

Smart Adhesive Solutions for PCBs



**Innovative Adhesives and Potting Compounds for
Automotive, Consumer Electronics and
Medical Devices**

**Conductive Adhesives
Flip Chip Underfills
SMD Bonding
UV Coatings
Glob Tops**

Adhesive Applications on The Printed Circuit Board

Adhesives are commonly used to attach surface mount components to printed circuit boards (PCBs). When formulated to be Glob Tops, coatings, and underfills, adhesives provide protection for chips and sensitive components. Electrically conductive adhesives offer greater flexibility and impact resistance for delicate wire connections.

Panacol provides a broad portfolio of adhesives that possess the necessary properties for PCB assembly, including strong adhesion, halogen purity and high resistance to chemicals, thermal shock and vibration.

Underfill

Underfills are used in electronic assemblies for mechanical stabilization of flip chips, which is of critical importance in BGA (Ball Grid Assembly) packaging.

more info on page 5

Thermally Conductive Adhesives for Power Electronics

Adhesives with thermal conductivity are used to dissipate heat on power electronics. To optimize their performance and lifetime in every application, adhesives with metallic, inorganic, ceramic or mineral fillers are available to provide the highest level of thermal conductivity.

more info on page 7

SMD and Component Protection

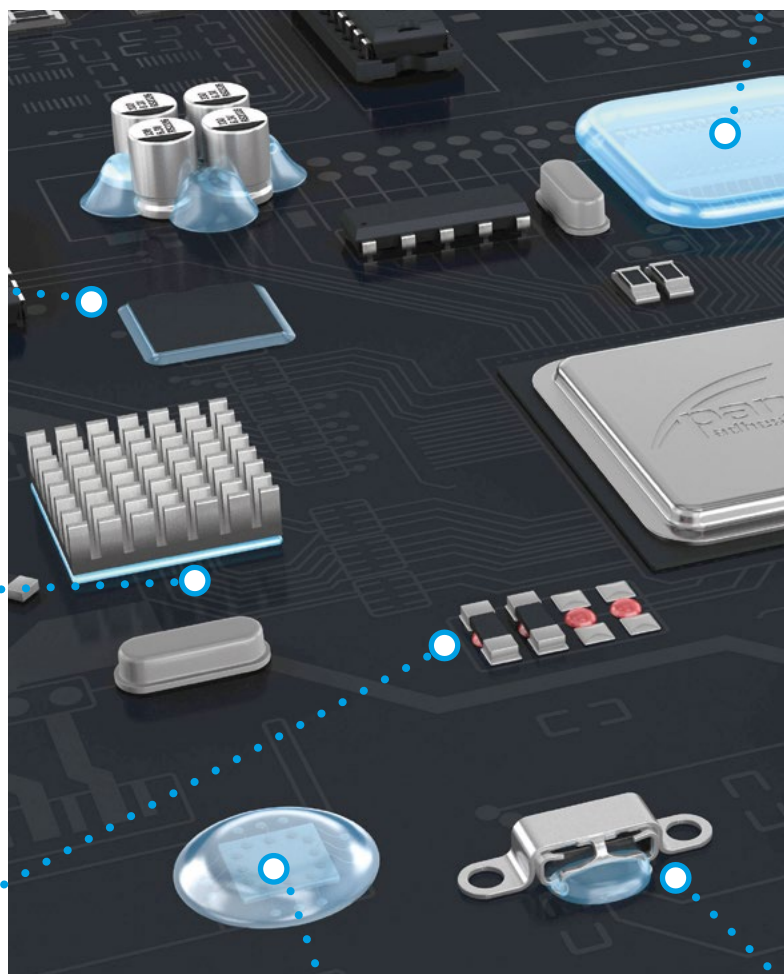
UV and structural adhesives are suitable for securing SMDs and other components before reflow soldering. The components remain secured in place during the soldering process and provide additional stability afterwards.

more info on page 6

Curing Systems

System solutions for your bonding applications from a single source: As a member of the Hönle Group, Panacol offers LED UV and UV curing equipment to match our UV-curing adhesives via our partner Dr. Hönle.

more info on page 12



Glob Top Encapsulants

Epoxy resin based materials are used in electronics assembly as Glob Tops to protect electronic components. The Glob Top material protects the components from moisture, dust, dirt, solvents, and physical impact. Opaque Glob Tops can also hide sensitive information from being easily viewed. Sensitive components are optimally protected by Glob Tops under heavy mechanical loads.

more info on page 6

• Frame & Fill

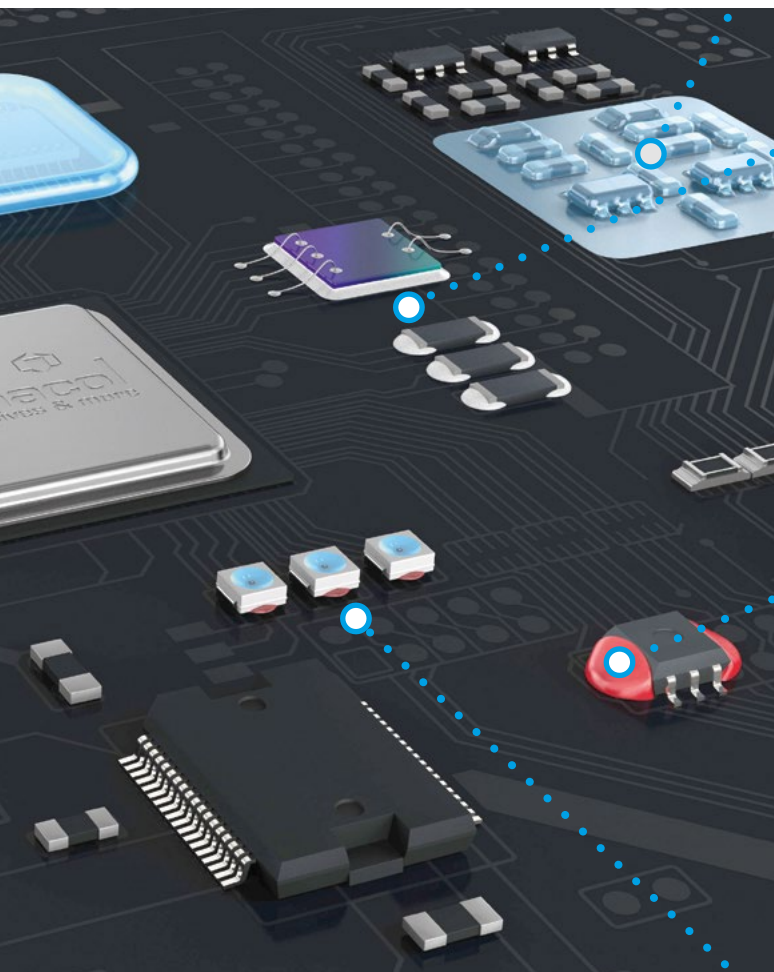
Protecting highly sensitive areas or sensitive information with adhesives? The combination of high and low viscosity Frame & Fill adhesives makes it possible.

more info on page 11

• Conformal Coating

Panacol UV acrylates and epoxy-based adhesives are used to coat electronic components for the purpose of environmental protection. These adhesives are silicone and solvent-free, and can be spray dispensed to selectively coat various size areas.

more info on page 9



• Electrically Conductive Adhesives (Die Attach)

Electrically conductive adhesives are the perfect solution for electrical contacting on printed circuit boards and other temperature-sensitive or flexible materials. Unlike solder pastes, these adhesives offer the ability to attach and contact components in one step. They are solvent and lead-free, and cure at low temperatures.

more info on page 10

• Edge Bonding

Panacol also offers various adhesives for mechanically securing components to PCB's. Securing capacitors, chips and many other elements on PCBs by means of edge bonding creates mechanical robustness and reliability, even under high thermal and mechanical stress.

more info on page 10

• Connector Bonding

Connector attachment can involve a wide variety of materials including metals and plastics, some of which possess low surface energy and can be difficult to bond. Panacol offers several adhesives for potting and bonding that successfully address these challenges. Dual cure adhesive options allow them to be applied to surfaces with shadowed areas.

more info on page 8

• Bonding of Optoelectronic Components

Special optically transparent and non-yellowing UV-curing adhesives for optics, fiber optics, and optoelectronics facilitate reliable attachment of diodes, LEDs, and camera modules. Collector photodiodes and optical fibers for recording optical signals or lenses, and other camera segments, can be aligned and bonded with these low-shrinkage adhesives.

more info on page 9

Automotive

Panacol supports the advancement of automotive technology with innovative adhesives, protective coatings, and conductive materials. Vitralit®, Structalit® and Elecolit® brand adhesives make it possible to design and manufacture reliable electrical circuits, responsive interior lighting, environmentally protected sensors, and durable camera systems for e-mobility. Panacol adhesives meet the rigorous requirements assigned to automotive components. All adhesives deliver high adhesion and excellent resistance to temperature variation, chemicals, vibration, and environmental stress. Adhesive performance can be customized for each specific application.



Medical Technology

Panacol formulates state-of-the-art adhesive technology to support the continuous innovation within the medical device industry. Advancements in wearables and minimally invasive devices demand higher performance adhesives. All of Panacol's medical grade adhesives are certified according to ISO-10993 and/or USP Class VI standards and are compatible with all common sterilization processes. Fast curing UV adhesives are suitable for precise production with fast cycle times. They are transparent, non-yellowing, and possess improved bond strength to low energy surfaces, including polyimide, Pebax®¹ and PEEK. Fluorescing adhesives are available for automated quality control.

¹ Pebax® is a registered trademark of Arkema.



Consumer Electronics

Our adhesives for consumer electronics enable production of lightweight designs with higher performance. Panacol's Vitralit®, Elecolit® and Structalit® brand adhesives produce high strength bonds with materials and components typically used in PCB and flex circuit assembly. This results in improved impact resistance, more secure wire bond connections, and optimized thermal management for long-life performance. Panacol offers adhesives that are low-ion, halogen-free, and RoHS compliant. Many Vitralit® UV adhesives contain secondary curing capability initiated by heat or moisture. These adhesives are suited for fully automated, large-scale production as well as lower volume, manual assembly operations.



Quickfinder

Find the right adhesive for every application by product range and curing mechanism.

Vitalit®
 UV-Adhesives

Structalit®
 Structural Adhesives

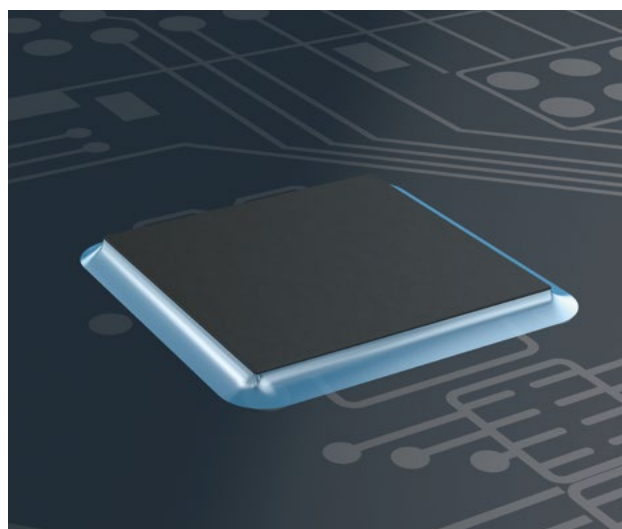
Elecolit®
 Conductive Adhesives

Light-Curing

LED-UV-Curing

Thermal Curing

Moisture-Crosslinking

Room Temperature-Curing


Underfills

Epoxy resin-based underfill adhesives can be used to mechanically stabilize and equalize stresses in electronic assemblies. They are specifically designed to support flip-chip soldering. To reduce the coefficient of thermal expansion (CTE), some of the adhesives are filled with nanofillers. Their capillary flow behavior enables fast and easy application, even in the smallest gaps. In addition to traditional epoxy systems, dual-curing UV adhesive systems can be utilized underfillers. Dual-cure adhesives provide fast fixturing from UV curing. Post-curing with heat ensures a complete cure under components and in areas shadowed from UV light.



Reworkability

Several Panacol underfill and edge-bonding adhesives are designed for simplified removal when required. For easy identification, the removable adhesives fluoresce yellow under UV light despite their black coloration. These adhesives enhance process control, improve reworkability, and provide recycling opportunities for electronic equipment manufacturing processes.



Typical Adhesives for Flip Chip Underfills

Adhesive	Viscosity [mPas]	Thermal expansion below Tg [ppm/K]	Base	Curing*	Ion purity	Characteristics
Vitalit® 2655	150 - 300 LVT, Sp. 2/30 rpm	<100	Epoxy	UV/thermal	●	Flexible, low viscosity
Vitalit® 2667	3 000 - 5 000 LVT, Sp. 4/30 rpm	<35	Epoxy	UV/thermal	●	Low CTE, no outgassing
Structalit® 5751	200 - 500 Rheometer, 10s ⁻¹	30 - 60	Epoxy	5 min/150°C 40 min/100°C	●	Reworkable above 150°C, black color with yellow fluorescence, jettable, compatible with Edge Bonder Structalit® 5705
Structalit® 8202	300 - 400 Rheometer, 10s ⁻¹	10 - 60	Epoxy	5 min/150°C 10 min/130°C	●	Very fast curing, capillary flow behavior, low CTE, high glass transition temperature

*UV = 320 - 390 nm; ● Semicon grade: DIN-EN ISO 10304-1 (D20); ● Electronic grade: (IEC 61249-2-21)

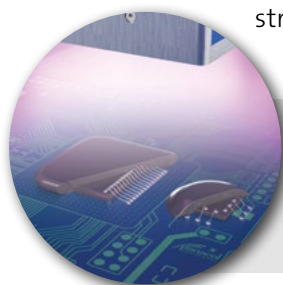
Applications in Detail



Glob Top Encapsulants

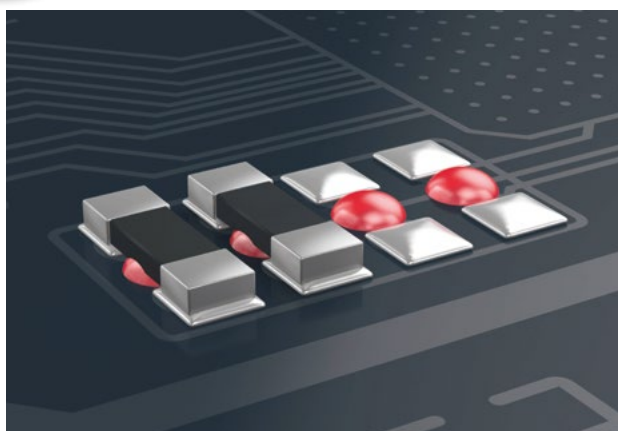


Glob Tops from Panacol are solvent-free and many have an ion purity of <10 ppm. UV-curing Glob Tops enable high cycle times for fully automated, serial production. To overcome component configurations that may potentially shield the Glob Top material from the UV light energy, Panacol provides UV-curing Glob Tops with secondary cure catalysts that initiate with moisture or thermal energy. If UV curing is not practical for the application, a selection of fast curing Glob Top materials with primary thermal cure are available. These adhesives have high peel and shear strength, are easy to process, and withstand reflow processes without any problems.



Black&Light

Conventional black adhesives absorb a high percentage of light intensity which limits the adhesives' depth of cure. With the new "Black&Light" technology from Panacol, black adhesives can now be cured in deeper layers (up to a few millimeters) using uv light.



SMD and Component Protection

For attaching SMDs, both UV-curing and purely thermal curing adhesives are available. They are optimized to cure in the shortest possible time to enable fast cycle times. Due to their high temperature resistance, they are also suitable for reflow processes. For optimum quality control during production, the adhesives are available in red coloration or with fluorescence upon request. Their rheological properties make Panacol's SMD adhesives suitable for precise dispensing processes including jetting.

Typical Adhesives for Glob Tops

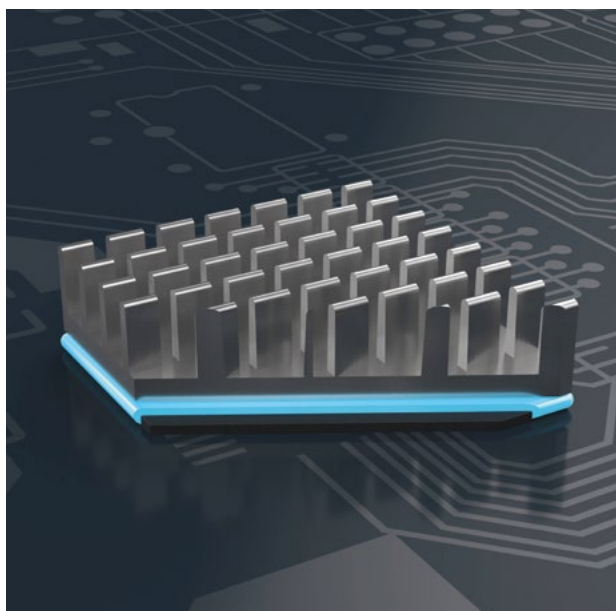
Adhesive	Viscosity [mPas]	Tg DSC [°C]	Curing*	Resistance [°C]	Ion purity	Characteristics
Structalut® 5717	3 000 - 8 000 Rheometer, 5s ⁻¹	150 - 180	30 min/120°C +30 min/150°C	-40 to +200	●	Fill-material, no bleeding, high ion purity
Structalut® 5719	7 000 - 11 000 Rheometer, 5s ⁻¹	150 - 180	30 min/120°C +30 min/150°C	-40 to +200	●	Fill-material, no bleeding, high ion purity
Structalut® 5721	15 000 - 20 000 Rheometer, 5s ⁻¹	150 - 180	30 min/120°C +30 min/150°C	-40 to +200	●	Fill-material, no bleeding, high ion purity
Structalut® 5891	25 000 - 50 000 Rheometer, 10s ⁻¹	110 - 130	5 min/150°C 60 min/100°C	-40 to +180	●	Fast curing at low temperatures, excellent shock resistance, very high chemical resistance
Structalut® 8801	30 000 - 45 000 LVT, Sp. 4/6 rpm	125 - 140	1 min/180°C 3 hrs/80°C	-40 to +200	●	Short curing times at low temperatures, very good resistance to grease, oil and media
Structalut® 8838	6 500 - 7 500 Rheometer, 20s ⁻¹	15 - 25	5 min/150°C 30 min/80°C	-40 to +200	●	Jettable, low glass transition temperature, flexible, shear-thinning, compatible with flux materials, resistant to temperature changes and moisture
Vitralit® 1671	9 000 - 14 000 Rheometer, 10s ⁻¹	110 - 130	UV/thermal	-40 to +180	●	Stable, dispensable wet-in-wet with fill materials, very high ion purity
Vitralit® UD 8050	8 000 - 11 000 Rheometer, 5s ⁻¹	50 - 65	UV/moisture	-40 to +120	●	Easy to dispense, fast curing, compatible with flux materials, shear-thinning

* UV = 320 - 390 nm, VIS = 405 nm; ● Semicon grade: DIN-EN ISO 10304-1 (D20); ● Electronic grade: (IEC 61249-2-21)

Typical Adhesives for Protecting Components and SMDs						
Adhesive	Viscosity [mPas]	Curing*	Resistance [°C]	Shore hardness	Ion purity	Characteristics
Structalite® 3060 N	4 000 - 8 000 Rheometer, 10s ⁻¹	20 sec/180°C 90 sec/120°C	-40 to +180	D 30 - 45	●	Extremely fast curing, high adhesion to dissimilar substrates, high flexibility
Structalite® 5604	25 000 - 40 000 Rheometer, 10s ⁻¹	4 min/150°C 50 min/100°C	-40 to +180	D 75 - 90	●	Fast curing, red color, resistant to solder temperatures up to 270°C (max. 5 minutes)
Structalite® 5606 F	22 000 - 30 000 LVT, Sp. 4/6 rpm	7 min/150°C 55 min/100°C	-40 to +180	D 67	●	Fast curing at low temperatures, easy to dispense, screen printable, pin transferable
Structalite® 5610	20 000 - 40 000 Rheometer, 10s ⁻¹	1 min/150°C 5 min/110°C	-40 to +180	D 55 - 65	●	Extremely fast curing at low temperatures, high temperature resistance, red color
Vitralit® UV 2115	20 000 - 30 000 Rheometer, 33s ⁻¹	UV/VIS	-40 to +150	D 55 - 65	●	Low shrinkage, low thermal expansion, hard and dry surface, fast curing, resistant to moisture

Thermally Conductive Adhesives for Power Electronics

Thermally conductive adhesives are used to protect electronic elements by dissipating heat while maintaining high adhesion. Thermally conductive adhesives can reduce the heat load on chips and other components while ensuring a seamless bond to the heat sink. Depending on the filler, they can be thermally conductive and electrically conductive at the same time, or they can be electrically insulating. Panacol offers UV curing adhesives with secondary thermal cure as a means of fast fixturing prior to oven cure. In addition, we have single and two-component materials that rely on heat to accelerate and provide full cure. The epoxy resin-based adhesives withstand high temperatures of up to 200°C after curing.



Typical Thermally Conductive Adhesives					
Elecolit®	6601	6603	6607	6616	Vitralit® 6129
Typical application	Heat sinks, sensors	Bonding of heat sinks and magnets	Flexible interconnect devices, die attach	Heat-sensitive components	Die attach, bonding of heat sinks
Base	1-part epoxy	1-part epoxy	1-part epoxy	2-part epoxy	1-part acrylate
Viscosity [mPas]	12 000 - 20 000 LVT, Sp. 4/6 rpm	20 000 - 40 000 Rheometer, 10s ⁻¹	50 000 - 65 000 Rheometer, 5s ⁻¹	50 000 - 120 000 Rheometer, 10s ⁻¹	4 000 - 7 000 Rheometer, 10s ⁻¹
Curing	5 min/150°C 70 min/100°C	4 min/150°C 50 min/100°C	10 min/150°C 60 min/80°C	24 hrs/RT 120 min/80°C	UV/chemical 30 min/120°C
Resistance [°C]	-40 to +200	-40 to +200	-40 to +180	-50 to +150	-40 to +180
Thermal conductivity (W/m × K)	0.7 - 0.9	1.2 - 1.4	0.8 - 1.0	0.9 - 1.1	0.9 - 1.1
Ion purity			●		●
Characteristics	Very high adhesion to metals, excellent flow properties, high durability, easy to dispense	Flexible, excellent flow properties, resistant to temperature and impact shocks, very high adhesion to metals	Very high adhesion to metals, resistant to vibration and temperature changes, long pot life up to 14 days	Curing at RT possible, short cycle times at high temperatures, easy to dispense, screen printable, stamp printable	White color, high resistance to heat and chemicals, excellent thermal conductivity, postcurable with activator, high adhesion to glass, aluminum, plastics and ceramics

*UV = 320 - 390 nm, VIS = 405 nm; ● Semicon grade: DIN-EN ISO 10304-1 (D20); ● Electronic grade: (IEC 61249-2-21)

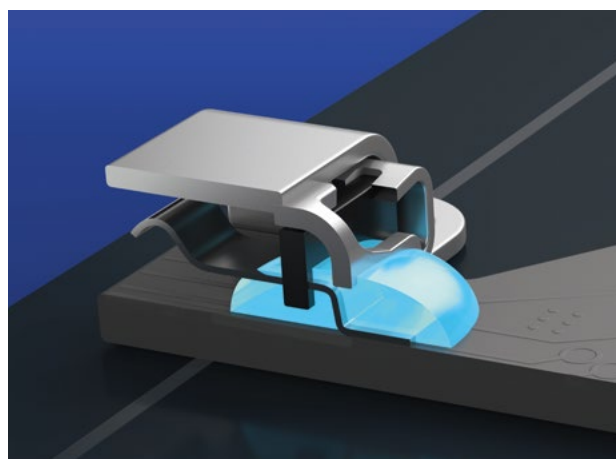
Applications in Detail



Connector Bonding



Panacol's latest generation of structural and UV-curing adhesives developed for connector bonding possess very low halogen content. They have been developed to meet the bonding requirements associated with consumer and automotive electronics assembly. They are ideal for temperature-sensitive materials, as they can be cured at temperatures as low as 60°C. Panacol adhesives produce high strength bonds with materials typically used in electronic component assembly. This reliably secures components through shock and vibration.



Potting

Potting materials from Panacol provide fast curing solutions to challenging potting applications. They achieve excellent results with their high media resistance after tests. Whether epoxy resin-based or acrylate, Panacol potting materials, are solvent-free and fast curing, making them ideal for large-volume, fully automated production. UV curable materials are available for shallow potting, and UV/thermal and UV/moisture curing materials overcome the challenges of deep potting and shadows.

Typical Adhesives for Connector Bonding

Adhesive	Viscosity [mPas]	Curing*	Resistance [°C]	Shore hardness	Ion purity	Characteristics
Structalite® 5511	800 - 1 200 Rheometer, 10s ⁻¹	10 min/120°C 40 min/60°C	-40 to +150	D 50 - 65	●	Low ion content, high E-Modulus, high elongation at break, resistant to vibrations and shock, excellent adhesion to LCP and PBT
Structalite® 5521	1 200 - 2 000 Rheometer, 10s ⁻¹	10 min/120°C 40 min/60°C	-40 to +150	D 60 - 80	●	Flexible, low E-Modulus, excellent adhesion to LCP and PBT, ideally suited for temperature-sensitive substrates
Structalite® 5531	5 000 - 10 000 Rheometer, 10s ⁻¹	5 min/150°C 40 min/60°C	-40 to +180	D 55 - 70	●	Low CTE, excellent adhesion to LCP and PBT, resistant to chemicals and vibrations, ideally suited for temperature-sensitive substrates
Vitralite® UD 5180 / Vitralite® UD 5180 MV	4 000 - 6 000 / 6 000 - 11 000 Rheometer, 10s ⁻¹	UV/thermal	-40 to +200	D 20 - 35	●	High adhesion to flexible conductive paths and metals, low ion content

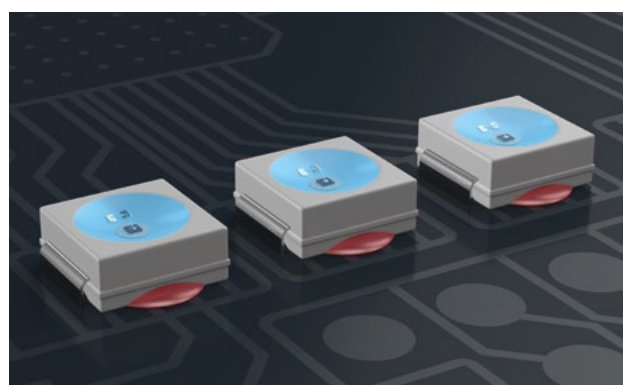
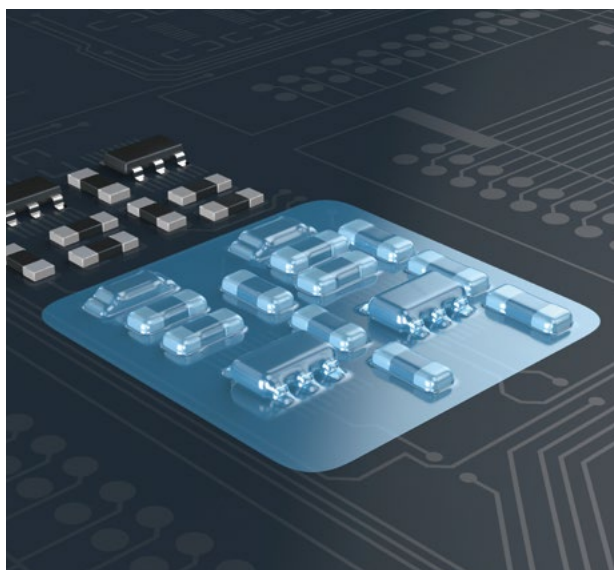
Typical Adhesives for Potting

Adhesive	Viscosity [mPas]	Curing*	Resistance [°C]	Shore hardness	Ion purity	Characteristics
Structalite® 5801	12 000 - 15 000 LVT, Sp. 4/30 rpm	30 min/80°C 12 hrs/RT	-40 to +180	D 70 - 80	●	2-part epoxy with high resistance to grease, oil, chemicals and moisture, low shrinkage, low water absorption, high adhesion to metals, glass and plastics
Structalite® 5802	40 000 - 60 000 Rheometer, 10s ⁻¹	15 min/80°C 7hrs/25°C	-40 to +180	D 65 - 85	●	Good oil, chemical and moisture resistance, low shrinkage, low water absorption,
Structalite® 5810-1	3 000 - 4 000 LVT, Sp. 4/30 rpm	3 min/150°C 14 hrs/RT	-40 to +180	D 60 - 80	●	2-part epoxy with high resistance to moisture and chemicals
Structalite® 8801	30 000 - 45 000 LVT, Sp. 4/6 rpm	1 min/180°C 3 hrs/80°C	-40 to +200	D 80 - 90	●	Short curing cycles at low temperatures, very high resistance to grease, oil and media, biocompatibility certified according to ISO 10993-5
Vitralite® 8050 MV F	2 500 - 4 000 Rheometer, 5s ⁻¹	UV/moisture	-40 to +120	D 55 - 70	●	Fluorescing, easy to dispense, fast curing, compatible with flux materials, shear-thinning

*UV = 320 - 390 nm, VIS = 405 nm; ● Semicon grade: DIN-EN ISO 10304-1 (D20); ● Electronic grade: (IEC 61249-2-21)

Conformal Coating

To protect component groups and PCBs from environmental influences such as moisture, dust, dirt or chemicals, Panacol offers a series of UV curble coating materials. They can be applied quickly over large areas using spray valves that ensure precise placement and uniform thickness. These UV curable coatings are suitable for fast processing, as dispensing and curing can be performed in-line with no waiting period. Panacol provides both acrylate and epoxy-based UV coatings in multiple viscosities and performance properties permitting application-specific optimization. Find the perfect adhesive for your specific application with the assistance of our Applications Engineering resources.



Bonding Optoelectronic Components

Panacol's light-curing adhesives for opto-electronics offer low shrinkage, high Tg values, and reliable impact resistance. They are well suited for bonding applications involving optics, fiber optics, and optical alignment. Their physical properties enable very low-stress, durable bonding. They are extremely resistant to temperature, moisture and chemicals. Non-yellowing, optically transparent adhesives are also available for bonding in the light path.



Typical Adhesives for Conformal Coatings

Adhesive	Viscosity [mPas]	Curing*	Resistance [°C]	Shore hardness	Ion purity	Characteristics
Vitralit® 2004 F	60 - 100 LVT, Sp. 2/30 rpm	UV/ thermal	-40 to +180	D 15 - 25	●	Post-curable in shadowed areas, fluorescent, high resistance to chemicals, sprayable, optimised low-viscous flow behavior, flexible, autoclavable
Vitralit® 2009 F	100 - 200 LVT, Sp. 2/30 rpm	UV/ thermal	-40 to +180	D 20 - 40	●	Flexible, very high resistance to chemicals, autoclavable, fluorescent
Vitralit® 4451	500 - 800 LVT, Sp. 3/30 rpm	UV	-40 to +130	A 30 - 50	●	Soft and elastic, protective coating, fast curing, dry and tack-free surface in cured condition

Typical Adhesives for Bonding on Optoelectronic Components

Adhesive	Viscosity [mPas]	Curing*	Resistance [°C]	Shore hardness	Ion purity	Characteristics
Vitralit® UC 1619	3 000 - 5 500 Rheometer, 10s ⁻¹	UV/ thermal	-55 to +175	D 60 - 90	●	Excellent transmission at 650 - 1300 nm, non-yellowing, resistant to temperature shocks (-55°C to +125°C)
Vitralit® UD 5134	15 000 - 25 000 Rheometer, 10s ⁻¹	UV/ thermal	-40 to +150	D 70 - 85	●	Low thermal expansion, low shrinkage, impact resistant, dry surface, grey color, ideally suited for dissimilar substrates
Vitralit® UV 2113 Vitralit® UV 2115	19 000 - 32 000 Rheometer, 10s ⁻¹ 20 000 - 30 000 Rheometer, 33s ⁻¹	UV VIS	-40 to +150	D 70 - 80	●	Acrylate hybrid, very stable, highly filled, low thermal expansion, low shrinkage, impact resistant, resistant to solder processes, dry surface
Vitralit® UV 2121	30 000 - 70 000 Rheometer, 10s ⁻¹	UV VIS	-40 to +150	D 55 - 65	●	Low shrinkage, low thermal expansion, hard and dry surface, fast curing, resistant to moisture

*UV = 320 - 390 nm, VIS = 405 nm; ● Semicon grade: DIN-EN ISO 10304-1 (D20)

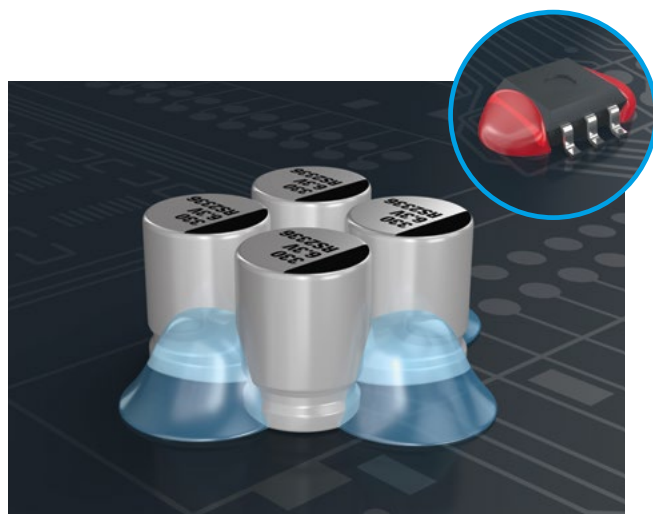
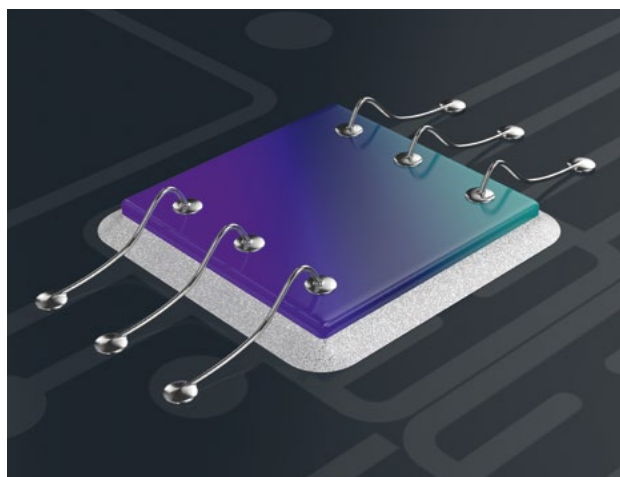
Applications in Detail



Edge Bonding



Adhesives for edge bonding ensure reliable stability of the mounted components by relieving stresses in sensitive joints. The increased bonded surface area around the component enables them to better maintain their functionality during fatigue cycling, vibration, and impact shock. These adhesives offer excellent bond strength, high temperature and chemical resistance, and exhibit low shrinkage behavior after curing. Several viscosity ranges are available to accommodate unique component configurations and dispensing methods.



Electrically Conductive Adhesives (Die Attach)

Panacol's Elecolit® series is suitable for applications such as die attach and semiconductor bonding. They enable electrical connections to be made on flexible and temperature-sensitive substrates. Adhesive curing temperatures are far below soldering temperatures as well as the tolerances of most temperature-sensitive components. Except for a few selections, the adhesives are single-component and can be applied by manual dispense, stencil printing, or jet printing. They are characterized by low shrinkage, excellent adhesion to FR4 and metals, and high chemical, mechanical and thermal resistance.

Typical Adhesives for Edge Bonding						
Adhesive	Viscosity [mPas]	Curing*	Resistance [°C]	Shore hardness	Ion purity	Characteristics
Structalit® 5705	7 000 - 12 000 Rheometer, 10s ⁻¹	15 min/150°C 60 min/100°C	-40 to +180	75 - 90	●	Fluorescing, jettable, halogen-free, compatible with underfiller Structalit® 5751, re-workable above 150°C
Vitralit® 1671	9 000 - 14 000 Rheometer, 10s ⁻¹	UV/thermal	-40 to +180	80 - 90	●	Stable Frame, applicable wet-in-wet with filling material, high ion purity, high thermal conductivity, low water absorption, passed UL94 HB test
Vitralit® 4731 VT	4 000 - 8 000 Rheometer, 10s ⁻¹	UV	-40 to +120	20 - 40	●	Dry surface, flexible and tear-resistant, high adhesion on many plastics
Vitralit® 6104 VT	8 000 - 17 000 Rheometer, 10s ⁻¹	UV/thermal	-40 to +200	45 - 60	●	Stable material für attaching large components, high adhesion on metals and sintered substrates, filled

Typical Electrically Conductive Adhesives (Die Attach)						
Elecolit®	3025	3647	3653	3655	3661	
Typical application	Temperature-sensitive components	Die Attach	Flexible bonding of components	Bonding components, die attach, semiconductors	Flexible interconnect devices, die attach	
Base	2-part epoxy	1-part epoxy	1-part epoxy	1-part epoxy	1-part epoxy	
Viscosity [mPas]	80 000 - 90 000 Rheometer, 10s ⁻¹	4 000 - 11 000 Rheometer, 10s ⁻¹	4 000 - 8 000 Rheometer, 10s ⁻¹	5 000 - 15 000 Rheometer, 10s ⁻¹	20 000 - 40 000 Rheometer, 10s ⁻¹	
Curing	24 hrs/RT 15 min/120°C	90 sec/150°C 8 min/100°C	5 min/150°C 4 hrs/80°C	30 min/150°C 60 min/120°C	10 min/150°C 6 hrs/80°C	
Resistance [°C]	-40 to +150	-40 to +180	-40 to +180	-40 to +180	-40 to +180	
Resistivity [Ohm × cm]	1E-4 - 5E-4	1E-4 - 3E-4	1E-3 - 5E-3	1E-4 - 3E-4	1E-3 - 5E-3	
Ion purity		●	●	●	●	
Characteristics	Short cycles at high curing temperatures, easy to dispense, stamp printable	Very flexible	Highly flexible, heat and shock resistant, easy to dispense	Small fillers (<10µm), very high thermal and electrical conductivity	Heat and shock resistant, long pot life up to 14 days	

*UV = 320 - 390 nm; ● Semicon grade: DIN-EN ISO 10304-1 (D20); ● Electronic grade: (IEC 61249-2-21)

Frame and Fill

Components can be protected through an encapsulation process known as „frame and fill“. Two adhesives of different viscosities are dispensed wet-on-wet. First, a bead of high viscosity adhesive is dispensed on the PCB that encircles the component (Frame). Second, the area within the bead, is filled with a low viscosity adhesive (Fill). Their properties are matched to the component configuration and the performance required from the assembled PCB. Structalit® series adhesives are single-component, thermally curing materials with low ionic content. They are available in black color for technology protection. Black UV adhesives from the Vitralit® series are available with Panacol's Black&Light technology for low heat stress and fast UV curing.



Frame and Fill Adhesives for Semiconductor Applications

Adhesive	Application	Viscosity [mPas]	Base	Curing*	Ion purity	Characteristics
Structalit® 5704	Frame-Material	60 000 - 100 000 Rheometer, 10s ⁻¹	Epoxy	30 min/120°C + 45 min/150°C	●	Black color, stable, suited as frame in combination with fills Structalit® 5717-5722, no bleeding, high glass transition temperature
Structalit® 5717	Fill-Material	3 000 - 8 000 Rheometer, 5s ⁻¹	Epoxy	30 min/120°C + 30 min/150°C	●	Very good flow properties, high glass transition temperature, no bleeding
Structalit® 5719	Fill-Material	7 000 - 11 000 Rheometer, 5s ⁻¹	Epoxy	30 min/120°C + 30 min/150°C	●	Very good flow properties, high glass transition temperature, no bleeding
Structalit® 5720	Fill-Material	10 000 - 15 000 Rheometer, 5s ⁻¹	Epoxy	30 min/120°C + 30 min/150°C	●	Very good flow properties, high glass transition temperature, no bleeding
Structalit® 5721	Fill-Material	15 000 - 20 000 Rheometer, 5s ⁻¹	Epoxy	30 min/120°C + 30 min/150°C	●	Very good flow properties, high glass transition temperature, no bleeding

Frame and Fill Adhesives for Electronics Applications

Adhesive	Application	Viscosity [mPas]	Base	Curing*	Ion purity	Characteristics
Structalit® 5791	Glob Top	45 000 - 65 000 Rheometer, 10s ⁻¹	Epoxy	5 min/150°C 60 min/100°C	●	Black color, resistant to vibration, impact resistant, low ion content (<900 ppm)
Structalit® 5891 T	Frame-Material, Glob Top	80 000 - 150 000 Rheometer, 10s ⁻¹	Epoxy	5 min/150°C 50 min/100°C	●	Black color, stable, applicable wet-in-wet with fill material, dispensible in several stacks of frames, stable edges, very high shock resistance
Structalit® 5893	Fill-Material	6 000 - 10 000 Rheometer, 10s ⁻¹	Epoxy	10 min/150°C 80 min/100°C	●	Black color, very good flow properties, applicable wet-in-wet with frame material, high shock resistance, very high resistance to heat and chemicals, biocompatibility certified according to ISO 10993-5
Structalit® 5894 M	Glob Top, Potting Compound	20 000 - 30 000 Rheometer, 20s ⁻¹	Epoxy	5 min/150°C 60 min/100°C	●	Black color, excellent flow properties, very high resistance to heat and chemicals, high shock resistance

UV-Curing Frame and Fill Adhesives

Adhesive	Application	Viscosity [mPas]	Base	Curing*	Ion purity	Characteristics
Vitralit® 1650	Fill-Material	3 000 - 5 000 Rheometer, 10s ⁻¹	Epoxid	UV	●	Low ion content, coating for semiconductors, ideally suited for small semiconductor chips, flexible, low water absorption, passed UL94 HB test
Vitralit® 1657	Fill-Material	5 000 - 15 000 Rheometer, 10s ⁻¹	Epoxid	UV	●	Excellent chemical resistance, low water absorption, ideally suited as coating for tall components, thixotropic, filled with quartz, flexible
Vitralit® 1671	Frame-Material	9 000 - 14 000 Rheometer, 10s ⁻¹	Epoxid	UV/thermisch	●	Stable Frame material, applicable wet-in-wet with fill material, excellent thermal conductivity, low water absorption, passed UL94 HB test
Vitralit® 1680	Fill-Material	5 000 - 8 000 Rheometer, 10s ⁻¹	Epoxid	UV	●	Climate resistant, coating for semiconductors
Vitralit® 1691	Fill-Material	20 000 - 40 000 Rheometer, 10s ⁻¹	Epoxid	UV/thermisch	●	Black color, excellent resistance to heat, fast uv curing on the surface

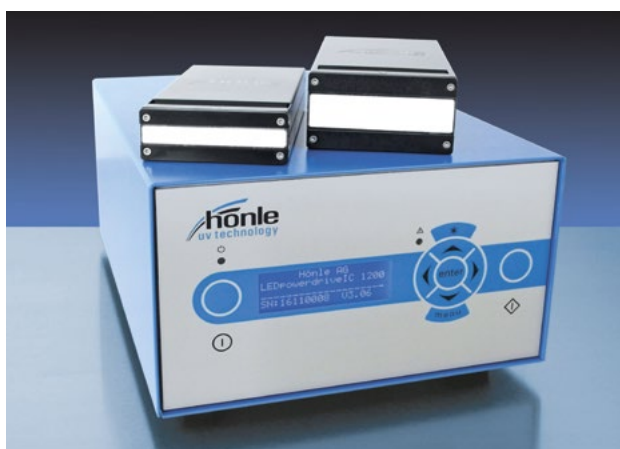
*UV = 320 - 390 nm; ● Semicon grade: DIN-EN ISO 10304-1 (D20); ● Electronic grade: (IEC 61249-2-21)

Hönle LED UV lamps

Vitralit® UV curable adhesives are optimally matched for curing with Hönle LED UV units.

Tailored to the application, Hönle supplies

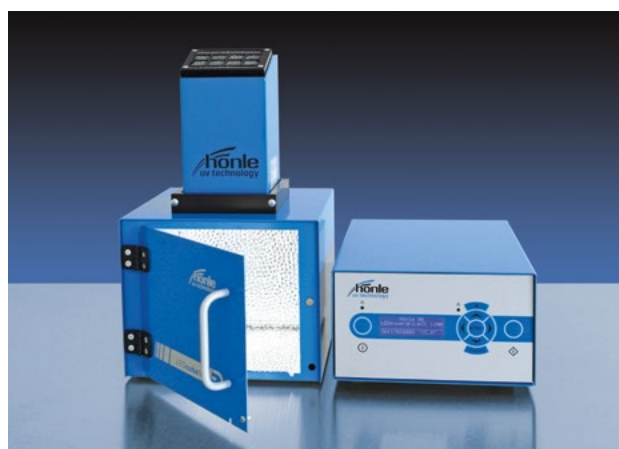
- LED-UV-spot systems
- LED-UV-wide area lamps
- LED-UV-irradiation chambers
- LED-UV-line lamps



Hönle UV-lamps

In addition to LED UV curing technology, Hönle is the leading supplier of conventional UV curing technology with gas discharge lamps.

Hönle also offers UV measurement technology for process-reliable production.



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