MD® 215-CTH-SV01-UR-SC

LED-Curable Adhesive with Encompass® Technology for Difficult-to-Bond Plastics

APPLICATIONS

- Balloon/Lumen
- Hub/Lumen
- Marker Band Adhesive
- Manifold Bond Joints
- Catheter Assembly

FEATURES

- UV/Visible Light Cure
- LED Curable (385 nm preferred)
- See-Cure Technology
- Ultra-Red® Fluorescing
- Designed for Difficult-to-Bond Plastics

RECOMMENDED SUBSTRATES

- PA (Nylon 6, Nylon 12)
- PEBA
- PET
- TPU

BIOCOMPATIBILITY

- ISO 10993-4 Hemolysis
- ISO 10993-5 Cytotoxicity
- ISO 10993-6 Implantation
- ISO 10993-10 Intracutaneous
- ISO 10993-11 Systemic Toxicity

Dymax MD® 215-CTH-SV01-UR-SC is an LED-curable adhesive designed for bonding and assembly of next-generation catheter designs using Nylon 12 and PEBA. Formulated with Encompass® technology that combines Dymax exclusive See-Cure color change and Ultra-Red® fluorescing technologies with LED-curing capabilities, 215-CTH-SV01-UR-SC provides secure bonds with the added benefits of easy cure confirmation and post-cure bond-line inspection. The product's blue color transitions to colorless when sufficient energy has been delivered to achieve full cure. The product also fluoresces bright red under low-intensity black light (365 nm), contrasting extremely well on plastics that naturally fluoresce blue, allowing manufacturers to incorporate automated or manual inspection to ensure complete and accurate placement of the adhesive. Dymax MD Medical Device Adhesives contain no nonreactive solvents and cure upon exposure to light. 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 ideal 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	Blue Translucent Liquid	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	1.01	ASTM D1875
Viscosity, cP (20 rpm)	1,100 (nominal)	DSTM 520
Shelf Life @RT (22°C to 25°C) from Date of Manufacture	7 months	N/A

CURED MECHANICAL PROPERTIES *

Property	Value	Test Method
Durometer Hardness	D53	ASTM D2240
Tensile at Break, MPa [psi]	11.7 [1,700]	ASTM D638
Elongation at Break, %	300	ASTM D638
Modulus of Elasticity, MPa [psi]	117 [17,000]	ASTM D638

OTHER CURED PROPERTIES *

Property	Value	Test Method
Refractive Index (20°C)	1.50	ASTM D542
Boiling Water Absorption, % (2 h)	5.1	ASTM D570
Water Absorption, % (25°C, 24 h)	9.6	ASTM D570
Linear Shrinkage, %	2.1	ASTM D2566
Glass Transition Tg, °C	76	ASTM D5418
CTEα_1, µm/m/°C	147	ASTM E831
CTEα_2, µm/m/°C	289	ASTM E831

CURING EQUIPMENT RECOMMENDATIONS *

Process Method	Spot Lamp	Flood Lamp	Conveyor
LED Curing/Wavelength	BlueWave® MX-150 PrimeCure® 385 nm	BlueWave® AX-550 PrimeCure® 385 nm	UVCS Conveyor with BlueWave® AX-550 PrimeCure® 385 nm
Broad Spectrum	BlueWave®	5000-ECE	UVCS Conveyor with Fusion F300S

* Not Specifications
N/A Not Applicable
‡ DSTM Refers to Dymax Standard Test Method

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Technical Data Collected 2016 Rev. 11/06/2020 DCR# C20-0085 Issue Date Jun 2020 DC440 Rev D

ADHESION	
Substrate	**Recommendation**
ABS acrylonitrile-butadiene-styrene	✔
PA polyamide	✔
PC polycarbonate	✔
PCTG poly(cyclohexylene dimethylene terephthalate)glycol	✔
PEBA polyether block amide	✔
PEEK Polyether ether ketone	✔
PEI polyetherimide	✔
PES polyethersulfone	o
PET poly(ethylene terephthalate)	✔
PETG poly(ethylene terephthalate)glycol	✔
PI polyimide	o
PMMA poly(methyl methacrylate)	✔
PPO poly(phenylene oxide)	o
PS polystyrene	✔
PSU polysulfone	✔
PU polyurethane	✔
PVC poly(vinyl chloride)	✔
SAN styrene-acrylonitrile	o
SB styrene-butadiene	o
TPU thermoplastic polyurethane	✔

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

CURING GUIDELINES

The vivid blue color of this adhesive transitions to colorless when fully cured. The charts below provide information on cure time required to transition from blue to colorless using different light sources and adhesive thicknesses. Cure rate is dependent upon many variables including lamp intensity, distance from the light source, and required depth of cure. The times and belt speed for the transition listed below are based on lab results and are intended for reference only.

Dymax Curing System (Intensity)	BlueWave® 200 (10 W/cm²)[B D]
Adhesive Thickness, mm [mil]	Time to complete transition,s [A]
0.10 [4.0]	1.4
0.20 [8.0]	1.2
0.41 [16]	1.0
0.81 [32]	1.0

Dymax Curing System (Intensity)	BlueWave® MX-150 RediCure® 365 nm (15 W/cm²)[C D]
Adhesive Thickness, mm [mil]	Time to complete transition, s [A]
0.10 [4.0]	1.0
0.20 [8.0]	1.0
0.41 [16]	1.0
0.81 [32]	1.0

Dymax Curing System (Intensity)	BlueWave® MX-150 PrimeCure® 385 nm (15 W/cm²)[C D]
Adhesive Thickness, mm [mil]	Time to complete transition, s [A]
0.10 [4.0]	3.5
0.20 [8.0]	3.0
0.41 [16]	1.5
0.81 [32]	1.5

Dymax Curing System (Intensity)	BlueWave® MX-150 VisiCure® 405 nm (15 W/cm²)[C D E]
Adhesive Thickness, mm [mil]	Time to complete transition, s [A]
0.10 [4.0]	36.5
0.20 [8.0]	30.0
0.41 [16]	20.5
0.81 [32]	12.0

A Curing through light-blocking substrates may limit the ability of See-Cure adhesives to transition from blue to clear and may require longer light exposure at critical wavelengths (320-400 nm for UV light curing; 20-450 nm for UV/Visible light curing). These times/speeds are typical for curing 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 Due to the distance between the end of the lightguide and adhesive, intensity at the curing area was measured as 4.0W/cm².
E 365 nm and 385 nm are the preferred LED wavelengths for use with the 215-CTH-UR-SC series. Additional cure time or intensity may be required to achieve full cure with 405 nm.

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 light exposure no longer improves cured properties. Higher intensities or longer cures (up to 5x) generally will not degrade Dymax light-curable adhesives.

Dymax recommends that customers employ a safety factor by curing longer and/or at higher intensities 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.

ACCELERATED AGING DATA

Lap shear evaluation at 54°C with various substrates. Report % of initial strength. PC to PC laps typically resulted in substrate failure for all conditions.

Per ASTM F1980, assuming Q10 Value = 2.0, 79 days at 54°C is equivalent to 24 months real-time shelf life.

Cured under BlueWave® Flood PrimeCure® 385 nm (200 mW/cm²) for 30 seconds.

Exposure Time	PC to PC Lap Shear	72D Pebax to PC Lap Shear	Nylon 12 to PC Lap Shear
24 Hours @ 23°C RT (control)	100%	100%	100%
10 Days	110%	134%	117%
20 Days	103%	110%	126%
40 Days	107%	154%	113%
79 Days	102%	135%	124%

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, and other contaminants prior to dispensing the adhesive.
3. Cure and color transition speed are 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 (>150 mW/cm²) 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. Parts should be allowed to cool after cure 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 for specific applications should be referred to Dymax Application Engineering.

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 shelf life is noted on page 1 of this document, when stored between 10°C (50°F) and 32°C (90°F) in the original container.

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.

CLEAN UP

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 biocompatibility 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.

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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