# LED Di Life

Dymax light-curing products integrate LED di from various manufacturers that advertise 20,000 to 50,000 hours of expected lifetime - defined as the ability to emit energy at a given percentage of its original energy output value while operating under controlled conditions. Reporting these expectations is based on many assumptions of the intended end use for the LED application, such as:

- The junction temperature of the di, and thermal management to minimize di temperature
- The ambient or environmental temperature of the final application system
- The environmental humidity conditions
- The duty cycle or frequency in which the LED di is turned on and off
- The duration of on-time
- The maximum allowable drive current to energize the di and the percentage of time in which the di are being driven at their maximum allowable current.
- The optical efficiency of the di encapsulate or other energy path components
- The presence of VOCs or other outgassing in the operating environment

Although Dymax cannot predict every possible combination of end use, Dymax does test a variety of simulated conditions to ensure the LED will continue to operate within manufacturers' recommendations to ensure the highest possible life expectancy can be achieved.

Dymax encourages customers to consider the following recommendations for integrating Dymax light-curing products into their processes.

- Be mindful of the ambient temperature surrounding the device. Any elevated temperatures will put an increased burden on the cooling system. In particular, temperatures above 40°C will have adverse effects on lifetime expectations.
    - In extreme cases, consider the use of additional cooling fans in the curing area or fixtures to ensure temperatures are minimized.
- Dymax products utilize a forced air convection cooling system. In order for the system to work efficiently, the fans need access to room-temperature air on the intake vents, and proper exhaust of the heated air on exit vents so that the air is not re-entrained into the intake vents.
    - Maintain 150 mm of spacing around the vents help to promote proper cooling.
    - If the device is placed within a secondary enclosure, ensure the enclosure has a source of fresh air and the means to sufficiently exhaust heated air.

- Be mindful of reflective surfaces in the active cure area. In some cases where an excessive amount of light is reflected directly back onto the emission optic, it will cause unnecessary thermal rise of the optics and LED. In rare cases, this can damage the optic and effect energy emissions.
    - One way to mitigate this is to take advantage of the LED instant on/off control and cycle the LED off when not actively curing a part. Do not leave the LED continuously running on when not in use.
    - Another mitigating option is the use of non-reflective materials/colors for fixtures around the curing area.

- Applications should not be designed around running the device at 100% intensity setting. Dymax offers a wide range of products with various power and performance levels. Selection of the appropriate product can optimize applications so that required operating intensity levels will enhance and extend LED life. This not only ensures the device operates at optimal settings, but also ensures the process can be modified over time to account for the slow degradation of the curing system.

Dymax is confident that when the product is used within recommended operating conditions, customers can achieve or exceed advertised LED lifetime expectancies.