Potential Questions to Assist in a Failure Analysis

These questions need to be answered to help us assist you in determining the root cause of your failure:

Light Source

What is the UV lamp output? Whose light source are you using (if Dymax which one)? What distance is your part situated from the light source? What is the UV and/or visible absorption of the substrates (has this changed?)? When was the bulb last changed? When was the lightguide last replaced (spot systems only)? If you are using a light source from someone other than Dymax, what is the wavelength produced by the unit? How long are you curing for? Has this changed? If cured longer, does this help or hinder the performance?

Parts

What are the substrates? Has the substrate changed? Have you isolated failures to a particular batch of parts? Has there been a change in the supplier of the parts? What type of failure has been experienced (substrate, adhesive, cohesive)? Is this consistent? How many failures have you experienced? Are they random or grouped together? Has a change been made to the preparation of the parts (either by a supplier or internally)? Do the parts look the same (color, shape)? What is the gap between mating parts? Are the parts cleaned prior to bonding? If yes, with what? Are there any rust preventative coatings (for activator cured products) on the metals? Do they leave the surface acidic or basic?

Process

Have there been any changes to processing conditions? Have steps been added or eliminated in the process? Are the failures occurring in a particular shift, after lunch, or by a specific operator? Has the process changed in any way, no matter how trivial, between this reported lot(s) (could be as simple as a bulb change or a light source being powered on)? Are the failures consistent to one another? Is the adhesive (or activator, if used) transferred to a pressure vessel or reservoir? Are any other products alternating with the same reservoir or is it used exclusively?

The next few questions pertain to the activator-cured products.

If using an activator-cured product, how are the activator and adhesive being applied? How long are parts clamped for? How are you clamping? How much force is being used? Are there any tests or processing steps conducted after the joining of the two parts? What are they? How long after are they performed?

Adhesive

(it is recommended that a sample of the questionable lot be returned to Dymax for analysis)

What is the expiration date? How is the product being stored? What does the container or syringe look like (is this the original packaging)? What does the label look like? What is the lot number? If using an activator-cured product, what is the appearance of the adhesive (color, soft, hard)? What is the coverage of the adhesive versus the bond area? Are you heating the material in the dispensing system to lower the viscosity? Have you added anything to the adhesive (pigments, dyes, fillers, adhesion promoters, fillers)?

Activator (If Used)

(it is recommended that a sample of the questionable lot be returned to Dymax for analysis)

Which surface is the activator applied to? Please describe the packaging and how the product is being used in your process. If applied manually, describe the storage conditions and process moving it from inventory to use on the production floor. If applied automatically, is the reservoir pressurized with an inert gas? What is the time between activator application and joining of the parts?

Other

How long have you used this material? Did the failure occur in-house or at your customer? Did it occur at more than one customer? What is the operating temperature for the parts? Is the assembly exposed to any solvents, cleaners, other chemicals? If yes, what are they? How long are they exposed and at what temperature?

The purpose of the paper is to help you analyze a failure to include the process, the parts, the curing system, and the adhesive; that is, every aspect of the production environment.

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