CSA C22.2 No. 0.22:11

National Standard of Canada

(reaffirmed 2021)

Evaluation methods for arc resistance ratings of enclosed electrical equipment

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Contents

Preface

This is the first edition of CSA C22.2 No. 0.22, *Evaluation methods for arc resistance ratings of enclosed electrical equipment,* one of a series of Standards issued by the Canadian Standards Association under Part II of the *Canadian Electrical Code*.

This CSA Standard draws on a number of earlier publications addressing the subject of arc resistance ratings of enclosed electrical equipment. The arc resistance testing guide in Annex AA of IEC 298-1981, *AC metal enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV,* was used as the basis for EEMAC G14-1, 1987, *EEMAC Procedure for Testing the Resistance of Metal-Clad Switchgear Under Conditions of Arcing Due to an Internal Fault*. EEMAC G14-1 incorporated advances in knowledge and understanding based on over a decade of use of Annex AA of IEC 298 in Europe. In 2001, IEEE published the first edition of C37.20.7, *IEEE Guide for Testing Medium-Voltage Metal-Enclosed Switchgear for Internal Arcing Faults*. IEEE Guide C37.20.7 relied heavily on Annex AA of IEC 298-1981, including Amendment 1-1994, and incorporated many of the refinements introduced in EEMAC G14-1. Annex A provides additional information on the history of the development of arc resistance standards in Canada.

This CSA Standard has been based in part on IEEE Std. C37.20.7-2007 *IEEE Guide for Testing Metal Enclosed Switchgear Rated up to 38 KV for Internal Arcing Faults*. Reprinted with permission from IEEE, 3 Park Avenue, New York, NY 10016-5997 USA, Copyright 2007, by IEEE. IEEE disclaims any responsibility or liability resulting from the placement and use of its material in this CSA Standard.

For general information on the Standards of the *Canadian Electrical Code, Part II*, see the preface to CAN/CSA-C22.2 No. 0.

This CSA Standard was developed in response to an increased demand in Canada for the evaluation of arc resistance ratings of equipment. The objective of this Standard is to provide guidance and to act as a source of reference to Subcommittees of other Part 2 standards where arc resistance may be a requirement within that standard. This Standard would apply when referenced by another Part 2 standard.

This Standard is intended to correlate with both the international (IEC) and North American (IEEE) procedures for determining equipment arc resistance ratings. Those intending to reference this Standard will need to consider which approach best meets their needs, as both methods are recognized and given equal validity within this Standard. When this document is referenced by another Part 2 Standard, it is recommended that the desired supply circuit neutral connection method be specified to ensure appropriate compliance.

This Standard was prepared by the Subcommittee on Requirements for Arc Resistance Ratings, under the jurisdiction of the Technical Committee on Industrial Products and the Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the Technical Committee.

Interpretations: The Strategic Steering Committee on Requirements for Electrical Safety has provided the following direction for the interpretation of standards under its jurisdiction: "The literal text shall be used in judging compliance of products with the safety requirements of this Standard. When the literal text cannot be applied to the product, such as for new materials or construction, and when a relevant committee interpretation has not already been published, CSA's procedures for interpretation shall be followed to determine the intended safety principle".

August 2011

Notes:

(1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*

(2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*

(3) *This publication 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 publication.*

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(b) relevant clause, table, and/or figure number;
(c) wording of the proposed change; and
(d) rationale for the change.

C22.2 No. 0.22-11
Evaluation methods for arc resistance ratings of enclosed electrical equipment

1 Scope

1.1
This Standard establishes methods by which metal-enclosed equipment can be tested for resistance to the effects of arcing resulting from an internal fault.

1.2
This Standard applies only to indoor and outdoor equipment that uses air as the primary insulating medium and that is rated up to 46 kV ac.

Note: *Building size and construction are factors to be considered in indoor applications. These factors are not addressed in this Standard.*

1.3
The tests and assessments described in this Standard are applicable only to arcing faults occurring entirely in air within the enclosure when all doors and covers are properly secured.

1.4
This Standard does not apply to arcing faults that occur within a component of the assembly, such as instrument transformers, sealed interrupting devices, or fuses.

1.5
Metal-enclosed switchgear designs that meet the requirements of this Standard are referred to as arc-resistant switchgear. Motor control designs that meet the requirements of this Standard are referred to as arc-resistant motor control.

Note: *Annex C provides additional information on the consequences of internal arc faults, equipment qualified to this Standard, relevance of tests, and the application of this Standard.*

1.6
In CSA Standards, "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 (nonmandatory) to define their application.