UL 248-19

STANDARD FOR SAFETY

Low-Voltage Fuses – Part 19: Photovoltaic Fuses

UL Standard for Safety for Low-Voltage Fuses – Part 19: Photovoltaic Fuses, UL 248-19

First Edition, Dated November 13, 2015

Summary of Topics

This revision of ANSI/UL 248-19 dated November 25, 2024 includes changes to the Scope to increase the maximum votage rating for PV systems: 1.1 and 3.2.1.

As noted in the Commitment for Amendments statement located on the back side of the title page, UL, CSA, and ANCE are committed to updating this harmonized standard jointly.

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated March 29, 2024 and August 13, 2024.

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Association of Standardization and Certification
NMX-J-009/248/19-ANCE
First Edition

CSA Group
CSA C22.2 No. 248.19
First Edition

ULSE Inc.
UL 248-19
First Edition

Low-Voltage Fuses – Part 19: Photovoltaic Fuses

November 13, 2015

(Title Page Reprinted: November 25, 2024)

ANSI/UL 248-19-2024

Commitment for Amendments

This standard is issued jointly by the Association of Standardization and Certification (ANCE), the Canadian Standards Association (operating as “CSA Group”), and ULSE Inc. (ULSE). Comments or proposals for revisions on any part of the standard may be submitted to ANCE, CSA Group, or ULSE at anytime. Revisions to this standard will be made only after processing according to the standards development procedures of ANCE, CSA Group, and ULSE. CSA Group and ULSE will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue. ANCE will incorporate the same revisions into a new edition of the standard bearing the same date of issue as the CSA Group and ULSE pages.

ISBN 978-1-77139-677-6 © 2015 Canadian Standards Association

This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

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This ANSI/UL Standard for Safety consists of the First Edition including revisions through November 25, 2024. The most recent designation of ANSI/UL 248-19 as an American National Standard (ANSI) occurred on November 25, 2024. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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PREFACE

This is the harmonized ANCE, CSA Group, and ULSE Standard for Fuses – Part 19: Photovoltaic Fuses. It is the first edition of NMX-J-009/248/19-ANCE , the first edition of CAN/CSA-C22.2 No 248.19, and the first edition of UL 248-19. This harmonized standard has been jointly revised on November 25, 2024. For this purpose, CSA Group and UL are issuing revision pages dated November 25, 2024, and ANCE is issuing a new edition dated November 25, 2024.

This harmonized standard was prepared by the Association of Standardization and Certification, (ANCE), CSA Group and ULSE Inc. (ULSE). The efforts and support of the Technical Harmonization Subcommittee, THC 32B under CANENA on the Harmonization of Electrotechnical Standards of the Nations of the Americas (CANENA), are gratefully acknowledged.

The present Mexican standard was developed by the CT 32 “Fusibles” from the Comite de Normalizacion de la Asociacion de Normalizacion y Certificacion, A.C., CONANCE, with the collaboration of the manufacturers and users of fuses.

This standard was reviewed by the CSA Subcommittee on Fuses and Fuseholders, under the jurisdiction of the CSA Technical Committee on Industrial Products and the CSA Strategic Steering Committee on requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: 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.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

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Low-Voltage Fuses – Part 19: Photovoltaic Fuses

1 Scope

1.1 This Part applies to fuses for photovoltaic (PV) systems rated up to 2000 Vdc.

1.2 Fuses for photovoltaic (PV) systems are intended to be used for the protection of photovoltaic strings or arrays and their associated wiring to provide protection against overloads or short circuits within the marked electrical ratings in accordance with the Canadian Electrical Code (CSA C22.1 Canadian Electrical Code Part I) in Canada, the Standard for Electrical Installations, NOM-001-SEDE, in Mexico and the National Electrical Code NEC), NFPA-70, in the United States of America.

1.3 These types of fuses are not intended to protect downstream inverter components, such as capacitors and against the discharge of such capacitors back into the arrays.

2 General

2.1 This Part is intended to be read together with the Standard for Low-Voltage Fuses – Part 1: General Requirements, NMX-J-009/248/1-ANCE ♦ CAN/CSA C22.2 No. 248.1-11 ♦ UL 248-1, hereafter referred to as Part 1. The requirements of Part 1 apply unless modified by this Part.

2.2 For products intended for use in Canada, general requirements are given in CAN/CSA-C22.2 No. 0, General Requirements – Canadian Electrical Code, Part II.

3 Characteristics

3.1 Classification

3.1.1 Fuses for photovoltaic (PV) systems shall:

a) Be non-renewable; and

b) Have an minimum interrupting rating of 10 kA minimum.

3.2 Voltage rating

3.2.1 The voltage rating may be up to 2000 Vdc. Preferred ratings are 600 V, 750 V, 1000 V, 1250 V, 1500 V, and 2000 V.

3.3 Frequency

3.3.1 Not applicable.

3.4 Interrupting rating

3.4.1 The interrupting rating shall be 10 kA minimum.

3.5 Peak let-through current and clearing I^2t characteristics

3.5.1 Not applicable.

4 Markings

4.1 Fuses shall be marked as indicated in the Standard for Low-Voltage Fuses – Part 1: General Requirements, CSA C22.2 No. 248-1 / UL 248-1, with additional requirements provided as follows:

a) The fuse shall be marked, with the letters “PV” or “gPV”; or

b) The text, “Photovoltaic Fuse”.

4.2 Fuses with integral wiring terminations shall also be marked in accordance with the Standard for Wire Connectors, UL 486A-486B / CSA C22.2 No. 65. The marking may be on the fuse, the smallest unit container, or an information sheet.

5 Construction

5.1 In addition to meeting the construction requirements of the Standard for Low-Voltage Fuses – Part 1: General Requirements, CSA C22.2 No. 248-1 / UL 248-1, a fuse with integral wiring terminations shall also meet the construction requirements of the Standard for Wire Connectors, UL 486A-486B / CSA C22.2 No. 65.

5.2 The dimensions are not specified but shall be in accordance with the manufacturer’s specifications.

6 Tests

6.1 General

6.1.1 A fuse with integral wiring terminations shall additionally be investigated to the mechanical sequence requirements of the Standard for Wire Connectors, UL 486A-486B / CSA C22.2 No. 65.

6.1.2 For fuses with integral wiring terminations, all test samples shall be wired based on the instructions of the manufacturer.

6.1.3 For fuses 100 Amps and greater, the number of samples shall be 3 for the current cycling test (See 6.7) in Table 1.

Table 1
Number of Fuses to be Tested

Test	Test Temperature	
	50° C	Ambient
6.2 – Verification of temperature rise and I_n		3
6.3 – Verification of overload operation		
a) t_{max} (1.35 I_n)		3
b) t_{max} (2.0 I_n)		2
6.4 – Verification of operation at rated voltage		
a) 2.0 I_n		1
b) manufacturers’ declared interrupting rating A		1
6.6.1 – Thermally induced drift		
Verification of temperature rise and I_n		3

Table 1 Continued on Next Page