

Questions	Answers
I am using a form-in-place urethane gasket in a groove running around my plastic housing. I don't want to move the part as it cures, but this ties up my fixtures. Can UV lights be added onto an XYZ robotic arm? Are they compatible with the software systems?	Light sources can be mounted and used with many XYZ systems and integrated seamlessly into the software controls. Some systems offer the ability to dispense a bead or gasket and then follow the bead or gasket with the end of a lightguide from a high-intensity spot lamp system.
My company is currently using UV-curable adhesives with a low-intensity black light, but the cure takes a long time (15-30 minutes). This is pretty inefficient. What can I do to speed up our process?	The cure time of some materials can be accelerated by increasing the intensity of the light sources and making your process more efficient.
What thicknesses can the light-curable materials be used to?	Typically, applications with a thickness of <0.25 inches are common. Best bond line thicknesses are usually 0.002-0.006 inches (0.05-0.15 mm), conformal coatings are typically 0.001-0.003 inches, and some special deep-section potting can be over 0.25 inches.
How heat resistant are the light-cure materials?	This varies by product, but most will be in the 200-400°F temperature range.
Most processes are validated/established processes. How much costs have you seen associated with an initial implementation of a UV-curing system?	This depends on the lamp type and application. Some starter R&D and low-production lamps start in the \$2500 range while other lamps with conveyors or XYZ tables can be much more. DYMAX offers a Trial Rental/Lease lamp program with 2 weeks free for trials and evaluations.
We currently use an automated machine to bond several plastic components together. Do you have a list of materials that are compatible with your adhesive such as polysulfone?	Each market that we service usually has a selector guide of the adhesives with appropriate substrates the adhesives like to stick to. We would be happy to provide further information. Please contact our Applications Engineering Department at (860) 496-0608 or info@dymax.com
Are you limited to size? Our parts are the size of a truck dash board (thermoforming).	This depends on the application. We would be happy to work with you to identify the best lamp to match the application. We often work with larger parts, and have a number of options depending if we are working with a coating, gasket, lamination, other application. Many lamps can be mounted on XYZ robots, or mounted above in a large conveyor.
Can polycarbonate/acrylic be vapor polished after using light?	Unfortunately we do not have a lot of experience with this technology at this time, so we cannot answer this question.
Does the color of the adhesive actually indicate the cross-link density or degree of cure?	In the See-Cure technology, the color of the adhesive relates to the degree of cure.
Can this system be used as a coating to penetrate a substrate? If so, what is limitation of depth of penetration?	The depth of penetration will depend on the substrate in question and application. It will also depend on the light transmission of the substrate. Some applications require a thick penetration into a porous media, but are UV transparent. We would be happy to work with you through an on-site demonstration or with our Applications Engineering laboratory.
Can you explain again See-Cure technology again? What are other methods to check cure quality? I heard about Orange sticks. How does that work?	See-Cure Technology utilizes a dye (it is not photochromic, not reversible) that loses its color with the light energy (intensity and time exposure). The color goes from blue to clear upon cure. Once the material is clear, it will remain clear, and be aesthetically pleasing to the eye. Other methods to check the state of cure is by either mechanical testing (such as tensile strength, durometer, and pull to destruction), or by chemical analytical testing (such as gas chromatograph on an extract sample, or FTIR of the cured material)

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<p>You mentioned "potting". Can you please expand on? What is the maximum depth of the potting? Can you cover moisture cure technology?</p>	<p>Potting is typically filling a small well or dam with adhesive to protect components, circuits, or seal a housing/port. The viscosity of the adhesive/coating is low so that it self levels, and fills the cavity. Typical maximum depth of potting applications are &lt;0.25 inches, but some special 2-part light-curable adhesives can be mixed to get a chemical reaction at deeper sections, while still allowing the benefit of a light-curable adhesive to lock in and seal the top surface. Moisture cure technology allows areas that can't see UV/visible light to be cured with atmospheric moisture in the air, and takes a few hours to complete the cure.</p>
<p>Is there printable UV adhesive?</p>	<p>Light-curable adhesives can be jet, pad, and screen printed. The viscosity choice will depend on the method of printing to optimize the process.</p>
<p>What kinds of eye protection do you need when implementing UV-curable materials?</p>	<p>DYMAX recommends that lights be fixtured to point away from the operators to avoid direct exposure. We provide tinted goggles that meet current ANSI standards, and some customers create custom shielding using brown PVC shielding or smoked/tinted polycarbonate sheet. We also provide training to operators as needed.</p>
<p>How thick can you apply (an adhesive) and still get full cure?</p>	<p>Many materials will cure easily to 0.25 inch and still reach full cure in a short time.</p>
<p>We use electrically-conductive gasketing material. Is there a DYMAX material that's conductive?</p>	<p>At this time, we do not have an electrically conductive gasket.</p>
<p>Do UV materials outgas during the cure process?</p>	<p>Light-curable materials may emit a little smoke during cure due to volatile vapors of short-chain monomers and oligomers. It is helpful to have good airflow past the operator to draw these small fumes away from an operator.</p>
<p>Can you talk about surface preparation such as corona treatment?</p>	<p>Corona treatment is a common and effective method to increase the surface energy of a plastic to improve bonding. It is used by many customers.</p>
<p>I was late joining this session. Will there be another? Are the viewgraphs available for review?</p>	<p>The presentation should be archived on the Assembly Magazine website for review to those that registered for the webinar.</p>
<p>Is See-Cure available in raw materials or finished products for sale?</p>	<p>The See-Cure technology is available in finished formulated adhesives. There are many optimized formulations.</p>
<p>Will any of your adhesives continue to cure after the UV light has been removed?</p>	<p>Some types of hybrid systems with moisture cure technology may continue to cure after the UV light has been removed. Some UV light-curable epoxies continue to harden slightly if they have achieved 90% of full cure, but extra care must be taken when working with these materials.</p>
<p>Are any of the light-curable materials RF &amp; microwave frequency "friendly"?</p>	<p>Yes. Certain formulations are compatible with RF and microwave frequencies, and are transparent to these wavelengths.</p>

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<p>Is there any concern, other than cosmetic appearance, when yellowing of the cured media occurs? In other words, is there cure quality issues if yellowing occurs?</p>	<p>Usually yellowing is a cosmetic phenomenon, with little impact on physical properties. Some optical applications do have a problem with yellowing as it would change the optical transmission of light through the adhesive. Therefore, an optically clear adhesive designed to be non-yellowing may be a good choice in this situation.</p>
<p>Are there aerospace replacement compounds available for EA 9394 or 3M 2216 equivalents?</p>	<p>We would be happy to discuss your application in detail in our Application Engineering Laboratory and recommend the best adhesive for your process.</p>
<p>If the light-curable adhesive is not fully exposed to the UV light, will the PIs "propagate" to the shielded portions of adhesive?</p>	<p>In the acrylic adhesive systems, once light is removed, the reaction will stop. It will not propagate to shielded portions of the adhesive.</p>
<p>Are dots better than a bead?</p>	<p>This would depend on the application. A consistent bead makes for great gaskets, while dots may be better for certain small bonds. It depends on the viscosity and thixotropy of the adhesive being considered.</p>
<p>Can you overcure? Does the adhesive break-down?</p>	<p>It is more difficult to overcure these acrylic-based light-cure adhesives. They are very forgiving, and it would have to be an extreme case of overcuring. However, I have seen a few cases where engineers put an adhesive under a static light source and went to lunch. Upon return, the adhesive had too much UV light at high intensity with too much resultant heat, and started to break down.</p>
<p>Do you recommend specific fillers that will not hinder the cure process?</p>	<p>There are a number of fillers available on the market which do not hinder the cure process. Selecting the proper filler that yields a clear or translucent adhesive is a trick that the chemists use as they formulate.</p>
<p>Can you affect durometer with level of cure?</p>	<p>If you plot durometer versus cure time with a constant intensity, you would actually see the durometer level off and plateau. Over-exposing the adhesive to 2x, 3x, 4x cure times do not usually have a negative effect.</p>
<p>If you need a liquid less than 100 centipoise, can you thin it with a solvent?</p>	<p>It is possible to thin an adhesive to 100 cP or less using organic solvents. We would want to make sure that this does not change the chemical and physical properties. Solvent selection, % concentration, and polar/non-polar would all impact the effectiveness of diluting these adhesives (but they would need to drive off the solvent; not recommended).</p>
<p>What conformal coatings are available such as replacements for Solithane, Conothane®, Uralane or Arathane®?</p>	<p>DYMAX has a number of conformal coatings that are UL and MIL Spec approved in the UR/AR type chemistries. We would be happy to send out our selector guides for these materials, or to discuss your application by phone.</p>

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Can you bond fabric?	We have had success bonding to fabric as long as we can get light to the adhesive from both sides and fully cure the adhesive embedded in the fabric.
What, if any, surface preparation is required to optimize the effectiveness of these adhesives?	On some difficult to bond to substrates like PE and PP, surface preparation can improve the adhesion. Chemical primers, corona treatment, or plasma treatment (preferably with oxygen gas) are very commonly explored, as well as UV pretreatment of the surface.
How do you clean up "bleed out" or excess material	Removal of uncured adhesive after application can be done with a foam wipe, cloth, or cotton swab, followed with an alcohol wipe (isopropanol, methanol, or other organic solvent). We do have a technical bulletin available with suggestions on how to clean up both cured and uncured adhesive residue.
Do you provide primers for low surface energy plastics?	Yes, we offer chemical primers for low-surface-energy plastics, as well as the often-recommended corona or plasma treatment systems.
I have heard that pre-exposing the substrate to UV light has a similar effect to surface treatment. Can you comment on this?	Pre-exposing a low-surface-energy plastic or substrate with high energy, short wavelength UV light is one effective way to increase adhesion, similar to other surface treatment options.
Are these UV-curable adhesives jettable?	Many materials can be jetted, and we have had success in some applications using this application technology.
Have you ever investigated a light diverter additive, some form of crystal, to wrap UV light to not directly exposed areas?	Our R&D group has experimented with light diverter additives that would allow the UV light to bend or bounce around a corner to cure shadowed areas. To date, the results have only shown very minimal results and a negative impact on depth of cure. They tend to scatter the light to the sides, and do not let the light penetrate as deep.
Can they (adhesives) be very flexible?	DYMAX offers products with durometer ranges from D-80 (rigid) to A-Scale (Flexible) to OO-Scale (extremely flexible).
Do most of your adhesives require refrigeration?	Very few of DYMAX adhesives require refrigeration. Room-temperature storage is typical for most products.
For adhesives with moisture cure secondaries, how dependent are they on the ambient humidity during the application and cure process?	Adhesives with secondary moisture cure systems are dependent on ambient humidity conditions, and we recommend using a humidity controlled environment if possible with a 30-60% RH humidity level.

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What is the pot life of adhesive once dispensed?	As long as the adhesive is kept away from light and dust, it is okay for a long time. We generally recommend short work times since manufacturing environments typically have a little bit of visible light that could start to polymerize the material. Also dust contamination should be avoided.
Does the fluorescence of the adhesive change from pre-cure to post-cure?	The fluorescence of the adhesive does not change from pre-cure to post-cure in most cases.
On your slide of comparative assembly costs, what kind of study are these figures based on?	These values were calculated through our long experience working with manufacturers over the years, and working with individual customers to calculate these costs.
Can you debond the adhesive with different light source?	Some DYMAX materials are considered removable/peelable. Some will dissolve in water. Some can be debonded with extreme light exposure, namely, with heat.
Do you have a product for bonding a very thin teflon coated wire to a PCB?	We offer a range of wire tacking adhesives that can bridge over the wire and lock it to a printed circuit board.
Can you add a small amount of water to improve the secondary, moisture cure mechanism? How long does this secondary cure take to completely cure (1/2" to 1" depths)?	It is possible to add small amounts of water to improve the secondary cure mechanism, but we highly recommend letting our chemists adjust the formulation to meet your cure profile. The additional water would shorten the shelf-life of material. Moisture curing can take a few hours to a few days, depending on the thickness and ambient humidity.
Have you glued any engine components on an engine?	We have been successful in underhood applications, mainly with small subassemblies.
But these automotive applications are heat-cured applications and not light-cure applications. Please explain?	DYMAX offers a number of products that are considered "MultiCure", which cure with both light and heat or light and activator. This allows the adhesives to be tacked in place by curing the adhesive you can shine light on, and the remainder will cure with the heat or activator. DYMAX also offers products that only cure with heat or activator, but not with light.
What packaging is available? 50 gallon drum? 5 gallon pail?	We offer a number of different package sizes, from 3, 10, 30 mL syringes, 170, 300, 600 mL cartridges, L or kg bottles, 15 L pails, 55 gallon drums, and totes.
Are there issues to consider when hardness testing is used for in-process monitoring? Will most materials cure in thick sections?	Most materials will cure in thick sections, but we prefer to use a thickness of 0.25 inches (metric) for our durometer pucks per ASTM D2240.