ULC Standards
Normes ULC

ANSI/CAN/UL/ULC 2200:2022

JOINT CANADA-UNITED STATES
NATIONAL STANDARD

STANDARD FOR SAFETY

Stationary Engine Generator Assemblies

Approved American National Standard
ANSI

ANSI/UL 2200-2022

scc ccn

SCC FOREWORD

National Standard of Canada

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited Standards Development Organization, in compliance with requirements and guidance set out by SCC. More information on National Standards of Canada can be found at www.scc.ca.

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada's economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at www.scc.ca.

UL Standard for Safety for Stationary Engine Generator Assemblies, ANSI/CAN/UL/ULC 2200

Third Edition, Dated September 29, 2020

Summary of Topics

This revision of ANSI/CAN/UL/ULC 2200 dated September 23, 2022 includes the following changes in requirements:

– New Definition of "Readily Accessible" added to Glossary; 4.3A

– Correction to Spacings; Table 25.1

– Revisions to requirements for Medium Voltage (MV) Walk-in Enclosure Door Mechanical Interlock; 44.3.1

– Revisions to requirements for Selective Catalytic Reduction (SCR); 5[illegible]3 – [illegible].8, Section 87A.

– Addition of Requirements for Accessory Equipment; 1.2A, 4.3B, Section 47A, Section 90A, Section 95A.

– Revision to the Test Potential for Medium Voltage Circuits in Table 69.1

– Correction to Rain Test Spray Head Figure 103.2

– Updates to Referenced Publications; 5.3, 7.7.2, 10.1, 10.2, 31.1, 54.2, 103.6.2.8 and 103.6.3.6.

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

The new and revised requirements a[illegible]e substantially in accordance with Proposal(s) on this subject dated February 11, 2022 and May 20, 2022.

No Text on This Page

ANSI/UL 2200-2022

SEPTEMBER 29, 2020
(Title Page Reprinted: September 23, 2022)

1

ANSI/CAN/UL/ULC 2200:2022

Standard for Stationary Engine Generator Assemblies

First Edition – October, 2011
Second Edition – December, 2013

Third Edition

September 29, 2020

This ANSI/CAN/UL/ULC Safety Standard consists of the Third Edition including revisions through September 23, 2022.

The most recent designation of ANSI/UL 2200 as an American National Standard (ANSI) occurred on September 23, 2022. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, Preface or SCC Foreword.

This standard has been designated as a National Standard of Canada (NSC) on September 23, 2022.

No Text on This Page

CONTENTS

Preface 9

INTRODUCTION

1 Scope 13
2 Components 13
3 Units of Measurement 14
4 Glossary 14
5 Referenced Publications 21

CONSTRUCTION

6 Materials 26
7 Frame and Enclosure 26
7.1 General 26
7.2 Enclosures and guards 27
7.3 Access doors and covers 28
7.4 Cast metal enclosures 30
7.5 Sheet metal enclosures 30
7.6 Nonmetallic enclosures 33
7.7 Viewing panes 34
7.8 Openings for wiring 35
7.9 Openings in an engine generator or electrical panel enclosure 36
7.10 Enclosure bottom openings 37
7.11 Indoor enclosure top openings 39
7.12 Sharp edges 40
8 Protection of Users – Accessibility of Uninsulated Live Parts and Moving Parts – and User Servicing 40
9 Electric Shock 46
9.1 Voltage 46
9.2 Stored energy 48
10 Corrosion Protection 49
11 Mechanical Assembly 51
12 Switches and Control Devices 52
13 Alternators and Generators 53
14 Output Power Disconnection Device 53
15 Engine Start Disable 54
16 Disconnects Used in Service Equipment Applications 54
17 Output Connections 55
17.1 General 55
17.2 Openings for conduit or cable connection 59
17.3 Openings for class 2 circuit conductors 59
17.4 Receptacles 60
18 Wiring Space and Wire Bending Space 60
18.1 Wiring space 60
18.2 Wire bending space for low voltage conductors 60
18.3 Wiring space for low voltage conductors 66
18.4 Wire bending space for medium voltage conductors 67
19 Output Circuit Grounding 67
19.1 General 67
19.2 Ground fault protection 71
20 Equipment Grounding 71
21 Bonding of Internal Parts 73

22 Internal Wiring....75
22.1 Wires....75
22.2 Protection of wiring....75
23 Current-Carrying Parts....76
23.1 General....76
23.2 Bus bars....76
23.3 Riveted construction (not for medium voltage equipment)....77
23.4 Washers....78
23.5 Ampacity....78
23.6 Support and securement of live parts....80
23.7 Heat sinks....81
24 Electrical Connections....81
25 Spacings....82
25.1 General....82
25.2 Insulation barriers....85
25.3 Alternate spacings for low voltage equipment – clearances and creepage distances....86
26 Control Circuits....88
27 Engine Generator Programmable Controls....89
28 Product Risk Assessment....89
29 Safety Circuits....90
30 Accessible Signal Circuits....91
31 Transformers....92
32 Separation of Circuits....92
32.1 Factory wiring....92
32.2 Separation barriers....93
32.3 Field wiring....94
32.4 Equipment above 7,200 V....94
32.5 Medium voltage circuits....94
33 Overcurrent Protection....95
33.1 General....95
33.2 Control circuits wiring and protection....96
33.3 Output alternating current power circuits....97
33.4 AC conductor inductive heating....97
34 Air Filters....98
35 Capacitors....99
36 Resistors....100
37 Printed-Wiring Boards....100
38 Insulating Materials....100
39 Adhesives....104
40 Battery Heaters and Miscellaneous Heaters....105
41 Engine Starting Equipment....105
42 Batteries....105
42.1 Battery compartment....105
42.2 Battery enclosure ventilation....106
42.3 Battery placement....106
42.4 Battery circuit overcurrent protection....107
42.5 Battery circuit isolation....107
43 Protection of Service Personnel....107
44 Walk-in Generator Enclosures....108
44.1 Working space....108
44.2 Panelboards within walk-in enclosures....108
44.3 Walk-in enclosures for medium voltage generators....110
45 Illumination....110
46 Inverters, Converters, Power Production Controllers, and Interconnection System Programmable Controls for Generators....110
47 Additional Requirements for Generator Switchgear Rated Above 1,000 V....110

47.1 General 110
47.2 Isolating means interlocks 111
47.3 Performance 111
47A Accessory Equipment 111

CONSTRUCTION – FUEL SYSTEMS

48 Liquid Fuel Systems 112
48.1 General 112
48.2 Tanks and fuel pumps 112
48.3 Fuel lines and fittings 113
48.4 Nonmetallic parts 114
48.5 Corrosion resistance 114
48.6 Carburetors 114
49 Fuel Injection Systems 115
50 Liquid Fuel Flow Controls 115
51 Selective Catalytic Reduction (SCR) 116
52 Liquefied Petroleum Gas 116
52.1 General 116
52.2 LP Containers 117
52.3 LP Gauges 118
52.4 LP Fuel lines and fittings 119
52.5 LP Vaporizers 120
52.6 LP Safety control and relief devices 120
52.7 LP Nonmetallic parts 121
52.8 LP Corrosion resistance 122
53 High Pressure and Low Pressure Natural Gas 122
53.1 General 122
53.2 Synthetic rubber material parts 124
53.3 Natural gas boosters 124
53.4 Gas flow controls 124
53.5 Natural gas pressurized containers/receivers 126
54 Bio-Gas and Well-Head Gas 126
55 Multi-Fuel Systems 127
56 Exhaust Systems 127

PERFORMANCE

57 General 128
58 Temperature Test 128
59 Dielectric Voltage Withstand Test 133
60 Harmonic Distortion Test 133
61 Output Voltage And Frequency Fluctuation Test 134
62 Blocked Inlet Test 134
63 Intake Air Filter and Intake Backfire-Deflector Test 134
64 Muffler Tests 135
65 Neutral to Ground Potential Measurement Test 135
66 10-Day Moist Ammonia-Air Stress Cracking Test 136
67 Salt Spray Test 136
68 LP-Gas Container Load Tests 136
69 Impulse Withstand Tests 136
69.1 General 136
69.2 Evaluation 137
70 Partial Discharge (Corona) Test 138
71 Abnormal Tests 139
71.1 General 139

71.2 Overspeed test 140
71.3 Output overload test 140
71.4 AC output short circuit test 140
71.5 Component short- and open-circuit test 141
71.6 DC output short circuit test 141
72 Over-Temperature Protection – Overload and Endurance Operation Tests 141
73 Grounding Impedance Test 142
74 Overcurrent Protection Calibration Test 142
75 Battery Compartment Ventilation Test 142
76 Strength of Terminal Insulating Base and Support Test 142
77 Cycling Test 143
78 Evaluation of Reduced Spacings on Printed-Wiring Boards 143
78.1 General 143
78.2 Dielectric voltage-withstand test 143
78.3 Shorted trace test 144
79 Bonding Conductor Test 144
80 Impact Tests 145
80.1 General 145
80.2 Impact on glass covered openings 145
80.3 Polymeric material guards over moving parts 145
81 Mechanical Tests of Viewing Panes for Medium Voltage Compartments 146
81.1 General 146
81.2 Pressure test 146
81.3 Impact test 146
82 Heat Sink Temperature Cycling Test 146
83 Ignition Test Through Bottom-Panel Openings 147
84 Bus Bar Tests 147
85 Volume Change and Extraction Test 148
85.1 General 148
85.2 Pull test – as-received 148
85.3 Aging test 148
85.4 Pull test – after the aging test 148
86 Vibration Test 149
87 Aerostatic Leakage Test 149
87A Pressure Test for Selective Catalytic Reduction (SCR) Systems 149
88 Hydrostatic Strength Test 149
89 Fuel Valve Flow Control Test 149
90 Rod Entry Test 150
90A Installation Test for Accessory Equipment 151

RATINGS

91 Details 151

MARKING

92 General 152
93 Content 152
94 Cautionary Markings 160
95 Conditional Markings 162
95A Accessory Equipment Markings 162

INSTRUCTIONS

96 Instruction Manual 163

97 Vented Batteries 167
98 Electronic Important Safety Instructions 168

MANUFACTURING AND PRODUCTION TESTS

99 Production-Line Dielectric Voltage-Withstand Test 169
100 Leak Test 170

OUTDOOR-USE UNITS

101 General 170
102 Weather and Outdoor Enclosure Construction 170
103 Performance 171
103.1 Rain test 171
103.2 Accelerated aging tests 175
103.3 Metallic coating thickness test 175
103.4 Thermal insulation 20-mm (3/4-inch) flame test 177
103.5 Lift lugs and fixtures test 177
103.6 Corrosive atmosphere test 177
103.7 Fuel and lubricating oil system design integrity tests 179
104 Marking 179

GAS TURBINES

105 General 179
106 Construction 180
106.1 Lubricating oil lines 180
106.2 Turbine blade failure 180
106.3 Combined heat and power (CHP – waste heat recovery applications) 181
106.4 Water heating parts subject to pressure 181
106.5 Pressure relief device 182
107 Performance – Battery Packs 183
107.1 Inoperative blower motor 183
107.2 Capacitor voltage determination test 183
107.3 Overcharge test 184
107.4 Capacitor surge current test 185

ANNEX A (Normative) Grounding/bonding terms

ANNEX B (Informative) Markings required to be translated and suggested French and Spanish translations

No Text on This Page

Preface

This is the Third Edition of ANSI/CAN/UL/ULC 2200, Standard for Safety for Stationary Engine Generator Assemblies.

UL is accredited by the American National Standards Institute (ANSI) and the Standards Council of Canada (SCC) as a Standards Development Organization (SDO). ULC Standards is accredited by the Standards Council of Canada (SCC) as a Standards Development Organization (SDO).

This Standard has been developed in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization.

This ANSI/CAN/UL/ULC 2200 Standard is under continuous maintenance, whereby each revision is approved in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization. In the event that no revisions are issued for a period of four years from the date of publication, action to revise, reaffirm, or withdraw the standard shall be initiated.

Annex A is identified as Normative, as such, form mandatory parts of this Standard.

Annex B, identified as Informative, is for information purposes only.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This joint American National Standard and National Standard of Canada is based on, and now supersedes, the Second Edition of UL 2200.

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

To purchase UL Standards, visit the UL Standards Sales Site at
http://www.shopulstandards.com/HowToOrder.aspx or call tollfree 1-888-853-3503.

This Edition of the Standard has been formally approved by the UL Standards Technical Panel (STP) on Stationary Engine Generator Assemblies, STP 2200.

This list represents the STP 2200 membership when the final text in this standard was balloted. Since that time, changes in the membership may have occurred.

STP 2200 Membership

Name	Representing	Interest Category	Region
Mathher Abbassi	New York City Department of Buildings	AHJ	USA
Blake Allen	Marex Canada Limited	AHJ	Alberta, Canada
Phillip Brehe	Solar Turbines	Producer	USA
Bret Dalton	GE – Gas Power and Power Services	Producer	USA
Susanne Dormann	TUV SUD	Testing & Standards	Germany
Brady Eifrid	Kohler Co.	Producer	USA
David Engelhart	Collier County Florida	AHJ	USA
Tim Evans	UL Solutions	Testing & Standards	Ontario, Canada
Jonette Herman	UL Standards & Engagement	STP Project Manager	USA
Jeff Jonas	Generac Power Systems	Producer	USA
Diana Pappas Jordan	UL Standards & Engagement	STP Chair	USA
Alan Manche	Schneider Electric	General	USA
Mark Molinski	Briggs & Stratton	Producer	USA
Thomas Pafford	Engine & Compressor Accessories	Supply Chain	USA
Prasant Panigrahy	Cummins Power Systems	Producer	USA
James Roberts	Jim Roberts and Associates	General	USA
Santokh Sahota	Simson Maxwell Ltd	Producer	British Columbia, Canada
Steve Sappington	Caterpillar	Producer	USA
Mark Siira	ComRent Load Bank Solutions	Commercial Industrial User	USA
Leo Subbarao	Subbarao Technologies LLC	General	USA
Samuel Sudler	SEA Ltd	General	USA
Bradley Sullivan	Technical Safety BC	AHJ	British Columbia, Canada
Simon Wall	Simon Wall Consulting	General	UK
Glen Watt	Glenergy Services	AHJ	Australia
Dan Wegner	City of West Allis	AHJ	USA
Eddie Young	IRED Thermal Group Ltd	General	Alberta, Canada

International Classification for Standards (ICS): 29.160.40

For further information on UL standards, please contact:

Underwriters Laboratories Inc.
Telephone: (613) 755-2729
E-mail: ULCStandards@ul.com
Web site: ulse.org

This Standard is intended to be used for conformity assessment.