

Photoinitiated-curing acrylates		DELO®-PHOTOBOND® UV- and light-curing							
		4436	4442	4468	PB437	4496	4494	4497	AD494
<b>Product code number</b>		B	B/S	B	B	B/S	B	B/S/C	B
<b>Application area</b> (B = bonding, S = sealing, C = coating)		B	B/S	B	B	B/S	B	B/S/C	B
<b>Color cured product</b>	in 0.1 mm layer thickness	colorless clear	colorless clear	colorless clear	colorless clear	colorless clear	colorless clear	milky	colorless clear
	in 1.0 mm layer thickness	colorless clear	colorless clear	colorless clear	colorless clear	yellowish clear	colorless clear	milky	yellowish clear
<b>Viscosity [mPas]</b> (+23 °C $\pm$ +73 °F) Brookfield	DIN EN 12092	350 ( $\pm$ cP)	650 ( $\pm$ cP)	7,000 ( $\pm$ cP)	8,000 ( $\pm$ cP)	17,000 ( $\pm$ cP)	20,000 ( $\pm$ cP)	30,000 ( $\pm$ cP)	50,000 ( $\pm$ cP)
<b>Wavelength range for curing [nm]</b>		320 – 450	320 – 450	320 – 450	320 – 420	320 – 450	320 – 420	320 – 450	320 – 450
<b>Minimum irradiation time [s]</b> DELOLUX® 04, DELO Standard 23	at 55 – 60 mW/cm <sup>2</sup> UVA intensity <sup>3)</sup>	8	60	40	6	50	7	15	14
<b>Compression shear strength [MPa]</b> DELO® Standard 5 Irradiation and curing conditions: DELOLUX® 03 S, layer thickness 0.1 mm; lamp distance approx. 70 mm; UVA intensity <sup>3)</sup> 55 – 60 mW/cm <sup>2</sup> irradiation time 60 s	glass/glass	18 ( $\pm$ 2,610 psi)	4 ( $\pm$ 580 psi)	22 ( $\pm$ 3,190 psi)	31 ( $\pm$ 4,495 psi)	6 ( $\pm$ 870 psi)	28 ( $\pm$ 4,060 psi)	19 ( $\pm$ 2,755 psi)	13 ( $\pm$ 1,885 psi)
	glass/Al	17 ( $\pm$ 2,465 psi)	4 ( $\pm$ 580 psi)	24 ( $\pm$ 3,480 psi)	30 ( $\pm$ 4,350 psi)	4 ( $\pm$ 580 psi)	25 ( $\pm$ 3,625 psi)	19 ( $\pm$ 2,755 psi)	12 ( $\pm$ 1,740 psi)
	glass/PC	7 ( $\pm$ 1,015 psi)	5 ( $\pm$ 725 psi)	3 ( $\pm$ 435 psi)	14 ( $\pm$ 2,030 psi)	5 ( $\pm$ 725 psi)	15 ( $\pm$ 2,175 psi)	10 ( $\pm$ 1,450 psi)	13 ( $\pm$ 1,885 psi)
	glass/PMMA	4 ( $\pm$ 580 psi)	3 ( $\pm$ 435 psi)	3 ( $\pm$ 435 psi)	8 ( $\pm$ 1,160 psi)	4 ( $\pm$ 580 psi)	4 ( $\pm$ 580 psi)	3 ( $\pm$ 435 psi)	9 ( $\pm$ 1,305 psi)
	PC/Al	2 ( $\pm$ 290 psi)	2 ( $\pm$ 290 psi)	3 ( $\pm$ 435 psi)	9 ( $\pm$ 1,305 psi)	5 ( $\pm$ 725 psi)	5 ( $\pm$ 725 psi)	4 ( $\pm$ 580 psi)	10 ( $\pm$ 1,450 psi)
	PC/PC	10 ( $\pm$ 1,450 psi)	6 ( $\pm$ 870 psi)	1 ( $\pm$ 145 psi)	22 ( $\pm$ 3,190 psi)	10 ( $\pm$ 1,450 psi)	18 ( $\pm$ 2,610 psi)	12 ( $\pm$ 1,740 psi)	–
PMMA/PMMA	4 ( $\pm$ 580 psi)	2 ( $\pm$ 290 psi)	3 ( $\pm$ 435 psi)	9 ( $\pm$ 1,305 psi)	3 ( $\pm$ 435 psi)	10 ( $\pm$ 1,450 psi)	7 ( $\pm$ 1,015 psi)	–	
<b>Tensile strength [MPa]</b>	DIN EN ISO 527	12 ( $\pm$ 1,740 psi)	3 ( $\pm$ 435 psi)	14 ( $\pm$ 2,030 psi)	21 ( $\pm$ 3,045 psi)	6 ( $\pm$ 870 psi)	20 ( $\pm$ 2,900 psi)	11 ( $\pm$ 1,595 psi)	13 ( $\pm$ 1,885 psi)
<b>Elongation at tear [%]</b>	DIN EN ISO 527	250	300	200	110	300	160	200	310
<b>Young's modulus [MPa]</b>	DIN EN ISO 527	35 ( $\pm$ 5,075 psi)	– <sup>2)</sup>	250 ( $\pm$ 36.25 ksi)	520 ( $\pm$ 75.4 ksi)	– <sup>2)</sup>	400 ( $\pm$ 58 ksi)	84 ( $\pm$ 12.18 ksi)	20 ( $\pm$ 2,900 psi)
<b>Shore hardness</b>	DIN EN ISO 868	D 38	A 30	D 45	D 65	A 35	D 62	D 40	D 25
<b>Glass transition temperature [°C]</b> Rheometer		57 ( $\pm$ 135 °F)	18 ( $\pm$ 64 °F)	74 ( $\pm$ 165 °F)	114 ( $\pm$ 237 °F)	21 ( $\pm$ 70 °F)	120 ( $\pm$ 248 °F)	52 ( $\pm$ 126 °F)	48 ( $\pm$ 118 °F)
<b>Coefficient of linear expansion [ppm/K]</b>	in temperature range: +25 °C to +140 °C ( $\pm$ +77 °F to +284 °F)	247	254	216	184	239	211	208	200
<b>Shrinkage [vol. %]</b>	DELO® Standard 13	10	6	9	9	6	9	9	7
<b>Water absorption [weight %]</b>	cured product DIN EN ISO 62, 24 h at rt	0.9	0.6	0.9	1.0	0.7	1.3	0.9	3
<b>Special features of product</b>		multi-purpose adhesive also for bonding dissimilar materials	flexible sealing very high elongation at tear USP XXIII Class VI approval	glass and glass/metal connections tension-equalizing USP XXIII Class VI approval	plastic adhesive good adhesion to glass and metal very fast curing tough-hard	flexible sealing run-resistant very high elongation at tear	plastic adhesive good adhesion to glass and metal tough-hard fast curing	multi-purpose adhesive dry surface	multi-purpose adhesive also for bonding dissimilar materials equalizes tensions very well steady

<sup>1)</sup> No component permeable to UVA light

<sup>2)</sup> Young's modulus not measurable

<sup>3)</sup> Intensity meter: DELOLUXcontrol

### Product description

DELO®-PHOTOBOND® are one-component, solvent-free adhesives based on acrylates which can be cured to their final strength in seconds by irradiating them with UVA or visible light (VIS). They have a good resistance to aging and humidity and adhere well to miscellaneous surfaces. Tough-hard to tension-equalizing product types are available. The flow behavior can be adjusted over a wide range of viscosities. We recommend not to use DELO®-PHOTOBOND® glass adhesives for structural outdoor bonding.

### Standard temperature range

DELO®-PHOTOBOND® acrylates are normally used in a temperature range of –40 °C to +120 °C ( $\pm$  –40 °F to +248 °F). Many product properties depend on the temperature and can permanently change, especially at high temperatures. Therefore, the suitability of the respective adhesive for the intended temperature range of use must be tested according to the application before use. You can find details on the behavior of the products under the influence of elevated temperatures in the respective technical data sheet.

### Processing

The products are supplied ready for use and can be processed well from the original container or with dispensing units. You can find more details in the DELO® equipment brochure.

### Curing

All DELO®-PHOTOBOND® acrylates immediately achieve complete curing by irradiation with light of the suitable wavelength. Therefore, to bond two components, one has to be permeable to light of the wavelength used for curing.

DELO®-PHOTOBOND® products are also used for casting and coating. After curing, the adhesive surface can remain slightly sticky.

The DELO®-PHOTOBOND® adhesive 4497 has a dry surface after curing with proper irradiation parameters.

### Surface pretreatment

For optimal adhesion, the surfaces to be bonded must be free of oil, grease, separating agents and other contaminations.

Adhesion can be improved by suitable pretreatment methods, such as sand blasting, flaming and plasma or corona treatment. For the cleaning of glass DELOTHEN EP cleaner has proven to be efficient.

### Storage life

Most DELO®-PHOTOBOND® products are durable for 6 months if stored in unopened original container at room temperature. Some products are stored at temperatures of approx. +5 °C ( $\pm$  +41 °F). You can find detailed information in the technical data sheet.

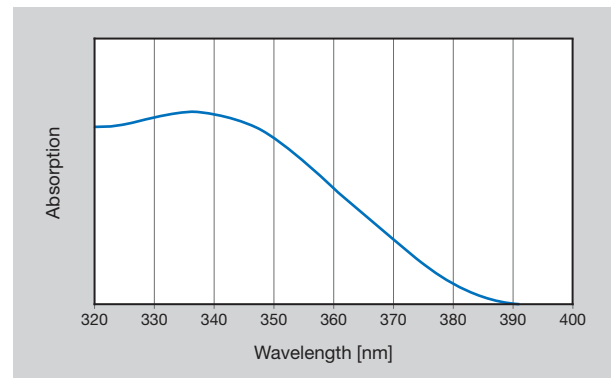
### Further information

You can find more details on type-specific properties in the technical data sheets and material safety data sheets.

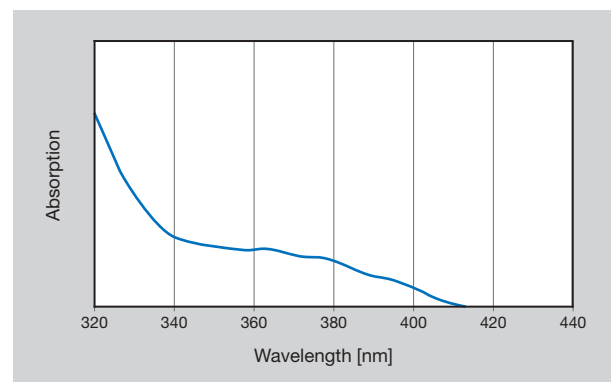
Our Engineering Department will be pleased to support you in technical application tests and questions resulting from processing DELO® products.

Please also refer to the DELO®-KATIOBOND® selection chart.

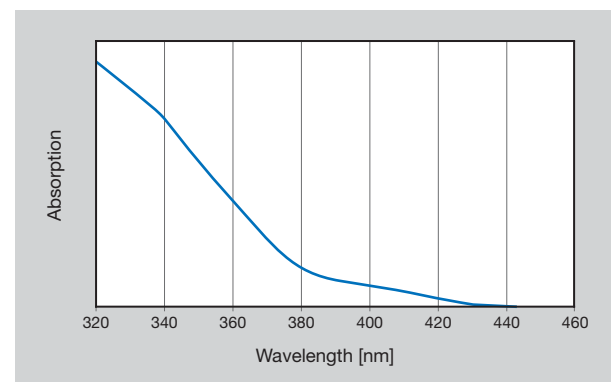
DELO®-KATIOBOND® are also photoinitiated, one-component and solvent-free adhesives. Contrary to the radical-curing acrylates DELO®-PHOTOBOND®, DELO®-KATIOBOND® are based on cationic-polymerizing epoxy resins curing completely after a minimum irradiation time even after irradiation is stopped. As a result, the light-activated types offer the possibility of preactivation. With this procedure two opaque components can be bonded. UV-curing DELO®-KATIOBOND® can be used as Dam&Fill® products for chip encapsulation. All DELO®-KATIOBOND® products have a completely dry surface after curing.



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

**DELO® curing lamps for photoinitiated-curing adhesives**

Lamp type	Radiation exit area	Emission spectrum [nm]	Bulb type	Typical service life [h]
<b>DELOLUX® 03 S;</b> hand-held lamp	212 x 170 mm	325–600	Iron-doped halide high-pressure bulb	1,000
<b>DELOLUX® 04;</b> spot lamp with light guide	Single light guide: Ø 5 mm resp. Ø 8 mm Double light guide resp. fourfold light guide: Ø 3 mm	315–500	halide super-pressure bulb	1,500
<b>DELOLUX® 80</b> LED light source with Coldguide	Diameter: 23.0 mm 16.9 mm	365 400, 460	LED	20,000

**Product selection**

Application area	Casting and coating	Bonding of UVA- and VIS-permeable materials	Bonding of VIS-permeable materials	Bonding of opaque materials	Bonding, casting and coating with reliable curing in shadowed areas
<b>Products</b>	All DELO®-KATIOBOND® and DELO®-PHOTOBOND® products	All DELO®-KATIOBOND® and DELO®-PHOTOBOND® products	Light-activated DELO®-KATIOBOND® and light-curing DELO®-PHOTOBOND® products	Light-activated DELO®-KATIOBOND® products	DELO®-DUALBOND products
<b>Processing suggestion</b>	Application ↓ Irradiation	Application ↓ Joining ↓ Irradiation	Application ↓ Preactivation ↓ Joining	Application ↓ Joining ↓ Irradiation and/or heating	

<b>DELO®-PHOTOBOND®</b>	1-component acrylates UV-curing · light-curing
<b>DELO®-KATIOBOND®</b>	1-component epoxies UV-curing · light-activated
<b>DELO®-DUALBOND</b>	1-component epoxies light-curing · heat-curing
<b>DELO®-MONOPOX®</b>	1-component epoxies heat-curing
<b>DELO®-DUOPOX</b>	2-component epoxies cold-curing
<b>DELO®-ML</b>	1-component methacrylates anaerobic-curing
<b>DELO®-CA</b>	1-component cyanoacrylates fast-curing
<b>DELO®-GUM</b>	1-component silicones highly flexible
<b>DELO®-PUR</b>	2-component polyurethanes cold-curing · tough-elastic
<b>DELOTHEN</b>	Cleaners CFC-free
<b>DELOMAT</b>	Dispensing units precise
<b>DELOLUX®</b>	Curing lamps intensive

Our selection charts are a technical selection aid giving an overview of various product variants. We will be pleased to provide you with sales details, such as available container sizes, stock availability and minimum order quantities, on request.

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. Many product properties are dependent on the temperature and can permanently change especially at increased temperatures. It is the user's responsibility to test the suitability of the product for the intended purpose and temperature range by considering all specific requirements. Type and 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.

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Acrylates  
one-component · UV-curing · light-curing

**DELO**

**DELO®-PHOTOBOND®**



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**Selection Chart**