

Two-component adhesives			Epoxy resins DELO®-DUOPOX								Polyurethanes DELO®-PUR					
Product code number			01 rapid	02 rapid <sup>3</sup>	03 rapid <sup>3</sup>	03 rapid thix <sup>3</sup>	CR804	AD821 <sup>3</sup>	AD850 <sup>3</sup>	AD894 <sup>3</sup>	AD895 <sup>3</sup>	AD897 <sup>3</sup>	9691 <sup>3</sup>	9692 <sup>3</sup>	9694 <sup>3</sup>	9895 <sup>3</sup>
Color cured product			yellowish transparent	yellowish transparent	yellowish transparent	yellowish transparent	yellowish transparent	yellowish transparent	brown	black	gray	gray	black	black	black	light beige
Filler			unfilled	unfilled	unfilled	unfilled	unfilled	unfilled	minerals	minerals	minerals	minerals	minerals	minerals	minerals	minerals
Mixing ratio		A:B according to weight	1:1	1:1	1:1	1:1	0.84:1	0.58:1	1.97:1	7:3	7:3	7:3	1:1	1:1	1:1	1:1
		A:B according to volume	1:1	1:1	1:1	1:1	0.72:1	1:2	2:1	2:1	2:1	2:1	1:1	1:1	1:1	1:1
Density [g/cm³] at room temperature, mixture			1.17	1.16	1.16	1.17	1.07	1.08	1.24	1.31	1.31	1.31	1.45	1.45	1.45	1.45
Viscosity [mPas] at +23 <span> </span> °C (± +73 <span> </span> °F), mixture			–	12,000 (± cP)	15,000 (± cP)	38,000 (± cP)	1,000 (± cP)	21,000 (± cP)	60,000 (± cP)	16,000 (± cP)	90,000 (± cP)	pasty	80,000 (± cP)	pasty	pasty	pasty
Processing 100 g preparation		processing time <sup>1)</sup> [min] at room temperature	4 (3 g prep.)	6 (3 g prep.)	3 (3 g prep.)	3 (3 g prep.)	35	20	15	45	30	30	4	5	7	30
		max. reaction temperature [°C]	150 (± 302 <span> </span> °F) (20 g prep.)	130 (± 266 <span> </span> °F) (20 g prep.)	140 (± 284 <span> </span> °F) (20 g prep.)	130 (± 266 <span> </span> °F) (20 g prep.)	132 (± 270 <span> </span> °F)	69 (± 156 <span> </span> °F)	128 (± 262 <span> </span> °F)	98 (± 208 <span> </span> °F)	98 (± 208 <span> </span> °F)	95 (± 203 <span> </span> °F)	40 (± 104 <span> </span> °F)	60 (± 140 <span> </span> °F)	50 (± 122 <span> </span> °F)	35 (± 95 <span> </span> °F)
Curing time at room temperature		firmness to touch	8 min	12 min	11 min	13 min	–	5.5 h	5 h	5 h	5.5 h	6 h	90 min	30 min	2 h	7 h
		functional strength	2 h	24 h	2 h	2 h	–	24 h	12 h	7 h	8 h	8 h	6 h	2 h	8 h	72 h
		final strength	24 h	72 h	24 h	24 h	7 d	7 d	48 h	24 h	24 h	24 h	24 h	72 h	72 h	72 h
Tensile shear strength [MPa] Al/Al sand-blasted		DIN EN 1465 1.6 mm	17 (± 2,465 psi)	18 (± 2,610 psi)	13 (± 1,885 psi)	13 (± 1,885 psi)	10 (± 1,450 psi)	14 (± 2,030 psi)	15 (± 2,175 psi)	19 (± 2,755 psi)	19 (± 2,755 psi)	17 (± 2,465 psi)	12 (± 1,740 psi)	16 (± 2,320 psi)	13 (± 1,885 psi)	13 (± 1,885 psi)
		DELO Standard 39 6 mm	–	16 (± 2,320 psi)	16 (± 2,320 psi)	17 (± 2,465 psi)	–	13 (± 1,885 psi)	17 (± 2,465 psi)	31 (± 4,495 psi)	32 (± 4,640 psi)	32 (± 4,640 psi)	13 (± 1,885 psi)	23 (± 3,335 psi)	14 (± 2,030 psi)	12 (± 1,740 psi)
Floating roller peel resistance [N/mm] St/St sand-blasted		DIN 53289 1.5 mm	4	9	3	2.5	–	4 <sup>2)</sup>	3.5 <sup>2)</sup>	2	4	3.2	14	10	10	19
Temperature stability [MPa] at +100 <span> </span> °C (± +212 <span> </span> °F)		according to DIN EN 1465	1.5 (± 218 psi)	1 (± 145 psi)	1 (± 145 psi)	2 (± 290 psi)	–	2 (± 290 psi)	3 (± 435 psi)	3.5 (± 508 psi)	2.5 (± 363 psi)	2.8 (± 406 psi)	2.5 (± 363 psi)	8 (± 1,160 psi)	3 (± 435 psi)	3 (± 435 psi)
Tensile strength [MPa]		DIN EN ISO 527	35 (± 5,075 psi)	24 (± 3,480 psi)	31 (± 4,495 psi)	35 (± 5,075 psi)	11 (± 1,595 psi)	10 (± 1,450 psi)	14 (± 2,030 psi)	41 (± 5,945 psi)	40 (± 5,800 psi)	42 (± 6,090 psi)	13 (± 1,885 psi)	20 (± 2,900 psi)	10 (± 1,450 psi)	10 (± 1,450 psi)
Elongation at tear [%]		DIN EN ISO 527	3	20	19	20	60	60	30	2.1	2	1.8	20	3	25	30
Young's modulus [MPa]		DIN EN ISO 527	1,800 (± 261 ksi)	1,000 (± 145 ksi)	2,000 (± 290 ksi)	2,000 (± 290 ksi)	100 (± 14.5 ksi)	114 (± 16.5 ksi)	600 (± 87 ksi)	2,300 (± 334 ksi)	2,400 (± 348 ksi)	2,500 (± 363 ksi)	500 (± 72.5 ksi)	1,500 (± 218 ksi)	100 (± 14.5 ksi)	300 (± 43.5 ksi)
Shore hardness D		according to DIN EN ISO 868	40	74	75	75	43	50	66	73	73	77	56	75	50	50
Decomposition temperature [°C]		DELO Standard 36	200 (± 392 <span> </span> °F)	280 (± 536 <span> </span> °F)	280 (± 536 <span> </span> °F)	280 (± 536 <span> </span> °F)	188 (± 370 <span> </span> °F)	195 (± 383 <span> </span> °F)	196 (± 385 <span> </span> °F)	215 (± 419 <span> </span> °F)	200 (± 392 <span> </span> °F)	210 (± 410 <span> </span> °F)	180 (± 356 <span> </span> °F)	160 (± 320 <span> </span> °F)	180 (± 356 <span> </span> °F)	170 (± 338 <span> </span> °F)
Coefficient of expansion [ppm/K] in temperature range [°C] (in temperature range [°F])		DELO Standard 26	–	211 +30 to +140 (± +86 to +284)	242 +30 to +140 (± +86 to +284)	224 +30 to +140 (± +86 to +284)	253 +30 to +140 (± +86 to +284)	149 +30 to +140 (± +86 to +284)	175 +30 to +140 (± +86 to +284)	91 +30 to +50 (± +86 to +122)	88 +30 to +50 (± +86 to +122)	88 +30 to +50 (± +86 to +122)	162 +25 to +140 (± +77 to +284)	153 +30 to +140 (± +86 to +284)	167 +30 to +140 (± +86 to +284)	205 +30 to +140 (± +86 to +284)
Shrinkage [vol. %]		DELO Standard 13	–	3.7	4.3	4.3	3.9	2	1.7	3.6	3.6	3.8	3.4	4.8	4.8	3.4
Water absorption [weight %] 24 h at room temperature		DIN EN ISO 62	1.9	0.7	1	1.1	0.68	0.63	0.3	0.3	0.25	0.25	0.24	0.3	0.3	0.3
Specific volume resistance [Ωcm]		VDE 0303, part 3	–	> 1 x 10 <sup>12</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	5.1 x 10 <sup>14</sup>	3.1 x 10 <sup>15</sup>	1.4 x 10 <sup>12</sup>	5.6 x 10 <sup>14</sup>
Surface resistance [Ω]		VDE 0303, part 3	–	> 1 x 10 <sup>11</sup>	> 1 x 10 <sup>11</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>11</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>	1.4 x 10 <sup>13</sup>	5.2 x 10 <sup>12</sup>	5.5 x 10 <sup>13</sup>	3.2 x 10 <sup>12</sup>
Dielectric strength [kV/mm]		VDE 0303, part 2	–	17	18	18	16	17	14	14.3	13.7	14.2	16.6	12.3	17.7	17.6
Dielectric constant		VDE 0303, part 4	–	3.2	2.9	2.9	3.2	3	3.6	3.7	3.7	3.7	–	–	–	–
Creep resistance		VDE 0303, part 1 IEC 112	400 M	> 600 M	> 600 M	525 M	> 600 M	> 600 M	> 600 M	> 600 M	> 600 M	> 600 M	> 600 M	> 600 M	> 600 M	> 600 M
Special features of product			in double chamber packages (3 g), portioned	good flow behavior	firm to touch already after approx. 11 min fast curing	high run resistance fast curing	flexible equalizes tensions very well thin low postcuring at high temperatures	good flow behavior flexible equalizes tensions very well low postcuring at high temperatures	good adhesion to metal equalizes tensions well	good flow behavior tough-hard	high strength cell test USP 28 ISO 10993-5	steady	fast curing flowable	steady very short reaction time	high strength and good elasticity	steady very high peel resistance cell test USP 28 ISO 10993-5

#### 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.

Adhesives (marked with „3“) can be processed from double chamber cartridges with a static mixing tube similar to one-component products.

#### Standard temperature range

The products (except for 01 rapid, 02 rapid, 03 rapid, 03 rapid thix) are normally used in a temperature range of −40 °C to +140 °C (± −40 °F to +284 °F) (DELO®-DUOPOX) resp. −40 °C to +100 °C (± −40 °F to +212 °F) (DELO®-PUR). 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

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

Deviations in the mixing ratio of +/- 5 % do not have any evident influence on the properties of the cured product.

#### Curing

DELO®-DUOPOX and DELO®-PUR cure at room temperature. Increased temperatures accelerate curing.

After exceeding the pot life, the viscosity increases until the adhesive is completely cured.

#### Surface pretreatment

For optimal adhesion, 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 adhesives are used for high-strength bonding of components which are extremely stressed to some extent. These adhesives 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, electronics, mechanical and electrical engineering, 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 processing DELO® products.

<sup>[1]</sup> Processing time: mixture has to be processed, i. e., mixed, applied and joined, within this time

<sup>[2]</sup> According to DELO® Standard 38

<sup>[3]</sup> Product is also available in double chamber cartridges; for further information see selection chart "DELO®-DUOPOX and DELO®-PUR adhesives in double-chamber cartridge system"

## Application examples

### High-strength bonding at thermal stress

e.g., bonding of:  
highly stressed carbide inserts, hardened guideway gibs in machines, robot gripper construction  
→ DELO®-DUOPOX AD895

### High-strength bonding with fast initial strength

e.g., 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 01 rapid  
→ DELO®-DUOPOX 03 rapid  
→ DELO®-DUOPOX 03 rapid thix

### High run resistance

→ DELO®-DUOPOX AD897  
→ DELO®-PUR 9692  
→ DELO®-PUR 9694  
→ DELO®-PUR 9895

### Good equalization of tensions

→ DELO®-PUR 9694, 9895  
→ DELO®-DUOPOX CR804, AD821, AD850

### Impregnating/soaking/laminating

e.g., of porous materials such as cast, fabric and glass fibers, of windings  
→ DELO®-DUOPOX CR804

### Sealing and casting of electronic components

→ DELO®-DUOPOX CR804  
especially for narrow gaps, tension-equalizing, flexible  
→ DELO®-DUOPOX AD821  
tension-equalizing, flexible  
→ DELO®-DUOPOX AD894  
tough-hard  
→ DELO®-PUR 9691  
tension-equalizing, fast firmness to touch

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

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

**DELO®-DUOPOX**

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

**DELO®-PUR**

# DELO

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## Selection Chart

