Polytec PT

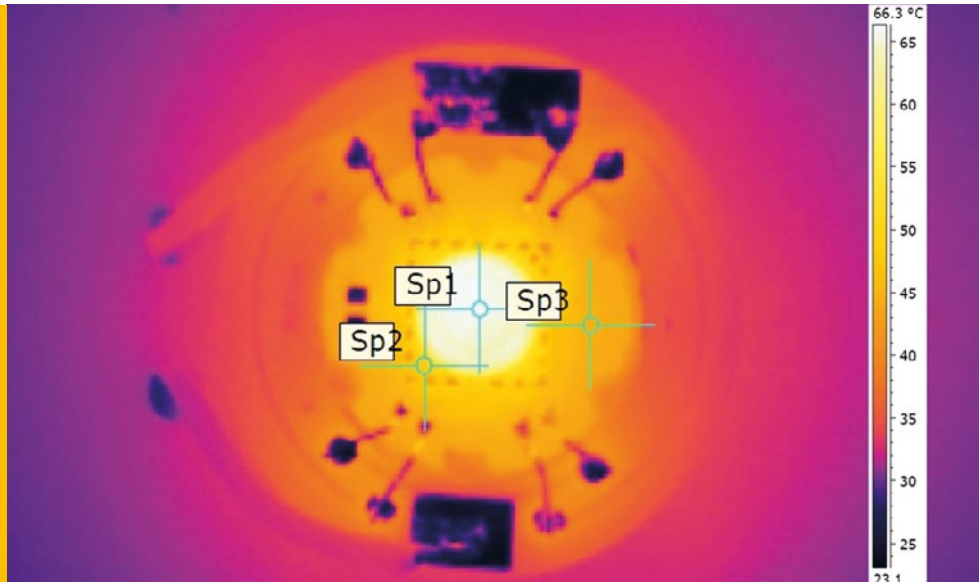
Thermally conductive adhesives

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.

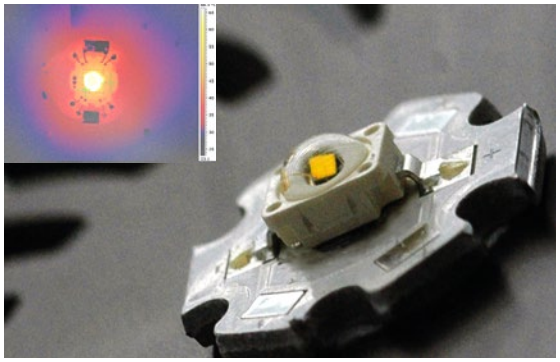
Why side-by-side cartridges?

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	rigid	flexible	rigid
Thermal	2.2 W/mK	1.4 W/mK	0.8 W/mK
Temperaturestability	+	0	+
Adhesion to Al	++	++	++
Adhesion to	++	++	++
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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