Accelerated weathering

automotive EXHIBITOR testing expo 2013 europe

Q-Lab offers a new method of performing accelerated weathering tests on coatings that promises better and faster laboratory results

Q-Lab Corporation
Tel: +44 1204 861616
Email: jrobinson@q-lab.com
Web: www.q-lab.com

At the end of the 20th century, accelerated weathering test standards for automotive coatings were dominated by methods specifying the use of a particular xenon test chamber configuration. These methods were typically effective in anticipating only certain modes of degradation – mainly gloss loss – over a narrow range of materials. However, these methods were proved insufficient when applied to materials outside their original scope of research (in other words, most materials) or when examining other modes of failure.

Exacerbating this problem was the fact that these hardware-based standards forced the industry into using only certain test chambers even if they lacked characteristics important for accurate reproduction of environmentally induced photodegradation. Recognizing that this approach stymied innovation, a few OEMs and coatings suppliers, led by Chrysler, created a new 'performance-based' approach that reinvigorated the world of xenon arc weathering testing, formalized through the publication of SAE standards J2412 and J2527.

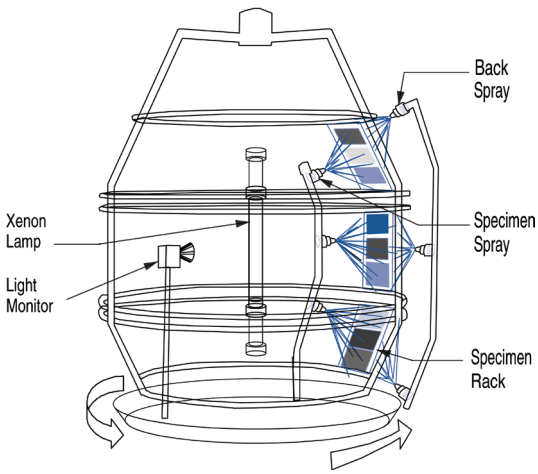
These first performance-based standards bridged the gap between the old and new eras. Test cycles remained unchanged, and results were expected to be similar to tests run under the old standards. Consequently, many of the flaws from the old tests existed in the newer methods. The importance of these new standards, however, was that industry was now free to explore alternative methods of performing xenon arc tests.

After introducing its first xenon arc test chambers in 1998, Q-Lab Corporation became the first company to offer a device designed specifically for this new era in weathering testing. The Q-SUN Xe-3 was the first flat array xenon arc tester with relative humidity control and a large capacity.

An early success with this new approach was the publication of *ASTM D7356, Standard Test Method for Accelerated Acid Etch Weathering of Automotive Clearcoats Using a Xenon-Arc Exposure Device*. Based on research performed by BASF and Q-Lab, this test reproduced the acid etch of automotive clearcoats associated with a summer of exposure in the acid rain environment of Jacksonville, Florida. One of the key lessons applied to subsequent work was how to characterize moisture uptake of coatings in the outdoor environment.

The next phase of innovation came from a group representing the transportation coatings industry during a decade-long series of studies to improve the correlation between accelerated weathering test methods and real-world performance. The goal of this effort was to accurately anticipate the multiple failure modes seen in outdoor tests in south Florida, a particularly harsh environment. After many years of experimentation and comparisons of the failure mechanisms that occurred in natural and accelerated tests, a new test method emerged that greatly improved correlation, while increasing acceleration compared with the old methods.

The culmination of this work is a proposed ASTM test method from technical committee D01.27, Paints and Coatings. The draft method recently cleared its first hurdle to acceptance as a new ASTM standard after a successful technical subcommittee ballot. The ASTM chairman for this committee, Doug Grossman, president of Q-Lab Corporation, commented, "This is a unique procedure, unlike anything currently in use for automotive paints. It produces results that correlate much better with outdoor service than other tests currently in use. It is the most thoroughly researched weathering test procedure ever developed." ❮



MAIN: 2006 Q-SUN Xe-3 xenon test chamber
ABOVE: Cross-section of a rotating rack chamber