



Quick Links



Drawing on decades of weathering leadership and expertise, the Atlas Consulting Group provides in-depth consulting services that assist you in developing and applying the best weathering test methods and strategies for your products. **Atlas Weathering Consulting Insights** offers interesting and valuable information on a variety of topics relevant to long-term durability testing.

LEDs - They're Bright, but Can They Outsmart Mother Nature?

Combining the keywords "illumination" or "lighting" and "future" in an internet search engine quickly reveals that LED (light emitting diodes) technology is the "hot topic" in the lighting market. The main reasons for such high interest are high energy efficiencies combined with long lifetimes. As an SSL (solid state lighting) solution, LED technology requires leaving behind established designs and concepts, and enabling new application fields.



LED Types and Applications

LED lamps have a long history. Starting in the seventies as weakly glowing red indicator lamps in TV sets and similar devices they are now available in a wide variety of different lamp types, ranging from small T-type lamps, to high power SMD LED lamps, to whole LED arrays in different colors, including white. Even more diverse than the lamp types are the emerging areas of LED applications. LED systems are increasingly used as a substitute for traditional indoor and outdoor lighting. For example, you can find LEDs utilized in room, street or automotive lighting, as well as in applications like architectural lighting, floodlights and display walls.

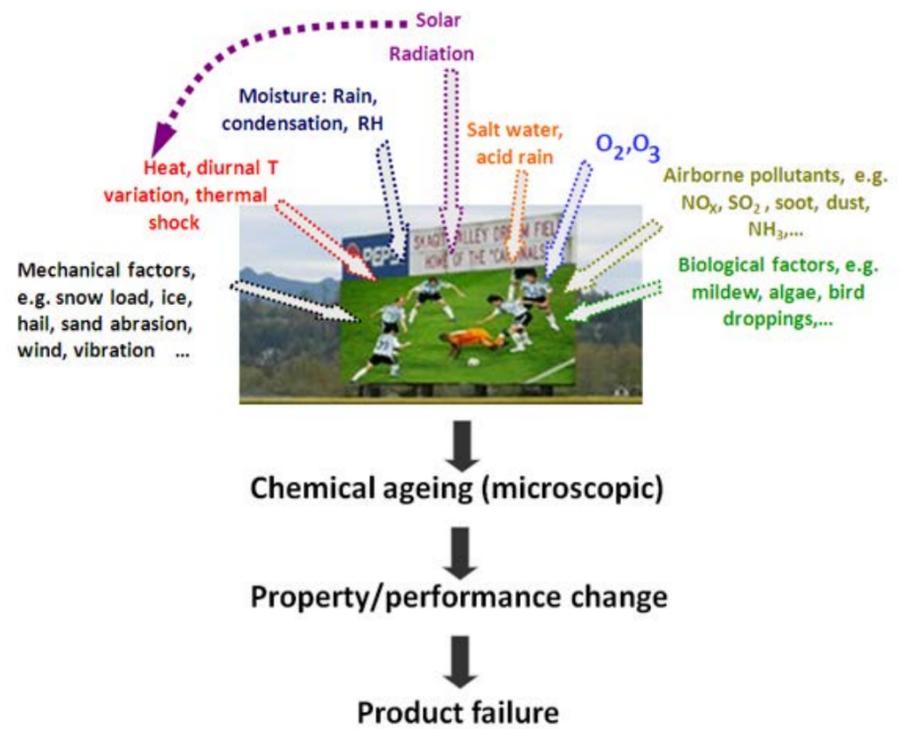
LED Lifetime Under the Influence of Weather

The current lifetime criterion for LED lamps is their brightness level (50% of initial brightness), for which extensive laboratory testing results are available. However, this gives no guarantee that the various structural and electronic parts of an LED product will not cause its failure before the brightness reaches its lowest acceptable limit. Durability testing standards for traditional lighting devices cannot cover the full range of modern LED applications.

Oftentimes today, LED displays can be seen at outdoor venues and are more frequently being used for information and advertising purposes in the urban landscape. As a result of residing in an outdoor environment, these massive devices are fully exposed to the influences of sun and weather. Major manufacturers guarantee about 10 years of lifetime in continuous use (75,000 to 100,000 hours) in any type of end-use environment. Operated at full sunlight, these video displays require high brightness levels which produce tremendous heat and result in extreme stresses to the materials, especially in combination with humidity and rain. Special care must be taken in the cooling, isolation, material selection and fabrication of these devices and their durability has to be proven.

Traditional approaches to evaluating the reliability of electronic components, like HALT (highly accelerated life test) and HASS (highly accelerated stress screening), are meant to screen for major material, design, and manufacturing flaws that would likely result in premature "infant mortality" failures, but they do not support the warranty period.

For durability and lifetime prediction, accelerated environmental life tests and standards are needed which reproduce and accelerate as realistically, precisely and quickly as possible the degradation modes resulting from combined environmental stresses, which are represented in the figure below.



The constantly expanding indoor and outdoor applications for LEDs should compel producers to back up their warranty statements by producing and correlating laboratory and real life data. The Atlas Consulting Group is a team of experts from different fields specialized in developing weathering testing strategies and programs for lifetime prediction. Atlas can help you to determine the appropriate test program that will allow you to validate warranty statements, avoid premature failures, save time and money and strengthen your company's market position.

If you are interested in learning more, come hear our presentation on "Environmental Durability of LED Products – A Model for LED Testing" at the "Strategies in Light® Europe" conference in Munich, Germany on September 20, 2012. To register for the conference, visit <http://www.sileurope.com/conference.html>.

To discuss how the Atlas Consulting Group can help you, contact us at atlas.info@ametek.com (US) or atlas.info@ametek.de (Europe).

