



**CSA C235:19**  
National Standard of Canada



# Preferred voltage levels for AC systems up to 50 000 V



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# *National Standard of Canada*

## *CSA C235:19*

### *Preferred voltage levels for AC systems up to 50 000 V*



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# Preface

This is the third edition of CSA C235, *Preferred voltage levels for AC systems up to 50 000 V*. It supersedes the previous editions, published in 1969 and 1983.

Prior to 1969 the need for a recognized set of voltage standards in Canada had been the concern of the electrical industry throughout its history. In preparation for the first edition many studies, questionnaire surveys, and discussions of national scope were conducted. Since its initial publication in 1969 this Standard has served well as a guide to those who are involved in the problems of applying a great variety of voltage levels across the country. Improved equipment design ratings and controlled system design levels have both resulted.

The second edition called for better definition of steady-state voltage and the way that it is assessed with respect to supply voltage variations for circuits up to 50 000 V.

Major changes in this third edition include

- removal of the table on “Recommended Steady-State Voltage Variation Limits for Circuits up to 1000 V at Utilization Points” since voltage levels at utilization points are regulated by the *Canadian Electrical Code, Part I* (CEC) when used in conjunction with this Standard, which defines the voltage variation range at the point of connection;
- newly defined measurement and assessment requirements to assess voltage performance. These are not intended to replace operators’ existing practices for troubleshooting, planning, maintaining, and operating the power system; and
- the title of the table on “Recommended voltage variation limits for circuits up to 1000 V, at service entrance” changed to “Steady-state voltage range limits for systems  $\leq$  1000 V at point of connection”. Utility performance is being defined at the point of connection.

This Standard was prepared by the Subcommittee on Preferred Voltage Levels for AC Systems under the jurisdiction of the Technical Committee on System Aspects of Electrical Energy Supply and the Strategic Steering Committee on Power Engineering and EMC, and has been formally approved by the Technical Committee.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

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- 3) *This Standard was developed by consensus, which is defined by CSA Policy governing standardization — Code of good practice for standardization as “substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity”. It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*
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Funding in support of the consensus process of this Standard was provided by the following funders, whose assistance is acknowledged with thanks:

- Canadian Electricity Association
- Fortis Alberta
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- Schneider Electric

# *CSA C235:19*

## *Preferred voltage levels for AC systems up to 50 000 V*

### **1 Scope**

#### **1.1**

This Standard establishes steady-state voltage operating ranges at point of connection for AC power systems in Canada. It serves to provide guidance

- a) to national committees on utilization and control equipment for establishing standard ratings of such equipment on a basis coordinated with power system voltages;
- b) to power system designers so that new systems will be designed to accommodate standard ratings of equipment and devices;
- c) to power system operators and to electrical energy users for determining suitable voltage performance and the need for corrective measures, with respect to existing systems, to accommodate current designs of equipment and devices; and
- d) towards a uniform system of voltage selections in the country without any suggestion that each utility will supply every voltage listed. The establishment of standards on this basis is aimed at future development towards more uniformity on a national basis.

This Standard includes nominal voltages and supply steady-state voltage ranges at point of connection under both normal and extreme operating conditions.

This Standard does not include voltage operating ranges at utilization points.

#### **1.2**

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

### **2 Reference publications**

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below: