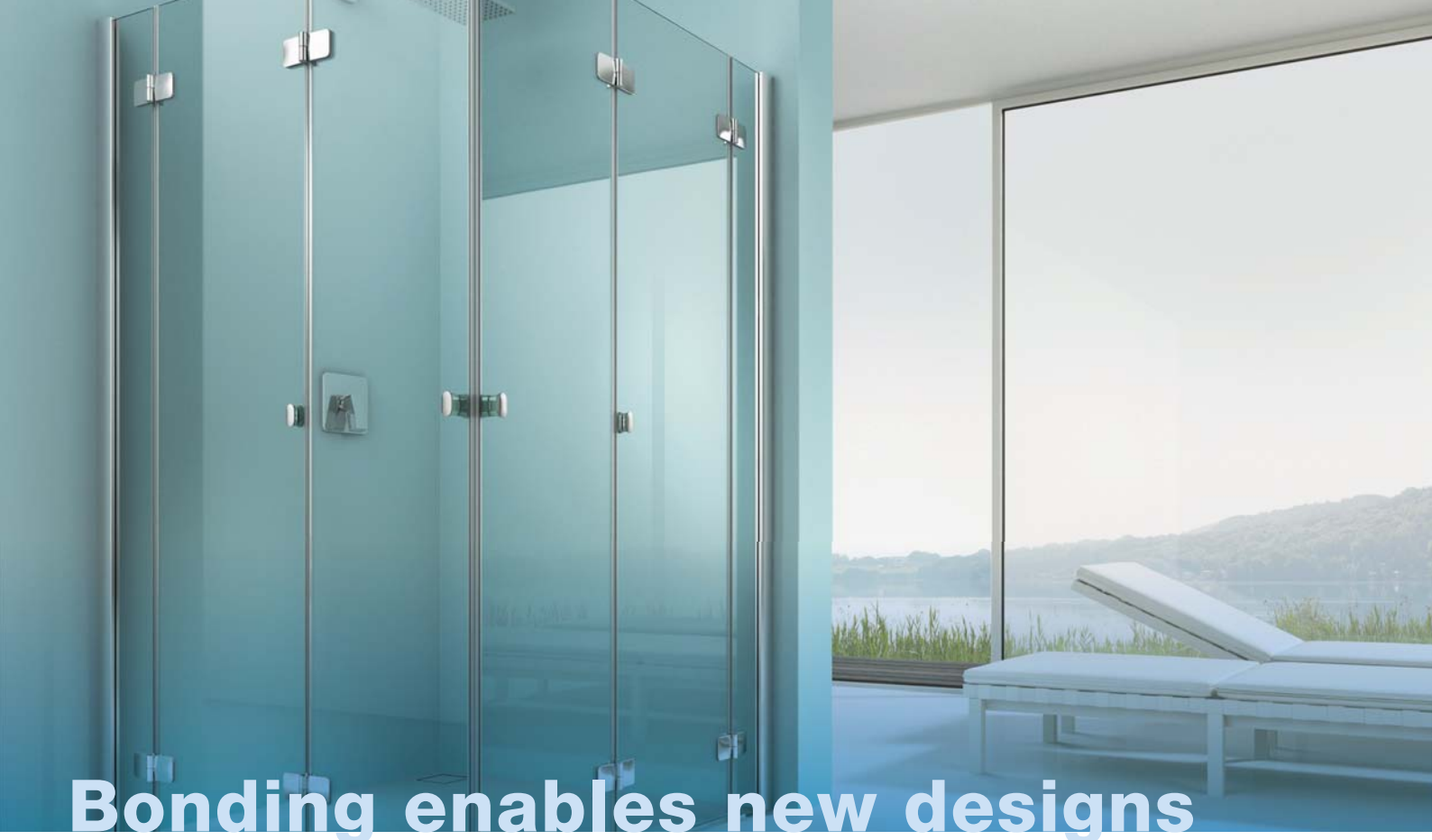


Glass Bonding Requirements, Adhesives, Applications



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 door hinges
for glass shower enclosures.*

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

© Pictures page 2/3: Artweger

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 PN microdispensing valve. Alternatively, the adhesive can be manually dispensed from the cartridge.

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



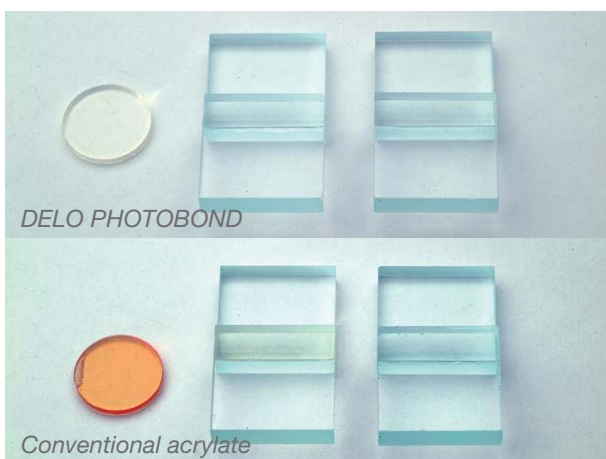


Glass adhesives must fulfill harsh requirements

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 GB422	3.0	2.6
DELO PHOTOBOND GB368	3.4	3.9
DELO PHOTOBOND GB345	2.2	4.3
DELO PHOTOBOND MF4181	1.4	2.3

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

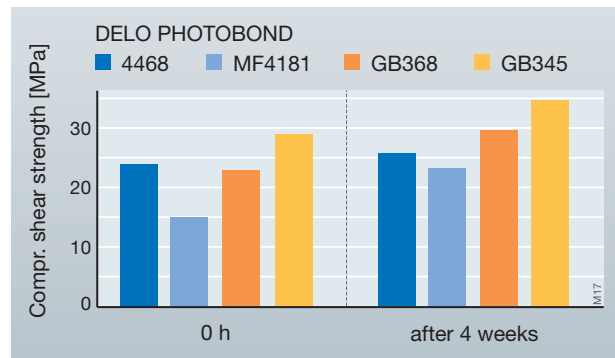


Glass plate on metal table base

DELO PHOTOBOND adhesives fulfill maximum requirements. They are high-strength and tension-equalizing at the same time.

Excellent adhesion

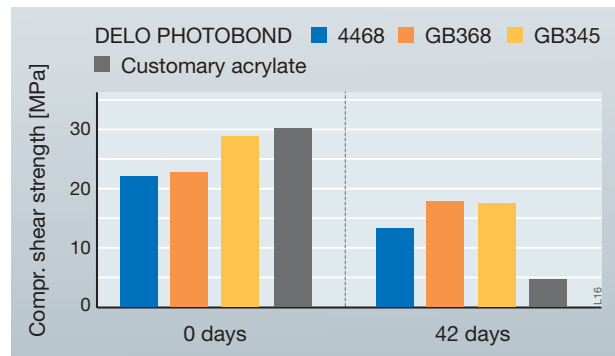
Adhesives for glass bonding and mixed glass-to-metal joints fulfill extreme requirements. They have to equalize dissimilar coefficients of expansion during temperature fluctuations, and withstand climatic influences. A comprehensive test process used by the automotive industry determines compression 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 joint. 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

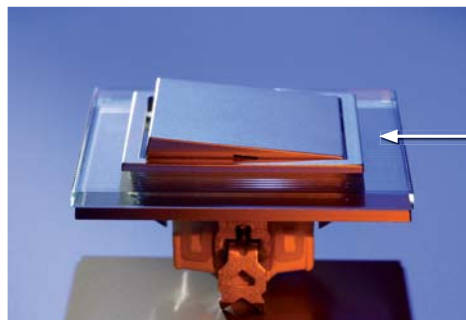
The invisible join creates a "floating effect"

Design light switches



DELO PHOTOBOND

- 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
© Artweger

Strap hinges to shower enclosures



DELO PHOTOBOND MF4181

- 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
© Duscholux

Glass gemstones



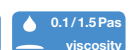
DELO PHOTOBOND GB368

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



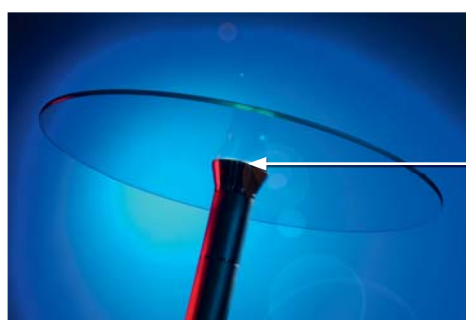
Bonding of small areas of glass gemstones

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



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Adhesives

Dispensing

Curing

Consulting

DELO