CSA GROUP™

CSA C22.2 No. 250.13:22
National Standard of Canada

Light emitting diode (LED) equipment for lighting applications

scc ccn

Legal Notice for Standards

Canadian Standards Association (operating as "CSA Group") develops standards through a consensus standards development process approved by the Standards Council of Canada. This process brings together volunteers representing varied viewpoints and interests to achieve consensus and develop a standard. Although CSA Group administers the process and establishes rules to promote fairness in achieving consensus, it does not independently test, evaluate, or verify the content of standards.

Disclaimer and exclusion of liability

This document is provided without any representations, warranties, or conditions of any kind, express or implied, including, without limitation, implied warranties or conditions concerning this document's fitness for a particular purpose or use, its merchantability, or its non-infringement of any third party's intellectual property rights. CSA Group does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA Group makes no representations or warranties regarding this document's compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA GROUP, ITS VOLUNTEERS, MEMBERS, SUBSIDIARIES, OR AFFILIATED COMPANIES, OR THEIR EMPLOYEES, DIRECTORS, OR OFFICERS, BE LIABLE FOR ANY DIRECT, INDIRECT, OR INCIDENTAL DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES, HOWSOEVER CAUSED, INCLUDING BUT NOT LIMITED TO SPECIAL OR CONSEQUENTIAL DAMAGES, LOST REVENUE, BUSINESS INTERRUPTION, LOST OR DAMAGED DATA, OR ANY OTHER COMMERCIAL OR ECONOMIC LOSS, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), OR ANY OTHER THEORY OF LIABILITY, ARISING OUT OF OR RESULTING FROM ACCESS TO OR POSSESSION OR USE OF THIS DOCUMENT, EVEN IF CSA GROUP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA Group is not undertaking to render professional or other services for or on behalf of any person or entity or to perform any duty owed by any person or entity to another person or entity. The information in this document is directed to those who have the appropriate degree of experience to use and apply its contents, and CSA Group accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA Group is a private not-for-profit company that publishes voluntary standards and related documents. CSA Group has no power, nor does it undertake, to enforce compliance with the contents of the standards or other documents it publishes.

Intellectual property rights and ownership

As between CSA Group and the users of this document (whether it be in printed or electronic form), CSA Group is the owner, or the authorized licensee, of all works contained herein that are protected by copyright, all trade-marks (except as otherwise noted to the contrary), and all inventions and trade secrets that may be contained in this document, whether or not such inventions and trade secrets are protected by patents and applications for patents. Without limitation, the unauthorized use, modification, copying, or disclosure of this document may violate laws that protect CSA Group's and/or others' intellectual property and may give rise to a right in CSA Group and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by licence or by law, CSA Group reserves all intellectual property rights in this document.

Patent rights

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. CSA Group shall not be held responsible for identifying any or all such patent rights. Users of this standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.

Authorized use of this document

This document is being provided by CSA Group for informational and non-commercial use only. The user of this document is authorized to do only the following:

If this document is in electronic form:

- load this document onto a computer for the sole purpose of reviewing it;
- search and browse this document; and
- print this document if it is in PDF format.

Limited copies of this document in printed or paper form may be distributed only to persons who are authorized by CSA Group to have such copies, and only if this Legal Notice appears on each such copy.

In addition, users may not and may not permit others to

- alter this document in any way or remove this Legal Notice from the attached standard;
- sell this document without authorization from CSA Group; or
- make an electronic copy of this document.

If you do not agree with any of the terms and conditions contained in this Legal Notice, you may not load or use this document or make any copies of the contents thereof, and if you do make such copies, you are required to destroy them immediately. Use of this document constitutes your acceptance of the terms and conditions of this Legal Notice.

Standards Update Service

CSA C22.2 No. 250.13:22
May 2022

Title: *Light emitting diode (LED) equipment for lighting applications*

To register for e-mail notification about any updates to this publication
- go to **www.csagroup.org/store/**
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **24299**.

If you require assistance, please e-mail **techsupport@csagroup.org** or call 416-747-2233.

Visit CSA Group's policy on privacy at **www.csagroup.org/legal** to find out how we protect your personal information.

Canadian Standards Association (operating as "CSA Group"), under whose auspices this National Standard has been produced, was chartered in 1919 and accredited by the Standards Council of Canada to the National Standards system in 1973. It is a not-for-profit, nonstatutory, voluntary membership association engaged in standards development and certification activities.

CSA Group standards reflect a national consensus of producers and users — including manufacturers, consumers, retailers, unions and professional organizations, and governmental agencies. The standards are used widely by industry and commerce and often adopted by municipal, provincial, and federal governments in their regulations, particularly in the fields of health, safety, building and construction, and the environment.

More than 10 000 members indicate their support for CSA Group's standards development by volunteering their time and skills to Committee work.

CSA Group offers certification and testing services in support of and as an extension to its standards development activities. To ensure the integrity of its certification process, CSA Group regularly and continually audits and inspects products that bear the CSA Group Mark.

In addition to its head office and laboratory complex in Toronto, CSA Group has regional branch offices in major centres across Canada and inspection and testing agencies in fourteen countries. Since 1919, CSA Group has developed the necessary expertise to meet its corporate mission: CSA Group is an independent service organization whose mission is to provide an open and effective forum for activities facilitating the exchange of goods and services through the use of standards, certification and related services to meet national and international needs.

For further information on CSA Group services, write to
CSA Group
178 Rexdale Boulevard
Toronto, Ontario, M9W 1R3
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.

Standards Council of Canada
600-55 Metcalfe Street
Ottawa, Ontario, K1P 6L5
Canada

Cette Norme Nationale du Canada est disponible en versions française et anglaise.

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 to judge its suitability for their particular purpose.
®A trademark of the Canadian Standards Association, operating as "CSA Group"

National Standard of Canada

CSA C22.2 No. 250.13:22

Light emitting diode (LED) equipment for lighting applications

Published in May 2022 by CSA Group
A not-for-profit private sector organization
178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3

To purchase standards and related publications, visit our Online Store at www.csagroup.org/store/
or call toll-free 1-800-463-6727 or 416-747-4044.

ICS 29.140
ISBN 978-1-4883-4200-4

Contents

Technical Committee on Consumer and Commercial Products

S. Lawrence	Scarborough, Ontario, Canada *Category: General Interest*	*Chair*
F. LaRiccia	Health Canada, Ottawa, Ontario, Canada *Category: Regulatory Authority*	*Vice-Chair*
G. Benjamin	ABB Electrification Canada SRI, Dorval, Québec, Canada *Category: Producer Interest*	
N. Breton	ESA (Electrical Safety Authortiy), Mississauga, Ontario, Canada *Category: Regulatory Authority*	
D. Briere	CSA Group, Toronto, Ontario, Canada *Category: General Interest*	
W. J. Burr	Burr and Associates, Campbell River, Britis[illegible] Columbia, Canada *Category: User Int[illegible]*	
J. Clements	Dallas, Tex[illegible]	*Non-voting*
J. E. Evans	Ev[illegible] Regulatory Certification, [illegible]as[illegible]er, Ontario, Canada *[illegible]ategory: User Interest*	
W. Hansen	La Crosse, Wisconsin, USA *Category: User Interest*	
J. A. Huza[illegible]	Consumers Council of Canada, Victoria, British Columbia, Canada *Category: User Interest*	
[illegible]Imlah	Imlah Electrical Consulting, Aloha, Oregon, USA	*Non-voting*

D. Lenasi	Signify Canada Ltd., Langley, British Columbia, Canada *Category: Producer Interest*	
B. K. Lowe	Vancouver, British Columbia, Canada *Category: General Interest*	
S. Mercier	Régie du bâtiment du Québec, Montréal, Québec, Canada *Category: Regulatory Authority*	
J. C. Potts	Dept. of Community & Government Services, Government of Nunavut, Iqaluit, Nunavut, Canada *Category: Regulatory Authority*	
J. Pourkarimi	IBM Canada, Markham, Ontario, Canada *Category: Producer Interest*	
J. Renard	Miele, Vaughan, Ontario, Canada *Category: Producer Interest*	
C. S. Seaby	Burlington, Ontario, Canada	*Non-voting*
A. Z. Tsisserev	AES Engineering Ltd. Vancouver, British Columbia, Canada *Category: General Interest*	
M. B. Williams	Association of Home Appliance Manufacturers (AHAM), Washington, District of Columbia, USA *Category: Producer Interest*	
A. Andronescu	CSA Group, Toronto, Ontario, Canada	*Project Manager*

Integrated Committee on Lighting Products

D. Lenasi	Signify Canada Ltd., Langley, British Columbia, Canada	*Chair*
G. Benjamin	ABB Electrification Canada SRI, Dorval, Québec, Canada	*Vice-Chair*
A. Alfano	Always On UPS Systems Canada Inc., Kelowna, British Columbia, Canada	*Non-voting*
B. Alsop	Intertek, Arlington Heights, Illinois, USA	
S. Altamura	Seasonal Specialties LLC, Scarsdale, New York, USA	
B. Barzideh	UL LLC, Melville, New York, USA	
J. Beare	Stanpro Lighting Systems Inc., Dorval, Québec, Canada	
D. M. Berlin	Intermatic Incorporated, Spring Grove, Illinois, USA	
J. Bettinelli	Polefab Incorporated, Sharon, Ontario, Canada	
C. Bloomfield	Intertek, Arlington Heights, Illinois, USA	
M. JP. Brok	Golden Scorpion NL (GSNL), Monster, Netherlands	
F. Carpenter	Lithonia Lighting A Division of Acuity Holdings Inc., Conyers, Georgia, USA	
N. Chen	Orient Advantage Inc., Markham, Ontario, Canada	

G. Chopra	Electro Federation Canada, Toronto, Ontario, Canada
F. Dabiet	Allanson International Inc., Markham, Ontario, Canada
T. De Francesco	Aeromation Inc., Vancouver, British Columbia, Canada
P. Desilets	Leviton Canada, Pointe-Claire, Québec, Canada
T. Dinic	Electrical Safety Authority, Mississauga, Ontario, Canada
M. Dionne	Stanpro, Dorval, Québec, Canada
P. Doucet	New Brunswick Department of Justice and Public Safety, Moncton, New Brunswick, Canada
A. Ertz	Memphis, Tennessee, USA
J. A. Gibson	TriVar Inc., Brampton, Ontario, Canada
I. Giosan	Valmont West Coast Engineering Ltd., Delta, British Columbia, Canada
D. V. Grandin	Bureau Veritas Consumer Products Services, Buffalo, New York, USA
J. D. Green	Lambda 530 Consulting, LLC, Fayetteville, Georgia, USA
N. Gu	Orient Advantage Inc., Markham, Ontario, Canada
J. Guarino	Kenall Manufacturing Company, Inc., Gurnee, Illinois, USA

M. Harwood	William F White International Inc., Toronto, Ontario, Canada
R. Holden	MBS Equipment Co. Canada, Burnaby, British Columbia, Canada
S. Hunt	IATSE Local 891, Vancouver, British Columbia, Canada
B. Keane	Eaton's Crouse-Hinds Business, Syracuse, New York, USA
P. Kumar	Hubbell Canada ULC, Pickering, Ontario, Canada
B. Latour	Stanpro Lighting Systems Inc., Dorval, Québec, Canada
L. Lecce	Ceco Poles & Structures Inc., Calgary, Alberta, Canada
F. Li	Ledup Enterprise Inc., Agoura Hills, California, USA
J. Lincoln	Everstar Merchandise, Canton, Connecticut, USA
A. Lopez	Intermatic Inc., Libertyville, Illinois, USA
G. A. Lue	Illumineer Limited, Mississauga, Ontario, Canada
S. Léger	Standard Products Inc., Dorval, Québec, Canada
F. Magisano	Hubbell Canada ULC, Pickering, Ontario, Canada
R. Massett	Consumer Product Safety Directorate, Health Canada, Ottawa, Ontario, Canada

R. Mattatall	Mattatall Signs Limited, Dartmouth, Nova Scotia, Canada
T. McGowan	American Lighting Association, Oberlin, Ohio, USA
D. McMillan	Integral Group, Vancouver, British Columbia, Canada
M. M. McRae	National Tree Company, Ormond Beach, Florida, USA
E. Mendoza	Signify, Rosemont, Illinois, USA
M. S. O'Boyle	Signify North America Corporation, Fall River, Massachusetts, USA
J. Overton	Technical Safety BC, Cranbrook, British Columbia, Canada
D. Patel	Leviton Canada, North York, Ontario, Canada
A. Pontello	Canadian Tire Corporation, Limited, Toronto, Ontario, Canada
J. Porter	Independent, Toronto, Ontario, Canada
M. Porumbaceanu	Liteline Corp., Richmond Hill, Ontario, Canada
M. Primrose	Kino Flo Inc., Burbank, California, USA
G. Prosser	Kichler Lighting, Cleveland, Ohio, USA
R. Rapeanu	ABB Installation Products Ltd., Dorval, Québec, Canada
D. Rittenhouse	Maple Ridge, British Columbia, Canada

P. Rotiroti	The Home Depot Canada Inc., Toronto, Ontario, Canada
C. S. Seaby	Burlington, Ontario, Canada
F. Sellers	Chauvet, Sunrise, Florida, USA
A. W. Serres	Lucidity Lights, Inc., Concord Twp, Ohio, USA
M. S. Shulman	UL LLC, San Jose, California, USA
S. K. Simon	Zaneen Lighting Inc., Toronto, Ontario, Canada
R. Spehalski	Lutron Electronics Company Inc., Coopersburg, Pennsylvania, USA
M. K. Timmings	Binbrook, Ontario, Canada
A. Z. Tsisserev	AES Engineering Ltd., Vancouver, British Columbia, Canada
J. Vu	Ledup Enterprise Inc., Agoura Hills, California, USA
H. L. Wolfman	Lumispec Consulting, Northbrook, Illinois, USA
S. Yang	Dongguan Walter Electric Co., Ltd., Dongguan, Guangdong, China
J. Yon	GE Current, a Daintree Compny, East Cleveland, Ohio, USA
J. Zawalek	Health Canada, Ottawa, Ontario, Canada

D. Lemaux CSA Group,
Alpharetta, Georgia, USA

C. Hamza CSA Group, *Project Manager*
Toronto, Ontario, Canada

Preface

This is the fifth edition of CSA C22.2 No. 250.13, *Light emitting diode (LED) equipment for lighting applications*. It is one of a series of Standards issued by CSA Group under Part II of the *Canadian Electrical Code*. It supersedes the previous editions published in 2020, 2017, 2014, and 2012.

The Scope of this edition has been revised to add limitations for LED equipment with features required to comply with other applicable requirements. Additional revisions have been made for potting compounds, direct plug-in and through-cord units, supply and load connections, limitations of LED controllers, the leakage current test, Class P controlgear, controlgear for hazardous location luminaires, and LED packages. New construction, testing, and marking requirements for feedthrough circuits, LED equipment requiring grounding and bonding, Type IC LED controlgear, special use LED arrays, and double-insulated LED equipment have also been added.

This Standard is based on, and includes copyrighted text from, ANSI/UL 8750, *Light Emitting Diode (LED) Equipment for Use in Lighting Products*. ANSI/UL 8750 is reprinted with permission from Underwriters Laboratories Inc. (UL), which owns the copyrights in ANSI/UL 8750. UL shall not be responsible for the use or reliance upon a UL standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon a UL standard. Revisions of UL standards are issued from time to time. A UL standard is current only if it incorporates the most recently adopted revisions.

For general information on the standards of the *Canadian Electrical Code, Part II*, see the Preface of CSA C22.2 No. 0, *General Requirements — Canadian Electrical Code, Part II*.

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

This Standard was prepared by the Integrated Committee on Lighting Products, under the jurisdiction of the Technical Committee on Consumer and Commercial Products and the Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the Technical Committee.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Interpretations: The Strategic Steering Committee on Requirements for Electrical Safety has provided the following direction for the interpretation of standards under its jurisdiction: "The literal text shall be used in judging compliance of products with the safety requirements of this Standard. When the literal text cannot be applied to the product, such as for new materials or construction, and when a relevant CSA committee interpretation has not already been published, CSA Group's procedures for interpretation shall be followed to determine the intended safety principle."

Notes:

1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
2) *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.*
3) *This Standard was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*

4) *To submit a request for interpretation of this Standard, please send the following information to inquiries@csagroup.org and include "Request for interpretation" in the subject line:*
   a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
   b) *provide an explanation of circumstances surrounding the actual field condition; and*
   c) *where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.*

   Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization *and are available on the* Current Standards Activities *page at standardsactivities.csa.ca.*
5) *This Standard is subject to review within five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line:*
   a) *Standard designation (number);*
   b) *relevant clause, table, and/or figure number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

CSA C22.2 No. 250.13:22
Light emitting diode (LED) equipment for lighting applications

1 Scope

1.1

The requirements specified in this Standard cover non-coherent light-emitting diode (LED) equipment that is intended for operation in the visible light spectrum between 400 and 700 nm, for installation on branch circuits of 600 V nominal or less, in accordance with CSA C22.1, *Canadian Electrical Code, Part I*, and for connection to isolated (non–utility-connected) power sources, such as generators, batteries, fuel cells, solar cells, and the like. These requirements cover

a) LED controlgear;
b) LED controllers that are intended to be integral to the luminaire or located remotely from the luminaire when the LED controller is supplied from and controls the luminaire using only Class 2 circuits;
c) component parts such as arrays, modules, and packages; and
d) equipment that is an integral part of a luminaire or other lighting equipment, and are intended to supplement those in other end-product standards:
    i) CSA C22.2 No. 207;
    ii) CSA C22.2 No. 250.4;
    iii) CSA C22.2 No. 89;
    iv) CSA C22.2 No. 141;
    v) CSA C22.2 No. 166;
    vi) CSA C22.2 No. 9.0;
    vii) CSA C22.2 No. 250.0;
    viii) CSA C22.2 No. 250.2;
    ix) CSA C22.2 No. 256;
    x) CSA C22.2 No. 250.7; and
    xi) CSA C22.2 No. 1993.

Notes:

1) *Where end applications are not covered by this Standard and no applicable end-product standards exist, additional end-product evaluations using applicable standards are needed. Such end applications include, but are not limited to, LED equipment installed in air handling spaces or in other environmental air spaces (plenums), LED equipment in recessed installations where direct contact with thermal insulation could occur, and LED equipment used in fire-rated installations.*
2) *LED packages (see Annex I) and special use LED arrays (see Annex N) have intended applications other than general illumination and may operate outside of the visible light spectrum.*

1.2

These requirements do not anticipate additional construction, marking, and performance considerations for LED equipment used in fire rated installations, environmental air handling spaces, outdoor use in the end-use application, equipment with integral batteries or battery packs, and emergency lighting equipment. LED equipment intended for these end-use applications is subject to additional evaluation as per applicable standards.

