hönle group

panacol-USA
adhesives & more

Innovative Adhesives for Medical Devices

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

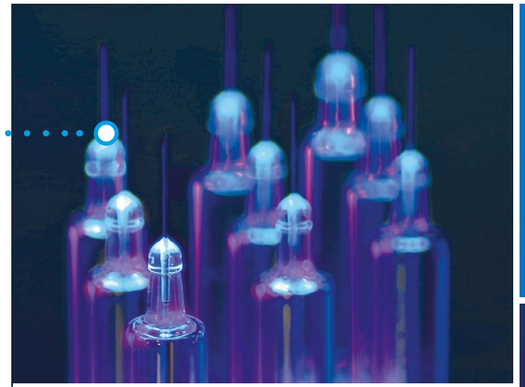
Catheters and connectors
Respiratory equipment
Needle bonding
Wearables
Diagnostics
Sensors

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/Guidewires

Advanced catheter designs incorporate new grades of extruded tubing that can create adhesive bonding challenges. Panacol-USA has developed a new line of adhesives specifically for Minimally Invasive Device assembly. These adhesives produce higher strength bonds with low surface energy substrates.
Possessing higher resistance to humidity and temperature, Panacol-USA's MID series adhesives retain higher bond strength after sterilization and aging.
They fully crosslink upon cure with UV or visible light to assure biocompatibility to USP Class VI and/or ISO 10993 standards. MID adhesives fluoresce bright orange under low intensity UV light (365nm wavelength). They are easily detectable by automated vision systems as the orange color contrasts with plastics that naturally fluoresce blue.

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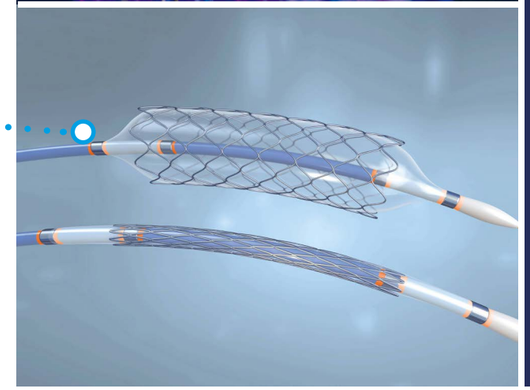

Electronic Packaging/Sensors

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.

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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.

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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

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.

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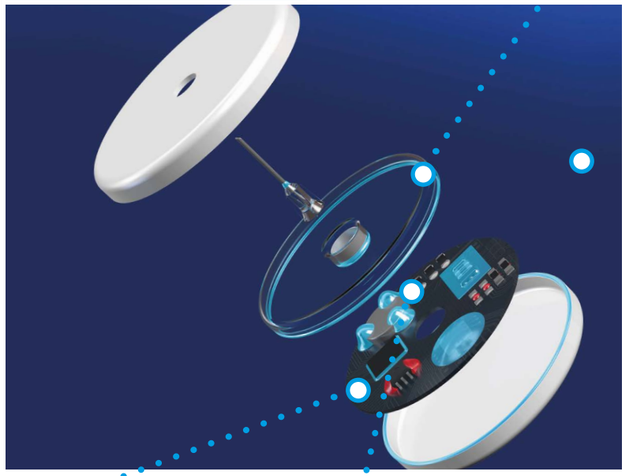
Plastic Bonding

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.

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Medical Grade Adhesives Selection Guide

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

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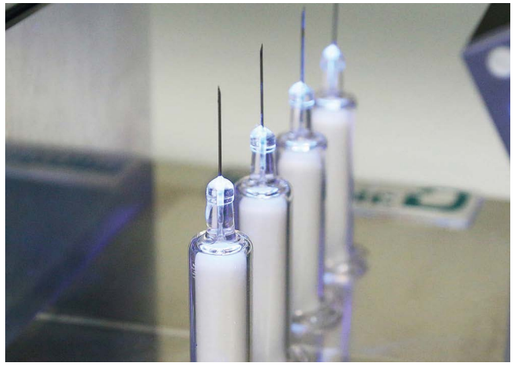
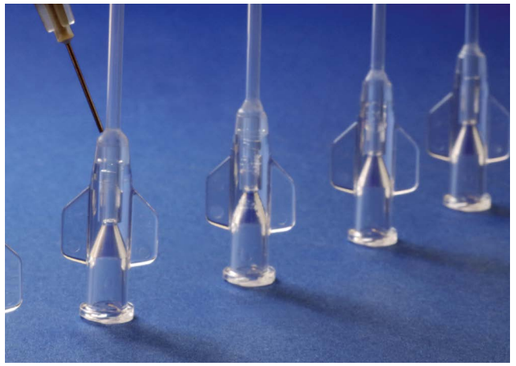


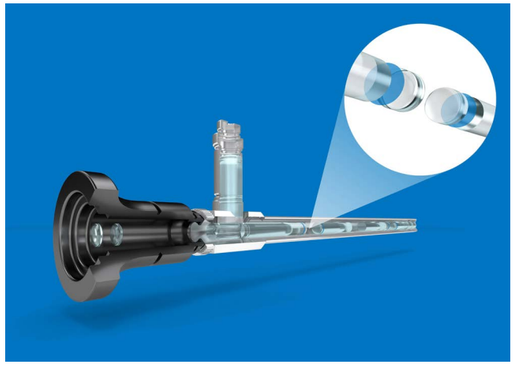
Needle Bonding

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

Vitralit® 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.



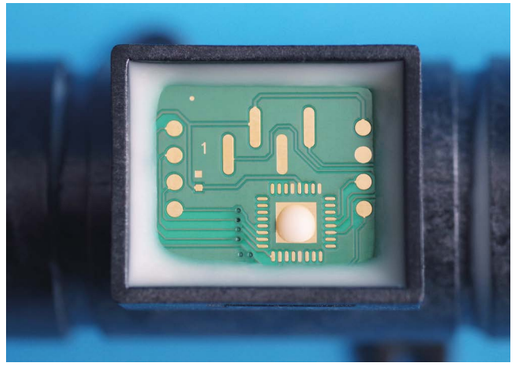


Lens Bonding and Stacking for Endoscopes

Dual curing 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 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.

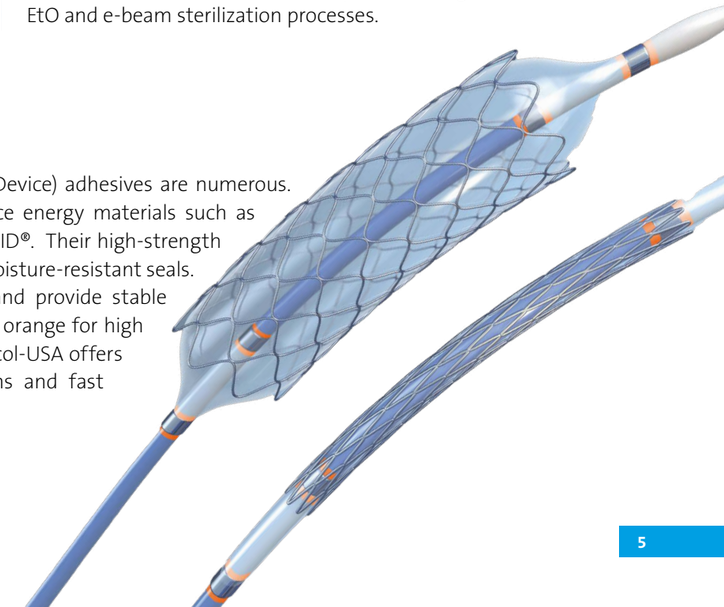


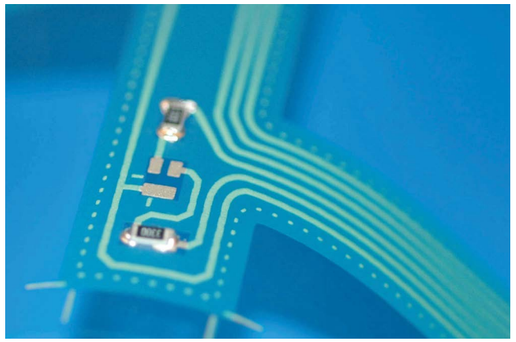
Plastic Bonding

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. 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/Guidewires

The features and benefits of MID (Minimally Invasive Device) adhesives are numerous. They can bond catheter shafts made from low surface energy materials such as polyamide (nylon 12), PEBAX®, VESTAMID®, and GRILAMID®. Their high-strength bonds form smooth guide wire transitions and create moisture-resistant seals. For greater process efficiency, they are LED-curable and provide stable bond strength through aging. MID adhesives fluoresce orange for high visibility. For electrophysiology catheter assembly, Panacol-USA offers Elecolit® conductive adhesives for reliable connections and fast component attachment.



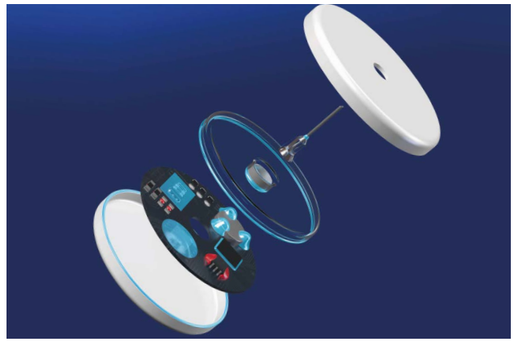


Wearables

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.

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.



Adhesion properties of adhesives on different substrates

Adhesive / Substrate	Structalit® 8801	Vitralit® 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 always required													
Silicone	Surface treatment always required													

● very good ● application-related

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/LED	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, fast curing at low intensities, high crosslinking. Suited for sealing hollow fiber filters, needles 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 flourescence (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 apparatures, moisture resistant
Vitralit® 7989	Acrylate	3,000 - 5,000 LVT, Sp. 4/30 rpm	UV/LED	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

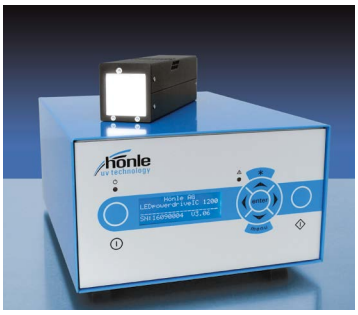
Hönle UV technology for applications in medical device assembly

Dr. Hönle AG is an internationally recognized supplier of industrial LED-UV technology and traditional broad spectrum UV lamps as well as the head of the global Hönle Group, which Panacol is a member of. Hönle and Panacol place great emphasis on joint research and development, creating optimal curing solutions for Panacol's UV and visible light curing adhesives and coatings. Decades of mutual cooperation and experience have created product lines of high-tech curing equipment ideally suited for medical device assembly. The programmable software in each Hönle curing system provides full process control through continuous monitoring and feedback. Here a small selection:

LED Powerline

The LED Powerline is a high-power array with a very long lifetime. It is available with wavelengths of 365/385/395/405/460 nm and can therefore be precisely matched to the respective application. The length of the array can be increased in 40 mm steps from 80 mm to more than 1 meter. The compact and versatile LED Powerline is designed to be incorporated into production processes with minimal modification. It can be powered and operated from an existing PLC. The LED device is well suited for high-speed production, which includes needle and syringe bonding.

LED Spot 40 IC



The LED Spot 40 IC provides highly intensive UV or visible light curing energy for areas up to 40 x 40 mm. It is used where a point source is no longer sufficient, e.g., for the simultaneous curing of several adhesive dots or for the curing of large diameters. The arrangement of the LEDs and an electronic power control ensure a homogeneous light distribution. An LED failure detection and extensive monitoring functions provide process reliability.

bluepoint LED eco

The bluepoint LED eco is perfect for applications that require high-intensity UV or visible light curing energy in diameters from 3 to 20 mm. Up to four LED heads can be operated by one controller, in programmed sequences or as totally independent workstations. Variable power settings, programmability of exposure cycles, and four wavelength options allow engineers to optimize their curing cycles and maximize their production output.

Further information and our standard product range at www.panacol.com

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