

Biocompatible Adhesives for Medical Devices

**Adhesives with biocompatibility in compliance with
USP Class VI and/or ISO-10993 for**

**Catheters and connectors
Respiratory equipment
Needle bonding
Wearables
Diagnostics
Sensors**

Panacol offers a broad spectrum of cutting-edge adhesives. We provide complete processing solutions for the medical industry that include adhesives and coatings as well as UV- and LED-UV curing equipment. These solutions contain adhesives for needle bonding and assembly of plastic housings. Adhesives are also available for PCB and Flex PCB assembly, including encapsulants, protective coatings, conductives for chip, connector and wire bonding. Find the right adhesives for your entire medical device with help from our technical support team. They possess an incredible amount of hands-on experience with medical device applications.

Needle Bonding

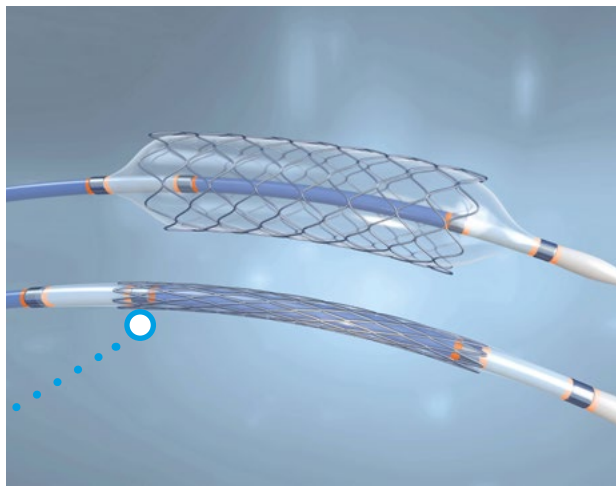
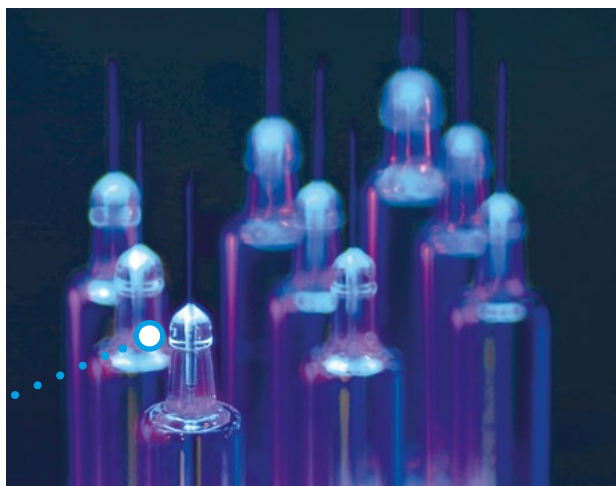
Biocompatible adhesives from Panacol are suitable for bonding stainless steel needles or cannulas in glass or plastic syringes. We will support you in selecting the right adhesive for your specific substrates and syringe design.

more information on page 4

Catheters/Tubes/Diagnostics

For disposable medical products, Panacol offers a range of different adhesives that allow fast cycle times for high volume production. UV-curable Vitralit® adhesives are suitable for clear, visible light curable adhesives for UV-blocked materials.

more information on page 5



Electronic Packaging/Sensors

Adhesives from Panacol are used in sensor technology for the attachment and protection of components. Conductive adhesives can be used to ensure electrically conductive connections.

more information on page 5

• Lens Bonding and Stacking for Endoscopes

- UV adhesives with high optical transparency and low shrinkage are used to fix lenses in microscopes and endoscopes as well as in cameras and bonding of prisms.

• more information on page 4



• Tube and Connector Bonding

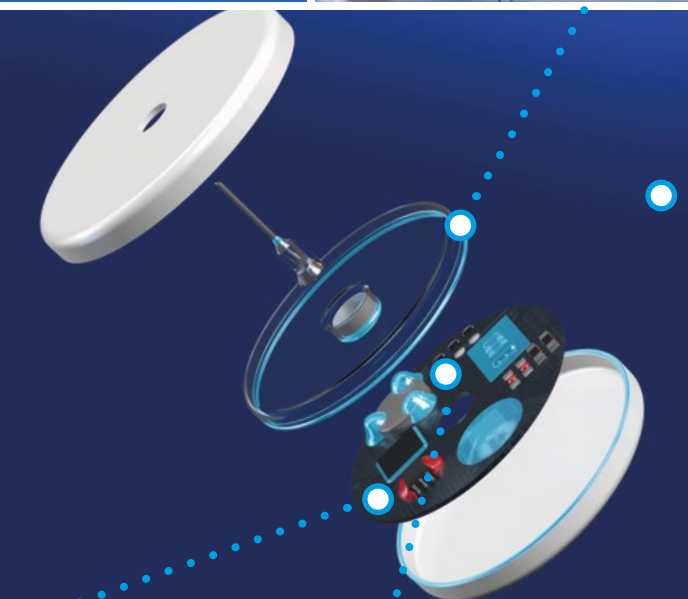
- Acrylic-based UV plastic bonders from Panacol are suitable for bonding connecting elements such as infusion lines or tubes of catheters and other disposable products. They enable fast cycle times and create process-reliable production.

• more information on page 4

• Plastic Bonding

Bonding and sealing transparent polycarbonate or acrylic housings of dialysis filters, blood oxygenators, blood bags and valves of different sizes are quick and reliable with Vitralit® UV adhesives from Panacol.

• more information on page 5



• Wearables & Medical Devices

Panacol offers complete adhesive and curing solutions for structural housing bonding, needle bonding or bonding to PCBs in medical wearables or other medical electronic devices.

• more information on page 6

• Conductive bonding •

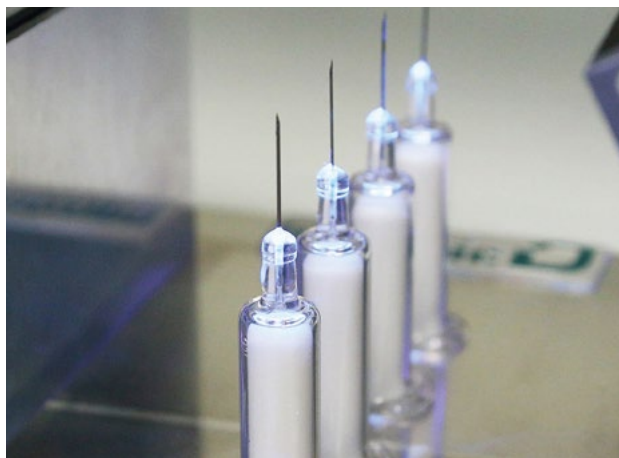
Panacol offers a wide range of Elecolit® brand thermally and/or electrically conductive adhesives. Elecolit® products are the contemporary answer to fast connectivity and thermal management for a wide range of applications.

• more information on page 6

Medical Grade Adhesives Selection Guide

View the Panacol adhesives meeting the requirements for USP Class VI and/or ISO 10993 certification.

• more information on page 7

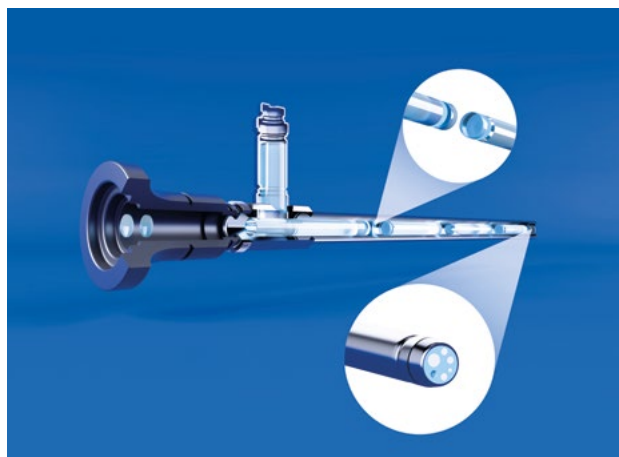


Needle Bonding

UV adhesives for bonding stainless steel needles or cannulas in glass or plastic syringes are solvent-free and fluorescent for a better process control. Suitable for USP Class VI and/or ISO 10993 certification, they offer the ability to bond PC, PVC, PP or ABS to stainless steel and other metals. Fully cured, they withstand high needlepull-out forces even after several sterilization cycles. UV blocked plastics can still be bonded and cured with long-wave light.

Tube and Connector Bonding

Vitalit® UV- and LED-UV-curing acrylate-based adhesives are suitable for connecting infusion lines or catheter tubing to stopcock valves, filters and adapters. They enable fast cycle times and process-reliable production. They are biocompatible and extremely resistant to chemicals and liquids. Depending on the application, they can be adjusted in viscosity to meet the required flexibility or strength for reliable bonding.

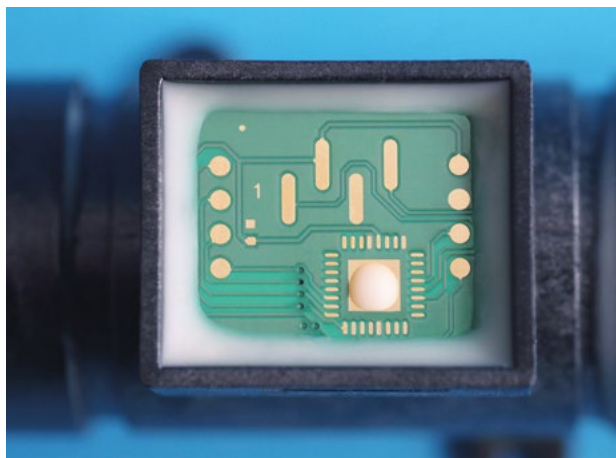


Lens Bonding and Stacking for Endoscopes

Dual curing Vitalit® adhesives are ideal for bonding lens stacks as well as attaching glass and rod lenses in endoscopes. High strength bonds are formed between glass and metal components that offer biocompatibility, good chemical resistance, and minimal shrinkage. Their high glass transition temperatures ensure operating stability and reliability. These adhesives are compatible with all common sterilization processes.

Electronic Packaging/Sensors

Adhesives for sensors in medical technology are used for environmental protection, shielding, electrical connection and heat dissipation. These products meet ISO 10993 and/or USP Class IV standards, are solvent-free and withstand common sterilization processes. Vitralit® adhesives can be cured with UV or visible light for a precise, process-reliable and fast production. Shadowed areas of components can be safely cured with dual-cure adhesives.



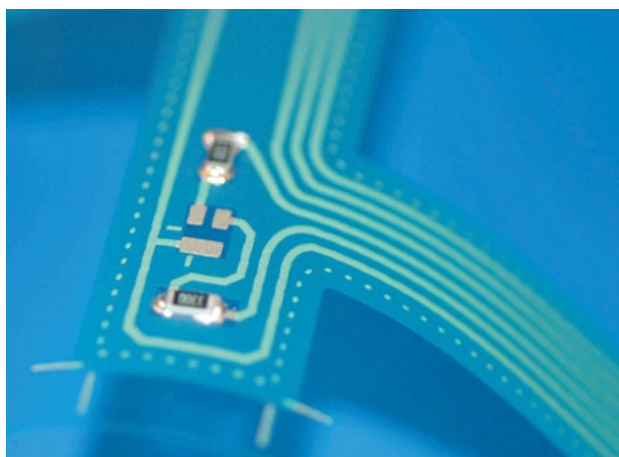
Plastic Bonding

For bonding and sealing transparent polycarbonate or acrylic housing halves, such as dialysis filters or blood oxygenators, Panacol offers Vitralit® brand light-curing one component adhesives. Multiple viscosity ranges are available to fill the smallest channels as well as larger bond line gaps. Components are joined within seconds using LED-UV or LED visible light curing systems. Strucralit® 2-component adhesives are suitable for materials not transparent to UV and visible light. All adhesives are solvent-free and compatible with gamma, EtO and e-beam sterilization processes.

Catheters/Tubes/Diagnostics

Bonding of respiratory materials, catheters and other diagnostic products can be accomplished quickly and reliably using UV adhesives from Panacol. The adhesives meet the requirements of ISO 10993 and/or USP Class VI and bond not only the common plastics such as polycarbonate, PVC or ABS, but also substrates that are difficult to bond, including PEEK, PE and PP. They are solvent-free and highly resistant to moisture. Due to the products fluorescing under UV light, fast, efficient and cost-saving assembly processes can be realized.



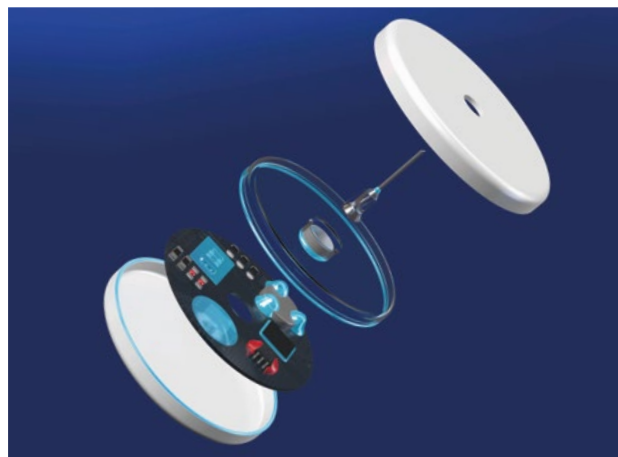


Conductive Bonding

Elecolit® electrically conductive adhesives are a suitable alternative to soldering processes. Their lower curing temperatures permit these conductive adhesives to be used for attaching temperature-sensitive chips and flexible conductors. In addition to forming electrical connections these mostly silver-filled adhesives offer heat dissipation, which reduces thermal stress on electronic components.

Wearables

Panacol's broad line of medical device adhesives enables manufacturers to select the exact adhesive properties required for their designs. For medical wearables, Panacol provides solutions for the complete device, including needle bonding, SMD packaging, protective coating, and housing assembly. Devices such as glucose monitors can be assembled quickly and reliably in high volume production processes. Our experienced technical team is ready to assist with recommendations for adhesives, curing systems, and dispensing options.



Adhesion properties of adhesives on different substrates														
Substrate	Adhesive Strucalut® 8801	Vitrilit®												
		1605	1655	1702	4731	E- 4731	UV 4050	5140	6108 /T	UV 7030	7041 /F/T	7044 VLV	7090 VHS	7311 FO/ T/GEL
ABS	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Aluminium	●		●		●	●	●	●	●	●				●
Stainl. Steel	●	●	●		●	●	●	●	●	●	●	●	●	●
Glass	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PA6	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PC	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PEEK	●	●	●	●	●	●	●	●	●	●		●	●	●
PET-A	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PMMA	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PS	●	●	●		●	●		●		●	●	●	●	●
PU/PUR		●		●					●	●	●	●	●	●
PVC	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SAN	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PP/PE	Surface treatment recommended													
Silicone	Surface treatment recommended													

● very good

● application-related

Medical Grade Adhesives Selection Guide

Adhesive	Base	Viscosity [mPas]	Curing*	Compliance	Color	Characteristics
Vitralit® 1605	1-part epoxy	200 - 400 LVT, Sp. 2/30 rpm	UV/thermal	ISO 10993-5	Transparent	Low shrinkage, low CTE, high glass transition temperature, excellent chemical resistance, dual cure
Vitralit® 1655	1-part epoxy	150 - 300 LVT, Sp. 2/30 rpm	UV/thermal	USP Class VI ISO 10993-5	Transparent	Flexible, low viscosity, excellent adhesion to plastics and metals, dual cure, resistant to sterilization
Vitralit® 1702	Acrylate	10 - 100 LVT, Sp. 2/60 rpm	UV	USP Class VI	Transparent, slightly yellow	High adhesion to plastics, capillary flow, high E-modulus, high material strength, low oxygen inhibition, perfect solution for bonding hose connections, back-pressure valves or blood filters
Vitralit® 1703	Acrylate	85,000 - 130,000 LVT, Sp. 4/3 rpm	UV/VIS	USP Class VI	Transparent, slightly yellow	Excellent adhesion to plastics, gap-filling, high E-modulus, specially formulated to bond hose connections, back-pressure valves and blood filters, shape retaining, shear thinning
Vitralit® 4731	Acrylate	900 - 1,500 LVT, Sp. 2/30 rpm	UV/VIS	USP Class VI ISO 10993-5	Transparent	Flexible, excellent adhesion to glass and plastics, specially formulated to bond tubing connections or housings, dry surface
Vitralit® E-4731	Acrylate	900 - 1,500 LVT, Sp. 2/30 rpm	UV/VIS	ISO 10993-5	Transparent	Flexible, excellent adhesion to glass and plastics, dry surface, CMR free
Vitralit® 5140	Acrylate	250 - 500 LVT, Sp. 2/30 rpm	UV/VIS	USP Class VI	Transparent slightly yellow	Soft, flexible with dry surface cure, excellent resistance to thermal cycling, used in tube sets and breathing circuits or as coatings of electronic devices
Vitralit® 6108 6108 T	Acrylate	600 - 900 LVT, Sp. 3/30 rpm 4,000 - 6,000 LVT, Sp. 5/30 rpm	UV/VIS/thermal	USP Class VI ISO 10993-5	Transparent	Dual cure, high resistance to moisture, very high adhesion to glass and metal. Ideal for bonding needles in glass syringes and endoscopes
Vitralit® 7041/F	Acrylate	50 - 90 LVT, Sp. 2/60 rpm	UV/VIS	USP Class VI	Transparent, slightly yellow	Capillary flow, very good adhesion to many plastics, suitable for needle bonding and joining connectors/tubes/housings or dialysis filters, fluorescent markers for in-line inspection
Vitralit® 7041 T	Acrylate	1.500 - 2.300 Rheometer, 10s ⁻¹	UV/VIS	USP Class VI	Transparent, slightly yellow	High gap filling capacity, very good adhesion to plastics, suitable for bonding needles, tubings and connectors, reservoir assemblies and sealing filter cartridges, shear-thinning
Vitralit® 7044 VLV	Acrylate	10 - 100 LVT, Sp. 2/60 rpm	UV/VIS	USP Class VI	Transparent	Excellent adhesion to rubber and elastomers, perfect solution for elastic bonding, resistant to sterilization
Vitralit® 7090 VHS	Acrylate	40 - 100 LVT, Sp. 2/60 rpm	UV/VIS	USP Class VI	Transparent, slightly yellow	Capillary flow, very high adhesion to plastics, very fast curing at low intensities, high crosslinking. Well suited for sealing hollow fiber filters, needles and endoscopes
Vitralit® 7311 (FO) 7311 (FO) T 7311 (FO) GEL	Acrylate	40 - 70 1,000 - 3,000 10,000 - 30,000 Rheometer 10s ⁻¹	UV/VIS	USP Class VI	Transparent	Very good adhesion to many plastics, available in various viscosities, creates high strength bonds in the assembly of tube sets, connectors and housings, all adhesive variations are also available with orange fluorescence (FO)
Vitralit® 7562	Acrylate	500 - 900 LVT, Sp. 3/30 rpm	UV/VIS	USP Class VI ISO 10993-5	Transparent	Flexible, elastic, very high adhesion to glass and metal, specially formulated to bond glass apparatuses, moisture resistant
Vitralit® 7989	Acrylate	3,000 - 5,000 LVT, Sp. 4/30 rpm	UV	USP Class VI	Transparent, slightly yellow	Flexible adhesive with suitability for bonding connectors, reservoir covers, filter housings and enclosures requiring impact
Vitralit® UV 4050	Acrylate	140 - 500 LVT, Sp. 2/30 rpm	UV/VIS	ISO 10993-5	Transparent, slightly yellow	Very good adhesion to many plastics, glass and metal, specially formulated for bonding needles, impact resistant
Vitralit® UV 7030	Acrylate	15,000 - 25,000 Rheometer, 10s ⁻¹	UV/VIS	USP Class VI	Transparent	Flexible, high elongation at break, good shear strength, bonding plastics with low surface energy. Dry surface after UV-curing
Structalit® 5893	1-part epoxy	6,000 - 10,000 Rheometer, 10s ⁻¹	thermal	ISO 10993-5	Black	Fast curing at low temperatures, good shock resistance, specially formulated to bond medical disposables
Structalit® 701	2-part epoxy	3,000 - 5,000 LVT, Sp. 3/30 rpm	thermal	USP Class VI ISO 10993-5	Transparent, amber	Heat resistant up to 200°C, perfect for bonding surgical instruments/endoscopes/light guides, solvent free
Structalit® 8801	1-part epoxy	30,000 - 45,000 LVT, Sp. 4/6 rpm	thermal	ISO 10993-5	Beige	Suited for encapsulation of electronic devices and for potting of sensors, very good oil- and media resistance, low ion content, solvent free
Elecolit® 323	2part-epoxy	Paste-like	thermal	ISO 10993 -5/-12	Grey	Thermally and electrically conductive, solvent-free, suitable for semiconductors (Na+, K+, Cl- <10ppm), autoclavable (1000h)
Cyanolit® 203 TX	Cyano-acrylate	5,000 - 1,000 LVT, Sp. 3/6 rpm	RT	USP Class VI	Transparent	Gap-filling, high adhesion to plastics (PA, PC, ABS, PVC, EPDM), metal and elastomers, ideally suited for bonding of hose connections and porous substrates, resistant to moisture, shear thinning
Cyanolit® 241 F	Cyano-acrylate	30 - 50	RT	USP Class VI	Transparent	Capillary flow, very good wetting properties, ideally suited for bonding of plastics (PVC, PMMA), copper, aluminum and steel
Cyanolit® 732 F	Cyano-acrylate	230 - 350 LVT, Sp. 2/60 rpm	RT	USP Class VI	Transparent	Short curing time, wide range of applications, very good adhesion to plastics (PVC, PMMA, ABS, EPDM) & stainless steel, film-forming

*UV = 320 - 390 nm, VIS = 405 nm

Process Solutions with Hönle UV Technologies

Dr. Hönle AG is an international supplier of UV technology and offers curing units with UV LEDs and conventional medium-pressure lamps. Hönle and Panacol attach great importance to joint research and development. The combination of decades of experience leads to optimally coordinated high-tech system products for bonding applications.

LED Spotlights Bluepoint

High-intensity punctiform UV irradiation



LED Cube LED Curing Chambers

Reliable protection against UV radiation



LED Line Emitters LED Powerline

High-power arrays with individual length



Convey LED LED Conveyor Belts

Can be combined with LED Powerline or LED Spot for high output



LED Floodlights LED Spot

Homogeneous light distribution with high intensity



UV Meter UV-Measurement

Measurement of intensity and dose for reliable process monitoring



UV Sources	Dimension in mm	Available Wavelength in nm	Intensity in mW/cm ²	Cooling
LED Spotlights	Light emission up to Ø 20	365/385/405	up to 20.000	air-cooled
LED Line Emitters	Light emission width 10/20/40, length variable	365/385/395/405/460	up to 25.000	air and water-cooled
LED Floodlights	Light emission 20x20 / 40x40 / 100x100 / 200x50	365/385/395/405/460	up to 30.000	air and water-cooled
LED Curing Chambers	Inner dimension 180x180 / 350x350	365/385/395/405/460	up to 5.000	air-cooled
LED Conveyor Belts	Belt width 110 - 520	365/385/395/405/460	up to 25.000	air and water-cooled



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