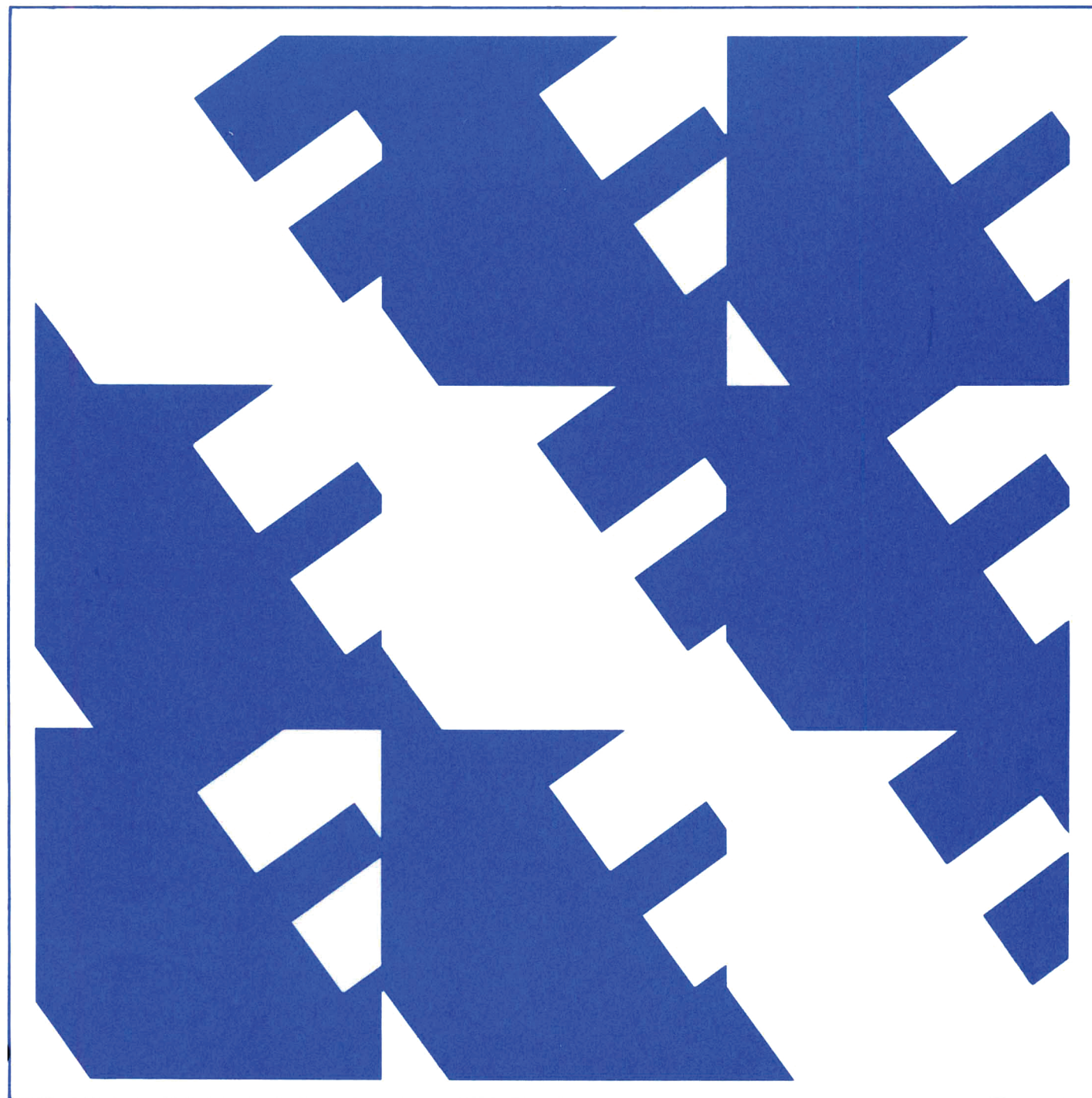


IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits

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IEEE
Std 384-1977

IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits

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

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Foreword

(This foreword is not a part of IEEE Std 384-1977, Criteria for Independence of Class 1E Equipment and Circuits.)

This document provides criteria and requirements for establishing and maintaining the independence of Class 1E equipment and circuits and auxiliary supporting features by physical separation and electrical isolation.

This 1977 revision of IEEE Standard 384-1974, Trial-Use Standard Criteria for Separation of Class 1E Equipment and Circuits, reflects an expansion in scope responsive to various expressed needs to address the following areas of concern:

(1) Electrical independence of Class 1E circuits, equipment, and systems, which includes the concepts of shielding and electrical isolation, in addition to the physical separation.

(2) Separation and other requirements for auxiliary supporting features, including the separation and isolation characteristics of interfacing mechanical and structural plant systems and features required to permit the electrical and physical independence of Class 1E systems to be achieved.

(3) Consideration of the Nuclear Regulatory Commission (NRC) regulatory positions stated in Regulatory Guide 1.75, Revision 1.

(4) Isolation devices; types and application criteria.

(5) Fire caused by ignition sources external to the raceway in addition to internally generated fires. Consideration has been given to NRC Publication NUREG-0050, Recommendations Related to Brown's Ferry Fire, as well as to the Nuclear Engineering Liability Property Insurance Association (NELPIA) recommendations. This aspect has been correlated with work being done on ANSI N18.10, Draft Standard on Generic Requirements for Nuclear Power Plant Fire Protection, IEEE Std 383-1974, Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations (ANSI N41.10-1975), and various cable fire tests sponsored by industry, Underwriters' Laboratories, and the NRC.

The distances that are given for separation between trays required to be separated in areas of limited hazard potential are based on current available data from actual cable fire situations and are considered to provide an adequate degree of separation. However, other events such as industrial sabotage, airplane crash, or other special considerations which could require increased separation requirements are beyond the scope of this document.

The Working Group has followed the development of IEEE Std 420-1973, Trial Use Guide for Class 1E Control Switchboards for Nuclear Power Generating Stations, developed by the Nuclear Power Plant Control and Protection Working Group of the Power Generation Committee. The separation requirements herein are considered not to be in conflict with IEEE Std 420-1973 which defines a design that, if followed, would be expected to result in an acceptable installation.

Two areas were identified during final Nuclear Power Engineering Committee (NPEC) approval that will be pursued in future revisions to this document:

(1) Proximity criteria relating to both associated cables and loads comprising the associated circuits.

(2) More definitive criteria relating to energy levels of circuits, specifically low energy instrumentation and control circuits.

The Institute of Electrical and Electronics Engineers (IEEE) has developed these criteria to provide guidance in the determination of the independence requirements related to the Class 1E systems of the nuclear facility. Each applicant for construction permit or an operating license for a nuclear facility in the United States is required to develop these items to comply with the NRC's Code of Federal Regulations, Part 50.

Adherence to these criteria may not suffice for assuring the public health and safety, because it is the integrated performance of the structures, the fluid systems, the instrumentation and the electric systems of the station that establishes the consequences of accidents. Failure to meet these requirements may be an indication of system inadequacy. Each applicant has the responsibility to assure himself and others that this integrated performance is adequate.

The Working Group feels that the criteria herein represent an industry and government consensus for ascertaining the adequacy of the independence of Class 1E systems.

The IEEE will maintain this standard current with the state of the technology. Comments are invited on this standard as well as suggestions for additional material that should be included in future revisions. These should be addressed to:

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