

## Delivery record of large UV irradiation equipment



Appearance of ground coil weather durability tester

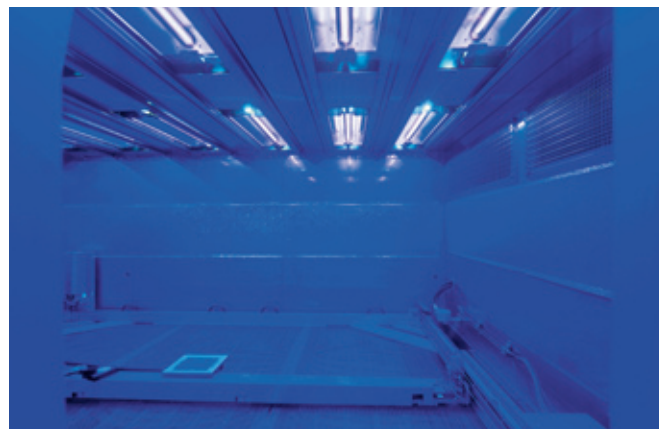


Appearance of light irradiation environmental test chamber



Inside the test chamber

Client: Railway Technical Research Institute  
Deliverables: weather durability tester (4 x 12kW metal halide lamps)  
Maximum effective ultraviolet irradiation range: 2.0m x 1.0m



Inside the test chamber during ultraviolet irradiation

Client: Japan Electrical Safety & Environment Technology Laboratories  
Deliverables: Light irradiation environment test facility (12 x 4kW metal halide lamps)  
Maximum effective ultraviolet irradiation range: 1.8m x 1.5m

### ⚠ Important safety information

- For your safety, be sure to observe the following.
- Read through the Operation Manual prior to use. Always operate in accordance with the Operation Manual.
- For optimum results, use only as directed and for the stated purpose.

#### Warning

Improper usage could lead to serious injury or death.

- Always shut off the power before opening the lid or commencing inspection or maintenance procedures.
- Due to the risk of electric shock and injury, the mains power box should only be opened by suitably qualified operators.
- Irradiation can harm the eyes and cause skin inflammation. During inspection, do not look directly at the lamp or expose the skin to irradiation.
- Keep hands away from conveyors and other rotating parts to avoid injury.

#### Caution

Improper usage could lead to danger with potential for injury or damage.

- The lamp becomes very hot during use. When replacing the lamp, wait until it has cooled down completely to prevent injury or burns.
- The power supply and self-ballasted irradiator must be properly earthed.
- Do not block external ventilation intake holes, which are used for internal ventilation of the system.
- Keep hands away from moving parts such as the ventilator fan and conveyor motor to avoid injury.
- Do not operate the system if the ambient temperature is 35°C or higher, as this may cause the cooling system to perform a safety shutdown. Contact Iwasaki Electric for advice.
- The operating environment should be relatively free of contaminants such as foreign gases and dust particles, which can cause corrosion or compromise system control.

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**EYE IWASAKI**

## EYE SUPER UV TESTER EYE SUPER XENON TESTER

Accelerated weather durability tester

**IWASAKI ELECTRIC CO., LTD.**

High Acceleration UV Tester  
High Correlation Xenon Tester

Every product used outdoors and must endure the harsh treatment of Mother Nature. They are exposed to the light from the sun, rain and wind. Plastics gradually crack, and paint colors fade. This phenomenon is referred to as deterioration. An accelerated weather-durability test artificially recreates outdoor conditions such as light, heat, rain and wind providing a rapid observation of the deterioration process to determine the life expectancy of a product. While Xenon based test systems are used predominately for standards development and finish testing, highly accelerated UV testing is preferred for R&D and product durability testing.

Since manufacturers in many industries are looking to design products to last 30 years or more in the field, it is essential to find ways to dramatically shorten the time it takes to simulate long life cycles of UV exposure. The EYE Super UV Tester can compresses years of detrimental UV radiation effects into just weeks of testing, allowing customers to quickly verify designs and significantly shorten product development time. The EYE Super Xenon Tester provides exceptional correlation with outdoor exposure testing along with the added flexibility of variable irradiation intensity.

These systems combine superior performance and quality for research and development, product durability testing, and standards development. They are used extensively for testing automobile parts, building materials, home furnishings, pigment/paint development, printed publications, and materials such as plastics and artificial stone. Regardless of the product, Iwasaki's systems can dramatically reduce testing time and improve quality and profitability.



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Metal halide lamp EYE SUPER UV TESTER SUV-W161

FEATURES

1 Highly Accelerated Life Testing (HALT)

Iwasaki's proprietary metal halide based high-output UV lamp delivers 10 times the acceleration of typical weathering chambers, dramatically shortening life cycle testing. This unique technology compresses years of detrimental UV radiation effects into just weeks of testing, allowing rapid verification of designs and significantly shortening product development time.

2 Correlated Acceleration

The SUV-W161 system can generate 30 times natural sunlight UV energy (UVA/UVB) to provide acceleration factors greater than 100, correlated to outdoor exposure. Product design problems and marginal components can be discovered and corrected during product development to achieve improved customer satisfaction and reduced warranty costs.

3 Natural Sunlight

For highly accelerated testing, natural sunlight replication is critical. The new SUV-W161 irradiation system utilizes an exclusive Iwasaki integral spectral filter that cuts UV irradiation below 295nm. This fully integrated proprietary lamp and filter system blocks extremely harmful UV spectral energy, not found in surface sunlight, to ensure optimal test correlation with natural UV degradation.

4 Automated Irradiation Control

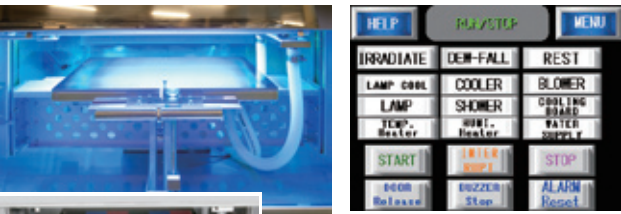
The desired UV irradiation intensity is easily set on the touch panel and then controlled by an electronic feedback system. This ensures constant irradiation intensity on the target material to deliver reliable long duration test results, even as the lamp ages.

5 Simple Data Capture and Analysis

The SUV-W161 system includes a built in data-logger for data storage and simple transfer to common programs such as MS-Excel, allowing prompt review of data and extensive post-test analysis.

6 Flexible Test Setup

All weathering parameters and cycle functions are fully programmable including temperature, humidity, rainfall, UV power, rest (night time), and cycle/duration timing. All functions are easily saved for quick recall to ensure repeatable test results and increased test productivity.

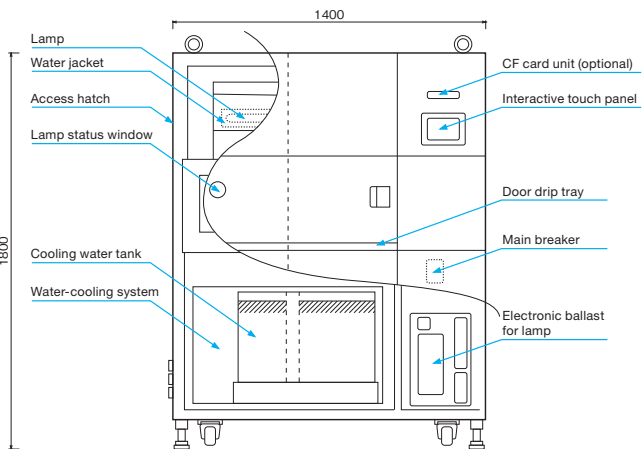


Operation area of the touch panel



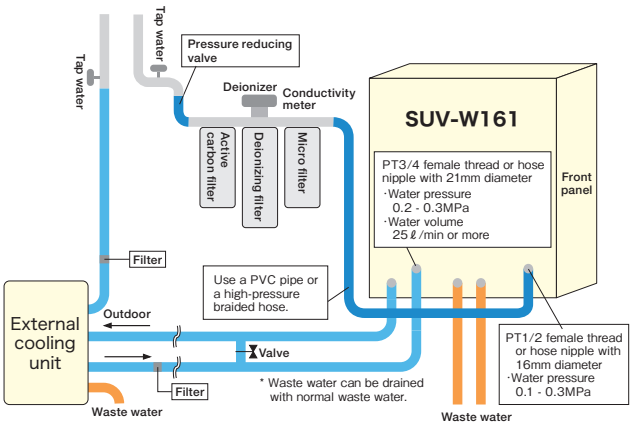
Inside the specimen table (irradiation time)

Main parts



Sample coolant and electrical connection

SUV-W161 typical connection diagram for operating water, system cooling water, and waste water.



## TEST DATA

### Test data for metal halide lamp type EYE SUPER UV TESTER

Material quality is steadily improving, but the demand for products to survive prolonged outdoor exposure continues to expand. Artificially accelerated weather-durability testing is essential to enable the development of new materials within a reasonable time frame. The phenomenal performance of the EYE Super UV Tester from Iwasaki Electric provides faster, more accurate, exposure testing making it an indispensable tool for material development and research.

- 1 Providing correlated acceleration factors more than 10 times typical weatherometer systems, the EYE Super UV Tester greatly increases the efficiency of research and development, quality control, and process control in the development and manufacture of plastic, paint, ink, pigment, textiles and other materials. Uniform irradiation of high intensity ultraviolet light ensures accurate and fast weather durability assessment.
- 2 Programmable temperature, humidity, rainfall, UV power, rest (night time), and cycle/duration timing.
- 3 An electronic feedback system provides flexible control of UV irradiation intensity and ensures constant energy to target material and uniform distribution of irradiation.
- 4 Custom spectral filtering cuts UV irradiation below 295nm to eliminate the negative effect from UV irradiation not present in natural sunlight.

Example of color differences in paint  
(time required until reaching an identical value)

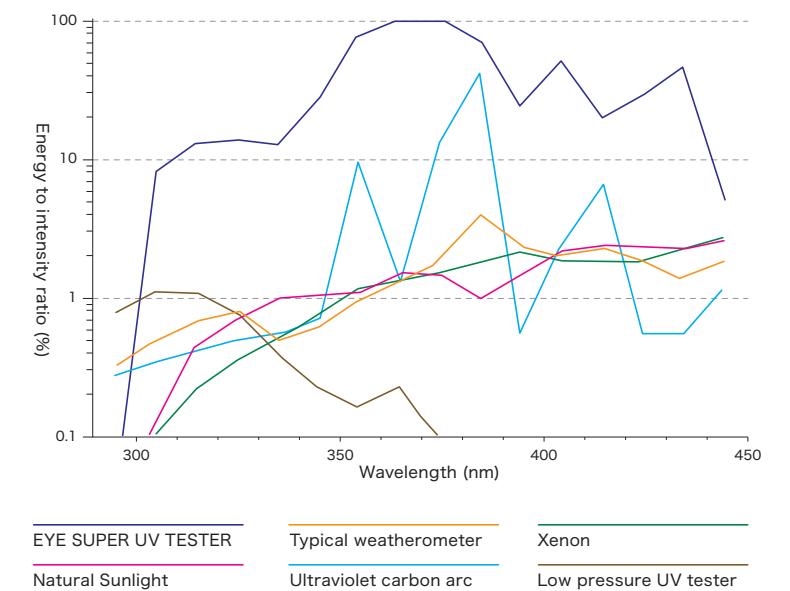
	Hours	Days
Outdoor exposure	10000	420
Sunshine weather meter	1000	42
Xenon	1000	42
EYE SUPER UV TESTER	100	4

### 30 times or greater UV irradiation intensity than conventional weatherometers. Unprecedented test speeds.

The EYE Super UV Tester uses a proprietary high output UV lamp that generates ultraviolet light very efficiently. Its UV irradiation intensity is 30 or more times greater than that of sunlight and conventional weatherometers. For even greater solar correlation, UV radiation below 295nm is removed from the light source by a custom filter.

Removing this radiation below 295nm, that in natural sunlight does not reach earth, produces an acceleration in deterioration that more closely resembles outdoor exposure. There is no risk that light of a wavelength not present in sunlight will bias the test results.

Ratio of energy to intensity by wavelength for different testers



### High UV irradiation intensity speeds up weather durability testing

The system concentrates the high deteriorating power of UV irradiation. The EYE Super UV Tester enables weather durability testing at an unprecedented speed. It dramatically reduces testing time that required months or years of outdoor exposure, or thousands of hours of laboratory testing, and speeds up quality verification during research and development.

#### UV rays are the greatest cause of product deterioration.

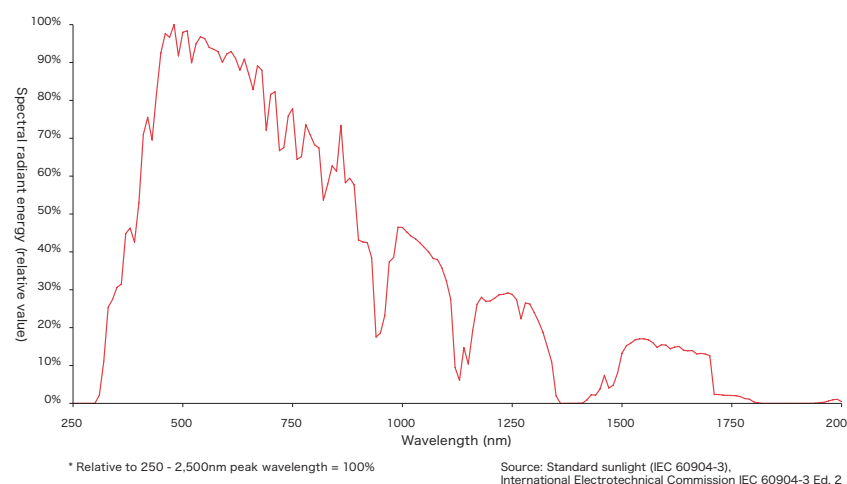
Whether it's the prolonged hot dry sun of Arizona, or the humid wet irregular sun of England, the EYE Super UV Tester can recreate these environmental conditions for repeatable testing. The system highly accelerates UV irradiation deterioration while generating the same physical changes that occur during outdoor exposure and conventional weatherometer testing. The EYE Super UV Tester, an ultra-accelerated weather durability test system, delivers capabilities that greatly exceed what is capable with common Xenon test systems.

EYE SUPER UV TESTER test example (blue hardened PVC)

Cycle of three hours irradiation and two hours condensation



Flat plane energy distribution of standard sunlight (IEC 60904-3)



### Uniform distribution of irradiation intensity ensures the reliability of weather durability test assessment

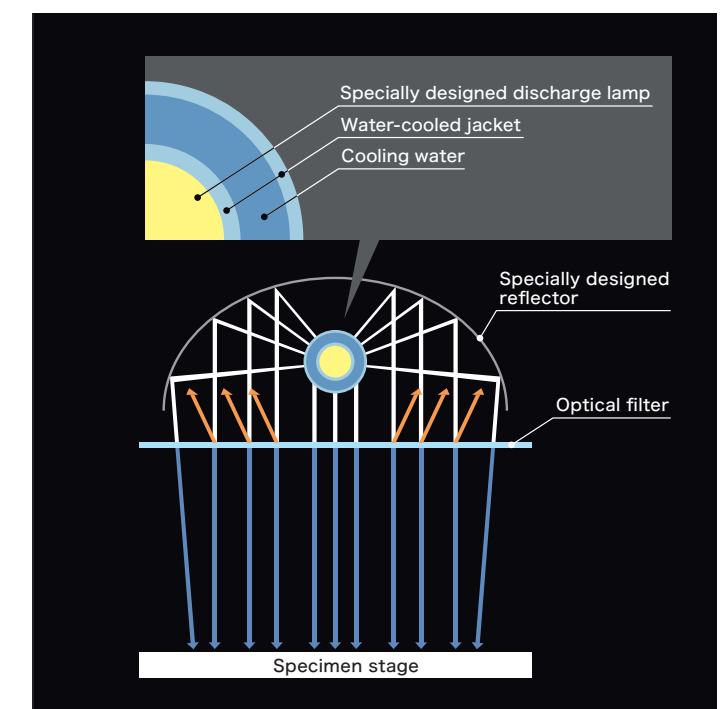
Specially designed reflectors ensure uniformity of UV irradiation distribution on the sampling plate. In addition, the automatic feedback control system guarantees that the UV intensity remains constant for unrivalled uniformity. This highly accurate and reliable UV power distribution design makes this an ideal test system for ultra-accelerated weather deterioration testing.

#### The new UV irradiator system features an updated optical configuration designed to simplify the lamp replacement procedure without compromising performance characteristics.

The SUV-W161 incorporates a newly designed optical system configuration that enables faster and easier lamp replacement. The lamp is easily accessed from a service door on the side of the system. It is not required to move or detach any cooling or filter system components. This expedites the lamp replacement while reducing the chance of damaging or displacing any system components that may affect performance.

The new optical filter is extremely durable and virtually impervious to the effects of heat and light. This new optical filter, in combination with the redesigned irradiation unit, significantly improves ease of maintenance without compromising operational performance.

Cross-section of irradiation field



SPECIFICATIONS

Model		SUV-W161
Light source	Lamp	Metal halide lamp (ME06-L31WX/SUV)
	Filter	Limited wavelength 295 - 450nm dielectric multi-layer filter (UVCF10)
	Water-cooled jacket	Quartz glass jacket (WJ50-SUV-4)
Test methods		Choice of continuous irradiation and programmed operation (1) Continuous irradiation (2) Irradiation -> stop program (3) Irradiation -> condensation program (4) Irradiation -> condensation -> stop program (5) Irradiation -> stop -> condensation program
Test duration		Irradiation, condensation and stop periods Individual timers: 0.1 - 999.9 hours Total time: 0.1 - 9999.9 hours Optional settings supported
Ultraviolet irradiation		Programmable up to 1500 ± 80W/m² (see footnote*)
Ultraviolet irradiation distribution		90% uniformity ratio
Ultraviolet irradiation measurement		Permanent UV measurement, portable UV photometer
Ultraviolet illuminance adjustment		Internal: electronic ballast controlled from touch-screen operating panel
Temperature control	Irradiation period (BP) **	50°C - 85°C (room temperature = 20°C)
	Pause period (BP) **	35°C - 75°C (room temperature = 20°C)
Black Panel temperature control		Closed cycle system
Auto-temperature adjustment function		Black panel temperature ± 3°C
Humidity control range	Irradiation period	40% - 70%RH (BP 63°C) **
	Pause period	50% - 90%RH (BP 50°C) **
Continuous irradiation duration		0 - 9999.9 hours
Effective irradiation area		190 (7.5in) x 422mm (16.5in)
Lamp cooling	Cooling method	Water-water heat exchange
	Cooling water tank capacity	25ℓ (pure water) + 35ℓ (pure water)
Externally-supplied water		Quality = pure water    Pressure = 0.1 - 0.3MPa Flow rate = 6ℓ/min min. (as required during operation)
		Quality = mains water    Pressure = 0.2 - 0.3MPa Flow rate = 25ℓ/min min.    Temperature = 20°C max.
Power consumption		21kVA (three-phase 3W, 200V, 50/60Hz) Maximum current = 60A
External dimensions		1400mm (W) x 1200mm (D) x 1800mm (H)
Weight		800kg approx..
Standard specifications	Temperature and humidity control during pause	Temperature and humidity can be controlled during pause Temperature = 35°C - 75°C ± 3°C Humidity = 50% - 90%RH
	Heat exchange and water cooling	Lamp heat is transferred to water and discharged
	Attenuation filter	30% light volume cut filter
	Shower (L&D)	Shower available during irradiation, before and after condensation and before and after idle periods
Optional extras		CF unit
		External cooling system

●Contact us for other specifications. "Drain pan" for preventing water leakage is available.  
●Please note that specifications may change due to continuous system improvement program.  
\* JIS compliant value (1000W/m² with conventional UV radiometer)  
\*\* BP = Black Panel thermometer

EYE SUPER XENON TESTER XER-W75

FEATURES

1 Designed to Meet Latest Standards

The XER-W75 is designed to comply with JIS K 5600-7-7 "testing methods for paints" - accelerated weathering and exposure to artificial radiation (exposure to filtered xenon-arc radiation). Available options also allow the system to comply with JASO high-intensity irradiation testing.

2 Natural Sunlight Correlation

The proprietary Iwasaki Xenon lamp and filter assembly create testing conditions that closely approximate the spectral distribution of natural sunlight. Water fall "showers" and dark (day/night) cycle features further increase the system correlation with true outdoor exposure conditions.

3 Outstanding Reproducibility

The EYE Super Xenon Tester's custom irradiation and sample assembly is the culmination of decades of test system experience. This integrated system ensures the target samples are exposed to an extremely uniform level of UV light to guarantee test reproducibility.

4 Comprehensive yet Simple Setup

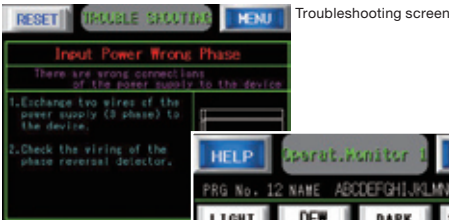
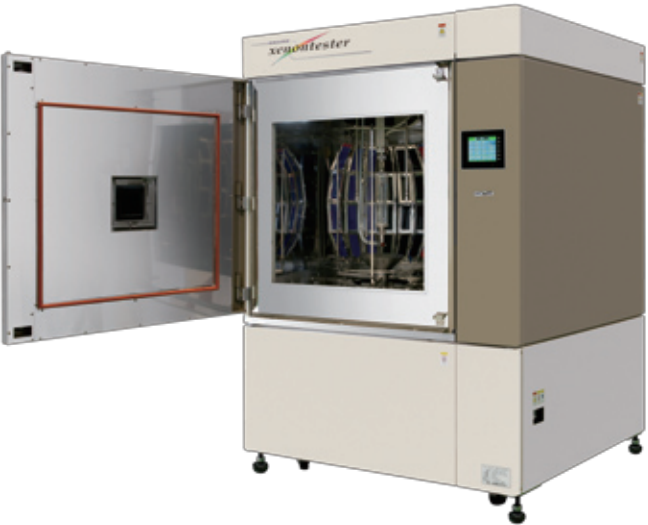
All weathering parameters and cycle functions are fully programmable on the system touchscreen panel. Temperature, humidity, rainfall, UV power, rest (night time), and cycle/duration timing are easily programmed and saved for quick recall to ensure repeatable test results and test efficiency. User interactive troubleshooting functions allow rapid problem detection and remediation.

5 Increased Testing Productivity

The EYE Super Xenon Tester can be used to test up to 104 panels at 30 -120 W/m² or 54 panels at 48 - 200W/m², using available optional equipment. The extensive test setup options provide flexibility to meet your changing test requirements and increase your productivity.

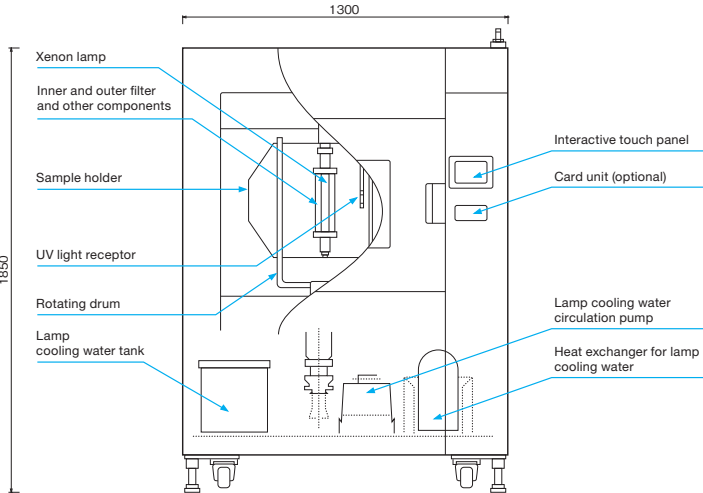
6 Simple Maintenance

The EYE Super Xenon Tester has been designed with ease of maintenance in mind. From lamp replacement to system cleaning, all tester maintenance and service tasks are easily accessed and simple, saving time and cost.

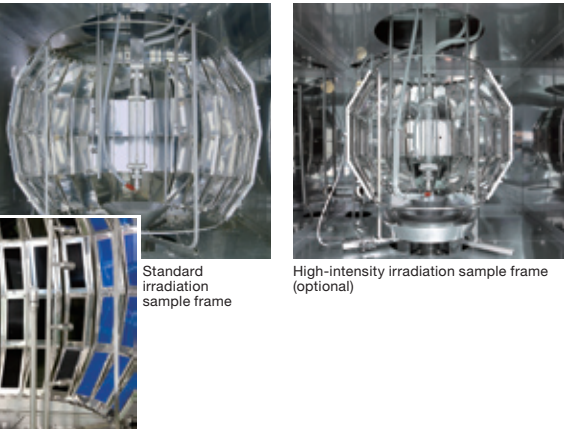


Touch-screen operating panel

■Main parts



■Sample mounting



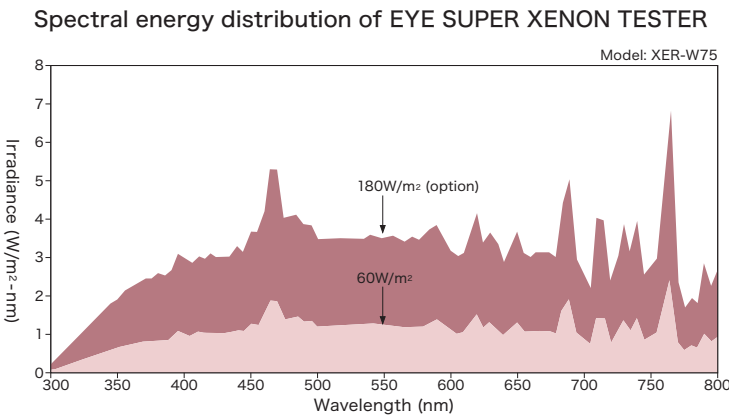
TEST DATA

Test data for EYE SUPER XENON TESTER

For many years weather durability testing has been performed using a variety of technologies including carbon arc (UV carbon arc lamps or sunshine carbon arc lamps). Considerable data has been accumulated using these testers in many application areas. While still in use in some parts of the world, Xenon based systems have supplanted most weatherometer technologies. The growing transition to Xenon systems has allowed global standardization of many common weather durability tests.

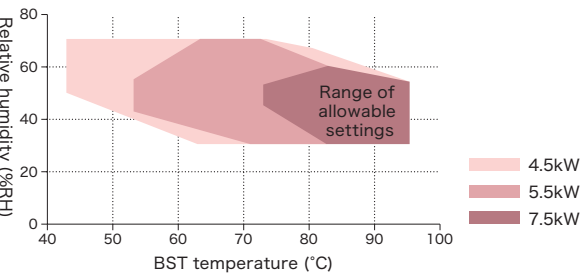
- 1 Recognizing the growing demand for Xenon based test systems, Iwasaki has developed the new XER-W75 super Xenon system to provide a more flexible high performance material testing solution. The EYE Super Xenon Tester benefits from decades of Iwasaki experience with prior generation Xenon test systems.
- 2 The wide acceptance of Xenon based test systems has aided the establishment of global (ISO) standards for many weather durability tests. Access to data based on these universal standards has accelerated new product development worldwide.
- 3 The EYE Super Xenon Tester is designed for maximum flexibility to provide a single test system that complies with global automotive, textile, plastic, paint and other material test standards.
- 4 Widespread use of Xenon based systems has produced substantial correlation data. The proprietary Iwasaki Xenon lamp and filter assembly delivers exceptional correlation with outdoor exposure conditions. Test results are repeatable and field product performance can be reliably predicted.

JIS has adopted the Xenon lamp system for testing paints. The XER-W75 complies with this standard. With options installed, it also complies with JASO (Japanese Automotive Standards Organization).

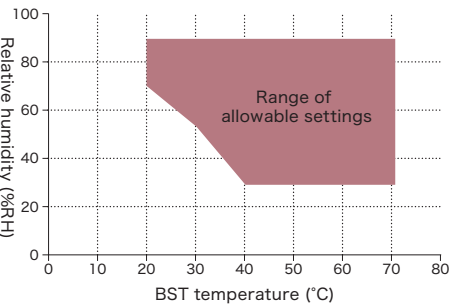


Temperature and humidity characteristics of EYE SUPER XENON TESTER

Relationship between black standard temperature and humidity that can be set during irradiation cycle



Relationship between black standard temperature and humidity that can be set during dark cycle



Xenon arc lamp weatherometer compliance information

The EYE Super Xenon Tester can be used unmodified or with optional fittings to achieve compliance with the following specifications and standards.

- 1 **Paints standards**  
JIS K 5600-7-7 (ISO 11341), ISO 787/15, ASTM D 4303
- 2 **Plastics standards**  
JIS K 7350-2 (ISO 4892-2), ASTM D 2565, ASTM D 4459, ASTM D 5071
- 3 **Textiles standards**  
JIS L 0843, ISO 105B-02, AATCC 169, ASTM D 4355
- 4 **Automotive standards**  
JASO M 346, JASO M 351, ISO 3917
- 5 **Other standards**  
JIS B 7754, ISO 4665-3, ASTM C 732, ASTM D 4434, ASTM D 4637, ASTM G 26

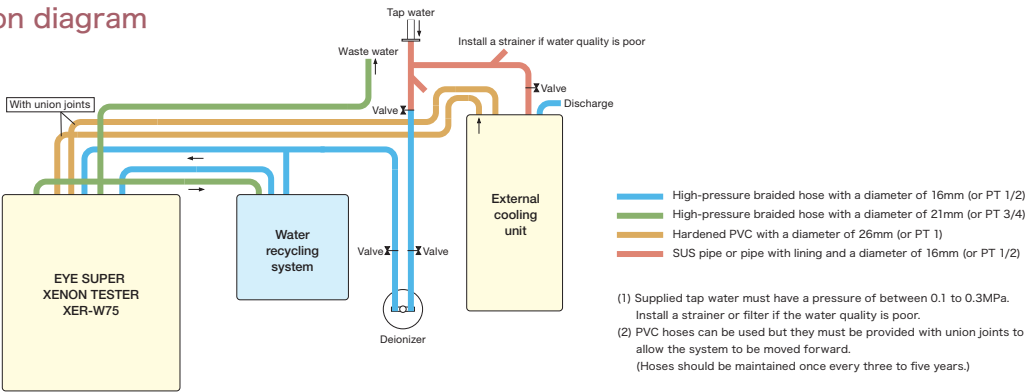
JIS = Japanese Industrial Standards  
ISO = International Standards Organization  
ASTM = American Society for Testing and Materials  
DIN = German Industrial Standard  
AATCC = American Association of Textile Chemists and Colorists  
JASO = Japanese Automotive Standards Organization

**Important standards**

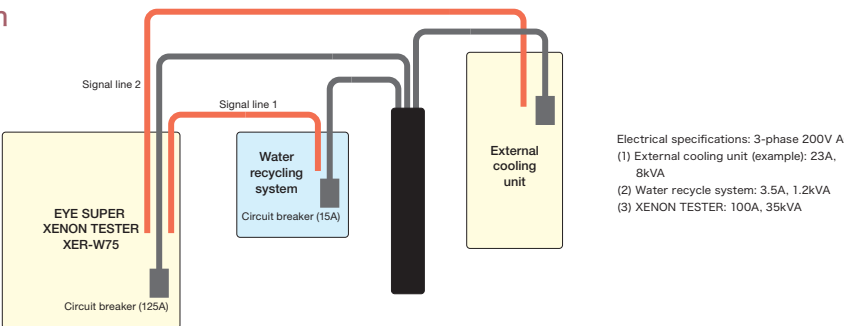
- JIS K5600-7-7  
Testing methods for paints  
Part 7: Long-period performance of film  
Section 7: Accelerated weathering (exposure to filtered xenon-arc radiation).
- ISO 787/15  
General methods of test for pigments and extenders  
Part 15: Comparison of resistance to light of colored pigments of similar types
- ASTM D 4303  
Standard Test Methods for Lightfastness of Colorants Used in Artists' Coloring Materials

\* The EYE Super Xenon Tester does not comply with all the standards listed above.

Sample pipe connection diagram



Sample wiring diagram



SPECIFICATIONS

Model			XER-W75
Light source	Lamp		Water-cooled 7.5kW xenon arc lamp
	Filters	Inner	Quartz glass
		Outer	Borosilicate glass
Test method			Enables continuous irradiation and combine irradiation with dark and condensation cycles Showers occur any time during irradiation or prior to or following dark and condensation phases
Test period			Total time: 0.1 - 9999.9 hours    Shower time: 1 - 30 minutes Irradiation, condensation and darkness times: 0.1 - 999.9 hours
Irradiance	Standard intensity test	Control range: 30 - 120W/m <sup>2</sup> Control format: automated Measured wavelength range: 300 - 400nm (contrast monitoring at 420nm)	
	High-intensity test	Control range: 48 - 200W/m <sup>2</sup> Control format: automated Measured wavelength range: 300 - 400nm (contrast monitoring at 420nm)	
Irradiation distribution			Uniformity ratio = 90%
Number of samples and effective target area	Standard intensity test	104 pieces (70 x 150mm), 10920cm <sup>2</sup> (including BST/WST panels)	
	High-intensity test	54 pieces (70 x 150mm), 5670cm <sup>2</sup> (including BST/WST panels)	
Temperature control	Control method		Closed loop feedback system (black standard PDI system)
	Controlled parameters		Black standard (white standard is used for monitoring)
	Control range		Irradiation time: 45 - 95°C (depends on irradiation intensity) Dark cycle: 20 - 70°C
	Control accuracy		±2°C of set value (depending on conditions)
Humidity control	Control method		Humidity control through use of capacitive RH sensors
	Control range		During irradiation cycle: 40 - 80%RH (depends on set conditions), dark cycle: 30 - 90%RH (depends on set conditions) Condensation cycle: 90%RH or more
	Control accuracy		±5%RH of set value (depending on conditions)
Lamp cooling	Cooling method		Direct water cooled
	Cooling water tank volume		20ℓ (pure water)
Specimen cooling	Cooling method		Circulated air-cooling system
	Refrigerator power consumption		2 x 750W
External dimensions			1300mm (W) x 1500mm (D) x 1850mm (H)
Weight			1100kg approx.
Power consumption			35kVA (three-phase 3W, 200V, 50/60Hz), maximum current 100A
External water supply			Water quality: Pure water, water pressure: 0.1 - 0.3MPa Water volume: About 1ℓ/min (for humidification), about 3ℓ/min (for shower) x 2
			Water quality: Tap water, water pressure: 0.2 - 0.3MPa Water volume: About 30ℓ/min, water temperature: 25°C or less
Option			1. External cooling unit (cooler) 2. Water recycling system 3. Black panel thermometer 4. Soda lime glass filter 5. 340nm photometer (irradiation meter for narrow band) 6. CF card unit 7. High-intensity unit 8. Remote acquisition unit 9. Custom-made sample holder

●Note that specifications are subject to change for improvements.

OPTIONS

- SUV-W161
- 1

External cooling unit
- 2

CF unit for recording temperature, humidity and irradiation intensity records temperature, humidity and irradiation intensity

- XER-W75
- 1

External cooling unit (cooler)
- 2

Water recycle system
- 3

Black panel temperature
- 4

Soda lime glass filter
- 5

340nm photometer (irradiation meter for narrow band measurements)
- 6

CF card unit
- 7

High-intensity unit
- 8

Remote acquisition unit
- 9

Custom-made sample holder

Compliance with key standards	
	Plastic JIS K 7350-2
3 Black standard temperature gauge	Standard is acceptable
4 Soda lime glass	B method only

Note:  
ASTM (American Society for Testing and Materials)  
High-frequency usage of 3.  
  
DIN (German Industrial Standard)  
High-frequency usage of 3.  
  
Laboratory testing  
Using mainly 4.

1 External cooling unit (cooler) is required as optional equipment if water for industrial use cannot be otherwise provided.  
2 A water recycle system is used for conserving pure water or tap water volume and lower running costs.

Handheld UV photometer:UVP365-03 (compliant with JIS C 1613 High-energy ultraviolet irradiance meter for metal halide lamp testers)

Features

- 1

Accurate numerical management of UV irradiation intensity (300 to 400nm)
- Measurement values are digitally indicated and easy to read. A measurement value hold function helps preventing measurement errors.
- 2

High measurement accuracy
- Spectral sensitivity characteristics that match the spectral distribution curve of the UV tester ensures high measurement accuracy.
- 3

Compact and easy to use
- Measurements are available by turning the tester on and off and calibration is not required.  
The receptor cells are silicon photocells. The receptors are compact. The meter is powered from a dry battery (9V). A battery check function is provided.

