UL 2157

STANDARD FOR SAFETY

Electric Clothes Washing Machines and Extractors

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UL Standard for Safety for Electric Clothes Washing Machines and Extractors, UL 2157

Fifth Edition, Dated October 30, 2024

Summary of Topics

This new Fifth Edition of ANSI/UL 2157 dated October 30, 2024 incorporates editorial changes including renumbering and reformatting to align with current style.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated September 15, 2023 and May 3, 2024.

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CSA C22.2 No. 169:24
Sixth Edition

ULSE Inc.
UL 2157
Fifth Edition

Electric Clothes Washing Machines and Extractors

October 30, 2024

Approved American National Standard

ANSI/UL 2157-2024

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PREFACE

This is the harmonized CSA Group and UL Standard for Electric Clothes Washing Machines and Extractors. It is the sixth edition of CSA C22.2 No. 169, and the fifth edition of UL 2157. This edition of CSA C22.2 No. 169 supersedes the previous edition published in 2018. This edition of UL 2157 supersedes the previous edition published in 2018.

This harmonized standard was prepared by the CSA Group and ULSE The efforts and support of the Technical Harmonization Committee for Laundry Standards and Association of Home Appliance Manufacturers (AHAM) are gratefully acknowledged.

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

This Standard was reviewed by the CSA Subcommittee on Clothes Washers – Household and Commercial, under the jurisdiction of the CSA Technical Committee on Consumer and Commercial 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 CSA Group and ULSE.

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.

Reasons for Differences From IEC

This Standard provides requirements for electric clothes washing machines and extractors for use in accordance with the electrical installation codes of Canada and the United States. This Standard does not employ any IEC standard for base requirements.

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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1 Scope

1.1 This Standard applies to electric clothes washing machines and extractors intended to be used in nonhazardous locations in accordance with the Canadian Electrical Code, Part I (CE Code), CSA C22.1-21, and the (U.S.) National Electrical Code (NEC), NFPA 70, on circuits having a nominal voltage not exceeding 600 V.

NOTE: Wherever practical, for convenience, the term "appliance" has been used in lieu of "clothes washer "or "machine".

1.2 This Standard applies to both cord-connected and permanently connected appliances. The appliances covered by this Standard are intended for use by the general public not specifically trained in the use of the appliance, regardless of the mode by which its operation is initiated. They are for use in household and commercial purposes, including appliances provided with coin-, ticket-, or card-operated mechanisms, tumbler, agitator and spinner machines, combination washer-dryers, and extractors of the centrifugal type.

1.3 This Standard does not apply to industrial and institutional type appliances. Industrial or institutional appliances are covered under the scope of Electric Washing Machines, CSA C22.2 No. 53, or Electric Commercial Clothes-Washing Equipment, UL 1206.

NOTE: Industrial and institutional type appliances are not intended for use by the general public, but only by trained or supervised personnel.

2 Definitions

NOTE: For the purpose of this Standard, the following definitions apply.

2.1 APPLIANCE, CORD-CONNECTED – an appliance that is connected to the electrical supply by a cord set or by a power-supply cord terminating in an acceptable attachment plug.

2.2 APPLIANCE, HOUSEHOLD TYPE – an appliance commonly used in, but not restricted to, a single-family dwelling.

2.3 APPLIANCE, PERMANENTLY CONNECTED – an appliance that is connected to the electrical supply by means other than a supply cord and an attachment plug.

2.4 APPLIANCE, RECESSED – an appliance intended to be:

a) supported by the floor; and

b) located immediately adjacent to a wall in the rear or located immediately adjacent to a wall, a cabinet, or another appliance on each side.

If the construction permits, a countertop can cover the appliance and adjacent cabinets and appliances. A recessed appliance is not intended for permanent attachment to the building structure or to adjacent cabinets or appliances.

2.5 APPLIANCE, STATIONARY – any appliance that is intended to be fastened in place or located in a dedicated space.

2.6 APPLIANCE, WALL-INSERT – an appliance intended to be mounted permanently in a wall or other vertical surface of a building or cabinet.

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2.7 AUTOMATIC – an appliance is considered to be automatically controlled if one or more of the following conditions applies:

a) repeated starting of the appliance, beyond one complete predetermined cycle of operation, to the point where some form of limit switch opens the circuit, is independent of any manual control;

b) during any single predetermined cycle of operation, the motor is caused to stop and restart one or more times;

c) upon energizing the appliance, the initial starting of the motor could be intentionally delayed beyond normal, conventional starting; or

d) during any single predetermined cycle of operation, automatic changing of the mechanical load could reduce the motor speed to re-establish starting-winding connections to the supply circuit.

2.8 BARRIER – a partition for the insulation or isolation of electric circuits, for the isolation of electric arcs, or for the isolation of moving parts or hot surfaces. In this respect, a barrier could serve as a portion of an enclosure and as a functional part.

2.9 CIRCUIT, LINE-VOLTAGE – a circuit having characteristics in excess of those of a low-voltage circuit.

2.10 CIRCUIT, LOW-VOLTAGE – a circuit having limited voltage and energy capacity supplied by:

a) a primary battery having an output voltage of 30 V or less;

b) a Class 2 transformer; or

c) a Class 2 power supply.

NOTE 1: A circuit that is derived from a circuit that exceeds 30 V by connecting resistance or impedance, or both, in series with the supply circuit to limit the voltage and current is not considered to be a low-voltage circuit.

NOTE 2: The term "low voltage” as used in this clause relates to "extra low voltage” in Canada.

2.11 CONTROL, OPERATING – control, the operation of which starts or regulates the appliance during normal operation.

2.12 CONTROL, PROTECTIVE – control, the operation of which is intended to prevent the risk of electric shock, fire, or injury to persons during normal or abnormal operation of the appliance.

NOTE: During the evaluation of the protective control, the protective functions are verified under normal and single-fault conditions of the control.

2.13 CRITICAL COMPONENT – a component that performs one or more safety related functions whose failure would result in an increased risk of fire, electric shock or injury to persons.

2.14 CURRENT-CARRYING PARTS – parts carrying current during normal or abnormal operation in line-voltage circuits.

NOTE: With respect to Separation of circuits, 18.3, this term refers to parts in both low-voltage and line-voltage circuits.

2.15 ELECTRICAL CONNECTION – the physical interface between two points in a circuit such as spade terminals, pin terminals, micro switch contacts, relay contacts, timer contacts, crimped connections, and connections that are welded or soldered.

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2.16 ENCLOSURE – a material used to:

a) render inaccessible, by itself or in conjunction with acceptable enclosure barriers and supplementary enclosures, any or all uninsulated current-carrying parts, internal wiring, or electrical components not having their own enclosures;

b) reduce the likelihood of propagation of ignition due to electrical disturbances occurring within; or

c) both (a) and (b).

2.17 ENCLOSURE BARRIER – a material used to reduce the size of an opening in an enclosure that:

a) will not permit the entrance of a 19.1 mm diameter rod; and

b) does not comply with 6.2(a)(1) or (2).

A polymeric enclosure barrier is evaluated as a functional polymeric part.

2.18 ENCLOSURE, SUPPLEMENTARY – a material used to reduce the size of an opening in an enclosure that:

a) will permit the entrance of a 19.1 mm diameter rod; and

b) does not comply with 6.2(a)(1) or (2); when enclosure barriers, if provided, are removed.

A polymeric supplementary enclosure is evaluated as an enclosure.

2.19 FIELD WIRING TERMINAL – a terminal to which a wire may be connected in the field, unless the wire and a means of making the connection, such as:

a) a pressure wire connector;

b) soldering lugs;

c) a soldered loop; or

d) a crimped eyelet;

factory-assembled to the wire, is provided as a part of the appliance.

2.20 FLAME CYLINDER – a projection of a vertical cylinder having a diameter of 20 mm and a height of 50 mm.

2.21 HEATER ASSEMBLY – an assembly of:

a) a heating element;

b) electrical insulation (eg, refractory, mica, magnesium oxide); and

c) a frame or housing (eg, a metal sheath or the like) that holds the assembly together.

2.22 HEATING ELEMENT – the actual electrical conducting medium that is intended to be heated by an electric current.

2.23 MEMBRANE SWITCH – a momentary switching device in which at least one contact is on, or made of a flexible substrate.

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2.24 NONCOMBUSTIBLE MATERIAL – for purposes of this Standard a noncombustible material is:

a) metal;

b) a 5VA material; or

c) a material that complies with the requirements for enclosure flammability in accordance with the 127 mm flame test in UL 746C.

2.25 PART, DECORATIVE – a material used for no other function except appearance. A removable polymeric control knob or lever may be considered a decorative part.

2.26 PART, FUNCTIONAL – a material used in such a way that deterioration or breakage of the part would result in a risk of fire, electric shock, or injury to persons.

2.27 PART, NONFUNCTIONAL – a part, such as thermal insulation or decorative material, that does not serve as electrical insulation or to support or enclose electrical components, maintain electrical spacings, or reduce the risk of injury to persons.

2.28 RISK OF ELECTRIC SHOCK – a risk of electric shock is considered to exist if under normal conditions and single component fault conditions the potential between the part and earth ground or any other simultaneously accessible part is more than the following relevant values (these low-voltage circuits shall be supplied from an isolating source):

a) 30 V rms;

b) 42.4 V peak for sinusoidal or nonsinusoidal AC;

c) 60 V dc continuous, or 60 V peak for interrupted DC outside the range of 10 – 200 Hz; and

d) 24.8 V peak for DC interrupted at a rate of 200 Hz or less

NOTE 1: A low-voltage circuit and the secondary circuit of a Class 2 circuit do not involve a risk of electric shock.

NOTE 2: In Canada, the low-voltage circuit in NOTE 1 is an extra low-voltage power circuit.

2.29 RISK OF FIRE – A risk of fire is considered to exist at any two points in a circuit where a power of more than 15 W can be delivered into an external variable resistor connected between the two points at the end of 5 seconds under normal conditions and single component fault conditions; see 26.6.3.2 and D14.

NOTE: A low power circuit does not involve a risk of fire.

2.30 TEMPERATURE-REGULATING AND -LIMITING DEVICE, COMBINATION – a device that functions to:

a) regulate the temperature under normal conditions of use; and

b) limit abnormal temperatures that might result from conditions of abnormal operation of the appliance.

2.31 TEMPERATURE-LIMITING DEVICE – a device that:

a) functions only under conditions that produce abnormal temperatures; and

b) is not intended to function during normal operation of the appliance.

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2.32 TEMPERATURE-REGULATING DEVICE – a device that:

a) regulates temperature; and

b) functions during normal operation of the appliance.

2.33 VULCANIZED FIBRE – a material that, if 0.8 mm thick minimum and acceptably mounted and secured, may be used as an enclosure barrier, but not as an enclosure or supplementary enclosure.

2.34 WITHIN 3 MM – falling within the dotted boundary formed by the flame cylinder with hemispherical ends as shown in Figure 26.2.

3 General Requirements and Reference Publications

3.1 General requirements

3.1.1 Combination washer-dryers shall comply with this Standard and also with the requirements of CSA C22.2 No. 112 and UL 2158. Where more than one Standard applies, preference shall be given to that Standard considered to require the highest standard of construction or testing.

3.1.2 In Canada, the general requirements applicable to this Standard are provided in CSA C22.2 No. 0.

3.1.3 The values given in SI (metric) units shall be normative. Any other values given shall be for information purposes only.

3.2 Reference publications

3.2.1 This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below. Such reference shall include all amendments published up to the time this referencing Standard was approved. Where reference is made to undated CSA Group Standards, such reference shall be considered to refer to the latest edition and all amendments published to that edition.

ASSE 1001-2021, *Performance Requirements for Atmospheric Type Vacuum Breakers*

ASTM B344-20, *Standard Specification for Drawn or Rolled Nickel-Chromium and Nickel-Chromium-Iron Alloys for Electrical Heating Elements*

ASTM D638M-96, *Test Method for Tensile Properties of Plastics (Metric)*

ASTM D1822-21, *Standard Test Method for Determining the Tensile-Impact Resistance of Plastics*

ASTM D6670-18, *Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products*

ASTM E230/E230M-17, *Standard Specification and Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples*

Code of Federal Regulations, Title 10, Part 430, as amended from time to time (referenced as 49 CFR 430)

CSA B64 Series 21, *Backflow Preventers and Vacuum Breakers*

CSA C22.1-21, *Canadian Electrical Code, Part I*

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CSA C22.2 No. 0:20, *General Requirements – Canadian Electrical Code, Part II*

CSA C22.2 No. 0.1:19, *General Requirements for Double-Insulated Equipment*

CSA C22.2 No. 0.2-16 (R2020), *Insulation Coordination*

CSA C22.2 No. 0.4:17 (R2022), *Bonding of Electrical Equipment*

CSA C22.2 No. 0.5:16 (R2020), *Threaded Conduit Entries*

CSA C22.2 No. 0.8:19, *Safety Functions Incorporating Electronic Technology*

CSA C22.2 No. 0.15:15 (R2020), *Adhesive Labels*

CSA C22.2 No. 0.17:22, *Evaluation of Properties of Polymeric Materials*

CSA C22.2 No. 8-13 (R2018), *Electromagnetic Interference (EMI) Filters*

CSA C22.2 No. 14-18, *Industrial Control Equipment*

CSA C22.2 No. 18.1:13 (R2022), *Metallic Outlet Boxes*

CSA C22.2 No. 18.2:06 (R2021), *Nonmetallic Outlet Boxes*

CSA C22.2 No. 18.3:12 (R2022), *Conduit, Tubing, and Cable Fittings*

CSA C22.2 No. 18.5:22, *Positioning Devices*

CSA C22.2 No. 21-18, *Cord Sets and Power Supply Cords*

CSA C22.2 No. 24:21, *Temperature-Indicating and Regulating Equipment*

CSA C22.2 No. 38-18, *Thermoset-Insulated Wires and Cables*

CSA C22.2 No. 39-13 (R2022), *Fuseholder Assemblies*

CSA C22.2 No. 42:10 (R2020), *General Use Receptacles, Attachment Plugs, and Similar Wiring Devices*

CSA C22.2 No. 42.1:13 (R2022), *Cover Plates for Flush-Mounted Wiring Devices*

CSA C22.2 No. 43:17 (2022), *Lampholders*

CSA C22.2 No. 49-18, *Flexible Cords and Cables*

CSA C22.2 No. 53:68 (R2019), *Electric Washing Machines*

CSA C22.2 No. 55:15 (R2020), *Special Use Switches*

CSA C22.2 No. 65-18, *Wire Connectors*

CSA C22.2 No. 66.1:06 (R2020), *Low Voltage Transformers – Part 1: General Requirements*

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CSA C22.2 No. 66.2-18, *Low Voltage Transformers – Part 2: General Purpose Transformers*

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CSA E60730-2-15:14 (R2019), *Automatic Electrical Controls for Household and Similar Use – Part 2-15: Particular Requirements for Automatic Electrical Air Flow, Water Flow and Water Level Sensing Controls*

CSA Component Acceptance Notice 5A, *Announcement of Extension of the Component Acceptance Service for Optocouplers and Related Devices*

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IEC 60695-2-10:2021, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2021, *Fire Hazard Testing – Part 2-11: Glowing/Hot-Wire Based Test Methods – Glow-Wire Flammability Test Method for End-Products*

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IEC 60695-2-13:2021, *Fire Hazard Testing – Part 2-13: Glowing/Hot-Wire Based Test Methods – Glow Wire Ignitability Test Method for Materials*

IEC 60695-11-10:2013, *Fire Hazard Testing – Part 11-10: Test Flames – 50 W Horizontal and Vertical Flame Test Methods*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2020, *Electromagnetic compatibility (EMC) – Part 4-3 : Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2012 RLV, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014+AMD1:2017 CSV, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6L2023 RLV, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11:22, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests*

ISO 16000-9:2011, *Indoor Air – Part 9: Determination of the Emission of Volatile Organic Compounds from Building Products and Furnishing – Emission Test Chamber Method*

ISO/IEC 28360:2015, *Information Technology – Office Equipment – Determination of Chemical Emission Rates from Electronic Equipment*

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