

An American National Standard

IEEE Standard for the Design and Qualification of Class IE Control Boards, Panels, and Racks Used in Nuclear Power Generating Stations

Sponsor
**Power Generation Committee
of the
IEEE Power Engineering Society**

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Foreword

(This Foreword is not a part of IEEE Std 420-1982, IEEE Standard for the Design and Qualification of Class IE Control Boards, Panels, and Racks used in Nuclear Power Generating Stations.)

This standard provides the requirements for the design, manufacture and qualification of Class IE control boards, panels, and racks and is intended for use by designers, manufacturers, users, and those who are responsible for the licensing of nuclear power generating stations. It may also serve for modifications to control boards, panels, and racks installed in existing plants.

This standard is not intended to define the selection, design or qualification of piping, modules, or other equipment mounted on the Class IE control boards, panels, or racks. The standard, however, is concerned with the effect such mounted equipment has on the design and qualification of Class IE control boards, panels, or racks. The selection, design and qualification of piping, modules and other equipment are covered by other standards such as ANSI/IEEE Std 381-1977 [5].¹

The separation criteria contained in IEEE Std 384-1981 [10] were used in the preparation of this standard. The criteria contained in this standard, in some cases, reaffirm and in other cases, expand upon criteria contained in IEEE Std 384-1981 [10]. In all cases, however, these criteria are consistent with those specified in IEEE Std 384-1981 [10], and it was the intent of the working group that no source of conflict exist between the documents.

Qualification of Class IE control boards, panels, and racks is included in this standard to address the overall requirements of IEEE Std 323-1974 (R1980) [9] and ANSI/IEEE Std 344-1975 (R1980) [4]. The qualification areas covered consist mainly of environmental and seismic requirements which specifically relate to control boards, panels, and racks. Where other IEEE standards provide applicable qualification information, such as aging methodology, they have been referenced. For example, ANSI/IEEE Std 381-1977 [5] has been referenced to provide qualification methodology for modules/components. ANSI/IEEE Std 383-1974 (R1980) [6] is referenced to provide a method for qualification of control board wiring.

This standard should be used in conjunction with IEEE Std 566-1977 [11], IEEE *Recommended Practice for the Design of Display and Control Facilities for Central Control Rooms of Nuclear Power Generating Stations*, and ANSI/IEEE Std 567 [7], *Trial-Use Standard Criteria for the Design of the Control Room Complex for a Nuclear Power Generating Station*. ANSI/IEEE Std 567 [7] basically deals with the environment within which the main control room must function while IEEE Std 566-1977 [11] covers the design of the main control room including equipment layout and human factors considerations.

This standard is intended to cover the design of control boards and panels contained in the main control room as well as those control boards, panels, and racks located outside the main control room. The working group has addressed the control of combustibles by relying on UL fire retardant requirements for materials and ANSI/IEEE 383-1974 (R 1980) [6] which provides for type testing of Class IE cable, field splices, and connections for nuclear power generating stations.

Various groups have been reviewing the Three Mile Island Unit #2 accident in order to determine the type of impact this accident would have on the design, operation, and regulation of nuclear power plants. Early responses have come in from the Nuclear Regulatory Commission which has set up several task forces. The working group has reviewed the statements issued so far from the *Lessons Learned Task Force* as contained in NUREG-0578, *TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations*, July 1979, to ascertain the impact that these observations would have on this standard. It is expected that as more of the committees report conclusions, other items will arise for consideration by the working group. The working group, however, does not expect this standard to require changes as a result of the Three Mile Island Unit #2 accident, because the structural design and qualification of control boards were not factors in the Three Mile Island Unit #2 accident.

¹Numbers in brackets correspond to those of the references listed in Section 2

The Institute of Electrical and Electronics Engineers (IEEE) undertook the development of this standard under the auspices of the Power Generation Committee. The chairman of the working group, W. J. Kerchner, died before this document was published. The members of the Nuclear Power Plant Control and Protection working group will miss him as a friend and as an advisor.

At the time this standard was approved the members of the Working Group on Nuclear Plant Control and Protection for this standard were:

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1. General

1.1 Scope

This standard specifies those design requirements which are unique to Class IE control boards, panels, and racks and provides standards for qualification tests to verify that these design requirements have been satisfied. It does not apply to:

- 1) Non-Class IE components and modules except as they may affect the design and qualification of Class IE control boards, panels, and racks
- 2) Qualification and test of individual Class IE control board components and modules
- 3) External field run cables

1.2 Purpose

The purpose of this standard is to specify the design requirements for Class IE control boards, panels, and racks and to establish the methods to verify that these requirements have been satisfied.

2. References

[1] ANSI N45.2-1977, An American National Standard Quality Assurance Program Requirements for Nuclear Facilities.²

²ANSI documents are available from the Sales Department, American National Standards Institute, 1430 Broadway, New York, NY 10018.