

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

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TRU OPEN PRESS, THOMPSON RIVERS UNIVERSITY
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Suggested citation (APA 7th edition):

SkilledTradesBC. (2026). *Block C: Routine Trade Activities and Electrical Concepts* (Rev. ed.; adapted by Audrey Curran, Mark Overgaard, the BC Articulation Curriculum Subcommittee, & TRU Open Press). TRU Open Press, Thompson Rivers University.
<https://c-tradeactivities-electrical-bcplumbingappr1.pressbooks.tru.ca/>

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Plumbing Apprenticeship & Trade Resources in BC

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Version History

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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.

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Resources

Content adapted from:

- ©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)
 - Piping Trades Apprenticeship Program – Use Tools and Equipment – Level 1 Harmonized (2019) (Binder) (ISBN: 978-0-7726-7362-6; Product no. 7960000261) Crown Publications Online Catalogue – Piping Trades Apprenticeship Program – Use Tools and Equipment – Level 1 Harmonized (2019) (Binder)
 - Piping Trades Apprenticeship Program – Perform Routine Trade Activities and Apply Electrical Concepts – Level 1 Harmonized (2019) (Binder) (ISBN: 978-0-7726-7362-6; product no. 7960000262) Crown Publications Online Catalogue – Piping Trades Apprenticeship Program – Perform Routine Trade Activities and Apply Electrical Concepts – Level 1 Harmonized (2019) (Binder)
 - Piping Trades Apprenticeship Program – Prepare Piping and Components – Level 1 Harmonized (2019) (Binder) (ISBN: 978-0-7726-7362-6; product no. 7960000263) Crown Publications Online Catalogue – Piping Trades Apprenticeship Program – Prepare Piping and Components – 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.	
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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-5 MANUFACTURER AND SUPPLIER DOCUMENTATION

Plumber Apprenticeship Program – Level 1



Drain Cleaning Machine



WARNING!
Read this Operator's Manual carefully before using this tool. Failure to understand and follow the contents of this manual may result in extensive property damage and/or serious personal injury.

• Français – 17
• Castellano – pág. 35

RIDGID® K-1500 & K-5208 DRAIN CLEANING SECTIONAL ESSENTIALS KITS

Pair machines with the Sectional Essentials Kit to contain mess and optimize the jobsite.

PICK YOUR MACHINE



K-1500A Sectional Machine
Cat. #23692



K-1500B Sectional Machine
Cat. #23697



K-5208 Sectional Machine
Cat. #61688

PAIR WITH THE TOOLS AND ACCESSORIES YOU NEED



C-5 Manufacturer and Supplier Documentation

Introduction

Manufacturer and supplier documentation plays an important role in the piping trades by providing the information needed to install, operate, and maintain equipment safely and correctly. These documents include manuals, specifications, product data sheets, and installation guides that help ensure systems meet required standards and perform as intended. In this section, you will learn about the types of documentation commonly encountered in the piping trades, the key information they contain, and how to effectively use the internet to find reliable manufacturer documentation for the products and systems you work with.

Learning Objectives

After completing this section, you should be able to:

- Describe documentation encountered in the piping trades.
- Describe information contained in manufacturer and supplier documentation.
- Describe how to use the internet to source manufacturers' documentation.

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.

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**.

- **as-built drawings:** Drawings that show how a system was actually built or installed. (Section C-5.2)
- **certification:** Proof that something meets certain rules or standards. (Section C-4.1; Section C-5.1)
- **certification mark:** A symbol on a product that shows it has been tested and approved. (Section C-5.1)
- **commissioning:** The process of testing a system to make sure it works properly. (Section C-5.2)
- **controlled product:** A product that may be dangerous and needs safety information. (Section C-5.1)
- **extended warranty:** Extra coverage you can buy to protect a product for a longer time. (Section C-5.2)
- **fluid-handling equipment:** Machines or tools that move or control liquids or gases, like pumps, pipes, and valves. (Section C-5.2)
- **hazard:** Something that can cause harm or danger. (Section C-5.1)
- **installation instruction manual:** A booklet that explains how to install and set up a product. (Section C-5.2)
- **maintenance:** Taking care of equipment to keep it working properly. (Section C-5.1)
- **manufacturer:** A company that makes products or equipment. (Section C-5.1)
- **operation and maintenance (o&m) manual:** A document that explains how to use and take care of a system. (Section C-5.2)
- **plant installed:** All the equipment and systems that have been set up and put in place as part of a project, such as pumps, boilers, pipes, and control systems. (Section C-5.2)
- **proprietary:** Something owned by a company that others cannot use freely. (Section C-5.1)
- **rough-in dimensions:** Measurements used to plan where pipes or fixtures will be installed. (Section C-5.3)
- **Safety Data Sheet (SDS):** A document that explains how to safely use a product and what dangers it may have. (Section C-5.1)
- **servicing instructions:** Simple directions that explain how to check, clean, fix, or take care of equipment so it keeps working properly and safely. (Section C-5.1)
- **set points:** Values set on a device to control how it operates, like temperature. (Section C-5.2)
- **spec sheet (datasheet):** A document that lists important details about a product's performance and features. (Section C-5.2)
- **technical documentation:** Written information that explains how to install, use, or fix a product. (Section C-5.1)
- **training:** Learning how to do a job safely and correctly. (Section C-5.1)
- **troubleshooting:** Steps used to find and fix problems with equipment. (Section C-5.2)
- **uncertified products:** Products that have not been tested or approved by an official organization to show they are safe and meet required standards. (Section C-5.1)
- **warranty:** A promise from a company to repair or replace a product if it has problems. (Section C-5.2)

C-5.I Describe Documentation Encountered in the Pipe Trades

Manufacturers' Instructions

To perform piping work, it is essential to have the right tools. Piping contractors fully appreciate the complexity of these tools and the importance of **manufacturers'** documentation for completing a job correctly.

Most appliances and plumbing components are supplied with manufacturers' instructions. These provide information on installation, service, and **maintenance** requirements. Once equipment is installed, these instructions should be left with the customer for future reference. Depending on the type of equipment or component, user instructions may also be included.

MATERIAL SAFETY DATA SHEET			
ADDRESS: Heat and Light Resources d/b/a HeatCell PO Box 1033 Jane Lew, WV 26378 (304) 326-2624		DATE: 01/02/00 PREPARED BY: Dr. Charles Simon EMERGENCY TELEPHONE NUMBER: CHEMTREC 800-424-9300	NFPA HAZARD CLASSIFICATIONS H = HEALTH F = FLAMMABILITY R = REACTIVITY NF = NOT FOUND
I. IDENTIFICATION		H = 1 F = 1 R = 1	
LABEL NAME: FOOD WARMER			
TRADE OR PRODUCT NAME: EcoFuel™ XBHeatCell			
FDA NO:		CAS NO: Diethylene Glycol CAS 00111-46-6	
II. FIRE, EXPLOSION AND REACTIVITY DATA			
FLASH POINT (METHOD): 246°F (104°C) Cleveland Open Cup		0 = LEAST 1 = SLIGHT 2 = MODERATE 3 = HIGH 4 = EXTREME	
EXTINGUISHING MEDIA: DRY CHEMICAL, FOAM OR CO ₂		DOT HAZARD CLASSIFICATION: NOT REQUIRED	
SPECIAL FIRE FIGHTING PROCEDURES: UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE UNKNOWN, Believed to be relatively safe.			
HAZARDOUS COMBUSTIBLE OR DECOMPOSITION PRODUCTS: Product consists of hydrocarbon component stabilized by tightly packed fiber wool to give an essentially non-spillable mass. The components are contained in a metal can with a metal lid. The mass is not ignitable at room temperature. To ignite, apply flame directly to glass fiber(s). Can produce carbon monoxide and some irritants under some burning conditions. Glass fibers caused cancer in animals through unnatural routes of exposure (surgical implantation), but it is not associated with cancer by inhalation. Use of glass fibers has not been shown to cause cancer in humans. If ingestion of glass fibers occur, observe individual for several days to ensure that intestinal blockage does not occur. It is not recommended to induce vomiting if ingested.			
STABILITY: Stable CONDITIONS TO AVOID: Excessive Heat MATERIALS TO AVOID: Strong Oxidizers			
HAZARDOUS POLYMERIZATION PRODUCTS: NA Will not occur.			
III. PHYSICAL DATA			
ODOR, APPEARANCE AND PHYSICAL STATE: Slightly opaque colorless liquid with subtle petroleum solvent odor.			
BOILING POINT: 433°F 223°C		SPECIFIC GRAVITY (H ₂ O = 1.0): 1.117 @ 68°F (20°C)	
MELTING POINT: NA		EVAPORATION RATE: < 1 (Butyl Acetate = 1)	
VAPOR PRESSURE (mmHg): < 1 @ 20°C, DEG = 0.01		SOLUBILITY IN WATER: Partially Miscible	
VAPOR DENSITY (AIR = 1): > 1			
IV. PROTECTION INFORMATION			
RESPIRATORY: Use MSHA or NIOSH respirator for handling vapor or mist.		VENTILATION: Always use with Good ventilation.	
EYE: Safety glasses for working with vapors or mists.		SKIN: Protective gloves or clothing generally not needed.	
OTHER PROTECTIVE DEVICES AND PROCEDURES: Generally not required. Avoid prolonged breathing of mist. Wash hands after handling. Wash soiled work clothing frequently.			
V. OCCUPATIONAL EXPOSURE LIMIT			
THRESHOLD LIMIT VALUE (TLV): TWP			
OSHA PERMISSIBLE EXPOSURE LIMIT (PEL): NF			
HAS THE SUBSTANCE BEEN LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN IN THE ANNUAL REPORT ON CARCINOGENS, PUBLISHED BY NTP, BY THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, OR BY OSHA? YES ☐ NO ☒			

Figure 1 MSDS Sheet (sid/Flicker) CC BY-NC-ND

- pipes and while working with lead-based solder.
- Exposure to welding fumes, ultraviolet light, heavy metals, and chlorinated compounds during welding or torch cutting.
- Contact with solvents, adhesives, and epoxies during repair or installation of PVC/ABS pipes.
- Exposure to materials and liquids in old pipes during repair or removal.

Safety Data Sheets

A **Safety Data Sheet (SDS)** is a technical bulletin that provides specific **hazard** information, safe handling information, and emergency procedures for a **controlled product**. Since the SDS contains detailed health and safety information specific to each controlled product, it should be used as a key source of information for developing **training** programs and safe work procedures.

Documentation of Hazards in Piping

A number of hazards are present when working with piping. The SDS may provide cautions and specific information about responding to a range of hazards such as:

- Exposure to asbestos during installation, removal, or repair of pipes in buildings contaminated with asbestos.
- Exposure to lead during installation or removal of lead

- Exposure to exhaust fumes from gas- or diesel-powered equipment.
- Awkward postures, vibration, and hazardous noise while using power tools, grinders, saws, and mobile equipment.
- Dust exposure on construction sites and from grinding activities.
- Contact with biological materials in pipes and drains.
- Exposure to hazardous materials from industrial work sites.

It is the employer's responsibility to ensure workers are adequately educated and trained. If the employer cannot provide the required education, training consultants can be employed to provide it. Education covers information about the product, while training must include how to safely use the product.

System Component Documentation

Technical documentation is the generic term for documentation related to a product. People mainly associate the term with documents and information that are provided to the public by the manufacturer, which typically include:

- User instructions
- Operating instructions
- Servicing instructions
- Installation manuals

Proprietary Component Documentation

A **proprietary** technology or product is one for which the technology or the product's inner workings are owned and carefully guarded by a company. Some proprietary products can only function properly, if at all, when used with other products made by the same company.

A primary motivation behind the development of products using proprietary technology is straightforward: buyers are compelled to use other products marketed by the same company. For example, some building automation system (BAS) manufacturers use proprietary communication protocols that will communicate only with their own control equipment. These protocols don't allow easy intercommunication with other brands of BAS. That is one reason why this type of system is rapidly disappearing from the marketplace. Because a proprietary system does not communicate with other systems, the user's options for expanding the BAS are limited. Choices are also reduced for the purchase of new equipment, which limits the user's bargaining power. However, proprietary systems do offer the advantage of a single source of responsibility when problems occur.

Plumbing Product Certification

The Canadian Institute of Plumbing and Heating (CIPH), in conjunction with provincial/territorial plumbing inspectors, recently found it necessary to provide an industry bulletin on the distribution and installation of uncertified plumbing products.

Uncertified products are being inappropriately sold and installed in all jurisdictions of Canada. In many instances, this is creating health and safety issues. There is a myth that all plumbing products sold through the wholesale chain are

suitable for sale and installation. There is no jurisdiction in Canada that allows uncertified products to knowingly be installed. In fact, Alberta and Quebec both have legislation against the sale of such products.

All certified plumbing products are required to bear a **certification mark**. Figure 2 shows some examples.

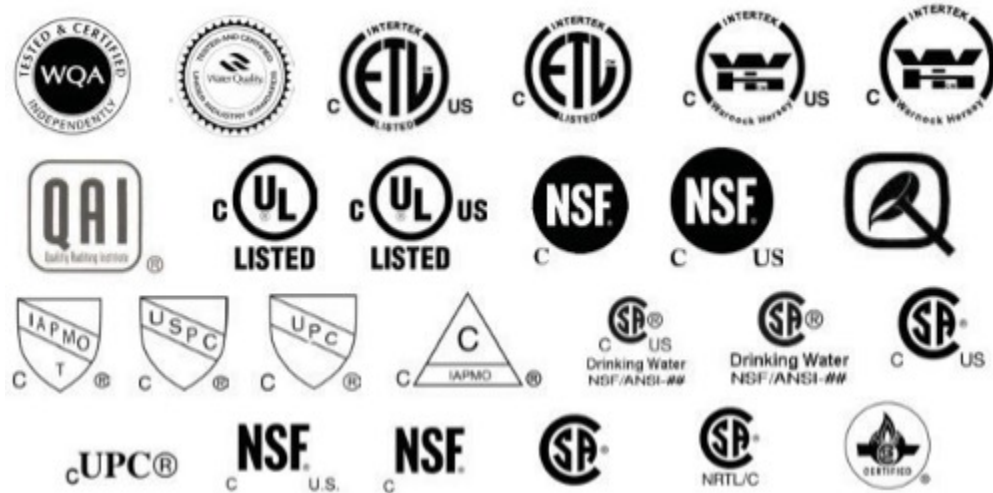


Figure 2 Plumbing product certification marks (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0

Some fixture manufacturers acknowledge that customers want an aesthetic that is mark-free and choose to mark their product with an adhesive label that is designed to be removed after inspection and to self-destruct so that it cannot be placed on another product. If the permanent adhesive label is accidentally removed prior to inspection, the inspector has no choice but to assume the product is uncertified and request its removal.

Therefore, wholesalers need to educate contractors to keep proof of the product's **certification** compliance on the product (in addition to the carton, installation instructions, warranty, homeowner's manual, and specification sheet) until AFTER inspection.

Certified products offer several advantages:

- They are more reliable and have been produced using a demonstrated quality program.
- They have been evaluated to ensure they will perform properly (e.g., ensuring threads are the correct type for proper connection).
- They are regularly checked for compliance by accredited certification organizations to ensure they continue to be manufactured in accordance with national standards.
- Where required, they have been evaluated for toxicological concerns.



Self-Test C-5.1: Describe Documentation Encountered in the Pipe Trades

Complete Self-Test C-5.1 and check your answers.

If you are using a printed copy, please find Self-Test C-5.1 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=2417#h5p-44>

References

BC Industry Training Authority. (2019). *Piping trades apprenticeship program: Use Tools and Equipment—Level 1 harmonized* [Binder]. Crown Publications, Queen's Printer for British Columbia. https://www.crownpub.bc.ca/Product/Details/7960000261_S

- Plumber: Level 2 Competency C-4 Use Manufacturer and Supplier Documentation
- Steamfitter: Level 2 Competency C-4 Use Manufacturer and Supplier Documentation
- Sprinkler Fitter: Level 1 Competency C-4 Use Manufacturer and Supplier Documentation

Camosun College. (2019). *Line D: Organizational Skills —Competency D-5: Use Manufacturer and Supplier Documentation* (Rev. ed.) [Learning guide]. BCcampus. <https://collection.bccampus.ca/textbook/9MgG7bwy/>

Camosun College. (2015). *Trades Access Common Core Competency D-5: Use Manufacturer and Supplier Documentation*. Victoria, B.C.: Crown Publications. Download for free from the B.C. Open Textbook Collection (<https://open.bccampus.ca/browse-ourcollection/find-open-textbooks/>).

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- **Figure 1** MSDS Sheet, by sid on Flickr is used under a CC BY-NC-ND license.

C-5.2 Describe Information Contained in Manufacturer and Supplier Documentation

Installation Instructions and Requirements

An **installation instruction manual** is an instructional booklet that is supplied with almost all technologically advanced products such as gas-fired appliances, control modules and **fluid-handling equipment**. Information contained in the instruction manual typically includes:

- Safety instructions: For liability reasons, these can be extensive, often including warnings against doing things that no intelligent person would consider doing.
- Assembly instructions: For products that arrive in pieces for easier shipping.
- Installation instructions: For field installation of the equipment
- Set-up instructions: For devices that keep track of time or temperature and maintain user-accessible state.
- Normal usage instructions.
- Programming instructions: For microprocessor-controlled products such as boiler control, programmable thermostats, and building automation controllers.
- **Maintenance** instructions.
- **Troubleshooting** instructions: For when the product does not work as expected.
- Service locations: For when the product requires repair by a factory-authorized technician.
- Regulatory code compliance information: For example, with respect to safety or electromagnetic interference.
- Product technical specifications.
- **Warranty** information: Sometimes provided as a separate sheet

With the increasing complexity of modern devices, many installation manuals have become so large that separate multi-language booklets are provided. Many manufacturers offer PDF copies of manuals that can be accessed or downloaded free of charge from their websites.

Operation and Maintenance (O&M) Manuals

An essential part of any mechanical services contract is the provision of a professional operation and maintenance manual and a set of **as-built drawings** delivered to the client or end user upon completion of the installation.

O&M manuals should contain references to specific equipment used in the project for which they are compiled. They must be compiled properly as they are important for the client and/or end-user as an instruction manual for the safe operation and maintenance of their systems.

These documents should form part of the effective operation of the systems and, as such, should be carefully prepared to include a comprehensive source of reference for the installed equipment.

Each O&M manual is tailored to a specific project, but the following would be a basic outline:

- **Preface:** Lists the contents of the manual's sections and subsections.

- **Section 1: Description of Systems**—Contains a description of each system, how it is controlled, and how it interrelates with other systems.
- **Section 2: Operating Instruction & Control**—Contains a description of how each system or type of system is controlled (listing any relevant **set points** or parameters), and the use of any user controls. This supplements the instructions contained in the manufacturer's data.
- **Section 3: Equipment Schedule**—Lists the items of **plant installed** under this contract, giving basic quick reference for model numbers, manufacture and design flows, etc., to be read in conjunction with the as-built drawings so plant designation can be understood.
- **Section 4: Supplier's/Manufacturer's Details**—To be read in conjunction with Section 3: Equipment Schedule, this section contains copies of the relevant manufacturer's literature/ brochures for the equipment installed under this contract.
- **Section 5: Routine Maintenance**—Provides information pertaining to the maintenance that must be carried out to ensure trouble-free operation at the lowest possible cost. This includes sample maintenance schedules and sample service sheets for equipment used in plant operation.
- **Section 6: Recommended Spares**—A list of items recommended to be held by the building operator for the purposes of routine maintenance and addressing emergency breakdowns.
- **Section 7: Commissioning Test Results**—A full and comprehensive record of system performance at the time of commissioning is shown, giving a picture of how the system was performing at the time it was commissioned; lists actual airflows and temperature splits, etc.
- **Section 8: As-Built Drawings**—Details on how the various systems have been installed. Please note that as with any section of an O&M manual, to retain its effectiveness as a reference document, it is imperative that any changes be noted on these drawings.
- **Section 9: Warranties & Certificates**—A record of equipment warranties and compliance certificates.

Product Specifications

A **datasheet** or **spec sheet** is a document summarizing the performance and other technical characteristics of a product in sufficient detail to enable a tradesperson to integrate the component into a system. Typically, a datasheet is created by the product manufacturer and begins with an introductory page describing the rest of the document, followed by listings of specific characteristics.

Warranty Information

The standard equipment **warranty** is a commitment from a manufacturer that a product has no defects and that services such as repairs and partial or complete exchange of defective parts are guaranteed for a particular period of time without the customer being billed.

An **extended warranty**—sometimes called a service agreement, a service contract or a maintenance agreement—is a prolonged warranty offered to consumers in addition to the standard warranty on a new item. Extended warranties cost extra, usually a percentage of the item's retail price.



Self-Test C-5.2: Describe Information Contained in Manufacturer and Supplier Documentation

Complete Self-Test C-5.2 and check your answers.

If you are using a printed copy, please find Self-Test C-5.2 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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BC Industry Training Authority. (2019). *Piping trades apprenticeship program: Use Tools and Equipment—Level 1 harmonized* [Binder]. Crown Publications, Queen's Printer for British Columbia. https://www.crownpub.bc.ca/Product/Details/7960000261_S

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C-5.3 Describe How to Use the Internet to Source Manufacturer's Documentation

Websites for Manufacturers

One key feature of this section is that you will be asked to carry out some of your own research. Finding information for yourself is a useful skill for a plumber because you need to keep up to date with changes to regulations and new technology. A majority of professionals use the internet to look for services and products. The internet serves as a tool for finding **technical information** or other criteria. Thus, the user saves time that would otherwise be spent using printed material to obtain information or compare products or services.

When a manufacturer has a website, there is no need to print product catalogues and brochures. All the manufacturer needs to do is place the information on the website.

You benefit as well because you will be able to find a product on a website much faster, which allows you to stay current as the product information changes and new products are introduced to the industry.

Product manufacturers' websites hold vast amounts of information, including:

- Online catalogues
- Detailed product pages, including:
 - **Rough-in dimensions** (every major manufacturer has specifications on their website, usually in PDF format)
 - Related products
 - Sub-assembly components
 - Component drawings and blueprints (including magnification-on-hover)
 - Product manuals
 - Warranty information
 - Support for multiple languages
- Dealer locators with built-in Google Maps integration

Many modern products also include digital controls or software (for example, boilers, pumps, or programmable thermostats). Manufacturers' websites, such as RIDGID, often provide setup instructions, manuals, and updates for these systems. However, not all products include software—many components, such as pipes, fittings, and basic fixtures, are still fully mechanical. Plumbers must still ensure that any software or digital tools are used in accordance with local codes and regulations. Manufacturer software is helpful, but it should be used as a guide and always verified against approved codes and requirements.

Search Engines

You do not always have to know a website's address to use the internet. It is important to know how to search for information. One of the best search methods is to use a **search engine**.

A web *search engine* is a type of website that helps a computer user find information on the internet. It does this by

looking through other web pages for the text the user wants to find. You've probably already used one or more search engines. Google is the most popular.

When using a search engine, you must enter at least one **keyword** in the search box. Usually an on-screen button must be clicked to submit the search. The search engine looks for matches between the keyword(s) entered and its database of websites and words.

After a search is submitted, the results are quickly returned as a list. The list usually shows web page names, short descriptions and a link for each matching web page. You can click on any of the links to go to one of the websites.

The usefulness of a search engine depends on the **relevance** of the **result set** it gives back. While there may be millions of web pages that include a particular word or phrase, some pages may be more relevant, popular or authoritative than others. Most search engines rank the results to provide the best results first.



Using AI and Online Search Results

Artificial intelligence (AI) tools and search engines (such as Google Search) can quickly provide summaries and answers, but they are not always reliable for plumbing work.

AI-generated content and search result summaries (often called “AI overviews”) may:

- Provide incorrect or outdated information
- Miss important safety details or code requirements
- Oversimplify complex installation or maintenance procedures
- Combine information from multiple sources without verifying accuracy

Plumbing work must follow current codes, manufacturer instructions, and applicable regulations. In British Columbia, these requirements are enforced by authorities such as Technical Safety BC.

Best practice:

- Always verify information using **manufacturer documentation, approved codes, and trusted industry sources** (e.g., regulatory authorities, certified training materials).
- Use AI and search engines as a **starting point only**, not as your final source.
- When in doubt, consult a **qualified professional, instructor, or inspector**.



Self-Test C-5.3: Describe How to Use the Internet to Source Manufacturer's Documentation

Complete Self-Test C-5.3 and check your answers.

If you are using a printed copy, please find Self-Test C-5.3 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.



Use the internet to access manufacturers' websites to find the following information:



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<https://c-tradeactivities-electrical-bcplumbingapprl1.pressbooks.tru.ca/?p=2481#h5p-46>

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RIDGID. (n.d.). *Software tools*. <https://www.ridgid.com/ca/en/software>

Technical Safety BC. (n.d.). *Technical Safety BC*. <https://www.technicalsaftybc.ca/>

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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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