

# Ci3000+

Weather-Ometer® & Fade-Ometer®



Meets International Standards  
for Xenon Weathering Testing

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## The Atlas Vision

Shaping the future of the materials testing world in partnership with our customers.

## The Atlas Mission

Advance the technology of material testing through:

- Our industry expertise
- Involvement in international standards development
- Partnerships with our customers
- Provision of world class products and services

## Focused On Your Goals

Atlas pioneers innovative ways for companies to test the weatherability of their products. From our industry-leading accelerated weathering equipment to the consulting services of our expert laboratory staff, our approach to the market is clear: Provide our customers with superior, easy-to-use technology and advanced testing solutions to determine how long their products will last. **As a result, they will reach their ultimate goals – a quality product, a competitive edge, a faster time to market.**

### Quality at Every Step

We take pride in our manufacturing. Every instrument must pass customer specified test parameters and we visually inspect all xenon lamps and optical filter glass per strict quality procedures. We test every instrument for material compliance before being shipped. The 3000® Series meets relevant CE, UL, CSA, ISO and EN safety and electrical standards for both machinery and laboratory test equipment.

### Learn from the Experts\*

Atlas offers hands-on courses to guide new users through the operation, calibration and maintenance of your Weather-Ometer. We make sure you know all of the instrument features to maximize the efficiency and effectiveness of your testing.

\* Offer may differ by country

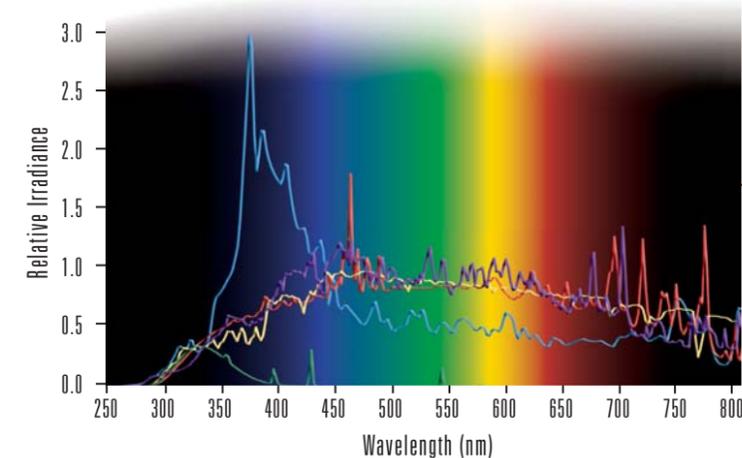
## Which Light is Right?

Choosing the “right light” is one of the first steps in creating an accurate and reliable weathering test program. The 3000® Series simulates solar radiation using xenon lamps and advanced filter systems specifically designed for weathering. Atlas xenon lamps are developed exclusively for weathering to meet high performance criteria for their spectral power distribution, lifetime irradiance stability and lot-to-lot uniformity.

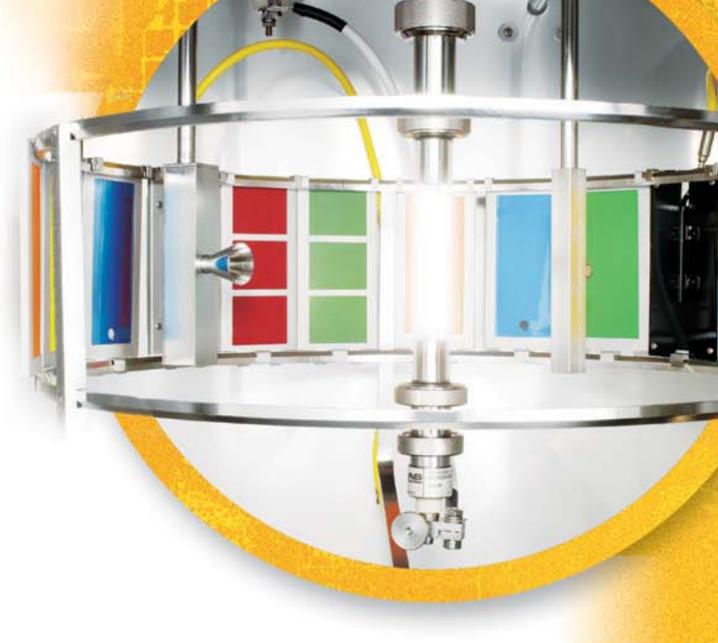
The 3000 Series uses interchangeable glass filters that tailor the xenon light spectrum to match light conditions in your products’ end use environment.

### Sunlight vs. Artificial Light Sources

#### A Comparison of Relative Spectral Power Distribution



- **Global Solar Radiation**  
Average Miami Sunlight 26° South Direct
- **Xenon Arc Lamp**  
As used in an Atlas Weather-Ometer® with CIRA inner filter and soda lime outer filter
- **UVA-340 Fluorescent Lamp**  
Commonly used in the Atlas UV2000
- **Metal Halide**  
As used in the SolarClimatic 340, 600, 1000 and 2000 systems equipped with MHG (Metal Halide Global) lamps
- **Sunshine Carbon Arc**  
As used in an Atlas Weather-Ometer® with Corex D filters



## Making the Most Advanced Instruments Even Better

We’ve overhauled the 3000 Series to include a new simplified operating system and an incredibly fast, fully-digital architecture to produce the most reliable and efficient instruments we’ve ever made. It all adds up to the most advanced and easy-to-use xenon weathering test instruments the industry has ever seen.

### Simplified Control Navigation

The new digital control system makes access to its most sophisticated features available to operators. The 3000 Series delivers exceptionally precise and reliable control of all test parameters for repeatable, reproducible and reliable results.

### Incredibly Efficient Xenon Lamp Cooling

The dramatically improved on-board xenon lamp cooling system can yield a significant reduction in cooling-water usage.

## Common Applications

The 3000® Series is the world standard for lightfastness testing and is used and approved by nearly all major US and European retailers. It is the only lightfastness instrument which meets AATCC 16E-1998, AATCC 16-2003, ISO 105 B02 and M&S C9 and C9A.

The 3000 Series is perfectly suited for testing:

- Textiles including Industrial and Geotextiles
- Pigments, Dyestuffs, Stabilizers and Additives
- Plastics
- Inks
- Paints and Coatings
- Packaging
- Automotive Materials
- Photovoltaics



# FEATURES

## A Higher Order of Weathering Testing Performance Through Superior Science

The Ci3000+ Weather-Ometer® and Fade-Ometer®, with their new advanced digital control systems, represent monumental achievements in applying digital and optical technologies in easy-to-use laboratory weathering instruments. The 3000® Series is approved by many OEMs in the textiles, paints & coatings and plastics industries as the exclusive platform to deliver accurate, reproducible and repeatable results for predicting service life. The 3000 Series has been certified CE, UL, CSA, ISO and EN compliant.

### Rotating Sample Rack

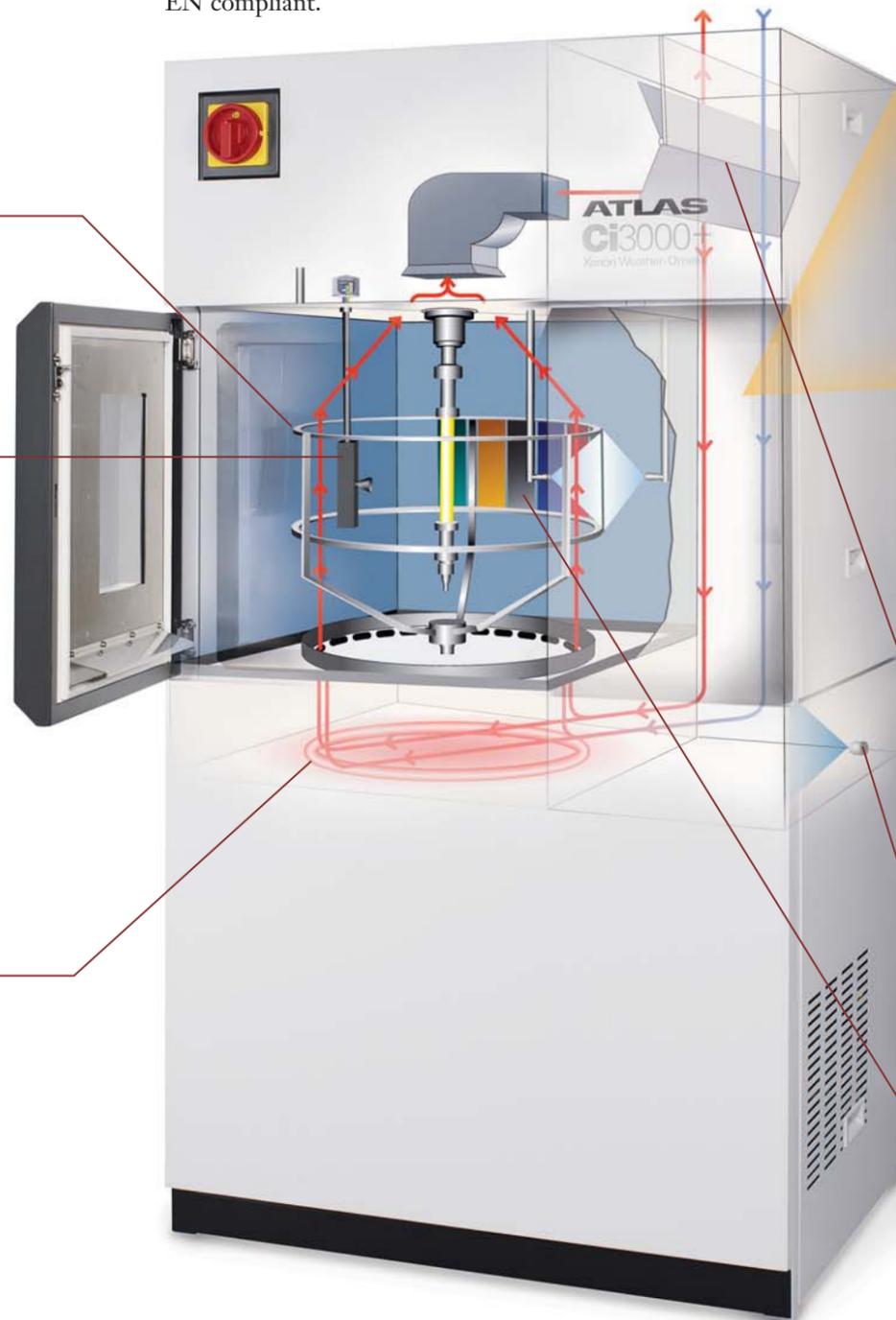
Maximizes exposure uniformity over all specimens

### Controlled Irradiance

Up to 2 sun levels for higher acceleration based on your test requirements. Narrow band (340 nm or 420 nm), broad band (300-400 nm) or illuminance control/Lux (400-750 nm) with optional monitoring at a second wavelength to meet global test requirements

### Test Chamber Temperature

Closely simulates your material's end use environment



**Intuitive User TFT LCD Touch Screen Interface**  
Increases functionality that makes the 3000® Series easy to program, monitor and calibrate

**Programmable Stepped Changes in Irradiance, Temperature, Humidity and Other Test Conditions**  
To meet any user defined test program or cycle

**Advanced Digital Control**  
Digital control with rugged, state-of-the-art embedded electronics

### Data Acquisition

Streaming data output in a format that can be compatible with many Laboratory Information Management Systems (LIMS) or stored onto a portable media. Connection sources include: Smart Media Card, RS-232 or both simultaneously

### Smart Damper™

Reduces test variability in chamber temperature and humidity and compensates for changes in ambient laboratory conditions

### VibraSonic™ Humidity Control

Accurately replicates humidity levels to meet stringent global test requirements

### ASTM Black Panel Thermometer or ISO/DIN Black Standard Thermometer

Controls and monitors temperature at specimen level to ensure test repeatability

## Additional Features



### Xenon Lamp Cooling System

The 3000 Series is equipped with a new, ground-breaking xenon lamp cooling system that dramatically reduces the amount of cooling water used

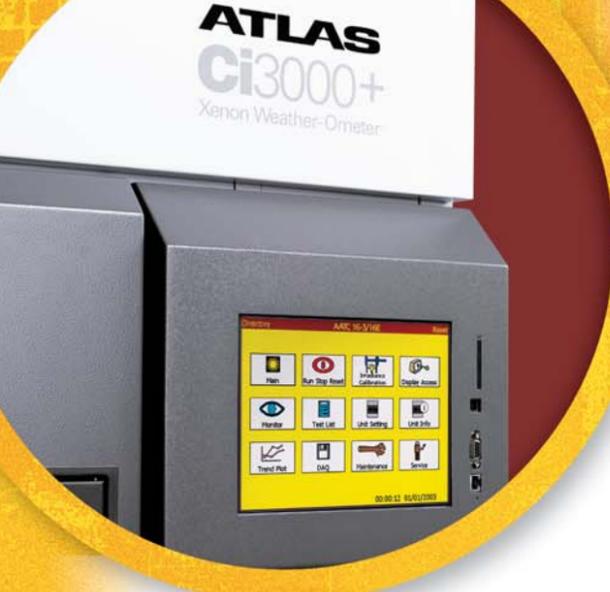
### Smart Light Monitor™

Verifies that the correct light capsule is installed

### Water Purity Indicator

Signals when incoming water quality falls below the factory set point

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# CONTROL

## Enhanced Control System Enables Complex, Custom Test Programs or Simple, Preprogrammed Test Operation

### Easy to Understand Icons Simplify Navigation

New icons make getting to the information you need fast and easy

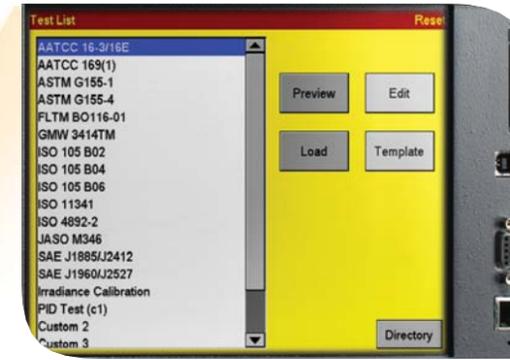
- Large, Touch Sensitive Buttons
- Clear, Easy-to-See Icons



### Two Simple-to-read Pages and On-screen Trend Plot Monitor All Critical Status Information

Monitor and/or plot all critical set points and compare with real time readings for:

- Rack Temperature: Black Panel Temperature (BPT), Black Standard Temperature (BST) or both
- Chamber Temperature
- Relative Humidity
- Irradiance
- Incoming Deionized Water Quality
- Lamp Cooling Water Temperature
- Countdown in Time or Radiant Exposure
- Phase Type and Duration



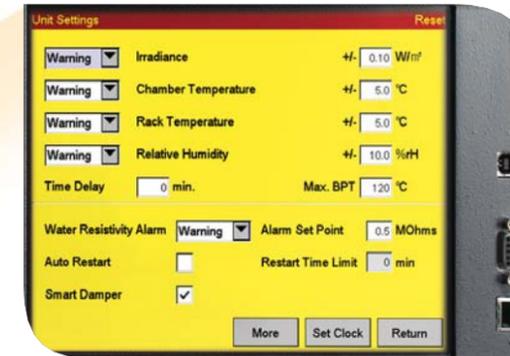
### 14 Factory Preprogrammed Test Methods

The test list includes:

AATCC	ISO	JASO
ASTM	Ford	GM
SAE	VW	

### Space for 12 Custom Test Programs

Existing test methods can be copied and edited for custom applications



### Simplified Setup of Selective Control Features

Set variance level notification for critical variables on one screen

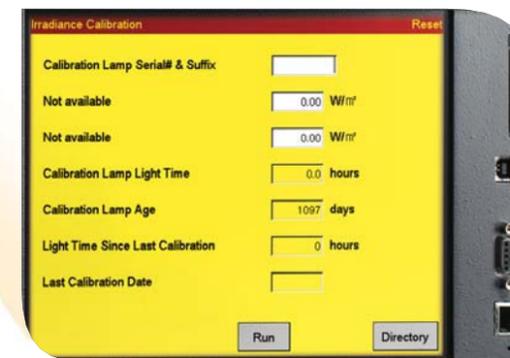
- Irradiance
- Chamber Temperature
- Rack Temperature (BPT, BST or both)
- Relative Humidity



### Multi-lingual Capability

Select the desired language:

- English
- German
- Chinese
- French
- Japanese
- Spanish
- Korean



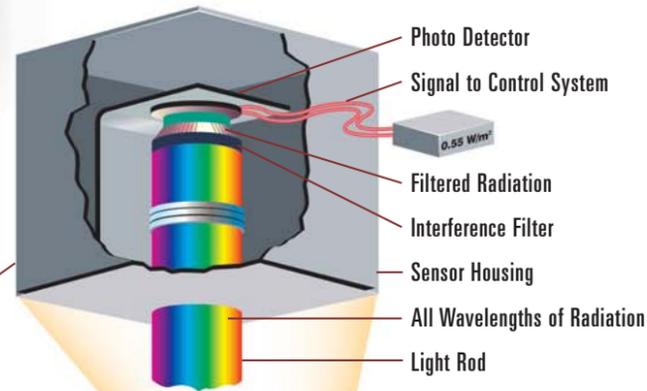
### Automated Irradiance Calibration

Simple procedure allows user calibration and eliminates duplicate information

- Enter Lamp and Certificate Data
- Install the Calibration Lamp
- Press the RUN Button
- Calibration is Done Automatically

# LIGHT

## Long Arc Xenon is the Closest Simulation of UV, Visible and IR of Solar Radiation



### Intelligent Controlled Irradiance (Ci) System

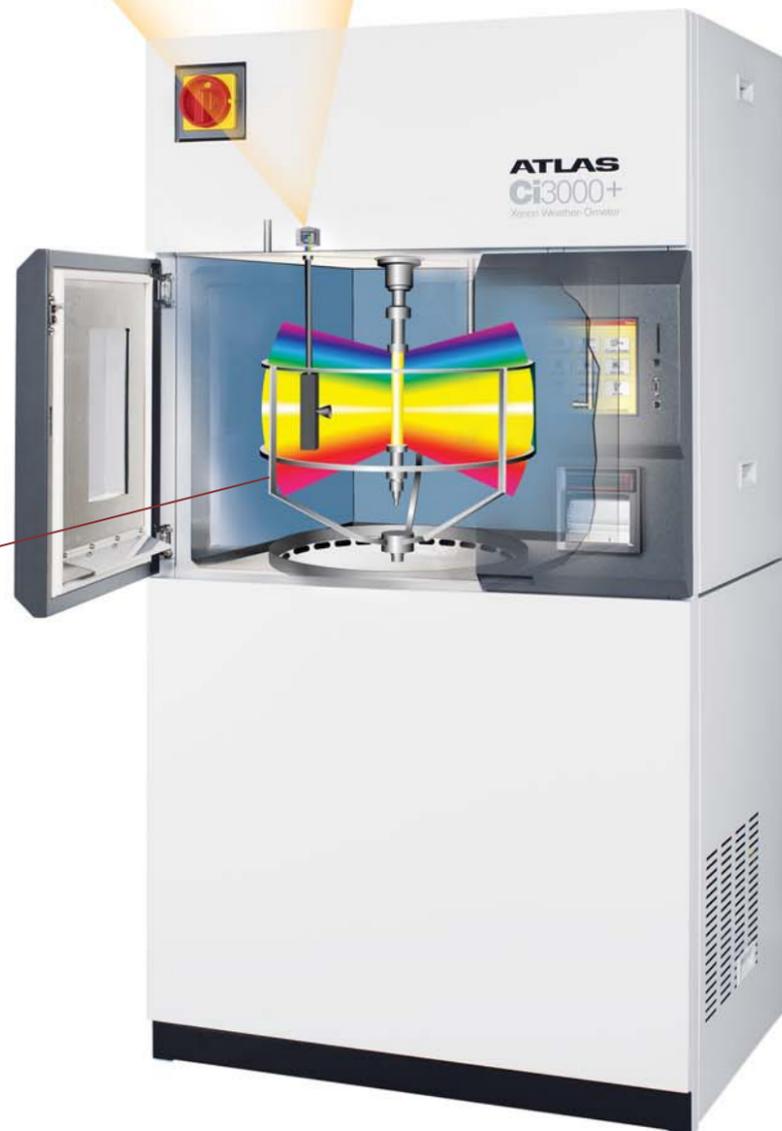
A closed loop system automatically adjusts lamp output in real-time delivering the most stable radiant exposure

- Narrow Band (340 nm or 420 nm), Broad Band (300-400 nm) or Illuminance Control/Lux (400-750 nm)
- Irradiance defined by user during test programming or by factory programmed test methods
- Intelligent control will only allow the user to select an irradiance that matches the defined test method
- Wattage Regulating System

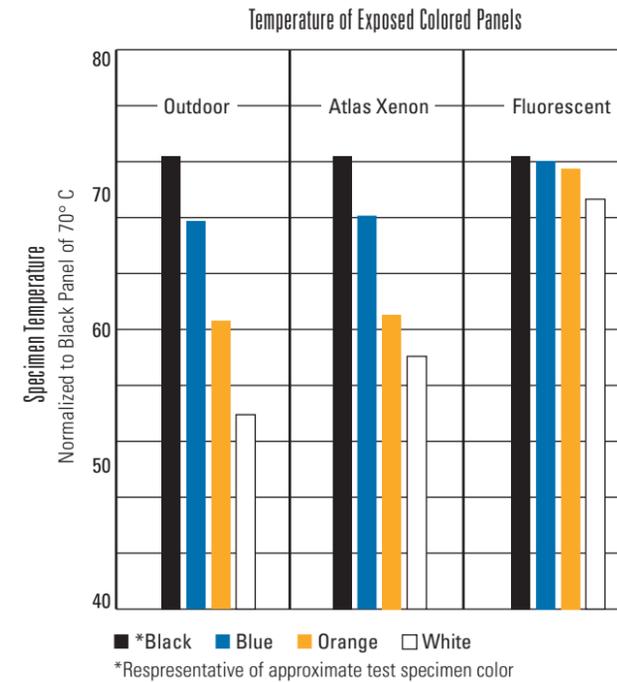
### Rotating Sample Rack

The rotating rack delivers the best exposure uniformity

- Samples are rotated continuously during test. No need to manually rotate test samples
- Uniform specimen and chamber temperature, RH, irradiance and spray
- Allows for even and consistent airflow over sample surfaces
- Can accommodate three dimensional samples
  - Small Components
  - Finished Products
  - Bottles



### Outdoor vs. Atlas Xenon vs. Fluorescent Exposure



Note: Black Panel temperature in the fluorescent device is achieved only by heating the chamber air (no IR). Thus, all specimens are heated equally, without regard to color. Because xenon light is a full spectrum light source like natural light, sample temperatures vary by color, as in natural sunlight.

Fischer, R.M, and Ketola W.D., "Surface Temperature of Materials in Exterior Exposures and Artificial Accelerated Tests," Accelerated and Outdoor Durability Testing of Organic Materials, ASTM STP 1202, Warren D. Ketola and Douglas Grossman, Eds., American Society for Testing and Materials, Philadelphia, 1994

### Recalibration on the Web

You can now process the return of your calibrated lamps for recalibration via the internet. This service is intended to reduce turn around time and better facilitate your recalibration request. Visit us at [www.atlas-mts.com/recalibration](http://www.atlas-mts.com/recalibration).

Filter Combinations		Test Conditions	Irradiance Ranges W/m <sup>2</sup>					
Inner	Outer		Wattage	300-400 nm	300-800 nm	340 nm	420 nm	
Type S Boro	Type S Boro	Most common combination for weathering tests	Min. 1800 W Max. 4500 W	40 151	398 1398	0.35 1.33	0.85 3.08	
Type S Boro	Soda Lime	Most common combination for lightfastness tests behind window glass	Min. 1800 W Max. 4500 W	35 136	393 1397	0.28 1.12	0.83 3.09	
Type S Boro	Soda Lime + Float Glass in Auxiliary Lantern	Common combination for testing European automotive interior trim materials (Requires lantern assembly)	Min. 1800 W Max. 4500 W	29 112	346 1230	0.21 0.82	0.74 2.75	
Quartz	Type S Boro	Weathering tests with somewhat more and shorter UV than sunlight	Min. 1800 W Max. 4500 W	45 172	404 1426	0.42 1.61	0.85 3.09	
Quartz	Quartz	Testing with consistently more and shorter (unrealistic) UV than global solar radiation	Min. 1800 W Max. 4500 W	52 204	419 1500	0.48 1.92	0.87 3.21	
CIRA	Type S Boro	Weathering tests requiring full spectrum match and/or cooler test temperatures	Min. 1800 W Max. 4500 W	47 181	411 1470	0.44 1.74	0.88 3.24	
CIRA	Soda Lime	Weathering tests requiring precise match of solar cut-on, full spectrum match and/or cooler test temperatures	Min. 1800 W Max. 4500 W	43 164	415 1476	0.39 1.53	0.83 3.23	
Sunlight Measurements			Irradiance Ranges W/m <sup>2</sup>					
				300-400 nm	340 nm	420 nm	300-800 nm	300-2450 nm
Average Optimum Natural Daylight	Measured 45° South Cloudless Miami, FL		28.40	0.30	0.67	287.20		
Peak Natural Daylight	Measured solar noon on Vernal Equinox at normal incidence Miami, FL		66.20	0.70	1.53	617.00		
Peak Natural Daylight Standard	Defined for Horizontal Plane (0°) in CIE Publication No. 85 Table 4		69.20	0.68	1.50	669.70	1087.80	

# CLIMATE CONTROL

The 3000® Series Offers Thorough Climate Control to Best Replicate Your Materials' End Use Environment

## Precise Humidity Control

The electronic sensor provides direct and accurate measurements of relative humidity and enables automatic control at the specimen level

- 10% RH to 75% RH in Light Cycles\*
- Up to 100% in Dark Cycles\*

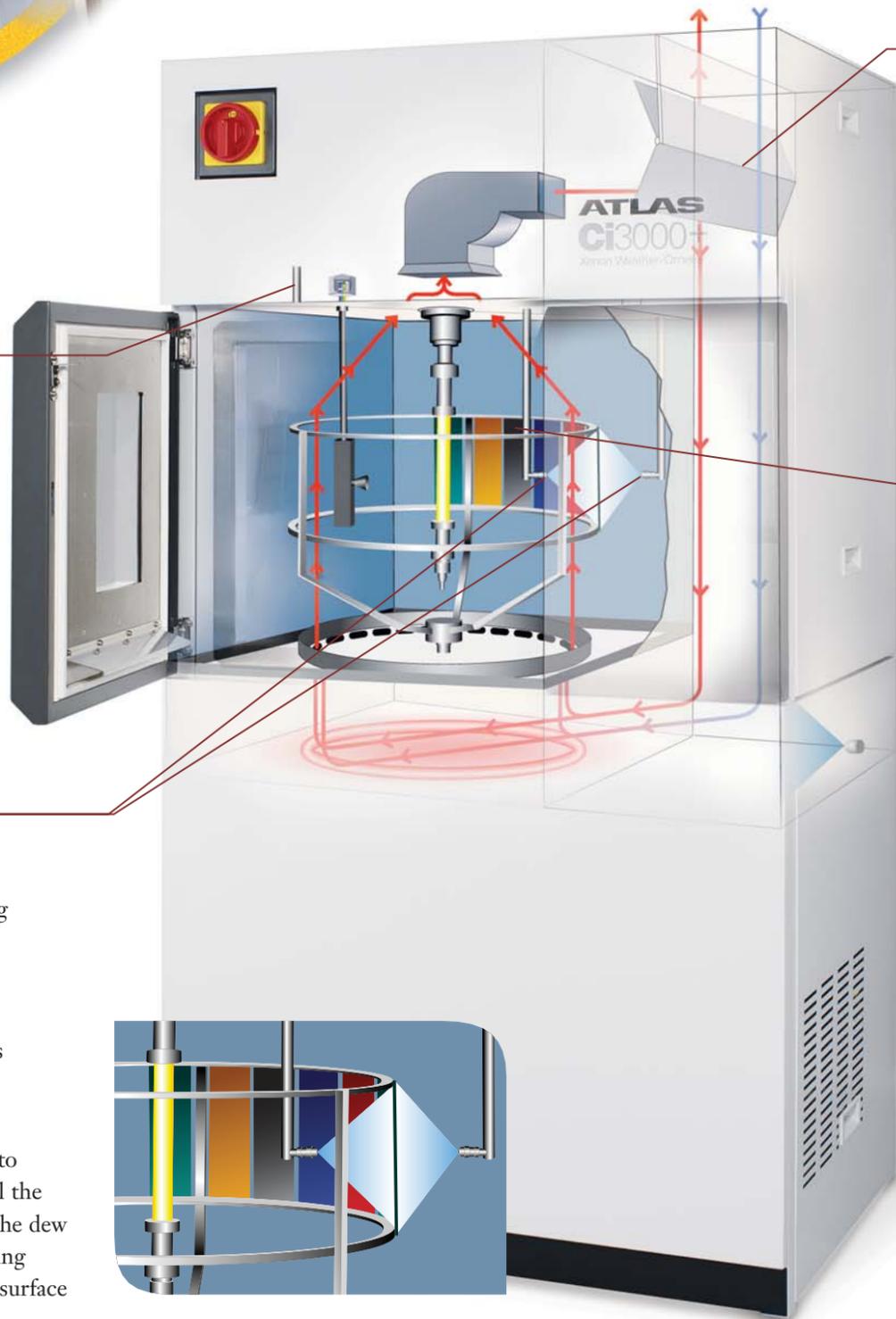
\* Dependent on other parameters such as lamp power, chamber temperature, ambient lab conditions etc.

## Specimen and Rack Spray

Not available on the Ci3000+ Fade-Ometer®

Custom designed precision nozzles provide uniform spraying of samples with deionized water

- The specimen spray applies water to the exposed surface of the sample which simulates rain to induce temperature shock and erosion effects
- The rack spray applies water to the back of the sample to cool the specimen temperature below the dew point during dark cycles causing condensation on the exposed surface



# TEMPERATURE CONTROL

Consistent, Controlled Temperature Delivers Repeatable and Reproducible Results

## Smart Damper™

- Balances test chamber temperature, BPT or BST and humidity levels and compensates for changes in ambient laboratory conditions
- Recirculates chamber air, introduces ambient air or a combination of the two

## ASTM Black Panel Thermometer (BPT) or ISO/DIN Black Standard Thermometer (BST)

- Controls and monitors temperature at specimen level to ensure test repeatability
- Control of one sensor type while simultaneously monitoring the other

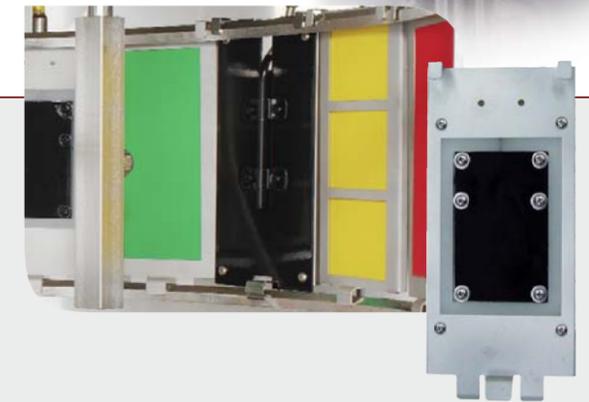
## BPT/BST Temperature vs. Chamber Temperature (CHT)

- BPT and BST sensors simulate an estimate of the maximum temperature on a sample's surface
- CHT measures the temperature of the air circulating within the chamber
- Controlling both sample and air temperature delivers maximum uniformity and can closely match the samples end use environment

## Temperature and Humidity Control

Operable ranges of temperature control at various irradiance levels (under normal laboratory conditions)

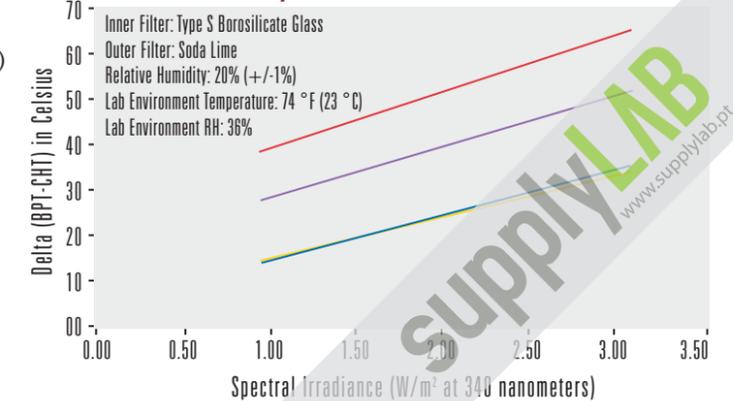
- Minimum Delta BPT/CHT @ 45 °C
- Minimum Delta BPT/CHT @ 60 °C
- Maximum Delta BPT/CHT @ 45 °C
- Maximum Delta BPT/CHT @ 60 °C



## Simultaneous Control of BPT/BST and CHT

- Advanced PID algorithms allow for discrete manipulation of test parameters
- Smart Damper, variable speed blower and chamber heater are independently controlled
- Instrument performance envelope is optimized allowing maximum flexibility in custom test applications

## Black Panel Temperature Control Performance



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# OPTIONS

## Optional Equipment and Features to Extend the Capabilities of Your Next Weather-Ometer® or Fade-Ometer®

### Hybrid Cooling System

Improved xenon lamp cooling system dramatically reduces water consumption

- Expanded LiquiAir™ Options Include Onboard Mounting
- Reduces Water Consumption up to 100%\*

\* Dependent on options, ambient lab conditions, and test methods

### Six Channel Chart Recorder

Plot up to six variables each in its own color. Record any of the following:

- Black Panel Temperature
- Relative Humidity
- Irradiance
- Chamber Temperature
- Black Standard Temperature or Second Irradiance
- Lamp Power



### XenoCal Irradiance Calibration Device

- For independent irradiance calibration and measurement at the sample plane
- Evaluation and graphical display of measured values on a PC by means of the XenoSoft analytical software
- Available with different wavelength sensitivities:
  - XenoCal BB 300 – 400 nm
  - XenoCal WB 300 – 800 nm
  - XenoCal NB 340 nm and XenoCal NB 420 nm



### Additional Options

#### Auxiliary Filter Lantern

For meeting special test requirements



### Sample Holders

This chart is a representative sample of specimen holders available for the 3000® Series. For specific information about specimen holders that best meet your needs, please contact your local Atlas representative.

Holder Type (Part Number)	Application	Max. Size mm WxHxD	Exposure Size mm WxH	Capacity
SL-3T (19163900) Single exposure window w/spring clip back	Textiles, plastic film, automotive interior	69 x 145 x 3	50 x 121	20
SL-3T with Glass (07303900) Single exposure window w/glass and adjustable back	Textiles, paper, plastic film, carpet, automotive interior	69 x 145 x 15	50 x 121	20
CD-3T (20215700) Three exposure windows w/spring clip back	Textiles, paper, plastic film, automotive interior	69 x 145 x 3	3 windows:38 x 50	20
CD-3T with Glass (07303800) Three exposure windows w/glass, spring clip back	Textiles, paper, plastic film, wood, automotive interior	69 x 145 x 15	3 windows:38 x 50	20
CD-2W (07255500) Thick carpet, hinged w/support	Carpet, foam, foam-backed materials	71 x 145 x 12	60 x 66	20
WPTC-3T (06150400)	Carpet, foam, foam-backed materials, patterned materials	165 x 146 x 12	131 x 100	8
TEX-3T with Mask (19186700) Single exposure window w/mask, adjustable	Textiles, foam, foam-backed materials	45 x 134 x 12	19 x 119	29
Polystyrene Reference Chip (19183400) 4 x 6 Panel (19210200)	Polystyrene reference chips	50 x 88 x 2	43 x 82	16
3 x 6 Panel (19188501)	Coatings, rigid plastic, wood	104 x 155 x 12	101 x 146	12
Solar Panel (19190400)	Coatings, rigid plastic, wood	76 x 152 x 9	76 x 146	14
Adjustable Bottle (19178100)	Rigid plastic, roofing material, solar panels, wood	127 x 138 x 9	119 x 119	14
Adjustable Bottle (19178100)	Bottles, labels, printing inks, adhesives, liquids, pills	69 x 101 x 43	50 x 121	20
Drop-in Specimen Bar (19184600)	Plastics	77 x 144 x 3	76 x 125	15
Tensile Bar with Spring Clip Back (19212100)	Plastics	85 x 145 x 3	71 x 121	15
Adjustable Specimen (19210600)	Plastics	55 x 137 x 5	56 x 127	20
Slide (19195800)	35 mm slides, rigid discs, plaques	50 x 151 x 3	39 x 138	21
Glass (19181900)	Automotive or building glass	101 x 101 x 10	101 x 92	14

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# STANDARDS & SPECIFICATIONS



## Textile Industry Standard

The 3000® Series meets global weathering and lightfastness test requirements. It is the world standard for lightfastness testing and is used or approved by nearly all major US and European retailers.

## International Standards

The Ci3000+ Weather-Ometer® and Fade-Ometer® meets or exceeds the following industry standards:

<b>AATCC</b>	TM 16-2003		TM 16E-1998		TM 169▲				
<b>ASTM</b>	C1442	C1501	D904	D3424	D3451	D4101			
	D4303	D4355	D4459	D4798	D5010	D5071			
	D5794	D6083	D6551	D6577	D6662	D6695	G151	G155	
<b>GME</b>	60292								
<b>ISO</b>	105-B02	105-B04▲	105-B06	11341▲	3917▲	4892-1▲	4892-2▲	12040	
<b>JASO</b>	M 346								
<b>Marks &amp; Spencer</b>	C9	C9A							
<b>MIL STD</b>	810 F▲								
<b>Peugeot/Citroen (PSA)</b>	D27 1389								
<b>Renault</b>	D27 1911	D47 1431▼							
<b>SAE</b>	J2412▲	J2527▲							
<b>VDA</b>	75202								
<b>VW</b>	PV 1303	PV 3929	PV 3930▲						

▲ Ci3000+ Weather-Ometer only

▼ Ci3000+ Fade-Ometer only

This is a sample of global standards that can be met by the 3000® Series. For more information on additional or specific standards, contact your local Atlas representative. Standards are subject to change without notice. This might lead to the inclusion or exclusion of certain standards.

## Standard Features

TFT Full Color 10.4" Touch Screen Control Panel  
Display of All Test Parameters

- Direct Setting and Control of Irradiance
- Direct Setting and Control of BPT/BST
- Direct Setting and Control of Relative Humidity
- Direct Setting and Control of Specimen and Chamber Air Temperature (Dry Bulb)
- Display of Diagnostic Messages
- 14 Factory Pre-Programmed Test Methods
- Space for 12 Custom Programs
- Multi-Lingual Capability (English, French, German, Spanish, Japanese, Chinese, Korean)

Smart Damper™

Smart Light Monitor™

Choice of Continuous Light or Light/Dark Cycling  
(Ci3000+ Weather-Ometer® Only)

Streaming Data Output via Smart Media  
Card or RS232 or Both Simultaneously  
(includes Smart Card Reader)

Air Heater

Main Power Disconnect Switch

Xenon Lamp Cooling System

Air Intake Dust Filter

Water Purity Indicator

Calibrated Xenon Reference Lamp

Chamber Viewing Door

316 Grade Stainless Steel Test Chamber

Universal Electrical Configurations to Meet Local  
Frequency, Voltage, and Electrical Requirements

CE, UL, CSA, ISO and EN Compliant

## Optional Features

6 Channel Printing Chart Recorder

Dual ASTM/BPT and DIN/BST Black Panel  
Temperature Measurement/Control including  
ASTM/BPT and DIN/BST Sensors

Monitoring of Second Wavelength

LiquiAir™

## Physical Dimensions

<b>Height</b>	183 cm (72 in)
<b>Width</b>	95 cm (37 in)
<b>Depth</b>	84 cm (33 in)
<b>Floor Space</b>	165 cm (65 in) x 264 cm (104 in) Including Access Area
<b>Total Exposure Area</b>	2188 cm <sup>2</sup> (339 in <sup>2</sup> )

## Electrical Specification

<b>Wiring Connections</b>	3 Phase, 3 Wire
<b>Operating Voltage Range</b>	200-240 VAC Phase to Phase
<b>Maximum Current</b>	47 Amps
<b>Frequency</b>	50/60 Hz
<b>Maximum Power</b>	8.5 kW

<b>Wiring Connections</b>	3 Phase, 4 Wire
<b>Operating Voltage Range</b>	200-240 VAC Phase to Neutral
<b>Maximum Current</b>	38 Amps
<b>Frequency</b>	50 Hz
<b>Maximum Power</b>	8.5 kW

## Weight

<b>Weight of Fully Skidded and Wrapped Ci3000+</b>	458 kg (1010 lbs)
<b>Weight of Ci3000+ without Skid</b>	411 kg (905 lbs)

## Water Consumption

<b>Pressure</b>	138-345 kPa (20-50 psi)
<b>Flow Rate (max')</b>	<b>Deionized Water</b> <b>Tap Water @ 18.5 °C</b>
<b>Humidification</b>	0.12 l/min
<b>Specimen Spray</b>	0.07 l/min**
<b>Rack Spray</b>	0.07 l/min**
<b>Xenon Lamp Cooling @ 2000W</b>	1.1 l/min

## BPT/BST Temperature Range

<b>Black Panel Temperature Range</b>	40-110 °C
<b>Black Standard Temperature Range</b>	40-120 °C

## HVAC

<b>Maximum</b>	26.06 MJ/h (24703 Btu/h)
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\* Typical water usage will be less. Tap water requirements for lamp cooling with the LiquiAir will be near zero.

\*\* Not available on the Ci3000+ Fade-Ometer.