

Spot Cure Bulb Life Warranties - What do they really mean?

Ultraviolet Light (UV) “spot” curing systems direct UV light to discrete cure sites to instantly cure or “harden” adhesives, coatings, potting materials and masks. In order to do so effectively and continuously, it is imperative that rated (or advertised) cure intensities be maintained throughout the process operation. Users of UV Spot Cure systems rely on manufacturer bulb warranties to guide them in this regard. The question then becomes: 1) Can you trust the warranty? and, 2) What does the warranty really mean?

The vast majority of UV spot cure systems are comprised of a UV light generation sub-assembly including either Mercury short arc lamps or Mercury-Halide lamps. Mercury short arc lamps deliver substantially higher proportionate levels of UV energy as compared to Halide lamps, which produce primarily visible light. In either case, intensity (or irradiance) of generated light drops off with time. For many spot cure manufacturers, UV intensity can be cut in half in as little as 500 hours after initial turn-on! That means that in as little as a month or two, a spot cure system can go from, say 10 W intensity, to 5 W intensity. Pretty disenchanting for the surprised customer, particularly if he/she purchased an advertised “High Intensity” system, hoping to capitalize on reduced cure times.

The Real Problem

The real problem, from a manufacturer’s perspective, is that if they specify output intensity at end of warranty, manufacturers open themselves to a world of headaches they’d rather not face.. Vendors simply stating that a lamp is “warranted” for 1000, 2000 or 3000 hours with no accounting for intensity at that point, will only legally mean that the lamp will simply light or turn on! A Spot Cure with an advertised rating of, perhaps, 10W output intensity at 320-390 nm (the primary UV A bandwidth), may have as little as 2 or 3W of power left at end of “warranty”. This is of no practical use if the process is certified at, say, 5W or 7.5W. So what can a user do to protect against such radical intensity fall-off?

Useful Life Vs Warranty Life

The clear answer is to force manufacturers to specify guaranteed intensity at end of warranty. Only in that way, users can assure that critical processes will have the optical power required, in the bandwidth required, to meet both production speed and through cure specifications. Now let’s look at a real world comparison using these considerations.

Company ABC has characterized and specified its new high speed line UV cure needs at 7.5W in the popular 320-390 nm bandwidth. If intensity falls below that

value, the process is halted for lamp change-out due to concerns over completeness of cure.

Spot Cure "X" has an advertised "Intensity" rating of 20W and an advertised "lamp life" of 2000 hours. Spot Cure "Y" has an advertised "Intensity" rating of 15W and an advertised "lamp life" of 1000 hours. So X is the winner right? Wrong!! Upon closer inspection with an independent certified radiometer, in the required 320-390 nm range for this application, the advertised intensity of X is just half that value, or 10W. Still enough, right? Wrong again. Upon actual trial, it's discovered that the "20W" rated X system falls below the required 7.5W level after just 200 hours of useful service life! The lamp may continue to light for another 1000 or 1500 hours but its useful life in the only range this customer cares about is just 200 hours. By exact comparison, Spot Cure "Y" has an advertised rating of 15W but it's all in the 320-390 nm range. It also carries a guaranteed useful intensity at end of warranty life of 7.5 W. Radiometry confirms that Spot Cure Y does in fact deliver 7.5W in the 320-390 nm range at 1000 hours. So the advertised "20W" system turns out to have 1/5 the useful service life of the advertised 10W system, and the decision is both easy and very important for company ABC's bottom line.

Conclusion

As always, read the fine print in any advertisement or printed materials. A UV lamp may still light with thousands of hours on it, but it's of little value to a process line when the useful intensity falls below its minimum. Specify only Spot Cure manufactures that guaranty minimum useful life intensity values within their warranties.