

Curing of photoinitiated adhesives

Curing with UV light or visible light in the respective wavelength range. DELOLUX LED curing lamps are especially suitable as per the chart below. All standard DELOLUX HID discharge lamps

are also suitable. For preactivation, only visible light in a wavelength range from 400 to 550 nm can be used.

Wavelength [nm]	DELOLUX LED curing lamps		
	365	400	460
DELO DUALBOND AD761	++	+	-
DELO DUALBOND GE731	++	+*	-
DELO DUALBOND OB6769	++	-	-
DELO DUALBOND OB6268	++	-	-
DELO KATIOBOND DI6049	+***	+	++
DELO KATIOBOND 4594	+**	+	++
DELO KATIOBOND 45952	+**	+	++
DELO KATIOBOND GE680	++	-	-
DELO KATIOBOND OB678	++	-	-

++ especially suitable
+ suitable
- not suitable

* not suitable for fast fixation, only in combination with heat curing
** suitable for direct irradiation, preactivation conditionally possible
*** fixation for thin layers

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Our selection charts/material selection guides 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. 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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ADHESIVES

DISPENSING

CURING

CONSULTING

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SELECTION CHART

DELO KATIOBOND

DELO DUALBOND

Epoxy resin adhesives
one-component
preactivated · UV-fixable · UV-/light-curing · UV-curing

Epoxy resin adhesives
one-component · UV-/light-/heat-curing

Photoinitiated-curing epoxy adhesives

Product group/curing class	DELO DUALBOND				DELO KATIOBOND				
	UV-/light-/heat-curing				preactivated, UV-fixable	preactivated, UV-/light-curing		UV-curing	
Product name	AD761	GE731	OB6769	OB6268	DI6049	4594	45952	GE680	OB678
Color of cured product	in 0.1 mm layer thickness yellowish transparent	yellowish transparent	whitish translucent fluorescent	yellowish transparent	whitish translucent	yellowish transparent	yellow transparent fluorescent	whitish translucent	colorless clear
Density [g/cm ³]	DELO Standard 13 at room temperature (+23 °C) 1.14	1.09	1.65	1.43	1.81	1.13	1.15	1.8	1.13
Viscosity [mPa·s]	Anton Paar rheometer, shear rate 10 1/s at room temperature (+23 °C) 6,000	10,000	22,500	35,000	20,000	5,500	6,300	70,000	8,400
Curing/irradiation	UV or visible light in the range 320 – 420 nm or by heat		UV light in the range 320 – 380 nm or by heat		UV or visible light in the range 320 – 550 nm		UV light in the range 320 – 380 nm		
Typical preactivation time [s] LED 460 nm, intensity 200 mW/cm ² , DELOLUXcontrol	–	–	–	–	10	3	8	–	–
Typical light fixation time [s] LED lamp, DELOLUXcontrol, see Technical Data Sheet for wavelength/intensity	15	30	1 – 3	15	5	–	–	–	–
Typical irradiation time [s] LED lamp, intensity: 200 mW/cm ² , DELOLUXcontrol	–	–	–	–	–	–	–	5	10
Curing time with heat without heating time of the components	5 min @ +130 °C 3 min @ +150 °C	10 min @ +130 °C 5 min @ +150 °C	50 min @ +80 °C 20 min @ +100 °C	15 min @ +130 °C	15 min @ +60 °C (preactivated)	–	–	–	–
Max. curable layer thickness [mm]	DELO Standard 20 > 4	> 4	–	1.2	–	–	–	> 4	2.1
Max. layer thickness that can be activated [mm]	DELO Standard 21 –	–	–	–	4	> 4	> 4	–	–
Compression shear strength [MPa] DELO Standard 5 after 24 h at room temperature (approx. +23 °C)	FR4/FR4 29 ¹⁾	n. d.	36 ¹⁾	n. d.	45 ³⁾	20 ³⁾	20 ³⁾	16 ^{*2)}	20 ^{*2)}
	PBT/PBT 5 ¹⁾	n. d.	14 ¹⁾	14 ¹⁾	8 ³⁾	9 ³⁾	6 ³⁾	11 ^{*2)}	9 ^{*2)}
	Al/Al (laser) 37 ¹⁾	3 ¹⁾	36 ¹⁾	52 ¹⁾	48 ³⁾	35 ³⁾	27 ³⁾	20 ^{*2)}	20 ^{*2)}
	PC/PC 40 ¹⁾	8 ¹⁾	41 ¹⁾	33 ¹⁾	8 ³⁾	26 ³⁾	14 ³⁾	19 ^{**2)}	47 ^{**2)}
Tensile strength [MPa]	by the criteria of DIN EN ISO 527 after 24 h at room temp. (approx. +23 °C) 22 ⁴⁾	1 ⁴⁾	65 ⁴⁾	46 ⁴⁾	65 ³⁾	27 ²⁾	30 ²⁾	37 ²⁾	50 ²⁾
Elongation at tear [%]	by the criteria of DIN EN ISO 527 after 24 h at room temp. (approx. +23 °C) 86 ⁴⁾	98 ⁴⁾	0.8 ⁴⁾	1 ⁴⁾	0.6 ³⁾	9 ²⁾	85 ²⁾	0.7 ²⁾	3 ²⁾
Young's modulus [MPa]	DMTA, 2nd run 1,000	< 10	11,000	6,300	17,000	2,300	1,100	16,800	3,400
Shore hardness	by the criteria of DIN EN ISO 868 after 24 h at room temp. (approx. +23 °C) D 56	A 43	D > 90	D 88	D > 90	D 75	D 67	D > 90	D 85
Glass transition temperature T _g [°C]	DMTA, 2nd run at room temperature (approx. +23 °C) +48	–33	+160	+202	+170	+140	+39	+160	+160
Coefficient of linear expansion [ppm/K] DELO Standard 26, TMA	α ₁ 91 (–40 °C to –20 °C)	–	26 (–40 °C to +30 °C)	37 (–40 °C to +20 °C)	18 (–40 °C to –20 °C)	123 (+30 °C to +55 °C)	–	33 (+30 °C to +150 °C)	65 (–40 °C to +10 °C)
	α ₂ 214 (+60 °C to +140 °C)	274 (–20 °C to +150 °C)	38 (+30 °C to +120 °C)	78 (+135 °C to +170 °C)	52 (+150 °C to +170 °C)	175 (+110 °C to +170 °C)	200 (+30 °C to +145 °C)	–	154 (+140 °C to +170 °C)
Shrinkage [vol. %]	DELO Standard 13 at room temperature (+23 °C) 3.3	2	1.7	0.7	2	4.3	3.7	1.7	3.9
Water absorption [weight %]	by the criteria of DIN EN ISO 62 after 24 h at room temp. (approx. +23 °C) 0.5	0.4	0.08	0.24	0.05	0.8	2.1	0.06	0.3

¹⁾ curing: heat

²⁾ curing: light

³⁾ curing: preactivation

⁴⁾ curing: combination of light and heat

* mixed bonding with glass

** bonding with PC Lexan

n. d. = not determined

AD = Adhesive DI = Dual Initiator GE = General Encapsulant OB = Optical Bonding

Product description

DELO KATIOBOND and DELO DUALBOND are one-component, solvent-free adhesives based on epoxy resins.

Curing of cationic DELO KATIOBOND and DELO DUALBOND until initial strength takes place within seconds, depending on the type, by irradiation with UVA or visible light (VIS). The products of both product groups cure until final strength even after irradiation is stopped.

DELO DUALBOND products can be additionally cured by applying heat. This is advantageous wherever the adhesive cannot be irradiated with light or cannot be irradiated sufficiently, e.g. in shadowed areas. The two curing mechanisms can be used independently.

Usual temperature range

DELO KATIOBOND and DELO DUALBOND are normally used in a temperature range of –40 °C to +150 °C. Individual products can be used in a range up to +180 °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 processed directly from the container or using dispensing units.

Curing

Curing of the DELO KATIOBOND products is triggered by light in the appropriate wavelength range with sufficient intensity and irradiation time. Longer irradiation times, higher intensities or higher temperatures accelerate the curing process. Afterwards, the adhesive cures until final strength at room temperature without further irradiation.

With preactivated DELO KATIOBOND products, even opaque components can be bonded using light curing. The adhesives are typically activated through short irradiation times (preactivation time), enabling an open time within which the components should be joined. Afterwards, the adhesive cures until final strength at room temperature without further irradiation. You can find the exact values in the Technical Data Sheets.

In addition to light curing, DELO DUALBOND products can be cured by applying heat to the areas that are not accessible to light. Light and heat curing mechanisms can be used independently. This makes it possible to cure the DELO DUALBOND adhesive first in the accessible areas with light in a short time, and then perform a heat curing step to cure shadowed areas reliably, as well.

The above irradiation, preactivation and open times are based on tests according to DELO Standards with defined procedures, equipment and specimens. In practice, the time parameters may vary accordingly.

In the case of specified components to be joined, these can be influenced in particular by irradiation intensity and temperature. The curing time is reduced by higher temperatures and/or higher irradiation intensity. This also reduces preactivation and open times.

DELO KATIOBOND and DELO DUALBOND adhesives have a completely dry surface after curing. Therefore, they can be used very well for potting and coating applications.

Surface pretreatment

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

Strongly alkaline surfaces can inhibit adhesive curing, resulting in poor establishment of adhesion.

Adhesion can be improved by suitable pretreatment methods, such as sand blasting, flaming and plasma or corona treatment.

Storage life

After delivery, in the unopened original container: see Technical Data Sheet of the respective product.

Notes

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 the DELO Engineering.

Please also refer to the “Preactivated epoxy resin adhesives DELO KATIOBOND” and “DELO PHOTOBOND” Selection Charts. These are also photoinitiated, one-component and solvent-free adhesives. In contrast to the cationic-curing epoxies DELO KATIOBOND, DELO PHOTOBOND are based on radical-curing acrylate resins and can be cured very quickly until final strength by irradiation with UVA light or visible light (VIS).