

# Encapsulants | Material Selection Guide

Product	Product group	DELO KATIOBOND			DELO DUALBOND		
	Product code	4670	GE680	DF698	GE4910	GE710*	
General	Basis	epoxy resin	epoxy resin	epoxy resin	mod. urethane acrylate	epoxy resin	
	Color	light gray translucent	milky translucent	light gray translucent	colorless transparent	milky translucent	
	Encapsulation	Fill	✓				
		Dam			✓		
		Glob top					
	Casting		✓		✓	✓	
Application area	Smart card	✓		✓			
	Chip on board		✓				
	Universal electronic casting		✓		✓	✓	
Curing	Curing mechanism	UV-curing	UV-curing	UV-curing	light- and humidity-curing	light- and heat-curing	
	Curing time	60 s UVA 55 – 60 mW/cm <sup>2</sup>	30 s UVA 55 – 60 mW/cm <sup>2</sup>	60 s UVA 55 – 60 mW/cm <sup>2</sup>	10 s UVA 60 mW/cm <sup>2</sup>	30 s UVA 55 – 60 mW/cm <sup>2</sup> 3 min @ +150 °C	
Mechanical values	Density [g/cm <sup>3</sup> ]	1.4	1.8	1.4	1.00	1.5	
	Viscosity [mPas]	4,800 <sup>1)</sup>	112,000 <sup>1)</sup>	180,000 <sup>1)</sup>	2,000 <sup>1)</sup>	16,000 <sup>1)</sup>	
	Tensile strength [MPa]	30	41	22	6	70	
	Elongation at tear [%]	6	0.6	20	315	2	
	Young's modulus [MPa]	1,700	6,900	160	17	5,300	
	Shore hardness D	79	91	61	12	89	
	Decomposition temperature [°C]	280	291	–	–	–	
	Glass transition temperature T <sub>g</sub> [°C]	62 <sup>2)</sup>	120 <sup>4)</sup>	35 <sup>2)</sup>	70 <sup>2)</sup>	79 <sup>4)</sup>	
	Coefficient of linear expansion [ppm/K]	below T <sub>g</sub>	150	32	147	235	52
		above T <sub>g</sub>					152
Water absorption [weight %]	0.2	0.1	0.4	1.3	0.2		
Shrinkage [vol. %]	3	2	2.9	5.3	2.4		
Storage	Storage life	at room temperature	4 weeks	1 week	10 days	–	2 weeks
		at 0 °C to +10 °C	6 months	6 months	6 months	6 months	6 months
		at –18 °C / at –40 °C	–	–	–	–	–
Features	Special features of product	Dam & Fill system DELO KATIOBOND 4670/DF698	thixotropic fulfills the requirements acc. to USP 30, NF25, Class IV	thixotropic Dam & Fill system DELO KATIOBOND 4670/DF698	highly flexible curing also in shadowed areas by humidity crosslinking	casting, coating, fixing in electrical engineering	
	Halogen-free by the criteria of IEC 61249-2-21						

DELO-DUOPOX			DELO-PUR	DELO MONOPOX							
CR716	CR804	AD894	CR901*	6093	6095	GE725	GE727	GE730	GE765	GE785	MG063
2C epoxy resin	2C epoxy resin	2C epoxy resin	2C polyurethane	epoxy resin	epoxy resin	epoxy resin	epoxy resin	epoxy resin	epoxy resin	epoxy resin	epoxy resin
black	yellowish transparent	black	light beige	black	black	black	black	black	black	black	black
						✓	✓				
										✓	
✓	✓	✓	✓	✓	✓			✓	✓		✓
						✓	✓	✓	✓	✓	
✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
heat-curing	room temperature	room temperature	room temperature	heat-curing	heat-curing	heat-curing	heat-curing	heat-curing	heat-curing	heat-curing	heat-curing
20 min @ +150 °C 60 min @ +130 °C	firmness to touch: 7.5 h final strength: 45 min @ +80 °C	firmness to touch: 5 h final strength: 24 h	final strength: 48 h	30 min @ +130 °C air convection oven	30 min @ +130 °C air convection oven	20 min @ +150 °C 90 min @ +125 °C	20 min @ +150 °C 90 min @ +125 °C	20 min @ +150 °C 90 min @ +125 °C	20 min @ +150 °C 90 min @ +125 °C	20 min @ +150 °C 90 min @ +125 °C	30 min @ +150 °C air convection oven
1.69	1.07	1.31	1.23	1.2	1.2	1.6	1.85	1.6	1.7	1.7	1.2
12,000 <sup>2)</sup>	1,000	16,000 <sup>1)</sup>	comp. A: 14,000 <sup>1)</sup> comp. B: 40 <sup>1)</sup>	40,000 <sup>1)</sup>	50,000 <sup>1)</sup>	6,500 <sup>2)</sup>	11,000 <sup>2)</sup>	9,000 <sup>2)</sup>	22,000 <sup>2)</sup>	135,000 <sup>2)</sup>	180,000 <sup>1)</sup>
36	11	41	5	41	45	50	59	60	60	55	35
0.6	60	2.1	65	1.6	1.2	0.5	0.5	0.7	0.7	0.5	1.00
7,000	100	2,300	< 100	2,900	3,800	9,700	12,300	9,000	9,000	11,000	3,000
87	43	73	–	74	83	87	87	88	86	89	80
284	188	215	–	300	300	323	318	325	316	329	260
173	–	63 <sup>2)</sup>	–	93 <sup>2)</sup>	87 <sup>2)</sup>	178 <sup>4)</sup>	165 <sup>5)</sup>	179 <sup>4)</sup>	186 <sup>4)</sup>	182 <sup>4)</sup>	113 <sup>2)</sup>
37	253	91	242	59	65	25	11	24	18	22	71
80		178		183	183		43		188		
0.2	0.7	0.3	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
1.6	3.9	3.6	2.4	1.1	2	2.5	1.2	2.4	1.7	1.4	1.9
6 months	12 months	6 months	3 months	6 weeks	6 weeks	48 h	24 h	48 h	48 h	48 h	4 weeks
–	–	–	–	6 months	6 months	–	–	–	–	–	6 months
–	–	–	–	–	–	6 months at –18 °C	6 months at –40 °C	6 months at –18 °C	6 months at –18 °C	6 months at –18 °C	–
thixotropic casting very good adhesion to PPS, Cu, Al excellent chem. resistance (e. g. oil)	tested by the criteria of UL 94 HB	tested by the criteria of UL 94 HB	tested by the criteria of UL 94 HB	excellent chemical resistance	excellent chemical resistance	casting of bare semiconductors and sensors	casting of bare chips and sensors especially for large-area encapsulation	casting of bare semiconductors and sensors	casting of bare semiconductors and sensors	casting of bare semiconductors and sensors	thixotropic casting, coating, fixing in electrical engineering good chemical resistance
											

\* customer-specific product  
<sup>1)</sup> Brookfield viscosimeter  
<sup>2)</sup> rheometer  
<sup>3)</sup> DMTA  
<sup>4)</sup> TMA  
<sup>5)</sup> DSC

## CONTACT

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- **South Korea** · Seoul
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- **Thailand** · Bangkok
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## MATERIAL SELECTION GUIDE

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