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## **MULTI-CURE<sup>®</sup> 625**

### **FOR GENERAL PURPOSE BONDING**

#### **INTRODUCTION**

Multi-Cure products (600Series) are rapid setting, structural adhesives. These products provide strength and resiliency similar to the Dymax 800 Series products. The Multi-Cure feature of these products means that bonds can be formed very rapidly using different cure mechanisms—exposure to ultraviolet light, activator or heat.

- ☐ For bonding transparent surfaces, tacking, potting, sealing and encapsulating cures occur by brief exposure to long wave (365 nanometer) UV light. (refer to figures below)
- ☐ Bonding close mating opaque surfaces may be achieved with 600 series adhesives by using activator 535 alone.
- ☐ Multi-Cure adhesives may also be heat cured. Heat cures are appropriately used as a secondary system in conjunction with UV or activator cures. In many applications these combination cures provide instant, “on-demand” handling strength for rapid processing of parts where full strength development may occur later or upon exposure to heat.

#### **DESCRIPTION**

Multi-Cure 625 is a general purpose adhesive for use in bonding, potting and sealing applications. The cured bonds are translucent in thick ( 1/16 to 1/8” ) sections. Bonds exhibit both toughness and flexibility and withstand strains caused by different coefficients of expansion present when bonding dissimilar substrates. Excellent bonds are formed to a wide variety of substrates including plated metal, many thermoset plastics, glass and ceramics.

#### **UNCURED PROPERTIES**

Composition	Urethane oligomer/(Meth)acrylate monomer blends
Viscosity (1)	4,000 to 6,000
Appearance	Straw to Amber
Solubility	Isopropyl Alcohol, chlorinated solvents
Toxicity	Low
Flash Point (2)	>93.3° C (200° F)

#### **CURED PROPERTIES**

Max Cured Film Thickness	
Ultraviolet Cure	1/8”
Activator Cure	.020”
Thermal Range (4)	-45/300°F
Thermal Shock (5) (%strength retention)	100%
Shore D Hardness (6)	40 - 50
Tensile (cured film at Break)	2,500 psi
Elongation at Break (7)	160
Shrinkage on Cure (8)	7%
Side Impact on lb (9)	20+
Tensile/Shear, Steel-to-Steel (ASTM D-1002)	2,500 psi
Moisture Resistance (10) (% strength retention)	85%
Water Absorption (11)	1.2%
Dielectric Strength kv/mm	13.1
Surface Resistivity (10 <sup>13</sup> Ohm)	.077
Linear Coefficient of Expansion (mm/mm/°C x 10 <sup>-4</sup> )	1.53
Resistance to Freon TMS (12) (% strength retention)	75%

#### **Footnotes for Cured and Uncured Properties-**

- 1- Brookfield viscometer (model#RVF); viscosity taken in centipoises at 25°C at 20rpm; Standard and T grades spindle #4; VT grade spindle #6.
- 2- Pinsky/Martens open cup method.
- 3- Adhesive is cured in black painted metal containers with exposure to 25 milliwatts/cm<sup>2</sup> intensity light at 365 nanometers for two minutes.
- 4- Stated range is for structural/load carrying applications. Strength loss will be experienced at the extremes of this range. Potting, tacking, coating and sealing applications beyond the stated thermal ranges are possible.

**Footnotes for Cured and Uncured Properties-**

- 5- 10 cycles from – 100°F to 300°F stabilized and tested at room temperature per ASTM D1002.
- 6- Range is +/- 5.
- 7- Per ASTM D-638-77A
- 8- Density change comparison (density of liquid vs. solid).
- 9- Fisher Body side impact test (steel deforms at 30 in. lbs.).
- 10- Bond formed between 2024-T3 alclad aluminium alloy laps. \_” overlapped joints submerged into room temp. tap water for seven days.
- 11- Per ASTM D-570.
- 12- Specimens were soaked in boiling Freon TMS for 7 hours.
- 13- Not tested.

**CURE DATA**

<u>UV CURE</u>	<u>Time to Full Cure (1)</u>	<u>Lamp Intensity</u>
Bonding (2)	<10 sec	20 – 45 milliwatts/cm <sup>2</sup>
Tacking (3)	<15 sec	130 - 170 milliwatts/cm <sup>2</sup>
Encapsulating (4)	<90 sec	20 – 45 milliwatts/cm <sup>2</sup>
Potting	<90 sec	20 – 45 milliwatts/cm <sup>2</sup>
Sealing	<90 sec	20 – 45 milliwatts/cm <sup>2</sup>

Footnotes- 1) – Measured at bond line using radiometer +/- 5% accuracy. 2) – Determined for 2 mil bonding between glass slides – larger gaps will require longer cure time. 3) – 1/16” bead placed on glass slide. 4) - .125” deep section.

**ACTIVATOR CURES (1)**

Fixture (2)	20 – 30 sec
2 minutes (3)	500
10 minutes	2300
1 hour	2200
24 hours	2500

Footnotes- 1) – Activator applied to one surface only. 2) – Fixture – sufficient strength to unclamp and support weight of steel lap shear – fixture times will vary depending on gap size, temperature and handling considerations. 3) – Per ASTM D-1002 steel to steel.

**HOW TO USE**

1) – Liberally spread Activator 535 over one of the surfaces to be bonded. Allow a few seconds for the solvent to evaporate. Surface will have an oily appearance. 2) – Apply only a single drop or bead of adhesive to the center of the mating surface. **DO NOT SPREAD OVER THE BOND SURFACE.** 3) – Press the parts firmly together and hold for the required fixture time (30 – 60 sec). Do not stress bonds until sufficient strength has been achieved. (This may be up to several minutes depending on requirements).

**HEAT CURES** Heat is used as a secondary cure mechanism where all adhesive cannot be cured with UV light. UV cure **MUST** be done prior to heat cure. The following heat cure schedule may be used:

(107.2°C)225°F	1 hour
(121.1°C)250°F	30 minutes
(148.9°C)300°F	15 minutes

Notes: The following are examples of applications where UV and activator or heat cures are used:

- Activator on black, porous surfaces where bridge bonding will be accomplished primarily with UV cure; example: bonding core to voice coil for speaker software.
- Activator on sealing and bridge bonding applications where adhesive will wick into a joint and not be cured by primary curing method (exposure to UV light).
- Heat cures for deeper potting applications where the top 1/8” is first cured by UV light. Heat cures of material remaining below a layer of UV cured material and/or where components create shadows can be effected by low temp (150 to 170°F) in short time periods (5 to 20 minutes). For specific instructions, contact Technical Service at (203) 482-1010.

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**FACTORS AFFECTING UV CURING**

- Dark surfaces lengthen cure time.
- Full range (UV-A, B & C) lamps provide faster cures than filtered sources.
- All UV sources degrade with use. Check output with a radiometer.
- Thicker films require longer cures.
- Light intensity decreases as distance from UV source increases.
- Some clear plastics may contain UV inhibitors.

**UV CURING LAMPS AVAILABLE FROM DYMAX**

<u>TYPE</u>	<u>INTENSITY (UV-A RANGE)</u>
Light-Welder™ PC-2	20 – 45 milliwatts/cm <sup>2</sup>
Light-Welder™ PC-3 (filtered)	130 - 170 milliwatts/cm <sup>2</sup>
Light-Welder™ PC-3 (unfiltered)	160 - 200 milliwatts/cm <sup>2</sup>
Light-Welder™ PC-12	120 - 150 milliwatts/cm <sup>2</sup>
Light-Welder™ PC-3D	Light & Dispenser Integrated

**PRECAUTION WHEN USING UV LAMPS**

- Never look directly at any UV source.
- Wear protective UV goggles.
- Do not expose bare skin to high intensity UV light. Wear protective clothing.
- Use in a well-ventilated area. Some UV sources generate ozone. Light-Welder lamps DO NOT provide shielding around high intensity UV sources.
- High intensity UV sources generate heat. Take appropriate precautions.

**HANDLING AND DISPENSING ADHESIVES**

Multi-Cure products are available packaged in 30ml, ½ liter, liter and bulk packaging. It may be dispensed with a variety of automatic benchtop syringe applicators or other equipment as required. For questions relating to dispensing and curing systems call Technical Service at (203) 482-1010.

**SAFETY**

Repeated or continuous skin contact with liquid adhesive (“resin”) will cause skin irritation or contact dermatitis, which in some cases, can be severe. Avoid this possibility by wearing impervious gloves and/or a barrier cream. Gloves made of rubber (including latex and any other rubber product) are not impervious. Nitrile (an artificial rubber) is preferred. Do not breathe the vapors from the adhesive. The user must be familiar with the Material Safety Data Sheet for the product before use. UV light can damage your eyes. Read and follow all instructions for the safe use of any UV light source that come with the device.

**CAUTION**

For industrial use only. Avoid breathing vapors. Avoid contact with eyes and clothing. In case of contact, immediately flush with water for at least 15 minutes; for eyes, get medical attention. Wash clothing before reuse. Keep out of the reach of children. Do not take internally. If swallowed, induce vomiting at once and call a physician. For specific information, refer to the Material Safety Data Sheet.

**STORAGE AND SHELF LIFE**

Store material in a cool dark place when not in use. Do not expose to UV light source or sunlight. Product has a minimum one-year shelf life when stored below 90°F out of sunlight in original container. MultiCure 625 may separate after periods of storage. Gently stir or agitate prior to use.

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**Metals**

Cold Rolled Steel	—
Zinc Chromate	—
Chrome Plate	—
Zinc Phosphate	—
Iron Phosphate	—
Galvanized	—
Stainless	—
Bronze/Copper	—
Silver/Gold	—
Aluminum	—
Magnesium	—
Pewter	—

**Ceramics**

Ferrite	—
Alumina	—
Stone/Marble	—
Abrasives	—

Cloth	—
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**Plastics**

Polycarbonate	—
SAN	—
Styrene	—
ABS	—
Valox (filled)	—
Acrylics	—
Nylon (filled)	—
Phenolic	—
Epoxy board	—
FRP	—
PVC	—
Mylar	—

**Glass**

Soda Lime	—
Borosilicate	—
Leaded	—
Quartz	—

Wood	—
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**Legend:**

- Tested as adhesive.
- Tested as Coating/Encapsulant/Potting Material.
- Unshaded = Fair/Good adhesion = May require surface cleaning.
- Shaded = Good Adhesion – Normally without surface preparation.
- Blank Contact Product Engineering, (203) 482-1010, to discuss requirements.

**Important:** The materials of construction/product selector chart represent a compilation of tests on materials that our customers have sent into Dymax's labs for testing. It should be used as a guide only. Samples are available for testing by contacting the Technical Service department.

**Notes on Material Selector Chart.**

Most solvent weldable plastics are bondable with the 600 series products once the surface has been coated with primer 510. In general, filled plastics will enhance adhesion. Solvent cleaning of parts and mechanical roughening of surfaces will also enhance adhesion. Keytone based solvents and cleaning processes which leave residues that are strongly basic or acidic in nature may retard/inhibit the cure of the adhesive and interfere with adhesion. All testing should be done on production parts. Dymax Engineering Adhesives are not recommended for bonding polyethylene, polypropylene, Teflon, fluorocarbons, hydrocarbons and silicone rubbers. UV inhibited and colored plastics may not pass sufficient UV radiation to cure Light-Weld and Multi-Cure products. Consult Technical Service for Specific product recommendations.

The data contained in this bulletin which represents typical results, is furnished for information only, and is believed to be reliable. We cannot assume responsibility for results obtained by others over whose methods we have no control. It is the users responsibility to determine suitability for the user's purpose of any product or method mentioned herein and to adopt such precautions as may be advisable for the protection of property and persons against any hazards that may be involved in the handling and use thereof. Nothing in this bulletin is to be interpreted as a representation of freedom from domination of patents owned by others or a license under a Dymax Corporation patent. We recommend that each prospective user test the proposed application before repetitive use, using the data as a guide. For specific information, refer to the Material Safety Data Sheet before use.

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