Ultra Light-Weld® 3220-GEL-SC
High-Viscosity Adhesive for Bonding Plastics

APPLICATIONS

- **Plastic Housing Assembly**
- **Plastics Lamination**
- **Plastic Window Bonding**
- **Appliance Assembly**

FEATURES

- **Blue-to-Clear Upon Exposure to UV/Visible Light**
- **UV/Visible Light Cure**
- **Flexible**
- **High Viscosity**

RECOMMENDED SUBSTRATES

- **PC**
- **PVC**
- **PET**
- **ABS**
- **PU**

Dymax Ultra Light-Weld® 3220-GEL-SC is designed for rapid bonding and laminating of plastics such as PC, PVC, PET, ABS, and PU. Formulated with patented Dymax See-Cure technology, the product dispenses blue and transitions to colorless upon full cure. This aids in verification of adhesive placement and validation of manufacturing processes. Dymax Ultra Light-Weld® materials 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 plastics 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 and 2011/65/EU.

UNCURED PROPERTIES *

Property	Value	Test Method
Solvent Content	No Nonreactive Solvents	N/A
Chemical Class	Acrylated Urethane	N/A
Appearance	Blue Translucent Gel	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	1.01	ASTM D1875
Viscosity, cP (20 rpm)	38,000 (nominal)	ASTM D2556

CURED MECHANICAL PROPERTIES *

Property	Value	Test Method
Durometer Hardness	D60	ASTM D2240
Tensile at Break, MPa [psi]	15.0 [2,200]	ASTM D638
Elongation at Break, %	180	ASTM D638
Modulus of Elasticity, MPa [psi]	110 [16,000]	ASTM D638

OTHER CURED PROPERTIES *

Property	Value	Test Method
Appearance	Clear	N/A
Refractive Index (20˚C)	1.50	ASTM D542
Boiling Water Absorption, % (2 hr)	4.2	ASTM D570
Water Absorption, % (25˚C, 24 hr)	4.7	ASTM D570
Linear Shrinkage, %	2.5	ASTM D2566
Glass Transition T_g, ˚C	70	DSTM 256‡

* Not Specifications
N/A Not Applicable

ADHESION

Substrate	Recommendation
ABS acrylonitrile-butadiene-styrene	✓
PA polyamide	o
PC polycarbonate	✓
PEBA polyether block amide	✓
PET poly(ethylene terephthalate)	✓
PMMA poly(methyl methacrylate)	o
PU polyurethane	✓
PVC poly(vinyl chloride)	✓

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

RoHS Compliant

Technical Data Collection Prior to 2008

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CURING GUIDELINES

The blue color of Dymax See-Cure products disappears when they are fully cured. Full cure is achieved when additional light exposure does not improve cured properties. The charts below provide information on how long it takes to complete the transition from blue to clear, using different light sources and adhesive thicknesses.

Dymax Curing System (Intensity)	5000-EC (200 mW/cm²) [B]
Adhesive Thickness, mm [mil]	**Time to complete transition, sec [A]**
0.10 [4.0]	11
0.20 [8.0]	11
0.41 [16]	12
0.81 [32]	22

Dymax Curing System (Intensity)	BlueWave® 200 (10.0 W/cm²) [B, D]
Adhesive Thickness, mm [mil]	**Time to complete transition, sec [A]**
0.10 [4.0]	2
0.20 [8.0]	3
0.41 [16]	3
0.81 [32]	4

Dymax Curing System (Intensity)	UVCS Conveyor with Fusion F300 (2.5 W/cm²) [C]
Adhesive Thickness, mm [mil]	**Belt speed to complete transition, m/min [ft/min] [A]**
0.10 [4.0]	1.5 [5]
0.20 [8.0]	1.4 [4.5]
0.41 [16]	1.2 [4]
0.81 [32]	1.2 [4]

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; 320-450 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 *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™ 100 Radiometer.*

D *Due to the distance between the end of the lightguide and adhesive, intensity at the curing area was measured as 4.0 W/cm².*

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, semi-automated, and fully automated fluid delivery systems. Small area applications including beads and small dots can be achieved using hand-held Dymax dispensing systems like our SD-100 syringe dispenser and our Model 400 needle valve systems. The value system can be used in a manual, semi-automated or fully automated application. Dymax has several other dispensing systems that may be suitable for use with our adhesive materials. Questions relating to and defining the best fluid delivery system and curing equipment for specific applications should be discussed with the Dymax Application Engineering Team.

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

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 a 12-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.

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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