

Will your product stand up after prolonged exposure to the sun?

When making products that will spend most or all of their life outside, it is critical to ensure they will stand up to the elements. Specifically, you must make sure they will maintain both functionality and appearance after prolonged exposure to the sun. For this reason, items such as vinyl siding, outdoor furniture, play structure components, outdoor monitors, awnings, shades, and umbrellas should be tested for the effects of sun exposure.

There are two types of testing for exposure to sunlight – xenon arc testing and full spectrum solar simulation.

The first, xenon arc testing, is best and most cost effective for items that can be tested in smaller samples such as swatches of fabric or small painted pieces. This is a great option if you just want to test the fabric that will be used on outdoor furniture or sun umbrellas. Xenon arc testing operates at a narrower wavelength and is used to evaluate color fade. After testing, the sample is evaluated using a spectrophotometer for color, a gloss meter, or a grayscale meter for a more subjective fade analysis. The test is also highly customizable; light intensity, temperature and duration can be set to meet the customer's needs. In addition, the test cycles can be programmed to include a water spray cycle that simulates dew.

Full spectrum solar simulation is performed in a large chamber which allows for the testing of much larger samples. This type of sun simulation serves two main purposes: determining the heating effects of solar radiation and identifying the actinic effects of direct solar radiation on a given product. Heating effects simply look at the impact of increased temperature above ambient that a part may experience when exposed to direct sunlight. Actinic effects, in turn, refers to any photochemical effects that are caused by UV radiation. These include fading, chalking, loss of strength, etc. This could be a critical safety issue for something like a plastic chair or child's play structure which could give way if exposed to excessive sunlight overtime. This can also be used to test how well electronic displays and monitors will perform overtime when exposed to the sunlight. For example, a manufacturer of outdoor displays will want to know if they will warp over time, if the cooling system doesn't function properly, or if the display will completely fail to function after prolonged exposure.

Much like xenon arc testing, full spectrum solar simulation is a highly customizable test. Solar chambers can also function as environmental chambers, allowing test engineers to produce custom test profiles to create specific environments. This is accomplished by determining temperature, relative humidity, and light irradiance based on geographic location. For instance, the light at the equator at noon is quite

different from sun exposure in Iceland. Depending on where the product will be used, this can be a critical difference.

At J.A. King's testing lab in Greenville, SC we have a xenon arc chamber as well as two sun simulation chambers large enough to accommodate a vehicle. Our team of test engineers can work with you to create a test protocol that will meet your needs or meet specific test standards such as MIL-STD-810G Method 505.5. Contact us today to learn more!