Polytec PT

Thermal interface materials for EV batteries – low-density, low-abrasive, silicone-free

Application note

Custom-tailored thermally conductive materials for electric and hybrid vehicle batteries

Responding to a strong and increasing demand in innovative manufacturing concepts for electric and hybrid vehicle batteries, we provide adhesives, pottings and pastes with high thermal conductivities that are customized with regard to processing parameters, thermal and mechanical properties, as well as service durability.

Force-fitted and heat-conductive at the same time

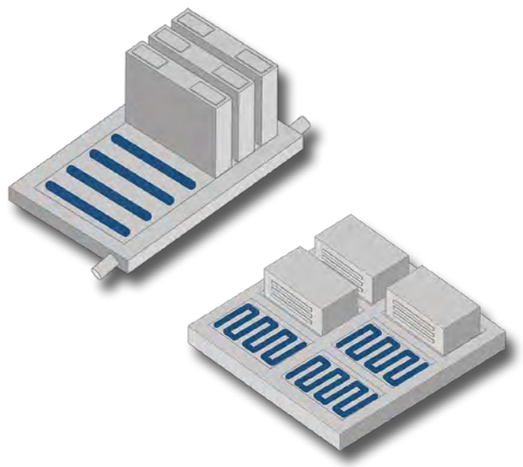
In order to build a secure and durable battery system, the assembly and integration of single hard-case (prismatic) or pouch cells requires reliable mechanical fixing, thermal management, and vibration damping. Our thermally conductive, epoxy-based adhesives provide structurally strong and durable joints.

Thermal connections that are easy to rework

In case thermally bonded parts must later be separated or replaced without being damaged, we supply paste-like thermal interface materials, either curing or non-curing. They will securely bridge any insulating air gap, as long as additional mechanical fixing is provided.

Low-density, low-abrasive, silicone-free

Our specialty is adhesives that offer more than just bonding things together. All of our thermal interface materials are silicone-free and mostly cure at room temperature. They feature high thermal conductivities, high dielectric strength, very low abrasion and low specific gravity in order to reduce vehicle weight.



A broad range of dedicated solutions

Polytec PT provides thermally conductive adhesives and silicone-free thermal pastes, all designed for ease of use and durability. In coordination with customer and market requirements, we are constantly developing new, improved materials, customized to the particular application. If you are interested in how we will accomplish your individual solution, please contact us at **info@polytec-pt.de**.

Adhesive bonding and sealing of motors, power modules and more

Please visit **www.polytec-pt.com** to see our thermally and electrically conductive as well as UV-curing and additional products for other electric and hybrid vehicle parts like motors, converters, control units, housings and power electronics devices.

Thermally conductive adhesives and pottings

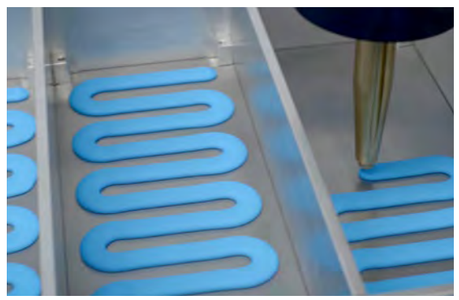
Our epoxies for battery mounting feature good thermal conductivity, very good dielectric strength, high mechanical strength, and excellent adhesion to aluminum. They cure at room temperature or slightly above and they are flexible in order to maintain a good adhesion even under varying temperature conditions. Please contact us for product selection and customized versions.

Consistency	flowable .... thixotropic
Curing schedule	24 h @ 23 °C ... 60 min @ 80 °C
Thermal conductivity	0.8 .... 2 W/mK*
Young's modulus	100 ... 9,000 MPa
Lap shear strength**	5 ... 15 MPa
Elongation at break	up to ~20 %

* up to 3 W/mK upon request (compromising other properties)
** on untreated Al surface

Thermally conductive pastes and gap fillers

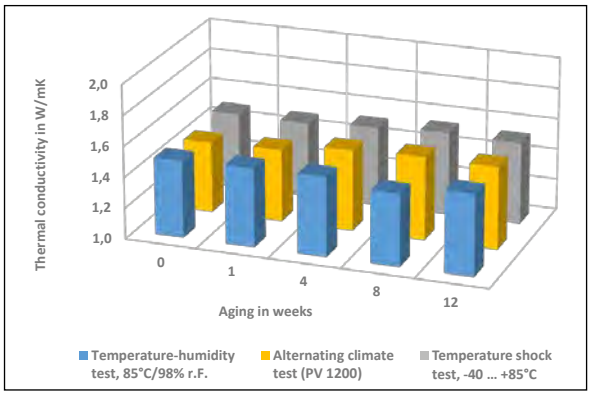
Thermally conductive pastes are easy to apply and to remove. They compensate for high tolerances, and they feature a permanent thermal contact to the substrate surface due to good intrinsic wetting properties. Part of our gap fillers are curable by humidity resulting in increased resistance against thermo-mechanical loads. Please contact us for product selection and customized versions.

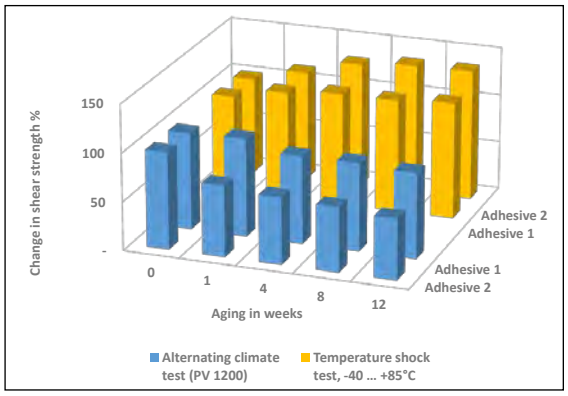


Consistency	thixotropic
Viscosity @ 40 °C	50 ... 250 Pa s
Gap width	0.15 ... 5 mm
Curing schedule	non-curing // curing at RT
Thermal conductivity	1.5 .... 3.0 W/mK
Specific gravity	1.8 ... 2.2 g/cm³

Typical performance of thermal interface materials

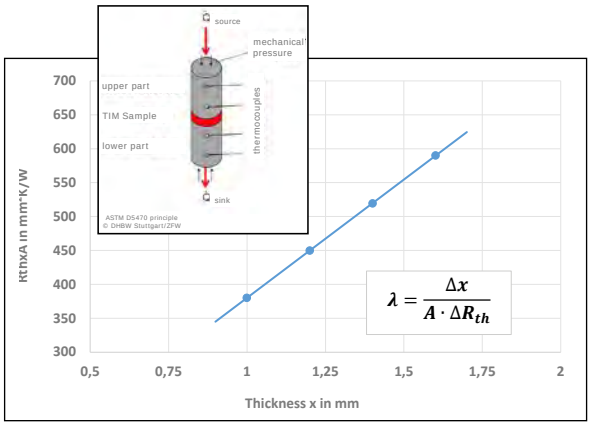
Thermally conductive adhesives and pottings

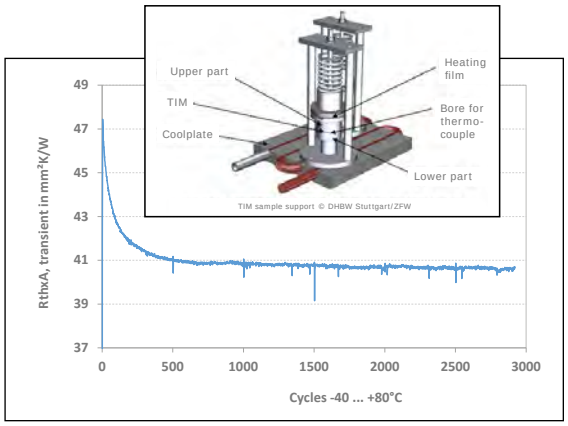




Thermal conductivity (left) and shear strength (right) of adhesives vs. various aging conditions

Thermally conductive pastes and gap fillers





Thermal resistivity of gap filler vs. thickness (left) and vs. no. of power cycles (right)

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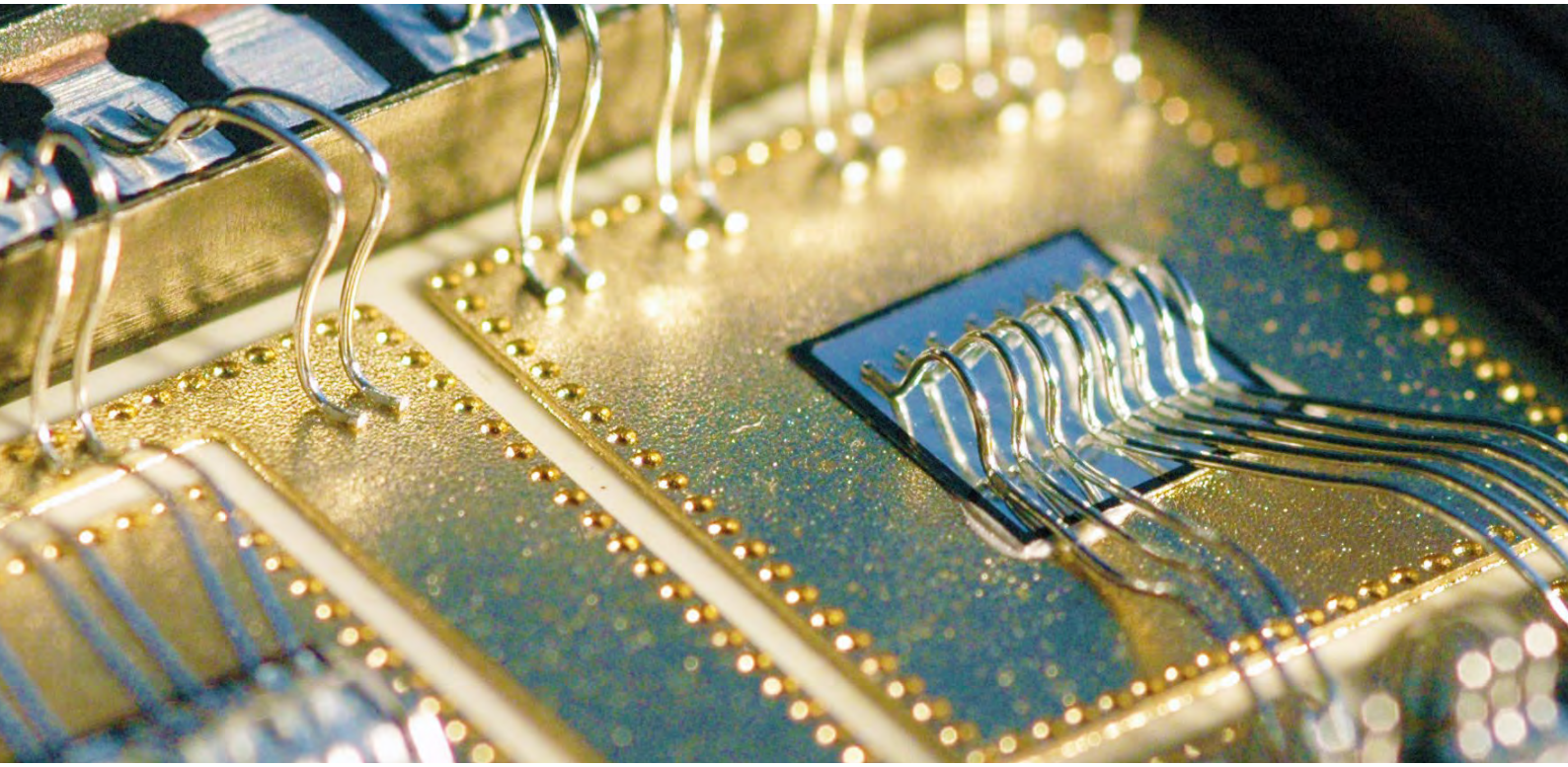
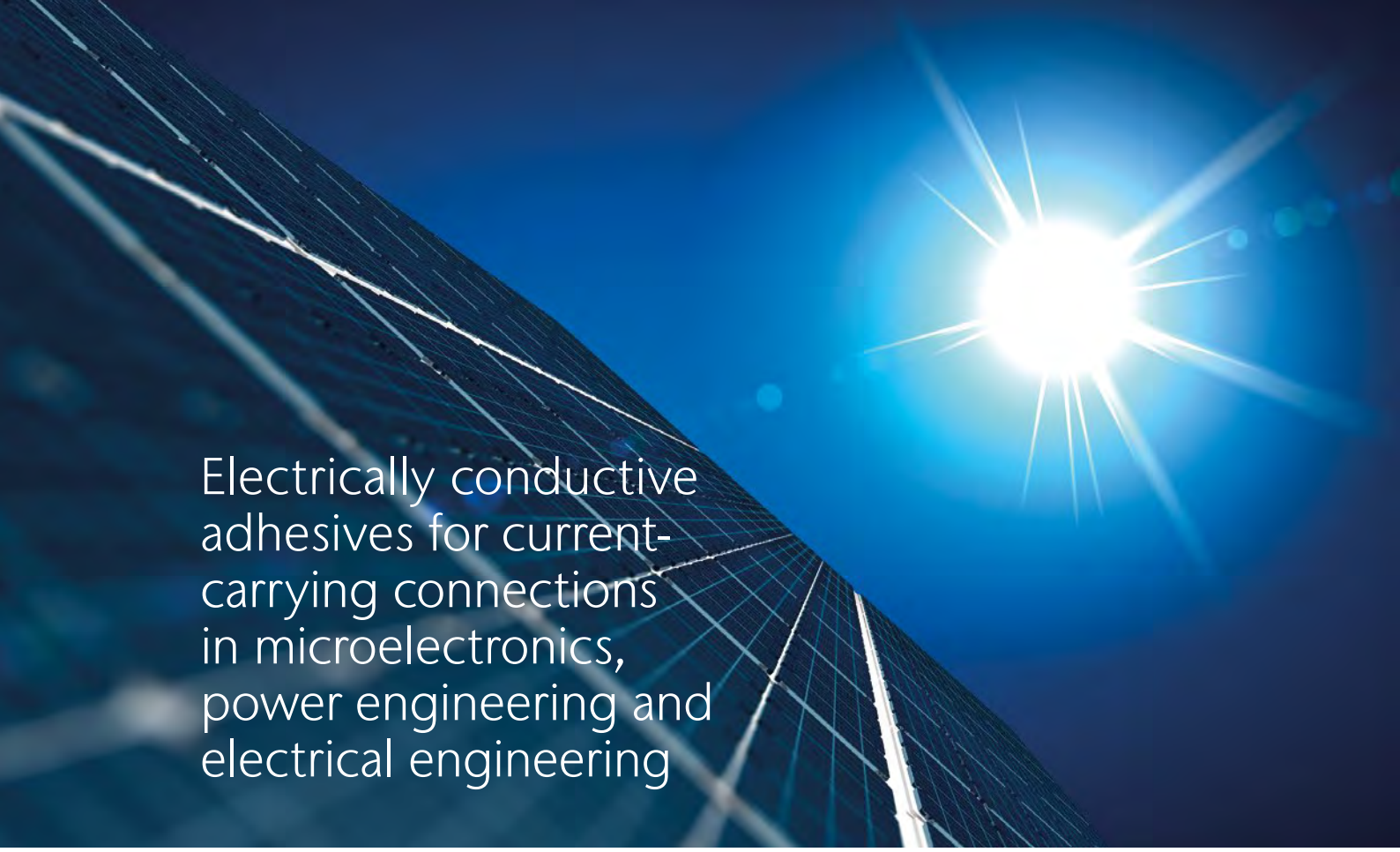


Electrically conductive adhesives

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.

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	$1\text{-}4 \cdot 10^{-4}$	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	$1\text{-}4 \cdot 10^{-4}$	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	$1\text{-}3 \cdot 10^{-4}$	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	$1\text{-}4 \cdot 10^{-4}$	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	$1\text{-}4 \cdot 10^{-4}$	200	75	D80	n.a.	32	7.0	0.5
EC 201	1:1	2.7	12	5 h	150 °C, 30 min	$2 \cdot 10^{-4}$	150	<23	D55	n.a.	10	1.0	8.0
EC 242-frozen	–	5.3	20	24 h	150 °C, 30 min	$5 \cdot 10^{-5}$	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	$1\text{-}6 \cdot 10^{-3}$	150	45	D80	8	25	4.2	0.7
PU 1000	–	1.7	15	–	23 °C, 4 h***	$1\text{-}4 \cdot 10^{-4}$	n.a.	<23	D32	n.a.	8	0.2	1.2
EC 262-2	1:1	1.2	25	0.5 - 1 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	$4 \cdot 10^{-4}$	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	$1 \cdot 10^{-2}$	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.

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Polytec PT

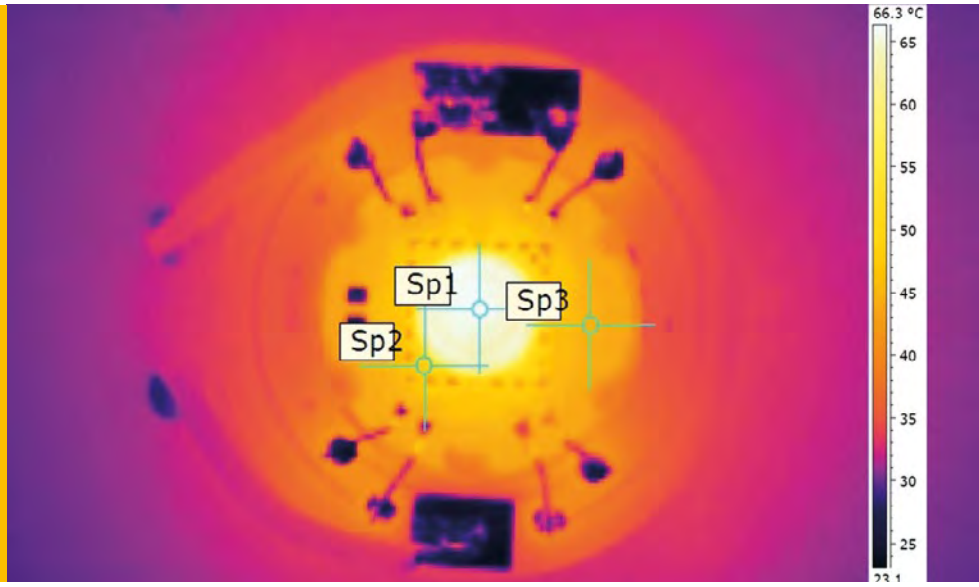
Thermally conductive adhesives

for manual processing from
side-by-side cartridges

Product brochure

Thermally conductive adhesives for manual processing from side-by-side cartridges

When used as a joining technique, thermally conductive adhesives fasten components to create a durable mechanical connection, while enabeling heat to transfer from warmer component to the colder component. Thus in many cases, thermally conductive bonding, in particular with epoxies is an alternative to conventional connection processes such as soldering, welding or mechanical attaching.



What is thermal conductivity?

The thermal conductivity refers to a specific rate that describes the heat flow through a sample volume of a material and is measured in W/mK.

Typical values are as follows:

Thermally conductive adhesives:	~ 0.5 to 5 W/mK
Plastics without additives:	~ 0.2 to 0.3 W/mK
Glass, ceramics:	~ 1 to 30 W/mK
Metals, alloys:	~ 10 to 400 W/mK

What are epoxies?

Epoxy adhesives are used in a variety of industrial applications ranging from automotive to electronics because of their high strength and excellent thermal and chemical resistance. They allow the connection of almost any material combinations, even difficult ones such as metals, plastics, glass or ceramics.

Due to their high mechanical strength, they are suitable for a variety of different structural bonding tasks. Epoxies are generally available as one-component, heat-curing or two-component, room-temperature-curing variants.

The processing of two-component systems is often a challenge in practice. On the one hand, the mixing ratio of resin and hardener must be kept as accurate as possible, on the other hand, both components must be sufficiently mixed to ensure proper curing of the material. In addition, the maximum processing time of the mixed adhesive must be taken into account (expressed as the pot life in the respective technical data). In automated serial processes, this is ensured by corresponding mixing and metering equipment. In contrast, the process-reliable manual dispensing of two-component adhesives often poses a challenge.

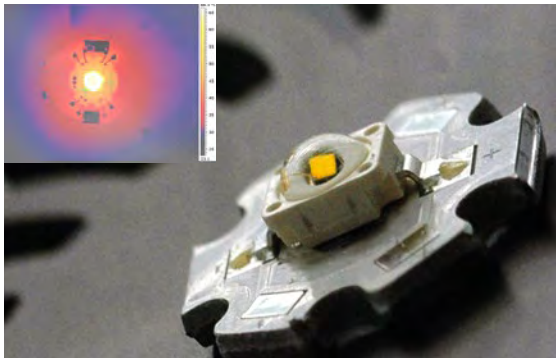
Why side-by-side cartridges?

In order to address the inherent challenges when processing two-component materials manually, Polytec PT has developed a range of thermally conductive adhesives that are available in side-by-side cartridges. Both components of the adhesive are already filled in the correct mixing ratio and can be easily dispensed by means of a dispensing gun. Resin and hardener mix automatically in the attached static mixer.

The perfect product for your application

The adhesives presented here are ceramic-filled and thus electrically insulating, two-component products which cure at room temperature. If desired, the cure can be accelerated by heat.

The variants differ in their thermal conductivity, temperature resistance and their mechanical properties. Matching dosing guns and mixing tubes are of course also available.



The following table gives an overview of the different material properties

	Polytec TC 406	Polytec TC 411	Polytec TC 422
Mechanical properties	rigid	flexible	rigid
Thermal conductivity	2.2 W/mK	1.4 W/mK	0.8 W/mK
Temperaturestability	+	0	+
Adhesion to Al	++	++	++
Adhesion to cataphoretic painting	++	++	++
Adhesion to PA	0	++	0

Thermally conductive pastes and gapfillers for temporary connections

In the event that thermally bonded parts must later be separated or replaced without being damaged, we offer pastes and gapfillers with thermal conductivities of 1-3 W/mK and application-specific processing properties.

Variations and customized products

You require a product with defined properties? Many of these are also available as variants with different flow properties, thermal conductivities or especially for automated processing. We also develop customized products according to your specifications. Please contact us for more information.

Thermally conductive adhesives

Parameter	Method	Unit	Polytec TC 406	Polytec TC 411	Polytec TC 422
Colour Mix	TM 101	–	white	white	blue
Mix ratio by volume	–	–	2:1	2:1	2:1
Pot life at 23°C	TM 702	h	0.5	2	1
Shelf life at 23°C	TM 701	months	12	12	12
Consistency	TM 101	–	pasty	pasty	pasty
Specific gravity mix	TM 201.2	g/cm³	1.9	1.5	1.9
Viscosity mix 84^{s-1} at 23°C	TM 202.1	Pas	180	140	50
Hardness (Shore D)	DIN EN ISO 868	–	85	38	85
Max. service temperature (continuous)	TM 302	°C	-55 / +150	-55 / +150	-55 / +160
Max. service temperature (short-term)	TM 302	°C	240	220	260
Degradation temperature	TM 302	°C	300	280	310
Glass transition temperature (T_g)	TM 501	°C	65	<20	65
Thermal conductivity	TM 502	W/mK	2.2	1.4	0.8
Young's Modulus	TM 605	N/mm²	5000	n.d.	7500
Tensile strength	TM 605	N/mm²	27	3	44
Lap sheer strength (Al/Al)	TM 604	N/mm²	14	7	19
Elongation at break	TM 605	%	3.5	11	1.2
Min. curing temperature	–	°C	15	15	15
Curing time at 23°C	–	h	24	48	24
Curing time at 80°C	–	min	60	90	60

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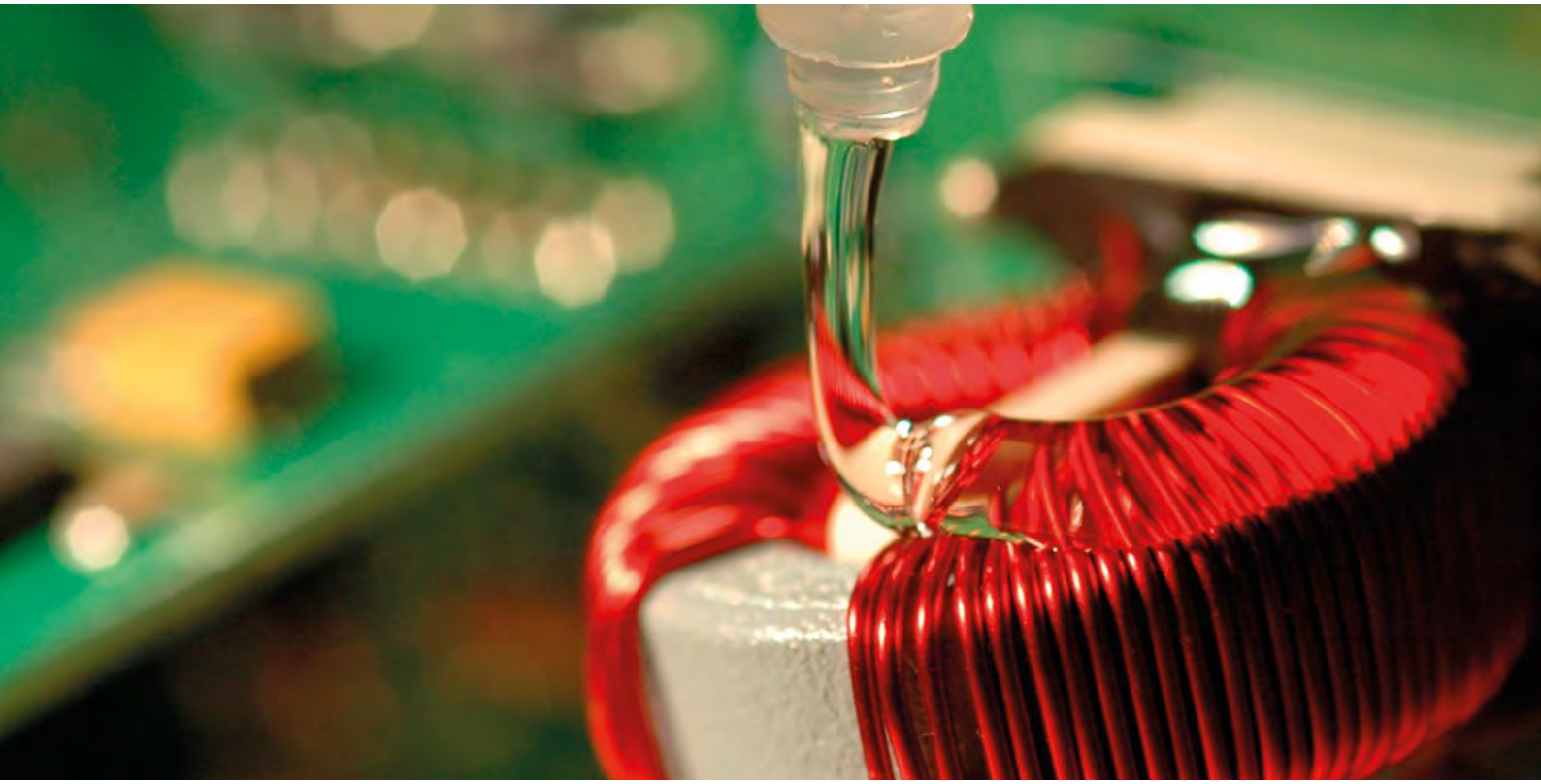
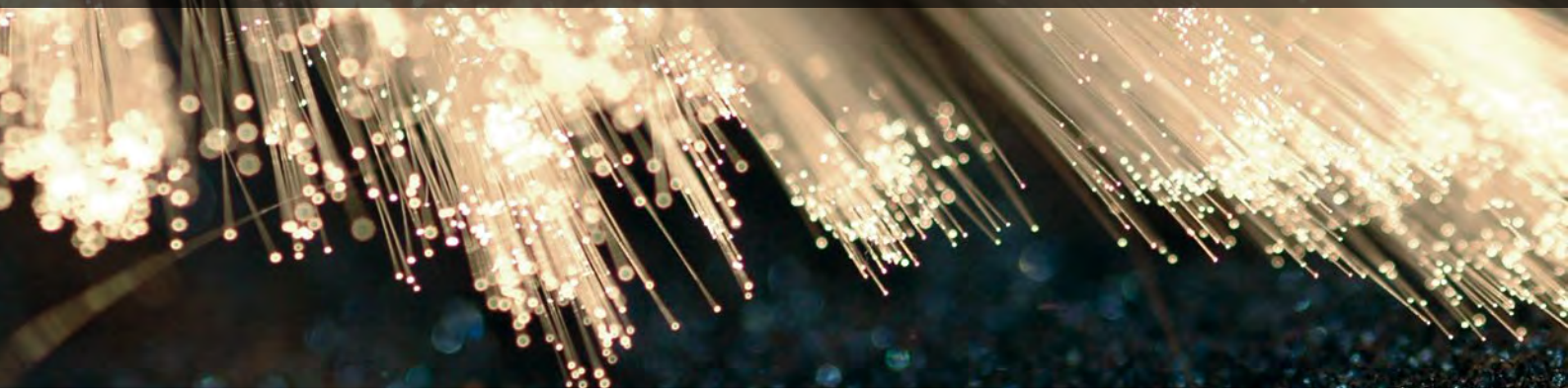


Epoxy resin adhesives and potting compounds

for applications in electronics, electrical engineering, optics and medical technology

Product brochure

Epoxy resin adhesives and potting compounds for applications in electronics, electrical engineering, optics and medical technology



Epoxy resin adhesives and potting compounds are widely used in many industrial applications. Generally speaking, the materials are characterized by the fact that they are internally very rigid, adhere well to a multitude of surfaces and are highly resistant to temperature loads and chemical influences. The material properties with respect to flow behavior, curing speed and flexibility can be adjusted across a relatively wide spectrum.

Extremely diverse usage and processing conditions

Epoxy resin adhesives and potting compounds are generally optimized for specific areas of use and applications. In addition it is often required that they can be used in a wide range of production processing. When deciding the ideal product for a specific application certain issues will be important to consider. The number of components desired, curing temperature, curing time as well as usage conditions are all part of selecting the best product.

Applications for epoxy resin adhesives and potting compounds

Whether products are used in electronics, electrical engineering, optics or medical technology, epoxy resin adhesives and potting compounds help to permanently bond a wide range of materials and to protect sensitive units from environmental influences.

- **Microelectronics:**
  SMD assembly, covering units, potting assemblies
- **Optics:**
  Positioning lenses and prisms, securing optical sensors, bonding fiber-optic cables
- **Medical technology:**
  Autoclavable, biocompatible bonding of medical devices such as endoscopes
- **Electrical engineering:**
  Bonding magnets, potting micro switches

Benefits of bonding

Epoxy resin adhesives enable bonding of almost any material combination – even difficult ones such as metals, plastics, glass or ceramic. As they have a low viscosity, potting compounds even penetrate fine cracks and openings and thereby protect sensitive units against mechanical loads and the influence of most process media such as water, oil or gases.

The perfect product for your application

The adhesives and potting compounds presented here are unfilled resin and hardener systems. They are available in the form of two-component products that can be cured at room temperature or as one-component, hot-curing formulations wherein the hardener is already "incorporated" in solid form. You achieve by far the highest resistance to temperature loads and chemical influences with two-component, hot-curing products.

The following table provides an overview of the various processing and material properties.

Processing	**Cold-curing**	**Hot-curing**	
Components	**2C**	**1C**	**2C**
Optically transparent, high-strength	EP 601	EP 501	–
Optically transparent, flexible	EP 610	–	–
Highest temperature and chemical resistance	EP 660	–	EP 642
Biocompatible	EP 601	–	EP 630 EP 653 EP 655-T
Biocompatible and autoclavable	–	–	EP 630 EP 653 EP 655-T

Variants and customized developments

Are you looking for a product with particular properties? Most of these adhesives and potting compounds also come as thinner, thixotropic, colored or premixed and frozen variants. One of the strengths of Polytec is the ability to partner with you to develop customized products according to your specifications. Please don't hesitate to contact us.

Epoxy resin adhesives and potting compounds

Product code	Processing properties					Thermal properties		Mechanical properties				
Parameter	Mix	Specific gravity	Viscosity	Pot life @ 23 °C	Cure schedule	Max. cont. service temp.	Glass transition temp.	Shore-hardness	Lap shear strength	Tensile strength	Young´s modulus	Elongation at break
Method	–	PT TM 201	PT TM 202*	PT TM 702	–	PT TM 302	PT TM 501	PT TM 601	PT TM 604	PT TM 605	PT TM 605	PT TM 605
Unit	by weight	g/cm³	mPa s	–	examples	°C	°C	–	MPa (Al/Al)	MPa	GPa	%
EP 501	–	1.2	16.000	1 mon	150 °C, 10 min	180	80	D85	31	76	3.6	4.0
EP 601	100:35	1.2	460	4 h	23 °C, 16 h	200	65	D80	37	65	3.5	2.9
EP 601-T	100:35	1.2	3.000	4 h	23 °C, 16 h	200	65	D80	37	65	3.5	2.9
EP 610	100:50	1.1	780	6 h	23 °C, 24 h	150	<23	A65	12	6	0.003	60
EP 610-T	100:50	1.1	3.000	6 h	23 °C, 24 h	150	<23	A65	12	6	0.003	60
EP 630	100:10	1.1	3.000	24 h	150 °C, 5 min	230	90	D85	19	63	3.2	2.9
EP 630-LV	100:10	1.1	1.000	24 h	150 °C, 5 min	230	90	D85	13	63	3.4	2.9
EP 642	100:5	1.1	10.000	24 h	180 °C, 15 min	250	150	D85	14	51	1.6	1.9
EP 653	100:10	1.1	6.000	24 h	150 °C, 5 min	230	80	D85	16	62	3.2	2.8
EP 653-T	100:10	1.1	23.000	24 h	150 °C, 5 min	230	80	D85	17	65	3.6	2.4
EP 655	100:10	1.2	5.600	24 h	150 °C, 5 min	220	100	D80	16	55	2.9	2.8
EP 655-T	100:10	1.2	11.000	24 h	150 °C, 5 min	220	100	D80	16	55	2.9	2.8
EP 660	100:17	1.1	1.000	45 min	23 °C, 16 h	240	120	D80	19	87	3.8	5.6

* Dynamic viscosity at 23 °C, plate – plate, gap: 0.5 mm, shear velocity: 84 s-1

With the exception of EP 660, all of the two-component adhesives also come as pre-mixed, frozen variants.

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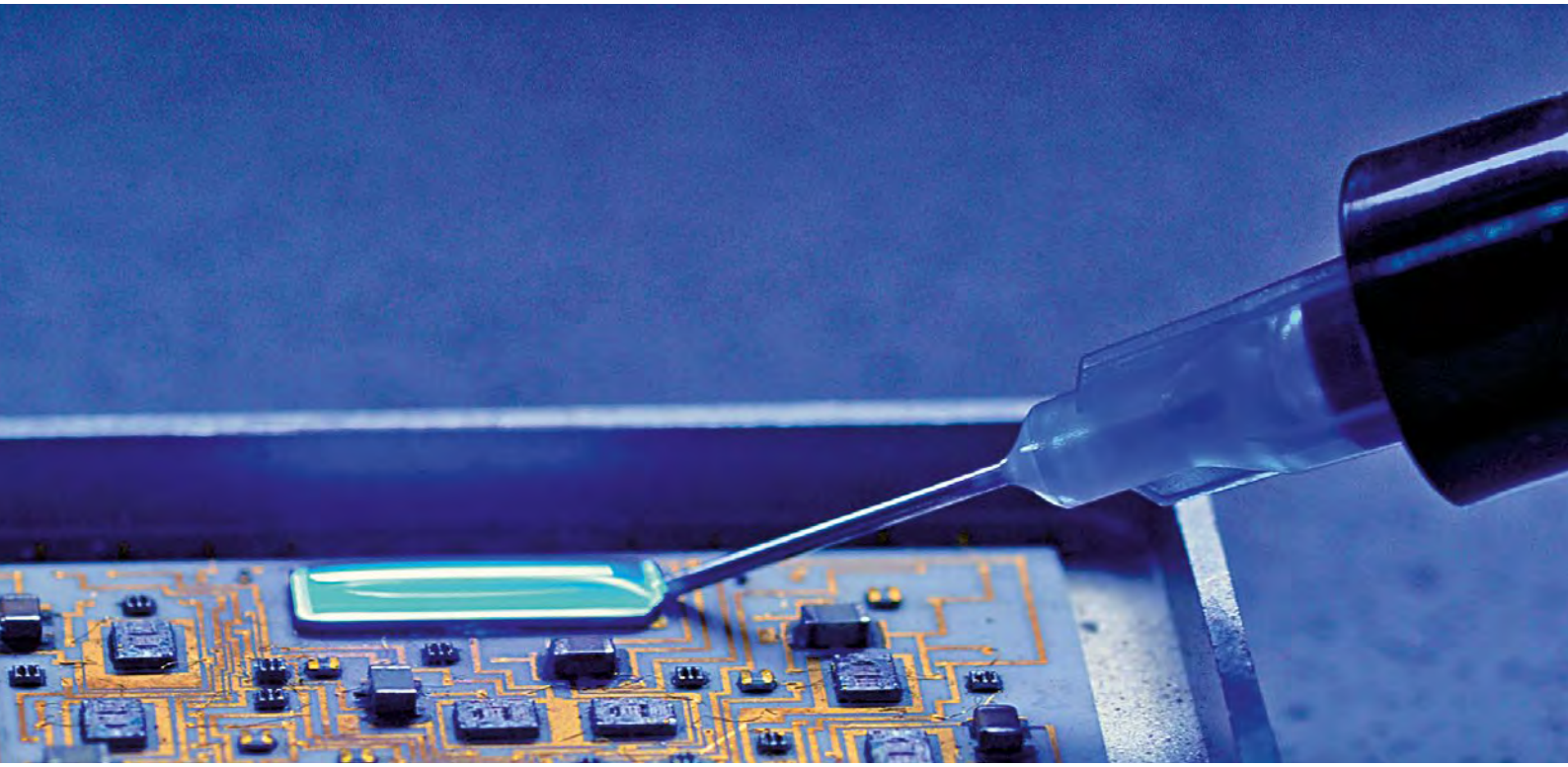
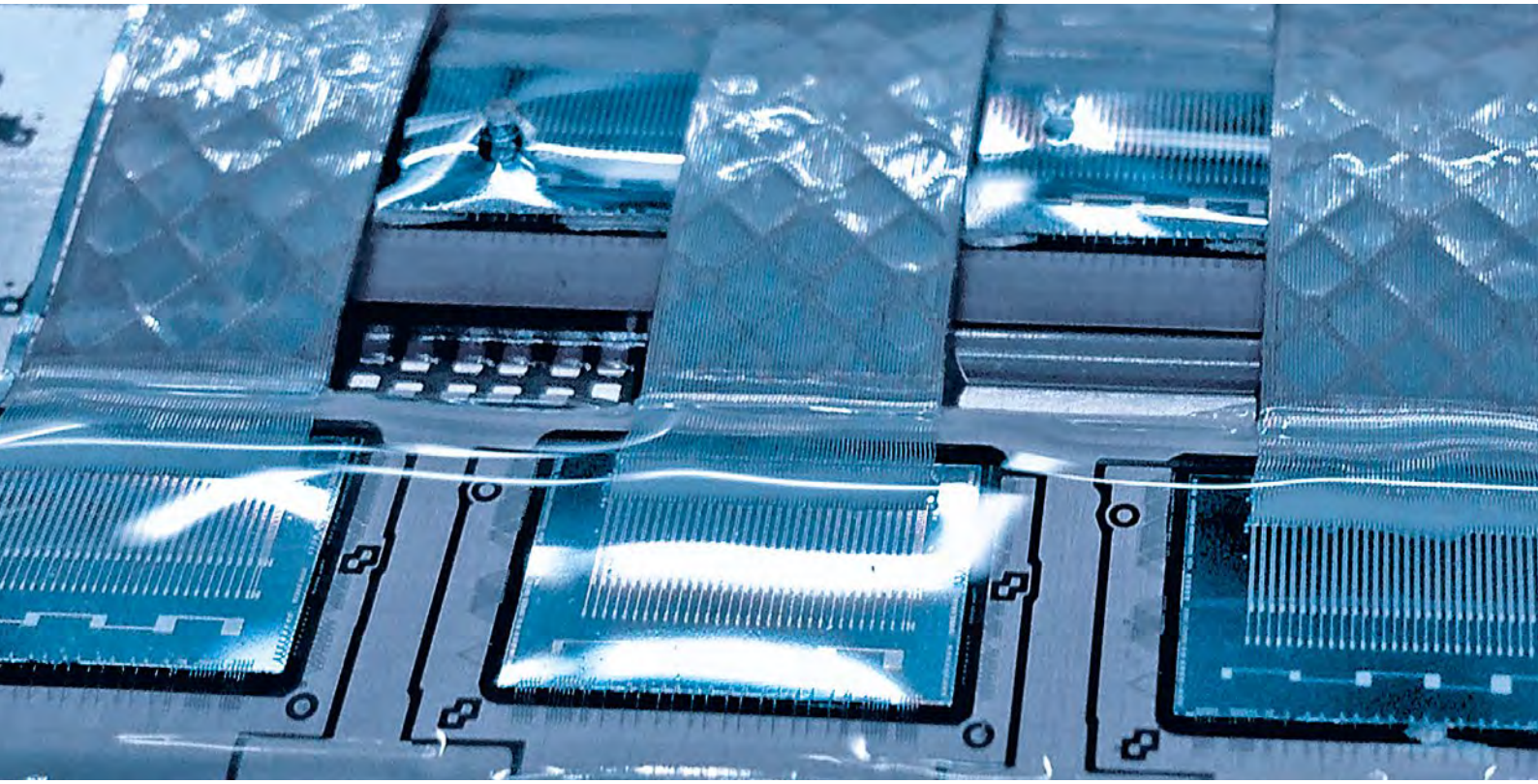


UV- and dual-curing adhesives

for frictional connections in electronics, electrical engineering, optics and medical technology

Product brochure



Light-curing adhesives are primarily used in connection technology where rapid curing is required. These one-component products cure at room temperature within seconds after irradiation with UV light. This allows very short cycle times, even with large numbers of pieces.

The use of purely UV-curing adhesives requires that at least one of the components to be joined has sufficient UV permeability or the adhesive surface can be exposed directly to a UV source. For components that have shadow zones and therefore cannot be exposed completely, dual-curing adhesives are suitable, which, in addition to curing with light, have a second curing mechanism. Here, thermal, anaerobic or humidity post-crosslinking systems are available.

Different applications and processing conditions

UV-curing adhesives are generally optimized for specific applications and operational conditions. Therefore, a wide range of viscosities (from low viscosity, capillating to non-sag and gap-filling) and mechanical properties (soft, flexible to high strength) are available. Depending on the properties of the product, the application can be carried out through dispensing or jetting.

Applications for UV and light-curing adhesives

UV and light-curing adhesives are used, for example, in the following areas:

- **Loudspeaker assembly:** bonding of membrane and coils
- **Electronics:** dam & fill for encapsulation and protection of sensitive components
- **Electrical engineering:** embedding of passive components
- **Displays:** optical bonding, mounting of cover plates
- **Automotive:** active alignment of camera modules (CCM)
- **Optics:** bonding of field and ancillary lenses, fiber optic couplers
- **Watch industry:** bonding of watch glasses in metal and plastic housings

Advantages of adhesives

UV-curing bonding as an alternative to conventional joining technology allows for the joining of any – even difficult – material combinations, such as plastic-metal or metal-glass connections. Since the adhesives are cured at room temperature, there is virtually no thermal stress during curing.

The right product for your application

UV-curing adhesives from Polytec PT are based on epoxy, acrylate and/or hybrid systems. These cure on exposure within a very short time and show excellent adhesion to glass, metals and most plastics.

The fluorescent properties of some adhesives also allow for cost-effective process control (optical inspection) of the bonding assemblies under UVA.

The UV adhesives in the Polytec portfolio also differ, among other things, in their curing systems. Depending on the adhesive, curing is radical, cationic or dual.

The following table provides a partial overview of various product and material properties:

Curing mechanism	**Pure UV-curing**		**Dual-curing**	
Chemical base	**Acrylate & hybrids**	**Epoxy**	**Acrylate & hybrids**	**Epoxy**
High-strength	UV 2101 UV 2108 UV 2133 UV 2195 UV 2144	UV 2237	UV 2137 DC UV 2157 DC UV 2322 DC UV 2341 DC	UV 2249 DC UV 2214 DC
Flexible	UV 2181 ME UV 2121	–	–	UV 2257 DC
Biocompatible	UV 2108 UV 2181 ME	–	–	–

Variations and customer-specific developments

Are you unable to find a product with certain characteristics? Many of these adhesives are also available as a lower viscosity or thixotropic variant. We also develop customer-specific products according to your specifications. Please contact us.

UV light sources

Polytec PT UV adhesives can be cured with gas discharge lamps or UV LEDs. We are happy to offer you suitable UV LED light sources, from battery-powered portable lights for laboratories and small series to systems capable of being integrated into production lines.

UV- and dual-curing adhesives

Description	Processing properties						Typical applications/comments
Parameter	Chemical basis	Color	Density	Viscosity approx.	Max. temperature	Hard-ness	
Unit			g/cm³	mPa s	°C	Shore	
UV 2101	Acrylate hybrid	Transparent	1,1	900	120	D67	Ideal for glass-glass, glass-metal bonding, yellowing resistance, refractive index 1.50
UV 2108	Acrylate	Transparent	1,1	200*	80	D70	Very good adhesion to many plastics, biocompatible, fluorescent, refractive index 1.44
UV 2121	Acrylate	Red	1,1	4800	n.b.	A20	Highly flexible, suitable for applications such as loudspeaker bonding (membrane-chassis)
UV 2133	Methacrylate-hybrid	Grey	1,8	35000**	160	D80	Highly-filled, paste-like, high TG (>100 °C), very good chemical and moisture resistance, thermal conductivity 0.6 W/mK
UV 2137 DC	Methacrylate/ acrylat	Transparent	1,1	850	120	D80	Ideal for sealing and protecting, dual-curing (thermal curing from 90 °C)
UV 2144	Epoxy/ acrylate hybrid	Transparent	1,1	15000	150	D83	Very high TG (167 °C), surface-dry, low water absorption
UV 2157 DC	Acrylate hybrid	Opaque	1,1	650	120	D68	High-strength for glass-glass, glass-metal bonding, dual-curing (thermal post-curing from 90 °C)
UV 2181 ME	Acrylate	Transparent	1,1	4500	80	A70	Flexible, above all for plastic bonds, biocompatible, refractive index 1.51
UV 2195	Acrylate hybrid	Transparent	1,1	7500***	120	D75	Universal product for glass, metal and plastic bonds, surface-dry, refractive index 1.50
UV 2237	Epoxy	Transparent	1,1	1200	150	D80	Self-leveling, surface-dry, cures itself with incomplete exposure
UV 2249 DC	Epoxy	Yellowish, opaque	1,1	1500***	150	D81	Thixotropic gel-like, surface-dry, low outgassing, thermal post-curing possible
UV 2257 DC	Epoxy	Slightly opaque	1,1	300	130	D73	Flexible, surface-dry, very good adhesion to plastics, thermal post-curing from 120 °C
UV 2322 DC	Acrylate/ PU-hybrid	Opaque	1,1	9000	150	D65	Dual-curing (humidity post-crosslinking), good adhesion to glass, metals and plastics, thixotropic
UV 2341 DC	Acrylate/ PU-hybrid	Opaque	1,1	800	150	D62	Dual-curing (humidity post-crosslinking), good adhesion to glass, metal and plastics, low viscosity

Shear rate: $10s^{-1}$ / $60s^{-1}$* / $100s^{-1}$** / $400s^{-1}$***

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MXBON®
Cartell Chemical Co., Ltd

MXBON®
Adhesives Expert

Founded in 1994, Cartell Chemical Co. Ltd. is one of the world's leading manufacturers of Cyanoacrylate Adhesives. Cartell Chemical has a strong research and development team, owns innovative production technologies with robust financial support and collaborates with world leading R&D teams to develop cutting-edge bonding solutions. By actively investing in research and development, constantly improving production facilities and inspection equipment, Cartell Chemical has been able to grow our market shares throughout the years. Moreover, Cartell Chemical Co., Ltd. complies to ISO9001 and ISO14001 and our products are accredited with international standards including ISO10993-5, NSF, and REACH.

Cartell Chemical aims to provide expert advice and offer technical support to our customers from the product design phase to the most appropriate adhesive selection during the production phase. Our belief of continuous innovation and pursuing excellence makes it possible to gain recognition and credit from our customers in various industries and achieve successful sales worldwide.

Cartell Chemical dedicates itself in providing the highest quality, most cost competitive, and most reliable industrial solution in design, manufacturing and repair phase. Our products are widely implemented into industries such as electronics, medical devices, railway transportation, naval architecture, sports equipment, etc. Applications include toys, motors, hand tools, pneumatic tools, 3C electronic products, automotive accessories, etc.

Excellence
Cartell Chemical focuses solely on our realm of expertise. With dedication,continuous improvement and innovation, we serve our clients diligently and professionally.

Quality
Quality and Service are the beliefs of Cartell Chemical. Quality is our priority to ensure that satisfaction and contentment will be provided to our valued customers.

Environment
Cartell Chemical has been an advocate and supporter of environmental protection. We have been working on the development of carbon reducing manufacturing processes and ensure we meet international environmental policies.

Win-Win
Cartell Chemical believes that the only path to true success is through the win-win relationships between customers, employees, suppliers, and all other social groups. Our goal is to provide the customer superior products with innovative technology to create a prosperous future.

MXBON® Adhesives Expert
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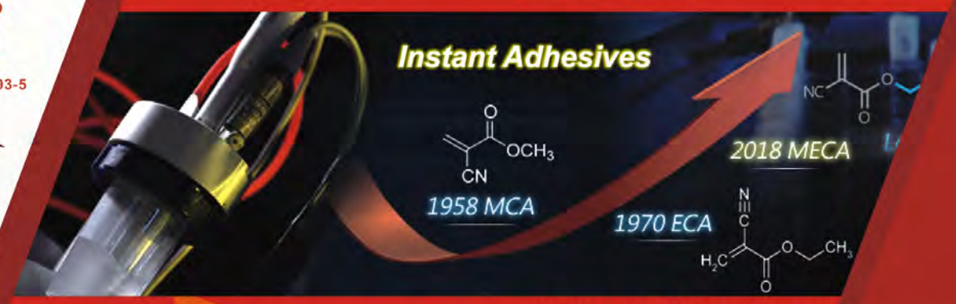
REACH COMPLIANCE
WRAS WATER REGULATIONS ADVISORY SCHEME
ISO ▸ ISO 9001 ▸ ISO 14001
NSF ▸ National Sanitation Foundation
DVGW ▸ Safety in Drinking water



www.mxbon.com

MXBON® Cyanoacrylate Adhesive products are specially developed for full ranges of comprehensive bonding applications.
Our mission is to create greater confidence for consumers offering higher adhesion strength, better durability and lower odor formulation, with less glue usage.

No welding, No fastening and No riveting required

MXBON® Cyanoacrylate Adhesives meet all kinds of bonding requirements providing excellent adhesion strength and durability. **MXBON®** Cyanoacrylate Adhesives also enhance the cleanness and aesthetics of the product. Application ranges from electronic 3C products, handheld devices,speakers, electronic components, medical devices, hand tools, kitchen equipment,bicycles, sporting goods, daily consumer goods to automobile supply chains. **MXBON®** products can meet your various requirements in product designs and manufacturing requirements.

MXBON® Cyanoacrylate Adhesive is a single component, solvent-free adhesive product. It forms initial bonding within 5 to 10 seconds at room temperature and reaches 85% of full adhesion strength within 1 hour with shear strength up to 4,500 psi. With a single drop, **MXBON®** Cyanoacrylate Adhesive can bond materials such as: rubber, wood, metal,leather, ceramic materials, acidic or contaminated surfaces, and low surface energy plastic materials.

Reaching a higher level for your product design

When it comes to product design, **MXBON®** Cyanoacrylate Adhesive is the alternative to traditional methods. The unique characteristics of our adhesives enables engineers to boldly make designs using new composite materials. Whatever the material and design , **MXBON®** Cyanoacrylate Adhesive has the solution that best suits your needs.

MXBON® provides bonding products and assembly solutions

MXBON® Cyanoacrylate Adhesives provide bonding solutions to a variety of assembly challenges, and most material substrates. **MXBON®** Cyanoacrylate Adhesive is a great tool to optimize product design, improve assembly efficiency, and lower production costs.

Complete sealing-leaking prevention and humidity resistance.

MXBON® Cyanoacrylate Adhesive Gasket Sealing Fixture Solution provides stable and durable adhesion. Bonding pre-cut gaskets and O-rings onto complex substrates to prevent leakage is always a challenge.
MXBON® Cyanoacrylate Adhesives creates a tight-fitting sealing layer on complex metallic components and could replace foams or rubber gaskets in certain applications.

Provide stable bonding for micro-components with strong adhesion in small area.

Bonding tiny, irregular-shaped components for structural points is a complicated task. **MXBON®** Cyanoacrylate Adhesive Micro-Components bonding solution provides a long lasting, stable, and vibration resistant bond. It makes bonding dissimilar components easy, as if the two components were like one piece.

Bonding composite materials and various materials to reduce the weight of the product.

Reducing product weight means cost reduction, energy efficiency improvement and product esthetics enhancement. Product engineers always seek to utilize new and light-weight materials. However, bonding two parts of dissimilar material can be difficult to accomplish.
MXBON® Cyanoacrylate Adhesives offer high adhesion and strong durability with a variety of choices making bonding possible for composite material and other lightweight material such as plastic and metal.

Optimize assembly process of medical products and electronic products.

ISO 10993 certified, Cyanoacrylate Adhesives **MXBON®** offers the optimal bonding solution for devices and equipment ranging from hospitals to clinics, long-term care, and home-based medical facilities.

MXBON® Cyanoacrylate Adhesive is designed to reduce assembling defects, increase production efficiency, and provide optimum bonding performances.

General Purpose (ECA type)

Surface Insensitive: For materials that are difficult to bond

Difficult to bond materials are difficult to achieve good bonding performance without pretreatment or using suitable grades. It is strongly recommended to check the substrate to be bonded before bonding.

Two types of difficult to bond materials

1. **Surface insensitive and low energy surface** such as PTFE, POM, EPDM, Silicone, electroplated material,stainless steel and aluminum-magnesium alloy.
2. **Porous materials, water absorption materials, acid surface materials** such as leather, textile, wood and paper.

21401 | General purpose,medium viscosity,withstand temperature up to 121℃
- Transparent, fast setting
- Excellent adhesion to most substrates
- Especially for insensitive surface and low energy surface
- Viscosity:80~120cps

21406 | Penetration characteristics,low viscosity, withstand temperature up to 121℃
- Transparent, fast setting
- Excellent adhesion to most substrates
- Especially for insensitive surface and low energy surface
- Viscosity: 15~40 cps

21454 | General purpose,gel type,withstand temperature up to 121℃
- Transparent, fast setting
- Suitable on vertical surfaces and gap filling up to 0.25mm
- Excellent adhesion to most substrates
- Especially for insensitive surface and porous materials
- Viscosity: 15,000~20,000 cps

Impact Resistance Rubber Toughened (black glue)

21380 | General purpose,medium viscosity,black liquid, withstand temperature up to 107℃
- High temperature, high humidity resistant, high flexibility
- Excellent impact and peel/shear strength
- Excellent adhesion to plastic, rubber, metal
- Viscosity: 200~800 cps

21410 | Rubber toughened,flexibility,high viscosity, black liquid,withstand temperature up to 107℃
- High temperature, high humidity resistant, high flexibility
- Excellent impact and peeling strength and resist most of chemicals
- Excellent adhesion to plastic, rubber, metal
- Viscosity: 1,700~5,000cps

21438 | Rubber toughened,low viscosity,black liquid, withstand temperatures up to 100℃
- Excellent impact and peeling strength and resist most of chemicals
- Excellent adhesion to plastic, rubber, metal
- Suitable for insensitive surface and porous materials
- Viscosity: 100~300 cps

21480 | Rubber toughened,low viscosity,black liquid
- Black appearance, medium curing speed
- Excellent impact and peel/shear strength
- Excellent adhesion to plastic, rubber, metal
- Viscosity: 100~200 cps

Impact Resistance Rubber Toughened (clear glue)

21411 | Transparent,impact resistance,high viscosity,gap filling
- High temperature, high humidity resistant, high flexibility
- Enhances resistance to shock/vibration condition
- Excellent impact and peeling strength and resist most of chemicals
- Excellent adhesion to plastic, rubber, metal
- Viscosity: 3,500~8,500cps

21435 | Transparent,impact resistance,medium viscosity,withstand temperature up to 107℃
- Excellent impact resistant and peeling strength and resists most of chemicals
- Excellent adhesion to plastic, rubber, metal
- Special formulation for porous materials
- Viscosity: 100~250 cps

General Purpose

21416 | General,purpose,high viscosity,Transparent, gap filling
- Suitable for gap filling up to 0.2mm
- Suitable for rough and irregular surface
- Especially suited bonding plastic or rubber parts
- Viscosity:900~1,500 cps

21420 | Penetration characteristics,low viscosity, Transparent,fast setting
- Special formulation for the assembling variety of materials with low viscosity
- Especially suited bonding plastic or rubber parts
- Viscosity: 1~5 cps

21495 | General,purpose,low viscosity,Transparent , withstand temperature up to 121℃
- Low viscosity, fast setting, high temperature resistant
- Excellent adhesion to most substrates
- Especially suited bonding plastic or rubber parts
- Viscosity: 20~60 cps

Specialty Purpose

21382 | PCB cable tacking,high viscosity,transparent, high bonding strength
- Suitable for gap filling up to 0.2mm
- Withstand temperature up to 100℃
- Excellent adhesion to most substrates
- Suitable for accelerator of MXBON 2001G/L
- Viscosity: 3,500~8,500 cps

21498 | Heat resistances,medium viscosity,transparent
- Thermal cycling resistance
- Excellent adhesion to plastic, rubber, metal
- Viscosity:400~600cps

Metal Series

23415 | General purposes, medium viscosity, transparent, gap filling
- Suitable for gap filling up to 0.2mm
- Suitable for rough and irregular surface
- Excellent adhesion to plastic, rubber, metal
- Viscosity: 900~1,500cps

23493 | Penetration characteristics,low viscosity, Transparent,high bonding strength
- Special formulation for the assembling of a variety of materials with low viscosity
- Excellent adhesion to most substrates, particularly suitable to metals
- Viscosity: 1~5cps

23496 | General purposes,low viscosity,Transparent, high bonding strength
- Low viscosity, fast setting
- Excellent adhesion to most substrates, particularly suited to metals
- Suitable for bonding rubber to plastic
- Viscosity: 100-200cps

NEW Formulation (MECA TYPE) Low Odor/ Low Blooming

The optimal experience of benefits and advantages using MXBON®

- Easy to dispense
- Weight reducing on components
- Costs saving production
- Work time saving
- Easier process for surface cleaning
- Fast setting on components
- Cures quickly to variety of materials
- Excellent adhesion to most substrates, especially plastic and rubber.

Surface Insensitive for difficult bonding material

22401 | General purpose, low viscosity, transparent, withstand temperature up to 100℃
- Transparent, fast setting
- Excellent adhesion to most substrates
- Especially suited for insensitive surface and low energy surface
- Low odor low blooming
- ISO 10993-5 certified
- Viscosity: 80~100cps

22403 | Transparent, colorless,high bonding strength
- Transparent, colorless, fast setting
- Withstand temperature up to 100℃
- Excellent adhesion to plastic, rubber, metal
- Especially suited for insensitive surface and porous materials
- Low odor low blooming
- ISO 10993-5 certified
- Viscosity: 900~1,300cps

22408 | Penetration characteristics, low viscosity, low odor low blooming
- Transparent, fast setting
- Excellent bonding strength
- Especially suited for insensitive surface and low energy surface
- Cures quickly to a wide variety of materials
- Viscosity:4~10cps

22460 | Penetration characteristics, low viscosity, Transparent,withstand temperature up to 100℃
- Transparent, fast setting
- Excellent adhesion to most substrates
- Especially suited for insensitive surface and low energy surface
- Low odor low blooming
- ISO 10993-5 certified
- Viscosity: 22~55cps

Specialty Purpose(Low Odor, Low Blooming)

22435 | Rubber toughened, low odor low blooming, withstand temperature up to 100℃
- Transparent, colorless, fast fixture speed
- High flexibility, high bonding strength, excellent shock resistance against humid environment.
- Cures quickly to a wide variety of materials
- Suitable for gap filling up to 0.15mm
- Suitable for porous materials
- Viscosity: 250~500cps

22455 | General purpose,gel type, low odor low blooming
- Transparent, high bonding strength
- Suitable for gap filling up to 0.25mm
- Suitable for vertical surfaces
- Excellent adhesion to most substrates
- Viscosity: 10,000~30,000cps

22498 | Thermal cycling resistance,low odor low blooming
- Transparent, excellent humidity resistance
- Maintaining the performance and adhesion strength under temperature of 100℃
- Viscosity: 400~600cps

22698 | Withstand temperature up to 150℃, low odor low blooming
- Transparent, excellent humidity resistance
- Maintaining the performance and adhesion strength in temperature 100℃ or above
- Viscosity: 200~400cps

224902 | Highly flexible,low viscosity, low odor low blooming
- Transparent, fast setting
- High bonding strength, excellent sealing capability
- Designed to assemble flexible medical devices
- ISO 10993-5 certified
- Viscosity: 30~70cps

UV Curable Cyanoacrylate Adhesive (Low Odor Low Blooming)

22441 | Low Viscosity, light cure cyanoacrylate
- Transparent, slight green color, rapid fixture
- Cure with UV light and/or moisture
- Gap filling capacity
- Viscosity: 8~20cps

22443 | Medium Viscosity, light cure cyanoacrylate
- Transparent, slight green color, rapid fixture
- Cure with UV light and/or moisturel
- Easy to dispense
- ISO 10993-5 certified
- Viscosity: 150~300cps

22446 | High Viscosity, light cure cyanoacrylate
- Transparent, slight green color, rapid fixture
- Cure with UV light and/or moisture
- Easy to dispense
- Viscosity: 600~1,200cps

22449 | General purpose,gel type without runs or drips, low odor low blooming
- Transparent, slight green color, rapid fixture
- Cure with UV light and/or moisture
- Viscosity: 15,000~25,000cps

Product Number	Color	Viscosity (cPs)	Strength (psi)	Temperature Range(℃)	Tg (℃)	Shore D	Carbon steel	Initial Setting Time (/sec)			
								Aluminum alloy	ABS	PC	NBR
21380	Black	200~800	3,800	-40~ 107	120	76	< 100	< 55	< 35	< 85	< 20
21382	Transparent	3,500~8,500	4,300	-54~ 100	150	85	< 20	< 25	< 30	< 20	< 10
21401	Transparent	80~150	4,000	-54~ 121	150	85	< 10	< 10	< 5	< 5	< 10
21406	Transparent	15~40	3,800	-54~ 121	150	83	< 10	< 10	< 5	< 15	< 15
21410	Black	1,700~5,000	3,200	-54~ 107	150	80	< 100	< 40	< 40	< 80	< 30
21411	Transparent	3,500~8,500	4,300	-54~ 99	150	85	< 20	< 25	< 30	< 20	< 10
23415	Transparent	900~1,500	4,200	-54~ 82	165	81	< 50	< 60	< 40	< 60	< 40
21416	Transparent	900~1,500	3,600	-54~ 82	150	84	< 25	< 30	< 40	< 20	< 10
21420	Transparent	1~5	3,700	-54~ 82	150	84	< 25	< 20	< 20	< 30	< 10
21435	Transparent	100~250	3,700	-54~ 107	150	80	< 55	< 50	< 25	< 55	< 30
21438	Black	100~300	3,300	-40~ 100	150	81	< 60	< 50	< 25	< 80	< 20
21454	Transparent	Gel	3,600	-54~ 121	150	84	< 5	< 20	< 5	< 15	< 5
21480	Black	100~200	3,400	-54~ 82	150	80	< 30	< 30	< 20	< 20	< 10
23493	Transparent	1~5	4,500	-54~ 82	165	80	< 45	< 55	< 30	< 65	< 30
21495	Transparent	20~60	3,800	-54~ 121	150	83	< 10	< 10	< 5	< 15	< 15
23496	Transparent	100~200	3,700	-54~ 82	165	84	< 20	< 50	< 30	< 30	< 25
21498	Transparent	400~600	3,700	-54~ 82	150	84	< 25	< 20	< 15	< 20	< 10
22401	Transparent	80~120	3,500	-54~ 100	150	82	< 5	< 5	< 5	< 10	< 15
22403	Transparent	900~1,500	3,600	-54~ 100	150	83	< 10	< 20	< 5	< 15	< 20
22408	Transparent	4~10	3,100	-54~ 100	120	75	< 15	< 5	< 5	< 10	< 15
22435	Transparent	250~500	3,600	-54~ 100	150	75	< 5	< 5	< 5	< 15	< 15
22455	Transparent	Gel	3,100	-54~ 100	130	79	< 75	< 30	< 40	< 50	< 30
22460	Transparent	25~55	3,200	-54~ 100	120	78	< 20	< 20	< 5	< 20	< 15
22498	Transparent	400~600	3,100	-54~ 100	120	80	< 20	< 20	< 5	< 15	< 20
22698	Transparent	200~400	2,900	-54~ 150	120	80	< 20	< 20	< 20	< 30	< 20
224902	Transparent	30-70	3,500	-54~ 100	150	55	< 5	< 5	< 5	< 15	< 15
22441	Transparent	8~20	3,100	-54~ 100	120	75	<15	<15	<15	<15	<5
22443	Transparent	150~300	3,500	-54~ 100	150	82	<15	<15	<15	<40	<10
22446	Transparent	600~1,200	3,600	-54~ 100	150	83	<20	<20	<15	<40	<10
22449	Transparent	15,000~25,000	3,100	-54~ 100	130	79	<20	<20	<15	<40	<10

Suitable Bonding Substrates																		
Carbon steel	Aluminum alloy	Plating	Plastic	Rubber	Elastomer	Ceramics	Leather	Fabric	Wood	Paper	Surface Insensitive	Low Odor	Impact Resistance	Anti-aging	Temp Resistance	Vertical plane	Light Curing	Certificate
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○	○	○	●	●	●	●	◎	◎	◎	◎	●	●			○		●	
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●Highly Recommendation | ◎Well Recommendation | ○Good Recommendation

EVERWIDE

Moisture-Curing Type (MS)

Applied Materials with Impact Resistance and High Tenacity for Bonding and Potting

MS resins are polyether resins with the characteristics of elasticity, transparency, and resistance to oil and abrasion. Technically, they are thermoplastic elastomers consisting of linear polymeric chains containing rather long, low polarity soft segments, which alternate with shorter, high polarity hard segments. Both types of segments are linked together by covalent links, so that they actually form block-copolymers.

The characteristics of MS resins are listed below:

- Excellent abrasion resistance
- Excellent mechanical properties with rubber-like elasticity
- Good oil resistance
- Excellent low-temperature performance
- High shear strength
- High transparency
- High elasticity

Description of Product Features:

The moisture-curing type polyether resin is a new type of adhesive, and it's also one of the ideal adhesives with a high price-performance ratio among fast curing adhesives. It has three features: pressure-sensitive during adhering, flexible after curing, and solvent-free formula. Everwide Chemical develops FS series moisture-curing type polyether resins (Silane Terminated Polyurethane) primarily for adhesion of plastics, metals, and glasses. Unlike toxic traditional PU due to usage of isocyanate (NCO), the reaction mechanism that we utilize is the same as that of non-alcohol-type silicones without the stench of de-acidification types. Also, they provide the effects of fast surface drying and are far superior to silicones on adhesion to plastics.

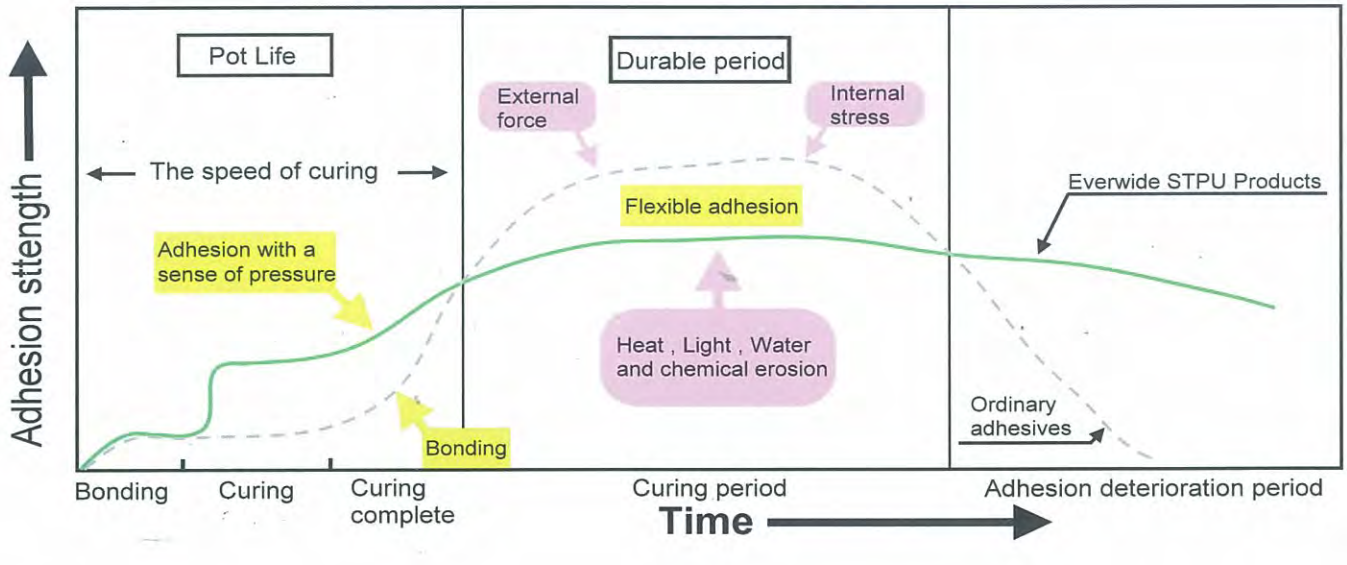
The biggest shortcoming of silicones, considered by users generally, is pollution, because its internal components will gradually spread to the outside, defacing the buildings in civil applications and resulting in defective contact in electronic applications. Compared with silicones, the polyether type resins do not have the above disadvantage. In recent years, polyether type resins have been rapidly promoted in the applications of adhesion, potting, sealing, reinforcement, etc. for the product design of the 6C industry.

Everwide Chemical considers the development of its polyether resins product series a key R&D point, invests a lot of human and material resources on the formulation technologies, product packaging, application range, etc. to develop the promising and multiple application market from all angles, and has full confidence in the future prospects, too.

Moisture-Curing Type (MS)
Applied Materials with Impact Resistance and High Tenacity for Adhesion and Potting

Product Features	Solvent-free formula	The products are made from solvent-free formula, enabling fast surface drying in room temperature and featuring safe, clean, and easy for use.
	Pressure-sensitive during adhering	The curing action is conducted after water absorption from the air. Before the surface is dried, the PU material has higher viscosity after about a 10-minute coating, providing pre-cured characteristics with pressure-sensitive effects.
	Fast curing	With the surface drying rate 5 ~ 10 min. and complete curing time 6 ~ 12 hr, the products have a double curing rate relative to silicones.
	Flexible after curing	The products are cured to form thermoplastic elastomers consisting of block-copolymers linked by covalent links so as to contain both the softness of silicones and tenacity of polyurethanes.
	Extensive application range	The application of products covers a variety of extensive materials. They can apply to various plastics, rubbers, glass-ceramics, metals of different types, etc.
	Durability	The products are not prone to being stripped because of strong adhesive force. They can endure high-low temperature alternating without cracking or delamination and have excellent weatherability in outdoor environments.

Concept Diagram for Moisture-Curing Type Adhesives



Product tables for moisture-curing type adhesives

Transparent version

Product Number	Product Features	Viscosity m. Pas	Surface drying time (25℃)min	Curing conditions 25℃X50%RH hr/3.3mm	Hardness SHORE	Surface Resistance ohm	Volume Resistance ohm-cm	Bonding strength Kg/cm² Glass + Glass	Bonding strength Kg/cm² Stainless steel +Stainless steel	Bonding strength Kg/cm² Aluminum+Aluminum	Bonding strength Kg/cm² PC VS. PC	Bonding strength Kg/cm² ABS VS. ABS	Packing Specifications	Storage Conditions
FS100	Rapid solidification and middle viscosity	50,000~80,000	5~10	48	A37	$1.04x10^{13}$	$1.84x10^{11}$	28	42	33	16	9	170/300ml	Dry at room temperature
FS1371	Rapid solidification and low odor	30,000~60,000	5~7	48	A40	$2.0x10^{12}$	$2.0x10^{11}$	8	28	25	35	17		
FS115	High strength and high tenacity	10,000~15,000	10	72	A42	$1.9x10^{12}$	$2.1x10^{11}$	6	26	25	12	6		
FS1442	High transparency and middle viscosity	30,000~60,000	20	72	A36	$2.0x10^{12}$	$2.0x10^{11}$	12	21	20	14	9		
FS1362	High strength and high tenacity	25,000~35,000	5~10	48	A43	$2.1x10^{12}$	$2.2x10^{11}$	11	28	26	24	15		
FS1381	Rapid solidification and middle viscosity	6,000~12,000	10	72	A40	$2.1x10^{12}$	$2.1x10^{11}$	13	29	28	32	15		

White version

Product Number	Product Features	Viscosity m. Pas	Surface drying time (25℃)min	Curing conditions 25℃X50%RH hr/3.3mm	Hardness SHORE	Surface Resistance ohm	Volume Resistance ohm-cm	Bonding strength Kg/cm² Glass + Glass	Bonding strength Kg/cm² Stainless steel +Stainless steel	Bonding strength Kg/cm² Aluminum+Aluminum	Bonding strength Kg/cm² PC VS. PC	Bonding strength Kg/cm² ABS VS. ABS	Packing Specifications	Storage Conditions
FS100W	Rapid solidification	80,000~120,000	4	48	A49	$1.8x10^{12}$	$2.0x10^{11}$	18	33	44	12	14	170/300ml	Dry at room temperature
FS100W1	Rapid solidification and middle thixotropy	60,000~100,000	4	48	A40	$1.9x10^{12}$	$2.0x10^{11}$	19	37	45	13	16		
FS115W	High strength	20,000~35,000	15	72	A49	$1.9x10^{12}$	$2.0x10^{11}$	31	36	19	11	8		
FS115W2	High strength and rapid solidification	110,000~220,000	6	48	A47	$1.8x10^{12}$	$2.0x10^{11}$	31	29	30	16	11		

Black version

Product Number	Product Features	Viscosity m. Pas	Surface drying time (25℃)min	Curing conditions 25℃X50%RH hr/3.3mm	Hardness SHORE	Surface Resistance ohm	Volume Resistance ohm-cm	Bonding strength Kg/cm² Glass + Glass	Bonding strength Kg/cm² Stainless steel +Stainless steel	Bonding strength Kg/cm² Aluminum+Aluminum	Bonding strength Kg/cm² PC VS. PC	Bonding strength Kg/cm² ABS VS. ABS	Packing Specifications	Storage Conditions
FS0664BL	Ultra-low viscosity	6,000~9,000	10	72	A30	$2.1x10^{12}$	$2.2x10^{11}$	29	25	25	29	10	170/300ml	Dry at room temperature
FS100BL1	Rapid solidification and low viscosity	80,000~110,000	15	48	A47	$1.8x10^{12}$	$2.0x10^{11}$	38	35	38	25	20		
FS115BL3	Rapid solidification and middle viscosity	53,000~99,000	5~10	72	A38	$3.54x10^{12}$	$1.0x10^{11}$	25	26	27	13	8.6		
FS115BL8	Rapid solidification and middle/high viscosity	150,000	7	72	A54	$1.9x10^{12}$	$2.0x10^{11}$	29	27	30	15	8.9		
FS115BL6	Rapid solidification and high thixotropy	410,000	5	48	A56	$1.9x10^{12}$	$2.0x10^{11}$	25	26	27	13	8.6		

Gray version

Product Number	Product Features	Viscosity m. Pas	Surface drying time (25℃)min	Curing conditions 25℃X50%RH hr/3.3mm	Hardness SHORE	Surface Resistance ohm	Volume Resistance ohm-cm	Bonding strength Kg/cm² Glass + Glass	Bonding strength Kg/cm² Stainless steel +Stainless steel	Bonding strength Kg/cm² Aluminum+Aluminum	Bonding strength Kg/cm² PC VS. PC	Bonding strength Kg/cm² ABS VS. ABS	Packing Specifications	Storage Conditions
FS115G4	Rapid solidification and middle viscosity	70,000~140,000	6	48	A42	$1.8x10^{12}$	$2.0x10^{11}$	29	28	28	13	9	170/300ml	Dry at room temperature
FS100G	Rapid solidification and middle viscosity	60,000~100,000	5~10	48	A42	$1.23x10^{13}$	$1.07x10^{11}$	30	33	44	25	14		

Fire resistant version

Product Number	Product Features	Viscosity m. Pas	Surface drying time (25℃)min	Curing conditions 25℃X50%RH hr/3.3mm	Hardness SHORE	Surface Resistance ohm	Volume Resistance ohm-cm	Bonding strength Kg/cm² Glass + Glass	Bonding strength Kg/cm² Stainless steel +Stainless steel	Bonding strength Kg/cm² Aluminum+Aluminum	Bonding strength Kg/cm² PC VS. PC	Bonding strength Kg/cm² ABS VS. ABS	Packing Specifications	Storage Conditions
FS168W02	Middle thixotropy in accordance with UL94V-0	80,000~110,000	4	48	A56	$1.23x10^{13}$	$1.07x10^{11}$	25	24	34	31	23	170/300ml	Dry at room temperature
FS168W03	High thixotropy in accordance with UL94V-0	180,000~240,000	4	48	A57	$1.8x10^{12}$	$2.0x10^{11}$	26	21	33	30	25		
FS168B02	Middle thixotropy in accordance with UL94V-0	80,000~110,000	4	48	A56	$1.23x10^{13}$	$1.07x10^{11}$	23	27	38	34	26		
FS168B03	High thixotropy in accordance with UL94V-0	180,000~240,000	4	48	A58	$1.8x10^{12}$	$2.0x10^{11}$	27	26	35	33	28		

Environmental version

Product Number	Product Features	Viscosity m. Pas	Surface drying time (25℃)min	Curing conditions 25℃X50%RH hr/3.3mm	Hardness SHORE	Surface Resistance ohm	Volume Resistance ohm-cm	Bonding strength Kg/cm² Glass + Glass	Bonding strength Kg/cm² Stainless steel +Stainless steel	Bonding strength Kg/cm² Aluminum+Aluminum	Bonding strength Kg/cm² PC VS. PC	Bonding strength Kg/cm² ABS VS. ABS	Packing Specifications	Storage Conditions
FS1326	Environmentally transparent thru tin-free compounds	15,000~10,000	15	72	A35	$2.1x10^{12}$	$2.2x10^{11}$	19	25	30	29	24	170/300ml	Dry at room temperature
FS1328	High strength and environmentally transparent thru tin-free compounds	10000~20000	10	72	A24	$1.8x10^{12}$	$2.0x10^{11}$	26	34	39	40	29		
FS132W3	High strength and environmentally white thru tin-free compounds	40000~80000	5	48	A36	$1.9x10^{12}$	$2.0x10^{11}$	20	28	32	28	25		
FS132BL4	High strength and environmentally black thru tin-free compounds	40,000~80,000	5	48	A43	$1.8x10^{12}$	$2.0x10^{11}$	21	26	29	21	9		
FS132BL1	Low viscosity and environmentally black thru tin-free compounds	20,000~30,000	10	72	A42	$2.1x10^{12}$	$2.0x10^{11}$	35	35	39	37	26		
FS132G3	High strength and environmentally grey thru tin-free compounds	10,000~20,000	5	48	A25	$1.9x10^{12}$	$2.0x10^{11}$	21	27	31	26	27		

Brief of Product Packing:

General packing: 300 ml

Packing with non-tin catalysts: 300 ml

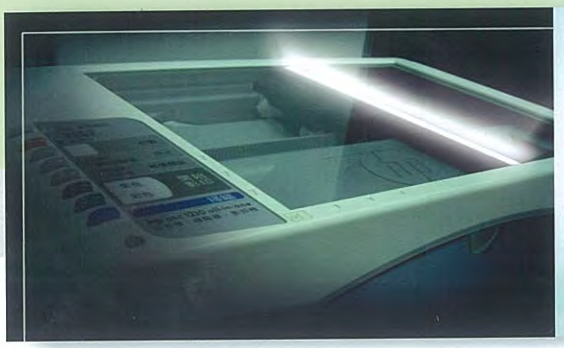
External packing in single set: 300 ml

High-density paper tubes with composite aluminum foils on the inside and outside layers

High-density paper tubes with composite aluminum foils on the inside and outside layers: single set

High-density paper tubes with composite aluminum foils on the inside and outside layers: 30 sets

Product Application Reference:



Optics

Application of adhesives and sealants for sensing elements

Electronics

Adhesive application with waterproof sealing for connection of cable assemblies

Lighting

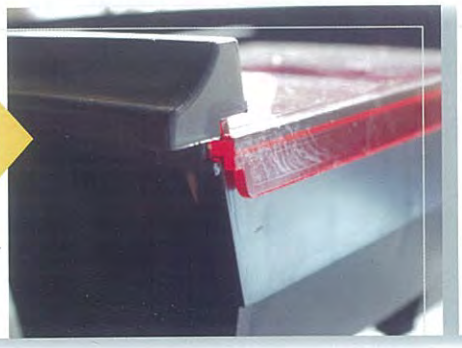
Adhesive application for plastics and metals

Industry

Adhesive application for passivated metals and plastics

Automobiles and motorcycles

Adhesive application with waterproof sealing for lamps



Buildings

Application of waterproof sealing for metal structures

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EVERWIDE
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手工藝品應用接著劑
UV glue for handcraft application

產品特性 / Feature

玻璃和水晶接著 Glass and crystal bonding	◆ 通過嚴苛的高、低溫環測及長期25°C泡水試驗 Pass severe high/low temperature experiment tests and 25°C long-term water immersion test ◆ 通過長時間日曬雨淋測試 Pass long-term outdoor weather-proof test ◆ 經過老化測試後不會產生黃變現象 Good yellowing resistance after aging test ◆ 適合傢俱、工藝品、花瓶缸、衛浴用具、光學玻璃產業接著 Suitable for furniture, crafts, vases, sanitary appliances, and optical glass bonding	
塑膠接著 Plastics bonding	◆ 高透明度、高接著強度 High transparency, high adhesion strength ◆ 具有良好延伸性及耐震特性 Good extensibility and shock resistance ◆ 接著工件做破壞測試時，可達到材破而不脫膠 Cured resin can achieve substrate failure without adhesive failure in bonding strength test. ◆ 適合電子、藝品類接著 Suitable for electronics and arts bonding	
金屬和玻璃接著 Metal and glass bonding	◆ 膠體固化後韌度高 Cured glue has high toughness ◆ 具有良好延伸性及耐震特性 Good extensibility and shock resistance ◆ 經過高低溫循環測試後，不會產生脫膠及龜裂現象 No adhesive failure and crack after high/low temperature experiment tests ◆ 傢俱、工藝品、電子零件接著 Suitable for furniture, crafts, and electronic devices bonding	

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玻璃和水晶接著 Glass and crystal bonding

產品編號 Product No.	外觀 Appearance	黏度, cps Viscosity, cps	硬化條件, mj/cm² Curing condition, mj/cm²	硬度 Hardness, Shore D	接著強度*1, kg/cm² Tensile strength*1, kg/cm²	耐熱範圍, °C Working Temperature range, °C
GA004	透明液體 Colorless liquid	16,000~26,000	1,500	70	81	-20~100
GA006	透明液體 Colorless liquid	6,400~9,600	1,500	71	72	-20~100
GA024	透明液體 Colorless liquid	2,050~3,150	1,500	70	84	-20~100

*1 試片材質：玻璃 vs. 玻璃
*1 Specimen material: glass vs. glass

以上數據僅供參考，詳情請查閱技術資料。
Please refer to the Technical Data Sheet for detailed information.

PMMA / PC / ABS接著 PMMA / PC / ABS bonding

產品編號 Product No.	外觀 Appearance	黏度, cps Viscosity, cps	硬化條件, mj/cm² Curing condition, mj/cm²	硬度 Hardness, Shore D	接著強度*2, kg/cm² Tensile strength*2, kg/cm²	耐熱範圍, °C Working Temperature range, °C
GP135	透明液體 Colorless liquid	3,200~4,800	1,500	62	62	-20~100
GP575	透明微黃色液體 Light yellow liquid	650~1,050	1,500	54	74	-20~100
GN156	透明液體 Colorless liquid	5~15	1,500	64	59	-20~100

*2 試片材質：PMMA vs. PMMA
*2 Specimen material: PMMA vs. PMMA

以上數據僅供參考，詳情請查閱技術資料。
Please refer to the Technical Data Sheet for detailed information.

金屬和玻璃接著 Metals and glass bonding

產品編號 Product No.	外觀 Appearance	黏度, cps Viscosity, cps	硬化條件, mj/cm² Curing condition, mj/cm²	硬度 Hardness, Shore D	接著強度*3, kg/cm² Tensile strength*3, kg/cm²	耐熱範圍, °C Working Temperature range, °C
GM005	透明液體 Colorless liquid	5,000~7,500	1,500	63	198	-20~100
GM300	透明液體 Colorless liquid	800~1,300	1,500	64	202	-20~100
GM220	透明液體 Colorless liquid	300~460	1,500	51	164	-20~100

*3 試片材質：玻璃 vs. 不鏽鋼
*3 Specimen material: glass vs. stainless steel

以上數據僅供參考，詳情請查閱技術資料。
Please refer to the Technical Data Sheet for detailed information.