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IEEE Standard Preferred Voltage Ratings for Alternating-Current Electrical Systems and Equipment Operating at Voltages Above 230 kV Nominal

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Abstract: Preferred voltage ratings above 230 kV nominal for alternating-current (ac) systems and equipment are provided, along with definitions of various types of system voltage.
Keywords: alternating-current electrical systems, electrical systems, system voltage, voltage ratings

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Introduction

(This introduction is not a part of IEEE Std 1312-1993, IEEE Standard Preferred Voltage Ratings for Alternating-Current Electrical Systems and Equipment Operating at Voltages Above 230 kV Nominal.)

This standard supersedes ANSI C92.2-1981, American National Standard Preferred Voltage Ratings for Alternating-Current Electrical Systems and Equipment Operating at Voltages Above 230 kV Nominal. Preferred maximum voltage ratings provide guidance in the development and design of these systems and equipment. Preferred nominal voltage ratings are included to provide consistent standard designations for electrical systems in the extra-high and ultra-high voltage classes.

This standard includes preferred voltage ratings up to and including 1200 kV maximum system voltage, as defined in the standard. Above this value, additional research and development work is needed before standard voltage levels can be specified. It is expected that the next voltage level to be established will be as high as is technically and economically feasible at the time that it is introduced.

ANSI C84.1-1982, American National Standard Voltage Ratings for Electric Power Systems and Equipment (60Hz), covers standard system voltages up to and including 230 kV nominal system voltage. The discussions in Sections 2 and 3 of ANSI C84.1-1982[1] contain information that should be helpful in achieving standardardization of voltage ratings for alternating-current electrical systems.

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[1]At the time of this reaffirmation, ANSI C84.1 had been revised and published as ANSI C84.1-1989.

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IEEE Standard Preferred Voltage Ratings for Alternating-Current Electrical Systems and Equipment Operating at Voltages Above 230 kV Nominal

1. Scope

This standard provides preferred voltage ratings above 230 kV nominal for alternating-current (ac) systems and equipment.

2. Definitions

NOTE—The definitions given in 2.1 through 2.5 for certain terms relating to voltage ratings for ac systems and equipment are intended to clarify the meaning and intent of this standard.

2.1 system voltage: A root-mean-square (rms) phase-to-phase power frequency voltage on a three-phase ac electrical system.

2.2 maximum system voltage: The highest rms phase-to-phase voltage that occurs on the system under normal operating conditions, and the highest rms phase-to-phase voltage for which equipment and other system components are designed for satisfactory continuous operation without derating of any kind.

When defining maximum system voltage, voltage transients and temporary overvoltages caused by abnormal system conditions such as faults, load rejection, etc., are excluded. However, voltage transients and temporary overvoltages may affect equipment operating performance and are considered in equipment application.

2.3 nominal system voltage: The system voltage by which the system may be designated and to which certain operating characteristics of the system are related.

The nominal voltage of a system is near the voltage level at which the system normally operates. To allow for operating contingencies, systems generally operate at voltage levels about 5–10% below the maximum system voltage for which system components are designed.

2.4 extra-high voltage (ehv): A maximum system voltage that is greater than 242 kV but less than 1000 kV.

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2.5 ultra-high voltage (uhv): A maximum system voltage that is equal or greater than 1000 kV.

NOTE—The classification of ehv and uhv is provided for the purpose of establishing consistency in the use of these terms, reflecting common usage.

3. Preferred system voltages

The values of preferred system voltages shall be as follows:

Voltage class	Preferred system voltage (kV)	
	Nominal	Maximum
ehv	345 500 765	362 550 800
uhv	1100	1200

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