

DOCUMENT NUMBER: UL 248-16

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Northbrook, Illinois • (847) 272-8800
 Melville, New York • (516) 271-6200
 Santa Clara, California • (408) 985-2400
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Subjects 198B, 198C, 198D, 198F, 248-2, 248-3,
 248-5, 248-6, 248-7, 248-9, 248-11, 248-13,
 and 248-16
 (In reply, refer to Subject 248)

333 Pfingsten Road
 Northbrook, IL 60062
 May 20, 1996

TO: Electrical Council of Underwriters Laboratories Inc,
 Subscribers to UL's Standards Service for Class C, CA, CB, G, H, K, Plug, and
 Semiconductor Fuses and Test Limiters

SUBJECT: Publication of Additional UL Standards for Low-Voltage Fuses, UL 248 Series

UL announces the publication of the following standards and the corresponding revised Guide Card
 information given in Appendix A:

<u>Standard No.</u>	<u>Title</u>
UL 248-2	Low-Voltage Fuses – Part 2: Class C Fuses
UL 248-3	Low-Voltage Fuses – Part 3: Class CA and CB Fuses
UL 248-5	Low-Voltage Fuses – Part 5: Class G Fuses
UL 248-6	Low-Voltage Fuses – Part 6: Class H Non-renewable Fuses
UL 248-7	Low-Voltage Fuses – Part 7: Class H Renewable Fuses
UL 248-9	Low-Voltage Fuses – Part 9: Class K Fuses
UL 248-11	Low-Voltage Fuses – Part 11: Plug Fuses
UL 248-13	Low-Voltage Fuses – Part 13: Semiconductor Fuses
UL 248-16	Low-Voltage Fuses – Part 16: Test Limiters

The above Parts supplement or modify the corresponding requirements in the Standard for Low-Voltage
 Fuses – Part 1: General Requirements, UL 248-1, and are to be used together with Part 1. UL 248-1
 provides the general requirements for fuse characteristics, marking, construction, and tests. Additional
 requirements – such as dimensions, I^2t limits, and the like – pertaining to the various Classes of fuses
 are given in the subsequent Parts.

BACKGROUND

These standards were developed at the request of industry by a committee comprised of representatives
 of the United States, Canada, and Mexico. These standards are bi-national standards, having been
 adopted by UL and CSA. These standards may eventually be adopted as national standards of Mexico.

A not-for-profit organization
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Subjects 198B, 198C, 198D, 198F, 248-2, 248-3, 2
248-5, 248-6, 248-7, 248-9, 248-11, 248-13,
and 248-16

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EFFECTIVE DATES

The effective dates for these standards are as follows:

<u>Standard No.</u>	<u>Effective Date</u>
UL 248-2	May 1, 1996
UL 248-3	May 1, 1996
UL 248-5	May 1, 1996
UL 248-6	May 1, 1996
UL 248-7	May 1, 1996, except Clause 6.1 which becomes effective November 3, 1997
UL 248-9	May 1, 1996
UL 248-11	May 1, 1996
UL 248-13	May 1, 1998
UL 248-16	May 1, 1997

IMPACT

The above UL 248 standards supersede the requirements for the corresponding fuse Classes found in the following UL 198 series standards:

UL 198B, The Standard for Class H Fuses
UL 198C, The Standard for High-Interrupting Capacity Fuses, Current-Limiting Type
UL 198D, The Standard for Class K Fuses
UL 198F, The Standard for Plug Fuses

A review, retest, or modification in the manufacturer of presently Listed or Recognized fuses will not be required for fuses covered by UL 248-2, 248-3, 248-5, 248-6, 248-9, and 248-11. As of May 1, 1996, new product submittals will be investigated in accordance with the requirements in the new standards.

A review and possible modification in the marking for presently Listed or Recognized Class H Renewable fuses, covered by Part 7, Clause 6.1, will be required. Except for Clause 6.1, as of May 1, 1996, new product submittals will be investigated in accordance with the requirements in Part 7.

A review and possible retest of presently Recognized semiconductor fuses and test limiters will be required. The retesting may be conducted during normal follow-up testing.

New product submittals made prior to a specified future effective date will be judged under all of the requirements in the respective standard unless the applicant specifically requests that the product be judged under the current requirements. However, should the applicant elect this option, it should be noted that compliance with all the requirements in the respective standard will be required as a condition of continued Listing, Recognition, and Follow-Up Services after the effective date and understanding of this should be signified in writing.

Subjects 198B, 198C, 198D, 198F, 248-2, 248-3, 3
248-5, 248-6, 248-7, 248-9, 248-11, 248-13,
and 248-16

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Questions regarding interpretation of requirements should be directed to the responsible UL Staff.
Please see Appendix B of this bulletin regarding designated responsibility for the subject product
categories.

UNDERWRITERS LABORATORIES INC.

Dennis Sullivan

DENNIS SULLIVAN (Ext. 43357)
Staff Engineer
Standards Department

REVIEWED BY:

Dale Hallerberg

DALE HALLERBERG (Ext. 43224)
Staff Engineer
Engineering Services 418D

SR:JPF

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Subjects 198B, 198C, 198D, 198F, 248-2, 248-3, -A1
 248-5, 248-6, 248-7, 248-9, 248-11, 248-13
 and 248-16

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APPENDIX A

GUIDE CARDS FOR
 CARTRIDGE FUSES, NONRENEWABLE (JDDZ)
 CARTRIDGE FUSES, RENEWABLE (JDRX)
 FUSE ACCESSORIES (JDVS)
 PLUG FUSES (JEFV)
 SPECIAL PURPOSE FUSES (JFHR2)
 TEST LIMITERS (JFUZ2)

Subjects 198B, 198C, 198D, 198F, 248-2, 248-3, -A2
248-5, 248-6, 248-7, 248-9, 248-11, 248-13
and 248-16

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GUIDE CARD FOR CARTRIDGE FUSES, NON RENEWABLE (JDDZ)

This listing covers cartridge-enclosed fuses of the nonrenewable type, rated 0 – 600 A, 250 V, 0 – 1200 A, 300 V, 0 – 6000 A, 600 V. These fuses are intended for use on ac circuits only unless also marked with a dc voltage rating. These fuses are suitable for branch circuit and service over-current protection in accordance with the requirements of the National Electrical Code.

Fuses designated as Class K1, K5, K9 (0 – 600 A, 250 V ac, or 600 V ac) are classified as to interrupting capacity and in terms of maximum clearing ampere squared seconds and maximum peak let-through current. They incorporate dimensional features equivalent to, and are interchangeable with Class H fuses. They are not marked "Current Limiting."

Fuses designated as Class RK1 and RK5 (0 – 600 A, 250 V ac, or 600 V ac) are high interrupting capacity types and are marked "Current Limiting." They are classified in terms of maximum clearing ampere squared seconds and maximum peak let-through current at 50, 100 and 200 thousand rms symmetrical amperes.

They incorporate features which permit their insertion into Class H and K fuseholders. Also they are provided with a feature which allows their insertion into rejection type fuseholders designed to accept only Class RK1 or RK5 fuses.

Fuses designated as Class CC (0 – 30 A, 600 V ac) are high interrupting capacity types and are marked "Current Limiting."

Fuses designated as Class G (0 – 60 A, 480 V ac) are high interrupting capacity types and are marked "Current Limiting."

Fuses designated as Class J (0 – 600 A, 600 V ac) or Class L (601 – 6000 A, 600 V ac) are high interrupting capacity types and are marked "Current Limiting."

Fuses designated as Class T (0 – 1200 A, 300 V and 0 – 800 A, 600 V ac) are high interrupting capacity types and are marked "Current Limiting."

The term "Current Limiting" indicates that a fuse, when tested on a circuit capable of delivering a specific short circuit current (rms amperes symmetrical) at rated voltage, will start to melt within 90 electrical degrees and will clear the circuit within 180 electrical degrees (1/2 cycle).

Because the time required for a fuse to melt is dependent on the available current of the circuit, a fuse which may be "Current Limiting" when subjected to a specific short circuit current (rms ampere symmetrical) may not be current limiting on a circuit of lower maximum available current.

The following tables indicate the maximum permissible let-through values which are obtained when the fuse is connected to a circuit having an available current tabulated below.

Subjects 198B, 198C, 198D, 198F, 248-2, 248-3, -A3
248-5, 248-6, 248-7, 248-9, 248-11, 248-13
and 248-16

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Maximum peak let-through current (I_p amperes) and clearing I^2t (amperes squared seconds)

Class CC Fuses

Rating, A	Between threshold and 50 kA		100 kA		200 kA	
	$I_p \times 10^3$	$I^2t \times 10^3$	$I_p \times 10^3$	$I^2t \times 10^3$	$I_p \times 10^3$	$I^2t \times 10^3$
0 – 15	3	2	3	2	4	3
16 – 20	3	2	4	3	5	3
21 – 30	6	7	7.5	7	12	7

Class G Fuses

Rating, A	$I_p \times 10^3$	$I^2t \times 10^3$
0 – 1	1	0.8
2 – 3	1.5	1.2
4 – 6	2	1.8
7 – 10	3	2.8
11 – 15	4	3.8
16 – 20	5	5
21 – 25	6	6
26 – 30	7	7
31 – 35	8	14
36 – 40	8.5	17
41 – 45	9	18.5
46 – 50	9.5	21
51 – 60	10.5	25

Subjects 198B, 198C, 198D, 198F, 248-2, 248-3, -A4
 248-5, 248-6, 248-7, 248-9, 248-11, 248-13
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Class J and 600 V Class T Fuses

Rating, A	Between threshold and 50 kA		100 kA		200 kA	
	$I_p \times 10^3$	$I^2 t \times 10^3$	$I_p \times 10^3$	$I^2 t \times 10^3$	$I_p \times 10^3$	$I^2 t \times 10^3$
0 – 30	6	7	7.5	7	12	7
31 – 60	8	30	10	30	16	30
61 – 100	12	60	14	80	20	80
101 – 200	16	200	20	300	30	300
201 – 400	25	1000	30	1100	45	1100
401 – 600	35	2500	45	2500	70	2500
601 – 800	50	4000	55	4000	75	4000

300 V Class T Fuses

Rating, A	Between threshold and 50 kA		100 kA		200 kA	
	$I_p \times 10^3$	$I^2 t \times 10^3$	$I_p \times 10^3$	$I^2 t \times 10^3$	$I_p \times 10^3$	$I^2 t \times 10^3$
0 – 30	5	3.5	7	3.5	9	3.5
31 – 60	7	15	9	15	12	15
61 – 100	9	40	12	40	15	40
101 – 200	13	150	16	150	20	150
201 – 400	22	550	28	550	35	550
401 – 600	29	1000	37	1000	46	1000
601 – 800	37	1500	50	1500	65	1500
801 – 1200	50	3500	65	3500	80	4000

Subjects 198B, 198C, 198D, 198F, 248-2, 248-3, -A5
248-5, 248-6, 248-7, 248-9, 248-11, 248-13
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Class K Fuses

Rating, A	Between threshold and interrupting rating					
	$I_p \times 10^3$			$I^2t \times 10^3$		
	K1	K5	K9	K1	K5	K9
30	10	11	14	10	50	50
60	12	21	28	40	200	250
100	16	25	35	100	500	650
200	22	40	60	400	1600	3500
400	35	60	80	1200	5000	15000
600	50	80	130	3000	10000	40000

Class L Fuses

Rating, A	50 kA or threshold current whichever is greater		100 kA		200 kA	
	$I_p \times 10^3$	$I^2t \times 10^6$	$I_p \times 10^3$	$I^2t \times 10^6$	$I_p \times 10^3$	$I^2t \times 10^6$
601 – 800	80	10	80	10	80	10
801 – 1200	80	12	80	12	120	15
1201 – 1600	100	22	100	22	150	30
1601 – 2000	110	35	120	35	165	40
2001 – 2500	–	–	165	75	180	75
2501 – 3000	–	–	175	100	200	100
3001 – 4000	–	–	220	150	250	150
4001 – 5000	–	–	–	350	300	350
5001 – 6000	–	–	–	350	350	500

Class RK1 Fuses

Rating, A	Between threshold and 50 kA		100 kA		200 kA	
	$I_p \times 10^3$	$I^2t \times 10^3$	$I_p \times 10^3$	$I^2t \times 10^3$	$I_p \times 10^3$	$I^2t \times 10^3$
0 – 30	6	10	10	10	12	11
31 – 60	10	40	12	40	16	50
61 – 100	14	100	16	100	20	100
101 – 200	18	400	22	400	30	400
201 – 400	33	1200	35	1200	50	1600
401 – 600	43	3000	50	3000	70	4000

Subjects 198B, 198C, 198D, 198F, 248-2, 248-3, -A6
248-5, 248-6, 248-7, 248-9, 248-11, 248-13
and 248-16

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Class RK5 Fuses

Rating, A	Between threshold and 50 kA		At 100 kA		At 200 kA	
	$I_p \times 10^3$	$I_t^2 \times 10^3$	$I_p \times 10^3$	$I_t^2 \times 10^3$	$I_p \times 10^3$	$I_t^2 \times 10^3$
0 – 30	11	50	11	50	14	50
31 – 60	20	200	21	200	26	200
61 – 100	22	500	25	500	32	500
101 – 200	32	1600	40	1600	50	2000
201 – 400	50	5000	60	5000	75	6000
401 – 600	65	10000	80	10000	100	12000

Class K1, K5, K9 fuses are marked, in addition to their regular voltage and current ratings, with an interrupting rating of 200,000, 100,000 or 50,000 A (rms symmetrical).

Class CC, RK1, RK5, J, L and T fuses are marked, in addition to their regular voltage and current ratings, with an interrupting rating of 200,000 A (rms symmetrical).

Class G fuses are marked, in addition to their regular voltage and current ratings, with an interrupting rating of 100,000 A (rms symmetrical).

Class H fuses have an interrupting rating of 10,000 A (rms symmetrical).

When a fuse has a dc rating, it is marked with the dc voltage and interrupting rating.

A Class CC, G, J, K, or R fuse and a Class T fuse rated 600 A or less may have an interrupting rating of 10,000, 20,000, 50,000, or 100,000 A dc. A Class T fuse rated 601 – 1200 A and a Class L fuse may have an interrupting rating of 20,000, 50,000, or 100,000 A dc. A Class H fuse may have an interrupting rating of 10,000 A dc.

Class K and R fuses, which have been investigated for use in protecting trailing cables in dc circuits in mines are marked "Mine Duty" and have an interrupting rating of 20,000 A, dc.

Equipment (a switch, motor starter, panelboard, etc.) which has been investigated and found suitable for use with these fuses is marked with the class of fuse intended to be used in equipment, and available current rating applicable to that piece of equipment. The equipment, with these fuses installed, is suitable for use on circuits having a maximum available fault current up to the short circuit rating of the equipment, or the interrupting rating of the fuse, whichever is lower.

An interrupting rating on a fuse included in a piece of equipment does not automatically qualify the equipment in which the fuses are installed for use on circuits with higher available currents than the rating of the equipment itself.

Classes CC, G, H, J, K, L, R, and T fuses may be marked with the designation "D" indicating that they have a time delay characteristic. This is the only designation which indicates that the fuse meets the time-delay requirements of the Standard.