Application examples

- **High-strength bonding at thermal stress**

  For example bonding of:
  highly stressed carbide inserts, hardened guideway gibs in machines, robot gripper construction
  → DELO-DUOPOX AD840
  → DELO-DUOPOX AD895
  → 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 AD897
  → DELO-PUR 9692
  → DELO-PUR 9694
  → DELO-PUR 9895

- **Good tension-equalizing behavior**

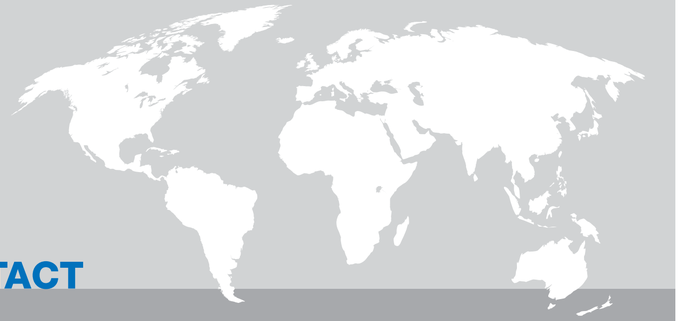
  → DELO-PUR 9691
  → DELO-PUR 9694
  → DELO-PUR 9895
  → DELO-DUOPOX CR804
  → DELO-DUOPOX CR805
  → DELO-DUOPOX AD840
  → DELO-DUOPOX AD848

- **Impregnating / soaking / laminating**

  For example of porous materials such as cast, fabric and glass fibers, of windings
  → DELO-DUOPOX CR804
  → DELO-DUOPOX CR805

- **Sealing and casting of electrical components**

  → DELO-DUOPOX CR804, DELO-DUOPOX CR805
  especially for narrow gaps, tension-equalizing, flexible
  → DELO-DUOPOX AD894
  tough-hard
  → DELO-PUR 9691
  tension-equalizing, fast initial strength



CONTACT

Headquarters

DELO Industrial Adhesives
▶ **Germany** · Windach / Munich
Phone +49 8193 9900-0
info@DELO.de
www.DELO.de

DELO Industrial Adhesives
▶ **USA** · Sudbury / Boston, MA
Phone +1 978 254 5275
usa@DELO-adhesives.com
www.DELO-adhesives.com/us

DELO Industrial Adhesives
▶ **Singapore**
Phone +65 6807 0800
singapore@DELO-adhesives.com
www.DELO-adhesives.com/en

DELO Industrial Adhesives
▶ **China** · Shanghai
Phone +86 21 2898 6569
china@DELO-adhesives.com
www.DELO-adhesives.com/cn

DELO Industrial Adhesives
▶ **Taiwan** · Taipei
Phone +886 2 6639 8248
taiwan@DELO-adhesives.com
www.DELO-adhesives.com/cn

DELO Industrial Adhesives
▶ **Malaysia** · Kuala Lumpur
Phone +65 6807 0800
malaysia@DELO-adhesives.com
www.DELO-adhesives.com/en

DELO Industrial Adhesives
▶ **South Korea** · Seoul
Phone +82 2 2190 3727
korea@DELO-adhesives.com
www.DELO-adhesives.com/en

04/16

DELO

SELECTION CHART

DELO-DUOPOX

DELO-PUR

Epoxy resins
two-component · cold-curing · high-strength to elastic

Polyurethanes
two-component · cold-curing · tough-elastic

Two-component adhesives

Product group		Epoxy resins DELO-DUOPOX										Polyurethanes DELO-PUR			
fast curing		✓	✓	✓								✓	✓	✓	
elastic / tension-equalizing					✓	✓	✓	✓				✓		✓	✓
very high strength		✓					✓	✓	✓	✓	✓		✓	✓	
high temperature of use					✓	✓	✓	✓	✓						
for large gaps				✓				✓		✓	✓		✓	✓	✓
good flow behavior		✓	✓		✓	✓	✓		✓			✓			
test for cytotoxicity acc. to ISO 10993-5							✓	✓		✓		✓			✓
Product code		**02 rapid** AUTOMIX[2]	**03 rapid** AUTOMIX[2]	**03 rapid thix** AUTOMIX[2]	**CR804**	**CR805**	**AD840** AUTOMIX[2]	**AD848** AUTOMIX[2]	**AD894** AUTOMIX[2]	**AD895** AUTOMIX[2]	**AD897** AUTOMIX[2]	**9691** AUTOMIX[2]	**9692** AUTOMIX[2]	**9694** AUTOMIX[2]	**9895** AUTOMIX[2]
Color cured product		yellowish transparent	yellowish transparent	yellowish transparent	yellowish transparent	black	dark gray	dark gray	black	gray	gray	black	black	black	light beige
Filler		unfilled	unfilled	unfilled	unfilled	unfilled	minerals	minerals	minerals	minerals	minerals	minerals	minerals	minerals	minerals
Mixing ratio	A : B by weight	1 : 1	1 : 1	1 : 1	0.84 : 1	0.84 : 1	0.88 : 1	0.87 : 1	7 : 3	7 : 3	7 : 3	1 : 1	1 : 1	1 : 1	1 : 1
	A : B by volume	1 : 1	1 : 1	1 : 1	0.72 : 1	0.72 : 1	1 : 1	1 : 1	2 : 1	2 : 1	2 : 1	1 : 1	1 : 1	1 : 1	1 : 1
Density [g / cm³] at room temperature (approx. +23 °C), DELO Standard 13	component A	1.17	1.15	1.19	1.17	1.17	1.18	1.19	1.37	1.37	1.37	1.45 (mixture)	1.47	1.47	1.48
	component B	1.14	1.14	1.16	1.0	1.0	1.33	1.37	1.18	1.19	1.17		1.43	1.43	1.44
Viscosity [mPas] at room temperature (approx. +23 °C), Brookfield	component A	8,000	13,000	50,000	10,000	10,000	100,000	pasty	45,000	100,000	pasty	80,000	pasty	pasty	pasty
	component B	18,000	18,000	36,000	400	450	150,000	pasty	20,000	95,000	pasty	80,000	pasty	pasty	pasty
Processing 100 g preparation	processing time[1] [min] at room temperature	6 (3 g preparation)	3 (3 g preparation)	3 (3 g preparation)	35	35	90	90	45	30	30	4	5	7	30
	max. reaction temperature [°C]	130 (20 g preparation)	140 (20 g preparation)	130 (20 g preparation)	110	106	86	90	98	98	95	40	60	50	35
Curing conditions at room temperature	initial strength 1–2 MPa (at rt / at +80 °C)	12 min / –	11 min / –	13 min / –	7.5 h / 18 min	–	7 h / 13 min	7 h / 10 min	5 h / –	5.5 h / –	6 h / –	90 min / –	30 min	2 h	7 h / 25 min
	functional strength (at rt / at +80 °C)	24 h / 15 min	2 h / 5 min	2 h / 5 min	24 h / 50 min	–	16 h / 20 min	16 h / 15 min	7 h / 16 min	8 h / 18 min	8 h / 17 min	6 h / 20 min	2 h / 5 min	8 h / 30 min	72 h / 60 min
	final strength (at rt / at +80 °C)	72 h / 1 h	24 h / 40 min	24 h / 1 h	7 d / 60 min	7 d / –	72 h / 40 min	72 h / –	24 h / 30 min	24 h / 30 min	24 h / 25 min	72 h / 22 min	72 h / 10 min	72 / 32 min	72 h / 90 min
Tensile shear strength [MPa] Al / Al sand-blasted	DIN EN 1465 1.6 mm, 7 d rt	18	14	10	12	12	23	21	19	19	17	15	20	17	13
	DELO Standard 39 6 mm, 7 d rt	16 (72 h rt)	16	17	–	–	27	23	31	32	32	13 (72 h rt)	23 (72 h rt)	–	12 (72 h rt)
Floating roller peel resistance [N / mm] St / St sand-blasted	DELO Standard 38	2.5	1.1	0.3	4.1	4	6	7	0.7	1.2	1.3	6	6	8	10
Temperature stability [MPa] at +100 °C	by the criteria of DIN EN 1465	1	1	2	–	–	5	5	3.5	2.5	2.8	2.5	8	3	3
Tensile strength [MPa]	DIN EN ISO 527	24	31	33	11	10	30	30	41	40	42	13	20	10	10
Elongation at tear [%]	DIN EN ISO 527	20	19	20	60	60	6	4	2.1	2	1.8	20	3	25	30
Young's modulus [MPa]	DIN EN ISO 527	1,000	2,000	2,000	100	100	1,700	1,800	2,300	2,400	2,500	500	1,500	100	300
Shore hardness D	by the criteria of DIN EN ISO 868	74	75	75	43	45	76	75	73	73	77	69	75	50	50
Glass transition temperature [°C]	DELO Standard 24, rheometer, 2nd heating step	31 (TMA)	38	–	32 (DSC)	–	69	70	63	63	64	49	53	40	39
Coefficient of expansion [ppm / K] in the temperature range [°C]	DELO Standard 26	211 +30 to +140	242 +30 to +140	224 +30 to +140	288 +30 to +140	–	160 +30 to +150	165 +23 to +160	91 +30 to +50	88 +30 to +50	88 +30 to +50	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	3.9	3.6	2.6	2	3.6	3.6	3.8	3.4	1.5	4.8	3.4
Water absorption [weight %] 24 h at room temperature	DIN EN ISO 62	0.7	1	1.1	0.68	0.5	0.18	0.21	0.3	0.25	0.25	0.24	0.3	0.3	0.3
Application examples		casting and bonding		bonding, e. g. sealing of housings	casting resin, impregnating, soaking and laminating		bonding and coating	bonding	casting and bonding	bonding and coating	coating and trowelling	casting and bonding of sensors and small components	bonding of housings	sealing of housings, construction adhesive	bonding and sealing of plastics
		high-strength construction adhesive													
Basic 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 chemical resistance, curing without elevated temperatures (however, curing can be accelerated by heat)													

[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 (all above-mentioned products in 50 ml; DELO-DUOPOX 02 rapid, 03 rapid, AD840, AD848, AD894, AD895, AD897, DELO-PUR 9694, 9895 also available in 200 ml)

AD = **AD**hesive **CR** = **C**asting **R**esin

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 we also use in internal development and testing.

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

Standard temperature range

The products (except for DELO-DUOPOX 02 rapid, 03 rapid, 03 rapid thix) are normally used in a temperature range of −40 °C to +140 °C (DELO-DUOPOX) resp. −40 °C to +125 °C (DELO-PUR).

Many product properties depend on the temperature and can permanently change especially at high temperatures. 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

- DELO-DUOPOX and DELO-PUR products must be mixed at the ratio indicated until the mixture is homogeneous and streak-free. This task is taken by the practical mixing and dispensing system DELO-AUTOMIX. (Deviations in the mixing ratio of ± 5 % generally do not have any evident influence on the properties of the cured product.)
- 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 our 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.
- 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

The surfaces to be bonded must be free of oil, grease, separating agents and other contaminations. We recommend our DELOTHEN cleaners.

After cleaning, adhesion can be further improved by sand blasting, grinding or pickling.

Storage life

After delivery in unopened containers:

see Technical Data Sheet of the respective 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

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 using DELO products.

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 and accessories

- Mixing tube B 050 short
  for 50 ml double chamber cartridges
  with clip-on nozzle for especially precise dispensing
- Mixing tube B 050 universal
  for 50 ml double chamber cartridges
  luer-cone, attaching of dispensing tips is possible
- Mixing tube F 200 short
  for 200 ml double chamber cartridges
- Mixing tube F 200 long
  for 200 ml double chamber cartridges
  dispensing tips can be attached to this mixing tube
- Euro cartridge adapter
  for the dispensing with Euro cartridge dispensing guns