

**UL2200 3RD EDITION
EVOLVING NORTH AMERICAN
CERTIFICATION REQUIREMENTS FOR
ENGINE GENERATORS**

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SEPT 2019**



UL/ULC2200 Is Ready for Ballot

- UL finalized the ballot draft and it is headed to the STP for Ballot!
- The UL/ULC 2200 Proposal Document will have a publish date of 9-20-19. The CSDS Work Area will open on 9-20-19 with a 45 day review period -- Ballots & Comments are due 11-4-19.
- The 60-day ULC Public Review starts today and comments are due 11-4-19:
<https://canada.ul.com/ulcstandards/standardsactivities/publicreview/>



Overview UL2200 Revisions and Expansion

- UL is a Standards Development Organization (SDO) in both the US and Canada. UL is writing UL2200 3rd edition for use in both countries and it will also address new industry needs and technologies including:

Medium voltage generators

Megawatt generators for utility applications

Walk in generators

Large gas turbines

Steam engine power generation

New alternative biogas and liquid bio fuels

Programmable controls

~~Relocatable generator assemblies that may be moved between locations~~ To be added later.

Need to develop task group. **Possibly UL2200B**



Since We Met Last

UPDATE!



- Address Comments from last EGSA meeting
 - NFPA 37 valve closing timing
 - 6200 reference
- Cleanup of the draft
 - MV minor revisions
 - Remove unused definitions
 - Correct typos and bad references
 - Metric and English units
 - Correct numbering
 - Updated references
 - Wiring Bending Space
 - Electrical Spacings
 - AHJ input for ingress and egress for the walk-in enclosures

UL/ULC 2200 3rd Ed. Harmonized Scope for both the US and Canada

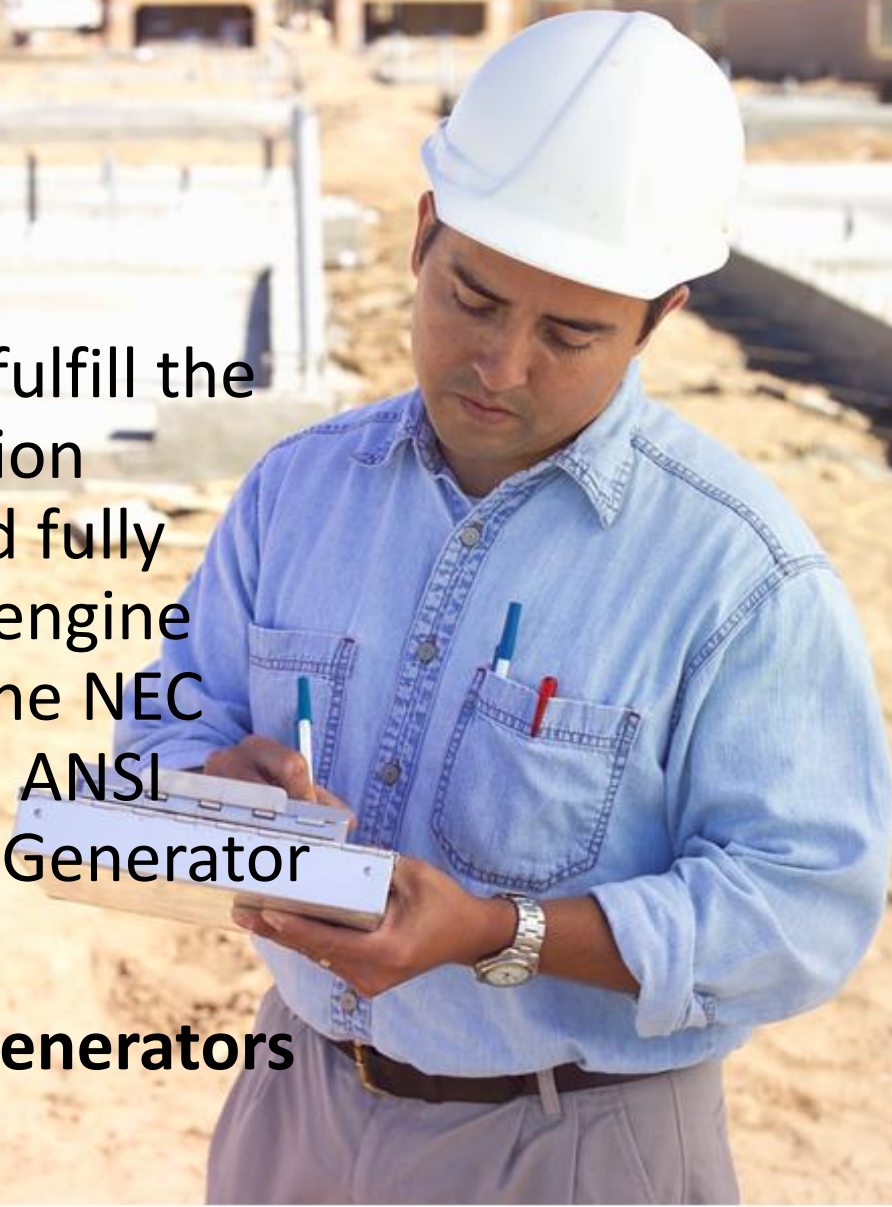


- Scope (approved by ANSI and SCC)
 - Intended to be installed per NEC and CEC
 - NFPA and CSA installation code references
 - Utility Scale- NESC not addressed by scope of UL2200, but many utilities benefit from protection of listed equipment for safety of their workers.
- Covers stationary engine generator assemblies intended for installation and use in ordinary locations in accordance with;
 - NFPA 37 Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines
 - CSA B149.1 Natural Gas and Propane Installation
 - ANSI/CSA B149.6 The Code for Digester Gas, Landfill Gas, Biogas Generation and Utilization
 - CSA B139 The Installation Code for Oil-Burning Equipment
 - NFPA 99, the Standard for Health Care Facilities
 - CSA Z8000 The Code for Canadian Health Care Facilities, the Standard for Emergency
 - NFPA 110 Standby Power Systems and Emergency Electrical Power Supply for Building
- Hazards addressed by this standard include; electrical (energy, shock and fire), mechanical (enclosures and moving parts), fuel containment and flow control for liquid and gaseous fuels and prime mover related hazards.

2020 NEC AHJ Support and Related Info

It is very difficult for an AHJ to fulfill the “approval of equipment” function defined in NEC Article 90.4, and fully evaluate the compliance of an engine generator in accordance with the NEC Annex A referenced to UL2200 ANSI Standard for Stationary Engine Generator Assemblies.

2020 NEC requires Listing for generators up to 600V.



Final Issues Prior to 3rd Edition Ballot

- Controls - UL6200 passed ballot and updated reference.
- MV updates
 - Minor cleanup of MV section.
 - New Electro-Mechanical Option – make use of functional safety and redundant protection that is not easily defeted.
- Unified the Wire Bending
- NFPA 37 Fuel Valve Closing Timing
 - Allowance for multiple fuel valves to meet timing requirement. Use fast valves (with reduced cycles 20K cycles) or fuel flow valves to rapidly stop/slow fuel flow while the safety shutoff valves close to reliably stop fuel flow to comply with NFPA 37.
- Electrical Spacings- simplified to one table
- Alignment of temperature limits
 - alternators and motors
 - Transformer, Relay, contactor, valve solenoids, and similar components

Medium Voltage (MV) Generators

- UL regularly performs MV engine generator field evaluation certifications (approx. 40/yr), as of today the scope in UL2200 is limited to 600Vac so UL does not have Listed MV generators.
- The new UL2200 3rd edition is being prepared for ballot now and it includes requirements for MV generators. Based upon present feedback, it is anticipated that the UL2200 3rd edition will be published in Q3 this year so by the NEC ROC meeting the published UL2200 will include MV requirements.
- UL has certified many (high tens to low hundreds) MW rated alternators including a significant number of medium voltage (MV) alternators under UL 1004-9 Form Wound and Medium Voltage Rotating Electrical Machines in combination with 1004-4 Electric Generators (referenced in Annex A of NEC). These component alternators are used in engine generator assemblies listed today for use in Canada.
- More updates to Interlocks Keyed and electromechanical options



Medium Voltage – New Interlock Option

7.3.4 Doors giving access to medium-voltage compartments shall be provided with one of the following interlock systems.

- a. An interlock that is solely mechanical, such that the door cannot be opened unless all medium voltage components or wiring in the compartment are de-energized. The interlock shall also prevent energizing any medium voltage components or wiring in the compartment until the door is closed. Electrical or electro-mechanical interlocks may be provided in addition to the required mechanical interlock, but shall not replace the requirement for a solely mechanical interlock. (The use of a captive key interlocking system is one method to provide mechanical interlocking.)
- b. An electromechanical interlock system that combines electrical and mechanical interlock protection that;
 - a. Provides prevents an enclosure door from being opened unless all medium voltage components or wiring in the compartment are de-energized. The interlock shall also prevent energizing any medium voltage components or wiring in the compartment until the door is closed.
 - b. has at least two different protection means.
 - i. With different actuation methodologies.
 - ii. Require use of a tool to disable the protection and .
 - c. Complies with the functional safety requirements in table 7.0 below.

Walk-in Enclosure - Egress Protection (AHJ input)

- 42.2.3 Doors to the walk-in enclosure shall be designed to prevent persons from becoming trapped within the walk-in enclosure. Doors shall be able to be opened from inside the enclosure without use of a tool or key should they become closed). Where a door locks automatically upon closing, the door shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure. Personnel door(s) intended for entrance to, and egress from a walk-in enclosure, shall open in the direction of egress.
- 42.2.4 Egress doors shall be marked with the word "Exit" and the line-of-sight to an exit sign shall not be interrupted. Any doorway or passage that might be mistaken for an exit shall be marked "Not an Exit" or with an indication of its actual use.
- 42.2.5 Walk-in enclosures with one or more personnel doors shall be provided with a switch near each door to operate interior lighting.
- Exception: A light switch is not required for doors or hatches provided only for emergency egress.



90 Fuel Valve Flow Control Test

90.1 The fuel flow control system shall identify a fault condition and take action to close the fuel valves following a failure event as defined in **Table 90.1** and as required by the tests in this Section. The valve closing feature may be performed in the complete product or may be separately tested as a fuel subsystem such as an evaluation of the controller and or the fuel valve component. The failure events defined above include loss of rotation, loss of combustion, and critical turbine failures. [Examples of programmable fuel control features are normal shutdown valve state, abnormal shutdown valve state and time (engine or engine control system failure such as overspeed, loss of ignition, or flame out) and the state of fuel flow and stop time.]

Table 90.1
Maximum generator fault fuel cessation time

Engine type	Maximum time between fault and fuel cessation time in seconds
Reciprocating	2
Turbine	5

NOTE 1: The time specified in this table is a sum of: a) the control time to identify the failure, b) the control action to close the valve, and c) the valve closing time.

NOTE 2: Some fuel valves close in 2 seconds, therefore the combinations of valves, fuel flow/metering components, and control system must be tested and verified for compliance with these requirements.

90.2 Compliance is demonstrated if at least one of the automatic valves closes within the specified time of the failure event.

Inverter Based Generators and Utility Export Generators



- UL2200 has a direct reference to Standard for Safety for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, UL 1741.
- Since 2003, UL has been certifying generators with inverter outputs for both the stand-alone and electric utility grid tied applications.
- NEC Article 705 requires that all products used for grid interactive / export functionality need to be Listed for the interactive purpose. UL1741 is the accepted certification standard by US electric utilities for products that export power back onto the utility grid.
- 1741- IEEE 1547 2018 and IEEE 1547.1 Est Q1 2020

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- Estimated publication late 2019





THANK YOU
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