JOINT CANADA-UNITED STATES
NATIONAL STANDARD

ANSI/CAN/UL 8752:2024

STANDARD FOR SAFETY

Organic Light Emitting Diode (OLED) Panels

ANSI/UL 8752-2024

SCC FOREWORD

National Standard of Canada

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UL Standard for Safety for Organic Light Emitting Diode (OLED) Panels, ANSI/CAN/UL 8752

Second Edition, Dated May 16, 2024

Summary of Topics

This new Second Edition of ANSI/CAN/UL 8752 dated May 16, 2024 incorporates editorial changes including renumbering and reformatting to align with current style.

The requirements are substantially in accordance with Proposal(s) on this subject dated September 1, 2023.

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MAY 16, 2024

ANSI/CAN/UL 8752:2024

Standard for Organic Light Emitting Diode (OLED) Panels

First Edition – June, 2012

Second Edition

May 16, 2024

This ANSI/CAN/UL Safety Standard consists of the Second Edition.

The most recent designation of ANSI/UL 8752 as an American National Standard (ANSI) occurred on May 16, 2024. 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 date May 16, 2024.

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Preface

This is the Second Edition of ANSI/CAN/UL 8752, Standard for Organic Light Emitting Diode (OLED) Panels.

ULSE is accredited by the American National Standards Institute (ANSI) and 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 8752 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 identified as Normative, forms a mandatory part of this Standard.

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 First Edition of UL 8752 and the First Edition of ULC S8752.

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 Collaborative Standards Development System (CSDS) at https://csds.ul.com.

This Edition of the Standard has been formally approved by the Technical Committee (TC) on Technical Committee For Solid State Lighting, TC 8752.

This list represents the TC 8752 membership when the final text in this Standard was balloted. Since that time, changes in the membership may have occurred.

TC 8752 Membership

Name	Representing	Interest Category	Region
Buoniconti, Ralph	SABIC	Supply Chain	USA
Busque, Christian	Armstrong World Industries INC	Supply Chain	USA
Cai, Dengke	EYE Lighting International Of North America	Producer	USA
Chou, Mike	Great Consultant Service (GCS) Co., Ltd.	General Interest	Chinese Taipei
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Shulman, Michael S.	UL Solutions	Testing & Standards Org.	USA
Sullivan, Brad	Technical Safety BC	Authorities Having Jurisdiction	British Columbia
Venkataramanan, Venkat	University Of Toronto	General Interest	Ontario
Willis, Karen	National Electrical Manufacturers Association (NEMA)	Non-Voting	USA

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This Standard is intended to be used for conformity assessment.

The intended primary application of this standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE

INTRODUCTION

1 Scope

1.1 These requirements apply to organic lighting emitting diode (OLED) panels intended for task, ambient, or aesthetic illumination, and for portable or permanent installation in accordance with the following standards, and for connection to isolated (non-utility connected) power sources such as generators, batteries, fuel cells, solar cells, and the like, in accordance with the:

a) In Canada:

1) Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, CSA C22.1;

b) In the United States:

1) National Electrical Code, NFPA 70.

1.2 The OLED panels covered by this Standard are intended to be installed in dry or damp locations only, in one or more of the following configurations:

a) Secured directly to the walls or ceiling of a structure,

b) Integrated into a mechanical frame or structure that is in turn mounted or secured to the walls or ceiling of a structure (for example, a luminaire or sign),

c) Integrated into a mechanical frame or structure that is portable and able to be relocated without special tools or skills (for example, a portable luminaire).

1.3 The OLED panels covered by this Standard are intended to be supplied from an electrical power source operating within the voltage and current limits specified in Electrical Construction – General, Section 12. These voltage limits are understood to represent no risk of electric shock injury, and the current limits sufficient to adequately reduce the risk of fire initiation.

Exception: For OLED panels intended to be supplied by a power source beyond the limits of Section 12, see the Supplemental Requirements for Higher Power OLED Panels, Annex A.

1.4 An OLED panel mounted within the frame structure of a fixed or portable luminaire per 1.2 (b) or (c) need not comply with the requirements in this Standard where the risk of fire or injury is fully addressed by the applicable luminaire standard.

1.5 These requirements do not address the power sources used to supply an OLED panel. Mechanically integrated assemblies that include both an OLED panel and a power source shall be evaluated for conformance with the applicable luminaire standard. Some power sources suitable for use with OLED panels are identified in Electrical Construction – General, Section 12.

1.6 This Standard does not include requirements for the evaluation of OLED panels intended for use in:

a) In Canada:

1) Hazardous locations as specified in the Canadian Electrical Code, CSA C22.1;

2) General patient care areas or critical patient care areas as defined by Section 24 of the Canadian Electrical Code, CSA C22.1;

3) Emergency systems as defined by Section 46 of the Canadian Electrical Code, CSA C22.1; or

4) Air-handling spaces as defined by Rule 12-010 of the Canadian Electrical Code, CSA C22.1.

b) In the United States:

1) Hazardous locations as specified in the National Electrical Code, NFPA 70;

2) General patient care areas or critical patient care areas as defined by Article 517 of the National Electrical Code, NFPA 70;

3) Emergency systems as defined by Article 700 of the National Electrical Code, NFPA 70; or

4) Air-handling spaces as defined by Article 300.22(C) of the National Electrical Code, NFPA 70.

1.7 This Standard does not include requirements for the assessment of OLED panel compliance with building code seismic requirements.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this Standard shall comply with the requirements for that component.

2.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this Standard; or

b) Is superseded by a requirement in this Standard.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

3.2 Unless otherwise indicated, all voltage and current values mentioned in this Standard are root-mean-square (rms).

4 Referenced Publications

4.1 Any undated reference to a code or standard appearing in the requirements of this Standard shall be interpreted as referring to the latest edition of that code or standard.

4.2 The following publications are referenced in this Standard:

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

ASTM E28, *Standard Test Methods for Softening Point of Resins Derived from Naval Stores by Ring-and-Ball Apparatus*

CSA C22.1, *Canadian Electrical Code, Part I, Safety Standard for Electrical Installations*

CSA C22.2 No. 0.15, *Standard for Adhesive Labels*

CSA C22.2 No. 0.17, *Standard for Evaluation of Properties of Polymeric Materials*

CSA C22.2 No. 0.2, *Standard for Insulation Coordination*

CSA C22.2 No. 65, *Standard for Wire Connectors*

CSA C22.2 No. 66.1, *Standard for Low Voltage Transformers – Part 1: General Requirements*

CSA C22.2 No. 66.3, *Standard for Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

CSA C22.2 No. 107.1, *Standard for General Use Power Supplies*

CSA C22.2 No. 153, *Standard for Electrical Quick-Connect Terminals*

CSA C22.2 No. 182.3, *Standard for Special Use Attachment Plugs, Receptacles, and Connectors*

CSA C22.2 No. 210, *Standard for Appliance Wiring Material Products*

CSA C22.2 No. 223, *Standard for Power Supplies with Extra-Low-Voltage Class 2 Outputs*

CSA C22.2 No. 250.7, *Standard for Extra-Low-Voltage Landscape Lighting Systems*

CSA C22.2 No. 250.13, *Standard for Light Emitting Diode (LED) Equipment for Lighting Applications*

CSA C22.2 No. 60950-1, *Standard for Information Technology Equipment – Safety – Part 1: General Requirements*

NFPA 70, *National Electrical Code*

UL 310, *Electrical Quick-Connect Terminals*

UL 486A-486B, *Wire Connectors*

UL 723, *Test for Surface Burning Characteristics of Building Materials*

UL 746C, *Polymeric Materials – Use in Electrical Equipment Evaluations*

UL 758, *Appliance Wiring Material*

UL 840, *Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment*

UL 969, *Marking and Labeling Systems*

UL 1012, *Power Units Other Than Class 2*

UL 1310, *Class 2 Power Units*

UL 1838, *Low Voltage Landscape Lighting Systems*

UL 1977, *Component Connectors for Use in Data, Signal, Control and Power Applications*

UL 2108, *Low Voltage Lighting Systems*

UL 5085-1, *Low Voltage Transformers – Part 1: General Requirements*

UL 5085-3, *Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

UL 8750, *Light Emitting Diode (LED) Equipment for Use in Lighting Products*

UL 60950-1, *Information Technology Equipment – Safety – Part 1: General*

ULC 102, *Method of Test for Surface Burning Characteristics of Building Materials and Assemblies*

5 Glossary

5.1 For the purposes of this Standard, the following definitions apply.

5.2 FIXED LUMINAIRE – A lighting assembly intended for fixed mounting and permanent connection to the facility electrical system.

5.3 OLED – An assembly of organic (carbon-based) electroluminescent semiconductor material situated between two electrodes, at least one of which is transparent. When supplied with an electric current (by applying a voltage across the electrodes), the organic material emits light.

5.4 OLED PANEL – An independently operable unit consisting of one or more OLEDs (of any size) with means for connection to an electrical current source. The panel may incorporate passive electrical components to regulate the current, and may also include a frame and/or means for mounting.

5.5 PORTABLE LUMINAIRE – A complete lighting assembly connected to the electrical supply by a flexible cord and plug assembly, and able to be relocated without the use of specialized tools.

5.6 POWER SOURCE – A device connected between the branch circuit protection device and the OLED panel, intended to supply the desired voltage and/or current to the OLED panel. A power source is typically referred to as transformer, power supply, driver, ballast, or comparable designation.

5.7 RISK OF FIRE – An electrical circuit able to generate sufficient heat to ignite adjacent materials. Consideration shall be given to the heat generated during normal operation, component faults, and damaged conductors or connections.

5.8 RISK OF INJURY – Parts containing characteristics or sufficient mechanical or thermal energy that, when contacted by a person, can cause permanent damage to the body. Examples include sharp parts that can cut the skin or hot parts that can cause second degree burns.

MECHANICAL CONSTRUCTION

6 General

6.1 An OLED panel shall be formed and assembled so that it has the strength to withstand the handling to which it may be subjected during installation and use, without increased risk of fire or injury to persons.

7 Mounting

7.1 An OLED panel intended to be secured directly to the building structure shall be provided with installation instructions, per the Installation and Operation Instructions, Section 27. Mounting hardware shall either be packaged with the panel or the installation instructions shall specify the types of acceptable mounting fasteners and systems to be used.

8 Glass

8.1 OLED panels with glass edges or corners that are accessible during use or maintenance shall be seamed, swiped, fire-polished, or similarly treated to eliminate sharpness.

8.2 Exposed glass surfaces of an OLED panel intended to be secured directly to the building structure, in accordance with 1.2(a), shall comply with the minimum thickness as specified in Table 8.1. Where the panel includes multiple layers of glass and/or other materials (such as printed circuit boards and organic material layers) secured together to form a laminate structure, the measurement shall consider the overall thickness of the laminate structure when determining compliance with Table 8.1.

Exception: Exposed glass or glass laminate structures of an OLED panel intended to be secured directly to the building structure that comply with the Glass Breakage Weight Limit Test, Section 23, are permitted to be of lesser thickness.

Table 8.1
Thickness of Glass Panels

Exposed area of glass		Minimum thickness of glass			
		Flat glass		Curved glass	
cm^2	($inches^2$)	mm	(inches)	mm	(inches)
0 – 968	(0 – 150)	2.11	(0.083)	2.11	(0.083)
969 – 3226	(150 – 500)	2.54	(0.100)	2.11	(0.083)
3227 and greater	(501 and greater)	3.56	(0.140)	2.54	(0.100)

8.3 An OLED panel intended to be directly mounted to the ceiling, in accordance with 1.2(a), and with an exposed glass surface shall comply with the Static Load Mounting Test, Section 24.

9 Polymeric Materials

9.1 An exterior polymeric material of more than 161 cm^2 (25 $inch^2$) contiguous exposed surface area shall be rated minimum HB flammability.

9.2 An OLED panel intended for mounting on a building surface and with a polymeric material of more than 2.3 m^2 (25 $feet^2$) in contiguous surface area shall comply with the:

a) In Canada, ULC 102

b) In the United States, UL 723

The panel shall have a smoke-developed index of not over 450 and a flame spread index of not over 25, with no evidence of continued progressive combustion.

9.3 Insulated wire and connectors made of polymeric materials shall be rated for the voltage, current, and temperature to which they are subjected.

10 Adhesives

10.1 Where adhesive failure could result in an increased risk of fire or injury, an adhesive used to secure parts of an OLED panel together or to secure the OLED panel to a frame or structural element shall be subjected to the Adhesive Support Test in the:

a) In Canada, CSA C22.2 No. 250.13

b) In the United States, UL 8750

11 Conductor Protection

11.1 Electrical connections shall be protected against mechanical stresses during installation or use by strain relief devices or comparable means. Electrical connections that are subject to movement or mechanical stress shall be subjected to the Conductor Secureness Test, Section 25.

11.2 Means shall be provided to prevent conductors from being displaced when such displacement could result in:

a) Subjecting the conductor to mechanical damage;

b) Exposing the conductor to a temperature higher than that for which it is rated;

c) Damaging internal connections or other components.

11.3 All openings and wireways shall be smooth and free from sharp edges or burrs that could cause abrasion of conductor insulation.

ELECTRICAL CONSTRUCTION

12 General

12.1 An OLED panel shall be marked, per 26.3, for connection to a power source conforming to the voltage limits in Table 12.1.

Table 12.1
Voltage Limits

Waveform type[a]	Maximum voltage
Sinusoidal ac	30 V rms
Non-sinusoidal ac	42.4 V peak
dc[b, c]	60 V

Table 12.1 Continued on Next Page

Table 12.1 Continued

Waveform type[a]	Maximum voltage
[a] For a combined ac + dc waveform, the voltage limit shall be the non-sinusoidal ac limit where the dc voltage is no more than 20.8 V, and shall be (33 + 0.45 Vdc) where the dc voltage is greater than 20.8 V. [b] If the peak-to-peak ripple voltage on a dc waveform exceeds 10 % of the dc voltage, the waveform shall be considered a combined waveform per footnote a above. [c] dc waveforms interrupted at frequencies between 10 – 200 Hz shall be limited to 24.8 V.	

12.2 An OLED panel shall be marked, per 26.3, for connection to a power source whose nameplate output current does not exceed 5 A.

12.3 The voltage and current limits of 12.1 and 12.2 shall be provided by a source that is electrically isolated from the branch circuit. Power sources that comply with the following standards are considered to comply with the following requirements:

a) In Canada:

1) CSA C22.2 No. 223;

2) CSA C22.2 No. 60950-1;

3) CSA C22.2 No. 107.1;

4) CSA C22.2 No. 66.1 and CSA C22.2 No. 66.3;

5) CSA C22.2 No. 250.7;

6) UL 2108; and

7) CSA C22.2 No. 250.13.

b) In the United States:

1) UL 1310;

2) UL 60950-1;

3) UL 1012;

4) UL 5085-1 and UL 5085-3;

5) UL 1838;

6) UL 2108; and

7) UL 8750.

Other power sources shall be determined to provide a comparable level of isolation as that provided by one of the above standards.

12.4 An OLED panel shall not be grounded.

Exception: Exposed conductive parts of an OLED panel or frame intended to be integrated into a (fixed or portable) luminaire provided with a means for grounding are permitted to be electrically bonded to the luminaire means for grounding.

12.5 An OLED panel shall be provided with no more than one electrical power input for field connection. Additional connections for control circuitry are permitted.

Exception: More than one power input connection is permitted if the circuitry limits total OLED panel power consumption to no more than the marked ratings, per 26.3.

13 Current Carrying Parts

13.1 Current-carrying parts not part of the OLED assembly, such as lead wires and control electronics, shall be of corrosion-resistant materials, such as copper, copper alloy, or aluminum.

13.2 Current-carrying parts shall have sufficient ampacity to reduce the risk of fire, as demonstrated by compliance with the Temperature Test, Section 19, and the Abnormal Input Test, Section 20.

13.3 Current-carrying parts shall be reliably secured to prevent turning or shifting in position if such motion may result in damage to an electrical connection or misalignment of electrical contacts.

14 Splices and Connections

14.1 A soldered wire connection shall be made mechanically secure before being soldered, using one or more of the following techniques:

a) A minimum of one full wrap around a terminal;

b) Insertion into a U- or V- shaped slot in a terminal;

c) Twisted together with other conductors;

d) For a lead integral with a component, inserted through an opening of a printed wiring board; or

e) For a lead not integral with a component, passed through an opening of a printed wiring board and bent 90° or covered with epoxy, silicone, or potting compound after soldering.

14.2 Push-in terminals, spade-type connectors, and similar means shall be investigated to determine if they provide adequate mechanical security. Quick-connect terminals shall comply with the:

a) In Canada, CSA C22.2 No. 153

b) In the United States, UL 310

Mechanical splicing devices shall comply with the:

a) In Canada, CSA C22.2 No. 65

b) In the United States, UL 486A-486B

Single and multi-pole connectors secured to conductors or to printed circuit boards shall comply with the:

a) In Canada, CSA 22.2 No. 182.3

b) In the United States, UL 1977

15 Segregation from Other Conductors

15.1 An OLED panel integrated into another product (such as a luminaire) shall have all conductive parts of the OLED panel effectively segregated from other conductive parts within the product that operate at higher voltages, by means of insulation, barriers, or maintained spacings.

15.2 Segregation of conductors shall be accomplished by clamping, routing, or an equivalent means that provides a minimum 6.4-mm (0.25-inch) separation.

16 Switches and Controls

16.1 A switch or other control device shall have a current and voltage rating not less than that of the load that it controls.

17 Supply Connections

17.1 An OLED panel intended to be secured directly to the building structure shall have provision to connect to a low voltage supply source by one of the following means:

a) In Canada:

1) Provision for mounting over a standard outlet box, connection to conduit or cable, or other means in accordance with the Canadian Electrical Code, CSA C22.1, Part I;

2) A length of power limited cable such as ELC, LVT, CM, or equivalent, or wiring terminals suitable for connection of such cable;

3) A length of flexible cord permanently connected to the panel or detachable using a mating plug and connector. The supply end of the cord shall not include a plug suitable for direct branch circuit connection; or

4) A length of appliance wiring material identified as suitable for external use in accordance with CSA C22.2 No. 210, permanently connected to the panel or detachable using a mating plug and connector. The supply end of the appliance wiring material shall not include a plug suitable for direct branch circuit connection.

b) In the United States:

1) Provision for mounting over a standard outlet box, connection to conduit or cable, or other means in accordance with Chapter 3 of the National Electrical Code, NFPA 70;

2) A length of power limited cable such as CL2 or CL3 or equivalent, as specified in Table 725.154(G) of the National Electrical Code, NFPA 70, or wiring terminals suitable for connection of such cable;

3) A length of flexible cord permanently connected to the panel or detachable using a mating plug and connector. The supply end of the cord shall not include a plug suitable for direct branch circuit connection; or

4) A length of appliance wiring material identified as suitable for external use in accordance with UL 758, permanently connected to the panel or detachable using a mating plug and connector. The supply end of the appliance wiring material shall not include a plug suitable for direct branch circuit connection.

17.2 An OLED panel intended to be mounted within the frame structure of a fixed or portable luminaire shall have provision to connect to a low voltage supply source in conformance to the internal wiring provisions of the applicable luminaire standard.

PERFORMANCE

18 Input Power

18.1 The measured input to an OLED panel in watts shall not exceed the marked rating by more than 10 % when the unit is operated under conditions of intended use and connected to a rated source of supply. Measurements shall be made no less than 20 minutes after the panel is energized, to allow for stabilization.

19 Temperature Test

19.1 An OLED panel shall not exhibit any visual signs of combustion (including discoloration), and shall not attain a temperature at any point greater than indicated in Table 19.1, when connected to an appropriately rated source of supply and operated continuously until temperatures are stable, as described in this section.

Table 19.1
Maximum Surface Temperatures

Materials and components parts	°C	(°F)
1. Electrical insulation (conductors, printed wiring boards, etc.)	60[a]	(140)[a]
2. Electronic components (diodes, transistors, capacitors, etc.)	75[a]	(167)[a]
3. Polymeric or cellulosic material	90[b]	(194)[b]
4. Surfaces adjacent to or upon which the panel may be mounted in service	90[c]	(194)[c]
5. Input supply terminals[d]	75[a]	(167)[a]
6. Supply wire connections	60[e]	(140)[e]
7. Fuse clip with rated fuse installed	110	(230)
8. Sealing compound	f	f

[a] This limitation does not apply to insulating materials or electronic components that have been investigated and found suitable for a higher temperature.

[b] The maximum temperature of a polymeric material, when corrected to a 25 °C (77 °F) ambient temperature, shall not exceed the generic or relative temperature index specified in CSA C22.2 No. 0.17 or UL 746B.

[c] 150 °C (302 °F) for an OLED panel marked for use only on non-combustible surfaces, per 27.3.

[d] The temperature on a wiring terminal or lug is measured at the point most likely to be contacted by the insulation of a conductor installed as in actual service.

[e] Unless the equipment is marked for use with 75 °C or 90 °C supply wire.

[f] No limit for thermoset material. For other sealing compound materials, the maximum temperature, when corrected to a 25 °C (77 °F) ambient temperature, is 15 °C (27 °F) less than the softening point of the compound as determined in ASTM E28.

19.2 The test is to be conducted at an ambient temperature of 25 ±5 °C (77 ±9 °F), unless the installation instructions specify a higher ambient in which case the test shall be conducted at the highest specified ambient, ±5 °C (±9 °F). The ambient temperature is to be measured by means of a thermocouple immersed in a bath of 15 milliliters of mineral oil in a glass container. Final temperatures are to be normalized to 25 °C (or the marked maximum ambient), to determine compliance with Table 19.1.

19.3 A temperature is considered stable when:

a) The test has been running for a minimum of 7.5 hours; or