

**ACHIEVING FASTER CURE TIME WITH PULSED UV**

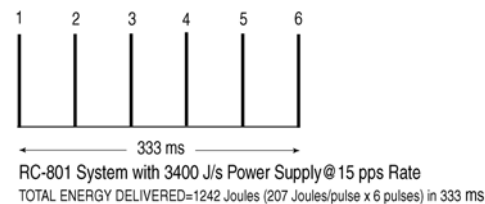
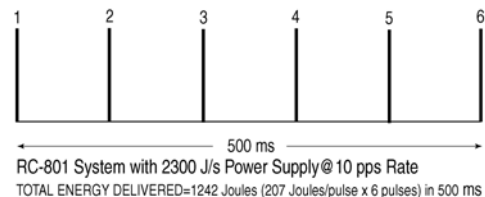
An important advantage of pulsed UV light curing systems in Optical Disc applications is the ability to deliver high peak UV energy in short pulses, at low substrate temperatures. This results in the UV penetrating the polycarbonate substrate layer with sufficient energy to complete the cure of the adhesive sandwiched in between the polycarbonate layers. For emerging formats, such as Blu-ray Disc and HD Disc, thick top coat and multiple layer penetration is a more demanding requirement.

Extensive tests on DVD manufacturing lines, confirm that effective curing is achieved when a critical total UV energy is delivered to the adhesive. As disc handling times are reduced, cycle time reduction becomes limited by cure time. The challenge to reduce cure time is to deliver that critical energy in as short a time as possible. A pulsed UV system instant on/off lamp control, narrow (168  $\mu$ s) high energy pulses, and its ability to deliver pulses at increasing rates, offers a means to reduce cure times by simply increasing the pulse rate.

An example of how UV energy, delivered at a higher rate, can reduce cure time, tests were carried out to determine the total energy required to achieve optimum curing of a DVD disc. The tests were performed with a Xenon Corporation CoolCureXL-DVD® system, model RC-801, delivering 207 joules/pulse, at a rate of 10 pulses per second (pps) to the UV lamp. The tests concluded that a total energy of 1242 joules, delivered with only 6 pulses, was required. The cure time was 500 ms.

To reduce the DVD cure time, the RC-801 15 pps system was then introduced. This system included a higher energy level power supply, model PS-813 (3400 J/s), triggering the same UV lamp, but at a higher pulse rate. The overall result was a reduced cure time of 33% - from 500 ms to 333 ms, as illustrated below.

In both configurations, the total energy delivered to the DVD substrate remained the same: 1242 joules. This was first determined to be the optimum total energy to cure the DVD. Note the energy delivered by each pulse does not change when triggering the UV lamp at a higher rate. The energy per pulse (207 Joules) and the pulse width (168  $\mu$ s) is set by the RC-801 system Pulse Forming Network (PFN).



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