A PERIODIC PUBLICATION HIGHLIGHTING THE MERITS OF VINYL PERFORMANCE PRODUCTS

FOCUS on Accelerated Light Aging and Outdoor Weathering

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FOCUS ON ACCELERATED LIGHT AGING AND OUTDOOR WEATHERING

When you purchase a product made with quality vinyl upholstery, you should expect a long service life without color fading, discoloration or degradation.

To test a material's resistance to exposure to laboratory-simulated sunlight, the Chemical Fabrics and Film Association (CFFA) developed CFFA Test Method 2 (CFFA-2), Accelerated Light Aging and Outdoor Weathering, which has proven to be a reliable means of determining the suitability of coated fabrics for both interior and exterior applications relative to their fade resistance.

Achieving such resistance requires a careful selection of fade-resistant pigments, choosing an effective stabilization system in the polymer matrix, as well as an ultra-violet absorber in the protective topcoat to prevent destructive radiation from reaching the polymer surface. Coated fabrics for outdoor applications must also provide resistance to rain, mold and mildew, and other issues associated with outdoor exposure. This requires two different test methods:

1 INDOOR WITH ULTRA-VIOLET LIGHT AND DRY HEAT

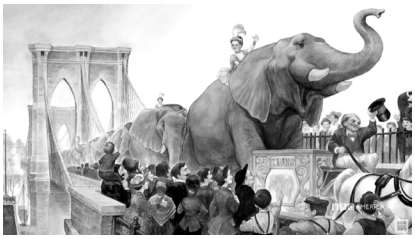
2 OUTDOOR WITH ADDED REPEATED WET CYCLES TO SIMULATE EXTERNAL CONDITIONS

Two different types of devices have been approved to run both the indoor and outdoor tests. Either the xenon arc fadeometer or weatherometer is approved for indoor applications, while only the xenon arc weatherometer device is approved for outdoor applications. The Q panel (QUV) is an alternate device suitable for running both indoor and outdoor tests, with specific cycles for each.

The reasons for two methods are the initial cost of the device and the length of the test. The xenon arc is by far the most expensive, and most versatile device, requiring 200 hours or 8½ days for Indoor and 300 hours or 12½ days exposure for outdoor, while the Q panel, a far less expensive device, calls for 150 hours or 6 ¼ days for indoor and 650 hours or 27 days exposure for outdoor.

HISTORY LESSON: THE ORIGINAL FADE RESISTANCE TEST

The original fade-resistance test method used carbon arc fadeometers and weatherometers, a nineteenth-century technology that was used to light the Brooklyn Bridge when P. T. Barnum marched his elephants across it in 1884. While this method is still supported by active published test methods, these instruments require daily service to replace the burnt-out carbon rods, which limits exposure time to those days when a laboratory is working, usually limiting to five days a week, and thus extending the time to complete the test cycles. CFFA has removed the use of these devices from CFFA-2.



YEARS OF WORRY-FREE PERFORMANCE

Vinyl upholstery can be expected to withstand exposure to light for many years of worry-free performance. To help manufacturers better understand how materials will react, and to provide peace of mind to end users, CFFA has adopted these commonly used test methods to help forecast fade resistance over time. Because of the availability of these tests, users of vinyl upholstery can be confident that the material they choose will achieve minimum performance standards across service life.

ASTM INTERNATIONAL (AMERICAN SOCIETY FOR TESTING AND MATERIALS) AND AATCC (AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS) TEST PROTOCOLS

ASTM G151 describes general requirements for accelerated test devices that use laboratory light sources. This includes all the devices discussed above.

Detailed information regarding procedures to be used for specific devices are found in standards describing the particular device being used. For example, detailed information covering exposures in devices that use xenon arc are found in ASTM G155, the standard practice for operating the xenon arc light apparatus for exposure of materials. Exposures in devices that use fluorescent UV light source are found in ASTM G154, the standard practice for operating the fluorescent ultra-violet lamp apparatus for exposure of materials.

XENON ARC

Indoor: fadeometer or weatherometer (actual test method)
AATCC Test Method 16.3, Option 3
Describes the Irradiance set point, 1.1 watts/square meter/nanometer at 420 nanometers.
Daylight filtered through window glass filters.
Continuous light, no water spray.

Outdoor: weatherometer only (actual test method)
ASTM G155, Table X3.1, Cycle 1
Describes Cycle 1, 102 minutes of light followed by 18 minutes of light and water spray consecutively for 1,000 hours, irradiance 0.35 W/m2/nm at 340 nm, daylight filters.

Q PANEL (QUV)

Indoor
ASTM D-4329, Cycle A, modified (actual test method)
Describes Cycle A, UV exposure, dry cycle only, with no condensing humidity, UVA-340 with peak of 340 nm, irradiance 0.89 W/m2/nm at 340 nm.

Outdoor
ASTM D-4329, Cycle A (actual test method)
Describes Cycle A, 8 hours UV followed by 4 hours condensing humidity, UVA340 with peak emission of 340 nm, irradiance 0.89 W/m2/nm at 340 nm.

Historical Illustration: BBC America

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