

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

### DELO® PHOTOBOND®

UV-curing and light-curing acrylates



### Application areas

DELO® PHOTOBOND® adhesives are predominantly used in electronics, electrical engineering, microelectronics, medical technology, optics, precision engineering, and in the jewelry, furniture and glass industry for bonding, coating, fixing and sealing.

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.

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

## **Preparation of the components to be bonded**

The contact surfaces must be free of oil, grease and other contaminations in order to achieve optimal bond strength. We provide our DELOTHEN cleaners. You can find more details in the “DELOTHEN Cleaners” technical information.

Condensation water on the substrate must be avoided res. must have completely evaporated before adhesive application.

After cleaning, adhesion to the component can be further improved by surface pretreatment. You can find further information in the written information on 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. The containers are conditioned at room temperature (max. +77 °F). Heat addition is not permitted. The conditioning times depend on the container size and the storage time. You can draw the conditioning times from the specific technical data sheet. Condensation water on the substrate should be prevented. DELO® PHOTOBOND® products are to be homogenized by rolling before use if necessary (see technical data sheets or information provided on the containers).

## Processing

Depending on the container type, the adhesives can be manually dispensed directly from the container or by means of special equipment such as DELOMAT dispensing units. It must be ensured that the adhesive is not permanently pressurized.

In order to achieve bubble-free processing, dispensing from original containers by means of a cartridge press should be preferred.

Containers must be reclosed when not in use.

After adhesive application, the components are to be joined and possibly fixed speedily as curing of the products may already start through room lighting and scattered radiation. Screening of the work station against light in the curing spectrum of the adhesive can prevent starting and undefined curing.

The UVA-curing products require wavelengths between 320 and 380 nm or between 320 and 400 nm for curing.

Furthermore, DELO® supplies UV-/light-curing adhesives that cure at wavelengths between 320 and 420 nm resp. between 320 and 440 nm, i. e., in subranges of visible light. The transmission of the components in the necessary wavelength range must be tested before bonding plastics with UV-curing products due to the adhesive-specific curing wavelengths.

Adhesive containers and dispensing tips must be protected or shielded against UV and visible light. During filling or when exchanging the container, no scattered radiation may reach the inside of the container as this can start the polymerization.

Stainless steel, polyethylene (PE, HDPE), polypropylene (PP) and teflon (PTFE) that 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), base metals and non-ferrous metals, such as Ni, Zn, Cu, and Fe.

The processing of DELO® PHOTOBOND® adhesives as intended is performed at temperatures between +64 and +77 °F and a relative air humidity of 20 to 65 % (normal room climate). Currently, we do not dispose of any negative cognitions as to processing under these room temperature and air humidity conditions. So far, the products could be processed very well under laboratory conditions and no impairment of the processing properties could be recognized.

You can find the detailed, product-specific information on the processing of each product in the specific Technical Data Sheet.

You can draw further details on the irradiation of the products from the technical documentations "Radiation curing" and "10 rules of light curing".

**Production flow for an open bonding, coating or sealing:**

1. Preparation and, if necessary, pretreatment of the components
  2. Adhesive application
  3. Irradiation until complete curing (the entire adhesive volume must be irradiated).
- Preparation/pretreatment → Application → Irradiation

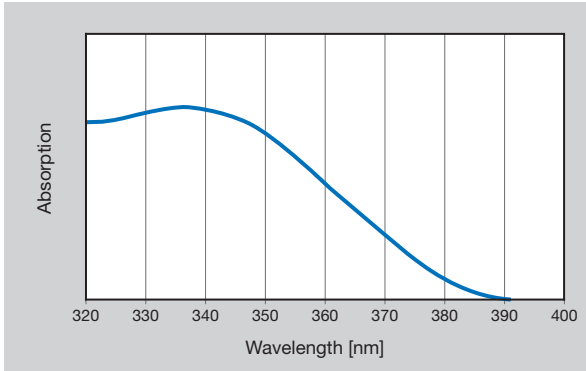
**Production flow for bonding components:**

1. Preparation and, if necessary, pretreatment of the components
  2. Adhesive application
  3. Joining
  4. Irradiation until complete curing (the entire adhesive area must be irradiated)
- Preparation/pretreatment → Application → Joining → Irradiation

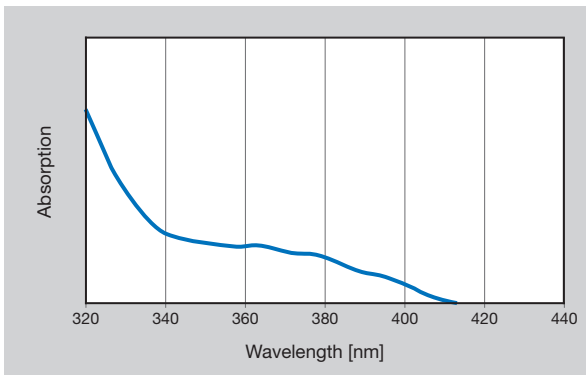
**Production flow when using capillary adhesives:**

1. Preparation and, if necessary, pretreatment of the components
  2. Joining / positioning
  3. Application of the adhesive into the fillet of the components
  4. Let the adhesive completely capillate into the bonding gap
  5. Irradiation until complete curing (the entire adhesive area must be irradiated)
- Preparation/pretreatment → Joining/positioning → Application → Irradiation

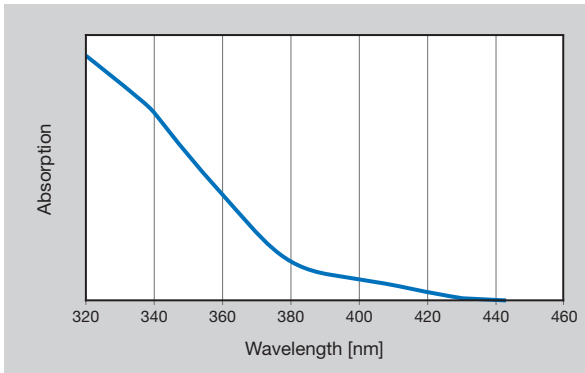
## Wavelength ranges



Absorption spectrum of the photoinitiator (wavelength range from 320 to 400 nm) of the UV-curing DELO® PHOTOBOND® in an acrylate matrix



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

Complete curing can only be achieved if the complete adhesive volume is reached by light of the suitable wavelength and sufficient intensity.

That means that

- the adhesive must be open (casting, coating)
- or at least one of two components to be bonded is made of a translucent material

The UVA-curing products require wavelengths between 315 and 400 nm. Therefore, these products are not suitable for many plastic types as UVA light is absorbed by plastic. The products which are cured by visible light (VIS) cure at wavelengths between 380 and 450 nm and are also suitable for translucent plastics. It is important that the components must be positioned before irradiation.

The surface of some DELO® PHOTOBOND® adhesives remains tacky 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. DELO® offers a lamp range tailored to the adhesives.

A steady irradiation intensity is necessary for complete adhesive curing and a reliable production process.

The intensity of the lamp must be monitored. We recommend the measuring device DELOLUXcontrol. The curing reaction proceeds very fast upon irradiation and stops immediately after removing the light source. The 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.

The maximum layer thickness that can be cured must be determined for the intended application task and is normally between 0.078 and 0.156 in.

## **Instructions and advice for occupational health and safety**

See material safety data sheet

Skin and eyes must be protected against UV radiation or glare of the lamp. A respective shielding of the lamp by means of yellow-colored plastic or grey glass and colored protective glasses (e. g., green or brown) is recommended for eye protection. Sufficient ventilation during processing must be ensured.

## **Storage**

In unopened, opaque container.

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.

# CONTACT

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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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