

Work in Progress Presentation – P627

November 2007 (SC-2 07-2)

“Standard for Qualification of
Equipment Used in Nuclear
Facilities”

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- This project will resurrect and update IEEE Std 627-1980 (R1996). Although withdrawn in 2002, this standard is continuing to be referenced in ASME's QME-1-2002 "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants", NRC's SRP Section 3.11 (NUREG 0800), at least one reactor vendor's Design Certification Document (DCD), several international documents, and elsewhere.
- This document provides high level approaches, criteria, guidance, and principles for qualification of both electrical and mechanical equipment that appear in no other industry standard.
- PAR was approved May 7, 2007.

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Working Group Formed in April 2007:

Dave Horvath – Chair
Suresh Channarasappa – Vice Chair
Rebecca Steinman – Secretary

Chris Abernathy

Nissen Burstein (Member Orig'l WG)

Walter Emerson

Artur Faya (just joined)

Patrick Gove

Hamid Heidarisaafa

Peter Kang

E Novacek replaced by M Bumgarner

Frank Kloer

James Parello

Bob Queenan (ISA Liaison)

Doug Hart

John Richards (ASME Liaison)

Glen Schinzel (ASME Liaison)

Steve Benson (just joined)

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Working Group Meetings held:

- Kickoff – 4/16/07 Myrtle Beach, SC
- Monthly Teleconference Meetings
 - 05/23/07
 - 06/12/07
 - 07/13/07
 - 08/16/07
 - 10/4/07
- Face-to-Face Meeting 11/5/07 Clearwater, FL

All meeting minutes are available on the WG 2.10 website:
<http://grouper.ieee.org/groups/npec/private/sc2/WG210/WG210Minutes.htm>

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From initial meetings - decision to seek a PAR revision to support a change in P627 title to better meet user feedback and needs.

- Based on ASME & other feedback the term “design qualification” is not being used.
- Desire to address additional industry needs.

Old Title: Standard for Design Qualification of Safety-Related Equipment Used in Nuclear Power Generating Stations

New Title: Standard for Qualification of Equipment Used in Nuclear Facilities

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Such a Change in Title would require a change in Scope and Purpose:

- Scope: This standard provides the basic principles for design qualification of safety-related equipment used in nuclear power generating systems.
- *New Scope: This standard provides the basic principles for qualification of equipment used in nuclear facilities.*

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Old Purpose: The purpose of this standard is to provide basic principles and guidance to demonstrate the design qualification of safety-related equipment. Design qualification is intended to confirm the adequacy of the equipment design to perform its safety functions over the expected range of normal, abnormal, design basis event, post design basis event, and in-service test conditions.

New Purpose: The purpose of this standard is to provide basic principles and guidance to demonstrate the qualification of equipment. Qualification is intended to confirm the adequacy of the equipment design to perform its safety function or safety functions over the expected range of normal, abnormal, design basis event, post design basis event, and in-service test conditions.

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High Level Elements Remaining Unchanged:

■ Qualification Principles

- Approaches & Specification Criteria
- Equipment description, interfaces, and safety function
- Service conditions (*but EMI/RFI being added as an example to consider*)
- Margin
- Aging
- Acceptance Criteria

■ Documentation

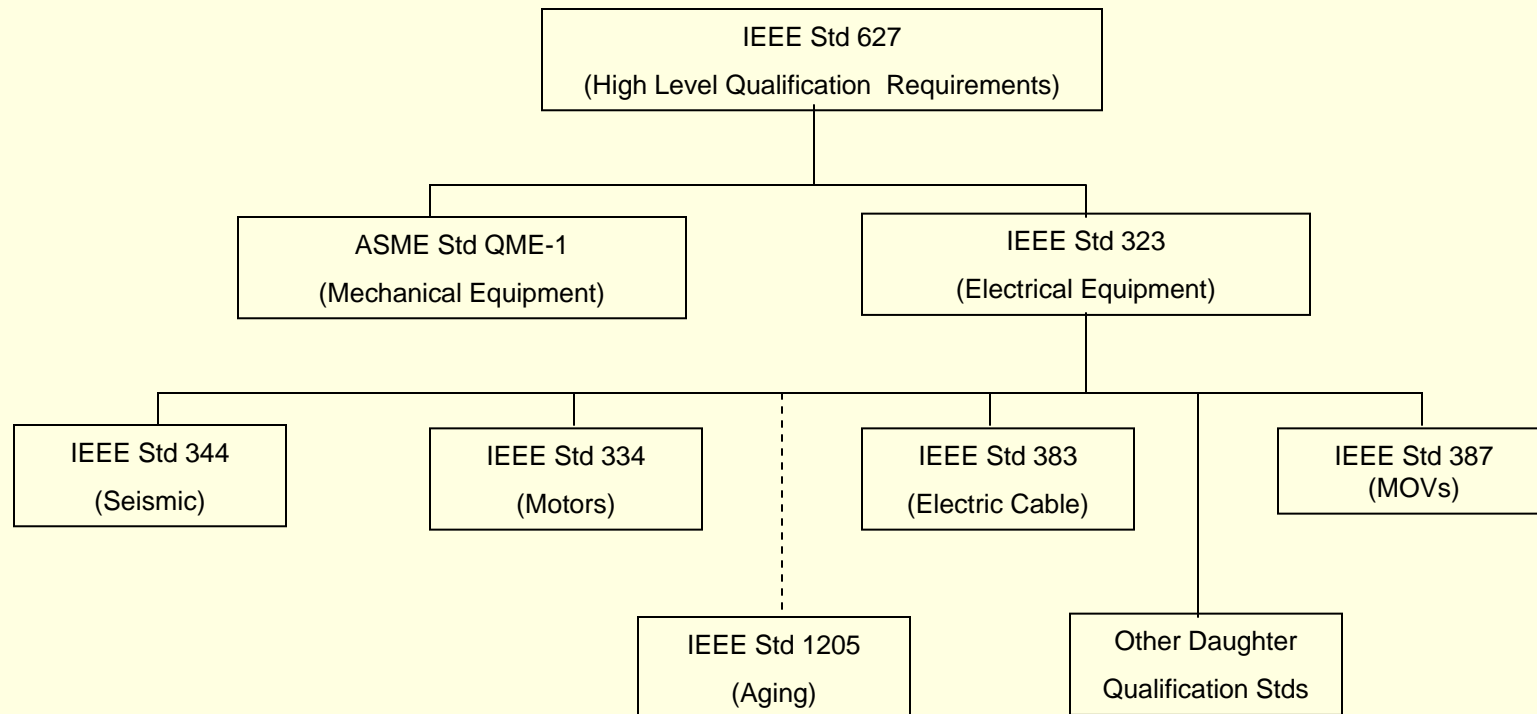
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- Intend to clarify qualification principles by moving and updating an often-referenced statement from the original forward to Clause 4:

The primary purpose of equipment qualification (EQ) is to provide reasonable assurance that design and age-related common failure modes will not occur to multiple trains of safety-related equipment during performance of safety functions during postulated accident conditions. The purpose of EQ is not to prevent all failures and, in particular, not to prevent postulated single failures caused by quality deficiencies.

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IEEE Std 627 Relationship to Other Standards



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10 definitions being updated to current usage:

- Aging
- Auditable data
- Common-cause failure
- Common-mode failure
- Design-basis events
- Design life
- Engineered safety features
- Equipment qualification
- Installed life
- Margin

[Design qualification being replaced by equipment qualification.]

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Definition examples:

- **common-cause failure:** Loss of function to multiple systems, structures or components due to a shared initiating event.

Improves on “multiple failures attributable to a common cause.”

- **common-mode failure:** Loss of function in multiple systems, structures or components through the same mechanism or in the same manner.

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Future work:

- Possibly expand on purpose of EQ to not prevent failures caused by quality deficiencies.
- Adding an informative (non-mandatory) Annex on safety terms (safety, safety-related, Class 1E, Category 1, Important to Safety, IROFS, etc.) previously planned for IEEE Std 323.
- Expect to preview next SC-2 meeting, at NPEC in July, and ballot by end of 2008.