# APPENDIX C

# IEEE STANDARDS ABSTRACTS

## 7-4.3.2-2003 - IEEE standard criteria for digital computers in safety systems of nuclear power generating stations

**Abstract**
Additional computer specific requirements to supplement the criteria and requirements of IEEE Std 603TM - 1998 are specified. Within the context of this standard, the term computer is a system that includes computer hardware, software, firmware, and interfaces. The criteria contained herein, in conjunction with criteria in IEEE Std 603-1998, establish minimum functional and design requirements for computers used as components of a safety system.

## 48-1996 - IEEE Standard Test Procedures and Requirements for Alternating - Current Cable Terminations 2.5 kV - 765 kV

**Abstract**
All indoor and outdoor cable terminations used on alternating-current cables having laminated insulation rated 2.5 kV through 765 kV or extruded insulation rated 2.5 kV through 500 kV are covered, except for separable insulated connectors, which are covered by IEEE Std 386-2006.

## 141-1993 (Red Book) - IEEE recommended practice for electric power distribution for industrial plants

**Abstract**
Recommendations are made regarding system planning; voltage considerations; surge voltage protection; system protective devices; fault calculations; grounding; power switching; transformation, and motor-control apparatus; instruments and meters; cable systems; busways; electrical energy conservation; and cost estimation.

## 142-2007 (Green Book) - IEEE recommended practice for grounding of industrial and commercial power systems

**Abstract**
The problems of system grounding, that is, connection to ground of neutral, of the corner of the delta, or of the midtap of one phase, are covered. The advantages and disadvantages of grounded vs. ungrounded systems are discussed. Information is given on how to ground the system, where the system should be grounded, and how to select equipment for the ground of the neutral circuits. Connecting the frames and enclosures of electric apparatus, such as motors, switchgear, transformers, buses, cables, conduits, building frames, and portable equipment, to a ground system is addressed. The fundamentals of making the interconnection of a ground conductor system between electric equipment and the ground rods, water pipes, etc., are outlined. The problems of static electricity-how it is generated, what processes may produce it, how it is measured, and what should be done to prevent its generation or to drain the static charges to earth to prevent sparking-are treated. Methods of protecting structures against the effects of lightning are also covered. Obtaining a low-resistance connection to earth, use of ground rods, connections to water pipes, etc., are discussed. A separate chapter on electronic equipment is included.

## 241-1990 (Gray Book) - IEEE recommended practice for electric power systems in commercial buildings

**Abstract**
The guide covers load characteristics; voltage considerations; power sources and distribution systems; power distribution apparatus; controllers; services, vaults, and electrical equipment rooms; wiring systems; systems protection and coordination; lighting; electric space conditioning; transportation; communication systems planning; facility automation; expansion, modernization, and rehabilitation; special requirements by

occupancy; and electrical energy management. Although directed to the power oriented engineer with limited commercial building experience, it can be an aid to all engineers responsible for the electrical design of commercial buildings. This recommended practice is not intended to be a complete handbook; however, it can direct the engineer to texts, periodicals, and references for commercial buildings and act as a guide through the myriad of codes, standards, and practices published by the IEEE, other professional associations, and governmental bodies.

## 242-2001 (Buff Book) - IEEE recommended practice for protection and coordination of industrial and commercial power systems

**Abstract**
The principles of system protection and the proper selection, application, and coordination of components that may be required to protect industrial and commercial power systems against abnormalities that could reasonably be expected to occur in the course of system operation are presented in a simple yet comprehensive format. The principles presented apply to both new electrical system design and to the changing, upgrading, or expansion of an existing electrical distribution system.

## 308-2001 - IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations

**Abstract**
Class 1E portions of alternating current and direct current power systems and instrumentation and control power systems in single-unit and multiunit nuclear power generating stations are covered. Not included are the preferred power supply; unit generator(s) and their buses; generator breaker; step-up, auxiliary, and start-up transformers; connections to the station switchyard; switchyard; transmission lines; and the transmission network. The intent is to provide criteria for the determination of Class 1E power system design features, criteria for sharing Class 1E power systems in multiunit stations, the requirements for their testing and surveillance, and the requirements for documentation of the Class 1E power system.

## 317-1983 - IEEE standard for electric penetration assemblies in containment structures for nuclear power generating stations

**Abstract**
An electric penetration assembly is an assembly of insulated electric conductors, conductor seals, module seals (if any), and aperture seals that provides the passage of the electric conductors through a single aperture in the nuclear containment structure, while providing a pressure barrier between the inside and the outside of the containment structure. The electric penetration assembly includes terminal (junction) boxes, terminal blocks, connectors and cable supports, and splices which are designed and furnished as an integral part of the assembly. This standard prescribes the requirements for the design, construction, qualification, test, and installation of electric penetration assemblies in nuclear containment structures for stationary nuclear power generating stations.

## 323-2003 - IEEE Std. 323 /sup TM/ IEEE standard for qualifying class 1E equipment for nuclear power generating stations

**Abstract**
The basic requirements for qualifying Class 1E equipment and interfaces that are to be used in nuclear power generating stations are described in this standard. The principles, methods, and procedures described are intended to be used for qualifying equipment, maintaining and extending qualification, and updating qualification, as required, if the equipment is modified. The qualification requirements in this standard, when met, demonstrate and document the ability of equipment to perform safety function(s) under applicable service conditions including design basis events, reducing the risk of common-cause equipment failure.

## 334-2006 - IEEE Standard for Qualifying Continuous Duty Class 1E Motors for Nuclear Power Generating Stations

**Abstract**
It is required that Class 1E motors, with their interfaces, meet or exceed the specified performance requirements throughout their service life. This is accomplished through a program that includes, but is not limited to, design, qualification, production quality control, shipping, storage, installation, operation, maintenance, periodic testing, and surveillance. This standard addresses the qualification portion of the program. It discusses the requirement for maintenance, repair, and surveillance of motors to maintain qualification of motors throughout their installed life but does not provide detailed guidance about how these programmatic items must be implemented and maintained. The qualification requirements of this standard, when met, demonstrate and document the ability of the motor and/or insulation system to perform its safety function(s) under specified service conditions.

## 336-2005 - IEEE Guide for Installation, Inspection, and Testing for Class 1E Power, Instrumentation, and Control Equipment at Nuclear Facilities

**Abstract**
This guide provides considerations for the pre-installation, installation, inspection, and testing of Class 1E power, instrumentation, and control equipment and systems of a nuclear facility. This guidance is applicable to initial construction, modification and maintenance activities. This guide does not apply to periodic testing.

## 338-2006 - IEEE Standard Criteria for Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems

**Abstract**
The standard provides criteria for the performance of periodic testing of nuclear power generating station safety systems. The scope of periodic testing consists of functional tests and checks, calibration verification, and time response measurements, as required, to verify that the safety system performs its defined safety function. Post-maintenance and post-modification testing are not covered by this document. This standard amplifies the periodic testing requirements of other nuclear safety-related IEEE standards.

## 344-2004 - IEEE Std. 344 - 2004 IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations

**Abstract**
Recommended practices are provided for establishing procedures that will yield data to demonstrate that the Class 1E equipment can meet its performance requirements during and/or following one safe shutdown earthquake event preceded by a number of operating basis earthquake events. This recommended practice may be used to establish tests, analyses, or experienced based evaluations that will yield data to demonstrate Class 1E equipment performance claims or to evaluate and verify performance of devices and assemblies as part of an overall qualification effort. Common methods currently in use for seismic qualification by test are presented. Two approaches to seismic analysis are described, one based on dynamic analysis and the other on static coefficient analysis. Two approaches to experienced-based seismic evaluation are described, one based on earthquake experience and the other based on test experience.

## 379-2000 - IEEE Standard Application of the Single-Failure Criterion to Nuclear Power Generating Station Safety Systems

**Abstract**
Application of the single-failure criterion to the electrical power, instrumentation, and control portions of nuclear power generating safety systems is covered in this standard.

## 382-2006 - IEEE Standard for Qualification of Safety-Related Actuators for Nuclear Power Generating Stations

**Abstract**
Direction for the implementation of the requirements of IEEE Std 323 trade - 2003 as they apply to the specific features of safety-related actuator qualification are provided. This standard establishes criteria for qualification of safety-related actuators, and actuator components, in Nuclear Power Generating Stations in order to demonstrate their ability to perform their intended safety functions under all required conditions.

## 383-2003 - IEEE standard for qualifying class 1E electric cables and field splices for nuclear power generating stations

**Abstract**
This standard provides general requirements, direction, and methods for qualifying Class 1E electric cables, field splices, factory splices, and factory rework for service in nuclear power generating stations. Categories of cables covered are those used for power, control, and instrumentation services, including signal and communication cables. Field cables, wires, and splices are within the scope of this standard. Cables, wires, and splices within or integral to other devices (e.g., instruments, panels, motors, etc.) should be qualified using the requirements in the applicable device standard or IEEE Std 323-1983, as appropriate. However, this standard's requirements may be applied to the wire and cable within these devices.

## 384-1992 - IEEE standard criteria for independence of Class 1E equipment and circuits

**Abstract**
The independence requirements of the circuits and equipment comprising or associated with Class 1E systems are described. Criteria for the independence that can be achieved by physical separation and electrical isolation of circuits and equipment that are redundant are set forth. The determination of what is to be considered redundant is not addressed.

## 387-1995 - IEEE standard criteria for diesel-generator units applied as standby power supplies for nuclear power generating stations

**Abstract**
The criteria for the application and testing of diesel-generator units as Class 1E standby power supplies in nuclear power generating stations is described in this IEEE Standard. The principal design criteria, factory production testing, qualification requirements and site testing are covered.

## 399-1997- Power Systems Analysis (Brown Book)

**Abstract**
This standard addresses the power system studies required for an efficient system design and includes load flow, short-circuit, stability, motor starting, harmonic analysis, switching transients, reliability, cable ampacity, ground mat, coordination, and dc auxiliary studies.

## 400-2001 - IEEE Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems

**Abstract**
This guide lists the various field test methods that are presently available or under development to perform field tests on insulated, shielded power cable systems rated 5 kV through 500 kV. A summary of advantages and disadvantages of the methods will be included. Users should avail themselves of the technical papers that are included as References and in the Bibliography before deciding whether to perform a test and which test to utilize. In making such decisions, consideration should be given to the performance of the entire cable system, including joints, terminations, and associated equipment.

## P400.1/D8A Dec 2006 - Draft Guide for Field Testing of Laminated Dielectric, Shielded Power Cable Systems Rated 5 kV and above with High Direct Current Voltage

**Abstract**
Procedures and recommended test voltage values for acceptance and maintenance high-direct-voltage testing of shielded power cable systems are set forth. They apply to all types of shielded, insulated power cable. The aim is to provide uniform test procedures and guidelines for evaluation of the test results.

## 400.2-2004 - IEEE Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF)

**Abstract**
This guide describes very low frequency (VLF) withstand and diagnostic tests and the measurements that are performed in the field on shielded power cable systems. Whenever possible, cable systems are treated in a similar manner to individual cables. Tables are included as an aid to identifying the effectiveness of the VLF test for various cable system insulation problems.

## 400.3-2006 - IEEE Guide for Partial Discharge Testing of Shielded Power Cable Systems in a Field Environment

**Abstract**
This guide covers the diagnostic testing of new or service-aged installed shielded power cable systems, which include cable, joints, and terminations, using partial discharge (PD) detection, measurement, and location. Partial discharge testing, which is a useful indicator of insulation degradation, may be carried out on-line or off-line by means of an external voltage source. This guide does not include the testing of compressed gas insulated systems or continuous on-line monitoring at normal service voltage.

## 420-2001 - IEEE standard for the design and qualification of class 1E control boards, panels, and racks used in nuclear power generating stations

**Abstract**
This standard specifies the design requirements for new and/or modified Class control boards, panels, and racks and establishes the methods to verify that these requirements have been satisfied. Methods for meeting the separation criteria contained in ANSI/IEEE Std 384-1992 are addressed. Qualification is also included to address the overall requirements ANSI/IEEE Std 323-1983 and ANSI/IEEE Std 344-1987.

## 450-2002 - IEEE recommended practice for maintenance, testing, and replacement of vented lead-acid batteries for stationary applications

**Abstract**
Maintenance, test schedules, and testing procedures that can be used to optimize the life and performance of permanently installed, vented lead-acid storage batteries used for standby power applications are provided. This recommended practice also provides guidance to determine when batteries should be replaced. This recommended practice is applicable to full-float stationary applications where a charger maintains the battery fully charged and supplies the DC loads.

## 484-2008- Installation Design and Installation of Vented Lead-Acid Batteries

**Abstract**
This standard provides recommended design practices and procedures for storage, location, mounting, ventilation, instrumentation, pre-assembly, assembly, and charging of vented lead-acid batteries. Required safety practices are also included. These recommended practices are applicable to all stationary applications. However, specific applications, such as emergency lighting units and semi-portable equipment, and alternate energy applications, may have other appropriate practices and are beyond the scope of this recommended practice.

## 485-2003 - Sizing Large Lead-Acid Batteries for Stationary Applications

**Abstract**
This standard describes methods for defining the dc load and for sizing a lead-acid battery to supply that load for stationary battery applications in full float operations. Some factors relating to cell selection are provided for consideration. Installation, maintenance, qualification, testing procedures, and consideration of battery types other than lead-acid are beyond the scope of this recommended practice. Design of the dc system and sizing of the battery chargers are also beyond the scope of this recommended practice.

## 497-2002/Cor 1-2007 - IEEE Standard Criteria for Accident Monitoring Instrumentation for Nuclear Power Generating Stations Corrigendum 1: Incorporation of User Feedback through 2005

**Abstract**
Criteria for variable selection, performance, design, and qualification of accident monitoring instrumentation are established in this standard. Included requirements for display alternatives for accident monitoring instrumentation, documentation of design bases, and use of portable instrumentation.

## 498-1985 - IEEE Standard Requirements for the Calibration and Control of Measuring and Test Equipment Used In Nuclear Facilities (Withdrawn in 1995)

**Abstract**
The standard sets forth the requirements for a calibration program to control and verify the accuracy of measuring and test equipment used to ensure that safety systems of a nuclear facility are in conformance with prescribed technical requirements and that data provided by testing, inspection, or maintenance are valid. These requirements also cover modifications and those activities occurring during the operating phase that are comparable in nature and extent to related activities occurring during the initial construction of the facility.

## 519-1992 - IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems

**Abstract**
This guide applies to all types of static power converters used in industrial and commercial power systems. The problems involved in the harmonic control and reactive compensation of such converters are addressed, and an application guide is provided. Limits of disturbances to the ac power distribution system that affect other equipment and communications are recommended. This guide is not intended to cover the effect of radio frequency interference.

## 535-2006 - IEEE Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Station

**Abstract**
Qualification methods for class 1E vented lead acid batteries and racks to be used in nuclear power generating stations outside primary containment are described in this standard.

## 567-1980 – IEEE Trial-Use Standard Criteria for the Design of the Control Room Complex for a Nuclear Power Generating Station

**Abstract**
This standard addresses the central control room and the overall complex where this room is housed.

## 572-2006 - IEEE Standard for Qualification of Class 1E Connection Assemblies for Nuclear Power Generating Stations

**Abstract**
This standard provides basic requirements, direction, and methods for qualifying class IE connection assemblies for service in nuclear power generating stations. These include connectors, terminations, and environmental seals in combination with related cables or wires as assemblies. Qualification of cable with connectors to this standard does not replace qualification to IEEE Std 383™-2003. This standard does not apply to containment electric penetrations, fire stops, in-line splices, or components for service within the reactor vessel. The qualification requirements in this standard, when met, demonstrate and document the ability of the equipment to perform safety function(s) under applicable service conditions (including design basis events) reducing the risks of common cause-equipment failures. This standard does not provide environmental stress levels and performance requirements.

The basic requirements for qualifying Class 1E Connection Assemblies and interfaces that are to be used in nuclear power generating stations are described in this standard. The principles, methods and procedures described are intended to be used for qualifying Connection Assemblies, maintaining and extending qualification, and updating qualification as required, if the Connection Assembly is modified. The qualification requirements in this standard, when met, demonstrate and document the ability of the Connection Assembly to perform safety functions under applicable service conditions including design basis events, reducing the risk of common-cause Connection Assembly failure.

## 576-2000 - IEEE recommended practice for installation, termination, and testing of insulated power cable as used in industrial and commercial applications

**Abstract**
A guide for installing, splicing, terminating, and field proof testing of cable systems in industrial and commercial applications is provided. It is not intended to be a design document, although many of the problems of installation can be avoided by designing cable layouts within the installation limits of this recommended practice.

## 603-1998 - IEEE standard criteria for safety systems for nuclear power generating stations

**Abstract**
Minimum functional and design criteria for the power, instrumentation, and control portions of nuclear power generating station safety systems are established. The criteria are to be applied to those systems required to protect the public health and safety by functioning to mitigate the consequences of design basis events. The intent is to promote appropriate practices for design and evaluation of safety system performance and reliability. Although the standard is limited to safety systems, many of the principles may have applicability to equipment provided for safe shutdown, post accident monitoring display instrumentation, preventive interlock features, or any other systems, structures, or equipment related to safety.

## 622-1987 - IEEE recommended practice for the design and installation of electric heat tracing systems for nuclear power generating stations

**Abstract**
This document provides recommended practices for designing and installing electric heat tracing systems in nuclear power generating stations. These electric heat tracing systems are applied, both for critical process temperature control and for process temperature control, on mechanical piping systems that carry borated water, caustic soda, and other solutions. Electric heat tracing systems are also applied on water piping systems to prevent them from freezing in cold weather. The recommendations include identification of requirements, heater design considerations, power systems design considerations, temperature control considerations, alarm considerations, finished drawings and documents, installation of materials, startup testing, temperature tests, and maintenance of electric pipe heating systems.

## 627-1980 - Safety System Equipment

**Abstract**
This document provides recommended practices for qualification of safety system equipment used in nuclear power generating stations. The standard also addresses specification criteria, the development of a qualification program, and documentation. All types of safety systems equipment – mechanical and instrumentation as well as electrical - are covered. Principles and procedures for preparing specific safety systems equipment standards are established.

## 628-2001 - IEEE Standard Criteria for the Design, Installation, and Qualification of Raceway Systems for Class 1E Circuits for Nuclear Power Generating Stations

**Abstract**
Criteria for the minimum requirements in the selection design, installation, and qualification of raceway systems for Class 1E circuits for nuclear power generating stations are provided. It also prescribes methods for the structural qualification of raceway systems for Class 1E circuits.

## 638-1992 - IEEE standard for qualification of class 1E transformers for nuclear power generating stations

**Abstract**
Procedures for demonstrating the adequacy of new Class 1E power transformers, located in a mild environment of a nuclear power generating station, to perform their required safety functions under postulated service conditions are presented. Single and three phase transformers rated 601 V to 15000 V for the highest voltage winding and up to 2500 kVA (self-cooled rating) are covered. Because of the conservative approach used in the development of this new standard for new transformers, the end point criteria cannot be used for in-service transformers.

## 649-2006 - IEEE Standard for Qualifying Class 1E Motor Control Centers for Nuclear Power Generating Stations

**Abstract**
The basic principles, requirements, and methods for qualifying Class 1E motor control centers for both harsh and mild environment applications in nuclear power generating stations are described. In addition to defining specific qualification requirements for Class 1E motor control centers and their components in accordance with the more general qualification requirements of IEEE Std 323-2003, this standard is intended to provide guidance in establishing a qualification program for demonstrating the adequacy of Class 1E motor control centers in nuclear power generating station applications.

## 650-2006 – Qualification of Class 1E Static Battery Chargers and Inverters for Nuclear Power Generating Stations

**Abstract**
The standard describes the methods for qualifying static battery chargers and inverters for Class 1E installations outside the containment of nuclear power generating stations. The methods may also be used to qualify similar electronic equipment for use in applications outside containment, where specific standards for such equipment are not available. The qualification methods set forth employ a combination of type testing and analysis, the latter including a justification of methods, theories and assumptions used. These procedures meet the requirements of IEEE Std 323-2003.

## 665-1995 - IEEE guide for generating station grounding

**Abstract**
In this IEEE guide, grounding practices that have generally been accepted by the electric utility industry as contributing to effective grounding systems for personnel safety and equipment protection in generating stations are identified. A guide for the design of generating station grounding systems and for grounding practices applied to generating station indoor and outdoor structures and equipment, including the interconnection of the station and substation grounding systems, is provided.

## 666 -2007 - Design Guide for Electric Power Service Systems for Generating Stations

**Abstract**
This guide applies to station service systems that supply electric power to auxiliary loads for electric power generating stations. The discussions and recommendations in this guide provide the practices, criteria, and range of system parameters that relate to the service system requirements and assist in the application of existing engineering documents. This guide is not a handbook of design data; however, it explains what is good power service systems for generating stations.

## 690-2004 - IEEE standard for the design and installation of cable systems for class 1E circuits in nuclear power generating stations

**Abstract**

Direction for the design and installation of safety-related electrical cable systems, including associated circuits, in nuclear power generating stations is provided. Guidance for the design and installation of those non-safety-related cable systems that may affect the function of safety-related systems is also provided.

## 692-1997 - IEEE standard criteria for security systems for nuclear power generating stations

**Abstract**
In this IEEE Standard, criteria are provided for the design of an integrated security system for nuclear power generating stations. Requirements are included for the overall system, interfaces, subsystems, and individual electrical and electronic equipment. This standard addresses equipment for security-related detection, surveillance, access control, communication, and data acquisition.

## 741-1997 - IEEE standard criteria for the protection of class 1E power systems and equipment in nuclear power generating stations

**Abstract**
This standard prescribes criteria that establish protection requirements for Class 1E systems and equipment. It describes the purpose of and the means for obtaining protection from electrical and mechanical damage, or failures that can occur within a time period that is shorter than that required for operator action. It includes testing and surveillance requirements. It does not include plant physical design requirements to protect against events such as pipe whip, fire, dropped load, etc.

## 749-1983 - IEEE Standard for Periodic Testing of Diesel Generator Units Applied as Standby Power Supplies in Nuclear Power Generating Stations

**Abstract**
Withdrawn Date: Dec 05, 1991. This standard applied to the periodic testing of diesel-generator units applied as standby power supplies in nuclear power generating stations.

See IEEE Std 387

## 765-2006 - IEEE Standard for Preferred Power Supply (PPS) for Nuclear Power Generating Stations (NPGS)

**Abstract**
The design criteria of the preferred power supply (PPS) and its interfaces with the Class 1E power system, switchyard, transmission system, and alternate ac (AAC) source are described. This standard provides PPS requirements for nuclear power plants and guidance in the areas of AAC power source interfaces with PPS, physical independence of the PPS power and control circuits, and expanded PPS criteria for multi-unit stations.

## 828-1990 – Standard for Software Configuration Management Plans (see also 1998, 2005)

**Abstract**
This standard establishes the minimum required contents of a software configuration management program plan and defines the specific activities to be addressed and their requirements for any portion of a software products life cycle.

## 829-1983 – Standard for Software Test Documentation (see also 1998, 2008)

**Abstract**
This standard describes a set of basic test documents that are associated with the dynamic aspects of software testing. The purpose, outline and content of each basic document are defined.

## 830-1993 – Recommended Practice for Software Requirements Specifications (see also 1998)

**Abstract**
This standard describes the content and qualities of a good software requirements specification. Several software requirements specifications outlines are presented. Can be used for the selection of commercial and in-house software products.

## 833-2005 - IEEE Recommended Practice for the Protection of Electric Equipment in Nuclear Power Generating Stations from Water Hazards

**Abstract**
Guidance regarding protection of electrical equipment from sources of water directed onto or around electrical equipment is provided.

## 835 -1994 - Power Cable Ampacity Tables

**Abstract**
This standard contains over 3000 ampacity tables for extruded dielectric power cables rated through 138 kV and laminar dielectric power cables rated through 500 kV are provided.

## 848-1996 - IEEE Standard Procedure for the Determination of the Ampacity Derating of Fire-Protected Cables

**Abstract**
This standard provides a detailed test procedure for determining the ampacity or derating factor in the following cable installation configurations: block-out or sleeve type cable penetration fire stops; conduits covered with a protective material; tray covered with a protective material; cable directly covered or coated with a fire-retardant material; and free-air drops enclosed with a protective material.

## 902-1998 (Yellow Book) - IEEE guide for maintenance, operation, and safety of industrial and commercial power systems

**Abstract**
Guidelines for the numerous personnel who are responsible for safely operating and maintaining industrial and commercial electric power facilities are provided. This guide provides plant engineers with a reference source for the fundamentals of safe and reliable maintenance and operation of industrial and commercial electric power distribution systems.

## 934-1987 Standard Requirements for Replacement Parts for Class 1E Equipment in Nuclear Power Generating Stations

**Abstract**
Basic requirements for the selection and utilization of replacement parts for Class 1E equipment in nuclear power generating stations, in both the construction and operation phases, are set forth. Selection, categories, and replacement of parts are covered. The requirements are intended to ensure that replacement parts selected and utilized for Class 1E equipment in nuclear power generating stations will not degrade the safety of the stations. They apply to parts which could result in the failure of the Class 1E equipment to perform its intended function or in degradation of the plant safety systems or the Class 1E equipment.

## 944-1986 – Application and Testing of Uninterruptible Power Supplies

**Abstract**
The standard covered the application and performance requirements for a low-voltage uninterruptible power supply (UPS) system used for service in power generating stations. Service conditions and requirements for design application, procurement documents, and testing are covered. The recommendations apply only to semi-conductor ac-to-ac converter systems (static) with dc electric energy storage capability. Equipment or component design requirements, safety-related design criteria, or requirements for equipment qualification and pre-operational and surveillance testing were not addressed.

## 946-2004 - IEEE Recommended Practice for the Design of DC Auxiliary Power Systems for Generating Stations

**Abstract**
The standard provides guidelines for the design of dc auxiliary power systems for generating stations including lead-acid storage batteries, static battery chargers and distribution equipment. Guidance is provided for selecting quantity and types of equipment, the equipment ratings, interconnections, instrumentation, control and protection.

## 1012-2004 - IEEE Std 1012 - 2004 IEEE Standard for Software Verification and Validation

**Abstract**
Software verification and validation (V&V) processes determine whether the development products of a given activity conform to the requirements of that activity and whether the software satisfies its intended use and user needs. Software V&V life cycle process requirements are specified for different software integrity levels. The scope of V&V processes encompasses software-based systems, computer software, hardware, and interfaces. This standard applies to software being developed, maintained, or reused [legacy, commercial off-the-shelf (COTS), non-developmental items]. The term software also includes firmware, microcode, and documentation. Software V&V processes include analysis, evaluation, review, inspection, assessment, and testing of software products.

## 1050-2004 - IEEE Guide for Instrumentation and Control Equipment Grounding in Generating Stations

**Abstract**
Instrumentation and control (I&C) equipment grounding methods to achieve both a suitable level of protection for personnel and equipment, and suitable electric noise immunity for signal ground references in generating stations are identified.

## 1143 – Low Voltage Cable Shielding

**Abstract**
This standard provides a concise overview of shielding options for various types of interference and recommendations on shielding practices, including suggestions on terminating and grounding methods.

## 1185-1994 - IEEE guide for installation methods for generating station cables

**Abstract**

The purpose of this recommended practice is to provide guidance for the proper installation of wire and cable in generating stations and industrial facilities so that potential wire or cable damage may be avoided during the installation and testing process.

## 1202 - 2006 - Flame Tests for Cables

**Abstract**
This standard provides a protocol for exposing cable samples to a theoretical 20 kW flaming ignition source for a 20 minute test duration. The test determines the flame propagation tendency of single conductor and multi-conductor cables intended for use in cable trays.

## 1205-2000 - IEEE Guide for Assessing, Monitoring, and Mitigating Aging Effects of Class 1E Equipment Used in Nuclear Power Generating Stations

**Abstract**
Guidelines for assessing, monitoring, and mitigating aging degradation effects on Class 1E equipment used in nuclear power generating stations are provided. This guide also includes informative annexes on aging mechanisms, environmental monitoring, condition monitoring, aging program essential attributes, and example assessments for five types of equipment (including electric cable).

## 1210-2004 - IEEE Standard Tests for Determining Compatibility of Cable-Pulling Lubricants With Wire and Cable

**Abstract**
Criteria and test methods for determining the compatibility of cable-pulling lubricants (compounds) with cable jacket or other exterior cable covering are described in this standard. Cable-pulling lubricants are used to lower the friction on cable as it is pulled into conduit, duct, or directionally bored holes. Compatibility is important because lubricants should not negatively interact with the cables they lubricate. Compatibility of lubricants with a variety of common cable coverings is considered.

## 1222-2004 - IEEE Standard for all-dielectric self-supporting fiber optic cable

**Abstract**
Construction, mechanical, electrical, and optical performance, installation guidelines, acceptance criteria, test requirements, environmental considerations, and accessories for an all-dielectric, nonmetallic, self-supporting fiber optic (ADSS) cable are covered in this standard. The ADSS cable is designed to be located primarily on overhead utility facilities. This standard provides both construction and performance requirements that ensure within the guidelines of the standard that the dielectric capabilities of the cable components and maintenance of optical fiber integrity and optical transmissions are proper. This standard may involve hazardous materials, operations, and equipment. It does not purport to address all of the safety issues associated with its use, and it is the responsibility of the user to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

## 1290-1996 - IEEE Guide for Motor Operated Valve (MOV) Motor Application, Protection, Control, and Testing in Nuclear Power Generating Stations

**Abstract**
Motors used to drive valve operators in nuclear power generating stations are discussed. Guidelines to evaluate the adequacy of motors used to drive valve operators; to provide recommendations for motor applications; and to provide methods for protection, control, and testing of motors used for valve operation are presented.

## 1349-2001 - IEEE Guide for the Application of Electric Motors in Class I, Division 2 Hazardous (Classified) Locations

**Abstract**
This guide was developed to assist individuals, organizations, and suppliers with the application of motors in Class I, Division 2 locations, where flammable gases and vapors may occasionally be present. Three-phase and single-phase ac synchronous and induction electric motors, fractional through very large sizes, are covered in this guide. Primary emphasis is on the use of general-purpose enclosures and precautions

against excessive surface temperatures and sparking of rotor bars and enclosure joints. Results of motor surface temperature tests and calculations performed by Working Group Member companies are documented in the guide. Guidance is included for maintaining the life-cycle integrity of motors in Class I, Division 2 locations. Existing codes and standards contain cautionary notes for general-purpose motor applications in Class I, Division 2 areas. Industry experience and established practices are documented for the application of general-purpose motors in Class I, Division 2 locations and guidance is given for applying motors in these locations. This guide is not a specification and is not intended for use as a specification for purchasing motors installed in Division 2 locations.

## 1375-1998 - Protection of DC Systems

**Abstract**
This standard provides guidance in the protection of the stationary battery systems. For the purpose of the guide, stationary battery systems include the battery and the dc components to and including the first protective device downstream of the battery terminals. The guide presents a number of options to the dc system designer of the different types of stationary battery system protection available.

## 1458-2005 - IEEE Std. 1458 - 2005 - 1458 IEEE Recommended Practice for the Selection, Field Testing, and Life Expectancy of Molded Case Circuit Breakers for Industrial Applications

**Abstract**
A recommended procedure for the selection, application, and determination of the remaining life in molded case circuit breaker is provided.

## 1590-2003 - IEEE recommended practice for the electrical protection of optical fiber communication facilities serving, or connected to, electrical supply locations

**Abstract**
The main emphasis of this recommended practice is the engineering design of optical fiber communication facilities serving, or connected to, electric supply locations. This recommended practice includes methods for providing telecommunication facilities serving electric supply locations using optical fiber cables, and their related electronic systems, extending across the zone of influence (ZOI).

## IEEE/EIA Std 12207.0-1996, "IEEE/EIA Standard Industry Implementation of International Standard ISO/IEC 12207: 1995 (ISO/IEC 12207) Standard for Information Technology Software Life Cycle Processes.

http://standards.ieee.org/reading/ieee/std_public/description/se/12207.0_desc.html

**Abstract**
The standard provides a common framework for developing and managing software life cycle process. It applies to the acquisition of systems and software products and services, and to the supply, development operation, maintenance, and disposal of software products and the software portion of a system whether performed internally or externally to an organization.

Consists of joint project of IEEE and EIA (Electronic Industries Association) and ISO/IEC.

## C62.23-1995 – Application Guide for Surge Protection of Electric Generating Plants

**Abstract**
The standard consolidates most electric utility power industry practices, accepted theories, existing standards and guides, definitions, and technical references as they specifically pertain to surge protection of electric power generating plants. Where technical information is not readily available, guidance is provided to aid toward proper surge protection and to reduce interference to communication, control, and protection circuits due to surges and other over-voltages. The application guide approached the subject of surge protection from a common or generalized application viewpoint.