



The IEC 62471 series of standards are generally used to evaluate the potential photobiological (interaction of light on living beings) hazards from LED radiation in products.

Common safety standards in this series include:

IEC 62471: “Photobiological safety of lamps and lamp systems.”

- The base LED radiation safety standard for all LED based products.

IEC/TR 62471-2: “Photobiological safety of lamps and lamp systems – Part 2: Guidance on manufacturing requirements relating to non-laser optical radiation safety.”

- Technical Report that provides additional guidance on labeling, user manual statements, etc.

IEC 62471-5: “Photobiological safety of lamps and lamp systems – Part 5: Image projectors.”

- Photobiological requirements specifically for LED, lamp, and some laser-illuminated projectors.

IEC/TR 62778: “Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires.”

- Photobiological requirements primarily for lighting products (General Lighting Service, or GLS, products).
- Lighting industry is generally moving toward this lighting-specific Technical Report instead of IEC 62471.

The process for evaluating an LED product to the photobiological safety requirements can vary depending on the product type and which set of photobiological safety requirements are used from the ones listed above. In general, the process involves the following main steps:

1. Determining the Risk Group of the LED radiation (usually by a series of irradiance and/or radiance measurements of the LED radiation, per the test methods described in the applicable photobiological safety requirements);
2. Making sure the product employs the applicable labels, user manual statements, etc. as required based on the Risk Group present;
3. Generating the appropriate IEC Test Report documenting how the product complies.

LED product manufacturers may use the IEC Report as part of their comprehensive technical file to show the LED radiation requirements are met, or to support a request for a 3rd party safety mark.



IEC LED Radiation Requirements and IEC Certification:

When products are submitted to UL for full IEC Certification (an evaluation of all potential hazards, not just LED Radiation hazards), generally the LED radiation aspect of that Certification process will use one of the above sets of photobiological safety requirements. The particular set of requirements used will depend in part on the product type and what the overall IEC Standard requires for those project types.

How UL Can Help with the IEC Photobiological Evaluation Process?

A: UL can perform any or all of the above steps in the IEC photobiological safety process for LED product manufacturers, even without a concurrent evaluation for full IEC Certification to address other non-LED safety requirements. Key services related to these this IEC photobiological evaluation process include:

- Conducting a preliminary evaluation on a product (or even plans for a future product, if the actual product is not yet available) to provide guidance on what the IEC/TR 62471-2 would require for labeling, user manual statements, etc.
- Performing only the LED radiation testing per the appropriate photobiological safety requirement and providing the results to the manufacturer; This could also include the determination of the LED Risk Group classification
- Performing LED radiation testing, determination of the Risk Group, and a construction review of the product and providing the results in a letter report.
- Performing all of the above and providing the manufacturer with an IEC 62471 Report in the official IEC Test Report Format (TRF) – either with a CB Test Certificate, or just as an Informative Report.

These services can help manufacturers meet IEC 62471 LED safety requirements, as well as address LED safety requirements for a full IEC Certification of the product.

