

Permabond Adhesives for Medical Devices

Permabond's medical device grade cyanoacrylate and UV-curable adhesives have been specially formulated to bond plastics and other materials commonly found in medical device manufacture. Permabond's technical team can help you select the most appropriate adhesive for your application or discuss your requirements for a custom formulation.

How do Permabond cyanoacrylate adhesives work?
Permabond cyanoacrylate adhesives are one-part adhesives that cure by reacting with minute traces of moisture on the surface of the material being bonded. They cure in seconds at ambient temperatures and have been formulated to bond flexible or rigid surfaces made from a wide range of plastics, rubbers or metals.

Permabond cyanoacrylates are available in a range of viscosities and material adhesion capabilities. These adhesives are formulated to bond a variety of porous and non-porous surfaces and to rigid or flexible materials.



Which sterilisation procedures will the 4C range withstand?

- Ethylene oxide sterilisation
- Gamma irradiation
- UV-irradiation
- Not suitable for autoclave sterilisation.

Typical Applications:

- Catheter bonding
- Bonding components for breathing masks
- Tacking wires and bonding materials for electro-cardiogram pads
- Bonding connectors to tubes
- Disposable scalpals - bonding blade to handle
- Bonding sponge swabs to swab stick

Benefits of cyanoacrylates

- Cure in seconds - ideal for high-speed production
- No need for curing equipment
- Form high-strength bonds - often exceeding that of the substrate material.
- Colourless and transparent for a clean, aesthetically pleasing finish.
- Can adhere to difficult-to-bond materials

Products pass USP Class VI and cytotoxicity testing.

How do Permabond UV-curable adhesives work?
UV curable adhesives cure during exposure to ultra violet light. The adhesives contain photo-initiators that react to specific wavelengths, causing the curing process to begin.



UV adhesives do not dissolve, melt or weaken the two components. They form strong chemical bonds between the two substrates and provide a high strength alternative to

other joining methods. They can be used to replace solvent welding to help reduce stress cracking and to increase bond strength and performance.



UV-curables are also a good alternative to ultrasonic welding as they are more able to cope with gaps or varying tolerances, this helps reduce reject rates.

Typical Applications:

- Face mask bonding
- Needle bonding
- Bonding connectors
- Catheter bonding
- Blood collection reservoirs

Benefits of UV-curables

- Cure in seconds - ideal for high-speed production lines
- Form high-strength bonds - often exceeding that of the substrate material.
- Colourless and transparent for a clean, aesthetically pleasing finish.
- Can adhere to difficult-to-bond materials

Permabond
Engineering Adhesives

Permabond Cyanoacrylate Product Data

PHYSICAL PROPERTIES	4C10	4C20	4C30	4C40
Appearance	Colourless, transparent	Colourless, transparent	Colourless, transparent	Colourless, transparent
Viscosity @ 25°C	40 mPa.s	500 mPa.s	1,500 mPa.s	2,000 mPa.s
Density	1.05	1.05	1.05	1.05
Flash Point	82°C	82°C	82°C	82°C
Base Compound	Ethyl cyanoacrylate	Ethyl cyanoacrylate	Ethyl cyanoacrylate	Ethyl cyanoacrylate
Cytotoxicity Approval	Pass	Pass	Pass	Pass
PERFORMANCE PROPERTIES				
Fixture Time (steel)	5-15 seconds	10-30 seconds	15-50 seconds	<10 seconds
(nitrile rubber)	5-15 seconds	10-25 seconds	15-40 seconds	< 5 seconds
(phenolic)	5-10 seconds	10-25 seconds	15-40 seconds	< 5 seconds
Lap shear strength (steel)	12 MPa	14 MPa	14 MPa	14 MPa
(aluminium)	7 MPa	8 MPa	8 MPa	8 MPa
(styrene)	1 MPa (substrate failure)	1 MPa (substrate failure)	1 MPa (substrate failure)	1 MPa (substrate failure)
(PVC)	3.6 MPa (substrate failure)	3.6 MPa (substrate failure)	3.6 MPa (substrate failure)	3.6 MPa (substrate failure)
Impact Strength	4-9.5 J	4-9.5 J	4-9.5 J	4-9.5 J

CURED PROPERTIES	ALL 4C PRODUCTS
Appearance	Colourless, transparent
Softening Point	150-170°C
Shore D Hardness	85
Dielectric Strength	10,000 Volts/mm
Service Temperature	-62 to +80°C
Water Absorbtion	<2%
Elongation	<5%

Suitability of medical device grade cyanoacrylate on different plastics:

ABS	Excellent
SBR	Excellent
Acrylic	Good
High-Impact Acrylic	Excellent
Polystyrene	Excellent
Polycarbonate	Excellent**
PVC-Rigid	Excellent
PVC-Flexible	Excellent
Nylon	Poor long-term durability
SAN	Excellent
PBT	Excellent
Polyphenylsulfone	Excellent

**Uncured adhesive may cause stress cracking.

Butyl cyanoacrylate 1001

PHYSICAL PROPERTIES OF THE UNCURED ADHESIVE:

Base compound	Butyl cyanoacrylate
Appearance	Violet transparent
Viscosity @ 25°C	5 mPa.s
Density	1.05
Flash point	110°C

PERFORMANCE OF CURED ADHESIVE:

Softening point	150-170°C
Dielectric strength	10,000 Volts/mm
Water absorbtion	<2%
Elongation	<5%
Fixture time - Steel	<60 seconds
-Buna N	<60 seconds
-Phenolic	<60 seconds
Lap shear strength - Steel	4.8 N/mm ²

IMPORTANT: for tissue bonding adhesive, please contact Permabond

Permabond Medical Device UV-Adhesive Product Data

PHYSICAL PROPERTIES	4UV80	4UV80 HV	4UV80 HH
Appearance	Opaque, translucent	Opaque, translucent	Opaque, translucent
Viscosity @ 25°C	100-200 mPa.s	1800 - 2800 mPa.s	8000 - 12,000 mPa.s
Density	1.1	1.1	1.1
Flash Point	>100°C	>100°C	>100°C
Base Compound	Methacrylate ester	Methacrylate ester	Methacrylate ester
Cytotoxicity Approval	Pass	As 4UV80 with bio-inert filler	As 4UV80 with bio-inert filler

Permabond can produce custom formulations to match customer's specific viscosity requirements.

PERFORMANCE PROPERTIES	
Fixture Time (low-powered 4mW/cm² lamp)	
Polycarbonate to polycarbonate	55 seconds
Acrylic to acrylic	6 seconds
PVC to PVC (rigid)	6 seconds
PVC to PVC (flexible)	5 seconds
Polycarbonate to ABS	55 seconds
Shear Strength	
Polycarbonate to polycarbonate	>9 N/mm ² SF
PVC to PVC (rigid)	>5 N/mm ² SF
PVC to PVC (flexible)	>2.5 N/mm ² SF
Polycarbonate to ABS	>7 N/mm ² SF

CURED PROPERTIES	
Appearance	Colourless, clear
Shore D Hardness	60
Tensile Strength	12 N/mm ²
Elongation	110%
Dielectric Strength	12 KV/mm
Dielectric Constant 1MHz@25°C	4
Service Temperature	-55°C to + 120°C

SF = Substrate Failure

UV-Fluorescence: The 4UV80 range products are UV-fluorescent for easy in-line QC inspection. These products can be supplied without UV fluorescence if desired.

Light Sensitivity: The 4UV80 range is highly reactive to allow cure through difficult plastics. Should a less-active product be required due to strong factory lighting, Permabond can produce light insensitive versions of the above products.

OTHER MEDICALLY APPROVED UVS: Permabond UV630 series UV-curables have cytotoxicity approval.

*Other Permabond adhesives commonly used in medical device manufacture include acrylic adhesives, epoxy adhesives and anaerobic adhesives.

- Two part epoxy **ET500** for glass to metal
- Anaerobic **MH052** for metal connections in oxygen delivery devices
- Anaerobic **A1042** for tamper proofing medical equipment case covers
- Structural Acrylic **TA 440 A&B** for sealing attachment points of equipment carts, gurneys and stretchers.

*These products have not been tested for biocompatibility.

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