DELO KATIOBOND DI (DI = Dual Initiator) enable a preactivation process with additional light fixation to achieve immediate initial strength. The adhesives can be handled like any other preactivated product. Details on the suitability of an adhesive for preactivation and fixation are provided in the specific Technical Data Sheet.



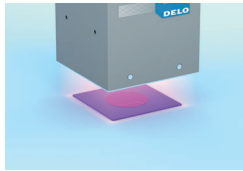
DELO KATIOBOND DI adhesives are characterized by a long open time which enables a robust preactivation process, largely independent of the influence of ambient conditions. In addition, an optional light fixation step can be implemented after joining. In this step, the fillet is irradiated/cured by UV light (recommended are 365 nm lamps of the DELOLUX series), leading to an immediate initial fixation strength of the bonded components in this area. Final curing takes place at room temperature within 24 h to 7 d, depending on the chemical composition of the adhesive. Curing can be accelerated after preactivation by low temperature input (heat curing). The respective parameters are listed in the Technical Data Sheet. Further information can be found in the Technical Information DELO KATIOBOND Dual Initiator.

## Bonding of opaque components with DELO KATIOBOND DI

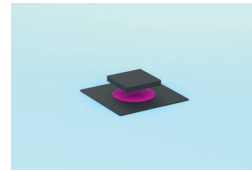
1. Preparation of the adhesive and the components
2. Adhesive application
3. Initiation of curing (preactivation) with the appropriate light spectrum
4. Joining of the components within the open time
5. Fixation of the fillet with the appropriate light spectrum
6. Curing of components at room temperature or acceleration with low temperatures



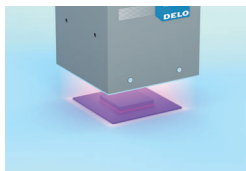
*Adhesive application*



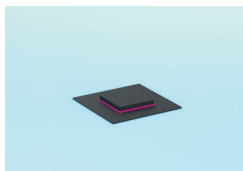
*Initiation of curing*



*Joining of the components within the open time*



*Fixation of the fillet with the suitable light spectrum*



*Curing of components at room temperature or acceleration with low temperatures*

## Details about curing

The irradiation parameters must be individually determined on original components under production conditions for every application. The curing reaction of the DELO KATIOBOND adhesives is significantly influenced by irradiation parameters, adhesive quantity and temperature. In order to obtain reproducible process results, these parameters must be kept consistent in production. The values for the irradiation parameters specified in the Technical Data Sheet are determined according to DELO Standards with specified methods, devices and specimens. Therefore, they are only reference values.

Heat is required for a satisfactory progress of the reaction. This can be provided by the light source, the exothermic reaction of the adhesive itself, or a separate heat source. High temperatures during or after curing can lead to post-crosslinking of the adhesive which influences the physical properties of the bond.

Polymerization of the adhesive is an exothermic reaction. When using large adhesive quantities, the heat released during this reaction may damage the component or the adhesive.

## Instructions and advice for occupational health and safety

Pay attention to the details provided in the Material Safety Data Sheet of the specific product and the hazard symbols on the labels of the adhesive containers.

Skin and eyes must be protected against ultraviolet light, glare of the lamp, possible reflections and scattered light. Complete shielding of the emissions by suitable optical filters is recommended. If the light source is not completely shielded, suitable clothing for eye and skin protection must be worn. Please contact your safety officer for further details. Sufficient ventilation must be ensured during processing.

## Storage

### Removal of the containers

After delivery, remove the package from the dry ice and condition to the storage temperature in unopened condition for at least 4 h.

Please make sure that frozen container is only minimally touched as large temperature difference between container and adhesive may lead to the adhesive becoming "detached" from the inner cartridge wall. It is recommended that the container is removed at its rear end or thermally insulating gloves are used (see figures).



Innen / Inside

DELO




**Instructions for cooled package (0 °C – +10 °C)**  
How to handle cooled DELO adhesives after arrival

- 1 Unpacking**  
Unpack the adhesive
- 2 Storage**  
Store in a fridge at 0 °C to +10 °C for at least 4 hours prior to step 3
- 3 Conditioning**  
Allow the adhesive to adjust to room temperature prior to use

- 1 打开外包装**  
取出装有胶水的纸箱
- 2 储存**  
进入第三步前，请在 0 – +10 °C 冷藏室中至少储存 4 小时
- 3 回温**  
使用前，请将胶水的温度恢复至室温 (+23 °C)

**冷藏包装使用说明 (0 °C – +10 °C)**  
怎样处理冷藏包装的 DELO 胶水

- 1 打开外包装**  
取出装有胶水的纸箱
- 2 储存**  
进入第三步前，请在 0 – +10 °C 冷藏室中至少储存 4 小时
- 3 回温**  
使用前，请将胶水的温度恢复至室温 (+23 °C)

Handling of cooled package 0 °C to +10 °C storage

Innen / Inside

DELO


**Instructions for frozen package (-18 °C)**  
How to handle frozen DELO adhesives after arrival

- 1 Unpacking**  
Unpack the adhesive
- 2 Storage**  
Store in a freezer at -18 °C in unopened box for at least 4 hours prior to step 3
- 3 Conditioning**  
Allow the adhesive to adjust to room temperature prior to use

- 1 打开外包装**  
取出装有胶水的纸箱
- 2 储存**  
进入第三步前，请将纸箱静不动在 -18 °C 冷冻室中至少储存 4 小时
- 3 回温**  
使用前，请将胶水的温度恢复至室温 (+23 °C)

**冷冻包装操作指南 (-18 °C)**  
怎样处理冷冻包装的 DELO 胶水

- 1 打开外包装**  
取出装有胶水的纸箱
- 2 储存**  
进入第三步前，请将纸箱静不动在 -18 °C 冷冻室中至少储存 4 小时
- 3 回温**  
使用前，请将胶水的温度恢复至室温 (+23 °C)


Handling of dry ice package -18 °C storage

### **Storage of the containers**

Improper storage must be prevented as this may unpredictably change the adhesive's properties

Depending on the product, The adhesive must be stored in the unopened original container in a cold (0 to +25 °C) or frozen (-25 °C to -15 °C) and dry place. Do not expose the container to direct sunlight, as this may cause it to heat up considerably. This can lead to a decrease in reactivity or even to adhesive curing.

The Technical Data Sheet and the container label provide details about the storage life and the recommended storage conditions of the specific adhesive.



## Troubleshooting

Perfect bonding results require the maintenance of ideal processing parameters. In case of deviations, the results achieved may also be accordingly unsatisfactory. The following table gives an overview of errors which may occur when using these products and it provides information on possible causes and solutions. If you have any other questions about how to use our products, please feel free to directly contact our application experts.

Error pattern	Errors	Possible cause	Solutions
Insufficient adhesion	Changed component surface	Inhibition of the adhesive due to alkaline component surface	Neutralize or dry the component surface
		Curing temperature on the component surface too low	Preheat the component to be bonded
Changed wetting behavior	Changed viscosity	Adhesive too cold or too warm	Temper the adhesive
		Possible sedimentation of the filler (see Technical Data Sheet)	Tumble the container or homogenize the adhesive by a stirring element in the tank
		Storage life of the adhesive exceeded	Use the products within their storage life
	Changed component surface	Changed surface properties (e.g. due to dissimilar material batches, suppliers, etc.)	Adapt the dispensing parameters; restore the original condition of the components
Incomplete curing	To low irradiation intensity	Lamp aging	Readjust the lamp intensity or exchange the light source
		Contaminated path of light	Clean the path of light
		Irradiation time too short	Readjust the irradiation time
	Decrease in reactivity of the adhesive	Storage life of the adhesive exceeded	Use the products within their storage life
	Changed component surface	Inhibition of the adhesive due to alkaline component surface	Neutralize or dry the component surface

## Label

Typical design of a GHS label at DELO. Depending on the container size, the design and content of the label may vary.



- 1** Product name
- 2** Container content (volume/weight)
- 3** Datamatrix  
Extended article number@Batch@Expiry date@Product name  
(1926818-Z01-EN@12345678@2021-01-30@DELO PRODUCT NAME)
- 4** GHS labeling
- 5** Article number
- 6** Batch number
- 7** Expiry date
- 8** Storage temperature



# CONTACT

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- **USA** · Sudbury, MA

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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.

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ADHESIVES

DISPENSING

CURING

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