

ISO 4892-2 and ISO 4892-3 UV test comparison

The two standards differ by the illuminating source (Xenon-Arc vs FI-UV) used to do the accelerated aging of the samples.

Filtered xenon-arc and fluorescent-UV (FI-UV) devices follow two completely different approaches. Both types differ considerable in how and in which wavelength range they simulate the sun's spectral irradiance. Another key difference is water delivery to the specimens.

ISO 4892-2 (ASTM G155)

uses Xenon-arc lamps as a light source and it is thus based on the ASTM G155 standard. This method primarily assesses the aesthetics and durability. The Xenon-Arc light source is a more suitable representation of the solar spectral distribution and especially of the spectral section that is most responsible for the color fading.

Xenon-arc weathering devices simulate and control all three primary weather factors: full solar spectrum, irradiance level, temperature, and moisture. Their optical filters provide full-spectrum solar radiation conditions in the UV, VIS, and IR range 295-2500 nm. Together with water spray, and wide temperature and RH control ranges, xenon devices can replicate a variety of different outdoor and indoor conditions in a realistic way.

Xenon-arc weathering is known as being more reliable for effectiveness studies of light/UV stabilizers, and testing color and appearance changes of products. For critical and premium applications, OEM's in particular prefer xenon-arc devices to choose the best polymer formulations for applications, coming in a variety of colors, polymer types, and resin technologies.

ISO 4892-3 (ASTM G 154)

uses UV fluorescent lamps as an illuminated source and it is thus based on the ASTM G154 standard. This standard mainly focusses on evaluating the loss of mechanical proprieties. The UV fluorescent lamps emit in the narrow UV spectrum section of just 295-350 nm that is responsible for the loss of mechanical resistance for polymers.

FL-UV lamps – as the name says - are limited to UV radiation in the range 295-350 nm. Water is usually delivered through condensation. Therefore, FL-UV testing is mostly confined to the rapid screening of paint and resin formulations against basic weathering stability. Furthermore, it is commonly applied to test wood coatings and clear coats for the same reason. Since FL-UV is lacking long wavelength UV-A and visible light, it is not recommended to test dyed or pigmented coating systems or study light/UV stabilizers.

Conclusion

For long-term polymer testing, ISO 4892-2 corresponds to the better time predictor of the two methods, because it is the best emulation of the product's environmental conditions.