

Section A Introduction

ES54 A0

A0-01 Table of Contents

ES54 A1

- A1-01 Notice from the Executive Vice President Transmission and Distribution and Customer Service
- A1-02 CSA Codes, Authority Having Jurisdiction, Tariff, and Application of Standards

Introduction Table of Contents	Issued: 2025-05-01 Effective: 2025-05-01	DISTRIBUTION STANDARDS 	ES54 A0-01 R4
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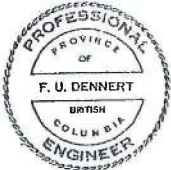
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REVISIONS: UPDATED LEGAL ACKNOWLEDGEMENT FORM, FD MAR '16

DESIGNED J. AGNOLIN	RECOMMENDED  F. DENNERT	ACCEPTED  G. REIMER	ENGINEER OF RECORD 	NOTICE FROM THE EXECUTIVE VICE PRESIDENT TRANSMISSION AND DISTRIBUTION AND CUSTOMER SERVICE		
DISTRIBUTION STANDARDS 		ISSUED: MAR 2016 REPLACES: MAY 2004 ORIGINALLY ISSUED: NOV 1980				PAGE 1 OF 2

Scope

This manual is one of a series containing standards for construction of the BC Hydro electrical distribution plant within the service area of BC Hydro. A new distribution plant shall be designed, constructed, owned, operated, maintained and repaired to these standards.

Purpose of Standards

BC Hydro objectives require standardization to:

- Ensure uniform safety requirements comply with BC statutes and regulations.
- Provide uniform system reliability.
- Provide uniform operating practices.
- Permit economic bulk purchasing of materials.
- Achieve optimum life cycle cost of plant construction.
- Effect efficient quality assurance.

Responsibility

The Distribution Standards Department prepares these standards and verifies that specified plant and procedures will perform adequately under all normally expected conditions encountered throughout the province of British Columbia. These standards are approved by Professional Engineers. It is the responsibility of BC Hydro Managers to ensure that the standards are followed unless abnormal conditions are encountered that require variations. These variations should be kept to a minimum and their performance shall be the responsibility of the Professional of Record in charge of the project, who will record and seal the variation based on satisfactory qualifications and experience to do so. As per the latest revision of the BC Hydro Distribution Owner's Engineer Guide, these variations must be accepted by BC Hydro's Owner's Engineer.

Use of Stock Materials

The electrical distribution plant covered by these standards is built using stock materials approved by a Professional Engineer as required by law. The use of non-stock materials for special and unusual situations must be approved by Distribution Standards or the BC Hydro Engineer responsible for the project.

Revisions to Manual

These standards are revised from time to time to improve the safety, performance, workability, cost effectiveness or appearance of the plant. The existing plant built to previous standards need not be updated unless so specifically advised by BC Hydro. When maintenance or other work, such as voltage conversion or conductor change is being done, updating plant to current standards is encouraged.

Mailing Addresses

The manual has been issued to a corporation or firm rather than to an individual. The corporation or firm is responsible for the safekeeping of the manual, and for keeping it current. Changes of address or in number of copies required must be reported promptly.

Suggestions for changes in the manual, or required changes of address may be made on the pre-addressed comment sheet included in the Manual and with each issue of revision.

REVISIONS: UPDATED LEGAL ACKNOWLEDGEMENT FORM. FD MAR '16

DESIGNED J. AGNOLIN	RECOMMENDED  F. DENNERT	ACCEPTED  S. REIMER	ENGINEER OF RECORD  F. U. DENNERT PROFESSIONAL ENGINEER BRITISH COLUMBIA	NOTICE FROM THE EXECUTIVE VICE PRESIDENT TRANSMISSION AND DISTRIBUTION AND CUSTOMER SERVICE		
DISTRIBUTION STANDARDS BC Hydro		ISSUED: MAR 2016 REPLACES: MAY 2004 ORIGINALLY ISSUED: NOV 1980		PAGE 2 OF 2	ES43/53/54/55/65 A1-01.02	R 4

Application

This document covers the references and interpretations which form the basis for BC Hydro distribution standards.

Revision Notes

New standard. This standard released concurrently with Standards and Equipment Advisory 2025-032 *Released ES43/53/54/55/65 A1-02 Clarifying Application of CSA Codes, Jurisdictional Boundaries, and Legal Basis for Distribution Standards.*

References

BC Hydro Documents

BC Hydro Electric Tariff

Distribution Instruction D10-4 Distribution Facilities on Private Property

External Documents

BCBC	British Columbia Building Code 2024 Book I: General
B.C. Reg. 100/2004	British Columbia Safety Standards Act, Electrical Safety Regulation
CSA C22.1	Canadian Electrical Code, Part I, Safety Standard for Electrical Installations
CSA C22.3 No. 1	Overhead systems
CSA C22.3 No. 3	Electrical coordination
CSA C22.3 No. 4	Control of Electrochemical Corrosion of Underground Metallic Structures
CSA C22.3 No. 5.1	Recommended practices for electrical protection - Electric contact between overhead supply and communication lines
CSA C22.3 No. 6	Principles and practices of electrical coordination between pipelines and electric supply lines
CSA C22.3 No. 7	Underground systems
CSA C22.3 No. 8	Railway Electrification Guidelines
CSA C22.3 No. 9	Interconnection of distributed energy resources and electricity supply systems
CSA C22.3 No. 11	Maintenance of electric and communication utility equipment and systems
CSA C22.3 No. 60826	Overhead transmission lines - Design criteria
CSA C22.3 No. 61936	Power installations exceeding 1 kV a.c. - Part 1: Common Rules
CSA-IEC 61000	Electromagnetic compatibility series of standards
TSBC B-E3 090312 1	Information Bulletin: Overhead line guidelines
TSBC D-EL 2017-01	Directive: Exemptions to Public Utilities
TSBC IB-EL 2016-02	Information Bulletin: High Voltage Installations
TSBC IB-EL 2017-04	Information Bulletin: Electrical Safety Regulation Application to Public Utilities

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Notes

1. Introduction

This document provides an overview of CSA electrical codes, authority having jurisdiction and the boundary between applicable codes, and the Electric Tariff. It summarizes the CSA C22.3 Part III codes applicable to utilities. These standards are developed by the Canadian Standards Association, an independent standards development organization accredited by the Standards Council of Canada. The document covers the application of these standards to overhead and underground distribution systems and electrical service standards. It also addresses the regulatory framework governing BC Hydro's standards and electrical services and the jurisdictional boundaries.

2. Canadian Standards Association (CSA) Codes

BC Hydro distribution standards are based on CSA C22.3 standards, known as Part III electrical codes. The objective of these codes is:

- a. Safety; system reliability, and service quality;
- b. Operations efficiency – maintenance and management of assets;
- c. Asset Management – enable infrastructure development and replacement; and
- d. Adapting to climate change.

CSA is an independent standards development organization accredited by the Standards Council of Canada. SCC is a federal crown corporation established by an act of parliament in 1970 to foster and promote voluntary standardization in Canada. It is independent of government in its policies and operations, although it is financed partially by parliamentary appropriation.

CSA C22.1 *Canadian Electrical Code, Part I, Safety Standard for Electrical Installations* is adopted into law in British Columbia and is mandatory for residential, commercial, and industrial customers beyond the demarcation. The BC adoption, with amendments, is known as the BC Electrical Code. It does not apply to utilities performing work in their capacity as a utility.

CSA C22.2, known as Part II of the Canadian Electrical Code, are the equipment standards mandated by Part I. Some are certification standards for certification of equipment. Some are used by utilities to specify equipment, but utilities do not require certification as per the BC Electrical Safety Regulation paragraph 21 (4). CSA also provides testing and certification of products used in conjunction with Part I.

The CSA Part III standards used by utilities are:

- a. CSA C22.3 No. 1 *Overhead systems*
- b. CSA C22.3 No. 3 *Electrical coordination*
- c. CSA C22.3 No. 4 *Control of Electrochemical Corrosion of Underground Metallic Structures*
- d. CSA C22.3 No. 5.1 *Recommended practices for electrical protection - Electric contact between overhead supply and communication lines*
- e. CSA C22.3 No. 6 *Principles and practices of electrical coordination between pipelines and electric supply lines*
- f. CSA C22.3 No. 7 *Underground systems*
- g. CSA C22.3 No. 8 *Railway Electrification Guidelines*
- h. CSA C22.3 No. 9 *Interconnection of distributed energy resources and electricity supply systems*
- i. CSA C22.3 No. 11 *Maintenance of electric and communication utility equipment and systems*
- j. CSA C22.3 No 60826 *Overhead transmission lines - Design criteria*
- k. CSA C22.3 No. 61936 *Power installations exceeding 1 kV a.c. - Part 1: Common Rules*

These standards, except for C22.3 No. 8 and C22.3 No. 60826, inform the distribution construction and design standards. The design basis for the overhead distribution system is CSA C22.3 No. 1 *Overhead systems*. It is also the technical basis of the Joint Use Agreement with TELUS. The design basis for the underground distribution system is CSA C22.3 No. 7 *Underground systems*.

CSA C22.3 No. 1 *Overhead systems* specifies:

- a. Service and operating conditions;
- b. Accessibility and working space on joint structures;
- c. Clearances, separations, spacings, offsets;
- d. Grades of construction;
- e. Weather loadings;
- f. Required strength of systems; and
- g. Grounding requirements.

CSA C22.3 No. 7 *Underground systems* specifies:

- a. Service and operating conditions;
- b. Location, unstable soils, seismic requirements;
- c. Depth of burial;
- d. Separations;
- e. Construction requirements:
 - i. Direct buried systems;
 - ii. Duct systems;
 - iii. Vaults, subsurface chambers, and boxes; and
 - iv. Above ground equipment;
- f. Electrical requirements;
- g. Grounding and bonding; and
- h. Records and identification of underground plant.

These codes specify dimensions (clearances, offsets, separations, spacings, working space) between adjacent utilities and infrastructure.

The No. 1 and No. 7 Part III codes are updated on a five-year cycle. The code committees have balanced representation and strive for consensus. There is a public notice before publication and the ballot process ensures dissenting ballots are dealt with before finalization.

3. CSA Application to BC Hydro

BC Hydro follows the Part III codes although they are not adopted into law per the BC adoption of CSA C22.1, Part I *Safety Standard for Electrical Installations*. The Part III codes are not legally binding in British Columbia but represent best practice. They are developed by committees of experts with national representation from utilities, including BC Hydro, telecoms, suppliers, and other industry representatives such as regulators, railways, and pipeline companies. They are considered by the BC Utilities Commission when making regulatory decisions. In the event of an incident that goes to court, an independent expert will always refer to CSA codes. BC Hydro must defend their standards and practices if they deviate from the CSA codes.

4. Power Quality Standards

The CSA-IEC 61000 series of standards provides the framework for achieving electromagnetic compatibility (EMC) in Canada. The series covers all aspects of EMC including description of the electromagnetic environment, power quality measurement, power system compatibility levels, equipment and large installation

emission limits, and equipment immunity levels. The standards, while voluntary in Canada, are referenced extensively by BC Hydro in ES55 section Q *Power Quality* (PQ) standards which define voltage planning targets and customer emission limits for both low and medium-voltage installations. Many equipment immunity standards are referenced by BC Hydro's equipment specifications.

5. Authority Having Jurisdiction and Demarcation

In the simplest terms, Part I and Part II standards apply on the customer side of the demarcation and Part III standards apply on the utility side. The demarcation for overhead secondary is the conductor at the top of the weather head. The demarcation for underground secondary is the high side lugs on the meter base. The demarcation for underground primary is the point of utility cable connection inside the customer's building or kiosk, and for overhead primary it is the first pole.

The scope sections of CSA C22.3. No.1 and No.7 were updated in 2016 (published in 2020 editions) clarifying that these Part III standards also apply to utility installations on private property and inside buildings. The scope clauses state:

This Standard applies to electric supply and communication lines and equipment located entirely outside of buildings and fenced supply stations and buildings, and also where the installations or equipment are inside buildings or sections of buildings where they are employed by a utility of

- a. an electric system;
- b. a communication system; or
- c. a community antenna distribution system

in the exercise of its function as a utility.

This is consistent with the scope section of CSA C22.1:24, *Canadian Electrical Code, Part I, Safety Standard for Electrical Installations* which states:

This Code applies to all electrical work and electrical equipment operating or intended to operate at all voltages in electrical installations for buildings, structures, and premises, ... with the following exceptions: a) installations or equipment employed by an electric, communication, or community antenna distribution system utility in the exercise of its function as a utility, as recognized by the regulatory authority having jurisdiction, and located outdoors or in buildings or sections of buildings used for that purpose; ...

Technical Safety BC has clarified the exemption to utilities for installations on private property in TSBC information bulletin IB-EL 2017-04 *Electrical Safety Regulation Application to Public Utilities*. This information bulletin and its attachment with appendices can be found on the TSBC website. The appendices clearly define the exemption with sketches and an application table, and provide specific information on the utility point of connection (demarcation), defining what is utility work and what work requires a permit and compliance with the BC Electrical Code.

The exemption is supported by TSBC directive D-EL 2017-01 *Exemptions to Public Utilities* which states the *Electrical Safety Regulation* does not apply to a public utility as defined in the *Utilities Commission Act* in the exercise of its function as a utility with respect to the generation, transmission, and distribution of electrical energy.

6. B.C. Safety Standards Act Electrical Safety Regulation

The interpretations of exemptions described in note 5 are consistent with *British Columbia Safety Standards Act, Electrical Safety Regulation*, B.C. Reg. 100/2004, last amended December 1, 2022 by B.C. Reg 255/2022. Clause 3 *Application to utilities* states:

(1) This regulation, except for section 3.1, does not apply to a public utility as defined in the Utilities Commission Act in the exercise of its function as a utility with respect to the generation, transmission and distribution of electrical energy.

(2) Despite subsection (1), this regulation applies to the electrical equipment owned or in the possession or control of a public utility if the electrical equipment is not used directly in the generation, transmission and distribution of electrical energy.

The *BC Electrical Safety Regulation* also covers approval of equipment. Clause 21 *Certification or approval mark required for electrical equipment* states:

(1) ... a person must not use electrical equipment in British Columbia, or offer for sale, sell, display or otherwise dispose of electrical equipment for use in British Columbia, unless the electrical equipment displays a label or mark ...

(4) Electrical equipment that has not been approved under subsection (1) may ... (b) be used by a utility in its capacity as a utility if a professional engineer has certified that the use of the equipment is safe.

The B.C. Building Code (BCBC) may impose additional requirements beyond those specified in the *Electrical Safety Regulation*, to which this exemption does not apply. According to the *Electric Tariff*, it is the customer's responsibility to comply with these additional regulations and BC Hydro will accommodate these requirements as necessary.

7. Electric Tariff

BC Hydro's services and pricing are regulated by the British Columbia Utilities Commission. The *Electric Tariff* contains the approved terms and conditions for distribution voltage service provided by BC Hydro and the approved rates for service at distribution voltage and transmission voltage. The *Electric Tariff* is binding on BC Hydro and all customers who request and receive service from BC Hydro. The *Electric Tariff* governs how BC Hydro treats its customers.

The *Utilities Commission Act* enables the British Columbia Utilities Commission to regulate utilities, including BC Hydro. The BCUC is authorized to review and approve rates as part of its administrative function, which includes the terms and conditions of BC Hydro's *Electric Tariff*. The BCUC undertakes a regulatory proceeding to approve the *Electric Tariff*, which includes submissions from BC Hydro and intervenors.

A customer must be connected by a service connection to receive electric service. Section 3.1 of the *Electric Tariff* states:

BC Hydro will provide an overhead or underground Service Connection for a Premises, subject to and in accordance with BC Hydro's current distribution system development plans, distribution standards and applicable laws and regulations in each case.

Further, section 4.2 states:

The Customer will provide wiring, fittings, structures and poles satisfactory to BC Hydro and in accordance with any applicable electrical code, civic by-law or other law or regulations, for the installation of each meter.

A customer receiving electric service from BC Hydro must meet not only local laws and electrical code requirements, but also BC Hydro's connection requirements and standards. Civil and electrical work on private property for the purpose of electrical distribution by the utility shall be built to BC Hydro standards. The customer shall supply, install, and maintain civil work and structures required for underground service connections on private property at their own cost.

The *Electric Tariff*, section 7.3 *Disturbing Use*, allows BC Hydro to restrict the equipment and loads that are interconnected to the electric system if they do not comply with BC Hydro's power quality customer emission limits standards. Section 7.3 states:

All equipment for which Electricity is provided under the *Electric Tariff* will be subject to the reasonable approval of BC Hydro and the Customer will at all times take and use Electricity so as not to endanger BC Hydro's apparatus or cause any undue or abnormal fluctuation of BC Hydro's line voltage or introduce disturbing elements into BC Hydro's electrical system. For three phase, four wire Service, the system design for the Premises served must not be such that any condition of unbalanced load between phases exceeds 10% of the phase carrying the least load.

BC Hydro may require the Customer, at the Customer's own expense, to provide equipment which will reasonably limit such fluctuations or disturbances and may refuse to provide Electricity or suspend Service until such equipment is provided.

8. Private Power Lines

Private power lines are under the jurisdiction of Technical Safety BC per information bulletin IB-EL 2016-02 *High Voltage Installations* which states that designers should consult the CSA C22.3 No. 1 and CSA C22.3 No. 7 standards. TSBC information bulletin B-E3 09312 1 *Overhead lines guideline* and the attachment *BC Guideline for Overhead Line Construction* provide information that mirrors CSA C22.3 No.1:15 and provides clarification on BC Electrical Code rules. TSBC IB-EL 2016-02 also states that private high-voltage installations connected to the utility must be acceptable to the utility.

BC Hydro does not share their design and construction standards with designers or constructors of private power lines as BC Hydro will not accept the liability. The exception is if a line is for BC Hydro takeover and there is an agreement in place. Lines for BC Hydro takeover must be constructed with BC Hydro approved materials, or materials acceptable to BC Hydro. Refer to BC Hydro Distribution Instruction D10-4 *Distribution Facilities on Private Property*.