

Standards Development

Weathering and Corrosion Test Methods

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Thank you for attending our webinar!



ASTM INTERNATIONAL



Q-Lab Corporation

Standards Leadership

- Q-Lab takes a leadership role in standards development worldwide
- Chairing and participating on standards drafting and revision
- Working with OEM's to modernize their standards



Association of Textile, Apparel
& Materials Professionals



Topics

- Two Paths of Development
 - Problem-based Development
 - Supply-based Development
- ISO/IEC Process
- ASTM Process
- Examples of Development

Problem-Based Development

- A problem exists that requires a standardized solution.
- Usually results in a Test Method or Specification



Problem-Based Development

This path of development is focused on the results of the test, and relies heavily on real-world performance of materials.



Supply-Based Development

- A piece of equipment or protocol exists that could be useful, but hasn't been proven yet
- Usually results in a Standard Practice



Supply-Based Development

This path of development is focused on providing a repeatable procedure for using a piece of equipment, so that labs can compare results when running the standard and when referenced in test methods.



Overlap of Standards Organizations

- Many of the same individuals participate in multiple standards organizations
- National committees for a particular industry are frequently the representatives for international committees
- ISO/IEC and ASTM overlap a good bit

ISO/IEC Process

International Organization on Standardization International Electrotechnical Commission

- Participation is by country, not by individual
- Experts are selected to represent their country for various committees
 - Development
 - Ring Trial Participation
 - Voting

'P' Member Countries

- 'P' Members are countries that have mirror committees for the international committee
 - ASTM, DIN, BIS, etc.
- 'P' Members are required to participate and form responses to committee work items
- General consensus among 'P' members is required
 - Voting occurs between most stages

Technical Committees (TC) and Working Groups (WG)

- Technical Committees represent an industry or general category
 - TC 61 on Plastics
 - TC 35 on Coatings
 - TC 156 on Corrosion
- Subcommittees (SC) are a subset of the TC, focused on a smaller part of industry, and those are further broken down into Working Groups (WG)

ISO Stages of Development

Summary of Development Options

Project Stage	Normal procedure	Draft submitted with proposal	Fast-track procedure	Technical Specification	Publicly Available Specification	Technical Report
Proposal	NP	NP	NP	NP	NP	
Working Draft	WD	WD		WD	WD	
Committee	CD	CD		DTS		DTR
Enquiry	DIS	DIS	DIS			
Approval	FDIS	FDIS	FDIS			
Publication	IS	IS	IS	TS	PAS	TR

The dotted lines show stages that are optional in certain circumstances.

This visual is adapted from the ISO Directives, Annex F.



Process Flow (ISO)

- Process starts with New Work Item Proposal and ends with publication
- Steps can be skipped depending on results of votes/comments



Important Notes (ISO)

- New Work items require experts from 5 countries to even be considered
- Comments need to be reviewed, but direct action is not required



ASTM Process

- Participation is by individual, anyone can participate
- “One Company, One Vote”
- Committees must have at least as many users/general interest voting participants as producers

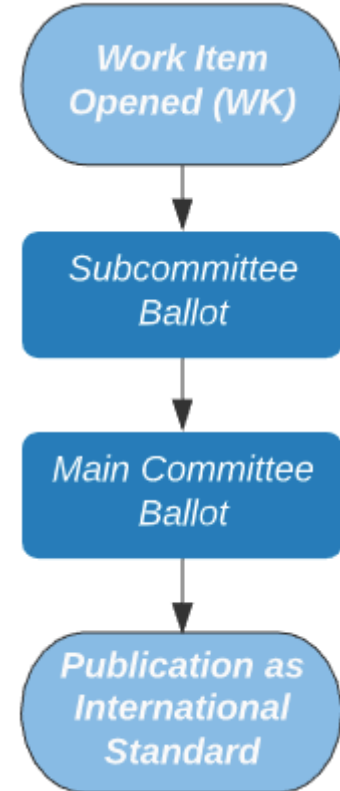
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ASTM Main Committees and Subcommittees

- Main Committees represent an industry or general category
 - D20 on Plastics
 - D01 on Coatings
 - G01 on Corrosion of Metals
- Subcommittees are focused on a smaller part of industry
 - D20.96 Plastics – Biodegradable Plastics
 - G01.05 Corrosion of Metal – Laboratory Corrosion Testing

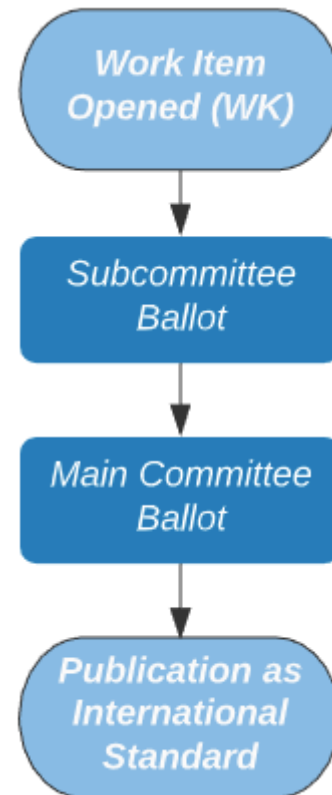
Process Flow

- Process starts with New Work Item opened as agreed upon by a subcommittee
- Draft is balloted to subcommittee or “Concurrent” (both main and sub)
- After passing subcommittee ballot, main committee ballot is automatically submitted



Important Note (ASTM)

- All negative comments must be addressed, even if you don't have an official vote!
 - **Persuasive:** Stops the ballot and returns to draft status
 - **Not Persuasive:** 2/3 of official voting Subcommittee and Committee members must vote to ignore the negative



ASTM D7869: Modern Weathering Testing



Designation: D7869 – 13

Standard Practice for
Xenon Arc Exposure Test with Enhanced Light and Water
Exposure for Transportation Coatings¹

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ASTM D7869

Background

SAE J2527 was developed to reproduce common failures of coatings in that era, primarily color fade and gloss loss.

Over years, coatings became very resistant to color fade and gloss loss, and SAE J2527 doesn't reproduce more common failures in modern coatings, primarily cracking and delamination.

Q: Which Path would you consider this?

ASTM D7869

Development Process

- Outdoor weather data collected to understand real-world weather conditions: **light, heat, and water**
- Outdoor weathering test dataset collected to provide basis for **correlation**

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ASTM D7869

Development Process

- **Accelerated** test cycle developed to match those **real-world** conditions and **degradation** mechanisms
- Variety of materials and failure modes evaluated with accelerated testing to verify **validity** of test

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ASTM D7869

Solution

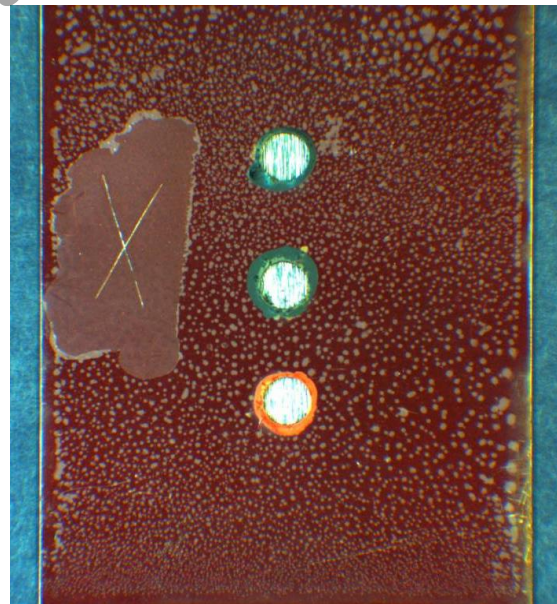
- New test cycle allowed for deep penetration of water in specimens
- Procedure required verifying enough water was delivered
- Higher irradiance to maintain the speed of the test



ASTM D7869

Problem-Based Development

- A problem was identified
- Testing was performed by experts against real world results
- New methods were discovered
- Publication of a new method



IEC 61701:2020

Photovoltaic (PV) modules - Salt mist corrosion testing

**INTERNATIONAL
STANDARD**

**NORME
INTERNATIONALE**

Photovoltaic (PV) modules – Salt mist corrosion testing

Modules photovoltaïques (PV) – Essai de corrosion au brouillard salin

IEC 61701:2020

Background

Photovoltaic durability testing is very important for cost-efficiency, safety, and general value of solar applications. Solar modules are being installed in many different environments, including floating on water.

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IEC 61701

- This is a salt spray corrosion test method published as an optional add-on to the operational and safety qualification standards IEC 61215 and 61730
- None of the qualification tests is a service lifetime test
- Passing a qualification sequence demonstrates a PV module design should withstand their expected environmental stresses for some reasonable time

Q: Which Path would you consider this?

IEC 61701 Edition 3

Update Objectives

- Harmonize with changes to IEC 61215 and 61730 (type and safety qualification requirements)
- *Provide guidance for choosing test method (severity) within IEC 60068-2-52*

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IEC 61730 Edition 3

- The big addition was a new annex on “Guidance for the selection of appropriate test method according to IEC 60068-2-52”
- The new annex rectified this:
 - Reference outdoor corrosivity classifications according to ISO 9223 (C1-C5, CX)
 - IEC 60068-2-52 contains 8 test methods (formerly referred to as test severities)
 - Basic Qualification tests were suggested based on corrosivity classification

IEC 61730 Edition 3

Table 1 in Annex A2

Corrosivity Classification of module location	Location Characteristics		One-year Mass loss range (g/m ²) of bare steel coupons	60068-2-52 Test Method achieving similar one-year corrosivity
	Distance from Saltwater (km)	Percentage Time of Wetness (ToW)		
C1 (testing per this document not necessary)	--	--	<10	none
C2 (testing per this document not necessary)	≥ 10	<25%	10-200	2, 3
C3	≥ 10 2 to 10	≥ 25% <25%	200-400	4 (14 days)
C4	2 to 10 < 2	≥ 25% <25%	400-650	1 (28 days) 5 (28 days)
C5	< 2	≥ 25%	650-1500	6 (56 days)
CX	offshore	--	1500-5500	7 (90 days) 8 (70 days)

ISO 23741

Background

- ISO 23741 was a new proposed standard based on evaluating the amount of water spray delivered in xenon arc testers.
- This standard doesn't define which cycles to run or how much water should be used. It simply indicates how you can evaluate water delivery of one of these testers

Q: Which Path would you consider this?

ISO Standards Development Example

Project Detail
ISO 23741 ed.1 - id.76806 ISO/TC 61/SC 6/WG 3

Stage 1

Stage	Version	Description	Target date	Limit date	Started	Status
10.00	1	Proposal for new project registered			2018-09-23	Closed
10.20	1	New project ballot initiated	2018-09-27		2018-09-27	Closed
10.60	1	Close of voting	2018-12-20		2018-12-21	Closed
10.99	1	New project approved			2019-01-15	Closed
20.00	1	New project registered in TC/SC work programme			2019-01-15	Closed
20.20	1	Working draft (WD) study initiated	2019-03-31		2019-04-28	Closed
30.00	1	Committee draft (CD) registered	2019-05-31		2019-06-17	Closed
30.20	1	CD study/ballot initiated			2019-06-18	Closed
30.60	1	Close of voting/comment period			2019-08-14	Closed
30.99	1	CD approved for registration as DIS			2019-12-16	Closed
40.00	1	DIS registered	2020-01-30	2021-01-15	2020-01-12	Closed
40.20	1	DIS ballot initiated	2020-03-15		2020-03-15	Closed
40.60	1	Close of voting	2020-06-07		2020-06-08	Closed
40.99	1	Full report circulated: DIS approved for registration as FDIS			2020-12-01	Closed
50.00	1	Final text received or FDIS registered for formal approval	2020-11-30		2020-12-03	Closed
50.20	1	Proof sent to Secretariat or FDIS ballot initiated: 2 months	2020-12-23		2020-12-23	Closed
50.60	1	Close of voting -- Proof returned by Secretariat	2021-02-17		2021-02-18	Closed
60.00	1	International Standard under publication			2021-02-18	Current
60.60		International Standard published	2021-03-11	2022-01-15		Awaiting

- ISO 23741
- Lots of steps!
- ISO collaboration site details actions and timing along the way
- 3-year timeframes are typical

Step 1: New Work Item Proposal



International Organization for Standardization
Organisation internationale de normalisation
Международная организация по стандартизации

Ch. de Blandonnet 8 | CP 401, 1214 Vernier | Geneva, Switzerland | T: +41 22 749 01 11 | central@iso.org | www.iso.org

Sept 2018

Form 4: New Work Item Proposal

<p>Circulation date: Click here to enter text.</p> <p>Closing date for voting: Click here to enter text.</p>	<p>Reference number: Click here to enter text. (to be given by Central Secretariat)</p>
<p>Proposer (e.g. ISO member body or A liaison organization) ANSI</p>	<p>ISO/TC 61/SC 6 / WG3</p> <p><input type="checkbox"/> Proposal for a new PC</p>
<p>Secretariat Click here to enter text.</p>	<p>N Click here to enter text.</p>

- Send NWIP to committee working group (WG)
- May involve short supporting presentation at an ISO meeting
- Approved with min. of 5 nations nominating experts

Step 2: Working Draft (WD)

Mar 2019

ISO/TC 61/SC 6 N

Date: 2019-06-13

ISO/CD 23741:2019(E)

ISO/TC 61/SC 6/WG 3

Secretariat: SAC

Determination of spray water delivery during spray cycles in weathering instruments —

Élément introductif — Élément central — Élément complémentaire

- Working on ideas, gathering input from WG
- WD skipped in some cases
- Multiple iterations are normal. Can be skipped in “fast-track” procedure
- Comments from WG members must be addressed

Step 3: Committee Draft (CD)

June 2019

ISO/TC 61/SC 6 N

Date: 2019-06-13

ISO/CD 23741:2019(E)

ISO/TC 61/SC 6/WG 3

Secretariat: SAC

Determination of spray water delivery during spray cycles in weathering instruments —

Élément introductif — Élément central — Élément complémentaire

- Building towards publication
- CD skipped in some cases
- Multiple iterations are normal. Can be skipped in “fast-track” procedure
- Comments from WG members must be addressed

Step 4: Draft International Standard (DIS)

Jan 2020

ISO/TC 61/SC 6

Date: 2020-01-03

ISO/DIS 23741:2020(E)

ISO/TC 61/SC 6/WG 3

Secretariat: SAC

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

Élément introductif — Élément central — Élément complémentaire

- Last chance to make technical comments!
- Comments discussed at ISO WG meeting
- Final step before pre-publication

Step 5: Final Draft International Standard (FDIS)

FINAL
DRAFT

INTERNATIONAL
STANDARD

ISO/FDIS
23741

- Final step before publication
- Editorial comments only

Dec 2020

ISO/TC 61/SC 6

Secretariat: DIN

Voting begins on:
2020-12-24

Voting terminates on:
2021-02-18

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

Step 6: Publication!

INTERNATIONAL STANDARD	ISO 23741
<i>Mar 2021</i>	First edition 2021-03
<hr/> <hr/> Plastics — Determination of spray water delivery during spray cycles when using a xenon arc weathering test apparatus	

Conclusions

- Standards are extremely useful to weathering and corrosion testing, particularly when trying to reduce variability of testing
- Some standards (problem-based) are designed to address existing problems, and may require round robin testing to develop meaningful results in the real world
- Some standards (supply-based) are designed as a tool box for users to develop their own test methods

Conclusions

- If you use standards on a regular basis, you should get involved in your standards committees!
 - For ISO/IEC, find out if your country has a national mirror committee, and become an expert to get involved
 - For ASTM, anyone can join and become involved today. Your concerns must be addressed (one way or another) if you participate in the process!

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Questions?



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