UL 248-12

STANDARD FOR SAFETY

Low-Voltage Fuses – Part 12: Class R Fuses

UL Standard for Safety for Low-Voltage Fuses – Part 12: Class R Fuses, UL 248-12

Third Edition, Dated May 13, 2011

Summary of Topics

This revision to ANSI/UL 248-12 dated November 14, 2022 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

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. However, the revision pages dated November 14, 2022 will not be jointly issued by UL, CSA, and ANCE as these revision pages only address UL ANSI approval dates.

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

The requirements are substantially in accordance with Proposal(s) on this subject dated September 23, 2022.

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Third Edition

Canadian Standards Association
CSA C22.2 No. 248.12-11
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Low-Voltage Fuses – Part 12: Class R Fuses

May 13, 2011

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Approved American National Standard

ANSI/UL 248-12-2017 (R2022)

Commitment for Amendments

This standard is issued jointly by the Association of Standardization and Certification (ANCE), CSA Group, and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to ANCE, CSA, or UL at any time. Revisions to this standard will be made only after processing according to the standards development procedures of ANCE, CSA, and UL. CSA and UL 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 and UL pages.

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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 Third Edition including revisions through November 14, 2022. The most recent designation of ANSI/UL 248-12 as a Reaffirmed American National Standard (ANS) occurred on November 14, 2022. 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 UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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Preface

This is the harmonized ANCE, CSA Group, and UL standard for Low-Voltage Fuses – Part 12: Class R Fuses. It is the third edition of NMX-J-009/248/12-ANCE, the third edition of CSA C22.2 No. 248.12-11, and the third edition of UL 248-11. This edition of NMX-J-009-248/12-ANCE supersedes the previous edition published in 2006. This edition of CSA C22.2 No. 248.12-11 supersedes the previous edition published in 2000.

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

This Standard is considered suitable for use for conformity assessment within the stated scope of the Standard.

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

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.

Level of Harmonization

This standard is published as an identical standard for ANCE, CSA Group and UL.

An identical standard is a standard that is exactly the same in technical content except for national differences resulting from conflicts in codes and governmental regulations. Presentation is word for word except for editorial changes.

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 12: Class R fuses

1 General

NOTE –

This Part is intended to be read together with the Standard for Low-Voltage Fuses – Part 1: General Requirements, hereafter referred to as Part 1. The numbering of the Clauses in this Part corresponds to like numbered Clauses in Part 1. The requirements of Part 1 apply unless modified by this Part. For Clauses not shown below, refer to 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.

1.1 Scope

This Part applies to Class R fuses rated 600 A or less and either 250 or 600 V ac. DC ratings are optional.

4 Classification

Class R fuses are non-renewable and current-limiting, with an interrupting rating of 200,000 A. Class R fuses are divided into sub-classes RK1 and RK5 and are physically interchangeable for the same current and voltage ratings. Class RK1 fuses have lower specified maximum peak let-through current and clearing I^2t characteristics. Each of the voltage ratings, 250 and 600 V ac, is divided into six body sizes. The maximum current rating, I_n, for each size is specified in this Standard. Time-delay ratings are optional.

5 Characteristics

5.2 Voltage rating

For AC, the rating shall be 250 or 600 V ac in accordance with dimensions shown in Figure A and Figure B.

The DC voltage rating may be different from the AC rating.

5.3 Current rating

Refer to Figure A and Figure B for range of current ratings in each body size for each voltage rating.

5.5 Interrupting rating

For AC, 200,000 A, or 300,000 A at the manufacturer's option (300,000 not applicable in Mexico).

For DC, the preferred ratings are 10,000, 20,000, 50,000, 100,000, 150,000, 200,000, or 300,000A.

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

Maximum values of peak let-through current and clearing I^2t Class RK1 and Class RK5 fuses are given in Table A (see 8.5.3). Peak let-through currents shall not exceed the levels defined by the appropriate Let Through Function specified in Table A, as verified through measurement of peak let-through currents at 25, 50, 100, 200, and, if applicable, 300 kA.

Clearing I^2t values recorded shall not exceed the limits specified in Table A as verified through measurement of clearing I^2t values at 25, 50, 100, 200, and, if applicable, 300 kA.

Table A
Maximum peak let-through current and clearing I^2t for Class R fuses

Current rating I_n, A	Between threshold and 25 kA		At 50 kA		At 100 kA		At 200 kA		At 300 kA, if applicable		Peak Let-through Function[a]
	Peak let-through current, kA	I^2t, ampere-squared seconds 3 10^3	Peak let-through current, kA	I^2t, ampere-squared seconds 3 10^3	Peak let-through current, kA	I^2t, ampere-squared seconds 3 10^3	Peak let-through current, kA	I^2t, ampere-squared seconds 3 10^3	Peak let-through current, kA	I^2t, ampere-squared seconds 3 10^3	
Class RK1											
0 - 30	6	10	6	10	8.7	10	12	11	16	13	Y = 3.71E-02X + 5E+03
31 - 60	9	40	10	40	12	40	16	50	20	60	Y = 0.04X + 8000
61 - 100	13	100	14	100	16	100	20	100	24	120	Y = 0.04X + 12000
101 - 200	16	400	18	400	22	400	30	400	38	480	Y = 8E-02X + 1.4E+04
201 - 400	32	1,200	33	1,200	35	1,200	50	1,600	79	1,920	$Y = 7.3E-07X^2 - 7E-02X + 3.47E+04$
401 - 600	43	3,000	45	3,000	50	3,000	70	4,000	104	4,800	$Y = 6.7E-07X^2 + 4.33E+04$
Class RK5											
0 - 30	11	50	11	50	11	50	14	50	21	60	$Y = 2.0E-07X^2 - 3E-02X + 1.2E+04$
31 - 60	20	200	20	200	21	200	26	200	35	240	$Y = 2.0E-07X^2 - 1E-02X + 2.0E+03$
61 - 100	21	500	22	500	25	500	32	500	40	600	$Y = 6.7E-08X^2 + 5E-02X + 1.93E+04$
101 - 200	30	1,600	32	1,600	40	1,600	50	2,000	62	2,400	Y = 1.17E-01X + 2.7E+04

Table A Continued on Next Page

Table A Continued

Current rating I_n, A	Between threshold and 25 kA		At 50 kA		At 100 kA		At 200 kA		At 300 kA, if applicable		Peak Let-through Function[a]
	Peak let-through current, kA	I^2t, ampere-squared seconds 3 10^3	Peak let-through current, kA	I^2t, ampere-squared seconds 3 10^3	Peak let-through current, kA	I^2t, ampere-squared seconds 3 10^3	Peak let-through current, kA	I^2t, ampere-squared seconds 3 10^3	Peak let-through current, kA	I^2t, ampere-squared seconds 3 10^3	
201 - 400			50	5,200	60	5,000	75	6,000	90	7,200	Y = 1.64E-01X + 4.25E+04
401 - 600			65	10,000	80	10,000	100	12,000	124	14,400	Y = 2.286E-01X + 5.5E+04

[a] The value of X in the equation is the value of the prospective short circuit current in A (e.g. 50,000, 100,000, 200,000 or 300,000) or as intended by the author.

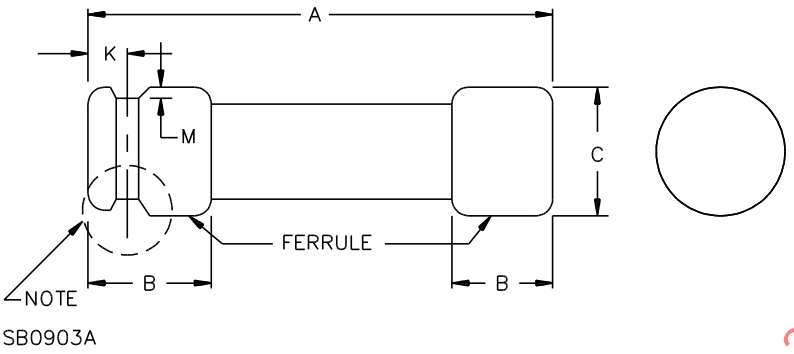
7 Construction

7.1 Dimensions

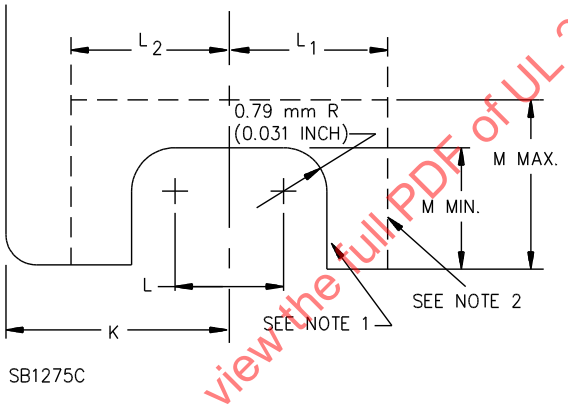
Fuse dimensions are shown in Figure A and Figure B.

Figure A

Dimensions of ferrule type Class R fuses in mm (in)



Note: See the following figure for rejection groove details.



Note 1: Solid line indicates location, shape, and dimensions for minimum rejection groove.

Note 2: Dashed line indicates location, shape, and dimensions for maximum rejection groove.

Rating		Overall length of fuse	Minimum length of ferrule	Outside diameter of ferrule	Distance of rejection feature from end	Minimum width of rejection feature	Depth of rejection feature	Maximum width toward end	Maximum width toward body
V	Current I_n, A	A[a]	B	C[b]	K[c]	L[d]	M	L2	L1
250	0 – 30	50.8 (2.0)	12.7 (0.5)	14.27 (0.562)	3.96 (0.156)	1.78 (0.070)	2.16 – 3.30 (.085– .130)	2.92 (0.115)	3.81 (0.150)
	31 – 60	76.2 (3.0)	15.9 (0.625)	20.62 (0.812)	4.78 (0.188)	2.18 (0.086)	2.16 – 3.30 (.085 – .130)	3.12 (0.123)	4.32 (0.170)
600	0 – 30	127.0 (5.0)	12.7 (0.5)	20.62 (0.812)	4.78 (0.188)	2.18 (0.086)	2.16 – 3.30 (.085 – .130)	3.12 (0.123)	4.32 (0.170)
	31 – 60	139.7 (5.5)	15.9 (0.625)	26.97 (1.062)	6.35 (0.250)	2.18 (0.086)	2.16 – 3.30 (.085 – .130)	3.91 (0.154)	4.57 (0.180)

[a] Tolerances: ± 0.79 mm (± 0.031 in).

[b] Tolerance:± 0.20 mm (± 0.008 in). To provide proper contact, the diameter of rejection ferrule shall be equal to or not more than 1.27 mm (0.050 in) smaller than actual diameter of main contact area for any fuse and no part of rejection ferrule end shall protrude beyond the diameter of the main part of the ferrule.

[c] Tolerance: +0.20 mm, -0.41 mm (+0.008 in, -0.016 in).

[d] Distance between centers of 0.79 mm (0.031 in) radius fillets. Shape of rejection groove is not specified but shall be completely within solid and dashed lines regardless of shape.