

New Developments in Testing Standards

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Q-Lab

[View Recorded Presentation](#)

Q-Lab's New Webinar Series

Today is the second of four new webinars this spring from Q-Lab on weathering and corrosion testing topics

All upcoming and archived webinars can be accessed at:
q-lab.com/webinars

Date	Topic
29 May	How to Perform a Comparison Test
12 Jun	New Developments in Testing Standards
01 Jul	Q-PANEL Standard Substrates
17 Jul	QUALICOAT

Administrative Notes

You'll receive a follow-up email from info@email.q-lab.com with links to a survey, registration for future webinars, and to download the slides

Use the **Q&A feature in Zoom** to ask us questions today!



We make testing simple.



Thank you for attending our webinar!

Standards Development

- Weathering and corrosion test standards have been in use for over **100 years**
- The most popular ASTM, ISO, SAE, and company standards have **A LOT** of historical data
 - Large changes are not common
 - Revisions are done carefully and with international support and agreement



Standards Development

Standards committees actively review, revise, and create test protocols!

- Calibration and maintenance recommendations
- Performance verification techniques
- Hardware neutrality
- Updates to cycles, accessories, and instrument parameters
- Incorporation of new technologies
- Language and typographical updates

Standards update types

1. New standard
 - A new project request is started, if approved
 - **Problem-based** (an issue requires a standardized solution) or **Supply-based** (new equipment needs a repeatable procedure)
2. Systematic review
 - Every ~5 years, depending on organization
3. Revision
 - Any time a need for an update is identified, a member can request a work item for the revision

Q-Lab Standards Leadership

- ISO
 - TC 61 (plastics)
 - TC 35 (paints and coatings)
 - TC 38 (textiles)
 - TC 42 (photography)
 - TC 156 (corrosion)
- IEC
 - TC 82 (photovoltaics)
 - TC 104 (environmental tests)
- ASTM
 - D20 (plastics)
 - D01 (paints and coatings)
 - G03 (Weathering)
 - G01 (Corrosion)
- AATCC (textiles)
- FGIA (building products)
- SAE (automotive standards)
- GB (Chinese national standards)



General Standards Updates

ISO 4892-1: General Lab Testing

- General laboratory guidance – widely referred to in many international standards
- Updates definitions including specimens, reference materials, test types, and black and white panel thermometers
- Clarifies black panel temperature sensor construction, performance, and calibration requirements
- Adds reference to ISO 23741 for water delivery in xenon testing – authored by Q-Lab
- Modernizes requirements for the test report

**INTERNATIONAL
STANDARD**

**ISO
4892-1**

**Plastics — Methods of exposure to
laboratory light sources —**

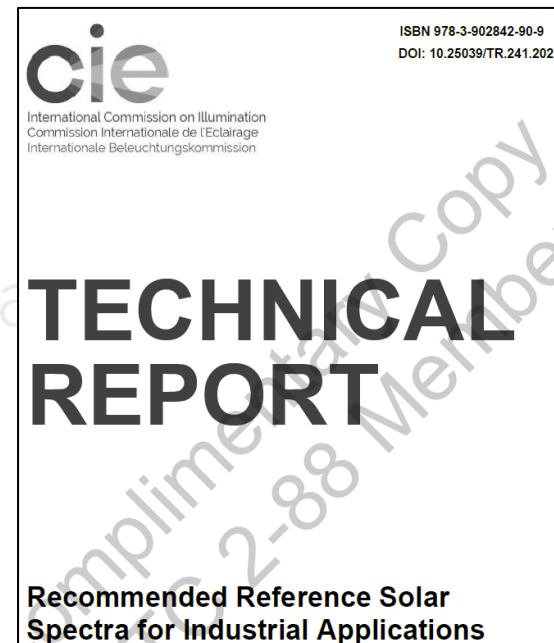
**Part 1:
General guidance**

CIE 241: Solar Reference Spectra

- Widely-referenced standard with reference solar irradiance tables
- Important table CIE-H1 for “noon summer sun” updated with improved data, modeling, and precision

Table A.2 – CIE-H1: Global solar spectral irradiance on a horizontal plane at sea level
AM: 1,0, Water Vapour: 1,42 atm-cm, O₃: 0,340 atm-cm, AOD: 0,10, Albedo: 0,2

Wavelength nm	$E_{\lambda,H1}$ $W \cdot m^{-2} \cdot nm^{-1}$	Wavelength nm	$E_{\lambda,H1}$ $W \cdot m^{-2} \cdot nm^{-1}$	Wavelength nm	$E_{\lambda,H1}$ $W \cdot m^{-2} \cdot nm^{-1}$	Wavelength nm	$E_{\lambda,H1}$ $W \cdot m^{-2} \cdot nm^{-1}$
290	1,956E-05	570	1,653E+00	850	9,548E-01	1 130	1,941E-01
295	1,025E-03	575	1,658E+00	855	9,206E-01	1 135	1,765E-01
300	1,478E-02	580	1,656E+00	860	9,766E-01	1 140	2,776E-01
305	7,653E-02	585	1,657E+00	865	9,422E-01	1 145	2,163E-01
310	1,894E-01	590	1,572E+00	870	9,555E-01	1 150	2,346E-01
315	3,113E-01	595	1,594E+00	875	9,463E-01	1 155	2,941E-01
320	4,238E-01	600	1,587E+00	880	9,333E-01	1 160	3,588E-01
325	5,700E-01	605	1,598E+00	885	9,205E-01	1 165	4,140E-01
330	7,221E-01	610	1,587E+00	890	9,085E-01	1 170	4,415E-01
335	7,102E-01	615	1,551E+00	895	8,090E-01	1 175	4,379E-01
340	7,562E-01	620	1,549E+00	900	6,973E-01	1 180	4,323E-01



Xenon Arc



ASTM G155: Xenon arc general weathering



Designation: G155 – 21

**Standard Practice for
Operating Xenon Arc Lamp Apparatus for Exposure of
Materials¹**

- Performance-based standard for operating a xenon-arc accelerated laboratory weathering apparatus, referred to in numerous standards
- Scope now includes all materials, not just “Non-metallic” ones
- Updates test cycles with chamber air temperatures, new modern test cycle for transportation coatings, and information on step transitions
- Recommends to always reposition specimens and demonstrates how

Daylight Optical Filter Classifications

ASTM and ISO define classes of Optical Filters:

- Daylight
- Window
- Extended UV (ASTM only)



Daylight definition is very broad and can cause different results

Standards updated to give users better guidance

Type I and Type II Daylight Optical Filters

Spectral Bandpass Wavelength λ in nm	General ^B		Type I ^C		Type II ^D		Benchmark Solar Radiation Percent ^{F,G,H}
	Min. % ^E	Max % ^E	Min. % ^E	Max % ^E	Min. % ^E	Max % ^E	
$\lambda < 300^I$			0	0.2	0.2	1.1	
$300 \leq \lambda \leq 320$	2.6	8.1	2.6	6	3.5	7.0	5.8
$320 < \lambda \leq 340$			10.0	17.0	10.0	17.0	
$340 < \lambda \leq 360$	28.3	40.0	18.3	23.2	18.3	23.2	40.0
$360 < \lambda \leq 380$			25.0	30.5	25.0	30.5	
$380 < \lambda \leq 400$	54.2	67.5	29.2	37.0	29.2	37.0	54.2

- **General:** unchanged, still permitted
- **Type I**
 - Close match to natural sunlight – generally recommended
 - Includes Daylight-Q and Daylight-F (ASTM D7869 type)
- **Type II**
 - Match to historical borosilicate filters – recommended only to match historical data
 - More shortwave UV than natural sunlight

Daylight Filter Standards Updates

ISO 4892-2 (Plastics)

Plastics — Methods of exposure to laboratory light sources —

Part 2:

Xenon-arc lamps

AMENDMENT 1: Classification of daylight filters

ISO 16474-2 (Paints)

Paints and varnishes — Methods of exposure to laboratory light sources —

Part 2:

Xenon-arc lamps

AMENDMENT 1: Classification of daylight filters

ASTM G155 (General)

6.1.3.1 *General Daylight Filters*—These filters meet the requirements in the General column of **Table 1**. The General column represents the broad definition for Daylight filters found in previous versions of this standard. Both **Type I** and **Type II** filters are subsets of General Daylight filters.

ISO 23741: Water Delivery for Xenon Arc

INTERNATIONAL
STANDARD

ISO
23741

First edition
2021-03

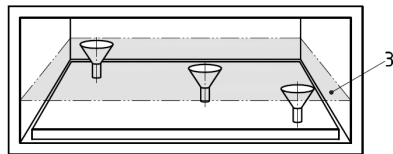
**Plastics — Determination of spray
water delivery during spray cycles
when using a xenon arc weathering
test apparatus**



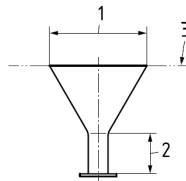
- Standard method introduced to quantify water delivery in xenon arc testers
- Includes rotating rack and flat array geometries
- Simple, 5-minute test with $\pm 10\%$ criterion for recommending specimen repositioning

ISO 23741: Water Deliver for Xenon arc

Suggested collection device configurations



Flat array



Rotating rack



SAE J2412: Xenon arc interior Weathering



SURFACE VEHICLE STANDARD

J2412™

FEB2024

Issued 2003-11
Revised 2024-02

Superseding J2412 NOV2023

Accelerated Exposure of Automotive Interior Trim Components
Using a Controlled Irradiance Xenon-Arc Apparatus

- Automotive interior materials performance-based standard for xenon arc testers
- Adds a defined setpoint of $0.55 \text{ W/m}^2/\text{nm}$ instead of leaving to user discretion
- The specified Extended UV filter is inappropriate – standard now explains why Window correlates better
- Example of standards revision for **self-correction!**



ISO 105-B04: Xenon arc for outdoor fabrics

- Wet lightfastness test standard designed for outdoor fabrics and textiles like tarps and all-weather clothing
- Unclear language for years led to specification of a Window filter – wrong for an outdoor test! New revision clearly defines spectral requirements for outdoor Daylight

INTERNATIONAL STANDARD **ISO/FDIS 105-B04**

Textiles — Tests for colour fastness —

Part B04:

Colour fastness to artificial weathering: Xenon arc fading lamp test



UV Fluorescent



ISO 4892-3: UVF General Weathering

- New, high-irradiance cycles added for UVA and UVB lamps
- Use of insulated black panel (IBP) for QUV tests is now permitted



International
Standard
ISO 4892-3

Plastics — Methods of exposure to
laboratory light sources —

Part 3:
Fluorescent UV lamps

Fifth edition
2024-10

Table D.1 — Alternative exposure cycles for condensation type devices

Method D: Artificial accelerated weathering with UVA-340 lamps with higher irradiance				
Cycle No.	Lamp type	Exposure period	Irradiance ^{a, b}	Black-panel temperature ^c
8	UVA-340	8 h dry 4 h condensation	$(1,36 \pm 0,02) \text{ W} \cdot \text{m}^{-2} \cdot \text{nm}^{-1}$ at 340 nm UV lamps off	$60 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$ $50 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$
9	UVA-340	8 h dry 4 h condensation	$(2,04 \pm 0,02) \text{ W} \cdot \text{m}^{-2} \cdot \text{nm}^{-1}$ at 340 nm UV lamps off	$60 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$ $50 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$

SAE J2020: UVF Automotive



SURFACE VEHICLE STANDARD

J2020™

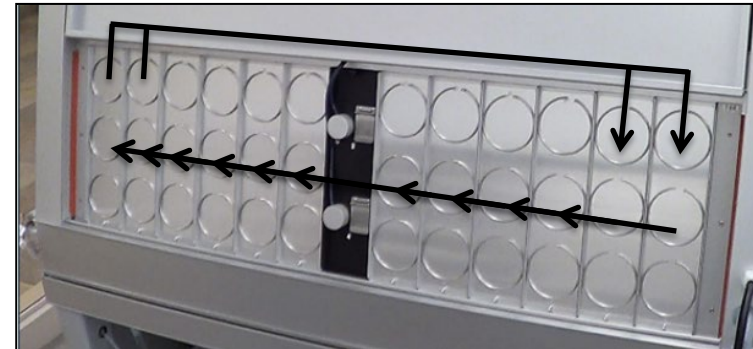
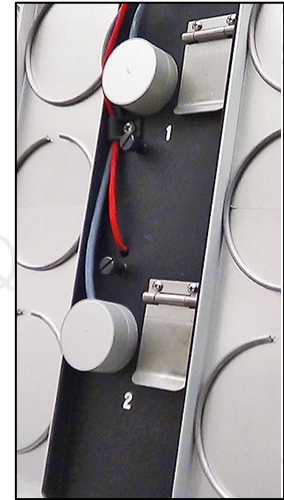
OCT2022

Issued 1989-06
Revised 2022-10

Superseding J2020 APR2016


Accelerated Exposure of Automotive Exterior Materials
Using a Fluorescent UV and Condensation Apparatus

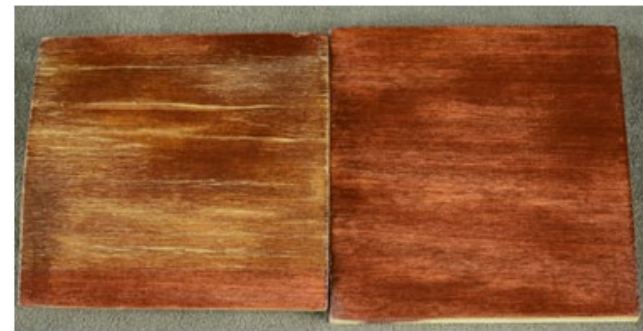
- Clarifies use of both UVA and UVB type lamps
- Improves guidance on specimen repositioning
- Describes black panel thermometers
- Adds CIE 241 spectrum data for comparison



ISO 16053-2: UVF Wood Coatings

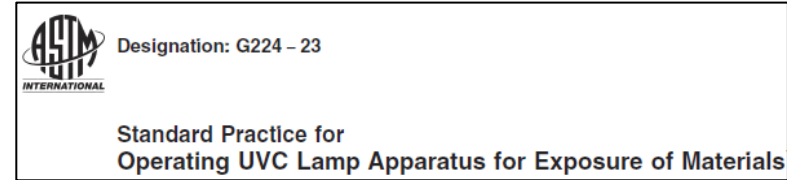
- Long-established European standard for weathering of wood coatings: EN 927-6
 - Long periods of water spray
 - Ideally suited to these materials
- Now adopted as an International Standard called ISO 16053-2
- Future revision will permit exposures of different wood types

	International Standard ISO 16053-2
Paints and varnishes — Coating materials and coating systems for exterior wood — Part 2: Exposure of wood coatings to artificial weathering using fluorescent UV lamps and water	First edition 2024-03



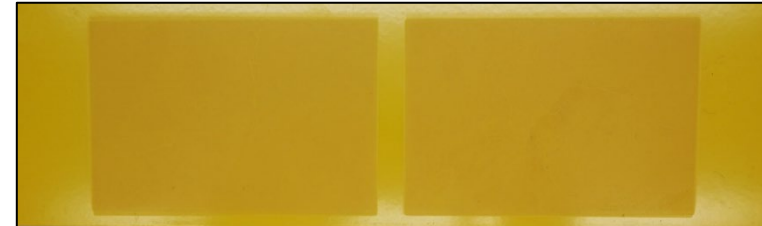
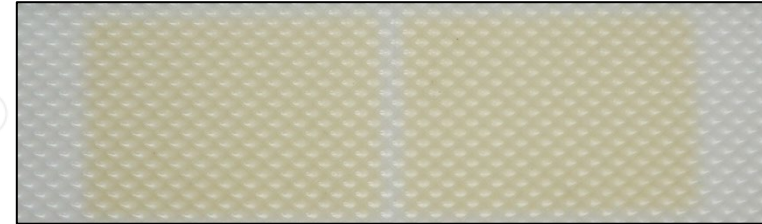
ASTM G224: UVC Testing

- Testing for resistance to UVC light became of great interest during the pandemic
- ASTM quickly published the first-ever international standard for UVC testing, development led by Q-Lab
- Includes some previous cycles, along with more realistic uses (lower dosage, lower temperature)



INTERNATIONAL STANDARD

Environmental testing –
Part 2-87: Tests – UV-C exposure of materials and components to simulate
ultraviolet germicidal irradiation or other applications



- IEC 60335-1 was one of the few UVC material durability standards available when COVID-19 happened, but its cycle is not widely applicable
- New Part 2-87 includes 15 “severities” that cover a range of conditions:
 - 35 °C and 60 °C
 - 1.0, 3.0, and 6.0 mW/cm²
 - Duration from 16 - 1000 hours

Corrosion



ISO 9227: Continuous Corrosion

INTERNATIONAL
STANDARD

ISO/FDIS
9227

**Corrosion tests in artificial
atmospheres — Salt spray tests**

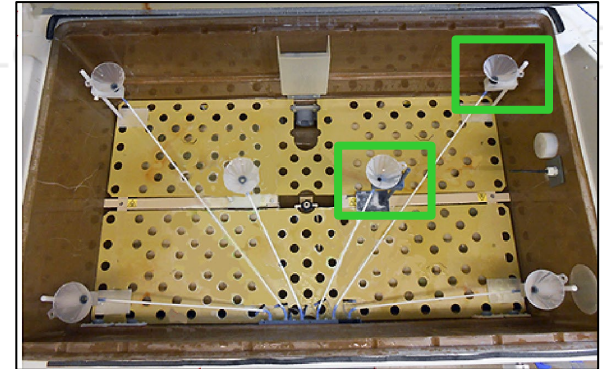
*Essais de corrosion en atmosphères artificielles — Essais aux
brouillards salins*



← Multiple steel grades allowed for
corrosion (mass-loss) coupons

Routine fog verification may be
performed with only two
collection devices →

Changes pending



ISO 12944-6: Corrosion of Coatings

- Major revision in progress
- Clarity to be added to panel scribing for consistency of test results and correlation



INTERNATIONAL
STANDARD

ISO
12944-6

**Paints and varnishes — Corrosion
protection of steel structures by
protective paint systems —**

**Part 6:
Laboratory performance test methods**

Summary

- Although many weathering and corrosion test standards have been in use for decades, international committees are continuously improving upon them
 - Add clarity, openness, and usability
- Many recent updates and new documents:
 - ISO 4892-1, CIE 241 (General)
 - ASTM G155, ISO 23741, SAE J2412, ISO 4892-2 and ISO 16474-2, ISO 105-B04 (xenon)
 - ISO 4892-3, SAE J2020, ASTM G224, IEC 60068-2-87 (UV fluorescent)
 - ISO 9227, ISO 12944-6 (corrosion)
- Many more updates and new standards in progress

Standards Resources

Q-Portal

New public tool for locating standards information

Q-Portal Web Tools

STANDARDS SEARCH

Q-Lab's Standards Search tool provides information on our broad library of weathering and corrosion test standards, including which Q-Lab testers can meet the requirements and how they should be configured. Click [here](#) if you have specific standards-related questions.

Product Family: ☒ QUV/Q-SUN ☐ Q-FOG 4892 ☒ Show Standard Description

Standard Designation	Cycle	Q-Lab Tester	Models	Optical Filters / Lamps	Control Point (nm)	Black Panel
ISO 4892-1	Q-SUN	Xe-3			340	BP
Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance						
ISO 4892-1	QUV	QUV			340	BP
Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance						
ISO 4892-2	Cycle 1	Xe-3	HBS, HBSC, HDS, HDSBS, HDSBSC, HDSC, HDSE, HDSCE, HDSBSE, HDSBSCE, HS, HSC, ...	Daylight-Q, Daylight-BB, ...	300-400 (TUV)	IBP
Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps						
ISO 4892-2	Cycle 1	Xe-2	HS, HBS, HSE, HBSE	Daylight-Q, Daylight-BB, ...	300-400 (TUV)	IBP

Q-Portal

Much more information for logged-in users (free)

The screenshot shows the Q-Portal Web Tools interface. At the top, there's a navigation bar with the Q-LAB logo and links for Ordering & Pricing, Sales, Assets, Repair, Test Services, Technical, and Documents. The user is logged in as Andy Francis. The main section is titled "STANDARDS SEARCH" and includes a search bar with "iso" entered and a "Search" button. Below the search bar, there are radio buttons for user roles: QUV/Q-SUN, Q-FOG, Content Editor, Q-Lab Employee, Representative, Direct Customer (selected), and Public. The search results table shows a single entry for ISO 4892-2, Cycle 1, Xe-3, with various models and optical filters. Below the table, there's a detailed view for ISO 4892-2 (2013) - Plastics -- Methods of exposure to laboratory light sources -- Part 2: Xenon-arc lamps. This section includes a table with steps, functions, RH, irradiance, black panel temperature, chamber air temperature, and step time. It also lists accessories, including a CR20/TUV Radiometer. A public note at the bottom states: "Chamber air can be raised when run in a hot lab."

Q-Portal Web Tools

Andy Francis | My Profile | Logout

Ordering & Pricing Sales Assets Repair Test Services Technical Documents

STANDARDS SEARCH

QUV/Q-SUN Q-FOG iso Search Clear

Content Editor Q-Lab Employee Representative Direct Customer Public

Watch Help Video

Standard Designation	Cycle	Q-Lab Tester	Models	Optical Filters / Lamps	Control Point (nm)	Black Panel	Special Notes
ISO 4892-2	Cycle 1	Xe-3	HBS, HBSC, HDS, HDSBS, HDSBSC, HDSC, HDSE, HDSCSE, HDSBSE, HDSBSCE, HS, HSC, HSE, HSCE, HBSE, HBSCE	Daylight-Q, Daylight-BB, Daylight-F	300-400 (TUV)	IBP	

ISO 4892-2 (2013) - Plastics -- Methods of exposure to laboratory light sources -- Part 2: Xenon-arc lamps

Step	Function	RH (%)	Irradiance (W/m ² /nm)	Black Panel Temp. (°C)	Chamber Air Temp. (°C)	Step Time (h:mm)
1	Light	50	60.00	65	38	1:42
2	Light + Spray		60.00	65*	38*	0:18
3	Final Step - Go To Step 1					

* Indicates no value specified in the test method but a value is programmed into the tester


Public Notes

Chamber air can be raised when run in a hot lab.

Accessories




[CR20/TUV] Radiometer (with TUV Sensor and not Window-IR filters) (Required)

Individual Standards pages


[Weathering](#) | [Corrosion](#) | [Q-PANEL](#) | [Company](#)

International Test Standards for Corrosion

Q-Lab's robust line of accelerated corrosion test chambers are capable of meeting a variety of internationally recognized standards from organizations such as ASTM and ISO. To view all of the standards the Q-FOG can meet, head to our [Standards Selector Tool](#).







[ASTM B117](#) > [ISO 9227](#) > [GMW14872](#) >

[Weathering](#) | [Corrosion](#) | [Q-PANEL](#) | [Company](#)[Contact Us](#)

International Test Standards for Weathering

Q-Lab's robust line of accelerated weathering test chambers are capable of meeting a variety of internationally recognized standards from organizations such as ASTM and ISO. To view all of the standards our accelerated weathering test chambers can meet, head to our [Standards Selector Tool](#).



[ASTM G154](#) > [ISO 4892-2](#) > [ISO 4892-3](#) > [SAE J2527](#) >


[Weathering](#) | [Corrosion](#) | [Q-PANEL](#) | [Company](#)[Contact Us](#)

ASTM G154: Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials




UV Exposure Testing for Nonmetallic Materials

ASTM G154 is an internationally-recognized test practice for exposing materials to UV light using fluorescent lamps. The test simulates the same outdoor conditions materials see from damaging UV energy, elevated temperatures, and the high time of wetness from outdoor moisture. The practice is used globally by manufacturers and developers of materials such as organic coatings, plastics, textiles, rubber, and more. The results gained from performing testing in a QUV to ASTM G154 provide a critical directional decision-making tool for manufacturers to assist in optimizing formulas, assess product durability, and meet qualification standards.

[Weathering](#) | [Corrosion](#) | [Q-PANEL](#) | [Company](#)[Contact Us](#)

ISO 9227: Corrosion tests in Artificial Atmospheres – Salt spray tests



A Simple, Repeatable Continuous Salt Fog Test

ISO 9227, along with [ASTM B117](#), is the most widely-used corrosion test method worldwide. It is a **salt spray (fog) test** for assessing the corrosion resistance of metals and coatings. With a salt fog environment continuously applied at constant temperature, materials are rigorously tested to simulate harsh conditions. The addition of acidic solutions enables even faster testing of highly durable materials. This proven method provides insights into durability and performance, helping manufacturers ensure their products stand up to the elements.

[Learn More](#)

Standards Research

- It's easy to find the status of most standards online
- Q-Lab can help with details
- Most standards are inexpensive

The screenshot shows the ISO website's product page for ISO 4892-3:2024. The page layout includes a top navigation bar with links for Standards, Sectors, About ISO, Insights & news, Taking part, and Store. The main content area features a large title 'ISO 4892-3:2024' and a subtitle 'Plastics — Methods of exposure to laboratory light sources'. Below this, it specifies 'Part 3: Fluorescent UV lamps' and indicates it is 'Published (Edition 5, 2024)'. A 'Read sample' button is located at the bottom left of the main content area. On the right side, there is a sidebar with the standard number 'ISO 4892-3:2024' and the price 'CHF 129'. It also includes a language dropdown menu set to 'English', a format selection (PDF + ePub is selected), and an 'Add to cart' button. At the bottom of the sidebar, there is a link to 'Convert Swiss francs (CHF) to your currency'.

ISO 4892-3:2024

Plastics — Methods of exposure to laboratory light sources

Part 3: Fluorescent UV lamps

Published (Edition 5, 2024)

Read sample

ISO 4892-3:2024

CHF 129

Language: English

Format: ☒ PDF + ePub ☐ Paper

Add to cart

Convert Swiss francs (CHF) to your currency

Standards Research

Find out what committee is responsible

Abstract

This document specifies methods for exposing plastic specimens to fluorescent UV lamp radiation, heat and water in apparatus designed to simulate the weathering effects that occur when plastic materials are exposed in actual end-use environments to global solar radiation, or to window-glass filtered solar radiation.

Fluorescent UV lamp exposures for paints, varnishes and other coatings are described in ISO 16474-3.

General information

Status : Published

Publication date : 2024-10

Stage : International Standard published [60.60]

Edition : 5

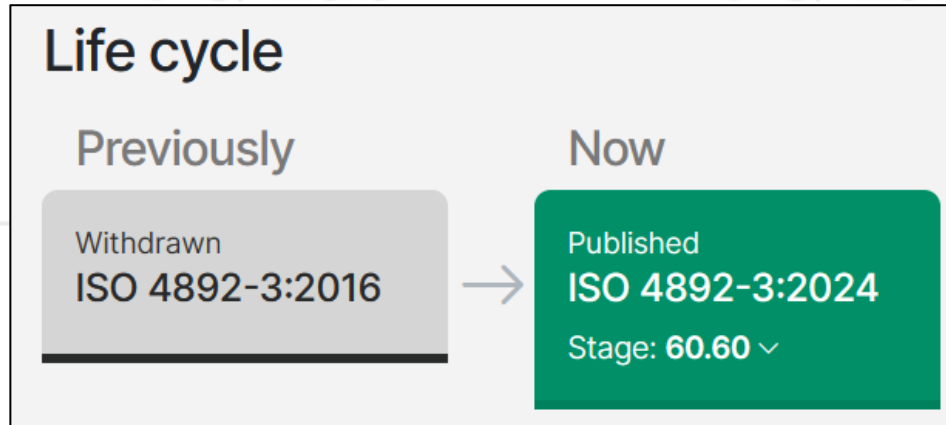
Number of pages : 19

Technical Committee : ISO/TC 61/SC 6

ICS : 83.080.01

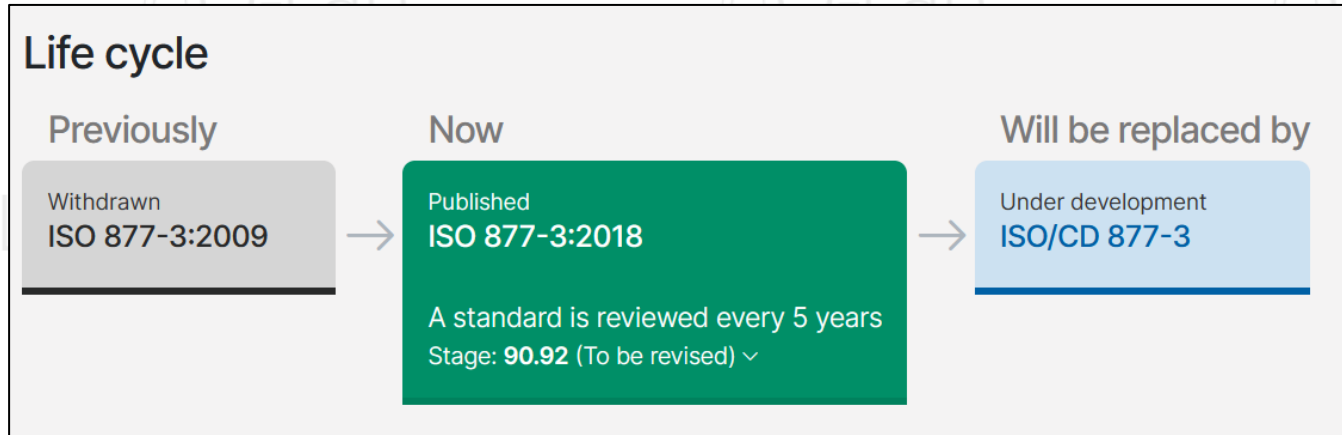
Check Status

Recently published



Check Status

Revision in progress



ASTM, ISO, IEC, and SAE all require regular 5-year reviews

Check Status

Withdrawn / replaced

Standard

Withdrawn

Last Updated: Feb 18, 2021

 Track

G26-96

Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials (Withdrawn 2000)


Scope1.1 This practice covers the basic principles and operating procedure for water- or light-exposure apparatus, or both, employing a xenon-arc light source. Note 1-This practice combines the practices previously referred to as G26 and G2...

Standard

Active

Last Updated: Feb 13, 2019

 Track

 Quick Add

G151-19

Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

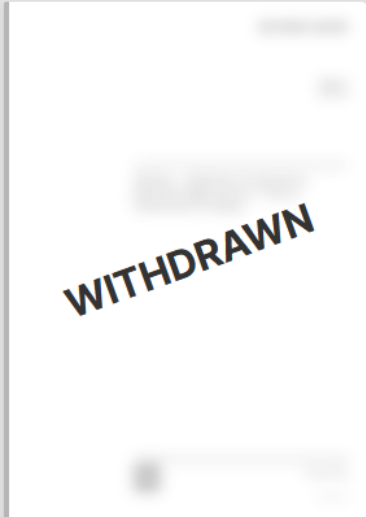
Significance and Use 4.1 Significance: 4.1.1 When conducting exposures in devices that use laboratory light sources, it is important to consider how well the accelerated test conditions will reproduce property changes and failure modes ...

Don't use this!

Use this!

Check Status

Withdrawn / replaced



~~ISO 4892-3:2016~~

Plastics — Methods of exposure to laboratory light sources

Part 3: Fluorescent UV lamps

Withdrawn (Edition 4, 2016)

→ New version available: **ISO 4892-3:2024**

Don't use this!

Use this!

Thank you for your time.

Questions?
info@q-lab.com

We make testing simple. |

