

# DELO

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

### **DELO® KATIOBOND® PS**

Pressure-sensitive epoxy adhesives



### **Areas of use**

DELO KATIOBOND PS products are mainly used in semiconductor packaging, microelectronics, electrical engineering, and in the automotive industry for bonding, coating and fixing.

They are characterized by a tape phase in which an immediate adhesion build-up is possible, 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. You can find more details about suitable cleaning agents in the "Cleaning Agents" information.

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".

## **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. It is recommended that dispensing valves and product-bearing elements are made of inert and totally opaque material. Suitable materials include PE, HDPE, PP, PTFE and stainless steel. Other materials require compatibility assessment. It is not recommended to use polyurethane, polyamides and non-ferrous metals. All parts in contact with the product must be cleaned thoroughly e. g. with isopropanol or acetone before use. 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. Through irradiation, the adhesive is transferred into a tape phase and the cationic reaction is started at the same time. Afterwards, the adhesive cures until final strength at room temperature without further irradiation.

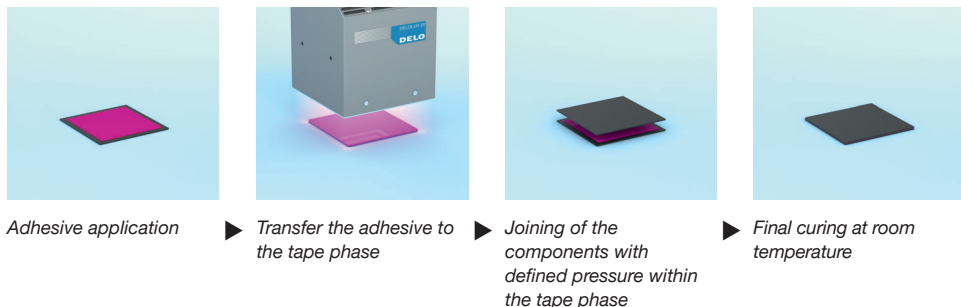
The light intensity is one parameter important for curing. As the intensity decreases over the lifetime of the light source or can be impaired by other factors (e. g. contamination of the lamp), the intensity must be checked at regular intervals and readjusted when necessary.

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 components (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 heat input during the curing process.

**The processing sequences for DELO KATIOBOND PS products are as follows:**

1. Preparation of the adhesive and the components
2. Adhesive application
3. Transfer of the adhesive into the tape phase and initiation of the cationic reaction by irradiation
4. Joining with pressure within the tape phase (see below for definition);
5. Complete curing without further irradiation



When irradiating the adhesive, 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.

The typical irradiation time is a reference value determined under laboratory conditions. Irradiation causes the adhesive to change to the tape phase and the reaction to cationic crosslinking is initiated.

The following joining process should take place within the tape phase with pressure parameters (contact pressure and contact time) adapted to the process. The optimal contact pressure depends on geometry (e.g. shape of adhesive application, stiffness of substrates), adhesive (hardness of adhesive in tape phase) and process (irradiation parameters, adhesive temperature, time between irradiation and joining) and must be determined under production-related conditions.

**The tape phase is the time between the end of irradiation and the loss of the surface tack. During this time, adhesion to the substrate can be built up through contact pressure. The adhesive completely cures at room temperature without further irradiation or heat.**

The tape phase varies depending on irradiation parameters and adhesive layer geometry. It is recommendable to determine this time for each application on original components under production conditions. Typical pressure parameters are listed in the technical data sheet and are reference values determined under laboratory conditions.

After sufficient irradiation, 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.

## 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 UV 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 dry ice shipment

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).



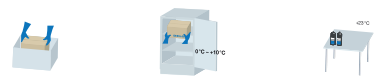
Innen / Inside

**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

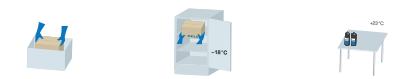
- 1 **打开外包装**  
取出装有胶水的纸箱
- 2 **储存**  
进入第三步前，请在 0 – +10 °C 冷藏室中至少储存 4 小时
- 3  **conditioning**  
使用前，请让胶水的温度恢复至室温 (+23 °C)



**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 **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，请让此包装至少放在 -18 °C 冷冻室中至少储存 4 小时
- 3  **conditioning**  
使用前，请让胶水的温度恢复至室温 (+23 °C)



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

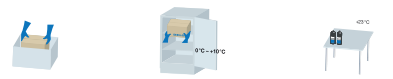
Innen / Inside

**DELO**

**Instructions for 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

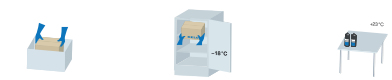
- 1 **打开外包装**  
取出装有胶水的纸箱
- 2 **储存**  
进入第三步前，请在 0 – +10 °C 冷藏室中至少储存 4 小时
- 3  **conditioning**  
使用前，请让胶水的温度恢复至室温 (+23 °C)



**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，请让此包装至少放在 -18 °C 冷冻室中至少储存 4 小时
- 3  **conditioning**  
使用前，请让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
	Joining outside the tape phase	Polymerization already so far advanced that complete wetting of the surface is no longer possible	Joining within tape phase
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
- 4 Extended article number@Batch@Expiry date@Product name (1926818-Z01-EN@12345678@2021-01-30@DELO PRODUCT NAME)
- 5 GHS labeling
- 6 Article number
- 7 Batch number
- 8 Expiry date
- 9 Storage temperature

# CONTACT

**DELO Industrial Adhesives**  
Headquarters

► **Germany** · Windach/Munich .....

- **China** · Shanghai
- **Japan** · Yokohama
- **Malaysia** · Kuala Lumpur
- **Singapore**
- **South Korea** · Seoul
- **Taiwan, China** · Taipei
- **Thailand** · Bangkok
- **USA** · Sudbury, MA

..... [www.DELO-adhesives.com](http://www.DELO-adhesives.com)

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.

© DELO – This document including any and all parts is protected by copyright. Any use not expressly permitted by the Urheberrechtsgesetz (German Copyright Act) shall require DELO's written consent. This shall apply without limitation to reproductions, duplications, disseminations, adaptations, translations and microfilms as well as to the recording, processing, duplication and/or dissemination by electronic means.

08/20

ADHESIVES

DISPENSING

CURING

CONSULTING

**DELO**