

Application examples

High-strength bonding at thermal stress

For example bonding of:
highly stressed carbide inserts, hardened guide rail strips at machines, robot gripper constructions, electrical machines, fiber composite sandwich panels

- DELO-DUOPOX AB8390
- DELO-DUOPOX AD840
- DELO-DUOPOX AD895
- DELO-DUOPOX SJ8665
- DELO-PUR 9692

High-strength bonding with fast initial strength

For example plastic to metal, garnish moldings resp. front spoilers of cars

- DELO-PUR 9692
- DELO-PUR 9694

High initial strength in very short periods of time

- DELO-DUOPOX 02 rapid
- DELO-DUOPOX 03 rapid
- DELO-DUOPOX 03 rapid thix
- DELO-PUR 9692

High run resistance

- DELO-DUOPOX AB8390
- DELO-DUOPOX AD897
- DELO-DUOPOX SJ8665
- DELO-PUR 9692
- DELO-PUR 9694
- DELO-PUR 9895
- DELO-PUR SJ9356

Good tension-equalizing behavior

- DELO-DUOPOX CR8021
- DELO-DUOPOX AD840
- DELO-PUR 9691
- DELO-PUR 9694
- DELO-PUR 9895
- DELO-PUR SJ9356

Impregnating / soaking / laminating

For example of porous materials such as cast, fabric and glass fibers, of windings

- DELO-DUOPOX CR8014
- DELO-DUOPOX CR8021
- DELO-DUOPOX CR8031

Sealing and casting of electrical components

- DELO-DUOPOX CR8014
especially for narrow gaps, tension-equalizing, flexible
- DELO-DUOPOX CR8031
tough-hard
- DELO-PUR 9691
tension-equalizing, fast initial strength

CONTACT

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- **Taiwan, China** · Taipei
- **Thailand** · Bangkok
- **USA** · Sudbury, MA

www.DELO-adhesives.com

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

DELO

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DELO



SELECTION CHART

DELO-DUOPOX

DELO-PUR

Epoxy resins
two-component · room-temperature-curing · high-strength to elastic

Polyurethanes
two-component · room-temperature-curing · tough-elastic

Two-component adhesives		Epoxy resins DELO-DUOPOX											Polyurethanes DELO-PUR				
Product group																	
fast curing		✓	✓	✓								✓	✓	✓	✓		
elastic / tension-equalizing					✓	✓			✓			✓	✓		✓		✓
very high strength		✓						✓	✓	✓	✓	✓		✓	✓		
high temperature of use					✓	✓			✓			✓					
for large gaps				✓				✓			✓			✓		✓	
good flow behavior		✓	✓		✓	✓	✓		✓			✓					
Product code		02 rapid AUTOMIX ²⁾	03 rapid AUTOMIX ²⁾	03 rapid thix AUTOMIX ²⁾	CR8014	CR8021 AUTOMIX ²⁾	CR8031 AUTOMIX ²⁾	AB8390 AUTOMIX ²⁾	AD840 AUTOMIX ²⁾	AD895 AUTOMIX ²⁾	AD897 AUTOMIX ²⁾	SJ8665 AUTOMIX ²⁾	9691 AUTOMIX ²⁾	9692 AUTOMIX ²⁾	9694 AUTOMIX ²⁾	9895 AUTOMIX ²⁾	SJ9356 AUTOMIX ²⁾
Color	cured product	yellowish transparent	yellowish transparent	yellowish transparent	yellowish translucent	yellowish translucent	black	white, colorfast	dark gray	gray	gray	black	black	black	black	light beige	black
Filler		unfilled	unfilled	unfilled	unfilled	unfilled	unfilled	inorganic	minerals	minerals	minerals	minerals	minerals	minerals	minerals	minerals	minerals
Mixing ratio	A:B by weight	1:1	1:1	1:1	0.84:1	0.58:1	2.37:1	1.20:1	0.88:1	7:3	7:3	1.65:1	1:1	1:1	1:1	1:1	10.3:1
	A:B by volume	1:1	1:1	1:1	0.72:1	0.5:1	2:1	1:1	1:1	2:1	2:1	2:1	1:1	1:1	1:1	1:1	10:1
Density [g/cm ³]	at room temperature (approx. +23 °C), DELO Standard 13																
	component A	1.17	1.15	1.19	1.17	1.18	1.15	1.41	1.18	1.37	1.37	1.16	1.45 mixture	1.47	1.47	1.48	1.31
	component B	1.14	1.14	1.16	0.98	1.03	0.97	1.21	1.33	1.19	1.17	1.41		1.43	1.43	1.44	1.28
Viscosity [mPa·s]	at room temperature (approx. +23 °C)																
	component A	8,000 Brookfield	13,000 Brookfield	50,000 Brookfield	10,000 Rheometer	34,000 Rheometer	18,000 Rheometer	pasty Rheometer	100,000 Rheometer	100,000 Brookfield	pasty Rheometer	250,000 Rheometer	80,000 Brookfield	pasty Brookfield	pasty Brookfield	pasty Brookfield	pasty Rheometer
	component B	18,000 Brookfield	18,000 Brookfield	36,000 Brookfield	330 Rheometer	10,000 Rheometer	11,000 Rheometer	pasty Rheometer	150,000 Rheometer	95,000 Brookfield	pasty Rheometer	40,000 Rheometer	80,000 Brookfield	pasty Brookfield	pasty Brookfield	pasty Brookfield	pasty Rheometer
Processing	100 g preparation																
	processing time ¹⁾ [min] at room temperature	6	3	3	50	60	85	30	90	30	30	40	4	5	7	30	9
	max. reaction temperature [°C]	130	140	130	100	87	120	89	86	98	95	166	40	60	50	35	–
Curing time	at room temperature																
	initial strength 1–2 MPa at rt./at +80 °C	12 min/–	11 min/–	13 min/–	8 h/<15 min	6 h/<15 min	8 h/10 min	5 h/–	7 h/13 min	5.5 h/–	6 h/–	3.5 h/<5 min	90 min/–	30 min/–	2 h/–	5.5 h/25 min	4 h/–
	functional strength >10 MPa, at rt./at +80 °C	24 h/15 min	2 h/5 min	2 h/5 min	48 h/30 min	48 h/15 min	16 h/15 min	12 h/–	16 h/20 min	8 h/18 min	8 h/17 min	5 h/<10 min	6 h/20 min	2 h/5 min	8 h/30 min	24 h/60 min	–/–
	final strength at rt./at +80 °C	72 h/60 min	24 h/40 min	24 h/60 min	72 h/2 h	72 h/90 min	7 d/60 min	7 d/2 h +60 °C	72 h/40 min	24 h/30 min	24 h/25 min	7 d/60 min	72 h/22 min	72 h/10 min	72 h/32 min	72 h/90 min	7 d/–
Tensile shear strength [MPa]	DIN EN 1465 Al/ Al sand-blasted curing: 7 d at room temperature																
	1.6 mm	18	14	10	13	11	16	24	23	19	17	32	15	20	17	13	3
	DELO Standard 39 6 mm	16	16	17	–	–	–	–	27	32	32	34	13	23	–	12	–
Floating roller peel resistance [N/mm]	steel/steel sand-blasted	2.5	1.1	0.3	3	3	–	5	6	1.2	1.3	6	6	6	8	10	4
Temperature stability [MPa]	by the criteria of DIN EN 1465 at +100 °C	1	1	2	–	2 at +80 °C	–	5 at +85 °C	5	2.5	2.8	20 at +85 °C	2.5	8	3	3	1.7
Tensile strength [MPa]	DIN EN ISO 527	24	31	33	8	9	40	36	30	40	42	46	13	20	10	10	2
Elongation at tear [%]	DIN EN ISO 527	20	19	20	45	35	5	4	6	2	1.8	3.5	20	3	60	70	120
Young's modulus [MPa]	DIN EN ISO 527	1,000	2,000	2,000	< 100	100	1,700	2,300	1,700	2,400	2,500	3,300	500	1,500	100	100	< 10
Shore hardness	by the criteria of DIN EN ISO 868	D 74	D 75	D 75	D 46	D 47	D 72	D 73	D 76	D 73	D 77	D 77	D 69	D 75	D 50	D 50	A 51
Glass transition temperature T _g [°C]	2nd heating step	+31 TMA	+38 Rheometer	–	+50 DMTA	+47 DMTA	+102 +66 DMTA TMA	+92 DMTA	+69 Rheometer	+63 Rheometer	+64 Rheometer	+126 DMTA	+49 Rheometer	+53 Rheometer	+40 Rheometer	+39 Rheometer	< –50 DMTA
Coefficient of expansion [ppm/K]	in the temperature range [°C]	211 +30 to +140	242 +30 to +140	224 +30 to +140	280 +30 to +140	250 +30 to +150	200 +80 to +160	93 +30 to +55	160 +30 to +150	88 +30 to +50	88 +30 to +50	82 +35 to +100	162 +25 to +140	153 +30 to +140	167 +30 to +140	205 +30 to +140	–
Shrinkage [vol. %]	DELO Standard 13	3.7	4.3	4.3	3.5	3	4	3	2.6	3.6	3.8	3	3.4	1.5	4.8	3.4	2
Water absorption [weight %]	24 h at room temperature	0.7	1	1.1	0.6	0.5	0.23	0.16	0.18	0.25	0.25	0.15	0.24	0.3	0.3	0.3	0.8
Application examples		casting and bonding		bonding, e.g. sealing of housings	casting resin impregnating, soaking and laminating			bonding and coating			coating and trowelling	bonding with high temperature load	casting and bonding of sensors and small components	bonding of housings	sealing of housings construction adhesive	bonding and sealing of plastics	tension-equalizing bonding and sealing
Properties and advantages of all products		highly reliable connections, mainly with dissimilar material combinations, for example glass, plastic, metal, ceramic or wood; multi-purpose, solvent-free, low curing shrinkage, very good temperature and media resistance, curing without elevated temperatures (however, curing can be accelerated by heat [except for SJ9356])															

¹⁾ Processing time: mixture must be used, i.e. mixed, applied and joined, within this time

²⁾ DELO-AUTOMIX = product is also available in double chamber cartridges for simple handling of two-component adhesives

AB = Aviation Bonding AD = Adhesive CR = Casting Resin SJ = Structural Joining

Product description

DELO-DUOPOX are two-component epoxy resins and DELO-PUR are two-component polyurethanes curing at room temperature (rt) after mixing the two components in the ratio indicated.

The DELO-AUTOMIX products can be processed from double chamber cartridges with a static mixing tube like one-component products. DELO supplies suitable mixing tubes that DELO also uses in internal development and testing.

The "mixing tube B 050 short" is only conditionally suitable for DELO-DUOPOX rapid adhesives.

Standard temperature range

DELO-DUOPOX products are normally used in a temperature range of –40 °C to +140 °C (CR8031 and SJ8665 up to +180 °C). DELO-DUOPOX rapid adhesives are excluded.

DELO-PUR products are normally used in a temperature range of –40 °C to +125 °C (SJ9356 up to +105 °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

DELO-DUOPOX and DELO-PUR products must be mixed at the ratio indicated until the mixture is homogeneous and streak-free.

When using the products marked as "AUTOMIX", this task is performed by the practical DELO-AUTOMIX mixing and dispensing system.

- Resin and hardener are filled in double chamber cartridges in the correct volume mixing ratio.
- With the dispensing guns DELO-XPRESS for manual or pneumatic operation, the two components are pressed out of the cartridge without great effort. The mixing tube attached to the cartridge serves for homogeneous mixing and exact dispensing. When following the instructions for use, mixing errors are excluded. No further utensils are necessary and neat application is enabled.
- The "mixing tube B 050 short" is only conditionally suitable for DELO-DUOPOX rapid adhesives.

Please pay attention to the respective Instructions for Use, as well.

Curing

- DELO-DUOPOX and DELO-PUR cure at room temperature. Increased temperatures accelerate curing (except for SJ9356).
- When mixing the components, the period of time available for processing the product starts.
- After exceeding the processing time, the viscosity increases until the adhesive is completely cured.
- Details: see Technical Data Sheets

Surface pretreatment

To achieve optimum bond strength, the surfaces must be free from dust, oil, grease, separating agents and other contaminations. For cleaning, we recommend using cleaning agents from the DELOTHEN series.

After cleaning, the adhesion of the adhesive can be further enhanced by sand blasting, grinding or pickling the surface.

Storage life

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

Use

DELO-DUOPOX and DELO-PUR products are used for high-strength bonding of components which are extremely stressed to some extent. These products are constructional elements. The adhesive selection is supposed to be optimized regarding component material, stresses, construction and processing technology. Application areas are mainly found in automotive and automotive supplier industry, mechanical and electrical engineering, electronics, plant construction, construction technology, energy and environmental technology.

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.

DELO dispensing guns for 50 ml double chamber cartridges

- DELO-XPRESS 902 manual operation; for 1:1 and 2:1 cartridges
- DELO-XPRESS 903 pneumatic operation; for 1:1 cartridges
- DELO-XPRESS 907 pneumatic operation; for 1:1 and 2:1 cartridges

DELO dispensing gun for 200 ml double chamber cartridges

- DELO-XPRESS 905 pneumatic operation; for 1:1 and 2:1 cartridges



Simple mixing and dispensing by means of DELO-XPRESS 902



DELO-XPRESS 903

DELO-XPRESS 907

DELO-XPRESS 905

Mixing tubes & accessories for 50 ml double chamber cartridges

- Mixing tube B 050 short, with clip-on nozzle
- Mixing tube B 050 universal*
- DELO-AUTOMIX adapter for the dispensing with Euro cartridge dispensing guns
- * Luer-lock adapter for dispensing tips available

Mixing tubes for 200 ml double chamber cartridges

- Mixing tube F 200 short*
- Mixing tube F 200 thin*
- Mixing tube F 200 long*
- * Luer-lock adapter for dispensing tips available

Mixing tubes for 490 ml double chamber cartridges

- Mixing tube F 490 thin*
- * Luer-lock adapter for dispensing tips available