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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.

**Laboratory Accelerated Weathering and Correlation to South Florida Results**

Laboratory accelerated artificial weathering based on full spectrum xenon arc light sources has become an indispensable part of durability testing in materials research, qualification testing and service life prediction, particularly for long lived products. However, the unreliability of these tests to reproduce the results of outdoor field performance or exposure tests in reference climates is often cited. This is particularly true of the South Florida subtropical climate, a global benchmark location for assessing the weatherability of many items such as paints and coatings, plastics, technical textiles, automotive and building products to name just a few.



The stark reality is that the overwhelming majority of these laboratory tests are conducted using test methods that were never developed, nor claim to represent any real climate, and certainly not specific benchmarks such as subtropical South Florida. The few that do, such as AATCC TM-169 for technical textiles used outdoors and Volkswagen PV-3930 for exterior automotive materials, either largely make only minor adjustments to existing methods, or default to historical parameters whose validation is questionable.

To resolve the issues of xenon weathering to South Florida correlation for high-value, durable automotive and aerospace coatings, a ten-year collaborative effort involving six (a seventh joined later) principals and multiple laboratories was undertaken. It should be noted that this collaboration followed about an additional ten years of intense research by the Ford Motor Company following major failures of the initial basecoat/clear-coat paint systems first introduced in the late 1970's and continuing into the 1980's. It should also be noted that automotive paint failures are still occasionally seen today across most OEMs.

The key features of the new xenon instrument test cycle resulting from this major effort, now introduced as ASTM D7869 Standard Practice for Xenon Arc Exposure Test with Enhanced Light and Water Exposure for Transportation Coatings are:

- Better optical light source filter systems resulting in a better UV cut-on match to sunlight
- Stepped irradiance profile to produce gradual temperature changes similar to South Florida
- Long moisture uptake periods representative of the high wet-time of South Florida

It has been demonstrated that for the coating systems under investigation, the following benefits could be achieved:

- Extensive analytical work to show that the degradation- chemistry matches that of South Florida
- Validation that appearance properties (cracking, checking, delamination, gloss and color change, etc.) match the 5-year South Florida results
- Test times may be 40% faster than previously used SAE test cycles

While this new method has only been validated for transportation coatings, the fact that it is the first, and only, method developed with both material degradation and the South Florida climate in mind, and extensively validated, gives rise to the possibility of wider implementation such as for architectural coatings. In any event, the method development process serves as a valuable template of how to develop laboratory test cycles which correlate to specific end-use climates.

Atlas Consulting can help you select or develop test cycles, test methods and complete test programs that are appropriate for both the products being tested and the intended end-use climates.

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