



UL 197

STANDARD FOR SAFETY

Commercial Electric Cooking Appliances

UL Standard for Safety for Commercial Electric Cooking Appliances, UL 197

Tenth Edition, Dated March 17, 2010

Summary of Topics

This revision to ANSI/UL 197 dated July 10, 2020 includes replacing the reference to the Standard for Power Conversion Equipment, UL 508C, with the reference to the Standard for Adjustable Speed Electrical Power Drive Systems – Part 5-1: Safety Requirements – Electrical, Thermal and Energy, UL 61800-5-1; [26.2.1.4](#)

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 revised requirements are substantially in accordance with Proposal(s) on this subject dated May 8, 2020.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical photocopying, recording, or otherwise without prior permission of UL.

UL provides this Standard "as is" without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability or fitness for any purpose.

In no event will UL be liable for any special, incidental, consequential, indirect or similar damages, including loss of profits, lost savings, loss of data, or any other damages arising out of the use of or the inability to use this Standard, even if UL or an authorized UL representative has been advised of the possibility of such damage. In no event shall UL's liability for any damage ever exceed the price paid for this Standard, regardless of the form of the claim.

Users of the electronic versions of UL's Standards for Safety agree to defend, indemnify, and hold UL harmless from and against any loss, expense, liability, damage, claim, or judgment (including reasonable attorney's fees) resulting from any error or deviation introduced while purchaser is storing an electronic Standard on the purchaser's computer system.

No Text on This Page

MARCH 17, 2010
(Title Page Reprinted: July 10, 2020)



ANSI/UL 197-2020

1

UL 197

Standard for Commercial Electric Cooking Appliances

First Edition – January, 1952
Second Edition – October, 1960
Third Edition – June, 1972
Fourth Edition – November, 1974
Fifth Edition – April, 1978
Sixth Edition – March, 1982
Seventh Edition – July, 1987
Eighth Edition – June, 1993
Ninth Edition – March, 2003
Tenth Edition March 17, 2010

Tenth Edition

March 17, 2010

This ANSI/UL Standard for Safety consists of the Tenth edition including revisions through July 10, 2020.

The most recent designation of ANSI/UL 197 as an American National Standard (ANSI) occurred on July 1, 2020. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

The Department of Defense (DoD) has adopted UL 197 on January 28, 1976. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

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>.

UL's Standards for Safety are copyrighted by UL. Neither a printed nor electronic copy of a Standard should be altered in any way. All of UL's Standards and all copyrights, ownerships, and rights regarding those Standards shall remain the sole and exclusive property of UL.

COPYRIGHT © 2020 UNDERWRITERS LABORATORIES INC.

This is a preview. Click here to purchase the full publication.

No Text on This Page

CONTENTS

PART 1 – ALL APPLIANCES

INTRODUCTION

1	Scope	11
2	Glossary	11
3	Components	15
4	Units of Measurement	15
5	Undated References	15

CONSTRUCTION

5A	General	15
5A.2	Ground-fault, arc-fault, and leakage current detectors/interrupters	16
5A.3	Surge protective device	17
5A.4	Terminal blocks	17
5A.5	Quick-connects	17
5A.6	Insulating tape and tubing	17
5A.7	Programmable controllers	18
5A.8	Fabricated polymeric parts	18
5A.9	Door latch release	18
6	Accessories	18
7	Mechanical Assembly	19
7.1	General	19
7.2	Mounting of components	19
7.3	Shipping	20
8	Electrical and Fire Enclosures	21
8.1	General	21
8.2	Metallic enclosures	22
8.3	Nonmetallic enclosures	23
8.4	Fire containment – general	23
8.5	Fire containment – enclosures for overcurrent protective device	27
8.6	Grease troughs and pans	28
9	Outer Cabinetry/ Enclosures	29
10	Accessibility of Live Parts	29
10.1	General	29
10.2	Open wire heating elements	34
10.3	Lamps, quartz enclosed heating elements, and similar components	35
10.4	Fuses, circuit breakers, supplementary protectors, and manually reset controls	35
11	Guarding of Moving Parts	38
11.1	General	38
11.2	Materials	39
12	Protection Against Injury to Persons	40
13	Protection of Service Personnel	40
14	Interlocks	42
14.1	General	42
14.2	Moving parts	42
15	Protection Against Corrosion	43
16	Electrical Supply Connections for Permanently Connected Appliances	43
16.1	General	43
16.2	Wiring compartment	44
16.3	Field-wiring terminals and leads	45

	16.4 Grounded supply conductor.....	47
	16.5 Equipment grounding connection.....	48
17	Electrical Supply Connections for Cord-Connected Appliances	49
	17.1 General.....	49
	17.2 Strain relief.....	51
	17.3 Bushings.....	51
	17.4 Grounding.....	52
	17.5 Multiple power supply cords.....	53
18	Bonding for Grounding.....	54
19	Polarity	56
20	Current-Carrying Parts.....	56
21	Attachment-Plug Receptacles	57
22	Internal Wiring.....	57
	22.1 General	57
	22.2 Insulation	58
	22.3 Protection	58
	22.4 Wiring in circuits involving a risk of fire or electric shock	58
	22.5 Splices and connections.....	59
23	Heating Elements.....	60
24	Electrical Insulation	61
	24.6 Film-coated wire (magnet wire).....	63
25	Thermal Insulation.....	63
26	Motors and Transformers	64
	26.1 Motors in circuits involving a risk of fire or electric shock	64
	26.2 Motor protection	64
	26.3 Transformers.....	65
27	Temperature Controls	65
28	Short-Circuit and Ground-Fault Protection.....	67
	28.1 General.....	67
	28.2 Supplementary-type overcurrent protective devices used as short-circuit and ground-fault protection.....	69
	28.3 Protection for circuits including specific components.....	70
	28.4 Protection for wiring located outside the enclosure	71
	28.5 Protection for high-voltage control circuits conductors.....	72
29	Auxiliary-Circuit Terminals.....	73
30	Capacitors	74
31	Switching Devices	74
	31.1 General.....	74
	31.2 Electrical ratings	75
	31.3 Guarding.....	76
	31.4 Specific applications	76
32	Components Containing Liquid Metal.....	77
33	Lampholders.....	77
33A	Light Sources and Associated Components	78
34	Secondary Circuits	79
	34.1 General.....	79
	34.2 Evaluation of the different types of secondary circuits	82
	34.3 Class 2 circuits	84
	34.4 Limited voltage/current circuits.....	84
	34.5 Limited voltage circuit requirements	85
	34.6 Limited energy circuits	85
	34.7 Limiting impedance circuits.....	86
	34.8 Safety extra-low voltage circuits.....	86
35	Lithium Battery Circuits	86
36	Isolating Devices	87
37	Electrical Spacings	87

37.1	General.....	87
37.2	Secondary circuits	90
38	Insulating Barriers	90
39	Clearance and Creepage Distances.....	92
40	Separation of Circuits	93
41	Parts Subject to Pressure.....	94
41.1	General.....	94
41.2	Pressure relief means	97
41.3	Pressure relief devices	97
41.4	Pressure Controls	98
42	Stability	98
43	Surface Mounted Appliances.....	99
43.1	General.....	99
43.2	Wall mounting.....	99
43.3	Under cabinet units	100
44	Gas-Tube Signs	100

PERFORMANCE – COMPLETE APPLIANCE

45	General	100
46	Leakage Current Test	101
47	Power Input Test	105
48	Input Averaging Test.....	106
49	Short-Circuit Tests	106
50	Normal Temperature Test.....	107
50.1	General.....	107
50.2	Surface temperatures	110
50.3	Test equipment.....	111
50.4	Procedure	112
50.5	Normal test conditions.....	114
51	Dielectric Voltage-Withstand Test	119
51.1	General.....	119
51.2	Primary circuits.....	120
51.3	Secondary Circuits.....	120
51.4	Transformers.....	121
52	Resistance to Moisture Test	121
53	Insulation Resistance Test	122
54	Grounding and Bonding Test	123
54.1	Grounding	123
54.2	Bonding	124
55	Stability	124
56	Abnormal Heating Test	125
56.1	General.....	125
56.2	Procedure	126
56.3	Test conditions – disabled thermostat	127
56.4	Test conditions – locked rotor.....	127
56.5	Stalled fan test – control compartment fan	128
56.6	Abnormal dry operation test.....	128
56.7	Test conditions – specific appliances	129
57	Breakdown of Components Test	130
58	Wiring Endurance Test.....	131
59	Cord Endurance Test – Hand-held Appliances.....	131
60	Strain Relief Test	134
61	Push-Back Relief.....	134
62	Thermal Shock Test – Glass/Ceramic Cooking Surfaces	134
63	Strength of Enclosures, Frames, and Guards Test	134

63.1	General.....	134
63.2	Static force test.....	135
63.3	Impact test – frames, guards, and metal enclosures	135
63.4	Impact test – glass/ceramic-cooking surfaces	135
63.5	Impact – exposed glass parts other than glass/ceramic cooking surfaces.....	136
64	Mounting Means Test.....	136
65	Reservoir Tests	137
65.1	General.....	137
65.2	Overflow test for automatic fill appliances	137
65.3	Overflow test for manual fill appliances.....	138
65.4	Removable container test.....	138
65A	Door Latch Release Test.....	138
65B	Door Opening Test	138

PERFORMANCE – COMPONENTS

66	General	139
67	Transformer Burnout Test.....	139
68	Endurance Test for Temperature-Regulating Controls	139
69	Endurance Test for Interlock Switches.....	139
70	Motor Switch Overload Test.....	139
71	Components Containing Liquid Metal Test.....	140
72	Printed-Wiring Board Abnormal Operation Test.....	140
73	Secondary Circuits Tests.....	141
73.1	General.....	141
73.2	Maximum voltage	141
73.3	Maximum current test for inherently limited circuits	142
73.4	Limited power point determination test	142
73.5	Component failure	143
73.6	Maximum power test.....	144
73.7	Power dissipation test	145
74	Parts Subject to Contact with Oil or Other Liquids	145
75	Hydrostatic Pressure Test	146
76	Start-To-Discharge Test	146
77	Relief Device Maximum Pressure Test	147
78	Pressure Controls Endurance Test.....	147
79	Permanence of Marking Test.....	147
79.1	Labels.....	147
79.2	Cord tags	148

MANUFACTURING AND PRODUCTION TESTS

80	Dielectric Voltage-Withstand	149
81	Grounding Continuity	150
82	Pressure Vessels and Parts Subject to Pressure.....	151

APPLIANCE RATINGS

83	Electrical Ratings	151
----	--------------------------	-----

MARKING

84	General	153
85	Visible to Operator.....	154
86	Visible After Installation.....	155

87	Graphical Symbols and Supplemental Markings	158
87.1	No user-serviceable parts compartment warning	158
87.2	Graphical symbol size and color.....	160
87.3	Supplemental marking size and color	160
87.4	Size of outlines and symbols.....	161
87.5	Explanation of graphical symbols in the operating instructions.....	161
88	Visible During Installation and Examination	162
89	Visible During Servicing Operations	164
90	Nonpermanent Marking	166

INSTRUCTIONS

91	Manufacturer's Literature	166
----	---------------------------------	-----

PART 2 – COMMERCIAL ELECTRIC COOKING APPLIANCES FOR MARINE USE

92	Scope.....	168
93	Cleaning and Maintenance.....	168
94	Hinges and Locking Devices	168
95	Protection of Personnel.....	169
96	Securing of Appliances	169
97	Disconnecting Means	169
98	Performance	170
98.1	General.....	170
98.2	Vibration test	170
98.3	Shock test	170
99	Marking	171

PART 3 – DEEP-FAT FRYERS AND RELATED EQUIPMENT

INTRODUCTION

100	Scope.....	171
-----	------------	-----

CONSTRUCTION

101	Temperature Controls	171
102	Switching Devices	172
103	Stability.....	172

PERFORMANCE

104	Normal Temperature Test.....	172
105	Disabled Temperature Regulating Control – Oil Temperature Test	173
106	Abnormal Heating Test.....	173

MANUFACTURING AND PRODUCTION TESTS

107	General	174
108	Limiting Controls	174

MARKINGS

109	General	174
-----	---------------	-----