

DELO

Instructions for Use & General Information on the Product Group

DELO DUALBOND®

Light- and humidity-curing acrylates



Application areas

DELO DUALBOND adhesives are predominantly used in electronics, microelectronics, electrical engineering, optics and precision engineering for bonding, coating, fixing and sealing.

DELO DUALBOND OC products are especially designed for the display industry. They have a high optical transparency and high yellowing stability to bond touch panels or other glass covers to displays. When using OC products, the section “Additional processing information for OC products” must be considered.

The suitability and strength of the adhesive must be verified on original components under the application-specific conditions. DELO DUALBOND products are one-component adhesives based on acrylates. The adhesives are cured by light, using a light source with the wavelength range specified in the Technical Data Sheet. DELOLUX curing lamps are suitable. Adhesive in shadowed areas can be cured by air humidity of the ambient air or by a combination of both mechanisms.

Preparation of the components to be bonded

For optimal bond strength, the surfaces to be bonded must be free of oil, grease and other contaminations. Our DELOTHEN cleaners are available for this purpose. You can draw more detailed information from the technical information "DELOTHEN Cleaners".

After cleaning, adhesion to the components can be improved by suitable pretreatment methods. You can draw additional details from the technical information on surface pretreatment.

Preparation of the adhesive

The adhesives are usually supplied ready for use.

In case of cold storage, it must be ensured that the containers are conditioned to room temperature before use. The containers are conditioned at room temperature (+18°C to max. +25°C). Adding heat is not permitted. The conditioning time depends on the container size and the storage temperature. The conditioning time of small containers (up to 30 g) is approx. 1 hour. Larger containers up to 1 kg may require a conditioning time of up to 4 hours. Condensation water on the substrate must be prevented or completely evaporated before application.

Processing

Depending on the container type, the adhesives can be manually dispensed directly from the container or by means of equipment. In order to achieve bubble-free processing, dispensing from original containers by means of a cartridge press should be preferred.

It is also possible to feed or extrude the adhesive by means of dried compressed air. If the compressed air is not dried, curing may start in the container due to air humidity. The air can be dried, for example by upstream water separators (air driers, pressure dew point –30 to –60°C).

During downtimes, it must be ensured that the compressed air applied to the system is removed from the container.

Stainless steel, polyethylene (PE, HDPE), polypropylene (PP) and Teflon (PTFE), which are sufficiently resistant to chemicals and are completely opaque, are suitable materials for equipment parts that come in contact with adhesive such as dispensing valves and product lines. When using other materials, their compatibility must be checked in advance. It is not recommended to use polyurethane (PU), copper and its alloys or cast iron. Tanks, valves and feeding lines should be thoroughly rinsed and cleaned with dry air before use. If the product is exchanged, the dispensing lines must be exchanged as there is a risk of contamination by solvents in case of cleaning. If the adhesive has started curing in the dispensing system, the system elements concerned must be exchanged or cleaned.

After adhesive application, the components are to be joined and fixed speedily as curing of the products may already start through room lighting and scattered radiation. Shielding the work station from light in the adhesive's curing spectrum can prevent a starting and undefined curing reaction. The adhesive's secondary curing mechanism can already be triggered by humidity available in the ambient or condensed on the surfaces to be joined.

DELO DUALBOND products with a light and humidity curing mechanism cure in a wavelength range from 320 to 420 nm or 320 to 450 nm, depending on the photoinitiator.

Adhesive containers and dispensing tips must be protected or shielded against light. When exchanging the container, no scattered light may reach the inside of the container as this may trigger the polymerization.

Containers must be closed when not used. Dispensing needles must be cleaned or exchanged after downtimes.

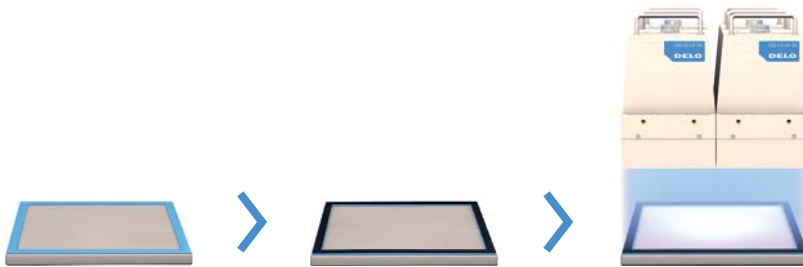
Processing of DELO DUALBOND products as intended is effected at temperatures between +18 and +25 °C and a relative air humidity between 20 and 65 %. You can draw the detailed, product-specific information on the processing of each product from the specific Technical Data Sheet.

Further details about adhesive irradiation can be found in the Technical Information “10 Rules of Light Curing”.

Production flow for bonding components:

1. Preparation and pretreatment of the components where necessary
2. Adhesive application
3. Joining
4. Irradiation of the adhesive
5. Adhesive in shadowed areas, which is not irradiated, cures by humidity (air or component humidity).

Preparation/pretreatment → Application → Joining → Irradiation → Independent humidity curing

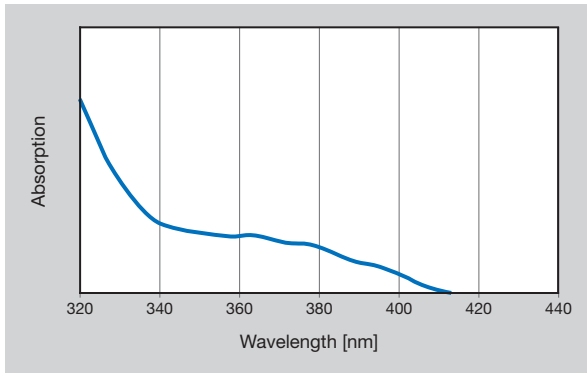


Application of the adhesive onto the opaque substrate

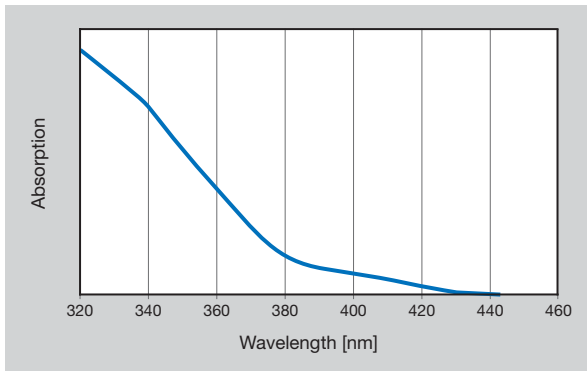
Joining of the substrates with opaque frame

Direct curing of the visible adhesive with UV or visible light. In the shadowed area, the adhesive cures by humidity.

Wavelength ranges



Absorption spectrum of the photoinitiator (wavelength range from 320 to 420 nm) of the UV- and light-curing DELO PHOTOBOND in an acrylate matrix



Absorption spectrum of the photoinitiator (wavelength range from 320 to 450 nm) of the UV- and light-curing DELO PHOTOBOND in an acrylate matrix

Curing

Primary curing can only be achieved if the complete adhesive is reached by light of the suitable wavelength and sufficient intensity for the required period of time.

Adhesive in shadowed areas crosslinks through a second curing mechanism. The primary light curing mechanism is mandatory for professional bonding as pure humidity curing does not lead to sufficient strength.

That means that

- The adhesive must be open (casting, coating).
- At least one of the components to be bonded is largely made of a translucent material or provides a large fillet accessible to light.

The secondary curing mechanism ensures that no adhesive remains liquid in shadowed areas. Secondary curing proceeds through a reaction with air humidity or the remaining humidity on the components to be bonded. The air humidity and temperature determine the curing speed in shadowed areas. The curing speed is approx. 2 mm/day at 50 % relative humidity and +23 °C. Increasing the temperature and air humidity can speed up curing. Lower air humidity and temperatures delay curing. +40 °C and 80 % relative humidity should not be exceeded when accelerating the curing reaction. Humidity curing at room temperature and a relative humidity between 20 % and 80 % is recommended. It must be considered that the components must be positioned before irradiation.

Some DELO DUALBOND adhesives have a tacky surface outside the bonding gap after curing. The tacky surface can be removed with DELOTHEN EP cleaner.

When selecting a lamp, attention must be paid to the emission spectrum and the substrates' transmission. DELO offers a lamp range tailored to the adhesives.

Complete adhesive curing and a reliable production process require unchanged light intensities.

The lamp intensity must be monitored. We recommend the DELOLUXcontrol light intensity meter. During irradiation, the primary curing mechanism proceeds quickly. After removal of light, the reaction stops immediately and only the secondary curing mechanism continues.

The primary curing time depends on product and lamp (see Technical Data Sheets). The curing speed of the respective products can be varied through the parameters lamp type, lamp intensity, lamp distance and irradiation time.

You can draw the detailed, product-specific information on the processing of each adhesive from the respective Technical Data Sheet.

Additional processing information for OC products

It is advisable to handle the OC products in a clean room in order to avoid dust and other contaminations. As the adhesive reacts with humidity and already humidity-cured adhesive may impair the appearance, special care must be taken. Refilling from the original container into other containers for storage purposes is not permitted. Feeding containers, etc. must be thoroughly rinsed with dried air. Containers must be used up completely once they are connected. During dispensing, it must be ensured that no preliminarily cured adhesive is in the system (e. g. at the dispensing needle). If cured adhesive is in the system, the components concerned must be exchanged or cleaned.

Instructions and advice for occupational health and safety:

see Material Safety Data Sheet.

Skin and eyes must be protected from UV radiation or glare of the lamp. A respective screening of the lamp by means of yellow-colored plastic (such as polymethyl methacrylate or polycarbonate) or gray glass and colored safety glasses (according to DIN EN 166 and DIN EN 170; safety class 6) is recommended for eye protection. Sufficient ventilation during processing must be provided.

Storage

After delivery in unopened, opaque original container.

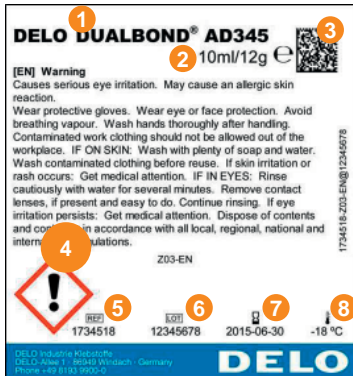
Cool storage in refrigerator at +5 °C to +10 °C is recommended, unless otherwise specified.

Storage life: see Technical Data Sheet

The container should not be exposed to direct solar radiation as it can heat up strongly due to its color. This may lead to an unwanted reactivity reduction or the adhesive may even cure.

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
(1734518-Z03-EN@12345678@2015-06-30@DELO DUALBOND AD345)
- 4 GHS labeling
- 5 Article number
- 6 Batch number
- 7 Expiry date
- 8 Storage temperature

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