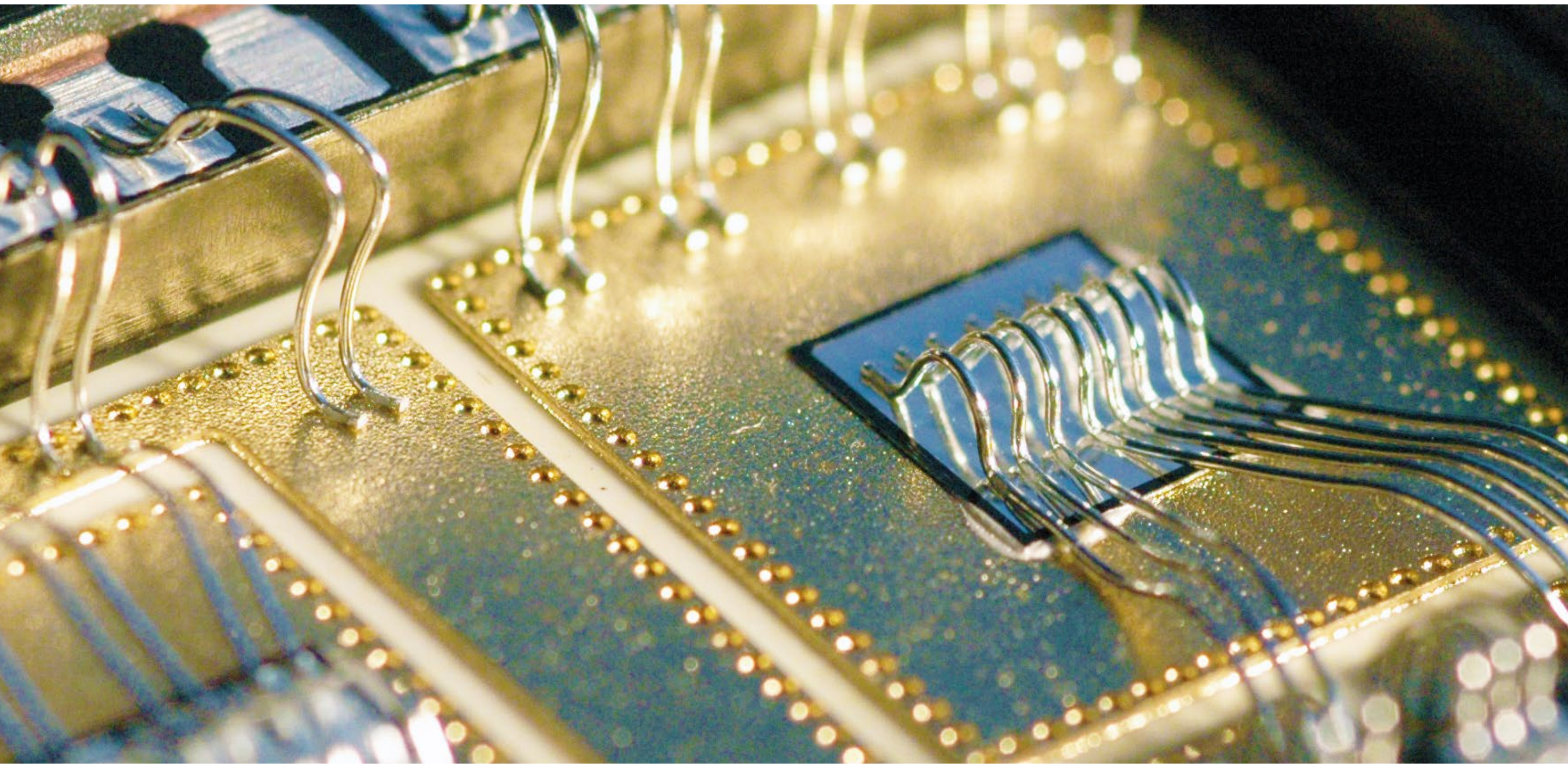
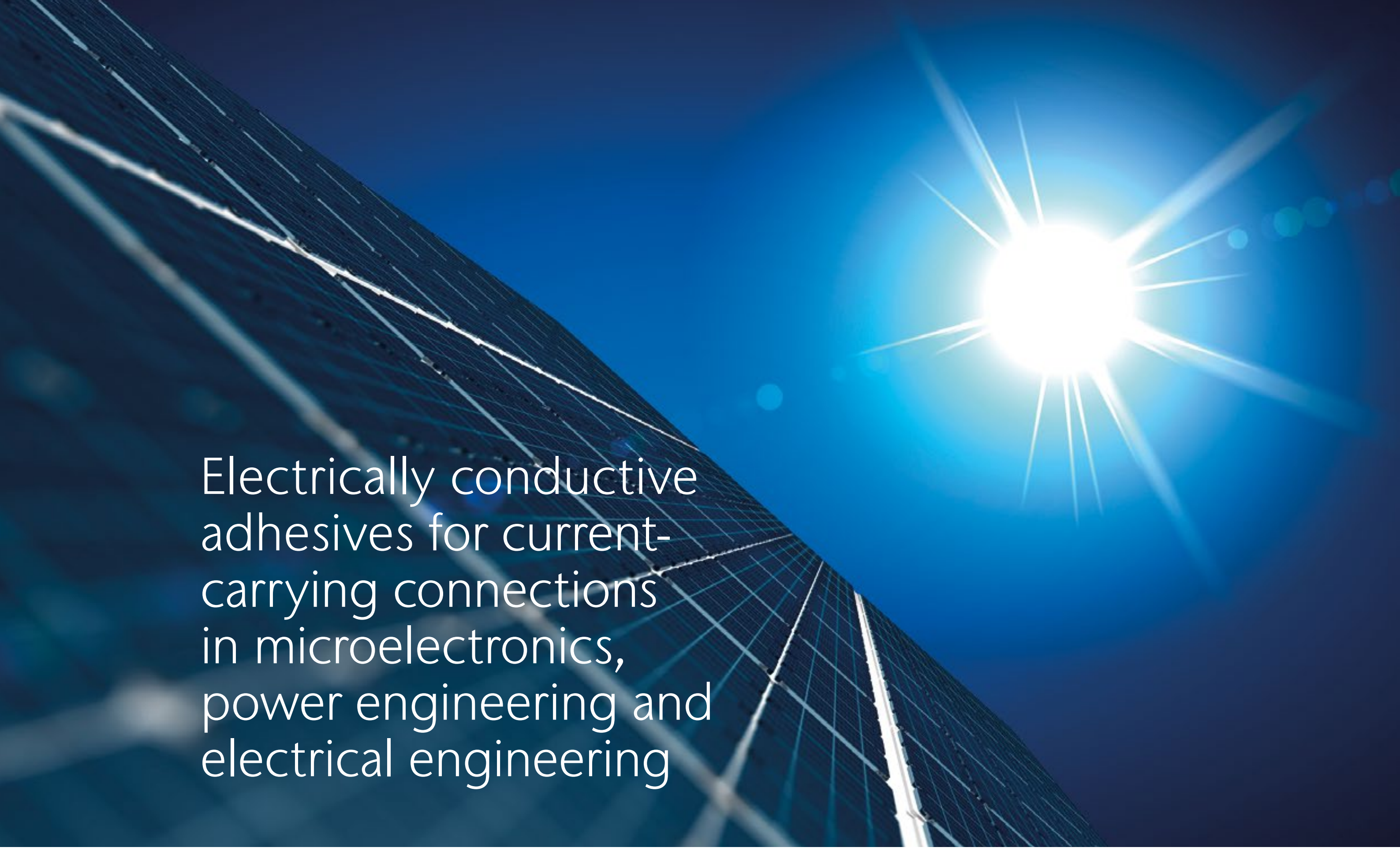
Polytec PT



Electrically conductive adhesives

for current-carrying connections in microelectronics, power engineering and electrical engineering

Product brochure



Electrically conductive adhesives for current-carrying connections in microelectronics, power engineering and electrical engineering

Electrically conductive adhesives are employed in integrated circuit packaging in order to provide a permanent mechanical connection for joining components and at the same time enabling electrical contact of the components. In many cases, adhesive bonding is therefore an alternative to the usual joining techniques, such as soldering or sintering.

What is electrical conductivity with adhesives?

Electrically conductive adhesives are characterized by their specific volume resistivity, which serves as a measure of their lateral conductivity. Typically, the volume resistivity of silver-filled adhesives is of the order of magnitude of 10^{-4} Ω·cm. For special applications, however, it can be more useful to consider the conductivity in the z-direction. For applications with lower requirements for the conductivity, less expensive fillers are used.

Applications for electrically conducting adhesives

For many years conductive adhesives have offered proven methods for providing contact between components. Such applications can be found in both small batch sizes and in mass volumes.

Electrically conducting adhesives find use in the following fields:

- **Microelectronics:**
  chip assembly, circuit board assembly
- **Automotive electronics:**
  providing contact between various current-carrying components
- **Smart Cards:**
  providing contact between the chip module and the RFID antenna
- **Photovoltaics:**
  providing contact between cell connectors
- **Electrical engineering:**
  shielding of electromagnetic fields
- Dissipation of electrostatic charge

Advantages of the adhesive

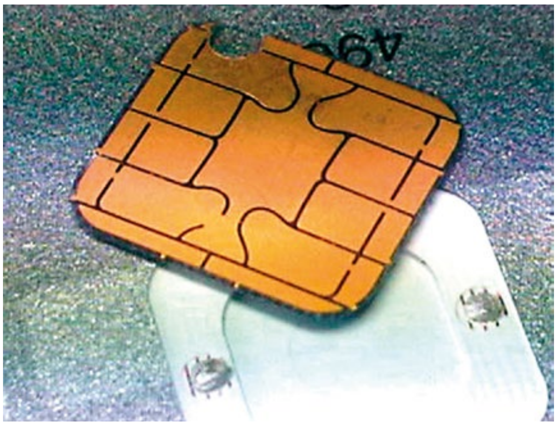
In contrast to welding or soldering, electrically conductive adhesives can bond difficult material combinations without altering the surface or the structural conditions.

According to the properties of the product the adhesive can be applied by dispensing, jetting, silk-screen printing or stamping. As the adhesives are cured at moderate temperatures or even at room temperature, the components are subjected to far less thermal stress than is the case with soldering.

Next generation electrically conductive adhesives

Electrically conductive adhesives are typically based upon epoxy resins, which are available as two components or pre-mixed and deep-frozen as a single-component variant. In order to unfold their optimal conductivity, these products must be cured at a temperature of at least 100 °C.

The following overview shows a number of innovative products including such ones which can be cured at room temperature and/or are characterized by excellent flexibility, together with proven standard conductive adhesives.



Processing	**Cold-curing**		**Hot-curing**	
Components	1K	2K	1K	2K
Electronics applications high-strength	–	EC 244	EC 101 L frozen EC 151 L frozen EC 112 L frozen EC 242 frozen	EC 101 EC 151 L
Electronics applications flexible	PU 1000	–	–	EC 201
Solar industry	–	–	SB 1227 frozen SB 1242 frozen	SB 1227 SB 1242
Electromagnetic shielding	–	–	–	EC 262-2

Variations and customer-specific developments

Are you missing a product with certain features? Many of these adhesives are also available with modified rheological properties or alternative cost-effective fillers. We also develop custom-tailored products according to your specifications. Just ask us.

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Electrically conductive adhesives

Product code	Processing properties					Thermal properties			Mechanical properties				
Parameter	Mix ratio by weight	Specific gravity	Viscosity	Pot life @ 23 °C	Cure schedule	Spec. volume resistivity	Max. cont. service temp.	Glass transition temp.	Shore hard-ness	Lap shear strength	Tensile strength	Young's modulus	Elon-gation at break
Method	–	PT TM 201	PT TM 202*	PT TM 702	–	PT TM 401	PT TM 302	PT TM 501	PT TM 601	PT TM 604	PT TM 605	PT TM 605	PT TM 605
Unit	–	g/cm³	Pa s	–	examples	Ω · cm	°C	°C	–	MPa (Al/Al)	MPa	GPa	%
EC 101	1 : 1	2.8	10	48 h	120 °C, 15 min 180 °C, 40 s	1-4 · 10^{-4}	200	80	D85	8	34	7.0	0.5
EC 101-L-frozen	–	2.7	8.0	48 h	120 °C, 15 min 180 °C, 40 s	1-4 · 10^{-4}	200	80	D85	8	34	7.0	0.5
EC 112-L-frozen	–	3.0	7.5	48 h	120 °C, 15 min 180 °C, 40 s	1-3 · 10^{-4}	200	75	D82	8	29	4.7	0.7
EC 151 L	1 : 1	2.8	4.8	48 h	120 °C, 15 min 180 °C, 40 s	1-4 · 10^{-4}	200	75	D80	n.a.	32	7.0	0.5
EC 151-L-frozen	–	2.8	4.8	48 h	120 °C, 15 min 180 °C, 40 s	1-4 · 10^{-4}	200	75	D80	n.a.	32	7.0	0.5
EC 201	1 : 1	2.7	12	5 h	150 °C, 30 min	2 · 10^{-4}	150	<23	D55	n.a.	10	1.0	8.0
EC 242-frozen	–	5.3	20	24 h	150 °C, 30 min	5 · 10^{-5}	230	110	D85	7	34	9.0	0.4
EC 244	10 : 1	3.0	9.0	15 min	23 °C, 24 h 50 °C, 60 min	1-6 · 10^{-3}	150	45	D80	8	25	4.2	0.7
PU 1000	–	1.7	15	–	23 °C, 4 h***	1-4 · 10^{-4}	n.a.	<23	D32	n.a.	8	0.2	1.2
EC 262-2	1 : 1	1.2	25	6 h	120 °C, 4 h 150 °C, 30 min	4 Ω/sq****	180	70	D75	8	6	0.6	3.0
SB 1227-frozen	–	3.0	10**	48 h	150 °C, 2 min 180 °C, 30 s	4 · 10^{-4}	200	70	D85	9	54	8.6	1.6
SB 1242-frozen	–	2.0	30**	48 h	150 °C, 3 min 180 °C, 30 s	1 · 10^{-2}	180	55	D85	13	45	3.4	5.1

* Dynamic viscosity at 23 °C, plate-plate, gap 0.5 mm, shear rate up to 84 s^{-1}, ** shear rate up to 50 s^{-1}
*** Curing time depends on substrate and film thickness, **** Sheet resistance
The above listed information are typical data and do not constitute specifications.

PB_Electr_conductive_adhesives_E
2018/09 - Technical specifications are subject to change without notice.

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