

IEEE Standard 141-1993: Recommended Practice for Electric Power Distribution for Industrial Plants (The Red Book). Detailed industrial power system considerations with guidance for design, construction, and continuity of an overall system for safety, preservation of property, reliability, simplicity, voltage regulation, care and maintenance, and flexibility to permit development and expansion.

IEEE Standard 142-1991: Recommended Practice for Grounding of Industrial and Commercial Power Systems (The Green Book). A detailed analysis of grounding problems and methods for resolving grounding problems.

IEEE Standard 242-1986: Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (The Buff Book). A detailed analysis of the selection, application, and coordination of protective devices for industrial and commercial power systems.

IEEE Standard 446-1987: Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications (The Orange Book). Recommended engineering practices for selection and application of emergency and standby power systems providing facility architects and operators with guidelines for assuring uninterrupted power virtually free of frequency excursions and voltage dips, surges, and transients.

IEEE Standard 493-1997: Recommended Practice for Design of Reliable Industrial and Commercial Power Systems (The Gold Book). Details the fundamentals of reliability analysis as applied to the planning and design of industrial and commercial power distribution systems, including probability methods, basics of power system reliability evaluation, economic analysis, cost of power outage, equipment reliability data, emergency and standby power, electrical and preventive maintenance, and evaluating and improving reliability of an existing plant are addressed.



IEEE Standard 519-1992: Recommended Practices and Requirements for Harmonic Control of Electrical Power Systems. This guide applies to all 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 for AC power disturbances that affect other equipment and communications are recommended.

IEEE Standard 929-1988: Recommended Practice for Utility Interface of Residential and Intermediate Photovoltaic (PV) Systems.

IEEE Standard 1100-1999: Recommended Practice for Powering and Grounding Sensitive Electronic Equipment (The Emerald Book). Recommended design, installation, and maintenance practices for electrical power and grounding, including power-related and signal-related noise control of sensitive electronic processing equipment used in industrial and commercial environments.

IEEE Standard 1159-1995: Recommended Practice for Monitoring Electric Power Quality. Monitoring of power quality for AC systems, definitions of power quality terms, impact of poor power quality on both provider and user equipment, and the measurement of electromagnetic events are addressed. The standard includes monitoring objectives, types of measurement devices, monitoring applications, and interpretation techniques.

IEEE Standard 1250-1995: Guide for Service to Equipment Sensitive to Momentary Voltage Disturbances. Computers and similar equipment using solid-state conversion have created new areas of power related concerns. Much of this equipment is not designed to withstand the surges and faults present on typical distribution systems. Momentary voltage disturbances, their possible effects on this new, sensitive, user equipment and guidance toward mitigation of these effects are described. Harmonic distortion limits are outlined.



Standards

IEEE Standard 1346-1998: Recommended Practice for Evaluating Electric Power System Compatibility with Electronic Process Equipment. A standard methodology for the technical and financial analysis of voltage sag compatibility between process equipment and electric power systems is outlined and recommended. The methodology is intended to be used as a planning tool to quantify the voltage sag environment and process sensitivity, showing how technical and financial alternatives should be evaluated.

IEEE Standards are available through The Institute of Electrical and Electronics Engineers, Inc. Website: <https://www.standards.ieee.org>

SEMI F-47-1999: Standard for Definition and Measurement of Equipment Reliability, Availability, and Maintainability. Standard that defines the sag ride through capability.

SEMI F-42-1999: Test Method for Semiconductor Processing Equipment Voltage Sag Immunity. Standard that defines test methodology to confirm compliance with F-47.

SEMI Standards are available from Semiconductor Equipment and Materials International. Website: <https://www.semi.org>

UL 1449 Second Edition, 1998: Underwriters Laboratories, Inc. Standard defining the safety, construction and performance standard for transient voltage surge suppressors. Website: <https://ulstandards.info.net.ul.com>

NFPA 70-2020: National Electrical Code. The NEC is a model code prescribing minimum requirements to "protect people and property from electrical hazards." The NEC is not a performance code. Most US localities adopt variations of the NEC as enforceable codes, and all US states enforce the NEC in jurisdictions without local codes.

Website: <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70>



ANSI C84.1-1995: Electric Power Systems and Equipment - Voltage Ratings (60Hz).

Establishes 120V and other nominal service and utilization voltages, the allowable deviation from nominal voltages, and the allowable imbalance between phases.

Website: <https://ansi.org>

NEMA MG 1-1998: Motors and Generators. Standard outlining the motor and generator specifications, including operating voltage, operating voltage tolerance, torque-speed characteristics, starting current, and insulation classes.

NEMA Standards Publication No LS1-1992, Low Voltage Surge Protective Devices. Standard outlining quality construction of the device.

NEMA 250-2003: Enclosures for Electrical Equipment. Designs, safety characteristics, and allowable environments for electrical enclosures. Includes specifications for normal residential and industrial environments, wet locations, hazardous (classified) locations as defined in NFPA 70, and other applications.

NEMA standards are available through the National Electrical Manufacturers' Association.
<https://www.nema.org/Standards>

EN 50160: Voltage Characteristics of Electricity Supplied by Public Electricity Networks. Establishes nominal voltages, allowable variations, and power quality requirements for European public electric utilities.

EN 61000-4-7: Testing and Measurement Techniques – General Guide on Harmonics and Interharmonics Measurements and Instrumentation, for Power Supply Systems and Equipment Connected Thereto.

EN 61000-4-15: Electromagnetic Compatibility (EMC) Testing and Measurement Techniques-Flickermeter-Functional and Design Specifications. Standards for the measurement of flicker producing voltages on AC power systems.



Standards

EN 61000-4-30: Metering and Aggregation. Prescribes measurement techniques for power quality parameters.

EN standards are available through European Standards and the International Electrotechnical Commission.

Websites: <https://www.en-standard.eu/>

<https://www.iec.ch/publications/international-standards>

ISA 101: First Human-Machine Interface Standard for Process Automation Systems. Covers the philosophy, design, implementation, operation, and maintenance of HMIs for process automation systems, including multiple work processes throughout the HMI life cycle.

ANSI/ISA 18.2 - 2016, Management of Alarm Systems for the Process Industries. Standard providing guidance, rationale and examples for the identification and rationalization of: basic alarm design; alarm system monitoring, assessment and auditing; enhanced alarm methods; and alarm systems for batch and discrete processes made part of previous versions of the standard.

ISA standards are available through the International Society for Automation:

<https://www.isa.org>.



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