Physical Testing: Weathering

Will Your Product Stand Up Against The Elements?
Ensure your product will outperform your customers’ expectations with product and material weathering testing at ARDL.

UV or Visible Solar Radiation Resistance by Xenon Arc Weather-Ometer
ARDL’s multiple Xenon Arc Weather-Ometers are the preferred light source for testing materials that will be exposed to natural sunlight. They use a precision gas discharge lamp sealed in a quartz tube with a water lamp cooling system. Precise humidity, chamber temperature and black panel temperature controls allow the Xenon long arc, when properly filtered, to simulate UV and visible solar radiation more accurately than any other artificial light source. Typical applications include automotive components, chemicals, paints and coatings, paper, pharmaceuticals, textiles, plastics and polymers.

Xenon Arc Test Methods Available Include But Are Not Limited To:

<table>
<thead>
<tr>
<th>ASTM D750</th>
<th>ASTM D1148</th>
<th>ASTM D2565</th>
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<tr>
<td>ASTM D6695</td>
<td>ASTM D7849</td>
<td>ASTM G26-96 (withdrawn 2000)</td>
<td>ASTM G151</td>
</tr>
<tr>
<td>ASSTM G155</td>
<td>AATCC Test Method 16</td>
<td>AATCC Test Method 169</td>
<td>Fiat 50451</td>
</tr>
<tr>
<td>Ford FLTM B0116-01</td>
<td>GM E 60292</td>
<td>GMW 3414</td>
<td>GMW 14162</td>
</tr>
<tr>
<td>GMW 14743</td>
<td>Honda H E S D6601</td>
<td>ISO 3865</td>
<td>ISO 4892-2</td>
</tr>
<tr>
<td>ISO 11341</td>
<td>ISO 105B02</td>
<td>ISO 105B06</td>
<td>ISO B 7754</td>
</tr>
<tr>
<td>JASO M346</td>
<td>JIS D0205</td>
<td>MIL STD 810</td>
<td>Nissan MO 135</td>
</tr>
<tr>
<td>SAE J 1885</td>
<td>SAE J 1960</td>
<td>SAE J 2412</td>
<td>SAE J 2527</td>
</tr>
<tr>
<td>Toyota TSM0501G</td>
<td>UL 1581</td>
<td>VW PV 1211</td>
<td>VW PV 1303</td>
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Color measurement analyzes the condition of a material’s surface after exposure to ultraviolet light to determine the degree of degradation or discoloration.

Color matching is a quality control method intended to check the color of end use products against federal standardized color chips.

Color Measurement/Matching Test Methods Available Include But Are Not Limited To:

<table>
<thead>
<tr>
<th>AATCC Gray Scale For Color Change</th>
<th>AATCC Gray Scale For Staining</th>
<th>ASTM D1003</th>
</tr>
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<tbody>
<tr>
<td>ASTM D 1925/DIN 6167</td>
<td>ASTM D2244</td>
<td>ASTM E308</td>
</tr>
<tr>
<td>ASTM E313</td>
<td>ASTM E1313</td>
<td>ASTM E1164</td>
</tr>
<tr>
<td>FED-STD-595B</td>
<td>ISO 105/A04</td>
<td>ISO 4585</td>
</tr>
<tr>
<td>SAE J 1545</td>
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Example of Color Measurement Chart
Weathering (cont.)

Crockmeter
A Crockmeter tests the transference of color from the surface of one material to another by either wet or dry rubbing. This test can be performed before and after weathering to detect changes after aging. In addition, the Crockmeter can also perform scuffing, wet/dry abrasion, flexing, powdering, dry-cleaning and ink abrasiveness tests.

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<tr>
<th>ASTM D 925 Method B</th>
<th>AATCC Method 8A</th>
<th>AATCC Method 165</th>
<th>ASTM F1319</th>
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<td>ISO 105, Part D02</td>
<td>JIS K 6328</td>
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UV Discoloration by UV Staining
ARDL can perform several types of UV staining to check product performance.

| ASTM D 925 Method B | GM 6086M | MS-AI 522 | SAE J 1037 | WSB-M3G 102-B2 |

UV Resistance by QUV
ARDL has several large capacity QUV testers to accommodate different sample sizes and odd shapes - which means you don’t have to wait in line. The QUV accelerated weathering tester is a cost-effective simulation of short wavelength UV exposure. This type of testing is often used for quality control applications and is especially useful for performance comparison of different types of polymers and stabilizers. The QUV offers a condensation system for moisture simulation that does not require water spray or humidity control.

QUV Test Methods Available Include But Are Not Limited To:

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<tr>
<th>ASTM D904</th>
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<td>ASTM G151</td>
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<td>BS 2782 Part 5</td>
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<td>JIS D 0205</td>
<td>MIL-DTL-85052</td>
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Fog Characteristics
Fog is a procedure performed in order to determine the tendency of interior materials to produce a light scattering film on a glass surface in a controlled environment.

Salt Fog / Salt Spray
Salt fog is an environmental testing procedure performed on products and materials to replicate conditions of an ocean exposed atmosphere.

UV Resistance by Sunshine Carbon Arc Weather-Ometer
The Carbon Arc Weathering system provides more UV exposure at wavelengths below 300 nm than natural sunlight alone. ARDL’s open-flame carbon arc light source tests light fastness durability of materials and coatings utilizing three pairs of carbon rods that emit ultraviolet, visible and infrared radiation when an electric current is passed between them. The Carbon Arc utilizes temperature control with a black panel sensor and sample conditioning water.

Carbon Arc Test Methods Available Include But Are Not Limited To:

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<tr>
<th>AATCC192</th>
<th>ASTM C1442</th>
<th>ASTM D730</th>
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<td>ASTM G152</td>
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Ozone Resistance
ARDL has numerous chambers to test your product or material for Ozone degradation and under a variety of Ozone concentrations and temperatures.

Dynamic Ozone Resistance
Tests for Ozone resistance under dynamic conditions.

Example of a Failed Rubber Sample After Testing in an Ozone Chamber

1.00 mm
Weathering (cont.)

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QUV lamps are electrically similar to the common cool white lamps used in general lighting but are designed to produce mostly UV light rather than visible or infrared light. In order to cover a wide range of testing needs, ARDL uses several types of UV lamps dependent on the amount of UV energy emitted and the wavelength where the spectral energy falls.

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