

Glass Bonding Requirements, Adhesives, Applications



Compression shear specimens acc. to DELO Standard 5



Bonding enables new designs

DELO has developed special UV- and light-curing acrylates for glass bonding. Classical applications include glass furniture, bathroom scales, shower enclosures or design elements.

The key requirements to be fulfilled by these adhesives are good adhesion to glass, long-term resistance of the bond, and maximum, permanent transparency of the adhesives. Neither temperature nor UV light (sunlight) may lead to discoloration.

DELO's glass adhesives are ideal for bonding transparent materials:

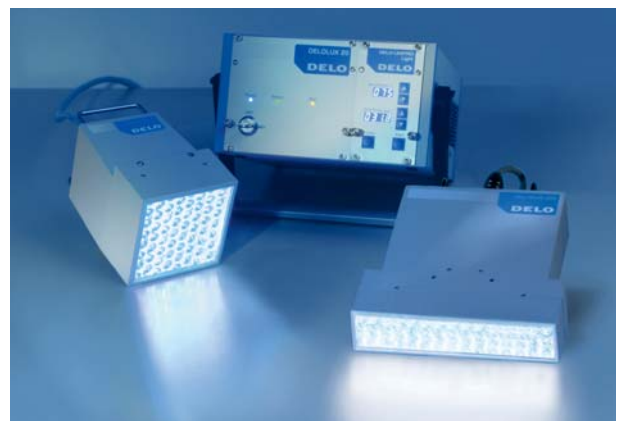
DELO-PHOTOBOND



- Fast curing within seconds
- Wavelengths:
 - 320 – 400 nm (UV-curing)
 - 320 – 420 nm or 320 – 450 nm (UV-/light-curing)
- Colorless and transparent
- Yellowing-resistant and lightfast
- Resistance to climate and chemicals
- Tension-equalizing

DELO-PHOTOBOND:

Ideal for bondings with high requirements on the visual appearance.



Fast adhesive curing within seconds, using the DELOLUX 20 and DELOLUX 202 LED area lamps

The use of DELO-PHOTOBOND adhesives in structural glass systems, such as façades or overhead applications, requires special building permits to be obtained by the user.



*Bonding of chrome-plated tin die cast
for glass shower enclosures.*

*Yellowing-resistant, excellent humidity
and chemical resistance.*

Source: Duscholux AG

Reliable and easy handling

Surface treatment

DELOTHEN cleaner removes contaminations from the surface and degreases it. It is directly sprayed onto the surface to be cleaned from a distance of 20 – 30 cm. After thorough cleaning with a lint-free cloth, the adhesive can be applied.

Curing

In order to bond two components, one material must be permeable to light with the wavelength required for curing.

The emission spectra of the DELOLUX LED lamps developed and produced by DELO are adapted to DELO's adhesives. Depending on the application, both area and spot lamps are available.

Dispensing

Precise and bubble-free dispensing of DELO-PHOTOBOND glass adhesives is possible with the DELO-DOT PN2 microdispensing valve. Alternatively, the adhesive can be manually dispensed from the cartridge.

*Adhesive dispensing with the
DELO-DOT PN2 microdispensing
valve, curing with DELOLUX 80*



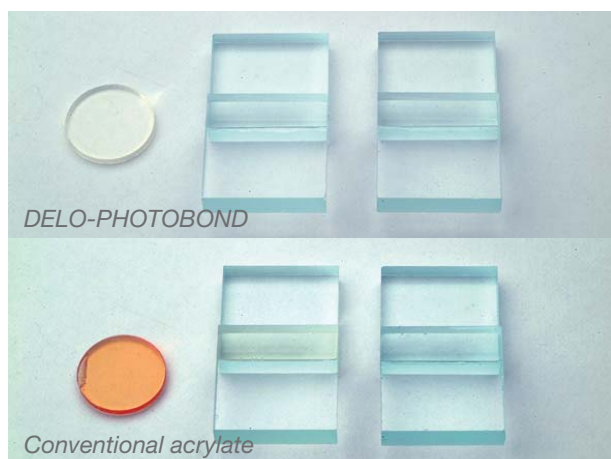


Glass adhesives must fulfill harsh requirements

High transparency

Glass adhesives must keep their transparency over the entire lifetime of the bonded product, even under intensive solar radiation. The conditions are reconstructed in a sunlight simulator to determine the transparency values using a special L*a*b* measuring device. The b* value is a particularly good indicator of a specimen's yellow portion.

The b* value must range from 0 to 5 for lightfast, yellowing-resistant bonds. The chart below lists some typical average values of various DELO glass adhesives. The light intensity of the simulator is about five times higher than the average solar radiation in Western Europe.



DELO-PHOTOBOND glass adhesives are permanently transparent and yellowing-resistant – even after 1,000 h in the sunlight simulator.

Conventional acrylates become very yellow already after 72 h in the simulator, even if the adhesive layer is thin.

UV test	b* value after 0 h	b* value after 1,000 h
DELO-PHOTOBOND 4468	2.7	2.7
DELO-PHOTOBOND GB485	1.0	3.3
DELO-PHOTOBOND GB422	3.0	2.6
DELO-PHOTOBOND GB368	3.4	3.9
DELO-PHOTOBOND GB345	2.2	4.3

b values of various DELO adhesives: Initial values and values achieved after 1,000 h in the sunlight simulator.*

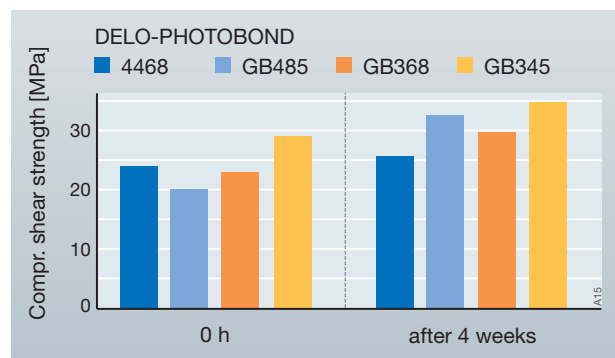


Glass plate on metal table base
 DELO-PHOTOBOND adhesives
 fulfill maximum requirements.
 They are high-strength and tension-
 equalizing at the same time.

Excellent adhesion

Adhesives for glass bonding and mixed glass-to-metal joints fulfill extreme requirements. They have to equalize dissimilar coefficients of expansion during temperature fluctuations, and withstand climatic influences.

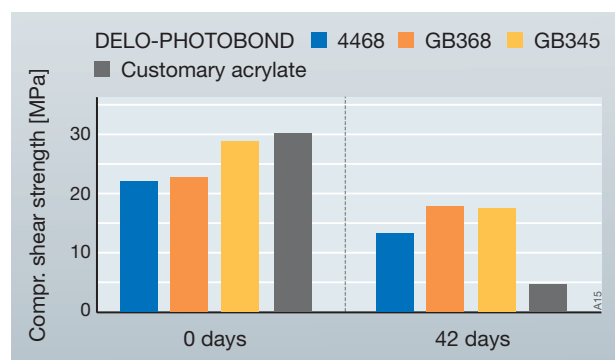
A comprehensive test process used by the automotive industry determines compression shear strength value of glass-to-Al bondings after exposure to heat, cold and humid warmth for four weeks according to the VDA climatic change test. The results show that DELO-PHOTOBOND adhesives adhere excellently.



DELO-PHOTOBOND adhesives adhere very well, even after the demanding automotive climate test.

Durable and humidity-resistant

In order to determine the durability of glass bonds, these are stored in surfactant-containing water at +45°C for 42 days. This test is an essential proof of the humidity resistance of the join. The diagram shows the clearly better durability of DELO-PHOTOBOND products compared to customary acrylates.



DELO-PHOTOBOND adhesives are clearly more durable than standard acrylates used in glass furniture design.

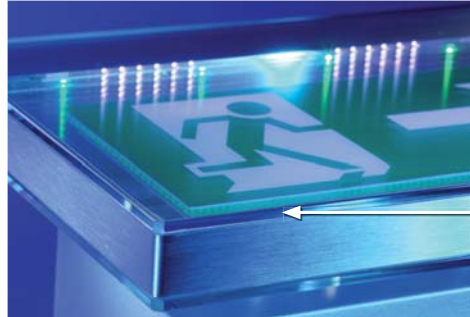
DELO's adhesives in action

Bonding of frames for LED display lamps



DELO-PHOTOBOND 4468

- UV-resistant, permanently transparent
- Excellent humidity and media resistance
- Equalization of thermal tensions
- Good adhesion, reliable sealing
- Strength 10 – 20 time higher than that of silicones



Bonding of a glass plate to the stainless steel frame of high-quality LED emergency exit signs

Glass plate to aluminum force transducer



DELO-PHOTOBOND 4468

- High strength, 300 kg load on the rim
- Transparent bond over the entire lifetime
- Humidity-resistant under wet room conditions
- More cost-efficient and higher process reliability than 2C epoxy resins or double-sided adhesive tapes



Bonding of a glass plate to the aluminum force transducer (60 mm dia.) of bathroom scales

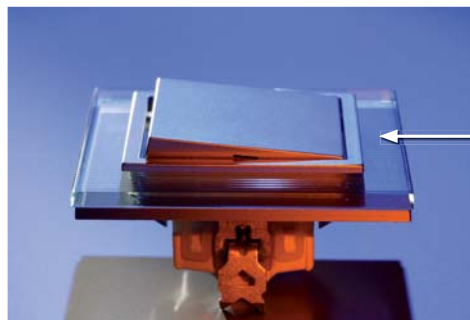
The invisible join creates a "floating effect"

Design light switches



DELO-PHOTOBOND 4302

- Colorless clear, high yellowing resistance
- Pretreatment not necessary
- High strength on glass and PC



Bonding of a glass cover to the PC frame of design light switches

Top part to glass bottle



DELO-PHOTOBOND GB422

- High transparency, colorless, yellowing-resistant
- Impact-resistant
- Excellent equalization of tensions
- Flexible and humidity-resistant even on plastic
- Application control by fluorescence



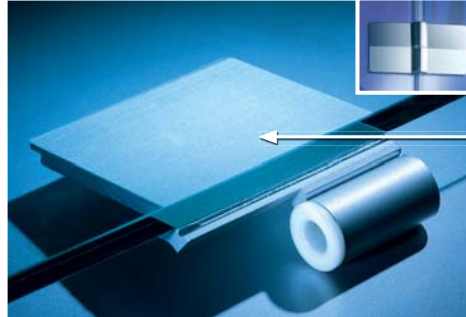
Bonding of the top part to glass bottles, e.g. cognac bottles

Aluminum door hinges to shower enclosures



DELO-PHOTOBOND 4468

- UV-resistant, permanently transparent
- Excellent resistance to humidity and chemicals (e.g. glass cleaner)
- High dynamic loading capacity
- Good adhesion to glass, stainless steel, anodized aluminum
- Positively tested acc. to DIN EN 14428 with more than 250,000 opening and closing cycles



Bonding of door hinges to shower enclosures

Strap hinges to shower enclosures



DELO-PHOTOBOND GB485

- High transparency, colorless, yellowing-resistant
- Excellent resistance to humidity and chemicals (e.g. glass cleaner)
- Equalization of tensions between glass and metal
- High-viscous, perfect dispensing of layers up to approx. 3 mm



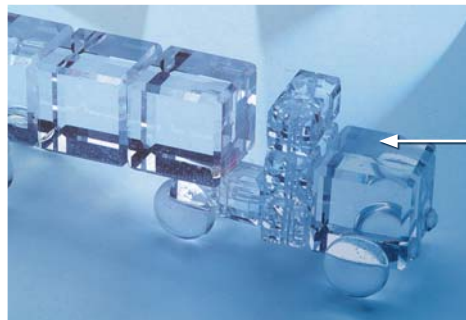
Assembly of stop rails or load-bearing strap hinges by means of line bonding

Glass gemstones



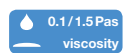
DELO-PHOTOBOND GB368

- Dry surface
- Invisible bond
- Multi-purpose for small glass-to-glass and glass-to-plastic joins



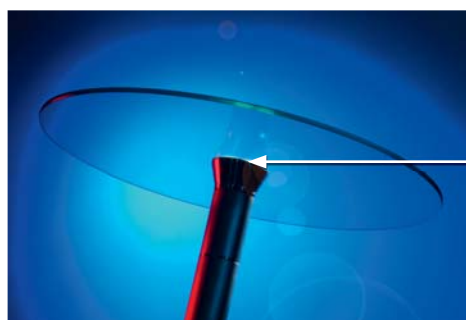
Bonding of small areas of glass gemstones

Glass plate to metal table base



DELO-PHOTOBOND GB310 / GB345

- High-strength, impact-resistant
- Very high shear strength
- Invisible bond
- Ideal for glass-to-glass and glass-to-metal bonds, e.g. glass furniture



Bonding of a glass plate to the metal table base



CONTACT

Headquarters

- DELO** Industrial Adhesives
▶ **Germany** · Windach / Munich
Phone +49 8193 9900-0
info@DELO.de
www.DELO.de

- DELO** Industrial Adhesives
▶ **USA** · Sudbury / Boston, MA
Phone +1 978 254 5275
info@DELO.us
www.DELO.us

- DELO** Industrial Adhesives
▶ **Singapore**
Phone +65 6560 0236
info@DELO.com.sg
www.DELO.com.sg

- DELO** Industrial Adhesives
▶ **China** · Shanghai
Phone +86 21 2898 6563
info@DELO.cn
www.DELO.cn

- DELO** Industrial Adhesives
▶ **Taiwan** · Taipei
Phone +886 2 6639 8248
info@DELO.com.tw
www.DELO.com.tw

- DELO** Industrial Adhesives
▶ **Malaysia** · Kuala Lumpur
Phone +65 6560 0236
info@DELO.de
www.DELO.de/en

- DELO** Industrial Adhesives
▶ **South Korea** · Seoul
Phone +82 2 2190 3727
info@DELO.de
www.DELO.de/en

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 user's responsibility to test the suitability of the product for the intended purpose by considering all specific requirements. 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 brochure 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. 02/15

Adhesives

Dispensing

Curing

Consulting

DELO