MD® 1128-M-VLV
Adhesive with Secondary Heat-Cure Capability

APPLICATIONS
- **Needle Bonding**
- **Catheters**
- **Heat Exchanger Assembly**

FEATURES
- **UV/Visible Light Cure**
- **Secondary Heat Cure**
- **Blue Fluorescing**
- **Impact Resistant**
- **Solvent Free**

RECOMMENDED SUBSTRATES
- **Stainless Steel**
- **Nickel Titanium**
- **Polyurethane**
- **ABS**
- **Polyamide**
- **Glass**
- **Aluminum**

BIOCOMPATIBILITY
- **ISO10993-5 Cytotoxicity**
- **ISO10993-6 Implantation**
- **ISO10993-10 Intracutaneous**
- **ISO10993-11 Systemic Toxicity**

MD® 1128-M-VLV medical device adhesive cures upon exposure to light and is designed for rapid bonding of metal typically used in the manufacture of medical devices. 1128-M-VLV is a Multi-Cure® material specially formulated to cure with heat in applications where shadowed areas exist. Dymax MD medical device adhesives contain no nonreactive solvents. Their ability to cure in seconds enables faster processing, greater output, and lower processing costs. When cured with Dymax light-curing spot lamps, focused-beam lamps, or flood lamps, they deliver optimum speed and performance for medical device assembly. Dymax lamps offer the optimum balance of UV and visible light for the fastest, deepest cures. This product is in full compliance with RoHS directives 2015/863/EU.

UNCURED PROPERTIES *

Property	Value	Test Method
Solvent Content	No Nonreactive Solvents	N/A
Chemical Class	Acrylated Urethane	N/A
Appearance	Colorless Transparent Liquid	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	1.05	ASTM D1875
Viscosity, cP (20 rpm)	55 (nominal)	ASTM D1084

CURED MECHANICAL PROPERTIES *

Property	Value	Test Method
Durometer Hardness	D85	ASTM D2240
Tensile at Break, MPa [psi]	34 [5,000]	ASTM D638
Elongation at Break, %	3.4	ASTM D638
Modulus of Elasticity, MPa [psi]	445 [64,500]	ASTM D638

OTHER CURED PROPERTIES *

Property	Value	Test Method
Refractive Index (20˚C)	1.51	ASTM D542
Boiling Water Absorption, % (2 h)	4.4	ASTM D570
Water Absorption, % (25˚C, 24 h)	1.5	ASTM D570
Linear Shrinkage, %	1.2	ASTM D2566
Glass Transition T_g, ˚C	81	ASTM D5418

* Not Specifications
N/A Not Applicable

ADHESION

Substrate	Recommendation
ABS acrylonitrile-butadiene-styrene	✓
CAP cellulose acetate propionate	✓
PA polyamide	✓
PS polystyrene	✓
GL glass	✓
SS stainless steel	✓

✓ Recommended o Limited Applications
st Requires Surface Treatment (e.g. plasma, corona treatment, etc.)

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CURING GUIDELINES

Fixture time is defined as the time to develop a shear strength of 0.1 N/mm^2 [10 psi] between glass slides. Actual cure time typically is 3 to 5 times fixture time.

Dymax Curing System (Intensity)	Fixture Time or Belt Speed [A]
2000-EC (50 mW/cm^2)[B]	4 s
5000-EC (200 mW/cm^2)[B]	4 s
BlueWave® 200 (10 W/cm^2)[B]	3 s
BlueWave® LED Prime UVA (10 W/cm^2)[C]	5 s
UVCS Conveyor with one 5000-EC (200 mW/cm^2)[D]	4.5 m/min [15 ft/min]
UVCS Conveyor with Fusion F300S (2.5 W/cm^2)[D]	4.5 m/min [15 ft/min]

A *Curing through light-blocking substrates may require longer cure times if they obstruct wavelengths used for light curing (320-400 nm for UV light curing, 320-450 nm for UV/Visible light curing). These fixture times/belt speeds are typical for curing thin films through 100% light-transmitting substrates.*

B *Intensity was measured over the UVA range (320-395 nm) using a Dymax ACCU-CAL™ 50 Radiometer.*

C *Intensity was measured over the UVA/Visible range (350-450 nm) using a Dymax ACCU-CAL™ 50-LED Radiometer.*

D *At 53 mm [2.1 in] focal distance. Maximum speed of conveyor is 8.2 m/min [27 ft/min]. Intensity was measured over the UVA range (320-395 nm) using the Dymax ACCU-CAL™ 150 Radiometer.*

Full cure is best determined empirically by curing at different times and intensities, and measuring the corresponding change in cured properties such as tackiness, adhesion, hardness, etc. Full cure is defined as the point at which more UV exposure no longer improves cured properties. Higher intensities or longer cures (up to 5x) generally will not degrade Dymax light-curable adhesives.

SECONDARY HEAT CURE

Heat can be used as a secondary cure mechanism where the adhesive cannot be cured with light. Light curing must be done prior to heat cure. The following heat-cure schedule may be used:

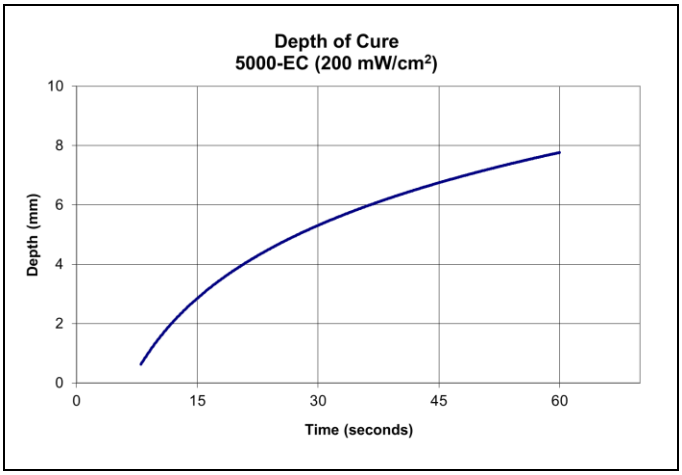
Temperature	Time*
110˚C [230˚F]	60 minutes
120˚C [250˚F]	30 minutes
150˚C [300˚F]	15 minutes

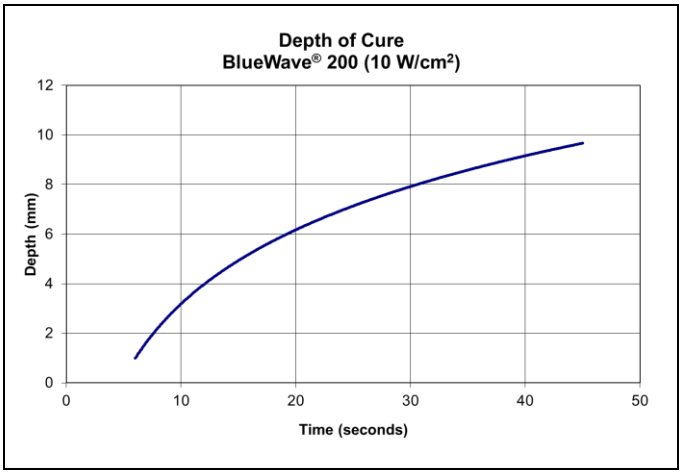
*Note: Actual heat-cure time may vary due to part configuration, volume of adhesive applied, and oven efficiency.

Dymax recommends that customers employ a safety factor by curing longer, at higher intensity, and/or at higher temperature than required for full cure. Although Dymax Application Engineering can provide technical support and assist with process development, each customer ultimately must determine and qualify the appropriate curing parameters required for their unique application.

DEPTH OF CURE

The graphs below show the increase in depth of cure as a function of exposure time at two different lamp intensities. A 9.5 mm [0.37 in] diameter specimen was cured in a polypropylene mold and cooled to room temperature. It was then released from the mold and the cure depth was measured. These depths are only due to light cure.





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OPTIMIZING PERFORMANCE AND HANDLING

1. This product cures with exposure to UV and visible light. Exposure to ambient and artificial light should be kept to a minimum before curing. Dispensing components including needles and fluid lines should be 100% light blocking, not just UV blocking.
2. All bond surfaces should be clean and free from grease, mold release, or other contaminants prior to dispensing the adhesive.
3. Cure speed is dependent upon many variables, including lamp intensity, distance from the light source, required depth of cure, bond gap, and percent light transmission of the substrate.
4. Oxygen in the atmosphere may inhibit surface cure. Surfaces exposed to air may require high-intensity (>100 mW/cm^2) UV light to produce a dry surface cure. Flooding the bond area with an inert gas, such as nitrogen, can also reduce the effects of oxygen inhibition.
5. Cured parts should be allowed to cool before testing and subjecting to any loads.
6. In rare cases, stress cracking may occur in assembled parts. Three options may be explored to eliminate this problem. One option is to heat anneal the parts to remove molded-in stresses. A second option is to open the gap between mating parts to reduce stress caused by an interference fit. The third option is to minimize the amount of time the liquid adhesive remains in contact with the substrate(s) prior to curing.
7. Light curing generally produces some heat. If necessary, cooling fans can be placed in the curing area to reduce the heating effect on components.
8. At the point of curing, an air exhaust system is recommended to dissipate any heat and vapors formed during the curing process.

DISPENSING THE ADHESIVE

This material may be dispensed with a variety of manual and automatic applicators or other equipment as required. Questions relating to dispensing and curing systems for specific applications should be referred to Dymax Application Engineering.

CLEANUP

Uncured material may be removed from dispensing components and parts with organic solvents. Cured material will be impervious to many solvents and difficult to remove. Cleanup of cured material may require mechanical methods of removal.

BIOCOMPATIBILITY

Polymerized Dymax MD® Medical Device Adhesives are bio-compatibility tested in accordance with ISO 10993 and/or USP Class VI. The completed tests are listed on each product data sheet. Copies of the test reports are available upon request. In all cases, it is the user's responsibility to determine and validate the suitability of these adhesives in the intended medical device. These adhesives have not been tested for prolonged or permanent implantation, and are only intended for use in short-term (<29 days) or single-use disposable-device applications. Dymax does not authorize their use in long-term implant applications. Customers using these materials for such applications do so at their own risk and take full responsibility for ensuring product safety and biocompatibility.

STERILIZATION

Compatible sterilization methods include gamma irradiation and ethylene oxide. Sterilization by autoclaving may be limited to certain applications. It remains the user's obligation to ascertain the effect of sterilization on the cured adhesive.

STORAGE AND SHELF LIFE

Store the material in a cool, dark place when not in use. Do not expose to light. This product may polymerize upon prolonged exposure to ambient and artificial light. Keep covered when not in use. This material has an 18-month shelf life from date of manufacture, unless otherwise specified, when stored between 10°C (50°F) and 32°C (90°F) in the original, unopened container.

GENERAL INFORMATION

This product is intended for industrial use only. Keep out of the reach of children. Avoid breathing vapors. Avoid contact with skin, eyes, and clothing. Wear impervious gloves. Repeated or continuous skin contact with uncured material may cause irritation. Remove material from skin with soap and water. Never use organic solvents to remove material from skin and eyes. For more information on the safe handling of this material, please refer to the Safety Data Sheet before use.

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