

# BIOCOMPATIBLE ADHESIVES FOR MEDICAL DEVICES



System solutions: CMR- and TPO-free adhesives  
in compliance with USP Class VI and/or ISO-10993,  
together with aligned UV curing equipment

# MEDICAL GRADE ADHESIVES

Hoenle provides comprehensive processing solutions for the medical industry, including adhesives and coatings, as well as UV- and LED-UV curing equipment. Our portfolio includes a wide range of CMR- and TPO-free adhesives for needle bonding and the assembly of plastic housings. We also offer adhesives for PCB and flex PCB assembly, including encapsulants, protective coatings and conductive materials 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.

## LENS BONDING AND STACKING FOR ENDOSCOPE

more information on page 4

## TUBE AND CONNECTOR BONDING

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## CATHETERS | TUBES | DIAGNOSTICS

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## MEDICAL GRADE ADHESIVES SELECTION GUIDE

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## WEARABLES & MEDICAL DEVICES

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

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### NEEDLE BONDING

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### ELECTRONIC PACKAGING SENSORS

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### CONDUCTIVE BONDING

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### PLASTIC BONDING

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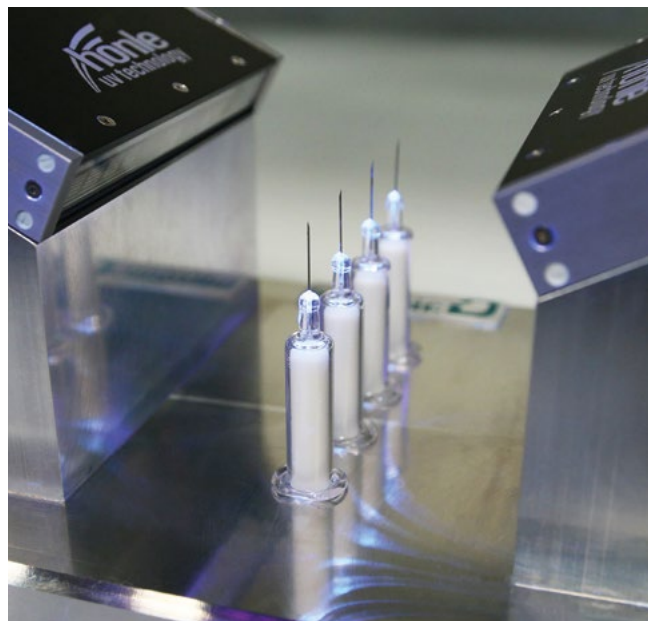
### UV CURING EQUIPMENT

**more information on page 8**

# APPLICATIONS IN DETAIL

## NEEDLE BONDING

Hoenle 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 stainless steel cannula with PC, PVC, PP and other plastics. Fully cured, Hoenle Medical adhesives maintain high pull-out strength after several sterilization cycles. These adhesives allow UV blocked plastics to be bonded and cured with long-wave, visible light.



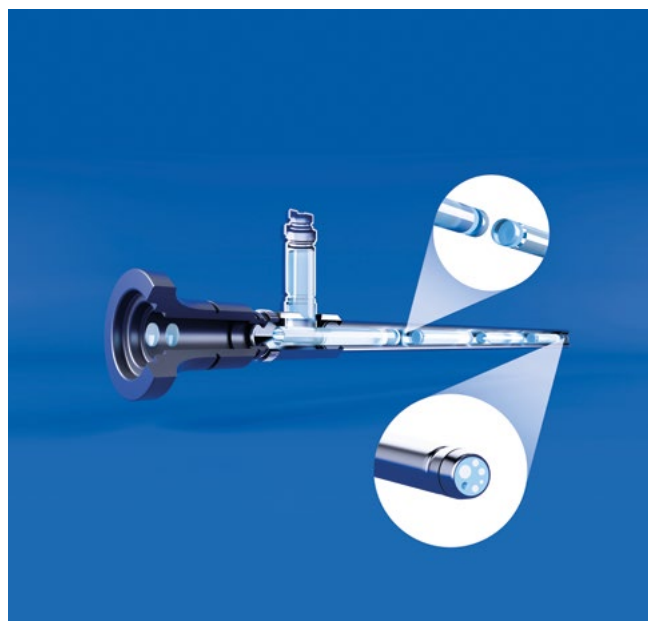
## TUBE AND CONNECTOR BONDING

Vitralit® UV- and LED-UV-curing acrylate-based adhesives are suitable for connecting infusion lines or flexible 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.



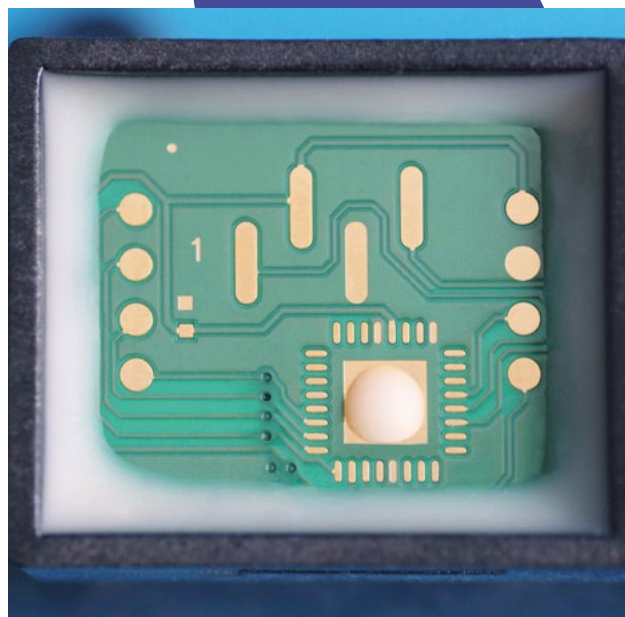
## LENS BONDING AND STACKING FOR ENDOSCOPES

Dual curing Vitralit® 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 VI 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.



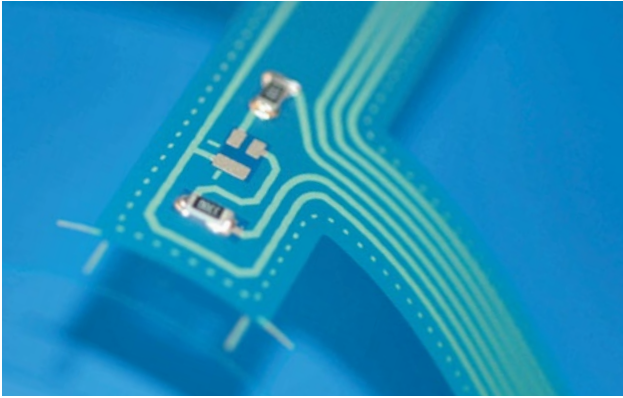
## PLASTIC BONDING

For bonding and sealing transparent polycarbonate or acrylic housing halves, such as dialysis filters or blood oxygenators, Hoenle 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. Structalit® 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

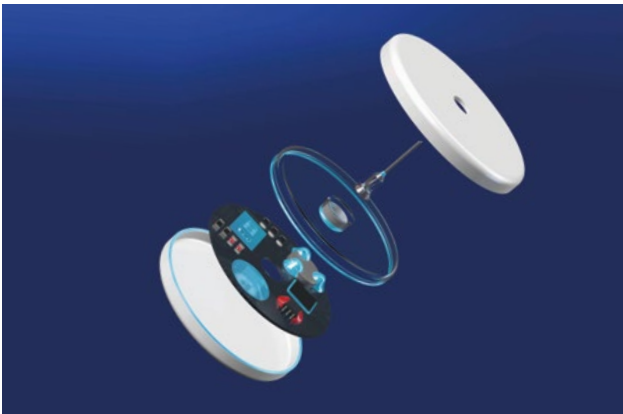
Bonding of respiratory materials, catheters and other diagnostic products can be accomplished quickly and reliably using UV adhesives from Hoenle. The adhesives meet the requirements of ISO 10993 and/or USP Class VI and bond not only the common plastics such as polycarbonate, PVC or ABS, but also substrates that are difficult to bond, including PEEK, Pebax, and polyamide. 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 can be 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 highly silver-filled adhesives provide heat dissipation, which reduces thermal stress on electronic components.



## WEARABLES

Hoenle's broad line of medical device adhesives enables manufacturers to select the exact adhesive properties required for their designs. For medical wearables, Hoenle 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

Adhesive Substrate	Structalit® 8801	Vitalit®										
		1605	1655	1702	UD 6572	E- 4731 (F   TF)	UV E- 4050	E- 5140 (F   VTF)	UV E- 7030 (LV)	E- 7041 (F   T   TF)	E- 7090 VHS F	E- 7311 (FO   T)
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
Vitalit® 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
Vitalit® 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
Vitalit® 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
Vitalit® 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
Vitalit® E-4731 Vitalit® E-4731 F Vitalit® E-4731 T	Acrylate	900 – 1,200 Rheometer, 10s <sup>-1</sup> 2,000 – 5,000 Rheometer, 10s <sup>-1</sup>	UV/VIS	ISO 10993-5	Transparent	Flexible, excellent adhesion to glass and plastics, dry surface
Vitalit® E-5140 Vitalit® E-5140 VT F	Acrylate	1,500 11,000 Rheometer, 10s <sup>-1</sup>	UV/VIS	ISO 10993-5	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
Vitalit® E-7041 (F) Vitalit® E-7041 T (F)	Acrylate	70 2,200 Rheometer, 10s <sup>-1</sup>	UV/VIS	ISO 10993-5	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
Vitalit® E-7090 VHS F	Acrylate	50 Rheometer, 10s <sup>-1</sup>	UV/VIS	ISO 10993-5	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
Vitalit® E-7311 (FO) Vitalit® E-7311 (FO) T	Acrylate	85 2,200 Rheometer, 10s <sup>-1</sup>	UV/VIS	ISO 10993-5	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)
Vitalit® UD 6572	Epoxy-acrylate	23,000-33,000 Rheometer, 10s <sup>-1</sup>	UV/VIS/thermal	ISO 10993-5	Black	Endoscope/Lens-Bonding, protection of sensitive parts from mechanical and natural stress, UV-prefixation, secondary heat cure necessary
Vitalit® UV E-4050	Acrylate	170 Rheometer, 10s <sup>-1</sup>	UV/VIS	ISO 10993-5	Transparent, slightly yellow	Very good adhesion to many plastics, glass and metal, specially formulated for bonding needles, impact resistant
Vitalit® UV E-7030 Vitalit® UV E-7030 LV	Acrylate	20,000 720 Rheometer, 10s <sup>-1</sup>	UV/VIS	ISO 10993-5	Transparent	Flexible, high elongation at break, good shear strength, bonding plastics with low surface energy. Dry surface after UV-curing
Vitalit® MASK E-20102 G	Urethane acrylate	8,000-15,000 Rheometer, 10s <sup>-1</sup>	UV/VIS	ISO 10993-5	Translucent, green	Masking, protective coating of highly polished surfaces, orthopedic implants, removable with hot water at 80°C
Structalit® 5893	1-part epoxy	6,000 – 10,000 Rheometer, 10s <sup>-1</sup>	thermal	ISO 10993-5	Black	Fast curing at low temperatures, good shock resistance, specially formulated to bond medical disposables
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	2-part-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	1,300 – 1,800 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® 290 WR	Cyano-acrylate	400 LVT, Sp. 2/60 rpm	RT	ISO 10993-5	Transparent	Water resistant, fast curing, good adhesion to plastic and metal
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

# UV CURING SYSTEMS

Hoenle offers a broad range of UV curing equipment for curing UV adhesives, which are perfectly aligned in terms of wavelength. Our sales engineers and application technicians will assist you in selecting the right UV Equipment in combination with the appropriate adhesive. Thanks to our extensive experience in both areas, we can offer you a system solution that is perfectly tailored to your individual requirements, ensuring maximum productivity and efficiency in your bonding processes.

## LED SPOTLIGHTS

High intensity small area UV irradiation

## BLUEPOINT



## LED LINE EMITTERS

High-power arrays with individual length

## LED POWERLINE



## LED FLOODLIGHTS

Homogeneous light distribution with high intensity

## LED SPOT



## LED CURING CHAMBER

Reliable protection against UV radiation

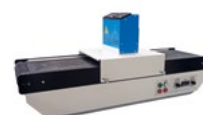
## LED CUBE



## LED CONVEYOR BELTS

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

## CONVEY LED



## UV-MEASUREMENT

Measurement of intensity and dose for reliable process monitoring

## UV METER



UV Sources	Dimension in mm	Available Wavelength in nm	Intensity in W/cm <sup>2</sup>	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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