

Block C: Routine Trade Activities and Electrical Concepts



Plumbing Apprenticeship Program Level 1 Series

Block C: Routine Trade Activities and Electrical Concepts

BC Plumbing Apprenticeship, Level 1

SKILLEDTRADESBC

AUDREY CURRAN; MARK OVERGAARD; BC PIPING ARTICULATION AND CURRICULUM SUBCOMMITTEE; AND PAUL SIMPSON

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Block C: Routine Trade Activities and Electrical Concepts of the Plumbing Apprenticeship Program Level 1 Series features Skilled Trades BC industry-authority content on the routine trade activities and foundational electrical concepts that support accurate, efficient, and code-compliant plumbing work. This block emphasizes the knowledge apprentices rely on to interpret information, apply standards, and make informed decisions on the job site.

In Block C, apprentices develop core skills in mathematics and science as they apply to the trades, build an understanding of basic electrical concepts and principles of electricity, and learn how to read and interpret drawings and specifications. The block also introduces codes, regulations, and standards, along with the effective use of manufacturer and supplier documentation. Together, these competencies help apprentices work safely, communicate clearly with other trades, and ensure installations meet required technical and regulatory expectations.

Plumbing Apprenticeship Program Level 1 Series

The *Plumbing Apprenticeship Program Level 1 Series* offers comprehensive training materials designed to build on foundational skills and knowledge. The series is divided into four main blocks, each focusing on critical areas of plumbing systems and installations.

Block A: Safety Related Functions

- A-1: Workplace Hazards
- A-2: WorkSafeBC Regulations
- A-3: Safe Handling of Hazardous Materials
- A-4: Personal Safety Practices
- A-5: Fire Safety

Block B: Tools and Equipment

- B-1: Use Hand Tools and Measuring Tools
- B-2: Use Portable Power Tools and Use
- B-3: Use Access Equipment
- B-4: Use Rigging, Hoisting, Lifting and Positioning Equipment, and Rigging
- B-5: Use Soldering and Brazing Equipment and Oxy-Fuel Cutting Equipment
- B-6: Use Welding Equipment

Block C: Routine Trade Activities and Electrical Concepts

- C-1: Mathematics and Science
- C-2: Electrical Concepts and Principles of Electricity
- C-3: Drawings and Specifications

C-4: Codes, Regulations and Standards

C-5: Manufacturer and Supplier Documentation

Block D: Piping and Components

D-1: Install Pipe and Tubing

D-2: Install Valves

D-3: Install Fittings

D-4: Penetrate Structures

Plumbing Apprenticeship Program Overview and Upcoming Resources

- **Plumbing Apprenticeship Program Level 1 Series** can be found in the TRU Open Press Collection.
- **Plumbing Apprenticeship Program Level 2 Series** can be found in the TRU Open Press Collection.
- **Plumbing Apprenticeship Program Level 3 Series** can be found in the BCCampus Open Collection.
- **Plumbing Apprenticeship Program Level 4 Series** can be found in the BCCampus Open Collection.
(Block F: Commission and Service will be available soon.)

Disclaimer

The materials in these Learning Guides are intended for use by students and instructional staff. They have been compiled from sources believed to be reliable and to represent the best current opinions on these subjects. These manuals are designed to serve as a starting point for good practices and may not cover all minimum legal standards. No warranty, guarantee, or representation is made by the BC Piping Trades Articulation Committee, the Skilled Trades BC authority, or the King's Printer of British Columbia regarding the accuracy or sufficiency of the information contained in these publications. These manuals aim to provide basic guidelines for piping trades practices. Therefore, do not assume that all necessary warnings and safety precautions are included, and additional measures may be required.

Safety Advisory

The current Standards and Regulation in BC can be obtained at the WorkSafeBC website: <http://www.worksafebc.com>

Please note that it is always the responsibility of any person using these materials to inform themselves about the Occupational Health and Safety Regulation pertaining to their areas of work.

[From previous 2021 book – confirm this message with Skilled Trades]

Symbol Legend



Important Information



Potentially Toxic/ Poisonous Situation



Required or Optional Resources



Potentially Flammable Situation



Complete a Self-Test



Possibly Explosive Situation



Use Protective Equipment



Potential Electric Shock

Acknowledgements

The development of the *Plumbing Apprenticeship Level 1* learning resources was a collaborative effort driven by a commitment to excellence in trades education. These resources were created to support apprentices and journeypersons in mastering the skills and knowledge essential to the piping trades. This achievement would not have been possible without the dedication and expertise of *Skilled Trades BC* and the *Piping Trades Articulation Committee*, whose contributions, leadership, and guidance have been instrumental in shaping high-quality, industry-aligned training resources. We extend our sincere gratitude for their contributions and ongoing stewardship in advancing the piping trades.

The content for *Block C: Routine Trade Activities and Electrical Concepts* is adapted from the Piping Trades Apprenticeship Program from SkilledTradesBC (2019 Harmonized) and the Trades Access Common Core (TACC) resources developed by Camosun College, created in 2015 and revised in 2019, and made available through BCcampus:

- Line D: Organizational Skills: Competency D-1: Solve Trades Mathematical Problems
- Line D: Organizational Skills: Competency D-2: Apply Science Concepts to Trades Applications
- Line D: Organizational Skills: Competency D-3: Read Drawings and Specifications
- Line D: Organizational Skills: Competency D-4: Use Codes, Regulations and Standards
- Line D: Organizational Skills: Competency D-5: Use Manufacturer and Supplier Documentation
- Line D: Organizational Skills: Competency D-6: Plan Projects

The original materials were produced in collaboration with industry partners and aligned with the Industry Training Authority (ITA)/SkilledTradesBC harmonized program outlines for Plumbing, Steamfitting/Pipefitting, and Sprinkler Fitting. These works were released under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence, except where otherwise noted.

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This adapted version has been reformatted and integrated into the current Thompson Rivers University/TRU Open Press open educational resource in collaboration with the BC Piping Articulation and Curriculum Subcommittee and SkilledTradesBC, in support of open, accessible, and up-to-date apprenticeship training.



The Open Press

The Open Press combines TRU's open platforms and expertise in learning design and open resource development to support the creation and reuse of open educational resources, while encouraging open scholarship and research.

Resource Development Team 2024-2026

Content Review, Revision, and Development: BC Plumbing Articulation Curriculum Subcommittee and Audrey Curran

Final Content Review and Revisions: Audrey Curran and Mark Overgaard, BCIT

Project Lead (TRU Plumbing Trades): Paul Simpson, Curriculum Subcommittee Chair

Author: SkilledTradesBC

Publishing Manager/ Copy Editing: Dani Collins, MEd

Production: Jessica Obando Almache, BCS

- Co-op Students:
 - Greg Vilac
 - Riley Phillips
 - Vansh Sethi
 - Jesse Perkins, BCS Co-op Student
 - Daniel Abdulai
 - Kobe Shimoyama
 - Jose Contreras Antequera

Resources

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- ©2019, Skilled Trades BC (Harmonized)
- Open School BC
- Camosun College
- Trades Training BC

For the latest BC Plumbing Trades Program Outline (2025), see the SkilledTradesBC website: www.skilledtrades.bc.ca

To order printed copies of Program Outlines or learning resources (where available) for BC Trades, contact:

Crown Publications, King's Printer

Web: www.crownpub.bc.ca

Email: crownpub@gov.bc.ca

Toll Free: 1 800 663-6105

- Piping Trades Apprenticeship Program – Perform Safety Related Functions – Level 1 Harmonized (2019) (Binder) (ISBN: 978-0-7726-7362-6; product no. 7960000260) Crown Publications Online Catalogue – Piping Trades Apprenticeship Program – Perform Safety Related Functions – Level 1 Harmonized (2019) (Binder)
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Land Acknowledgement

Thompson Rivers University (TRU) campuses are situated on the ancestral lands of the Tk'emlúps te Secwépemc and the T'exelc within Secwepemcúl'ecw, the ancestral and unceded territory of the Secwépemc. The rich tapestry of this land also encompasses the territories of the St'át'imc, Nlaka'pamux, Tšilhqot'in, Nuxalk, and Dakelh. Recognizing the deep histories and ongoing presence of these Indigenous peoples, we express gratitude for the wisdom held by this land. TRU is dedicated to fostering an inclusive and respectful environment, valuing education as a shared journey. TRU Open Press, inspired by collaborative learning on this land, upholds open principles and accessible education, nurturing respectful, reciprocal relationships through the shared exchange of knowledge across generations and communities.



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If you are using a printed copy, you can scan the QR code with your digital device to go directly to the video: Introducing SkilledTradesBC



Starting December 1, 2022, Industry Training Authority was officially renamed to SkilledTradesBC. Hear more in this video from SkilledTradesBC CEO, Shelley Gray, on what this means for the trades industry and British Columbians. Closed captioning and transcripts are available with this video, Introducing Skilled Trades BC (2022) on YouTube.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://c-tradeactivities-electrical-bcplumbingapprl1.pressbooks.tru.ca/?p=2618>

AI Use Statement

ChatGPT and other (AI) tools may have been used to assist with the development of glossary definitions, support copy editing for grammar, clarity, and readability, and revise some image content. All content was reviewed, revised, and verified by the authors to ensure accuracy and alignment with course and industry standards.

References

- Camosun College. (n.d.). *Line D: Organizational Skills*. BCcampus. <https://collection.bccampus.ca/textbook/qFKGAJ78/>
- SkilledTradesBC. (2025). Plumber program outline (Implementation date: August 18, 2025; Last revised: December 16, 2025) [PDF]. Province of British Columbia. <https://skilledtradesbc.ca/media/2776/download>
- SkilledTradesBC. (2022, December 1). Introducing Skilled Trades BC. YouTube. <https://www.youtube.com/watch?v=OQgwdP0rNog>

Accessibility

The web version of *Block C: Routine Trade Activities and Electrical Concepts* has been designed to meet Web Content Accessibility Guidelines 2.0, level AA. In addition, it follows all guidelines in Appendix A: Checklist for Accessibility of the Accessibility Toolkit – 2nd Edition.

Includes:

- **Easy navigation.** This resource has a linked table of contents and uses headings in each chapter to make navigation easy.
- **Accessible videos.** All videos in this resource have captions.
- **Accessible images.** All images in this resource that convey information have alternative text. Images that are decorative have empty alternative text.
- **Accessible links.** All links use descriptive link text.

Accessibility Checklist

Element	Requirements	Pass
Headings	Content is organized under headings and subheadings that are used sequentially.	
Images	Images that convey information include alternative text descriptions. These descriptions are provided in the alt text field, in the surrounding text, or linked to as a long description.	
Images	Images and text do not rely on colour to convey information.	
Images	Images that are purely decorative or are already described in the surrounding text contain empty alternative text descriptions. (Descriptive text is unnecessary if the image doesn't convey contextual content information.)	
Tables	Tables include row and/or column headers with the correct scope assigned.	
Tables	Tables include a title or caption.	
Tables	Tables do not have merged or split cells.	
Tables	Tables have adequate cell padding.	
Links	The link text describes the destination of the link.	
Links	Links do not open new windows or tabs. If they do, a textual reference is included in the link text.	
Links	Links to files include the file type in the link text.	
Video	All videos include high-quality (i.e., not machine generated) captions of all speech content and relevant non-speech content.	
Video	All videos with contextual visuals (graphs, charts, etc.) are described audibly in the video.	
H5P	All H5P activities have been tested for accessibility by the H5P team and have passed their testing.	
H5P	All H5P activities that include images, videos, and/or audio content meet the accessibility requirements for those media types.	
Font	Font size is 12 point or higher for body text.	
Font	Font size is 9 point for footnotes or endnotes.	
Font	Font size can be zoomed to 200% in the webbook or eBook formats.	

Known Accessibility Issues and Areas for Improvement

- Images in H5P self-tests lack alt text, attributions, and licenses to avoid revealing answers.
- Some tables may use merged cells, but they have been structured to work properly with screen readers and there may be long descriptions included in each section if readers prefer to see the table data in a bulleted list.
- Youtube videos do not have edited captions.

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Other Formats Available

- In addition to the web version, this book is available in a number of file formats, including PDF. The Print PDF has passed our Accessibility Check.

C-4 CODES, REGULATIONS AND STANDARDS

Plumber Apprenticeship Program – Level 1



Engineer with safety gear inspecting red industrial piping system indoors (Marianna Zuzanna/Pexels) Pexels License

C-4 Codes, Regulations and Standards Introduction

Codes, regulations, and standards play a critical role in the pipe trades by ensuring that work is safe, reliable, and meets legal and environmental requirements. They guide how systems are designed, installed, and maintained, and help protect both people and the environment.

In this section, you will learn about the organizations that develop these codes and standards, where they are applied in everyday trade work. Environmental agencies and health authorities play a key role in regulating sewage disposal systems to protect public health and water quality. In British Columbia, this includes provincial legislation, regional health authorities, and local permitting bodies. Understanding these requirements is essential for working to code, maintaining public health and safety, and meeting industry expectations.

Learning Objectives

After completing this section, you should be able to:

- Identify organizations, codes, and standards affecting the pipe trades.
- Describe where various codes and standards are encountered within the pipe trades.
- Identify environmental agencies with concerns related to sewage disposal.

Topic areas covered in this publication are in alignment with SkilledTradesBC Harmonized 2018 Program Outlines.



You will be required to reference publications and videos available online at WorkSafeBC.

In practice: The most commonly used documents in everyday plumbing work include the National Building Code of Canada, the CSA Gas Code, local permits, and Technical Safety BC regulations. The tables below summarize key codes, standards, and organizations you may encounter in the pipe trades.

Core codes and legislation (Canada and British Columbia)

Document or organization	What it is used for	Where you will see it
National Building Code of Canada (NBC)	Sets minimum requirements for building safety, construction, and occupancy	Design, construction, inspections
BC Public Health Act	Protects public health, including water and sewage systems	Onsite sewage, drinking water systems
BC Sewerage System Regulation and Standard Practice Manual	Governs design and installation of onsite sewage systems	Residential and rural plumbing
Safety Standards Act (BC)	Regulates installation and operation of technical systems	Gas, boilers, pressure systems
Gas Safety Regulation (Technical Safety BC)	Rules for installing and maintaining gas systems	Gas fitting work
Power engineers and pressure equipment regulation	Governs boilers, pressure vessels, and refrigeration systems	Industrial and commercial systems

CSA codes (Canada)

Document or organization	What it is used for	Where you will see it
CSA Gas Code (with BC variations)	Installation and safety requirements for gas systems	Daily gas work
CSA B51 and CSA B52	Standards for pressure vessels and refrigeration systems	Mechanical systems

Technical industry codes

Document or organization	What it is used for	Where you will see it
ASME B31 series (piping codes)	Design and construction of piping systems	Industrial piping
ASME Boiler and Pressure Vessel Code	Safety and design of pressure equipment	Boilers and pressure systems
ANSI and National Board codes	Inspection and safety requirements	Equipment inspection
API standards	Inspection and maintenance of piping and vessels	Oil, gas, and industrial work

Fire and safety codes

Document or organization	What it is used for	Where you will see it
NFPA codes (e.g., NFPA 85)	Fire prevention and safety systems	Combustion systems and safety compliance

Material and product standards		
Document or organization	What it is used for	Where you will see it
ASTM International	Material testing and specifications	Product selection
ULC (Underwriters Laboratories of Canada)	Product safety testing and certification	Approved equipment
CGSB (Canadian General Standards Board)	National standards for products and systems	Materials, transport, safety
AWWA (American Water Works Association)	Standards for water systems and treatment	Water distribution systems
International standards		
Document or organization	What it is used for	Where you will see it
ISO (International Organization for Standardization)	Global standards for products and systems	Manufacturing and international work
Sustainability frameworks		
Document or organization	What it is used for	Where you will see it
LEED (Leadership in Energy and Environmental Design)	Green building certification and environmental performance	Design and construction projects
Local requirements and permits		
Document or organization	What it is used for	Where you will see it
Municipal bylaws and permits	Legal approval and compliance for construction	All job sites
Building, plumbing, and gas permits	Ensure work meets code requirements	Daily trade practice
Authority having jurisdiction (AHJ)	Reviews and approves permits and inspections	Inspections and approvals

Terminology

The following terms may be used throughout this section. Note that some glossary terms may be in *italics* throughout the section content but are not included in this list. A complete list of terms for this section can be found in the **Glossary**.

- **authority having jurisdiction (AHJ):** The person or organization responsible for making sure rules, codes, and laws are followed. They have the power to approve work, inspect it, and enforce safety standards. (Section C-4.1)
- **building code:** A set of rules that tells you how buildings must be built to keep people safe. (Section C-4.1)
- **CANDU (Canada Deuterium Uranium):** A type of nuclear power system made in Canada that uses heat to make electricity. (Section C-4.1)

- **certification:** Proof that something meets certain rules or standards. (Section C-4.1)
- **code:** A set of rules that must be followed by law to keep people safe. (Section C-4.2)
- **compliance:** Following rules, laws, or standards. (Section C-4.1)
- **enforcement:** Actions taken to make sure rules are followed, such as fines or license suspension. (Section C-4.1)
- **harmonize:** To make different rules or systems work the same way. (Section C-4.1)
- **inspection:** A check to make sure work is done correctly and safely. (Section C-4.1)
- **Leadership in Energy and Environmental Design (LEED):** A system that rates how environmentally friendly a building is. (Section C-4.1)
- **permit:** Official permission to do work, like building or plumbing. (Section C-4.1)
- **pressure-retaining components:** A part (like a pipe or tank) that holds fluids under pressure safely. (Section C-4.1)
- **public health:** The health and safety of people in a community. (Section C-4.1)
- **regulation:** A rule made by a government that must be followed. (Section C-4.1)
- **standards organization:** A group that creates rules and guidelines for industries; e.g., ANSI, ASME, ASTM, CSA, UL. (Section C-4.1)
- **sustainability:** Using resources in a way that protects the environment for the future. (Section C-4.1)

C-4.1 Identify Organizations, Code and Standards Affecting the Pipe Trades

Building codes are legally adopted **regulations**, while **standards** are technical documents referenced by codes to define acceptable materials, methods, and performance.

A **standards organization's** primary activities are developing technical codes and standards that address industry needs. The main purpose of building codes is to protect **public health**, safety, and general welfare, as they relate to the construction and occupancy of buildings and structures. A **standard** is a document that provides requirements, specifications, guidelines, or characteristics that ensure materials, products, processes, and services are fit for their intended purpose. Standards in the construction industry cover a range of topics, but they are usually in one of the following categories:

- **Test or measurement standards**, which provide information on the acceptability (pass/fail) in a performance category, usually under some standard condition (fire separation ratings), or provide data that can be used to determine acceptability or performance.
- **Procedural standards**, which describe how products or systems are to be installed, used, maintained, tested, or operated to be safe, reliable, and fit for the intended use.

As tradespeople, we come into contact with code requirements and standards every day. Due to their importance, a construction industry without them is almost unimaginable.

Organizations

The following are some of the organizations that issue codes and standards for our industry and the areas they oversee.

American National Standards Institute

The American National Standards Institute (ANSI) has served as coordinator of the voluntary standardization system for the US private sector for more than 90 years.

ANSI establishes the procedures that are the basis for the development of American national standards. They then accredit standards-developing organizations that operate in accordance with these procedures and approve their draft standards, provided they are developed via this process.

A recent example of this accreditation process occurred when ANSI-accredited the American Society of Safety Engineers (ASSE). The ANSI/ASSE A10 Construction Package is a comprehensive compilation of the ANSI/ASSE A10 series of construction safety standards, which includes more than 30 construction and demolition standards.

American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)

The American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) publishes a well-recognized series of standards and guidelines relating to HVAC systems and issues. These standards are often referenced in building codes and are considered useful standards for use by consulting engineers, mechanical contractors, architects and government agencies. These are legally unenforceable, except when referenced as mandatory provisions in building codes, but they are commonly accepted standards for architects and engineers.

American Society of Plumbing Engineers

The American Society of Plumbing Engineers (ASPE) is a non-profit association dedicated to the advancement of the science of plumbing engineering, to the professional growth and advancement of its members and to the health, welfare and safety of the public.

ASPE is a member of and approved by ANSI as an ANSI-accredited standards developer. As such, ASPE may submit standards for approval by ANSI's Board of Standards Review as meeting certain criteria regarding due process in development to be designated American National Standards.

ASPE provides plumbing engineers and designers with ways to enhance their skills and knowledge through research and education.

American Society for Testing and Materials

The American Society for Testing and Materials (ASTM) is a group of voluntary members who test and certify standards of materials and procedures. It is now international in range and is currently known as ASTM International. ASTM standards apply to a large area of products and technology in over 130 industries. ASTM standards have made product selection easier for a wide variety of products and techniques, such as steel classifications.

The standards produced by ASTM International fall into six categories:

- The Standard Specification, which defines the requirements to be satisfied by the subject of the standard.
- The Standard Test Method, which defines the way a test is performed and the precision of the result. The result of the test may be used to assess **compliance** with a Standard Specification.
- The Standard Practice, which defines a sequence of operations that, unlike a Standard Test Method, does not produce a result.
- The Standard Guide, which provides an organized collection of information or series of options that does not recommend a specific course of action.
- The Standard Classification, which provides an arrangement or division of materials, products, systems or services into groups based on similar characteristics such as origin, composition, properties or use.
- The Terminology Standard, which provides agreed definitions of terms used in the other standards.

ASTM has a dominant role among standards developers in the USA and claims to be the world's largest developer of

standards. The quality of the standard test methods is such that they are frequently used worldwide, even in places where ASTM specifications are not required.

American Water Works Association

The American Water Works Association (AWWA) is the largest non-profit scientific and educational association dedicated to managing and treating water. AWWA is the only organization dedicated strictly to the interest of people in the waterworks field. Its publications, committee studies, reports and standard specifications are all of great value, as is the opportunity to interact and exchange ideas with others in the profession.

Currently, there are over 150 AWWA standards covering filtration materials, treatment chemicals, disinfection practices, meters, valves, utility management practices, storage tanks, pumps, ductile iron, steel, concrete, asbestos-cement, and plastic pipe and fittings. Standing committees periodically review and update the standards as required.

The International Organization for Standardization (ISO)

The International Organization for Standardization (ISO) is a worldwide federation of national standards bodies from more than 145 countries. ISO is a non-governmental organization established in 1947 and based in Geneva, Switzerland. Its mission is to promote the development of standardization and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological and economic activity. ISO's work results in international agreements that are published as International Standards and other types of ISO documents.

Out of 19,400 standards from almost all sectors of business and technology, more than a hundred come from ISO technical committee ISO/TC 59, Buildings and Civil Engineering Works. In addition, many other ISO technical committees have developed standards and related technical documents on construction products.

Standards Council of Canada

The Standards Council of Canada (SCC) is a federal Crown corporation. Its mandate is to promote efficient and effective standardization in Canada. *Standardization* is the development and application of standards publications that establish accepted practices, technical requirements and terminologies for products, services and systems. Standards help to ensure better, safer and more efficient methods and products, and are an essential element of technology, innovation and trade. SCC carries out a variety of functions intended to ensure the effective and coordinated operation of standardization in Canada. It also represents Canada's interests on standards-related matters in foreign and international forums.

The designation *National Standard of Canada* indicates that a standard is recognized as the official

Canadian standard in a particular subject area or topic. Before a standard can become a national standard, it must be approved by the SCC. Inclusion of the abbreviation CAN in the prefix of the standard's reference number indicates that a particular standard has been designated a National Standard of Canada.

Canadian Construction Code Development

Canada's model construction and fire codes are developed through a national process supported by the National Research Council (NRC). Historically, the **Canadian Commission on Building and Fire Codes (CCBFC)** oversaw code development, working with technical committees and receiving policy input from provinces and territories.

In 2022, the Canadian Board for Harmonized Construction Codes (CBHCC) was established to replace the CCBFC. The CBHCC works with federal, provincial, and territorial governments to improve coordination and **harmonize** construction codes across Canada, while continuing to support stakeholder input from industry and the public.

Table 1: Old vs. New Code Development Structure

Aspect	Previous Model (CCBFC)	Current Model (CBHCC)
Governance	Canadian Commission on Building and Fire Codes (CCBFC)	Canadian Board for Harmonized Construction Codes (CBHCC)
Policy Input	Provincial/Territorial Policy Advisory Committee on Codes (PTPACC)	Integrated federal–provincial–territorial governance
Technical Development	Standing committees and task groups	Committees and working groups under CBHCC
Focus	National model codes with provincial input	Harmonization across jurisdictions
Role of NRC	Supported development and published codes	Continues to support development and publication
Stakeholder Participation	Industry and public input through committees and public review	Continued stakeholder input through consultations and review processes

Canadian Gas Association

Founded in 1907, the Canadian Gas Association (CGA) is the voice of Canada's natural gas distribution industry. Members include distribution companies, transmission companies, equipment manufacturers and other service providers.

CGA produces and maintains a range of publications, background information, presentations and statistics on natural gas and the natural gas distribution industry. As well, CGA develops educational information and organizes training schools, workshops, seminars and conferences.

They sponsor and participate in a number of forums, partnerships and coalitions to foster dialogue on energy policy and achieve a better understanding of natural gas.

Canadian General Standards Board (CGSB)

The Canadian General Standards Board (CGSB) has historically been one of Canada's largest standards development and conformity assessment organizations. It provided services such as standards development, product and service **certification**, and the registration of quality and environmental management systems. These activities supported economic, regulatory, procurement, health, safety, and environmental interests across government, industry, and the public.

CGSB developed and maintained more than 900 standards through committees of volunteer experts, covering a wide range of areas, including building construction and the transportation of dangerous goods.

Recent Update (2026)

As of April 1, 2026, CGSB has ceased offering standards development and conformity assessment services. However, its existing standards remain available and can be accessed free of charge through the CGSB catalogue. While CGSB no longer develops new standards, its existing standards continue to be used as reference documents in industry and regulatory contexts.

Canadian Standards Association



Figure 1 CSA certification mark.

The Canadian Standards Association (CSA) is the largest standards development organization (SDO) in Canada, with the widest subject area recognition. They have published more than 3000 standards and codes addressing subjects that affect the interests of industry, consumers, regulators and the public at large.

The Canadian Standards Association is a not-for-profit standards organization that develops standards in over 50 areas, including:

- Safety and performance standards for electrical and electronic equipment
- Industrial equipment
- Boilers and pressure vessels
- Compressed gas handling appliances
- Environmental protection
- Construction materials
- Selection and installation of backflow preventers

Most standards are voluntary, meaning there are no laws requiring their application. Despite that, adherence to standards is beneficial to companies because it shows products have been independently tested to meet certain standards. Some standards are referenced in codes and regulations, which then makes them law. The CSA mark (Figure 1), like many certification marks, is a registered certification logo and can only be applied by someone who is licensed or otherwise authorized to do so by the CSA.

Laws and regulations in most municipalities, provinces and states in North America require certain products to be tested to a specific standard or group of standards by a Nationally Recognized Testing Laboratory. Currently 40 percent of all the standards issued by CSA are referenced in Canadian legislation. CSA's sister company, CSA International, is a Nationally Recognized Testing Laboratory (NRTL) that manufacturers can choose, usually because the law of the jurisdiction requires it or the customer specifies it.

National Fire Protection Association

The National Fire Protection Association (NFPA) is an international non-profit organization with the mission of reducing the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training and education.

The world's leading advocate of fire prevention and an authoritative source on public safety, NFPA develops, publishes and circulates more than 300 consensus codes and standards intended to minimize the possibility and effects of fire and

other risks. As part of its commitment to eliminate fire deaths and injuries through effective public education programs and information, NFPA strives to be the definitive source for fire and life safety information.

UL Solutions (formerly Underwriters Laboratories of Canada – ULC)

UL Solutions is an independent product safety testing, **inspection**, and certification organization operating in Canada and globally. In Canada, this work was historically carried out by Underwriters Laboratories of Canada (ULC), which has been testing products for public safety for over 100 years. UL Solutions in Canada is accredited by the Standards Council of Canada (SCC) and plays a key role in the Canadian National Safety System. It evaluates a wide range of products, components, materials, and systems to ensure they meet established safety and performance requirements.

Standards development is now carried out through UL Standards & Engagement (ULSE Inc.), an independent, not-for-profit organization that develops consensus-based safety and performance standards using input from industry, government, and the public. Today, UL Solutions supports manufacturers in bringing safer products to Canadian and global markets through testing, certification, and standards development. Its certification marks (such as the ULC mark) are widely recognized as indicators of product safety and compliance.

Municipal Bylaws

Depending on the scope of work, you may need a building permit, a development permit, or both.

Building Permits

You need a building permit if you plan to:

- Construct a new building
- Make additions or structural changes to an existing building
- Renovate, repair, or demolish a building
- Change a building's use
- Build a garage, balcony, or deck
- Excavate a basement or construct a foundation

Plumbing and Gas Permits

Plumbing and gas permits are required for the construction of all associated systems and must be obtained *before* construction begins.

A plumbing permit is required if you:

- Install, change, or upgrade any part of a plumbing system
- Open walls

- Change other plumbing or move pipes
- perform major repairs

If your company is a licensed gas contractor, you require a gas permit to install or replace a gas-fired appliance like a fireplace, hot water tank, boiler, furnace or kitchen stove. A permit is also required if you are installing or altering the associated gas pipes and appliance vents.

If you are constructing a new dwelling, a building permit will be required prior to a gas or plumbing permit being issued. A plumbing permit is NOT required for clearing of stoppages or the repairing of leaks in pipes, valves or fixtures.

Plumbing permits are issued by your local municipal building department. Gas permits are typically issued by Technical Safety BC (previously known as the British Columbia Safety Authority [BCSA]). In some instances, gas installation permits might also be offered by municipal departments.

The permit process is generally the same for all types of projects, but more specific requirements may be required for some commercial construction and industrial projects.

Permit Process

Permit Application

A completed permit application must be submitted before work begins. Permit applications are available through the **authority having jurisdiction (AHJ)**. Typical information required includes who will perform the work, and what, where, and how the work will be completed. Drawings, plans, or other documentation of the proposed work may be required. Permit fees are usually due at the time of application.

Review Process

During the review process, staff officials will determine if the project is in compliance with the applicable codes and other local ordinances and statutes. The length of the review process will depend on the type and complexity of the project. Many small residential applications can be processed in one day.

Permit Approval

If the project meets all requirements, the permit application is approved. Once all final permit fees are paid, the permit is issued.

However, if the permit application is not approved or a review has determined that a project fails to meet the requirements, the permit application, as submitted, will be denied. When a permit application is denied, corrections to the application shall be made and the application is resubmitted for final approval.

Permit Execution

Construction

During the entire construction phase, the permits must be placed in a prominent place at the project site. A copy of the approved building plan and other related documents must also be maintained at the site.

Inspections

Each major phase of construction must typically be inspected by an inspector or similar authority to make certain the work conforms to the code, the permit and the approved plans. Inspection requests may be made via internet, by phone or in person. Normally, the response is one business day after the request is made.

If an inspector finds that work does not conform to the approved plans, the inspector will fail the inspection and provide comments. Another inspection will be necessary before work is resumed. Reinspections can cause project delays and unnecessary expense.

Field Changes

Most changes will require a review and approval in the same manner as the original application. Proposed revisions or alterations must be brought to the attention of the permit staff before making changes in the field.

Project Completion

When the project is completed and code compliance is determined, the inspector issues a final inspection. The final inspection marks the completion of the project and grants permission to occupy a building with the knowledge that it has met the minimum safety standards as required by code.

Codes, Standards, Acts, and Regulations

National Building Code of Canada

The National Building Code (NBC) is the model building code that forms the basis for all of the provincial building codes. Some jurisdictions create their own code based on the NBC, while other jurisdictions have adopted the NBC, often adding supplementary laws or regulations.

The intent of the NBC is to detail the minimum provisions acceptable to maintain the safety of buildings, with specific regard to public health, fire protection, accessibility and structural sufficiency. It is not a textbook for building design. The building code concerns construction, renovation and demolition. It also covers change-of-use projects where the

change would result in increased hazard and/or maintenance and operation in the existing building. The code sets out technical requirements for the aforementioned project types and does not pertain to existing buildings.

British Columbia *Public Health Act* (Ministry of Health)

The Ministry of Health is a provincial organization that provides guidance to health authorities and develops legislation, policy and guidelines in all areas that concern public health. In the piping trades we follow the guidelines from the *Public Health Act* when installing and servicing onsite sewage and private drinking water systems, for example.

BC Sewerage System Regulation

- The Sewerage System Regulation replaces the old Sewage Disposal Regulation (2005). This regulation, along with the companion document, the Sewerage System Standard Practice Manual (SPM), Version 3(PDF, 7.6MB), shifts the focus of managing onsite sewerage systems by using an outcome-based approach to wastewater management. This is intended to allow for greater flexibility in how the systems are regulated.
- An onsite sewerage system is usually located on the land from which sewage originates. This type of system locally treats effluent that is not serviced by a larger municipal or regional sewerage system.
- The Sewerage System Regulation, under the *Public Health Act*, covers holding tanks for sewage effluent or onsite sewerage systems that:
 - process a sewage flow of less than 22,700 litres per day
 - serve single-family systems or duplexes
 - serve different buildings on a single parcel of land
 - serve one or more parcels on strata lots or on a shared interest of land
- The regional health authorities are responsible for accepting applications and fees for onsite sewerage systems submitted by homeowners or, on their behalf, by industry professionals. Onsite sewerage systems are installed, repaired and maintained by authorized persons.
- Site investigations of sewerage systems may be initiated in cases where systems are suspected to be negatively affecting a drinking water supply (e.g., as a result of system failure) or causing a health hazard, as per the *Public Health Act*.

Safety Standards Act

The *Safety Standards Act* sets out the general requirements for regulated work performed by contractors involved in the operation and installation of technical systems and equipment. It also includes information on the legal requirements for permits and qualifications. The *Safety Standards Act* authorizes the British Columbia Safety Authority to take **enforcement** actions if they discover a non-compliance with the act or regulations.

Products and work regulated under the act include:

- Boilers and boiler systems
- Electrical systems and equipment
- Elevating devices and passenger conveyors
- Gas systems and equipment

- Pressure vessels, pressure piping, refrigeration systems and equipment
- Amusement rides
- Ski lifts

Gas Safety Regulation—Technical Safety BC

The Gas Safety Regulation applies to everyone who installs, alters, maintains, or operates gas technologies.

Technical Safety BC administers and enforces the Gas Safety Regulation in British Columbia. This includes issuing permits, licensing contractors and gas fitters, conducting inspections, and ensuring that gas systems and equipment are installed and operated safely in accordance with applicable codes and regulations.

All licensed contractors and gas fitters are required to keep up to date with changes in the act and regulations. Contractors and gas fitters must have access to a current edition of the Canadian CSA Gas Code and BC Variations to the National Code.

Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation

The Power Engineers, Boilers, Pressure Vessel and Refrigeration Safety Regulation applies in respect of every boiler and boiler plant, every pressure plant, every pressure vessel, every pressure piping system, every fitting, every plant and all refrigeration equipment and refrigeration plants. This regulation has many other agency-adopted national codes and standards listed below:

American Society of Mechanical Engineers (ASME)

- ASME B31.1 Power Piping
- ASME B31.3 Process Piping
- ASME B31.5 Refrigeration Piping and Heat Transfer Component
- ASME B31.9 Building Services Piping
- ASME B31.11 Slurry Transportation Piping Systems
- ASME PTC 25 Pressure Relief Devices

American National Standards Institute and National Board of Boiler and Pressure Vessel Inspectors (ANSI/NB)

- ANSI/NB-23 National Board Inspection Code
- ANSI K61.1-1999/CGA G-2.1-1999 Safety Requirements for the Storage and Handling of Anhydrous Ammonia

American Petroleum Institute (API)

The following are adopted:

- a. API STD 530 Calculation of Heater-Tube Thickness in Petroleum Refineries
- b. API 510 Pressure Vessel Inspection Code: In-Service Inspection, Rating, Repair and Alteration
- c. API 570 Piping Inspection Code: Inspection, Repair, Alteration and Rerating of In-Service Piping Systems.

American Society of Mechanical Engineers and American National Standards Institute (ASME/ ANSI)

- a. ASME Section I—Rules for Construction of Power Boilers
- b. ASME Section IV—Rules for Construction of Heating Boilers
- c. ASME Section VIII—Rules for Construction of Pressure Vessels
- d. ASME Section X—Fibre-Reinforced Plastic Pressure Vessels 2013 Edition
- e. ASME Section XII—Rules for Construction and Continued Service of Transport Tanks
- f. ASME CSD-1—Controls and Safety Devices for Automatically Fired Boilers
- g. ASME/ANSI PVHO-1 Safety Standard for Pressure Vessels for Human Occupancy
- h. ASME QAI-1-2010 Qualifications for Authorized Inspection

Canadian Standards Association (CSA)

- a. CSA B51-09 Boiler, Pressure Vessel, and Pressure Piping Code
- b. CSA B52-05 (R2009) Mechanical Refrigeration Code
- c. CSA N285.0-08/N285.6 Series-08

General Requirements for Pressure-Retaining Systems and Components in CANDU Nuclear Power Plants and Material Standards for Reactor Components for CANDU Nuclear Power Plants.

CANDU (Canada Deuterium Uranium) reactors are a type of nuclear power system used to generate electricity by producing steam to drive turbines. Like other large-scale industrial systems, they rely on complex networks of pipes, valves, and **pressure-retaining components** to safely transport water and steam under high pressure and temperature.

To ensure safety and performance, these systems must comply with strict codes and standards.

The following codes and standards are adopted:

- NFPA 85, Boiler and Combustion Systems Hazards Code
- Tubular Exchanger Manufacturers Association (TEMA) standards

Safety Orders, Directives and Information Bulletins

- **Safety orders** are instruments that are issued to prevent or reduce the risk of personal injury or damage to property. Compliance is mandatory and enforceable by the Safety Authority.
- **Directives** are instruments that clarify or provide new interpretation of a regulation or code. Compliance is mandatory.
- **Information bulletins** provide helpful information and clarification on existing regulations or code that affect your particular technology.

Non-Compliance Enforcement Process

- An enforcement action typically begins with the safety officer. The safety officer is an employee/ inspector working for TSBC in British Columbia, who may address a non-compliance by suspending a **permit**, issuing a compliance order, or recommending that a safety manager impose a monetary penalty.
- The next step involves the provincial safety manager, also within Technical Safety BC, who may impose more significant sanctions such as monetary penalties or suspending contractors' licences or certificates of qualification. Enforcement decisions by safety officers and safety managers are generally subject to review or appeal.
- The Safety Standards Appeal Board is created under the *Safety Standards Act*. It is this appeal board that can review certain TSBC decisions when clients request a review.

Non-Compliance Enforcement Process

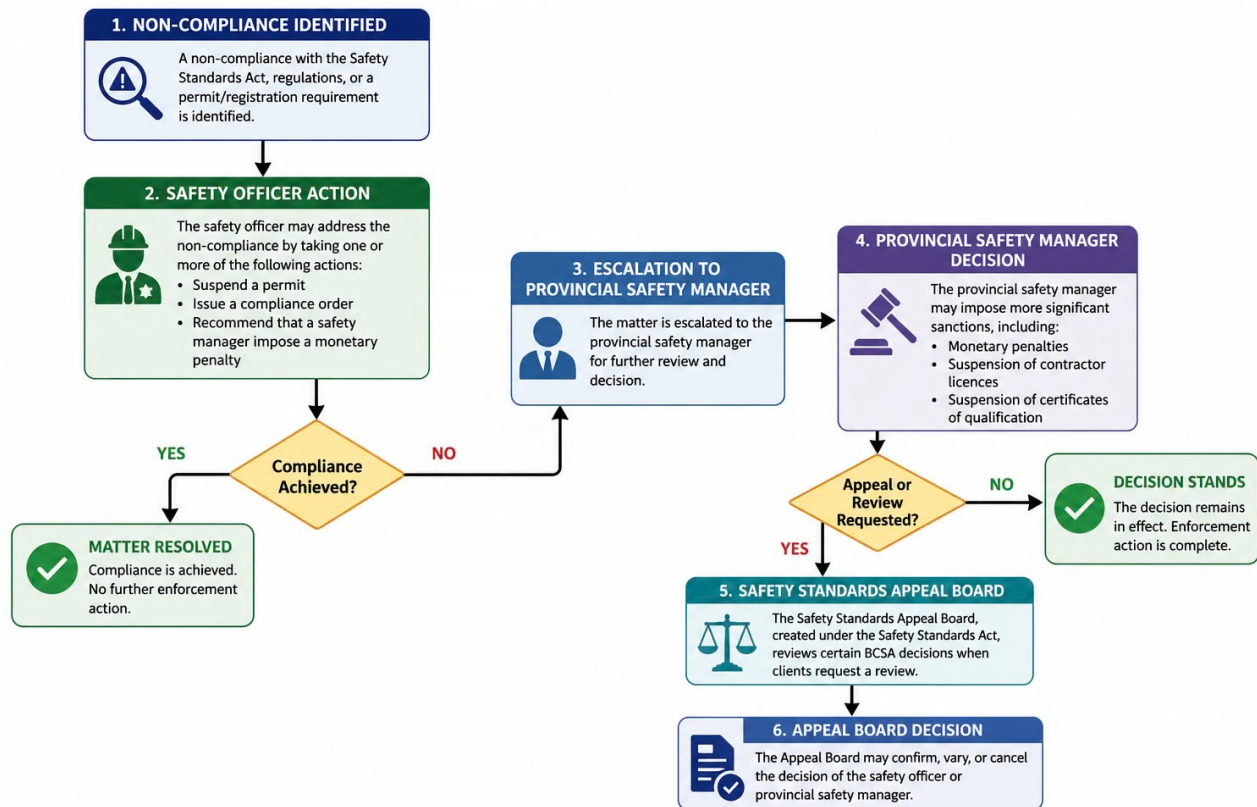


Figure 2 Non-compliance enforcement process (TRU Open Press/OpenAI) CC BY-NC-SA

Leadership in Energy and Environmental Design

- **Leadership in Energy and Environmental Design (LEED)** is a program developed by the US Green Building Council to certify environmentally responsible and sustainable buildings. It comprises a suite of rating systems for recognizing best-in-class sustainable design, construction, and operation of high-performance green buildings, homes, and neighbourhoods.
- It provides third-party verification of green building projects that satisfy prerequisites and earn points to achieve different levels of certification. Prerequisites and credits differ for each rating system, and teams choose the best fit for the project.
- The program addresses the following types and scopes of projects:
 - New construction and major renovation
 - Core and shell
 - Schools
 - Hospitality
 - Data centres
 - **Retail:** new construction and major renovations / **retail:** commercial interiors
 - Health care
 - Commercial interiors
 - Existing buildings: operations and maintenance

- Homes and multi-family dwellings
- Neighbourhood development
- LEED rating systems generally have 100 base points plus six “Innovation in Design” points and four “Regional Priority” points, for a total of 110 points (LEED for Homes is based on a 125-point scale, plus 11 Innovation in Design points). Each credit is allocated points based on the environmental impacts, **sustainability** outcomes, and human benefits that the building addresses. Projects achieve certification if they earn points according to the following levels:
 - **Certified:** 40–49 points
 - **Silver:** 50–59 points
 - **Gold:** 60–79 points
 - **Platinum:** 80+ points
- LEED also offers professional credentials for those in the industry who wish to document their knowledge of current sustainability and green building principles. LEED Green Associate and LEED AP accreditations are sought after when developing design teams for LEED projects.

Why This Matters for Plumbing Students

Plumbing systems directly impact:

- **Water efficiency** (low-flow fixtures, reuse systems)
- **Environmental impact** (less waste, energy use)

Many job sites (especially commercial) require LEED standards

You may install:

- High-efficiency fixtures
- Greywater or rainwater systems
- Energy-efficient hot water systems



Self-Test C-4.1: Identify Organizations, Code, and Standards Affecting the Pipe Trades

Complete Self-Test C-4.1 and check your answers.

If you are using a printed copy, please find Self-Test C-4.1 and Answer Key at the end of this section. If you prefer, you can scan the QR code with your digital device to go directly to the interactive Self-Test.



An interactive H5P element has been excluded from this version of the text. You can view it online here:
<https://c-tradeactivities-electrical-bcplumbingapprl1.pressbooks.tru.ca/?p=2415#h5p-41>

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- **Figure 1** CSA *certification mark* is used with permission from CSA.
- **Figure 2** Non-compliance enforcement process was created by TRU Open Press using OpenAI (2026) as is subject to the CC BY-NC-SA license.

C-4.2 Describe Where the Various Codes and Standards are Encountered Within the Pipe Trades

Codes and Standards

There is a unique difference between **codes** and **standards** used in the plumbing and pipe trades industry. Unlike standards, which typically define best practices for products, services, and processes, codes are often adopted by government regulatory bodies to address safety concerns for consumers and businesses.

Codes are developed as **regulations** that can be adopted by regulatory authorities. In general, they are much broader in scope than a standard and cover a wider range of issues. They are also designed to be given the force of law by the various provinces, territories, and jurisdictions in which they are adopted.

Standards are normally narrower in scope, cover a limited range of issues, and are given the force of law when referenced in an adopted code or jurisdictional regulation. Codes often reference other standards, giving them additional visibility and importance within the industries in which they are used.

In the pipe trades, there are many codes and standards that we must reference. Working with some of these documents will be an everyday occurrence, while others will be project-specific. It is important to know that these documents exist and what types of mechanical systems they address.

Canadian Standards Association—Construction Program

The Canadian Standards Association is Canada's leading developer of codes, standards, and related publications in the field of construction. Many of these standards are referenced in various regulations and codes. Documents can be accessed from the CSA website under the following categories and subcategories:

- Concrete
- National construction codes
- Offshore structures
- Structures (design)
- Welding
- Building products and systems
- Plumbing products and materials
- Forest products
- Masonry

British Columbia Building Code

The BC Building Code (BCBC) contains specific requirements in the following categories:

- Fire safety based on construction type, separation distances and occupancy(ies)
- Life safety for occupants based on construction type and occupancy(s)
- Structural integrity based on expected loads
- Approved materials
- Accessibility features
- Energy efficiency features

There are several mechanical issues to be addressed for new buildings, additions, and major renovations to be BCBC-compliant. These include:

- Energy calculations
- Exhaust systems
- Ventilation requirements
- Makeup air
- Roof-mounted equipment anchorage design
- Minimum plumbing facilities
- Fixture requirements

British Columbia Plumbing Code

The BC Plumbing Code (BCPC) applies the core concepts of the National Plumbing Code, combined with elements specific to BC's unique needs, and sets out technical provisions for the design and installation of new plumbing systems. It also applies to the extension, alteration, renewal, and repair of existing plumbing systems.

The BCPC provides the minimum requirements for systems, including:

- Water supply piping location, size, and material
- Sanitary drainage location and sizing
- Specifications for water heater(s) and associated features
- Vent sizing and location
- Roof drainage calculations, and roof primary and secondary drain locations
- Backflow prevention specification, and location of backflow devices
- Irrigation
- Location of water supply line relative to sanitary drain lines
- Grease traps

BC Fire Code

The BC Fire Code contains technical requirements designed to provide an acceptable level of fire safety within a community. It applies the core concepts of the National Fire Code of Canada, combined with elements specific to BC's unique needs. It sets out the technical provisions regulating:

- Activities related to the construction, use, or demolition of buildings and facilities
- The condition of specific elements of buildings and facilities
- The design or construction of specific elements of facilities related to certain hazards

- Protection measures for the current or intended use of buildings.

CSA B51—Boiler, Pressure Vessel, and Pressure Piping Code

Boilers, pressure vessels, pressure piping, and fittings pose potential health and safety risks if they are not designed, installed, operated, and/or maintained. CSA B51 covers the safe design, construction, installation, operation, inspection, testing, and repair practices for these systems.

CAN/CSA B214-21—Installation Code for Hydronic Heating Systems

The purpose of this code is to establish uniformity in the installation of hydronic heating systems. CAN/CSA B214:21 (R2025) also provides a reference point showing that proper installation of hydronic heating systems will lead to good performance, serviceability, and longevity.

CSA B149.1—Natural Gas and Propane Installation Code

CSA B149.1 targets Canadian gas and propane industry workers. It is intended to protect public health and safety for all building systems that use fuel gas. It addresses system design, installation, and inspection of such systems by providing minimum safeguards and corresponding safety requirements. It has been reviewed by regulatory authorities across Canada and has been adopted into law in every Canadian province and territory. CSA B149.1 applies to the installation of:

- Appliances, equipment, components, and accessories where gas is to be used for fuel purposes
- Piping and tubing systems
- Vehicle-refuelling appliances and associated equipment
- Stationary gas engines and turbines

Canadian Electrical Code

The BC Gas Safety Regulation (Section 8) states that:

8 (1) The holder of a class A or class B gas fitter's certificate of qualification may, while employed by a licensed gas contractor or working under an operating permit, perform electrical work that is restricted to the installation, repair and maintenance of electrical wiring for solid, liquid and gaseous-fuel-fired heating equipment . . .

Because of this endorsement, gas fitters must be familiar with the electrical code (CSA C22.1:24) as it applies to branch circuit wiring serving gas-fired appliances.

CSA B64.10—Selection and Installation of Backflow Preventers/ Maintenance and Field Testing of Backflow Preventers

Improperly installed wastewater drainage systems can create bacterial or chemical contamination of the public water supply due to accidental backflow and exposure to discharge. The CSA B64.10 standard helps protect consumers from water contamination by specifying requirements and information on:

- The selection, installation, and field testing of backflow preventers
- How backflow occurs, including when caused by back siphonage and back pressure
- Selecting and applying specific devices

Western Canada Section—AWWA—Cross Connection Control Manual

This Cross Connection Control (CCC) Manual was developed by the Western Canada Section CCC Committee and contains information identifying:

- Legal, health, and plumbing aspects of cross connection control (CCC) in Canada
- Aspects of setting up a CCC program
- Causes of backflow
- Hazard classification, including methods of protection
- Typical hazards found on premises
- Maintenance and testing procedures for backflow assemblies
- Test equipment requirements

National Fire Protection Association (NFPA)®

The industry benchmark for design and installation of automatic fire sprinkler systems, NFPA addresses sprinkler system design approaches, system installation, and component options to prevent fire deaths and property loss. There are a number of codes that are based on the type of occupancy served by automatic sprinkler systems:

NFPA 13—Standard for the Installation of Sprinkler Systems

The NFPA 13 standard covers sprinkler system design, installation, and acceptance testing; hanging and bracing systems; underground piping; and seismic protection.

NFPA 13D—Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

The NFPA 13D standard is the recognized residential sprinkler design standard focussed on one- and two- family

dwelling and manufactured homes. The intent is to provide an affordable sprinkler system in homes while maintaining a high level of life safety.

NFPA 13R—Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies

NFPA 13R is a residential sprinkler design standard focussed on low-rise residential occupancies. The standard's intent is to provide a sprinkler system that aids in the control of residential fires and provides improved protection against injury and loss of life in multi-family dwellings. This document addresses automatic sprinkler system design, installation, and maintenance, including component listing, hydrostatic tests, sprinkler temperature ratings, design documentation, above-ground pipe and equipment, underground pipe, pre-engineered systems, water supply sources, multipurpose piping systems, and hydraulic calculations.

NFPA 14

NFPA 14 provides requirements for the installation of standpipes and hose systems to ensure that systems will work as intended to deliver adequate and reliable water supplies in a fire emergency. The document covers all system components and hardware, including piping, fittings, valves, and pressure-regulation devices, as well as system requirements, installation requirements, design, plans and calculations, water supply, and system acceptance.

NFPA 96

NFPA 96 provides preventive and operative fire safety requirements intended to reduce the potential fire hazard of both public and private commercial cooking operations. The document covers the design, installation, operation, inspection, testing, and maintenance of the full spectrum of cooking equipment, hoods, grease removal devices, exhaust duct systems, fans, fire suppression systems, and clearance to combustibles.



Self-Test C-4.2: Describe Where the Various Codes and Standards are Encountered Within the Pipe Trades

Complete Self-Test C-4.2 and check your answers.

If you are using a printed copy, please find Self-Test C-4.2 and Answer Key at the end of this section. If you prefer, you can scan the QR code with your digital device to go directly to the interactive Self-Test.



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<https://c-tradeactivities-electrical-bcplumbingapprl1.pressbooks.tru.ca/?p=2475#h5p-42>

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- Steamfitter: Competency C-3 Use Codes, Regulations and Standards
- Sprinkler Fitter: Competency C-3 Use Codes, Regulations and Standards

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C-4.3 Identify Various Environmental Agencies with Concerns to Sewage Disposal

Onsite Sewage Systems

Onsite sewage systems are effective at treating household sewage when properly designed and installed in appropriate soil and maintained regularly. In typical onsite sewage systems, the wastewater from toilets and other drains flows from your house into a tank that separates solids and scum from the liquid. Bacteria help break down the solids into sludge. The liquid flows out of the tank into a network of pipes buried in a disposal field of gravel and soil. Holes in the pipes allow the wastewater to be released into the disposal field. These systems can be efficient and cost-effective and can protect public health and the environment. However, they must be properly planned, installed, and, above all, properly maintained.

Enacted in 2005, the Sewerage System Regulation (SSR) applies to all smaller systems, including those for houses, small businesses, and even small community systems. Compared to the previous Sewage Disposal Regulation, the SSR includes a significant change in approach. The new approach is performance-based, and responsibility for the proper design and installation of onsite systems has been transferred for the most part from health authorities to “authorized persons,” as defined by the SSR.

Organizations Concerned with Sewage Disposal

- **The Ministry of Health (Health Protection Branch):** Still plays a role in onsite systems by holding records of sewage systems and enforcing the regulations to protect public health.
- **BC Onsite Sewage Association (BCOSSA) and Western Canada Onsite Wastewater Management Association (WCOWMA):** Develop educational programs for onsite wastewater practitioners and provide technical information to industry stakeholders and practitioners.
- **Applied Science Technologists and Technicians of BC (ASTTBC):** The association for technology professionals in British Columbia. The ASTTBC also registers practitioners once they have obtained the required training.
 - **Onsite Wastewater Registration Program (ASTTBC):** Provides information for onsite wastewater service providers.
- **Engineers and Geoscientists of British Columbia (EGBC):** The licensing body for professional engineers and geoscientists. Only professional engineers and geoscientists are permitted to construct and/or maintain a Type 3 sewerage system.
- **BC Water and Waste Association (BCWWA):** This organization supports over 3700 water and wastewater professionals in BC and the Yukon with training, educational opportunities, technology transfer and networking opportunities.
- **Local Governments (Municipal and Regional Governments in BC):** Provides links to regional and municipal governments in the province to help locate any pertinent bylaws under respective jurisdictions.



Self-Test C-4.3: Identify Various Environmental Agencies with Concerns to Sewage Disposal

Complete Self-Test C-4.3 and check your answers.

If you are using a printed copy, please find Self-Test C-4.3 and Answer Key at the end of this section. If you prefer, you can scan the QR code with your digital device to go directly to the interactive Self-Test.



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Self-Test C-4.1: Identify Organizations, Code and Standards Affecting the Pipe Trades

Complete Self-Test C-4.1 and check your answers.

1. How many categories do the standards produced by ASTM International fall into?

Answer: _____

2. In Canada, before a standard can become a national standard, it must be approved by whom?

Answer: _____

3. What commission develops and maintains Canada's six model construction and fire codes?

Answer: _____

4. How many standards and codes has CSA published?

Answer: _____

5. What name is given to published standards when there are no laws requiring their application?

Answer: _____

6. In Canada, which building code forms the basis for all of the provincial building codes?

Answer: _____

7. At what point in time during a construction project must all associated permits be obtained?

Answer: _____

8. Who is allowed to install, repair and maintain onsite sewerage systems?

Answer: _____

Answer Key: Self-Test C-4.1 is on the other page.

Answer Key: Self-Test C-4.1

1. How many categories do the standards produced by ASTM International fall into?
 - a. 6
2. In Canada, before a standard can become a national standard, it must be approved by whom?
 - a. Standards Council of Canada
3. What commission develops and maintains Canada's six model construction and fire codes?
 - a. Canadian Commission on Building and Fire Codes
4. How many standards and codes has CSA published?
 - a. 3,000
5. What name is given to published standards when there are no laws requiring their application?
 - a. Voluntary
6. In Canada, which building code forms the basis for all of the provincial building codes?
 - a. National Building Code
7. At what point in time during a construction project must all associated permits be obtained?
 - a. Before construction begins
8. Who is allowed to install, repair and maintain onsite sewerage systems?
 - a. Authorized persons

Self-Test C-4.2: Describe Where the Various Codes and Standards are Encountered Within the Pipe Trades

Complete Self-Test C-4.2 and check your answers.

1. When comparing a code and a standard, which document covers a wider range of issues?

Answer: _____

2. In BC, is a gas fitter allowed to do limited electrical work on the gas appliance that is being installed?

Answer: _____

3. Which document is known as the industry benchmark for design and installation of standpipe and hose fire protection systems?

Answer: _____

4. Which document is known as the industry benchmark for design and installation of automatic fire sprinkler systems?

Answer: _____

Answer Key: Self-Test C-4.2 is on the other page.

Answer Key: Self-Test C-4.2

1. When comparing a code and a standard, which document covers a wider range of issues?
 - a. A code
2. In BC, is a gas fitter allowed to do limited electrical work on the gas appliance that is being installed?
 - a. Yes
3. Which document is known as the industry benchmark for design and installation of standpipe and hose fire protection systems?
 - a. NFPA 14
4. Which document is known as the industry benchmark for design and installation of automatic fire sprinkler systems?
 - a. NFPA 13

Self-Test C-4.3: Identify Various Environmental Agencies with Concerns to Sewage Disposal

Complete Self-Test C-4.3 and check your answers.

1. In typical onsite sewage systems, what separation process occurs in the tank?

Answer: _____

2. In a septic tank, what helps break down the solids into sludge?

Answer: _____

3. In what area of the onsite sewerage system is the wastewater released to the soil?

Answer: _____

Answer Key: Self-Test C-4.3 is on the other page.

Answer Key: Self-Test C-4.3

1. In typical onsite sewage systems, what separation process occurs in the tank?
 - a. Solids and scum separate from the liquid.
2. In a septic tank, what helps break down the solids into sludge?
 - a. Bacteria
3. In what area of the onsite sewerage system is the wastewater released to the soil?
 - a. Disposal field

Plumbing Apprenticeship & Trade Resources in BC

A successful career in plumbing requires a strong foundation of skills, knowledge, and workplace safety awareness. Below are key resources to support plumbing apprentices in BC, including educational pathways, trade certifications, workplace safety guidelines, and mental health and wellness support.

Plumbing Apprenticeship & Certification Resources

- **SkilledTradesBC – Plumbing Apprenticeship** — Overview of plumbing training, certification requirements, and apprenticeship pathways in British Columbia.
- **Red Seal Program – Plumber** — National certification program with exam prep guides and trade mobility information.
- **BC Building Codes & Standards** — Official building and plumbing codes for British Columbia.

Workplace Safety & Regulations

- **WorkSafeBC** — Essential safety resources for plumbers, including:
 - Health & Safety – WorkSafeBC
 - Report Unsafe Working Conditions
 - Report a Workplace Injury or Disease
 - Submit a Notice of Project Form
 - Get Health and Safety Resources (Videos, Posters, Publications, and More)
 - Search the OHS Regulations (and Related Materials)
 - Conduct an Incident Investigation
- **CCOHS: OHS Answers Fact Sheets – Plumber** — Safety guidelines and best practices for plumbers in various work environments.

Financial Supports

- **Financial Support (SkilledTradesBC)** — Information about grants, tax credits, Canada apprentice loans, employment insurance, and the Indigenous Skills and Employment Training (ISET) program.
- **StudentAidBC** — Complete post-secondary education through student loans, grants, and scholarships. There is also programs that help with loan repayment.
- **WorkBC (Government of BC)** — Services for apprentices and employers.

Mental Health & Wellness Support

- **HealthLink BC – Mental Health and Substance Use** – HealthLink BC resources for mental health and wellness support.
- **Here2Talk** – Free and confidential counseling services available to all post-secondary students registered at a BC school.
- **Help Starts Here** – A database with over 2,500 listings of services related to mental health and substance use supports.
- **Hope for Wellness Helpline** – 24/7 online chat and phone line with experienced and culturally competent counselors available to all Indigenous people in Canada.
 - First Nations Health Authority Mental Health Supports Info Sheet [PDF] by First Nations health Authority – List of culturally safe services for Indigenous people.
- **HeretoHelp – BC** – Mental health resources, including videos, articles, and support services in BC.
- **BC Construction Industry Rehabilitation Plan** – Mental health and substance use services for CLRA and BCBT members and their families.
- **Virtual Mental Health Supports (Government of BC)** – Virtual services are available for British Columbians who are experiencing anxiety, depression, or other mental health challenges.

Crisis Support

- **Interior Crisis Line Network** – Call 1-888-353-2273 for 24/7 emotional support, crisis intervention, and community resource information.
- **Talk Suicide Chat Service** – An alternative if calling is difficult; available for crisis intervention.
- **310Mental Health Support** – Call 250-310-6789 for emotional support, information, and resources specific to mental health.
- **1-800-SUICIDE** – Call 1-800-784-2433 if you are experiencing feelings of distress or despair, including thoughts of suicide.
- **Opioid Treatment Access Line** – Call 1-833-804-8111 between 9 am and 4 pm to connect with a doctor, nurse, or healthcare worker who can prescribe opioid treatment medication that same day.
- **KUU-US Crisis Response Service** – Call 1-800-588-8717 for culturally-aware crisis support for Indigenous peoples in BC.
- **Alcohol and Drug Information and Referral Service** – Call 1-800-663-1441 to find resources and support.



Emergency Services – For life-threatening situations, call 911 or visit your nearest emergency department.

Version History

This page provides a record of changes made to this learning resource, Plumbing Apprenticeship Level 1, Block C. Each update increases the version number by 0.1. The most recent version is reflected in the exported files for this resource.

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