

DELO® PHOTOBOND® photoinitiated-curing acrylates

Product code	UV-curing	UV- and light-curing								light-activated humidity curing		
		GB310	GB368	PB437	4494	AD491	AD494	4442	FB4175	GE4005	LA4860	LA4875
Application area	B = bonding, S = sealing	B	B	B	B	B	B	B/S	B	B/S	B/S	B/S
Color cured product	in 0.004 in (0.1 mm) layer thickness	colorless clear	colorless clear	colorless clear	colorless clear	colorless translucent	colorless clear	colorless clear	yellowish	blue fluorescent	colorless fluorescent	colorless
	in 0.04 in (1.0 mm) layer thickness	colorless clear	colorless clear	colorless clear	colorless clear	colorless translucent	yellowish clear	colorless clear	yellowish	blue fluorescent	yellowish fluorescent	yellowish
Viscosity [cP = mPas] at +73 °F (+23 °C), rheometer	DIN EN 12092	65 ¹⁾	5,000 ¹⁾	6,000 ¹⁾	21,000 ¹⁾	48,000 ¹⁾	26,000 ¹⁾	740 ¹⁾	150,000 ¹⁾	1,700 ²⁾	70,000 ¹⁾	70,000 ¹⁾
Wavelength range for curing [nm]	320 – 400	← 320 – 420 →				← 320 – 450 →				← 360 – 460 →		
Recommended preactivation time [s] Layer thickness 0.02 in (0.5 mm) LED 400 nm, LED intensity 200 mW/cm ²	–	–	–	–	–	–	–	–	–	–	4	4
Open time after preactivation [s]	DELO Standard 19	–	–	–	–	–	–	–	–	–	~ 23	~ 10
Recommended irradiation time [s] DELOLUX® 80/400, intensity 200 mW/cm ²	20	15	4	3	3	6	10	6	13	–	–	–
Compression shear strength DELO Standard 5 Irradiation and curing conditions: DELOLUX® 20, layer thickness 0.004 in (0.1 mm); LED intensity 200 mW/cm ²	glass/glass	3,625 psi (25 MPa)	3,625 psi (25 MPa)	3,625 psi (25 MPa)	4,205 psi (29 MPa)	3,770 psi (26 MPa)	1,450 psi (10 MPa)	580 psi (4 MPa)	3,915 psi (27 MPa)	725 psi (5 MPa)	290 psi (2 MPa)	870 psi (6 MPa)
	glass/Al	2,900 psi (20 MPa)	3,045 psi (21 MPa)	3,480 psi (24 MPa)	4,205 psi (29 MPa)	4,205 psi (29 MPa)	1,595 psi (11 MPa)	580 psi (4 MPa)	2,900 psi (20 MPa)	725 psi (5 MPa)	290 psi (2 MPa)	725 psi (5 MPa)
	glass/PC	580 psi (4 MPa)	1,595 psi (11 MPa)	1,450 psi (10 MPa)	2,030 psi (14 MPa)	3,625 psi (25 MPa)	1,015 psi (7 MPa)	725 psi (5 MPa)	1,450 psi (10 MPa)	580 psi (4 MPa)	435 psi (3 MPa)	–
	glass/PMMA	725 psi (5 MPa)	2,175 psi (15 MPa)	1,450 psi (10 MPa)	1,450 psi (10 MPa)	2,030 psi (14 MPa)	1,305 psi (9 MPa)	580 psi (4 MPa)	1,885 psi (13 MPa)	580 psi (4 MPa)	145 psi (1 MPa)	725 psi (5 MPa)
	PC/PC	–	–	3,915 psi (27 MPa)	3,915 psi (27 MPa)	3,625 psi (25 MPa)	2,900 psi (20 MPa)	725 psi (5 MPa)	2,320 psi (16 MPa)	870 psi (6 MPa)	145 psi (1 MPa)	1,015 psi (7 MPa)
	PMMA/PMMA	435 psi (3 MPa)	1,885 psi (13 MPa)	2,175 psi (15 MPa)	2,175 psi (15 MPa)	2,030 psi (14 MPa)	1,305 psi (9 MPa)	435 psi (3 MPa)	2,030 psi (14 MPa)	725 psi (5 MPa)	–	–
Tensile strength	by the criteria of DIN EN ISO 527	4,785 psi (33 MPa)	2,900 psi (20 MPa)	3,045 psi (21 MPa)	2,900 psi (20 MPa)	2,900 psi (20 MPa)	1,885 psi (13 MPa)	435 psi (3 MPa)	3,190 psi (22 MPa)	1,595 psi (11 MPa)	145 psi (1 MPa)	870 psi (6 MPa)
Elongation at tear [%]	by the criteria of DIN EN ISO 527	4	17	110	160	150	310	300	220	460	350	270
Young's modulus	DMTA	232.1 ksi (1,600 MPa)	159.5 ksi (1,100 MPa)	126.2 ksi (870 MPa)	112.4 ksi (775 MPa)	118.9 ksi (820 MPa)	29 ksi (200 MPa)	870 psi (6 MPa)	84.7 ksi (584 MPa)	9,280 psi (64 MPa)	75 psi (0.5 MPa)	580 psi (4 MPa)
Shore hardness	by the criteria of DIN EN ISO 868	D 77	D 67	D 65	D 62	D 63	D 25	A 30	D 51	A 53	A 10	A 50
Glass transition temperature T _g	DMTA	+284 °F (+140 °C)	+194 °F (+90 °C)	+194 °F (+90 °C)	+232 °F (+111 °C)	+212 °F (+100 °C)	+118 °F (+48 °C)	+66 °F (+19 °C)	+154 °F (+68 °C)	+102 °F (+39 °C)	–83 °F (–64 °C)	–103 °F (–75 °C)
Average coefficient of linear expansion [ppm/K]	TMA, in temperature range: +77 °F to +311 °F (+25 °C to +155 °C)	168	236	184	211	180	200	254	185	340	400	195
Shrinkage [vol. %]	DELO Standard 13	10	7	9	9	7.5	7	6	6.7	6.8	3	2.5
Water absorption [weight %]	by the criteria of DIN EN ISO 62 24 h at +73 °F (+23 °C)	0.4	0.5	1	1.3	1	3	0.6	1.1	0.7	0.7	1.5
Special features of product		glass adhesive capillary high-strength	glass adhesive also for glass-to-plastic connections dry surface	very fast curing tough-hard	fast curing tough-hard	excellent humidity resistance	multi-purpose adhesive run-resistant gap-filling	flexible sealing USP XXIII Class VI approval	for the bonding of fastening elements (ONSERT)	pin sealing	peel-resistant flexible for bonding and sealing opaque components	peel-resistant flexible for bonding opaque components

Values according to other measuring methods can be found in the Technical Data Sheet of the respective product.

¹⁾ shear rate 2 1/s

²⁾ shear rate 10 1/s

AD = Adhesive **FB** = Fastener Bonding **GB** = Glass Bonding **GE** = General Encapsulant **LA** = Light-Activated **PB** = PHOTOBOND

Product description

DELO® PHOTOBOND® are one-component, solvent-free adhesives based on acrylates.

The use of DELO® PHOTOBOND® adhesives in the field of glass construction, including façade engineering or overhead applications, requires special building approvals which must be obtained by the users themselves.

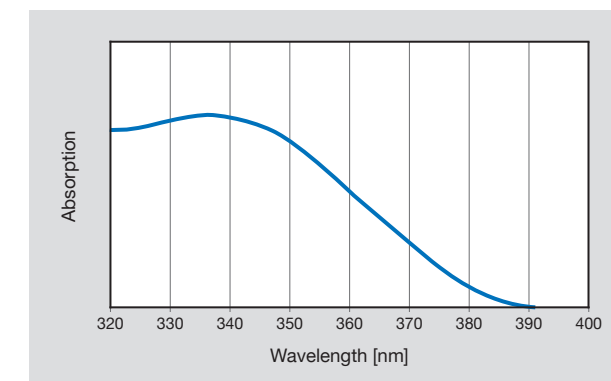
Standard temperature range

DELO® PHOTOBOND® acrylates are normally used in a temperature range of –40 °F to +248 °F (–40 °C to +120 °C).

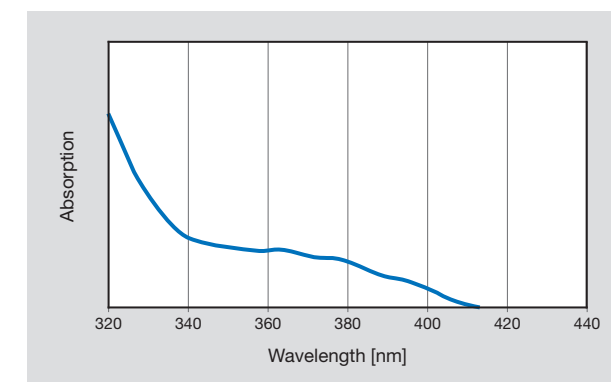
Many product properties depend on the temperature and can change permanently, in particular at high temperatures. Therefore, it has to be checked before each use whether a certain adhesive is suitable for the temperatures in the required area of application. Please see the Technical Data Sheet for more information on how our products react to temperatures.

Processing

The products are normally delivered ready for use. They are applied directly from the container or using dispensing units.



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



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

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 applications. After curing, the adhesive surface can remain slightly sticky. DELO® PHOTOBOND® GB368 has a dry surface after curing with proper irradiation parameters.

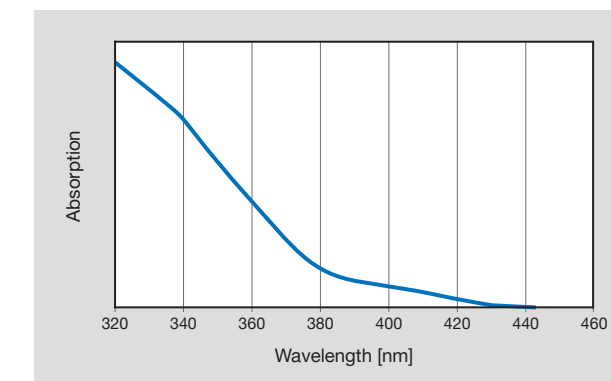
Curing of DELO® PHOTOBOND® LA products is initiated by exposure to light in the suitable wavelength range with the suitable intensity for the required irradiation time. Humidity access is required during curing. Without activation by light of the suitable wavelength, the adhesive does not cure within several days, even if humidity is available.

Surface pretreatment

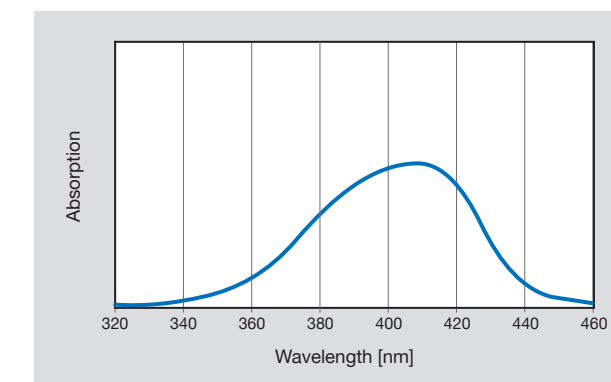
To achieve optimum bond strength, the surfaces must be free from dust, oil, grease, separating agents and other contaminations. After cleaning, the adhesion of the adhesive can be further enhanced by sand blasting, flaming and plasma or corona treatment.

Preservability

After delivery, most DELO® PHOTOBOND® products are durable for 6 months if stored in the unopened original container at room temperature. You can find detailed information in the Technical Data Sheet of the product.



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



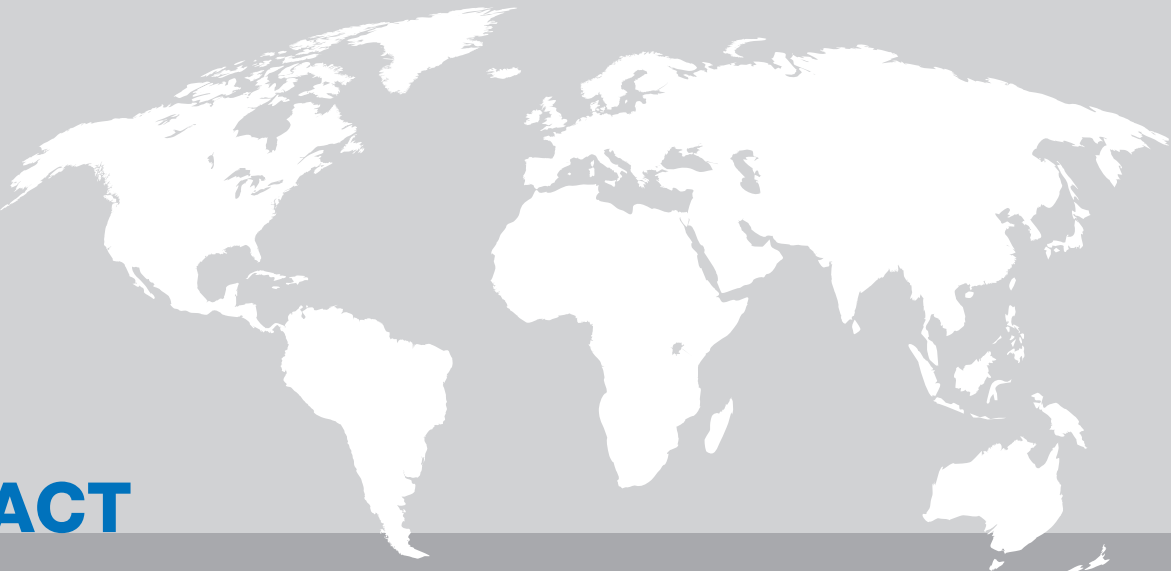
Absorption spectrum of the photoinitiator (wavelength range from 360 to 460 nm) of the light-activated humidity-curing DELO® PHOTOBOND® LA products in an acrylate matrix.



Acrylates
one-component · UV-curing · UV- and light-curing ·
light-activated humidity curing

SELECTION CHART

DELO® PHOTOBOND®



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Further information

More type-specific properties are included in the Technical Data Sheets, Material Safety Data Sheets and Instructions for Use. For application tests and any question you might have regarding the use of DELO® products, please do not hesitate to contact our Engineering Department. 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 DELO®

PHOTOBOND® acrylates, 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.

Curing of photoinitiated adhesives

Curing with UV light or visible light in the specific wavelength range. DELOLUX® LED curing lamps are especially suitable as

per the chart below. All standard DELOLUX® HID lamps are also suitable.

Lamp type	DELOLUX® 80, DELOLUX® 50 and 502, DELOLUX® 20 and 202		
	365	400	460
DELO® PHOTOBOND® GB310	++	–	–
DELO® PHOTOBOND® GB368	++	+	–
DELO® PHOTOBOND® PB437	+	++	–
DELO® PHOTOBOND® 4494	+	++	–
DELO® PHOTOBOND® AD491	++	++	–
DELO® PHOTOBOND® AD494	+	++	–
DELO® PHOTOBOND® 4442	+	++	–
DELO® PHOTOBOND® FB4175	+	++	–
DELO® PHOTOBOND® GE4005	++	++	–
DELO® PHOTOBOND® LA4860	–	++	+
DELO® PHOTOBOND® LA4875	–	++	+

++ especially suitable + suitable – not suitable

Product selection

Application area	Potting / encapsulation Coating	Bonding of UVA- and VIS-permeable materials	Bonding of VIS-permeable materials	Bonding of opaque materials	Bonding, potting, encapsulation, coating with reliable curing in shadowed areas
Products	DELO® KATIOBOND®, DELO® PHOTOBOND®	DELO® KATIOBOND®, DELO® PHOTOBOND®	Light-activated DELO® KATIOBOND®, light-curing DELO® PHOTOBOND®	Light-activated DELO® KATIOBOND®, light-activated humidity-curing DELO® PHOTOBOND® LA	DELO DUALBOND®
Processing suggestion	Application ↓ Irradiation	Application ↓ Joining ↓ Irradiation	Application ↓ Joining ↓ Irradiation	Application ↓ Preactivation ↓ Joining	Application ↓ Joining ↓ Irradiation and/or heat or air humidity