

Ultra Light-Weld® 3091 Low Stress Plastic Bonder

APPLICATIONS

- Appliance Housings
- Fluid Reservoir Assembly
- Tube Assembly

FEATURES

- Moisture Resistant
- Multi-Substrate Adhesion
- Extremely Fast Curing

BONDS

- Polyurethane
- Styrene
- PVC
- PMMA
- Polyamide
- Polycarbonate

DYMAX 3091 adhesive is designed for rapid bonding of PVC, Nylon, polycarbonate, polyurethane, styrene, and other plastic substrates. This product dispenses easily and cures quickly for precise quantity and placement of adhesive. DYMAX adhesives are solvent-free and cure upon exposure to UV and/or visible light. Their ability to cure in seconds enables faster processing, greater output, and lower assembly costs. When cured with DYMAX UV 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.

TYPICAL UNCURED PROPERTIES *		
Property	Value	Test Method
Solvent Content	No Nonreactive Solvents	N/A
Chemical Class	Urethane Oligomer/ (Meth)Acrylate Monomer Blends	N/A
Appearance	Clear/amber liquid	N/A
Solubility	Alcohols/Chlorinated Solvents/Ketones	N/A
Toxicity	Low	N/A
Flash Point	>93°C (200°F)	N/A
Density (g/ml)	1.05	ASTM D1875
Refractive Index	1.48 (20°C)	ASTM D1218
Viscosity, cP (20 rpm)	300 (nominal)	ASTM D1084

OTHER CURED PROPERTIES *		
Property	Value	Test Method
Refractive Index (20°C)	1.484	ASTM D542
Linear Shrinkage, %	1.6	ASTM D2566
Boiling Water Absorption, % (2 h)	2.8	ASTM D570
Water Absorption, % (25°C, 24 h)	5.8	ASTM D570

CURED MECHANICAL PROPERTIES *		
Property	Value	Test Method
Durometer Hardness	D55	ASTM D-2240
Tensile at Break, MPa [psi]	8.3 [1,200]	ASTM D-638
Elongation at Break, %	200	ASTM D-638
Tensile at Yield, MPa [psi]	6.9 [1,000]	ASTM D-638
Elongation at Yield, %	115	ASTM D-638
Modulus of Elasticity, MPa [psi]	69 [10,000]	ASTM D-638

* Not Specifications

ADHESION	
Substrate	Recommendation
ABS	✓
Pebax	✓
PMMA	✓
Polyamide	✓
Polycarbonate	✓
Polyimide	✓
Polyurethane	✓
Polyvinyl Chloride	✓
Stainless Steel	o

✓ Recommended Adhesive 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 10 psi (0.1 N/mm²) between glass slides. Actual cure time is typically 3 to 5 times fixture time.

DYMAX Curing System Intensity	Fixture Time/Speed ^B
2000-EC (50 mW/cm ²) ^A	<1 sec
5000-EC (200 mW/cm ²) ^A	<1 sec
BlueWave™ 200 (10 W/cm ²) ^A	<1 sec
BlueWave™ 50 AS (3.0 W/cm ²) ^A	<1 sec
UVCS Conveyor with one 5000-EC (200 mW/cm ²) ^A	>28 ft/min
UVCS Conveyor with Fusion F300S (2.5 W/cm ²) ^C	>28 ft/min

^A Intensity was measured over the UVA range (320-395 nm) using the DYMAX ACCU-CAL™ 50 Radiometer.

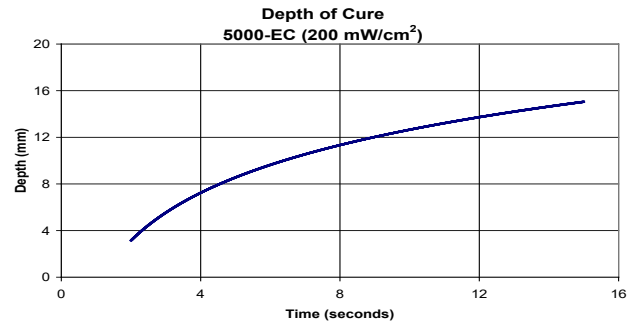
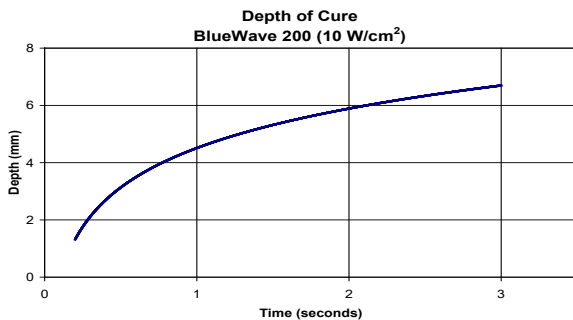
^B Curing through light blocking substrates may require longer cure times if they obstruct wavelengths used for light curing (320-450 nm for UV light+visible light curing and 320-400 nm for UV light-only curing). These fixture times/speeds are typical for curing thin films through 100% light transmitting substrates.

^C At 2.1" focal distance. Maximum speed of conveyor is 27 feet per minute (fpm). Intensity was measured over the UVA range (310-395 nm) using the Dymax ACCU-CAL™ 100 Radiometer.

Full cure is best determined empirically by curing at different times and/or 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) will generally not degrade DYMAX UV curing adhesives. DYMAX recommends that customers employ a safety factor by curing longer and/or at higher intensities than required for full cure. Although DYMAX Applications Engineering can help, each customer must ultimately determine the curing parameters required for their unique application.

DEPTH OF CURE

The following graphs show the increase in depth of cure of a 0.375" (9.5 mm) diameter slug cured in a polypropylene mold with different light sources.



OPTIMIZING PERFORMANCE AND HANDLING

1. This product cures with exposure to UV and/or visible light. Exposure to UV, 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 transmission of the substrate through which the energy must pass.
4. Oxygen may inhibit surface cure. Surfaces exposed to air may require high intensity UV (> 100 mW/cm²) to produce a tack-free cure. Flooding the bond area with an inert gas, such as nitrogen, can also reduce the affects of oxygen inhibition.
5. Parts should be allowed to cool after cure before testing and subjecting to any loads.
6. For rare applications, stress cracking may occur in assembled parts. Three options may be explored to minimize this problem from occurring. 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. UV curing generally produces some heat. If necessary, cooling fans can be placed in the curing area to reduce heat.
8. A good practice is to utilize an air exhaust system at the point of curing. This will dissipate the heat and vapors formed during the curing process.

DISPENSING THE ADHESIVE

This material may be dispensed with a variety of automatic bench-top syringe applicators or other equipment as required. Direct questions relating to dispensing and curing systems 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 visible or UV light. This product may polymerize upon prolonged exposure to ambient 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 35°C (90°F) in the original, unopened container.

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. Clean up of cured material may require mechanical methods of removal.

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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