

Article: tips and hints for UV curing

We were very pleased to see some extensive coverage of some of our **tips and hints for UV curing** in the latest issue of ***FAST (Fastening & Assembly Solutions And Technology) Magazine*** – the UK's only journal dedicated 100% to the subject of fastening, bonding and assembly in manufacturing applications. We recommend that you [subscribe](#).

Download a copy of the [magazine article](#), and also download our ***Top tips for getting the best from your UV curing process***.

Article: tips and hints for UV curing

In the tips from Intertronics covered in this feature, the term 'adhesive' also covers coatings, encapsulants, potting compounds, temporary masking materials and form-in-place gaskets, where applicable



Tipping the balance

Let's kickstart proceedings by taking a look at UV curing lamps, which can be based on two types of quite different technology:

■ **Mercury arc lamp** – used successfully for decades and still the predominant lamp type, it produces a broad spectrum of light

■ **LED lamp** – a much newer technology, it produces a narrow spectrum of light. The output from UV curing lamps based on LEDs does not appreciably degrade over time. There are no bulbs to replace in LED lamps, they require no warm up time, they emit cooler light radiation and they are more electrically efficient. They also meet the increasingly stringent regulations regarding the use of mercury. LED UV curing lamps will not work optimally with all UV curing adhesives, many of which are designed to cure with broad spectrum UV light.

Dosage decisions

By testing, understand the minimum dose needed for your application – how much energy do you need to achieve an optimal cure? Establish a curing process at the minimum dose, plus a recommended 25% safety factor. Make sure the spectral output (UV and/or visible light wavelengths) of your curing lamp is correctly

matched with the material you're curing. Not all materials cure optimally with all lamps, and a mismatch can result in non-optimal or poor bonds. If you're considering taking advantage of the benefits of LED UV curing technology, remember that it is not a simple like-for-like replacement for broad spectrum lamps.

Variables control

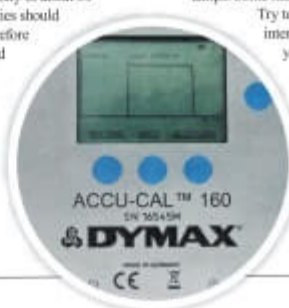
Understand and control the process variables, in order to get repeatability and consistency. Ideally, you would like to fix each process variable i.e. time of exposure, distance, intensity, adhesive quantity and location etc. As a rule of thumb, Intertronics recommends a minimum curing intensity of about 50 mW/cm². Higher intensities should give better cure and therefore better performance – and shorter process time. It is not recommended to use very low power UV lights (or the sun!) for extended times, as this is likely to result in non-optimal or incomplete curing

for most industrial grade products, which may have a minimum activation energy level. Fix the distance between the light source and bondline. This is a critical variable, because the light intensity falls off with the square of the distance – so at twice the distance, you will have only one quarter of the energy. For faster cures, get as close as you can.

Radiometers

You can measure the light intensity using a radiometer, which gives an output in mW/cm² or W/cm². Radiometers with different spectral sensitivities are recommended for use with the different broad spectrum and LED curing lamps. Some radiometers also measure dose.

Try to understand the curing intensity at the bondline. If you are curing through a substrate, how does this affect the light transmission to the adhesive? Some plastics have UV blocking additives, which can inhibit transmission, and therefore curing. >>



Article: tips and hints for UV curing

Supplied by:



INTERTRONICS

12a Station Field Industrial Estate, Banbury Road, Kidlington

Oxfordshire England OX5 1JD

t 01865 842842 e info@intertronics.co.uk

Last updated: February 2021

Statements, technical information and recommendations contained herein are based on tests we believe to be reliable but they are not to be construed in any manner as warranties expressed or implied. The user shall determine the suitability of the product for his intended use and the user assumes all risk and liability whatsoever in connection therewith.