ATLAS
MATERIAL TESTING SOLUTIONS

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SunSpots®

Summer 2007

Strong Combinations

Efficient Stabilizer Packages in Waterborne Transparent Wood Coatings

By Angela Classen and Thomas Rentschler, Sachtleben Chemie GmbH, Duisburg, Germany; and Gerd Faoro and Karl Bechtold, Pigments & Additives Division, Clariant (Huningue) S.A., France

If coated wood is not sufficiently protected against weathering, the occurrence of damage follows a typical pattern. The wood darkens increasingly, followed by gloss reduction and yellowing of the coating and subsequent chalking, blistering, and cracking. Later, delaminating affects the embrittled coatings, and the decomposition process continues in the wood substrate. The main culprits for this decomposition are UV-A and UV-B radiation, as well as, yet to a lesser extent, the visible portion of sunlight. The visible effect of this process is that the wood turns grey, as the decomposition of lignin and the subsequent washout makes the whitish-grey cellulose directly visible. The previously smooth wood surface becomes fibrous and ribbed.

The most successful light stabilizer "classics" are coatings pigmented with transparent iron oxides. These coatings provide very good protection. However, the yellowish-red pigments contained in the coating alter the color of the wood. The starting point of comprehensive weathering tests question how wood coatings can be effectively protected in the long term while ensuring colorlessness and maximum transparency. The tests included organic and inorganic UV absorbers, both individually and in combination with radical scavengers (sterically hindered amines, also called HALS, Hindered Amine Light Stabilizer) in waterborne wood coatings.

Physical Light Absorption

The function of UV absorbers is based on the physical absorption of light, which protects both the substrate and the coating from the high-energy radiation of sunlight. According to the Lambert-Beer Law, the light absorption of a medium depends, among other factors, on the concentration of the UV absorber and the distance that light rays are covering in the medium. The deeper the UV radiation penetrates the

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December 14–15
Bangkok, Thailand

*For the latest on Atlas shows and presentations, visit **www.atlas-mts.com.***

Atlas Consulting Group adds Senior Technical Consultant

Atlas is pleased to introduce **Dr. David Dumbleton** as a Senior Technical Consultant for the newly created Atlas Consulting Group. David will lend his expertise in environmental durability and performance to a number of Atlas customers, as well as focus on growing the North American consulting services group.

Before joining Atlas, David held a variety of technical and business management positions in the polymer materials industry. He has served as Director of Research and Development at Alcoa Flexible Packaging; Business Director of an $85 million division at the P.H. Glatfelter Paper Company; and VP of Technology and Engineering at Graphic Packaging Corporation, a $350 million spinoff from the Coors Brewing Company.

With over 25 years of experience in the materials industry, David's knowledge of weathering applications and material composition brings an unprecedented level of expertise that will guide Atlas' customers to better testing protocols, experimentation methodologies, and product performance.

David holds degrees in chemistry, chemical engineering, physics, and materials science from Northwestern University, the University of Wisconsin, and Georgia Tech.

David Dumbleton can be contacted at **+1-773-289-5871** or **ddumbleton@atlas-mts.com.** For additional information about the Atlas Consulting Group, visit **www.weatheringconsulting.com.**

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coating, the more absorption is taking place, or the stronger the effect of the UV absorbers is. The physical-chemical reaction caused by organic absorbers is shown in Figure 1 for a 2-hydroxy phenyl benzotriazole. The process, called keto-enol tautomerism mechanism, is nothing but a continuously repetitive proton transfer which in the end leads to a transfer of radiational into thermal energy.

Halogenated benzotriazoles are particularly suited for the protection of photosensitive wood. Less energy is required to bring the electrons into the excited state. In this case, the absorption maximum reaches the areas of the visible sunlight ("bathochromic shift"), thus protecting more efficiently the lignin from the damaging effect of this type of radiation.

Special grades of titanium dioxide (TiO_2) may also be used as an UV absorber for transparent coatings. The scattering ability of a pigment depends not only on the refractive index and the wavelength of the light, but also on the particle size. Ultra-fine titanium dioxide particles do not scatter visible light, which makes them also suitable for transparent coatings.

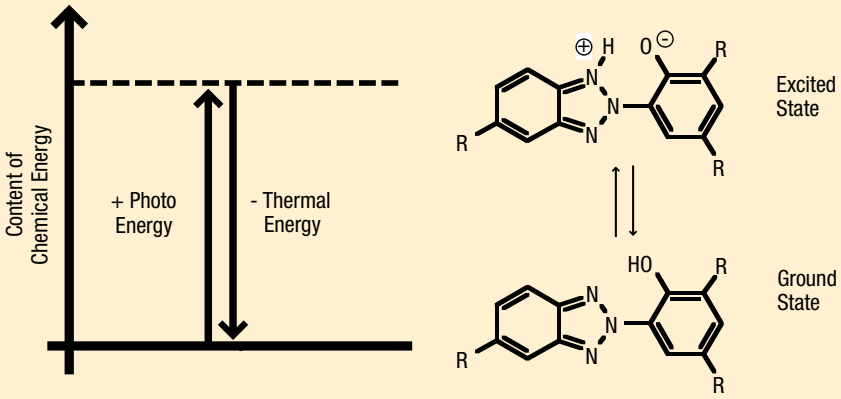

FIGURE 1: Physical-chemical reactions of UV absorption in organic light stabilizers, shown for 2-hydroxy phenyl benzotriazole

TABLE 1: Basic formulation for a waterborne wood coating, with subsequent addition of light stabilizers

Product	Product Name	Manufacturer	Amount (wt. %)
Copolymer Dispersion	Acronal LR 8960	BASF	67.00
In-can Preservative	Actizide MBS	Thor Chemie	0.50
Silicone Tenside	Byk 346	Byk Chemie	0.10
Defoamer	Tego Foamex 810	Tego Chemie Service	0.20
Neutralizer	AMP 90	DOW (Angus Chemie)	0.30
Associative Thickener	Coatex BR 100P 50%	DIMED Lackrohstoffe	0.25
Various Solvents (demineralized water, solvent naphtha, butyl diglycol, propylene glycol)			17.10
Demineralized Water for Viscosity Adjustment			14.55
Total			**100**

The function of the inorganically based UV absorbers is comparable to their organic variants. Here, energy absorption releases two mobile charged particles, "excitons": the negatively charged electron in the conduction band, and the positive charge in the valence band. As described above for the organic UV absorbers, the UV radiation is absorbed and transformed into thermal energy. However, unlike organic substances, the chemically inert titanium dioxide does not decompose, so that the long-term stability of the entire system is increased.

It is an important feature to reduce the photo-activity of titanium dioxide, which may lead to the formation of radicals. The required photostability is achieved by crystal lattice doping of the TiO_2 core with foreign ions (Figure 2). In addition, the surface of the pigment is encapsulated with an inorganic coating consisting of aluminum oxide (Al_2O_3) and/or silica (SiO_2). These surface coatings make it possible to modify not only the photo-activity but also the optical and colloidal properties of the white pigment. For achieving good dispersibility of the ultra-fine pigments, they are treated with an additional organic substance.

Chemical Light Protection

Light stabilizers of the sterically hindered amine type (HALS) are, with few exceptions, derived from tetramethyl piperidine. Unlike UV absorbers, stabilization with HALS is a chemical and not a physical process. Under photo-oxidative conditions, HALS compounds generate stable nitroxyl radicals that can serve as a trap for carbon-centered radicals of the alkyl-type evolving from resin degradation. According to Denisov, the so generated hydroxylamine ethers react with further radicals, e.g. broken off side chains from the binder, forming ketones and alcohols of any other chemically stable compound. By that, the effective nitroxyl radical is released again so that one nitroxyl radical can neutralize up to several hundred radicals. The radical scavengers prevent the photolytic decomposition of the binder, indirectly shielding the wood below. The coating lasts longer, and the substrate is also protected for a longer time.

The Recommended Formula

To determine the optimal light stabilization formula, a waterborne clearcoat based on a styrene-free acrylic emulsion was used, in which different light stabilizers were dispersed. Table 1 lists the ingredients of the coating. For light stabilization, proven light stabilizer types from various manufacturers were used (Table 2).

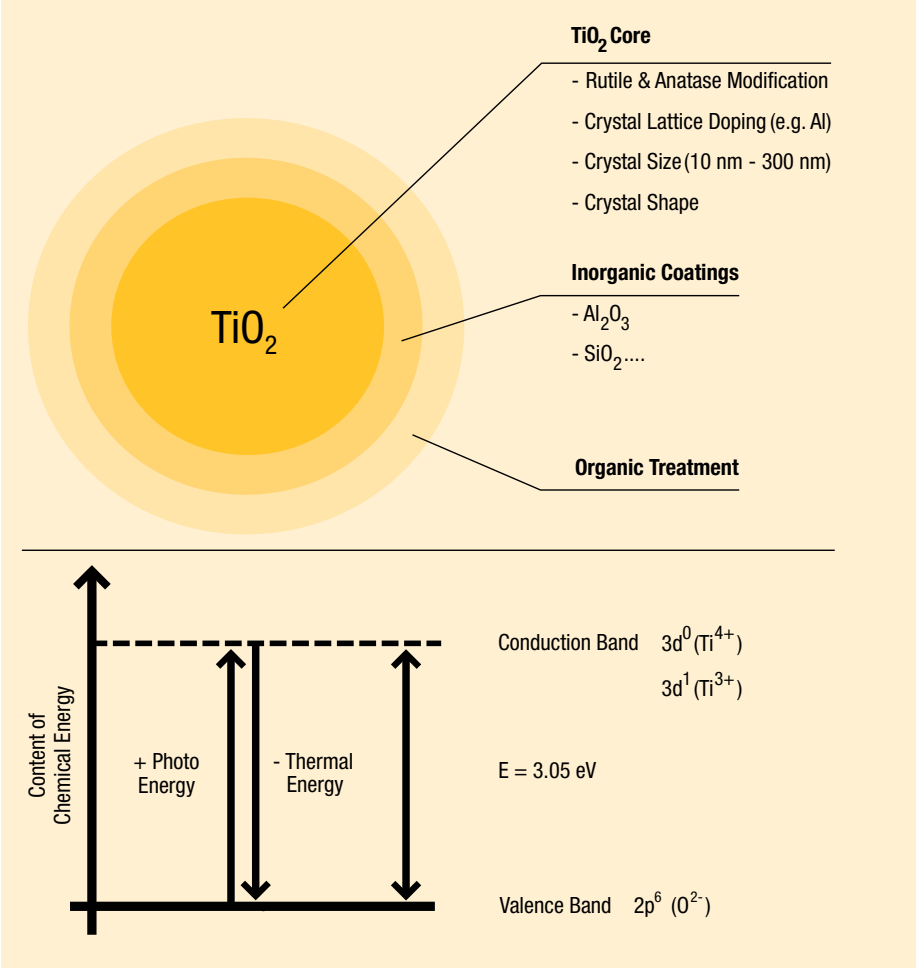

FIGURE 2: Ultra-fine titanium dioxide is being modified for UV absorption without photocatalytic activity: doping, inorganic and organic coatings UV absorption triggers the transfer of an electron from the valence band to the conduction band. The absorbed energy is released as harmless radiant heat.

As a typical organic UV absorber, o-hydroxyphenyl benzotriazole was tested in two variants: an unsubstituted in liquid form and a Cl-substituted crystalline type, which was applied in its preparation as aqueous dispersion.

The inorganic UV absorbers are ultra-fine titanium dioxides in the rutile modification (both containing > 99% rutile). The two types used mainly differ in their primary crystal size and doping: Mikrorutile 10 nm and Mikrorutile 15 nm.

All of the tested radical scavengers are sterically hindered amines. HALS 1 as a liquid, 100% active compound, a second product consisted of an 80%-solution HALS 2 in N-methyl-2-pyrrolidone (NMP). The third of the tested radical scavengers, HALS 3, is photo-reactive and is added in its preparation as aqueous dispersion.

A total of 75 different combinations of these light stabilizers were tested. Inorganic and organic UV absorbers and HALS were tested individually and in double and triple combinations. The only exception was made for HALS compounds, as experience has shown that these products do not yield sufficient results if they are not combined with an UV absorber. The stabilizer concentration in the coating mixture ranged from 0.5 to 2% wt. of the total formula, with the entire amount of stabilizers never exceeding 4%.

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RESULTS AND DISCUSSION

Effect of Light Stabilizers on Wet Coats

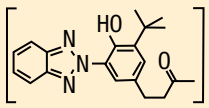
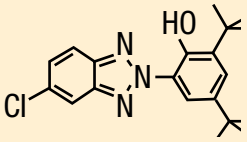
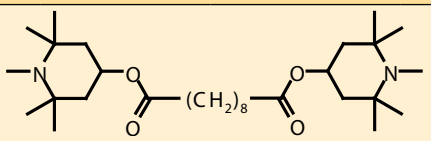
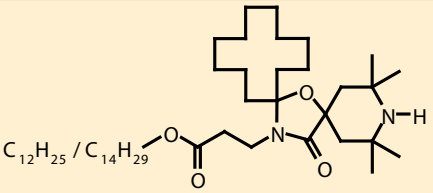
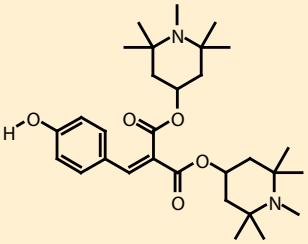
Depending on the basic chemical structure of the light stabilizer, its addition may alter the properties of the wet coating. Due to their basic amine function, HALS increase the pH value, which prompts the resin preparation to behave more like a solution than like a dispersion. With the viscosity being strongly influenced by the molecular weight of the resin, the viscosity of the coating consequently increases.

Significantly lower, but still measurable, is the increase of viscosity after the addition of inorganic UV absorbers and dispersed organic stabilizers. In both instances, this effect occurs after adding a small amount of finely distributed solids to a liquid.

HALS and dispersed light stabilizers can also increase the specific conductivity. This modifies the electric resistance of the coating. In electrostatically sprayed coatings application (ESTA), this can be of crucial importance.

TABLE 2: Summary of tested light stabilizers

Inorganic UV Absorbers: Titanium Dioxide [TiO_2]					
Crystal Size	TiO_2 Content	Rutile Content	Specific Surface	Product Name	Manufacturer
~ 15 nm	~ 87%	> 99%	~ 70 m^2/g	Hombitec RM 300	Sachtleben
~ 10 nm	~ 78%	> 99%	~ 110 m^2/g	Hombitec RM 400	Sachtleben

Organic UV Absorbers	**Structure**
Benzotriazole, liquid Used product, for example Sanduvor 3311, manufacturer: Clariant	50% $R(OCH_2CH_2)_{6\text{-}7}$ OH 38% $R(OCH_2CH_2)_{6\text{-}7}$ OR 12% $H(OCH_2CH_2)_{6\text{-}7}$ OH R = 
Benzotriazole, halogenated, crystalline Applied as a dispersion Used product, for example Sanduvor 3326 disp. XP, manufacturer: Clariant	
Radical Scavenger (HALS)	**Structure**
100% HALS, liquid, organic Used product, for example Sanduvor 3065 liq., manufacturer: Clariant	
80% solution HALS in NMP Used product, for example Sanduvor 3063 liq., manufacturer: Clariant	
Photo-reactive HALS, crystalline, applied as a dispersion Used product, such as Sanduvor PR-31 disp. XP, manufacturer: Clariant	

Impact of Light Stabilizers on Different Coating Properties

In order to test different coating properties, such as elasticity, hardness, transparency, and UV absorption, substrates like polypropylene, glass, and aluminum were coated with the aid of a spray robot. Applying a coating onto polypropylene several properties can be easily measured, such as the coating's UV absorption, transparency, and elasticity. The application of the coating on aluminum helps to determine the film thickness and elasticity according to ASTM D522, and DIN 53455 (tensile

strength), respectively. Coating onto glass allows determining the hardness according to EN ISO 1522.

The types of the inorganic absorber and the titanium dioxide concentration have a major influence on the transparency of the coating. The rule is: the lower the concentration and the smaller the particles, the more transparent the clearcoat. At a film thickness of 40 µm and a concentration of roughly 0.75%, Mikrorutile 10 nm does not have any negative impact on the transparency of the coating. For Mikrorutile 15 nm, the limit is at a lower concentration of 0.5%.

Coatings with organic stabilizers show exceptionally good transparency that makes them suitable even for the most sophisticated applications.

As expected, when adding crystalline particles, such as ultra-fine titanium dioxide, the coatings become harder and slightly less elastic. HALS or organic UV absorbers lead to a slightly reduced hardness, but they do not affect the elasticity of the coating. To sum up, adding light stabilizers does barely affect the mechanical properties of the coatings, and therefore no further consideration will be given to this aspect.

Weathering Resistance of Light-Stabilized Clearcoats

TESTING METHOD

For the weathering tests, 7x28-cm pieces of North European pine were treated

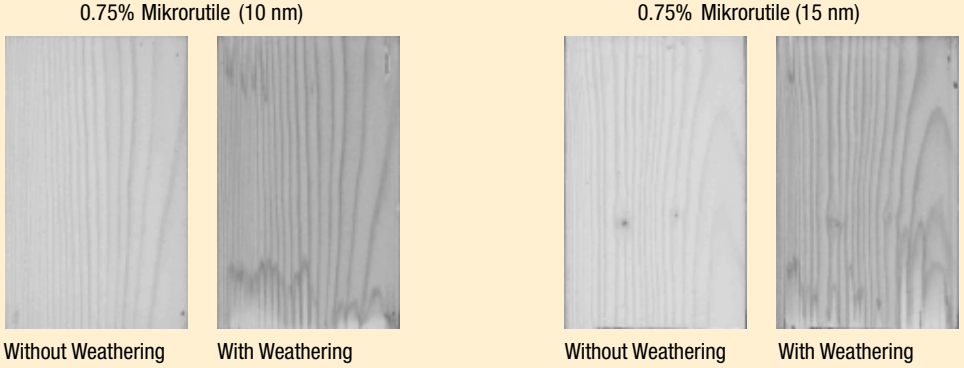


FIGURE 3: Short-term weathering results after 1000 h WOM, using 0.75 % Mikrorutile 10 nm, or 15 nm, respectively.

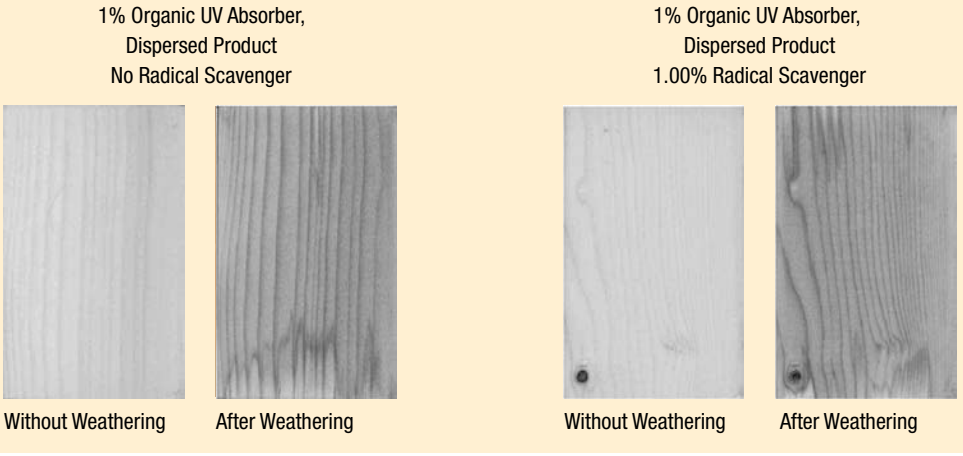


FIGURE 4: Short-term weathering results after 1000 h WOM, using a 1% organic UV absorber with and without 1% HALS

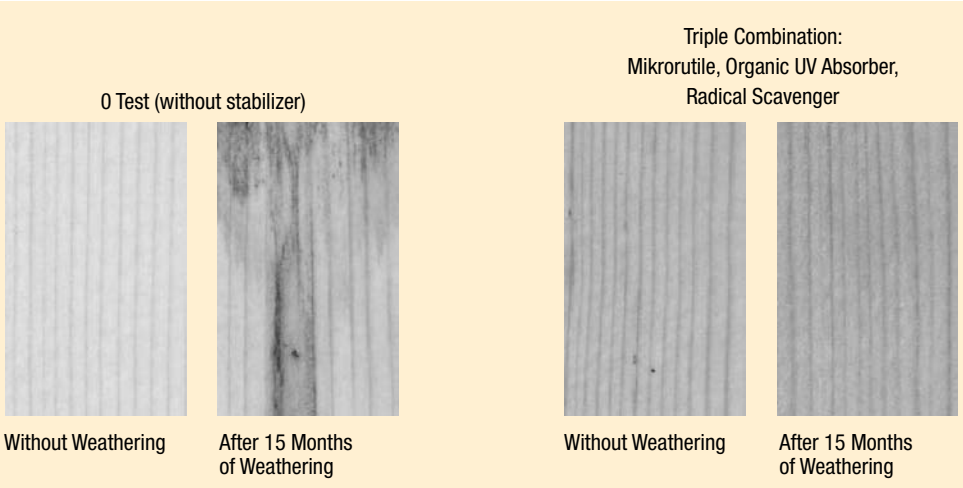


FIGURE 5: The combination of inorganic, organic UV absorbers with HALS provides optimal protection and transparency, here shown after 15 months of weathering.

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with wet coats that had been stabilized with different stabilizer additives. After drying, the coated panels (thickness of the dry coating around 40 µm) were exposed to artificial and natural weathering.

The artificial weathering was performed in an Atlas Ci35 Weather-Ometer® according to ISO 11341 A. The duration of the total exposure was 2,000 hours, with the samples being examined every 200 hours. The testing parameters included gloss (20°, 60°), transparency, yellowing (Delta b*), decrease of brightness (Delta L*), and reddish shade (Delta a*), as well as an evaluation of the general stability of the coatings.

The samples were also exposed to natural weather at a location 50 km north of Düsseldorf, Germany. The outdoor exposure consisted of a 9-month and a 15-month test series where the above parameters were measured every six weeks. In addition, the wood panels were screened for fouling.

THE EFFECT OF LIGHT STABILIZERS

In terms of accuracy of the measurements, the results obtained through artificial and natural weathering are comparable and allow the same conclusions.

Already at a pigment concentration of 0.5%, titanium dioxide shows a very good protective effect. Although higher concentrations work better, they are less transparent. The direct comparison shows that Mikrorutile 10 nm provides slightly better UV protection and is more transparent than Mikrorutile 15 nm, which has a visibly higher brightness due to residual scattering. As in the initial transparency measurements, the optimal concentration in order to obtain permanent protection while maintaining optimal transparency is at 0.75%. It provides excellent long-term protection with the best possible transparency. Figure 3 shows the weathering results after 1,000 hours WOM. The tests revealed that Mikrorutile 10 nm is not only more transparent than Mikrorutile 15 nm, but it is also superior in terms of its stabilizing effect.

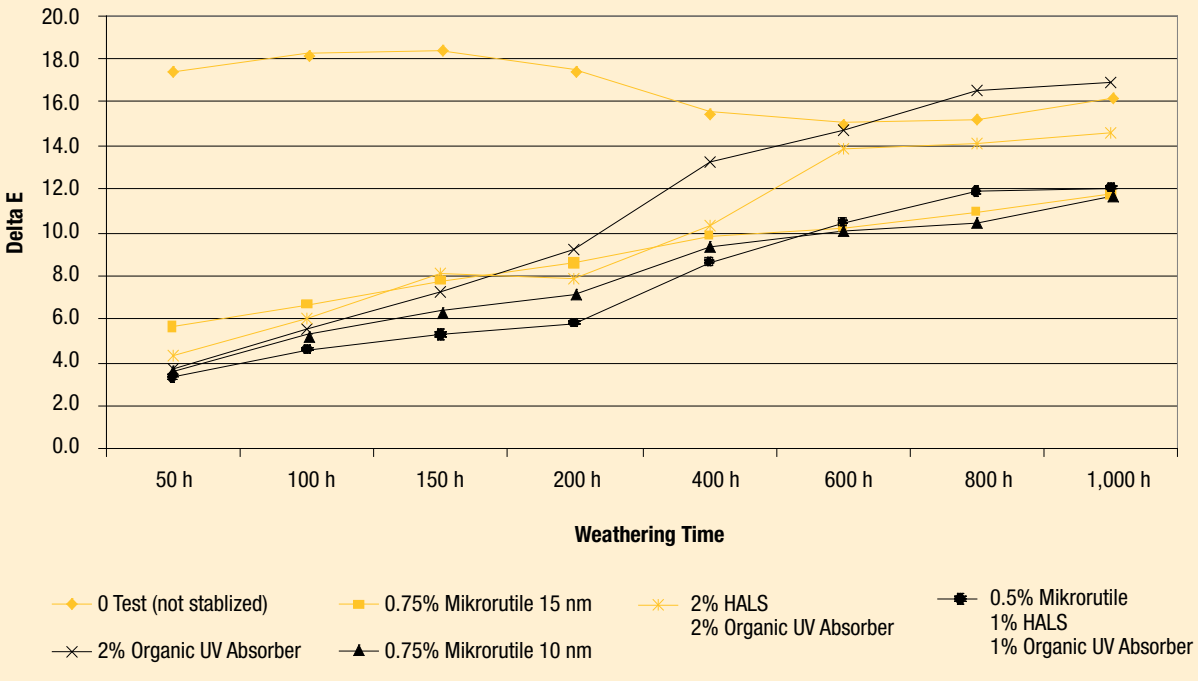


FIGURE 6: Modification of the change of the total color value Δ E with extended weathering—the triple combination in direct comparison with artificial weathering of up to 1,000 hours WOM

The combination of ultra-fine titanium dioxide with HALS does not lead to visible synergies or significant improvements of the light stabilization. This allows the conclusion that it is mainly the inorganic absorber that ensures the light stabilization. However, a suitable variation is the combined use of inorganic and organic UV absorbers. This light stabilizer combination offers very good UV protection. Again, Mikrorutile 10 nm was evaluated as the better option.

The tested organic UV absorbers create coatings with high transparency that is not even affected by long-term radiation. However, the downside is that when clearcoats are solely stabilized with organic UV absorbers, they show the well-known tendency towards yellowing. Here, adding a HALS can significantly reduce the yellowing—the addition of radical scavengers substantially increases the stability of the coatings. The photos in Figure 4, showing different samples, confirm this finding. Additional tests showed that the optimal concentration is at approx. 2 wt. % UV absorber, and 1 to 2 wt. % HALS (referring to the total formulation and 40 µm thickness of the dry film).

The best results are obtained with a triple combination of all colorless light stabilizers. Figure 5 shows the permanent stability of the coating, even after 15 months of outdoor exposure, and remains colorless and transparent. The extraordinary effect of the triple combination emanates from the positive results obtained for the various light stabilizers: ultra-fine TiO_2 by itself provides excellent and permanent UV protection; and organic UV absorbers, combined with HALS, provide good protection while offering outstanding transparency and colorlessness. This synergy effect is being confirmed by measurements of the yellowing and brightness behavior in relation to the duration of weathering. Figure 6 shows how the change of the total color value ΔE with ongoing artificial weathering. Based on the current findings, the best light stabilization for water-based clearcoats is a combination of 0.5% ultra-fine titanium dioxide Mikrorutile 10 nm, 1% dispersed HALS, and 1% organic UV absorber in dispersion form (referring to the total formulation and 40 µm thickness of the dry film).

Conclusion

Inorganic UV absorbers can be viewed as “specialists” for exterior applications because they offer the most effective and easiest long-term UV protection and do not decompose even under continuous weathering. On the other hand, organic UV absorbers in combination with HALS are the first choice for applications that require the utmost transparency and brilliance, for example in the furniture industry. The highest transparency and brilliance while providing long-term stabilization are obtained by the triple combination of the different light stabilizer types. Clearcoats containing these additives are suitable for sophisticated applications and offer UV protection for a long time.

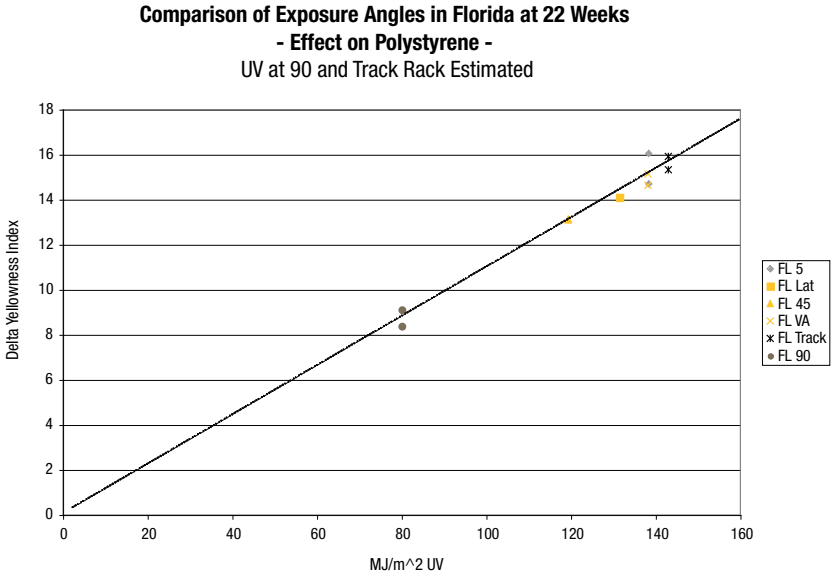
Again, it has been confirmed that it is not the solar UV radiation alone that leads to the decomposition of wood. The radiation of visible light, which is transmitted through colorless clearcoats, also has a destructive effect on the material, although at a slower pace. While adding light stabilizers cannot completely prevent the photocatalytic decomposition of wood, it can considerably delay it. ■

This article was first published in the *European Coatings Journal (Vincentz Verlag)* in December 2006.

Weathering Experimenter's Toolbox: n = Exposures

By Henry K. Hardcastle III

Traditionally, weathering researchers have looked at the issue of sample size as the number of replicate pieces of material placed on a single exposure. Often, more valuable information is obtained by considering multiple exposures and blocking other variables. For instance, simultaneous exposures of a single material at a variety of exposure angles, backed condition, treatments, formulations, etc., may characterize degrees of variation (dispersion) in a materials weathering response. It is important that the researcher block other variables.



Here, researchers obtain information regarding variation between exposure types. For example, we wanted to investigate the effect of exposure angle on polystyrene yellowness index. We simultaneously exposed two replicates of polystyrene chips on different exposure angles in Florida. The results are shown in the chart to the left. The data indicated that the variation we could expect for the different exposure angles in Florida was smaller than expected except for the 90° exposure.

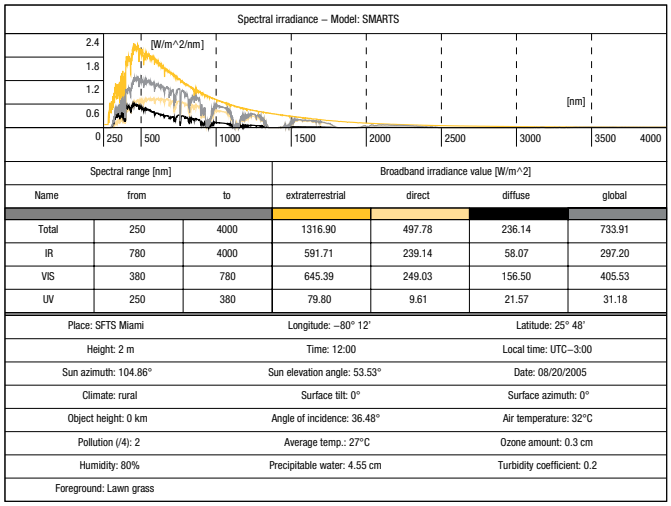
n = number of replicates = 2.
n = number of environments = 1.
n = number of exposures = 6. ■

Kudos!

Congratulations to **Norma Searle** *and* **Bill Murray,** *friends of Atlas, who received distinguished service awards from ASTM at meetings held earlier this year.*

New CESORA® Software Calculates Solar Radiation

Atlas now offers a unique new softwaare tool for calculating solar radiation. The CESORA, developed in cooperation with Prof. Dr. Gerhard Manier and Dr. Chris Gueymard, offers extensive and versatile calculations for effective terrestrial solar radiation. It is designed to provide important information to users in numerous fields of application in which knowledge of the spectral distribution of radiation is essential and must be simulated if it cannot be measured easily. CESORA can be applied in virtually all technologies where solar radiation and its spectral can cause measurable effects: automotive and transportation, plastics, paints and coatings, solar energy, cosmetics, agriculture, photochemistry, and building and construction.



Spectral range [nm]			Broadband irradiance value [W/m^2]			
Name	from	to	extraterrestrial	direct	diffuse	global
Total	250	4000	1316.90	497.78	236.14	733.91
IR	780	4000	591.71	239.14	58.07	297.20
VIS	380	780	645.39	249.03	156.50	405.53
UV	250	380	79.80	9.61	21.57	31.18

Place: SFTS Miami	Longitude: –80° 12'	Latitude: 25° 48'
Height: 2 m	Time: 12:00	Local time: UTC–3:00
Sun azimuth: 104.86°	Sun elevation angle: 53.53°	Date: 08/20/2005
Climate: rural	Surface tilt: 0°	Surface azimuth: 0°
Object height: 0 km	Angle of incidence: 36.48°	Air temperature: 32°C
Pollution (/4): 2	Average temp.: 27°C	Ozone amount: 0.3 cm
Humidity: 80%	Precipitable water: 4.55 cm	Turbidity coefficient: 0.2
Foreground: Lawn grass		

Spectral irradiance – Model: SMARTS

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For more information on CESORA, please contact your local sales representative or e-mail info@atlas-mts.com. ■

ITMA 2007

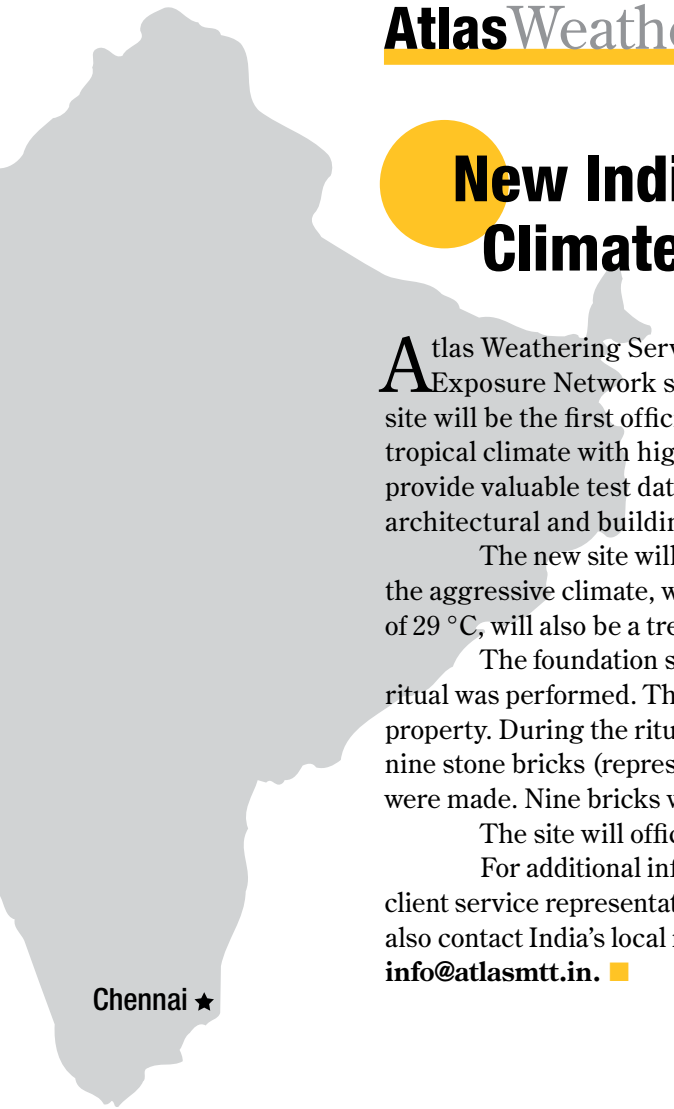
International Exhibition of Textile Machinery

September 13–20, Munich, Germany • Atlas Booth: Hall A4, Booth #338 • SDL Atlas Booth: Hall A4, Booth #241/342

Atlas and SDL Atlas are excited to exhibit at ITMA 2007, the world's largest textile machinery exhibition held every four years. Atlas will exhibit at Booth #338, Hall A4, and will showcase a range of instruments, including Ci4000 Weather-Ometer®, Xenotest® Alpha+ and SUNTEST® XXL+. Next to the Atlas Booth is the SDL Atlas Booth, #241/342, Hall A4. SDL Atlas will showcase numerous instruments, including: Ci3000+ Fade-Ometer®, Quickspin, 45 degree Flammability Tester, Moisture Management Tester, Quickwash®, ColorChex, and various Pilling Testers.

Please visit us at the show and find out how we can help you meet textile industry testing standards.

AtlasWeathering Services Group



New India Facility Provides Tropical Climate Testing Environment

Atlas Weathering Services Group is pleased to announce the addition of a new Worldwide Exposure Network site in the southeast region of India. Located near Chennai, the site will be the first official outdoor exposure site in India and is characterized by a tropical climate with high levels of sunlight, humidity, and temperature. This site will provide valuable test data for many industries, including automotive exterior and interior, architectural and building products, consumer durable goods, and lightfastness of textiles.

The new site will become a new benchmark climate for the Indian market. However, the aggressive climate, with long periods of hot, humid weather and an average temperature of 29 °C, will also be a tremendous value for manufacturers from outside of India.

The foundation stone was laid on May 2, at which time a Bhoomi Puja ("land offering") ritual was performed. The Bhoomi Puja ceremony took place in the northeast corner of the property. During the ritual, different seeds, flowers, and coloring substances were used on the nine stone bricks (representing the nine planets); mandala chants were recited; and offerings were made. Nine bricks were then placed in a test pit in the northeast corner of the site.

The site will officially open on August 31. Full climatic data will be available shortly.

For additional information on the new India site or any of our sites, please contact a client service representative at **+1-800-255-3738** or visit **www.atlas-mts.com.** You may also contact India's local representative, Mr. C.S. Ravi, at **+91-44-450-360-20/30/40** or **info@atlasmtt.in.** ■

Atlas Part of Industry Group in Austria

As a global materials testing leader, Atlas is committed to supporting and participating in industry organizations worldwide. In 2006, Atlas joined ÖGUS, the Austrian Association for Environmental Stimulation.

Founded in 2005 and headquartered in Vienna, Austria, ÖGUS facilitates communication between vendors and customers, as well as national and international organizations, in regard to process engineering and market needs. The association provides trouble-shooting teams for development, production, quality management, and standards. ÖGUS also coordinates cooperative projects to reduce costs for its members such as round robin tests in market areas of interest. ÖGUS organizes regular seminars and symposia for customers and specialists, featuring experts presenting the latest findings of environmental influences on different materials.

Atlas has participated in several of these events, including presenting a lecture on "Weathering and Ageing of Materials" during a seminar on "Interaction between Modern Materials and Environment." The latest symposium in May 2007 focused on "Weathering and Stability of Paints and Varnishes" and was attended by 70 people from more than 40 companies.

Atlas is excited to be a part of this new group and looks forward to working with and contributing to future seminars and events. For more information, please visit **www.oegus.at.**

Atlas Testing Network: All You Need

Accelerated Testing, Evaluation Services, Global Reach

Atlas is the only weathering organization with a global approach to providing natural and accelerated weathering testing solutions for materials durability issues with over 20 exposure sites and laboratories to serve your needs. Atlas laboratories can provide the expertise and the equipment necessary to meet the ever-increasing demands of our clients. Our indoor exposure laboratories offer artificial accelerated weathering tests and a variety of other environmental test programs, all designed to accurately simulate true end-use conditions. We can meet most accelerated test methods from national and international standards organizations such as ISO, ASTM, SAE, GM, Ford, Chrysler, JIS, and DIN.

No accelerated weathering program can be complete, however, without the confirmation from and correlation to natural weathering. Natural weathering provides the data you need to ensure that your product is covered against costly liability issues. From static exposure racks to full-scale testing, our natural weathering facilities serve over 2,000 clients in 40 countries and are affiliated with more than 25 trade and professional organizations around the world. Our staff of trained scientists, engineers, and technicians provides broad expertise and ongoing commitment to improve existing services and develop new methods for our clients' increasingly sophisticated needs.

Once your testing is complete, Atlas offers a wide range of evaluation and measurement services. We use the most advanced instrumentation from leading manufacturers for measuring appearance properties such as color change, gloss, distinctness-of-image, transmittance, and reflectance. All of our services meet the latest measurement test standards from organizations such as ASTM, ISO, and DIN. A full range of visual assessment services is also available, including coating adhesion, blistering, chalking, cracking, mildew growth, and gray scale evaluation in accordance with respective standards organizations. Strict quality control guidelines have enabled Atlas' Evaluations Laboratory to achieve industry-accepted accreditation from world-renowned standards organizations. Atlas is accredited to ISO/IEC 17025 by the American Association for Laboratory Accreditation (A2LA) and accredited or approved by Ford, GM, and AMECA. Atlas is also accredited to DIN EN ISO/IEC 17025:2005 by the Germany Accreditation Council.

We can help you meet the industry standards and international test methods necessary for your business. Contact your customer service representative for our latest offerings at **+1-800-255-3738** or **info@atlas-mts.com.** ■

Atlas to Display New Offerings at K-Show 2007

Atlas will exhibit our latest product enhancements and state-of-the-art technology at **K, the International Trade Fair for Plastics and Rubber,** October 24-31 in Dusseldorf, Germany. You can find us in Hall 10 at Booth #C23.

Atlas will showcase the Ci4000 Weather-Ometer®, Xenotest® Beta+ and the SUNTEST® XXL+ accelerated weathering instruments. We will also present our outdoor and laboratory weathering solutions and will introduce a new service: the Atlas Consulting Group, which provides consulting for the design, implementation, and an evaluation of weathering test programs as well as analysis of product failure and service life prediction.

For more information on our weathering products, visit Atlas at Booth #C23 in Hall 10 or go to www.atlas-mts.com.

K-show K-show K-show K-show

AtlasWeathering Services Group

Atlas Outdoor Site in South of France Now Accredited

Atlas is pleased to announce that our outdoor exposure site in Sanary-sur-Mer in the Bandol region (South of France) received accreditation to DIN EN ISO/IEC 17025:2005 in early April.

The test procedures listed in the accreditation certificate relate to a wide variety of materials like plastics and rubber, paints and coatings, interior and exterior automobile components, and much more.

The accreditation and subsequent annual audits will ensure that:

The Atlas exposure site in Sanary sur Mer, France, now offers even more comprehensive services.

- Samples are positioned in an exact southerly exposure to get maximum effect of sunlight in compliance to corresponding standards
- Exposure on non-corrosive racks according to relevant standards
- Consistent separation distance between the racks to avoid shading or formation of shadows
- Regulated ground distance to avoid a reflection effect of the ground (albedo effect)
- ISO-traceable calibration of radiometers, pyranometers and humidity, temperature, and BST/BPT/WST/WPT sensors to measure weather data
- Weather data is available online—at www.atlas-mts.com (Online data is also available for other outdoor sites like Miami, Florida; Phoenix, Arizona; and Hoek v. Holland, Netherlands.)

The existing certification of the French organization CSTB (Centre Scientifique et Technique du Batiment) for the testing of window profiles will remain effective.

The outdoor site in Sanary-sur-Mer can be visited anytime with an advance reservation.

For more information, please contact Siegfried Rößner at our laboratory in Duisburg (labordu@atlasmtt.de or +49 2065 76490) or Cécile Cartereau at our outdoor site in Sanary-sur-Mer (atlas.sanary@wanadoo.fr or +33 494 88 32 75), or visit www.atlas-mts.com. ■

Client Education Goes Online

Webinars Coming Soon to Atlas!

Coming later this year, Atlas Client Education trainings will be offered via electronic webinars. Now from the convenience of your desktop, you will be able to continue your weathering education and learn more about the factors of weathering testing. Knowing how to perform weathering tests is just the beginning. It is important to know the impact of each factor of weathering, how to analyze results, how to modify procedures and how to design test methods for yourself. You can learn more about these topics as well as industry specific topics through our short webinar courses, available soon!

Watch for information at www.atlas-mts.com, or e-mail us at info@atlas-mts.com for details.

AtlasSpeaks

2007

13th Addcon World Congress
Rapra Technology

September 5–6 • Frankfurt, Germany

Dr. Olivier Haillant will present "Examination of the Physical and Chemical Behavior of Migrating HALS in Natural and Artificial Weather Conditions."

3rd European Weathering Symposium
Weathering

September 12–14 • Krakau, Poland

Dr. Artur Schönlein and Dr. Jörg Hussong will present "Comparison of Tolerances for the Spectral Power Distribution Given by Technical Standards for Artificial Weathering to the Measurement Uncertainties of Typical Spectroradiometers in Use Determined by an International Round Robin Test."

Kelly Hardcastle will present "Effects of Moisture, Location, and Angle on Automotive Paint System Appearance During Natural Weathering" and Dr. Olivier Haillant will present "Reliability of Weathering Test Methods—Example of the Accelerated Weathering of Stabilized PP/EPR."

NDT 2007
Non-Destructive Testing

September 18–20 • Glasgow, Scotland

Paul Gibbon will present "Fundamentals of Weathering."

ICE 2007/FutureCoat
Coatings

October 3–5 • Toronto, Ontario, Canada

Kelly Hardcastle will present "Considerations for Characterizing Moisture Effects in Coatings Weathering Studies."

Durability of Polymers
Polymers

October 9 • Paris, France

Dr. Olivier Haillant will present "Reliability of Weathering Test Methods—Example of the Accelerated Weathering of Stabilized PP/EPR."

ATCAE Set for 2008

The third ATCAE, **Atlas Technical Conference for Aging and Evaluation,** is set for September 15 and 16, 2008, in Oxford, England.

For more information, please contact Bruno Bentjerodt, Client Education, **+49-6051-707-245** or e-mail **clienteducation@atlas-mtt.de.**

SABS
Russell Lane presented the South African Bureau of Standards (SABS) with a Ci4000 Weather-Ometer®.

August 7 • Johannesburg, South Africa

AtlasClient Education

Atlas Client Education helps clients learn to design durability test programs to understand how weathering affects materials. Our education and training solutions will help you and your staff effectively master the skills and knowledge needed to develop long-lived products in shortened development cycles. Our programs are designed for all levels to ensure that everyone develops the skills required to understand the fundamentals of weathering and how to operate our instruments. For the latest schedules and locations, check the Atlas website, **www.atlas-mts.com,** or e-mail **info@atlas-mts.com.**

2007

Fundamentals of Weathering I

September 11
Kolding, Denmark

October 10
Chicago, Illinois, USA

November 6
Münster, Germany

November 15
Paris, France

Fundamentals of Weathering II

September 12
Kolding, Denmark

October 11
Chicago, Illinois, USA

November 7
Münster, Germany

November 16
Paris, France

Xenotest® Workshop

October 9–10
Linsengericht, Germany

Weather-Ometer® Workshops

October 9
Ci4000/Ci5000
Chicago, Illinois, USA

November 27–28
All Ci Series
Duisburg, Germany

SUNTEST® Workshop

October 12
Linsengericht, Germany

For more information on courses in Europe, contact Atlas MTT GmbH, attention Bruno Bentjerodt, +49-6051-707-245 or **clienteducation@atlasmtt.de.**

For more information on courses in North America, contact Kerry Quilter at +1-773-327-4520 or **kquilter@atlas-mts.com.**

Or visit our website at **www.atlas-mts.com.**

AtlasMaterial Testing Solutions

Visit us at ICE!
October 3–5
Toronto, Canada
Booth #1312

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

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Experience. The Atlas Difference.
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