ATLAS
MATERIAL TESTING SOLUTIONS

Material Testing Product and Technology News

Volume 31
Issue 65

SunSpots

Summer 2001

General Motors Announces New Standard

by Susan Schultz
Engineering Group Manager
General Motors Corporation

The General Motors World Wide Fabric Specification Team was charged with the development of a common worldwide laboratory test method to determine the effects of weathering on automotive interior materials. The new method GMW 3414TM, "Artificial Weathering of Automotive Interior Trim," was recently completed and is expected to be published in a few months. Once published, it will initially become a mandatory requirement for fabric and eventually all interior trim material supplied to General Motors entities throughout the world.

Since the new test is significantly different from the currently specified SAE J1885, I am taking this opportunity to let our suppliers know that it is eminent, so that they may prepare their laboratories to perform it.

Continued on next page

The Atlas Ci5000 Xenon Arc Weather-Ometer® will meet the new GMW 3414TM standard.

The Making of Reference Solar Spectral Power Distributions

by Henry K. Hardcastle III
Research and Development Manager
Atlas Weathering Services Group

Introduction

The solar spectral power distribution (SPD) represents a critical variable in natural and artificial weathering processes. Weathering research often requires reference SPDs representative of end-use environments or worst-case in-service conditions. Uses of SPDs include comparison of different environments, comparison of artificial light sources to natural sources, estimates for dose-damage models and characterization of materials wavelength sensitivity in natural environments. The impetus for this study was to develop more realistic reference SPDs than are currently available for Miami, Florida and Phoenix, Arizona.

To date, the weathering industry has widely used ASTM E 891[1]

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General Motors, from page 1

The main differences are:

	SAE J1885	GMW3414TM	
Xenon Type	Water-cooled	Water-cooled	Air-cooled
Xenon Filters	Quartz Inner/ Type S Borosilicate Outer	CIRA Inner/Sodalime Outer/Float Glass in Lantern*	Suprax & Window Glass for the Xenotest Alpha or Suprax & Xenochrome 320 for Xenotest Beta
Irradiance Control	340nm	420nm	300-400nm
Irradiance Level	0.55 W/m²/nm, 340nm	2.2 W/m²/nm, 420 nm	95 W/m², 300–400nm
Black Panel Control	89°C Black Panel	105°BST**	105°BST
Chamber Temperature	62°C	65°C	65°C
Sample Backing	White Cardboard	Fleece Material***	Fleece Material

Notes:

* *Lantern assembly required to house the additional filters around the standard xenon lamp.*

** *"Black Standard Thermometer" insulated black panel.*

*** *Fleece material to be used between the specimen and the white cardboard for specimens less than 8mm thick.*

The test requirements are comprehensively outlined in the method. Here, I only wish to point out the major differences. However, it is important to note that all instruments that currently meet SAE J1885 may not be capable of meeting the new requirements. Please contact Atlas Electric Devices if you are uncertain about your instrument's capability.

Should you have any questions about the new test method, please feel free to contact me at (810) 575-6095 or susan.a.schultz@gm.com. You may also contact Kurt Scott at Atlas, (773) 327-4520 or kscott@atlas-mts.com.

New Automotive Trends Demand New Testing

by Kurt P. Scott
General Manager, Laboratories and Calibration Services
Atlas Material Testing Technology

The sleek, modern designs of today's automobiles incorporate a great deal more glass than their predecessors. Use of more glass requires that the glass itself be protective of a vehicle's occupants and interior trim materials, both from the harmful solar ultraviolet light and high temperatures caused by transmitted sunlight.

In addition, today's consumer expects a much wider variety of materials in many different patterns and colors. Needless to say, the consumer also expects that aesthetics of the interior be reasonably maintained for the life of the automobile. This translates to minimal allowable color change and virtually no material wear or tear. Consequently, great emphasis is placed on the weatherability testing of automotive interior trim material.

In the late '80s, harmonized tests were developed for the U.S. automotive industry. The outcome, the SAE (Society of Automotive Engineers) J1885, was a rigorous test meant to reduce or eliminate the potential for use of poor performing materials. The most severe aspect of SAE J1885 method is due to its specification of xenon filters that subjects samples to light that automotive interior material would never "see." Though the overall consensus is that J1885 has served the community well, there have been a few negative consequences to its broad use. In general, it has forced materials suppliers to use an excessive amount of costly UV stabilizers, unnecessarily inflating the cost of materials in many cases. Furthermore, it was not uncommon for materials that failed J1885 to perform well in end-use applications. Nor was it uncommon for the opposite to occur: Materials that actually passed the severe J1885 test would, on occasion, perform poorly in application. Flaws of the J1885 test method became more evident with the advent of more sophisticated analytical techniques for the evaluation of weathered materials.

The development of new, more realistic testing has become the next logical step in the automotive industry — tests using xenon light filters that more accurately duplicate the light passing through the glass of an automobile, in combination with elevated test temperatures which are more typical of cars parked in sunlight in warm climates.

Since automotive glass varies with vehicle and manufacturer, laboratory weathering instruments should be readily adaptable to meet a variety of test conditions, especially the varied new light requirements that are being specified in the emerging realistic tests. Atlas has addressed this need by providing the Auxilliary Filter Lantern, which affords the use of a virtually unlimited variety of xenon glass filters. The auxiliary lantern is designed to easily fit existing lamp hardware on new and field-installed devices.

If all other test conditions remain as they are in SAE J1885, for example, the attenuation of short ultraviolet light by more realistic filters typically result in relatively long tests to produce significant material property change. Given time to market pressures and accompanying shortened production cycles in industry, extended test cycles are generally unacceptable. High irradiance testing is being effectively used to mitigate this potentially unfavorable aspect of realistic testing. In addition, the specification of higher black panel and chamber test temperatures that are closer to those measured in enclosed vehicles will also serve to speed up the tests.

In private as well as public studies like that conducted by IFAI/SAE Fade and Weathering Committee, it has been shown that the results of 2-sun, high-irradiance testing duplicate those produced at 1-sun level.

To summarize, new automotive test methods will specify xenon filters which will transmit/attenuate light similar to the glass used in today's vehicles. The glass used will vary with manufacturer. Generally, higher irradiance and temperatures will be specified. Though traditional 1-sun irradiance remains an option in some cases, there are significant time and perhaps economic disadvantages associated with it.

Atlas is committed to assisting its customers in becoming familiar with and prepared to run these emerging standards. In this effort, a number of initiatives will soon be announced. In the interim, please contact your sales or customer service representative with any questions or check the corresponding box on the reply card. ■

Ci65A Discontinued

The Ci65A Weather-Ometer® has earned loyalty from many companies for its legendary stability. But with the many advances in electronics, weathering technology, and the upcoming changes in automotive standards, Atlas is moving forward from the Ci65A and will officially discontinue the product on July 1, 2001. This discontinuation means that the Ci65A will no longer be manufactured; however, it will continue to be supported with Atlas parts and service. ■

Reference SPDs, from page 1

Solar Spectral Power Distributions Throughout a Clear Day in Phoenix — June 22, 1997 — 45° South Facing Surface

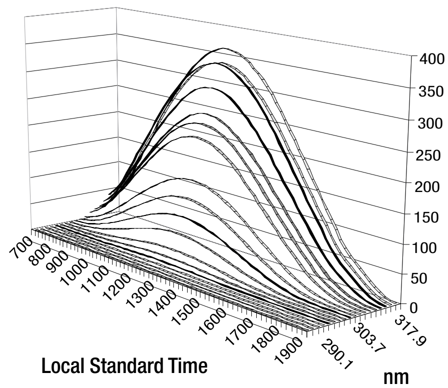

Figure 1. Example of daily solar spectral power distribution measurements made in June 1997 in Phoenix at 45° south.

Effect of Clouds on Solar Intensity at 315.6 nm on 45° South Facing Surfaces in Phoenix — June 1997

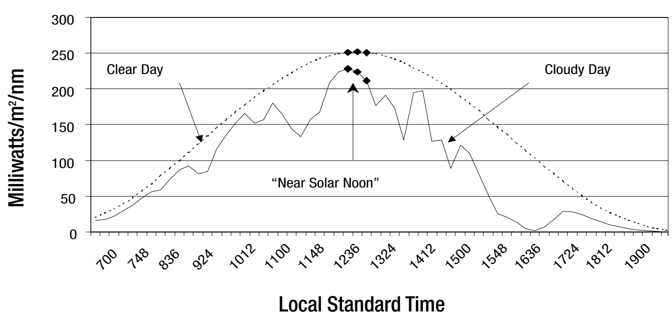

Figure 2. Solar noon intensities at 315.6 nm on a clear and cloudy day.

Variability of Solar Intensities for 3 Clear Days in Miami Near Solar Noon — February, 1997 — 45° South Facing Surfaces

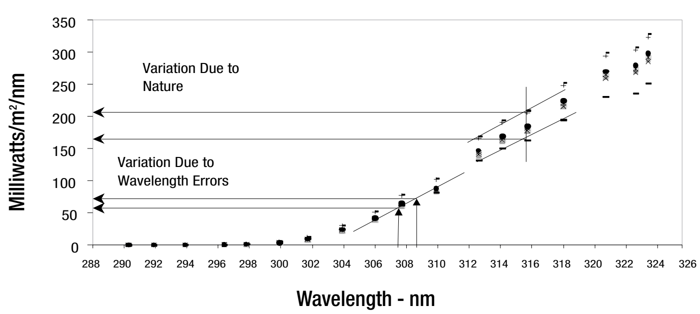

Figure 3. Effect of wavelength calibration errors on measured solar intensities.

and E 892[2] as reference SPDs. These models, however, are theoretical distributions based on the extraterrestrial solar spectrum (Air Mass 0). Very significant discrepancies are observed between these reference SPDs and actual measurements of SPDs at exposure laboratories. Atlas Weathering Services Group (AWSG) desired a set of reference SPDs representative of and derived from actual measurements performed in the reference exposure environments of Miami (subtropical) and Phoenix (desert). Two criteria were important for this project: first, that the new SPDs be derived from actual repeated measurements, and second, that large and statistically robust numbers of measurements be utilized.

Scanning spectral radiometers were installed at exposure laboratories in Miami and Phoenix at a 45° angle from horizontal facing south throughout 1997, 1998, and 1999. Daily solar spectral data near solar noon was obtained and reduced to histograms and frequency distributions. The grouped modal values from these distributions represent the most frequently observed class of irradiance at specific wavelengths over the three-year period. By using the grouped modal values to construct reference SPDs for 45° south near solar noon, the project criteria was achieved. AWSG proposes that the reference SPDs developed in this study be utilized in addition to ASTM E 891 and E 892 where applicable in weathering technology.

Experimental

Instrumentation

The primary instrument used for this study was an SR18 scanning radiometer developed by The Smithsonian Environmental Research Center. The SR18 is an 18-channel scanning radiometer with a filter wheel of 18 interference filters providing 2nm-bandwidth resolution in the UV B range. The instrument measured a 180° field of view. The instrument was designed for continuous monitoring of solar radiation and collected solar UV B data in the 290–324 nm range over the three-year period of this study. The instrument transformed raw, one-minute voltages to 12-minute average intensities. Data processing as well as scheduled instrument calibrations were performed at The Smithsonian Environmental Research Center.

Measurements

One SR18 scanning radiometer was situated at AWSG's South Florida Test Service exposure laboratory near Miami, Florida (Latitude 25°52'N, Longitude 80°27'W) in the subtropical reference environment. Another SR18 was situated at AWSG's DSET Laboratories near Phoenix, Arizona (Latitude 33°54'N, Longitude 112°8'W) in the desert reference environment. Both instruments were oriented at 45° from horizontal facing south throughout 1997, 1998, and 1999. An example of the daily data is shown in Figure 1 (page 4).

Even though the instruments were calibrated and recorded data from 290 nm to 324 nm, only the data above 295 nm is considered in this study (295–324 nm). Several features of the data at wavelengths shorter than 295 nm indicated that signal-to-noise ratios may have reached unacceptable levels. Data at wavelengths shorter than 295 nm will be left for consideration in other treatments. Additionally, although the instruments recorded solar spectral intensities at 12-minute intervals, only three data points closest to solar noon were considered in this analysis. Due to spectral scans being taken on a local standard time schedule rather than a solar time schedule, the data are properly denoted as "near solar noon." Figure 2 (page 4) identifies the three data points near solar noon for a clear and cloudy day in 1997 at the desert site.

At frequent intervals (three to four times each year) the instruments were returned to the manufacturer for calibration. From calibration to calibration, minor adjustments in the wave band centers were noted. In all cases, these wavelength adjustments were less than ±0.5 nm. It was important to understand the magnitude effect on spectral intensities measured due to these errors. As illustrated in Figure 3 (page 4), the maximum effect on reported spectral solar intensity is estimated to be considerably less than the effects of local weather. This inaccuracy, however, is noted. The wavelength identifiers used in this study represent nominal values throughout the three-year study.

Results and Discussion

Scatter Plots

Initial data analysis involved plotting the entire population of near solar noon measurements for each wavelength on x-y scatter plots. These complex plots indicated effects of season (sun angle) and atmospheric trends (clouds) on solar intensities.

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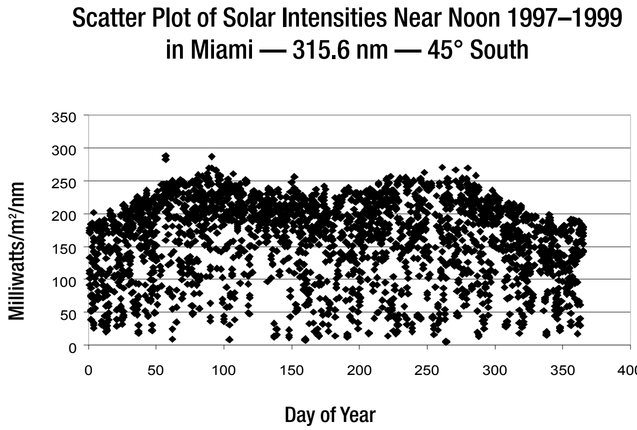

Figure 4. Scatter plot of solar intensities at 315.6 nm for 3 years in Miami.

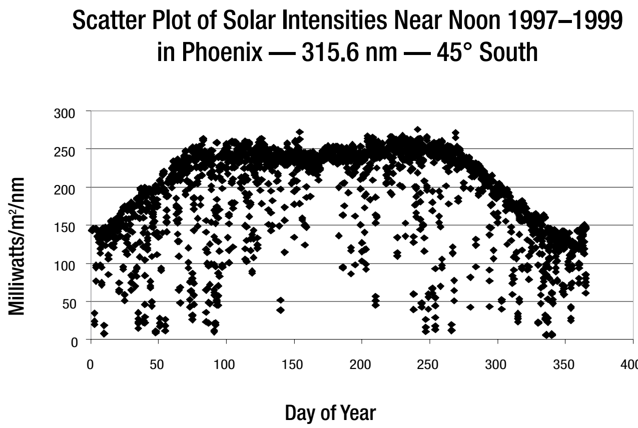

Figure 5. Scatter plot of solar intensities at 315.6 nm for 3 years in Phoenix.

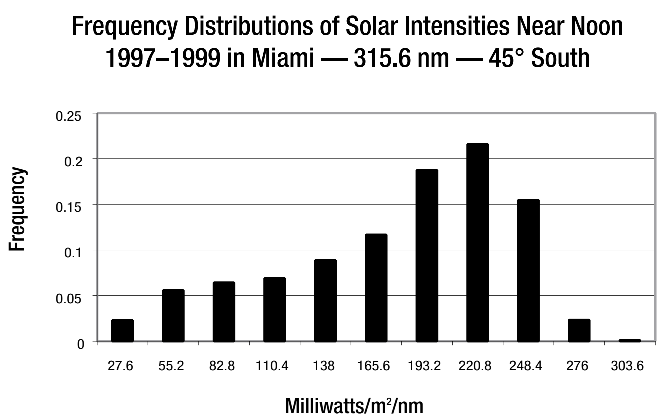

Figure 6. Histogram frequency distribution of solar intensities at 315.6 nm for 3 years in Miami (n = approx. 2780).

Reference SPDs, from previous page

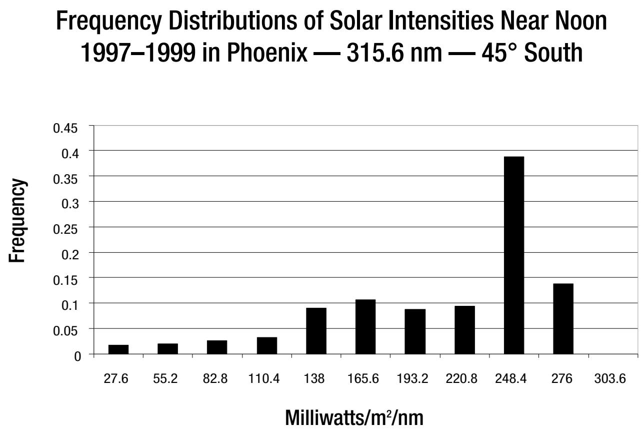

Figure 7. Histogram frequency distribution of solar intensities at 315.6 nm for 3 years in Phoenix (n = approx. 2970).

Examples of these scatter plots are shown in Figure 4 (page 5) for Miami and Figure 5 (page 5) for Phoenix. The population of measured solar intensities for the three-year period at 315.6 nm near solar noon is plotted as a function of day of year. A collection of these scatter plots was generated for all 15 wavelengths considered for both Miami and Phoenix.

Histograms and Frequency Distributions

Though interesting, the scatter plots were difficult to apply and therefore were reduced to histograms. For each wavelength, the range of solar intensities was determined. The intensity range was then divided into 10 classes. For ease of comparison, the same set of classes was used for both the Miami and the Phoenix data. The number of occurrences of solar intensity within each class was counted.

Each class count was then ratioed to the total count of measurements to obtain a frequency for each

Table 1

Proposed Reference Solar Spectral Power Distributions for Miami, Florida and Phoenix, Arizona, 45° South Near Solar Noon

Miami Subtropical Environment		Phoenix Desert Environment	
Nominal Wavelength-nm	**Modal Value in Milliwatts/m²/nm**	**Nominal Wavelength-nm**	**Modal Value in Milliwatts/m²/nm**
296.2	0.35	296.2	0.16
297.6	1.21	297.6	0.38
299.7	6.83	299.7	1.04
301.4	13.64	301.4	16.63
303.7	35.72	303.8	41.75
305.7	55.04	305.8	64.95
307.5	78.32	307.5	96.3
309.7	99.71	309.7	123.76
312.3	164.82	312.3	193.74
314.0	185.77	314.0	217.92
315.6	201.96	315.6	235.72
317.9	237.82	317.9	277.68
320.4	281.32	320.5	323.17
322.2	285.31	322.2	325.86
323.3	301.92	323.3	345.27

class of intensities within each wavelength. An example of this histogram frequency distribution is shown at 315.6 nm for Miami and Phoenix in Figures 6 (page 5) and 7 (page 6), respectively. A collection of these histograms was generated for the 15 wavelengths considered for both Miami and Phoenix.

Calculation of Grouped Modes

The distributions obtained displayed non-normal behavior. In all cases, the distributions were skewed. Researchers desired a statistic that would represent the most frequently observed intensity at each of the 15 wavelengths. For each wavelength, a grouped mode was calculated from the frequency distribution using the formula[3]:

$$\text{Mode} = L_{Mo} + [d_1 / (d_1 + d_2)]\, w$$

Where:

- L_{Mo} = lower limit of the modal class
- d_1 = frequency of the modal class minus the frequency of the class directly below it
- d_2 = frequency of the modal class minus the frequency of the class directly above it
- w = width of the modal class interval

Table 1 (page 6) shows the grouped modes calculated at the nominal wavelengths for Miami and Phoenix.

Proposed Reference SPDs

The data in Table 1 were then plotted in x-y format to obtain the proposed reference SPDs as shown in Figures 8 and 9. These SPDs are properly denoted as hemispherical solar spectral power distributions for a 45° south facing surface near solar noon in Miami and Phoenix.

It is unclear why these distributions indicate that Miami has a higher grouped mode than Phoenix at wavelengths shorter than 300 nm. Errors due to wavelength calibration do not appear to account for this observation. One possibility may be that this is an artifact of signal-to-noise ratios in either of the two instruments. Another may be that these values are truly representative of differences between the environments. No matter what the root cause of this observation, users of this data are strongly cautioned

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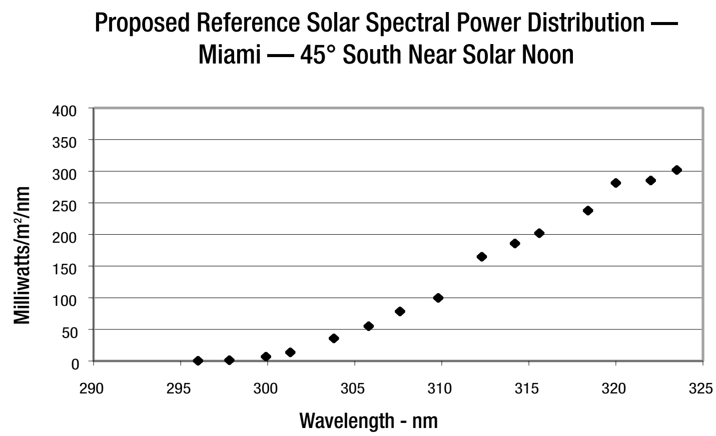


Figure 8. Proposed reference solar spectral power distribution for Miami, 45° south near solar noon.

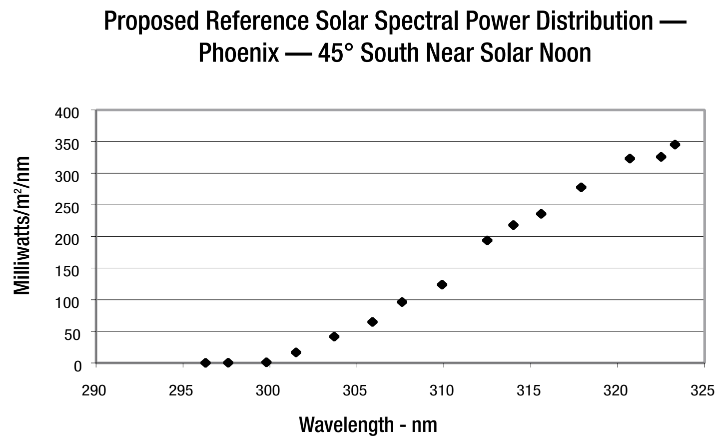


Figure 9. Proposed reference solar spectral power distribution for Phoenix, 45° south near solar noon.

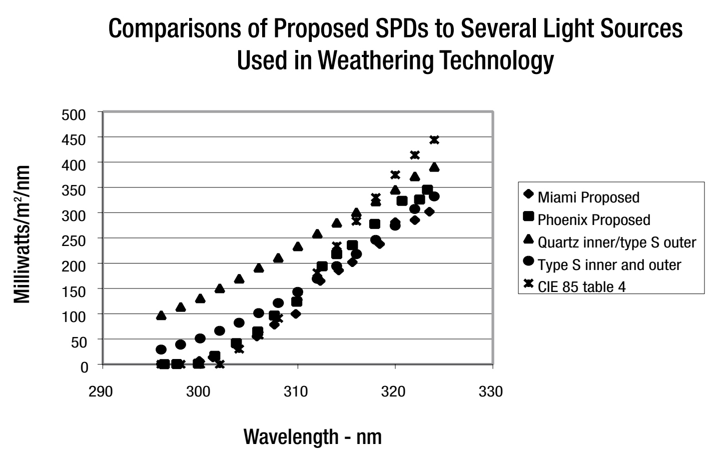


Figure 10. Comparison of the proposed reference SPDs to other light sources in weathering technology.

Reference SPDs, from previous page

about the values at wavelengths shorter than 300 nm until these data are successfully explained.

Applications

One application envisioned for the proposed SPDs is a comparison of the most frequently observed values near solar noon in actual real world environments to values measured from artificial light sources and values measured at different conditions in the real world. Figure 10 (page 7) shows a graphical comparison of several different types of data to the reference SPDs developed in this study.

Conclusions/Summary

This study enabled exposure laboratories in Miami and Phoenix to obtain reference spectral power distributions based on empirical measurements in the subtropical and desert reference environments. Sufficient measurements were considered (daily measurements for approximately three years) to constitute statistically robust data sets. The reference SPDs were derived from grouped modes and represent the most frequently observed class of intensities for the period of measurements. Only intensities near solar noon for wavelengths between 295 and 324 nm were considered for the 45° tilted surfaces facing south.

Sources of instrumental error appeared less than variation due to environmental factors. It is unclear why the Miami data displayed higher intensities than Phoenix data at wavelengths shorter than 300 nm. The proposed reference SPDs may be useful for comparing artificial light sources to real world measured solar intensities.

Acknowledgement

The UV B data reported in this paper were obtained by AWSG in partnership with the National Institute of Standards and Technology consortium on Service Life Prediction. AWSG would like to acknowledge Dr. Jonathan Martin, Consortium Director, for providing processed data; Larry Kaetzel, of K Systems, for facilitation in processing the SR18 measurements; and The Smithsonian Environmental Research Center for instrument development and calibration services. ■

References

(1) *Storey, R.F.; Shoemake, K.A.; Chisholm, B.J.* J. Polym. Sci.: Part A: Polym. Chem. 1996, 34, *2003.*

(2) *Storey, R.F.; Chisholm, B.J.; Brister, L.B.* Macromolecules 1995, 28, *4055.*

Notes

1 *ASTM E 891-87 (1992) Standard Tables for Terrestrial Direct Normal Solar Spectral Irradiance for Air Mass 1.5, Annual Book of ASTM, Volume 14.02.*

2 *ASTM E 892-87 (1992) Standard Tables for Terrestrial Solar Spectral Irradiance at Air Mass 1.5 for a 37° Tilted Surface, Annual Book of ASTM, Volume 14.02*

3 *Levin, R.I. "Statistics for Management," 4th Ed., Prentice-Hall, p. 90 (1987).*

AtlasCommitment to Education

Atlas to Participate in ASTM Training Sessions

The executive committees of ASTM D08 on Roofing, Waterproofing, and Bituminous Materials, D35 on Geosynthetics, and C24 on Building Seals and Sealants have agreed to hold Technical Training Sessions dealing with the subject of Natural and Artificial Weathering. Mathew McGreer, General Manager of Client Education at Atlas Electric Devices Company, will give an Introduction to the Fundamentals of Weathering at each meeting.

ASTM Committee D08 is scheduled for training Sunday, June 24, 2001 at the Norfolk Waterside Marriott in Norfolk, Virginia, from 3:00 p.m. to 5:00 p.m.

ASTM Committees C24 and D35 are scheduled for training Wednesday, June 27, 2001 at the Norfolk Waterside Marriott in Norfolk, Virginia from 10:00 a.m. to 12:00 p.m.

Training sessions are free to members and visitors of ASTM.

Atlas to Participate in Weathering Symposium in China

Atlas Electric Devices has accepted an invitation to participate in a symposium to introduce to the Chinese market the latest technological developments in weathering tests, service life prediction, and correlation of natural weathering exposure and artificial accelerated weathering tests. The Sino-American Academic Symposium on Environmental Corrosion and Degradation Tests of Materials will be held on June 13–14, 2001 in Beijing, China, and is co-sponsored by Atlas, Intertek Testing Services, and the Mechanical Environment Technology Research Centre (METRC). Intertek is the long time sales organization for Atlas in China. METRC is a prestigious organization developed by the Guangzhou Electrical Appliance Research Institute and works with several other research institutions in China to provide natural and artificial weathering services to companies across the country.

For a complete list of speakers and topics, please contact Matt McGreer, General Manager of Client Education, at (773) 327-4520.

2001

Fundamentals of Weathering I

June 7
Mexico City, Mexico

June 8
Puebla, Mexico

June 18
Milwaukee, Wisconsin

June 21
Parsippany, New Jersey

September 13
Seattle, Washington

September 18
Pointe-Claire, Quebec

September 19–20
Paris, France

September 24
Dubuque, Iowa

September 26
Evansville, Indiana

September 26–27
Lyon, France

September 27
Dublin, Ohio

October 1
Baltimore, Maryland

October 3
Arlington, Texas

October 9
Guadalajara, Mexico

October 11
Monterrey, Mexico

October 15
Buena Park, California

October 30
Raleigh, North Carolina

Fundamentals of Weathering II

June 22
Parsippany, New Jersey

October 16
Buena Park, California

Xenotest Workshop

September 4–5
Lochem, Netherlands

Atlas School for Natural and Accelerated Weathering (ASNAW)

October 24–26
Phoenix, Arizona (ASNAW-Automotive)

Ci4000/Ci5000 Weather-Ometer Workshop

November 14

Ci35/Ci65 Weather-Ometer Workshop
(2-day course)

November 15–16

For more information on our Educational Programs, please check the corresponding box on the reply card.

Atlas Test Instruments Group

CD Aging Brought to Light

Atlas' XENOTEST® Beta LM

The German magazine *PC PROFESSIONELL* recently completed a CD-burner comparison test in its laboratory in Duisburg, Germany. For the test, CD blanks were exposed according to ISO 105 B02 in a XENOTEST® Beta LM. The tests carried out by *PC PROFESSIONELL* were based solely on the "Orange Book" standard developed by Sony and Philips. This standard requires that CD blanks be able to withstand 20 days of exposure to the sun behind window glass with no adverse effects.

The results of the test showed that cheaper blanks were severely inferior. Artificial aging tests literally bring these findings to light. The results are data loss, read errors, and CDs that the CD-ROM reader fails to recognize. The only CDs to successfully pass the test and remain undamaged were re-writable CDs. The complete test report and results appeared in the February 2000 issue of *PC PROFESSIONELL*.

One interesting observation that the test made was that the aging process leaves visible traces on the media. Holding the blank up to the light reveals a distinct brown haze of varying intensity on the medium's "write" side. Therefore, CDs must not be left lying unprotected in cars or behind a pane of glass.

For more information about the XENOTEST Beta, please check the corresponding box on the reply card or visit our Web site at **www.atlas-mts.com.**

Linitest+ Debuts on World Market

The new Linitest+ made its debut at the April ATME-I 2001 Show in Greenville, South Carolina, USA. What's new? The Linitest+ is now available in a 230 V 50/60 Hz 3 Phase model that can be used worldwide. The new electrical configuration allows it to be operated without the use of a step down transformer at facilities not having 400 volt electrical. This new capability unquestionably expands the market for the Linitest+!

The Linitest+ is a compact benchtop laboratory instrument designed to conduct dyeing, washfastness, and fastness testing of fabrics. It is equipped with an extremely user-friendly microprocessor controller that ensures accurate, repeatable test cycling and allows for easy user programming. For washing tests, 500 mL washing containers are used, mounted in an eight position carrier. For high temperature dyeing, 100 mL or 300 mL specimen containers are mounted in a carrier with 12 positions. The stainless steel bath includes a 9 kW heating system that allows ascent rates up to 7°C per minute and an integrated cooling system with programmable temperature descent rates.

For more information about the Linitest+ or Atlas Launder-Ometers® and Laboratory Dyeing Systems, please check the corresponding box on the reply card or visit **www.atlas-mts.com.**

Atlas' Linitest+

Atlas Discounts AATCC Instruments

Atlas is proud to manufacture several American Association of Textile Chemists and Colorists (AATCC) designed instruments:

- **AATCC Crockmeter, Models CM-1 and CM-5**
- **AATCC Perspiration Tester**
- **AATCC Accelerotor®**
- **AATCC Launder-Ometer®**

To support the fine efforts of AATCC, Atlas is offering a discount of 2 percent on the purchase of any of these four official instruments to members of AATCC, either individual or corporate. When placing an order for these instruments, simply provide your current membership number and the discount will be applied. Corporate members should verify that they are in good standing.

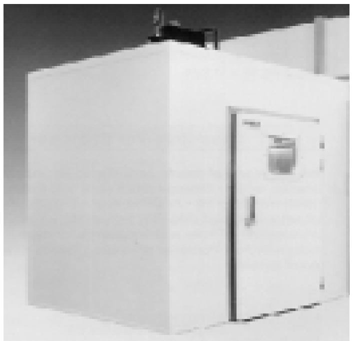
For more information about a discount on official AATCC instruments, please contact your local sales representative or check the corresponding box on the reply card.

Atlas' AATCC Crockmeter, Model CM-1

Atlas Announces New Lab Corrosion Equipment

The **Atlas SF** Salt Fog and Humidity Cabinet has been an integral part of the product catalog for over 25 years. We are pleased to announce the addition of the **Atlas SF Walk-in** with three exposure volumes: 252 ft^3, 336 ft^3, and 420 ft^3 (7,100 liters, 9,500 liters, and 11,900 liters). These cabinets will perform the same salt fog and humidity tests as the SF cabinets, such as ASTM B117, ASTM D1735, ISO 9227, and CASS.

The SF Walk-in provides a means to test oversize samples and assembled components, such as motorcycles, electrical panels, refrigerators, vehicle seats, pressurized cylinders, bicycles, military items, ranch and farm machinery, and window and door assemblies. A window in the large front door allows easy viewing of test conditions. Multiple-nozzle Omni-Fog Dispersion Towers provide precise control of fall-out rates for compliance with standard test methods. This patented system provides for double baffling of fog, exceeding the requirements of most test methods.



Atlas' new SF Walk-in models offer expanded testing capabilities.

When equipped with optional Micro-processor-based Cycling Controls, the Atlas SF Walk-in becomes a huge "basic cyclic" (BCX) cabinet, capable of wet-dry tests like Prohesion™ (ASTM G85 Annex 5). Cycling Controls allow automatic changes to environmental conditions. The controls are set by the operator to cycle automatically between Salt Fog, Dry-off/Purge, Dwell, and optional Direct Spray.

For more information about the new Atlas SF Walk-in, please check the corresponding box on the reply card or contact your local Atlas sales representative.

Revolutionary UV2000 Provides Reliable Results at an Affordable Price

Atlas' new UV2000 is cost effective and easy to use.

Atlas is pleased to unveil the new, easy-to-use UV2000 fluorescent UV condensation weathering instrument. The UV2000 tests the effects of exposure to the sun's ultraviolet light on coatings, plastics, pigments, textiles, adhesives, sealants, and other materials. The newest addition to the Weathering Instrumentation Product line, the UV2000 operates with a breakthrough power supply system designed to increase bulb life — eliminating the need for bulb rotation — while generating steadier output. Customers will also benefit from lower operating costs.

The UV2000 provides complete irradiance control, as well as superior air and temperature distribution. It also features a state-of-the-art Seimens controller with an intuitive touch screen display to set up test parameters. The instrument offers a microprocessor-based test control with test parameter storage. The device is also outfitted with a low water level alarm and a safety for the water heater and high temperature chamber.

The UV2000 uses eight 40-watt fluorescent UV lamps. A countdown timer controls the duration of a test, and an operation meter lets users know the total number of hours the instrument has been in use. The instrument is equipped with independent UV and condensation cycle switches, and specimen holders for 75 x 300mm (3" x 12") and 100 x 300mm (4" x 12") panels. A spray for thermal shock or water-initiated erosion, along with a strip chart recorder and Aquanizer® water deionizer system are extra options available with the device. The UV2000 meets the requirements of SAE J2020, ASTM G53, JIS D0205, BS 2782 Part 5, and numerous others.

For more information about the UV2000, check the corresponding box on the reply card or contact Craig Hazzard, Direct Sales, at (773) 327-4520.

AtlasShows

2001

GRAFITALIA
June 12–17
Milano, Italy

Intl. Exhibition Poznan
June 18–21
Poznan, Poland

Chemistry 2001
September 10–14
Moscow, Russia

43rd International Engineering Fair
September 24–28
Brno, Czech Republic

Plastics USA
October 2–4
Chicago, Illinois

MAC
October 2–6
Milano, Italy

Flanders Textile Valley
October 4–6
Kortrijk, Belgium

TIB
October 8–13
Bucarest, Romania

ITMA Aisa
October 15–19
Singapore

IFAI
October 18–20
Opryland Hotel
Nashville, Tennessee

Plast 2001
October 18–21
Biylekdüzü, Turkey

AATCC
October 21–24
Palmetto Expo Center
Greenville, South Carolina

K'2001
October 25–November 1
Düsseldorf, Germany

FSCT ICE 2001
November 3–7
Booth #1528
Georgia World
Congress Center
Atlanta, Georgia

Kemodijana
November 15–17
Helsinki, Finland

Context 2001
November
Mumbai, India

EXPOTRONICA
November
Barcelona, Spain

Textech 2001
December
Chandigarh, India

Atlas Executive Chosen to Head AMZ


Stefan Daiser

Stefan Daiser, general manager of Atlas' new Analytical Instruments Group, has been elected as chairman of AMZ. AMZ — the German acronym for "analytical management circle" — is a nonprofit association of general managers, managing directors, and sales/marketing managers of scientific instrumentation companies. Founded in 1987 in Munich, Germany, the group draws from companies with an emphasis on analytical, meditech, testing, and measuring that are headquartered in Central Europe or have important subsidiaries in that region.

The organization offers an active forum for seminars, workshops, and idea exchange on relevant topics for those industries. One of the primary goals of AMZ is to initiate and support political lobby work, primarily for the scientific instrumentation industry. Atlas has been a member of AMZ since 1997. Other members include highly reputable scientific instrumentation companies like Biorad, Millipore, Shimadzu, Sentech, and Dionex.

AWSG Makes Organizational Changes

AWSG is pleased to announce the promotion of Rich Slomko and John Wonders to the position of Weathering Manager, South Florida Test Service (SFTS) and DSET Laboratories, respectively, and of Oscar Cordo to Technology Manager. The promotions and the new organizational structure reflecting their positions were effective April 1.

The new position of Weathering Manager will result in one manager for all testing departments thus allowing increased flexibility and resources management among previously separate departments. This change will allow for a seamless flow of specimens among different test areas. Rich Slomko will be responsible for all day-to-day activities in Static, Evaluation Services, and the Accelerated Laboratory at the SFTS location, along with the SFTS-Everglades site. John Wonders will be responsible for all day-to-day activities in Static, Evaluation Services, EMMAQUA®, and IP/DP Automotive Testing at the DSET location.

The Technology Department was established to enhance procedures, processes, and data reporting through the implementation of new technology. Oscar Cordo, who recently received his Master of Science degree in Information Systems, has a strong knowledge base for his new role as Technology Manager.

Congratulations to Rich, John, and Oscar!

Correlation and Acceleration

In the context of materials durability, *correlation* can be defined as the ability of an artificial weathering method to produce results that agree with real-time outdoor or service environment exposures. *Acceleration* is a measure of how rapidly a test can be conducted using a natural accelerated or artificial laboratory method compared with conventional, natural outdoor weathering. The foundation of whether or not an artificial test correlates with natural weathering is based on the changes that have occurred to the materials on exposure. These might be mechanical or appearance changes, such as gloss loss, color change, or tensile strength, or they may be chemical changes, which can be detected with infrared spectrophotometry, electron spin resonance, chemiluminescence, or thermal analysis. There are several factors that will certainly decrease correlation:

Reasons for poor correlation	The "myth"	What really happens
Short wavelength light sources (outside of the solar spectrum)	Shorter wavelengths of radiation have more energy, which will degrade my material faster.	The high energy contained in shorter wavelengths of radiation causes unnatural photochemical changes.
Continuous exposure to light	Maximizing the amount of time a material is exposed will shorten my test time.	Some materials need a "rest period" for certain chemical reactions to take place. Since the natural outdoor exposures will always have a "dark cycle," it makes sense to simulate this in artificial weathering instruments.
High light intensities (especially with artificial light sources)	Blasting my samples with high irradiance is the only way to get the acceleration I need.	Some photochemical changes during exposure may be altered at high irradiance levels that do not occur at normal levels.
Abnormally high specimen temperatures	I'll get faster acceleration since higher temperatures result in faster degradation rates.	Unrealistic temperatures during exposure often cause different types of degradation, which do not correlate with outdoor exposures.
Unrealistic temperature differences between light and dark materials	Since UV radiation is the most important factor of weathering, that's all I really care about.	Radiation sources with only UV radiation will cause unrealistic or a lack of temperature differences between materials of different color or structure.
No temperature cycling	If I keep my temperatures high, I will get faster acceleration.	Natural temperature cycling often causes physical changes to materials as a result of the expansion and contraction of materials.
Unnatural levels of moisture	I'll soak my specimens to increase degradation.	The absorption/desorption cycle of water causes physical stresses which can actually cause more (and realistic) degradation than a saturated environment.
Absence of pollutants or other biological agents	Since these are "secondary" factors, I'm not concerned about these factors or what they do to my material.	Laboratory weathering instruments are rarely, if ever, used to replicate the effects of pollutants or other biological factors, but they are an inherent part of the natural weathering process, and we must remember that they may be a cause for less than expected correlation.

A Correlation/Acceleration Example

Probably the best way to graphically show what can happen when trying to over-accelerate a weathering test is the chicken and the egg story. But this is not the traditional question of “Which came first?” If we consider an egg, we know that after approximately 21 days at 35°C, the result will be a chick hatched from the egg. This is analogous to testing material under natural conditions. Of course, materials engineers are always saying, “I can’t wait that long for my results!” But if we try to accelerate the birth of this chick by exposing it for five minutes at 180°C, we get a result of fried eggs instead of a little chick! While we know the results of acceleration in our chicken-egg story, we sometimes forget that the same type of thing might happen with our accelerated weathering test.

Weathering Leader First to Get Accreditation to ISO/IEC 17025

As part of a commitment to provide the best products and services to its customers, Atlas Weathering Services Group (AWSG), the world’s largest independent outdoor weathering site, is the first weathering organization to receive accreditation to ISO/IEC 17025, General Requirements for the Competence of Testing and Calibration Laboratories.

ISO/IEC 17025 reinforces Atlas’ commitment to ensure accurate and repeatable results for every customer’s weathering tests. This new standard places more emphasis on management requirements, stresses the laboratories’ obligation to identify clients’ needs, and ensures that the test methods chosen meet those needs. Technical requirements, such as selection of methods and laboratory-developed methods, are significant new additions. In accordance with ISO/IEC 17025, AWSG also has set procedures for reviewing standard and special contracts, including a test acknowledgement that is sent to clients to check for discrepancies when testing begins.

Recently, various countries and regions have used laboratory quality standards, such as ISO/IEC Guide 25 in the U.S. and EN45001 in Europe, that were similar but not completely uniform. Atlas is aware of the importance of this standard to its international client base. The adoption of ISO/IEC 17025 assures that Atlas standards will be applicable to customers around the world, because harmonization is ensured.

For more information, contact Atlas Weathering Services Group at (800) 255-3738, visit **www.atlaswsg.com**, or check the corresponding box on the reply card.

AtlasSpeaks

Coatings for Plastics Symposium
June 4–6, 2001
Troy, Michigan

Fred Lee, Atlas Material Testing Solutions, will present “Analysis of Scratch Resistance Using Optical Imaging and Automatic Classification System.”

Coming Next Issue:

FSCT International Coatings Expo 2001 Preview

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