ATLAS
MATERIAL TESTING SOLUTIONS

SunSpots®

Material Testing Product and Technology News

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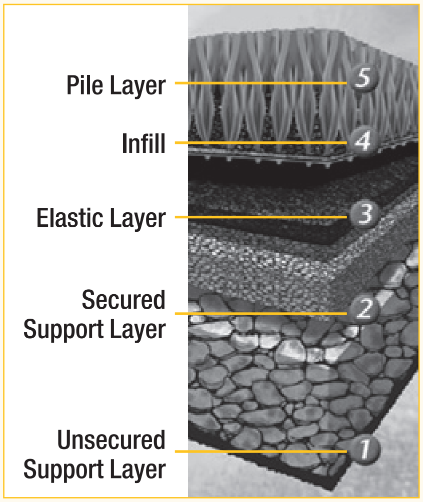
Atlas Now Offers Complete Test Management
Page 15

Requirements for Accelerated Laboratory Weathering of 3rd Generation Artificial Turf

By Dr. Artur Schönlein and Dr. Oliver Rahäuser, Atlas Material Testing Technology GmbH

One of the most significant milestones in artificial turf technology was FieldTurf's development of the 3rd Generation in 1999–2000, for which the company received several patents. Probably the most significant of these patents is for a combined filling of quartz sand and rubber granulate. The 3rd Generation layer concept led to a worldwide boom in artificial turf [1].

To optimize turf performance, developers have focused on the design of the fibers' outer form, but also a range of options for the chemical components. The current 3rd Generation artificial turf—widely used in soccer stadiums over the past few years—consists of multi-component systems. This has increased the risk of undesirable chemical interactions, making accelerated laboratory weathering more critical in the development of high quality artificial turf.



To date, few practical examples are available, but there are indications of decomposition processes, which existing accelerated laboratory tests are unable to adequately simulate. In particular, the interactions between recycled rubber granulate, water and/or acid rain have been cited. Finally, the different colorations of the components must be considered since these result in differing surface temperatures and, consequently, differing reaction kinetics.

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In This Issue

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Shanghai, China

Industry Fair Brno
September 15–19
Brno, Czech Republic

Auto Testing 2008
September 17–19
Shanghai, China

LatinCoat 2008
September 23–25
São Paulo, Brasil
Booth 84

Korea Energy Show 2008
September 29–October 2
Seoul, Korea

Solar Power 2008
October 13–17
San Diego, California, USA
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October 14–18
Friedrichschafen, Germany

Expoquimia
October 20–24
Barcelona, Spain

ITME 2008
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Bangalore, India

China Coat
November 18–20
Guangzhou, China

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2008

Fundamentals of Weathering I

October 1
Chicago, Illinois, USA

October 7
Oensingen, Switzerland

November 4
Kassel, Germany

November 27
Horb, Germany

Fundamentals of Weathering II

October 2
Chicago, Illinois, USA

October 8
Oensingen, Switzerland

November 5
Kassel, Germany

Weather-Ometer® Workshop

November 25–26
Duisburg, Germany

Ci4000/Ci5000 Workshop

September 30
Chicago, Illinois, USA

Xenotest® Workshop

October 21–22
Linsengericht, Germany

SUNTEST® Workshop

October 9
Oensingen, Switzerland

October 24
Linsengericht, Germany

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This paper examines the extent to which existing methods for accelerated laboratory weathering should be modified to meet the challenges arising from the growing chemical/physical complexity and to allow for testing that is as close to real life as possible.

1 3rd Generation Artificial Turf

1.1 » Structure

3rd Generation artificial turf represents the best alternative to natural grass. It is installed on prepared support layers and, as a rule, an additional elastic layer. The pile layer consists of straight or curly fiber structures, including both multiple fiber and single fiber types. The quartz sand and rubber granulate filling enhances the turf's self-load, protecting and holding the pile layer in place to create the playing field surface. Equipped with a drainage system that typically begins in the pile layer's support web, this type of artificial turf exhibits nearly all the characteristics of natural grass with respect to aesthetics and playing properties.

1.2 » Pile Layer Materials

The two plastics most frequently employed for artificial turf fibers are polyethylene and polypropylene thermoplastics, with soccer field turf generally being made of polyethylene.

As is the case with nearly every technical plastic, additives are introduced to enhance the turf fibers' appearance and improve their physical characteristics and durability. These additives include dyes, pigments, and light protection agents.

1.3 » Infill Materials

Specially prepared quartz sand (silicon sand) should be employed to stabilize the artificial turf before filling in the rubber granulate. Removing iron appears to be particularly important during the manufacturing process. Studies on carbonyl formation in polyethylene containing different concentrations of iron ligand show that iron affects the photochemical decomposition of polyolefins. It is also recommended that round-grained sand be used to avoid damaging the synthetic fibers.

Three types of rubber granulate are currently employed to give artificial turf the necessary elasticity and flexibility:

- Unencapsulated recycled rubber granulate; containing vulcanizing chemicals sulfur types and ZnO (approximately 6%).
- Treated/encapsulated recycled rubber granulate; CO_2-"washed" or encapsulated with any desired (colourable) PUR system.
- Ethylene propylene diene monomer rubber (EPDM); synthetic rubber available in a variety of colors. EPDM granulates contain ZnO and are approximately 4–6 times as expensive as recycled rubber granulates.

Due to their much broader use, recycled rubber granulates have been the subject of major discussion, both with respect to the user as well as the turf itself. The hazardous sources most frequently discussed are the sulfur [2] and zinc oxide contained in the recycled rubber granulate.

Oxidized sulfur in the form of SO_2 can be a preliminary stage for sulfurous acid. In turn, it can be oxidized into sulfuric acid. Both represent a hazard to the HALS and low-basicity HALS which lose their stabilizing effect in a protonized state.

ZnO is less photo-catalytically active than other hazardous sources, for example, TiO_2. Scientific studies proving that ZnO promotes the decomposition of polyolefins are lacking, but the suspicion remains nonetheless.

The described variety of used yarn and infill components necessitates a revision of the current accelerated laboratory weathering procedures. As the following sections show, simply transferring a standard test to these multi-component systems is subject to numerous risks.

Table 1: *Currently applied standardized test procedures for laboratory testing of artificial turf based on the underlying standards ISO4892-2/3*

Test Method	EN 14836 (March 2006)	FIFA method (February 2005)	ISO 4892-3 (May 2006)	DIN V 18035-7 (June 2002)	ISO 4892-2 (May 2006)
Lamp Technology	Fluorescent	Fluorescent	Fluorescent	Xenon	Xenon
Filter	UVA 340	UVA 340	UVA 340	Daylight	Daylight
[A]E (W/m²/nm) or (W/m²)	0.8 (340 nm)	----------	0.76 (340 nm)	60 (300-400 nm)	60 (300-400 nm)
Dry/Wet Cycle (min.)	240±4/120±2	240±4/120±2	480/240	102/18	102/18
Light/Dark Cycle	240±4/120±2	240±4/120±2	480/240	----------	----------
[B]BPT (°C)	55±3/45±3		60±3/50±3	----------	----------
[C]BST (°C)		55±3/45±3	60±3/50±3	60±3	65±3
[D]CHT (°C)	≈ BPT	≈ BPT	----------	----------	38±3
r.H. (%)	Not Specified	Not Specified	Not Specified	65±3	50±10
Test Conclusion (kJ/m²)	4,896±125	----------	----------	7,500,000	----------
Test Conclusion (hr.)	≈ 3,000	≈ 3,000	----------	----------	----------

[A]*E - Irradiance*
[B]*BPT - Black Panel Temperature*
[C]*BST - Black Standard Temperature*
[D]*CHT - Chamber Temperature*

2 Current Employed Standardized Laboratory Weathering Tests

The currently employed standard test procedures orient themselves to ISO 4892-1, while reference is made to ISO 4892-2 and ISO 4892-3. Table 1 above summarizes the conventional test procedures as well as the underlying standards. The differentiation between the cited standards lies in the light sources employed in the laboratory (see Figure 1). This results in basic differences which will be discussed in greater detail below.

Both the FIFA test procedure from 2005 [3] and the European EN 14836 standard are derived from ISO 4892-3. Compared with ISO 4892-3, the dry/wet cycles and the light/dark phases are shortened by one-half while temperatures are set 5K lower. One instance specifies the black panel temperature, while the other utilizes the black standard temperature.

The test method defined in DIN V 18035-7 is also derived from ISO 4892-2. The important differences are the lower black standard temperature of 60°C and the significantly higher relative humidity of 65%.

In contrast to the method employing the fluorescent lamp, the xenon lamp method does not include a dark phase. DIN V 18035-7 cites a value of 7,500 MJ/m² as indicating the end of the test, however, no reference is made to the wavelength range to which this irradiation refers.

We are fully aware that the two test methods cannot be compared with one another and that it cannot be assumed that both methods can provide comparable test results with regard to a change in properties. Our sole intention is to present the current situation.

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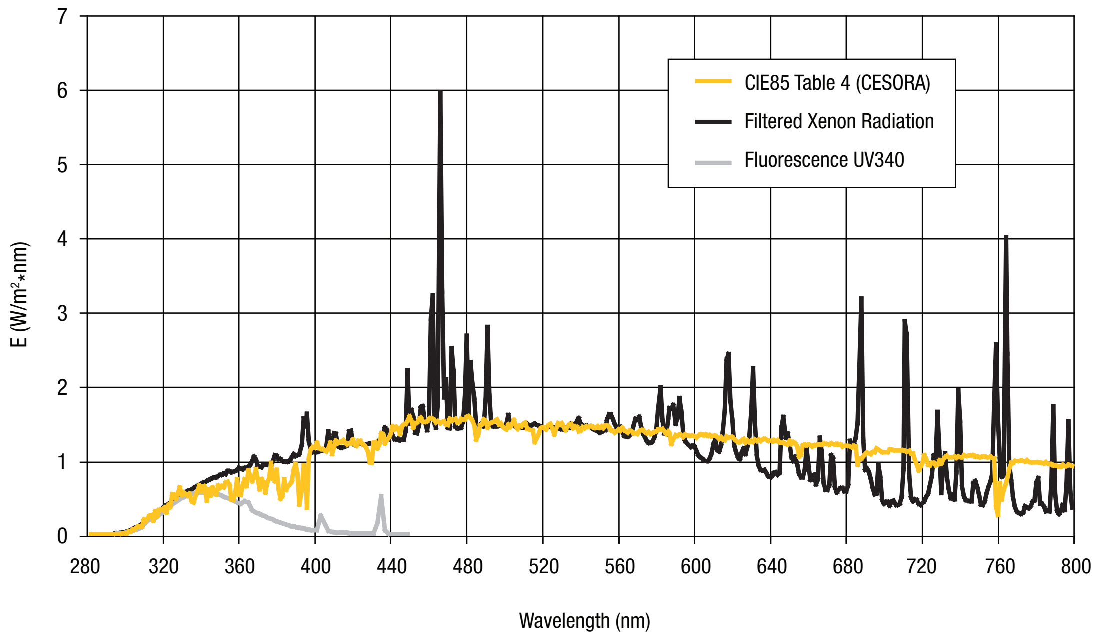

FIGURE 1: Laboratory light sources in comparison with the solar reference (CIE85, Table 4)

3 Climatic Requirements for Artificial Turf Testing

The climatic requirements for artificial turf tests are derived from actual conditions of use. The primary weather factors considered are the actual stresses resulting from solar radiation and ambient temperature, water that may be polluted, and moisture.

3.1 » Solar Radiation for Artificial Turf Testing

Solar UV radiation is the most important primary weather factor. Currently there is no reason to assume that any geographical limits will be placed on the employment of artificial turf. Therefore, the global solar radiation which has, for years, been defined in Table 4 of the CIE85 [4] should be employed as the reference for the relative spectral power distribution of the solar radiation. The radiant distribution defined there corresponds to the global radiation at the highest point of the solar arc during the equinox at the equator, measured at sea level.

The following table lists irradiances for various wavelength intervals calculated with the aid of CESORA [5] for both reference climates and typical ball game locations. An irradiance of 60 W/m² in the wavelength interval between 300 nm and 400 nm—as is employed for ISO 4892-2—can be confirmed as a realistic maximum condition for a weathering test procedure.

3.2 » Temperature Factors for Artificial Turf Testing

The second primary weather factor for weathering tests is the temperature. The reaction speed—that is, the rate of a chemical reaction over time—is described by the Arrhenius equation. In general, the higher the temperature the more rapidly a chemical reaction will proceed.

The relevant climatic value for this is the surface temperature of the materials involved. On three different clear, sunny days, the surface temperature of 10 different artificial turf systems filled with sand and rubber was measured in Pennsylvania [6]. The calculated mean value as well as the maximum and minimum values are shown in Figure 2. The measured surface temperatures are up to 40K higher than the air temperature and surface temperatures of up to 70°C are reached. The increase in surface temperature as related to

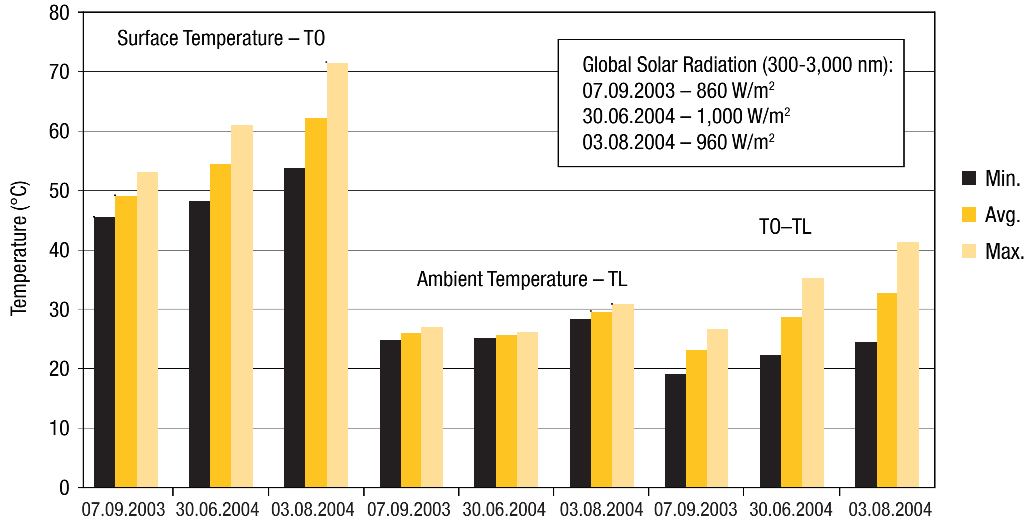

FIGURE 2: Mean, maximum, and minimum surface temperatures of 10 different artificial turf systems filled with sand and rubber, measured in central Pennsylvania on clear, cloudless days with the aid of an infrared thermometer (Scheduler Model 2 LiCor)[6]. Also shown are the air temperatures measured simultaneously approximately 1 m above the turf as well as the differences between the surface and air temperatures. The global solar irradiation at the highest point of the solar arc is calculated with the aid of CESORA [5].

solar radiation was investigated in Japan [7]. During the period from February to December, the surface temperature and illumination on an artificial turf system filled with sand and rubber were measured on clear, sunny days. Here too, surface temperatures of up to 65°C were reached. Also of note is the fact that—under identical climatic conditions—artificial turf can exhibit surface temperatures that are up to 40K higher than those of natural grass [8].

3.3 ›› Water as an Influencing Factor

Water is the third primary weather factor that must be considered for artificial turf weathering. Water can act on the artificial turf materials in the form of rain, dew, artificial watering, and water vapor contained in the air.

Stresses resulting from rain, dew, and humid air depend on the exposition location, but artificial watering may be introduced anywhere. Periodic artificial watering is highly recommended because it helps optimize the functional characteristics of the turf (sliding, turning, the ball's bouncing and rolling behavior) and—just as important—it increases the protective function for players ("rug burns," sprains, binding airborne dust).

When evaluating rain-induced stress, acidic precipitation in industrial areas must be considered.

4 Approaches for Realistic Weathering Testing

This section looks at the primary weather factors individually and discusses how these factors can best be simulated for an accelerated laboratory weathering procedure.

4.1 ›› The Laboratory Light Source

The currently standardized test procedures employ either a fluorescent lamp or a xenon lamp as their light source. Figure 1 illustrates the spectral energy distribution compared to the solar reference in accordance with CIE85 (Table 4).

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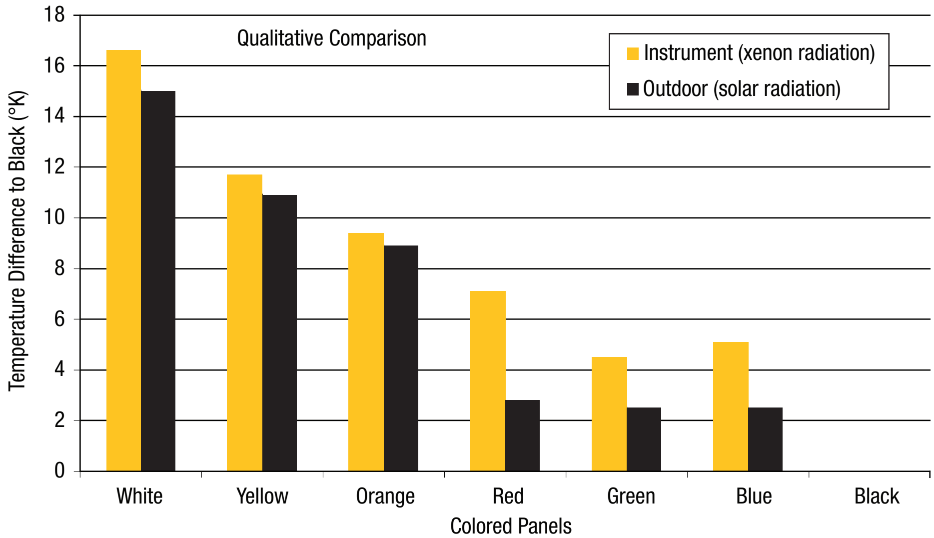

FIGURE 3: Temperature measurements of polyvinylchloride sheeting mounted on aluminum panels made outdoors and in a weathering device [10, 11]

Up to approximately 340 nm, the fluorescent lamp's spectrum matches that of the solar spectrum very well, as does the spectrum of the filtered xenon lamp. Above 340 nm, only the filtered xenon radiation adequately describes the solar spectrum. 3rd generation artificial turf systems are multi-component systems comprising different and very complex polymers. Many polymers are essentially susceptible to photochemical aging in the shortwave UV range up to approximately 340 nm. In these cases, the fluorescent lamp provides a satisfactory solution for weathering tests. In most cases, however, the wavelength interval at which the employed polymer materials are photochemically active is unknown, particularly in view of the frequently different additives used. It must, therefore, always be assumed that the employed materials can exhibit photochemical reactions above 340 nm—something that is already known for a range of materials [9]. Added to this is a temperature effect, which can arise as a result of natural sunlight on multi-component systems with differing spectral absorptions and which can only be adequately simulated with the aid of filtered xenon radiation.

Figure 3 illustrates the qualitative effect using outdoor and laboratory device temperature measurements of dyed polyvinylchloride sheets mounted on aluminum panels [10, 11]. The temperature difference with respect to the black panel has been plotted. Qualitatively similar temperature differences can be observed for both solar irradiation as well as in the weathering device. Since the fluorescent lamp has no visible radiation and no infrared radiation, this effect will not arise [12]. Similar effects must be anticipated for multi-component systems comprising materials with differing absorption characteristics.

4.2» Black Standard Temperature Test Parameter

The actual surface temperatures of filled artificial turf systems, such as those discussed in Section 3.2, are distinctly higher than the black standard or black panel temperatures adjusted as control parameters in the current standardized test procedures. Even though temperature measurements comparing artificial turf systems with black standard temperature measurements are not yet available, it can nonetheless already be stated that black standard and black panel temperatures as relevant temperature measures must be increased by at least 10K in order to create conditions that are as close to realistic as possible.

Table 2: *Irradiances for various wavelength intervals calculated with the aid of CESORA[5] for reference climates in Arizona and Florida, as well as for a location in Central Europe and for Cape Town, South Africa, where soccer's 2010 World Cup will be played. The spectra are calculated for noon—the highest point of the solar arc—on June 21st.*

Wavelength Interval (nm)	Arizona E (W/m^2)	Florida E (W/m^2)	Frankfurt E (W/m^2)	Cape Town E (W/m^2)
280–300	0.016	0.017	0.008	0.016
300–400	60.3	62.0	47.6	61.6
400–800	565.7	583.8	468.4	567.2
800–4000	419.5	386.9	349.5	429.9
280–4000	1045.6	1032.7	865.6	1058.7

In this field the investigations are ongoing. So far it seems that the most critical temperature is the temperature on the surface of the infill.

4.3›› Rain, Watering and Humidity Test Parameters

With regard to dry and wet cycles as well as moisture, the recommendations in ISO 4892-2 or ISO 4892-3 appear to be practical. Whether or not light and dark cycles are necessary to allow dark reactions for testing with a xenon lamp compared with outdoor weathering is something that will require further examination.

A combination of spraying or wetting with acid rain in accordance with the draft standard, "Artificial Weathering Including Acidic Deposition," to ISO TC61/SC6 will also require careful consideration.

4.4›› Test Chamber and Sample Holder

Accelerated laboratory weathering testing will undoubtedly need to take all types of artificial turf into consideration. This includes simple systems as well as ones with very complex structures, as described in Section 1.1. In order to meet all possible spatial requirements, a horizontal sample arrangement is preferable. Almost all of the currently employed test procedures use vertical sample arrangements. Horizontal sample retention, however, allows a wide variety of system structures to be easily tested—provided the height of the sample can vary to ensure that the it remains equidistant from the laboratory light source.

The sample holder should be designed so that, on the one hand, the more complex structures—e.g., those with water drainage systems—can be tested and, on the other, so that the test parameters of irradiance, temperature, and humidity can be properly measured and continually regulated.

A test surface area of at least 80 cm x 40 cm appears adequate to perform general physical tests (e.g., tensile strength, force reduction/shock absorption) and/or other standard FIFA tests (e.g., Lisport).

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5 Summary

In Section 1 we saw that today's variety of infill materials increases the risks for an accelerated polymer decomposition. This is primarily due to the metallic components and/or the sulfur contained in the infill. We further noted that, through the employment of low-basicity HALS, the industry is researching and offering increased acid protection.

In light of these developments, current accelerated laboratory weathering tests should be evaluated and modified accordingly. The primary consideration is that weathering tests can only be considered to adequately mimic reality if the artificial turf is tested together with its infill material.

The second consideration is to take the temperatures of the actually attainable turf and infill material into account, as described in Section 3. This is most practically achieved by regulating the black standard temperature (BST) in the test chamber, whereby the BST value of 60°C currently demanded by the standards must be viewed as being at least 10K too low. The employment of filtered xenon light is recommended, as—in contrast to fluorescent light—it has been shown to be capable of simulating the differential heating of coloured materials in a realistic fashion.

Also practical is the employment of acidic rain, as artificial turf is frequently installed in industrial and metropolitan areas where the potential for acid rain is high.

Finally, an examination and optimization of the duration of the wet/dry cycles might be worthwhile. Significant dew formation, as well as the regular artificial wetting required to protect players against injuries, needs to be further taken into account. Longer wet/dry cycles than currently mandated may come closer to mimicking reality.

6 Bibliography

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Atlas Debuts Two New XenoCal® Sensors

Precision is critical for all testing equipment, especially for laboratory weathering instruments. Accurate irradiance and temperature control are key parameters in determining the quality, reliability and consistency of the test results generated. With this accuracy in mind, Atlas has developed two new XenoCal sensors to provide user-friendly, precise calibration for our Atlas xenon testing instruments.

XenoCal BB 300-400 BST

This sensor combines two weathering parameters—irradiance in the UV range 300 to 400 nm and black standard temperature—in the same sensor. A combination sensor of this kind provides highly accurate results, as both values are measured at the same time and at the same level. The simultaneous measurement also saves valuable time and money. The XenoCal BB 300-400 BST is available for all Xenotest® instruments.

Get a sneak preview at the Atlas booth at **Fakuma** October 14–18!

XenoCal LUX

This sensor is custom-made for the SUNTEST CPS/CPS+ and XLS/XLS+. These instruments have become the standard for photostability testing in the pharmaceutical and printing ink industry. The pharmaceutical industry conducts tests in accordance with ICH Guidelines, specifying typical dosage measurements in Lux hours or citing radiant exposure in Lux. The XenoCal LUX supports calibration of the SUNTEST in Lux and compliance with the required test times.

The two new sensors will be on display at the Fakuma exhibition, October 14–18, but will be commercially available in September. For more information on the new XenoCal sensors, please visit www.atlas-mts.com or e-mail **info@atlasmtt.de.**

Scott Morehead now serves as Technical Sales Representative for Atlas for the Southeastern USA, covering Georgia, South Carolina, Florida, Mississippi, Alabama, and Tennessee. Scott has been with Atlas for over two years, acting as Technical Sales Support Representative, providing instant contact, research, and support for all Atlas customers in the U.S. Scott is an ASTM committee member and graduate of Iowa State University. He looks forward to providing quick response and technical guidance to customers in the Southeast. Scott can be reached at +1-773-289-5587 or smorehead@atlas-mts.com.

Atlas Commitment to Growth

Weathering Experimenter's Toolbox: Student's t-Test

A t-Test is a simple statistical tool weathering researchers often use to determine if two groups of samples significantly differ. Weathering researchers should be familiar with the theoretical underpinnings of these types of hypothesis tests. Student's t-Tests are often used when a large number of replicates is not available, normally distributed mean values are available, and an easy methodology is desired. Following is an example of a t-Test applied to weathering results.

Two batches of automotive paint were obtained from a single supplier with the same formulation. We wanted to see if batch-to-batch differences in raw materials, manufacturing processes, and application processes could result in significant differences in weathering. Six specimens were randomly selected from the first batch and six specimens were randomly selected from the second batch. We wanted a high degree of confidence that the weathering was truly different if we rejected the null hypothesis ($a > 0.95$).

The specimens were measured initially for color and placed side by side on Florida 5° South exposure racks for six months. After six months, the specimens were re-measured with the following results:

Batch 811	$\Delta\beta^*$ after 6 months
Sample	
A	1.04
B	1.19
C	1.04
D	1.01
E	1.01
F	1.04

Batch 921	$\Delta\beta^*$ after 6 months
Sample	
A	0.83
B	0.86
C	0.78
D	0.86
E	0.82
F	0.79

These results were then analyzed using the Student's t-Test in the following manner:

STEP 1. NULL HYPOTHESIS *(research question)*

The mean $\Delta\beta^*$ is the same for Batch 811 and Batch 921 after 6 months of weathering in Florida, 5° backed South.

STEP 2. CALCULATION OF SAMPLE VALUES

Batch 811	Batch 921
$n_1 = 6$	$n_2 = 6$
$mean_1 = 1.055$	$mean_2 = 0.823$
$S_1 = 0.068$	$S_2 = 0.034$

$$S_P \left(\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}\right)^{1/2} = \text{Estimate of Pooled Variance}$$

$S_P = 0.054$

STEP 3. CALCULATION OF TEST STATISTIC

$$t = \frac{mean_1 - mean_2}{S_p\,(n_1 + n_2)^{1/2}} = 7.469$$

STEP 4. DETERMINATION OF REJECTION REGION

For a = 0.05, $n_1 + {}_2 - 2 = 10$ degrees of freedom

$t_{crit.} = 1.8.125$

STEP 5. CONCLUSIONS

The calculated t value (Step 3) falls in the rejection region and therefore chance is an unlikely explanation for the observed difference between the weathered Δ β* value for the different batches. The null hypothesis is rejected and it is concluded that the weathering degradation is different for the two sets.

Even though the two paint samples were from the same vendor, of the same formulation, and certified to be equivalent, their weathering behavior was significantly different when exposed side by side in Florida. Since the exposure variables were blocked (same exposure rack, same exposure period, same measurements, same mounting, etc.) we may infer that significant weathering differences were due to variation in formulation, manufacture, or application of the coating.

The Student's t-Test provides a powerful tool for discrimination that includes both the location of the means and dispersion or variation within the two groups. ■

New Cooling System Helps Meet Corrosion Standards

Atlas is pleased to introduce a new mechanical cooling system for our CCX Advanced Cyclic Corrosion cabinets. Special cooling requirements are listed in a variety of industry and international corrosion standards, especially with many large automobile manufacturers. This new device reduces the component footprint by approximately 80%. The compact, streamlined design fits in line with the exposure cabinet and solution reservoir. The unit is fully integrated and operated by the premium PC-based control system.

Other features include:

- Cooling capability down to -30ºC
- Dehumidification system for precision %RH control
- High-speed circulator fan with air movement up to 2,000 CFM to ensure a well-mixed environment in the exposure zone, even in larger-capacity cabinets
- Plenum wash-down system for prolonged corrosion resistance

For more information on the mechanical cooling system in the CCX, please contact your local Atlas sales representative at info@atlas-mts.com.

Atlas Test Instruments Group

New Sample Table Enhances SUNTEST® CPS/CPS+ Instruments

In 2007, the COLIPA organization issued a new method describing how sunscreen products are exposed in Atlas SUNTEST CPS/CPS+ and XLS/XLS+ instruments: *Method for the in Vitro Determination of UVA Protection Provided by Sunscreen Products [Edition 2007a].* It includes a detailed Excel worksheet that helps to calculate the exposure duration.

The test time of each individual sample is calculated based on the type of sunscreen product and amount of product on the test substrate. Due to the frequent exchange of samples the COLIPA method suggests taking samples out of the SUNTEST instrument without stopping the test program and switching off the instrument. This procedure, however, leads to unacceptable exposure of the operator to xenon light.

Atlas is pleased to introduce a new sample table, the **SunTray,** for sunscreen products based on the COLIPA test method.

SunTray enables the operator to remove samples from the SUNTEST CPS/CPS+ instruments without switching off the lamp. The sample table consists of a drawer with a holder in which six samples can be placed. The samples are positioned into normal sample plane by turning the knob of the drawer. The apertures for the six samples in the holder have a standard size of 50 x 50 mm. In addition, a special sample holder is available for calibration purposes. The standard XenoCal calibration sensors fit into the SunTray drawer for regular measurement and calibration of the light source.

The SunTray sample table is for SUNTEST CPS and CPS+ only and will be available in the fourth quarter of 2008. For more information, please e-mail **info@atlasmtt.de.**

FMVSS 108 Gets Update

The Department of Transportation's National Highway Traffic Safety Administration (NHTSA) has updated FMVSS 108 to include a fourth thickness requirement for Automotive Manufacturers Equipment Compliance Agency (AMECA) approval. The four thicknesses are as follows: 1.6 +/- 0.25 mm, 2.3 +/- 0.25 mm, 3.2 +/- 0.25 mm and 6.4 +/- 0.25 mm. These changes become mandatory September 1, 2008, but voluntary early compliance is effective immediately.

Atlas Weathering Services Group is an approved testing laboratory for AMECA testing per SAE J576 – Plastic Materials for Use in Optical Parts Such as Lenses and Reflex Reflectors of Motor Vehicle Lighting Devices. The requirements for SAE J576 include outdoor exposures in Arizona and Florida at an angle of 45° South, Open Back for a period of three years. Prior to exposure, the material must have a Heat Test performed and Chromaticity Coordinates and Haze must be measured. During the exposure period, the specimens must be cleaned once every three months with a mild soap solution. After the exposure period, the specimens must once again be measured for Chromaticity Coordinates and Haze to ensure compliance to FMVSS 108. The samples are also visually checked for any physical changes that may affect performance, such as delamination, color bleeding, cracking, or crazing.

For more information about the changes to FMVSS 108 or any other tests that AWSG performs, please contact your customer service representative at +1-800-255-3738 or info@atlas-mts.com.

Atlas Now Offers Test Program Management

AWSG is pleased to offer Test Program Management as our latest offering of products/ services designed to coordinate all aspects of our clients' weathering testing programs.

Many AWSG clients have multiple locations and departments that require weathering testing coordination. This often requires additional resources to catalog, order, and coordinate all internal testing needs. The Atlas Test Program Management can provide this service for you.

LET ATLAS TAKE CARE OF THE WEATHERING WHILE YOU FOCUS ON YOUR CORE BUSINESS!

You will now be able to focus your resources in the lab formulating, evaluating new raw materials, and developing the next generation of products while an Atlas Test Program Manager (ATPM) becomes the point of contact for all of your testing needs. The ATPM will organize all weathering testing; catalog, archive, and crunch data in methods designated by the client; and provide on the spot decision-making based on the latest industry standards and years of weathering experience.

The Test Program Management service begins with a visit from your ATPM to assess your specific needs. A yearly follow-up visit will be scheduled in order to maintain the program. The ATPM can provide quotes for all new orders, coordinate all exposures and evaluation services (including types of evaluations, frequency of services, and duration of exposures), provide industry standards updates, and send monthly e-mail notifications of accelerated testing price-breaks prior to industry-wide distribution.

In addition, clients will have custom web access where they can retrieve all archived data for present and future testing, review digital photograph archives, and access client-specific order forms for easy test initiation.

Test Program Management services do not end with coordination of all client testing needs. Additional benefits include (package specific):

- Free webinars of choice
- Free yearly onsite Fundamentals of Weathering course
- Custom reporting of data

Let Atlas take care of the weathering while you focus on your core business! Contact an Atlas customer service representative at **+1-800-255-3738** for an official quote today.

Visit us at the Fakuma show, October 14–18, in Germany!

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To receive Sun Spots *electronically, please visit www.atlas-mts.com*

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