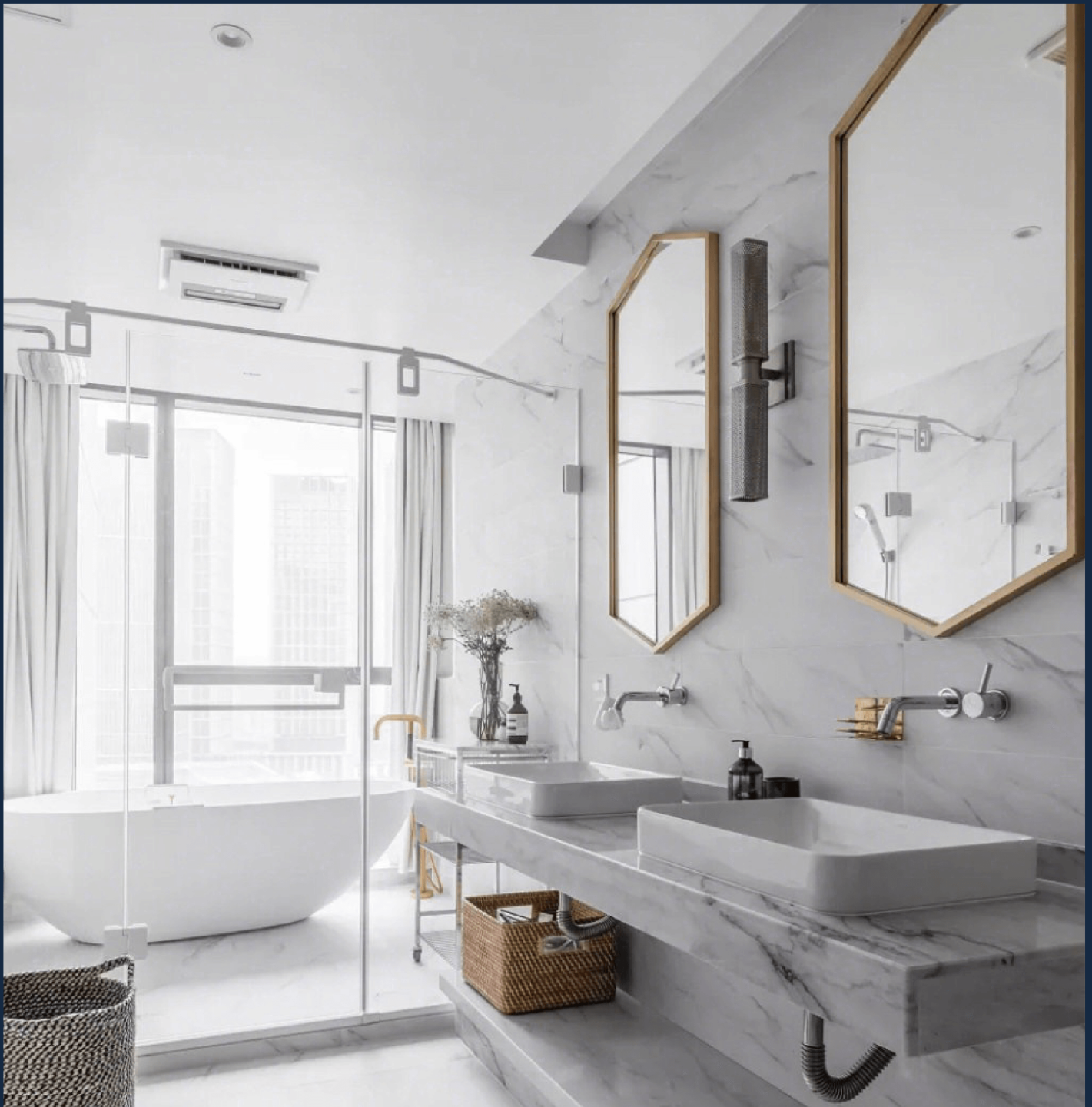


Block C: Plumbing Fixtures and Appliances



Plumbing Apprenticeship Program Level 2 Series

Block C: Plumbing Fixtures and Appliances

BC Plumbing Apprenticeship, Level 2

SKILLED TRADES BC

*BC PIPING ARTICULATION AND CURRICULUM SUBCOMMITTEE; ROD
LIDSTONE; AUDREY CURRAN; AND PAUL SIMPSON*

TRU OPEN PRESS
KAMLOOPS



Block C: Plumbing Fixtures and Appliances Copyright © 2025 by Skilled Trades BC, TRU Open Press is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (<https://creativecommons.org/licenses/by-nc-sa/4.0/>), except where otherwise noted.

Original material © SkilledTradesBC, All Rights Reserved. The original material provided by SkilledTradesBC has been adapted and modified with permission. ©COPYRIGHT TRU, 2025. Licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/deed.en>)) licence.

This licence allows you to retain, reuse, copy, redistribute, and revise this resource — in whole or in part — for **non-commercial purposes**, provided that the adapted version is released under the same licence and the original creators are properly attributed as follows:

Block C: Plumbing Fixtures and Appliances (<https://c-plumbfixappliance-bcplumbingapprl2.pressbooks.tru.ca/>) by SkilledTradesBC, revised by the BC Articulation Curriculum Subcommittee, Rod Lidstone, Audrey Curran, and TRU Open Press, is used under a **CC BY-NC-SA 4.0** (<https://creativecommons.org/licenses/by-nc-sa/4.0/deed.en>) licence. **Download for free at:** <https://c-plumbfixappliance-bcplumbingapprl2.pressbooks.tru.ca/>

Suggested citation (APA style, 7th Edition):

Block C: Skilled Training BC. (2025). Block C: Plumbing Fixtures and Appliances (Rev. ed.; adapted by Rod Lidstone, the BC Articulation Curriculum Subcommittee, & TRU Open Press). TRU Open Press, Thompson Rivers University.
<https://c-plumbfixappliance-bcplumbingapprl2.pressbooks.tru.ca/>
(<https://c-plumbfixappliance-bcplumbingapprl2.pressbooks.tru.ca/>)

Cover Art Attribution: Contemporary Bathroom Fixtures and Trim (<https://www.flickr.com/photos/161816492@N07/46650333334>) (Pick Comfort/ Flickr) CC BY 2.0 (<https://creativecommons.org/licenses/by/2.0/>)

This book was produced with Pressbooks (<https://pressbooks.com>) and rendered with Prince.

Contents

Block C: Plumbing Fixtures and Appliances Introduction	vii
Acknowledgments	xi
Accessibility	xvii
Glossary	169
Plumbing Apprenticeship & Trade Resources in BC	178
Version History	181

In the field, there are many similarities or overlaps with the work of plumbers and gas fitters. Many plumbing and heating contractors employ both plumbers and gas fitters as well as tradespeople with dual certifications.

Upon completion of a Plumbing Apprenticeship, a plumber can receive cross-program credit for a portion of the Gas fitter apprenticeship. As such, training in fuel gas has been incorporated into all levels of the Plumbing Apprenticeship.

Block C of the **Plumbing Apprenticeship Program Level 2 Series** focuses on the installation of plumbing fixtures and appliances, providing apprentices with the essential skills to complete these tasks accurately and efficiently. This section equips apprentices with the knowledge required to install various plumbing fixtures and appliances, ensuring they can complete installations to industry standards and meet the needs of different plumbing systems.

Plumbing Apprenticeship Program Level 2 Series

The *Plumbing Apprenticeship Program Level 2 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: Fuel Gas Systems (<https://a-fuelgas-bcplumbingapprl2.pressbooks.tru.ca/>)

A-1: Gas Fired Appliances

A-2: Gas Codes Regulations and Standards

A-3: Gas Appliance and Building Air Requirements

A-4: Technical Instruments and Testers

Block B: Heating and Cooling Systems (<https://b-heating-bcplumbingapprl2.pressbooks.tru.ca/>)

B-1: Types of Heating and Cooling Systems

B-2: Hydronic Heating and Cooling Generating Equipment

B-3: Hydronic Heat Transfer Units

B-4: Hydronic Heating Piping and Components

Block C: Install Fixtures and Appliances (<https://c-plumbfixappliance-bcplumbingapprl2.pressbooks.tru.ca/>)

C-1: Plumbing Fixtures and Trim

C-2: Plumbing Appliances

Block D: Drainage Systems

(<https://d-drainagesystems-bcplumbingapprl2.pressbooks.tru.ca/>)

- D-1: Sanitary Drain, Waste and Vent Systems
- D-2: Planning and Installation of DWV Systems
- D-3: Storm Drainage Systems
- D-4: Test and Drainage Systems
- D-5: Drainage System Maintenance and Repairs

Plumbing Apprenticeship Program Overview and Upcoming Resources

- **Plumbing Apprenticeship Program Level 1 Series** is coming soon to TRU Open Press in 2025–2026!
- **Plumbing Apprenticeship Program Level 3 Series** (<https://collection.bccampus.ca/search/?q=%22pl3%22>) can be found in the BCCampus Open Collection (<https://collection.bccampus.ca/>).
- **Plumbing Apprenticeship Program Level 4 Series** (<https://bccampus.ca/projects/archives/zed-cred-z-degrees/ztc-open-educational-resources-for-trades/>) can be found in the BCCampus Open Collection. (<https://collection.bccampus.ca/>) (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 (<http://www.worksafebc.com>) 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.

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

Acknowledgments

The development of the *Piping Trades Learning Guides* was a collaborative effort driven by a commitment to excellence in trades education. These guides 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 leadership and guidance have been instrumental in shaping high-quality training resources. We extend our sincere gratitude for their contributions and ongoing stewardship in advancing the piping trades.



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 2024/2025

Content Review, Revision, and Development: BC Plumbing Articulation Curriculum Subcommittee and Rod Lidstone

Final Content Review and Revisions: Audrey Curran

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

Publishing Manager: Dani Collins, MEd

Copy Editing: Kaitlyn Meyers, BA

Production: Jessica Obando Almache, BCS

- Co-op Students:
 - Greg Vilac
 - Riley Phillips
 - Vansh Sethi
 - Jesse Perkins

Resources

Content adapted from:

- ©2019, Skilled Trades BC (Harmonized)

- Open School BC
- Trades Training BC

Skilled Trades BC website: <https://skilledtradesbc.ca> (<https://skilledtradesbc.ca>) To order printed copies of Program Outlines or learning resources (where available) for BC Trades, contact: Crown Publications, Queen's Printer Web: www.crownpub.bc.ca Email: crownpub@gov.bc.ca Toll Free: 1 800 663-6105

The following suppliers have kindly provided copyright permission for selected images throughout these Plumbing Apprenticeship resources:

- Caleffi Hydronic Solutions (<http://www.caleffi.us>)
- Canadian Standards Association (<https://www.csagroup.org/>) (CSA Group Org)
- Danco (<https://www.danco.com/>)
- Fine Homebuilding (<https://www.finehomebuilding.com/>)
- International Organization for Standardization (<https://www.iso.org/>)
- MAAX Canada (<https://maax.ca/>) [MAAX Canada is a subsidiary of ABG American Bath Group]
- NIBCO, Inc. (<http://www.nibco.com>)
- Oatey Co (<https://www.oatey.com/>).
- Province of British Columbia (Building and Safety Standards Branch (<http://www.gov.bc.ca/buildingcodes>))
- SFA SANIFLO INC. (<https://www.sfasaniflo.com/us/>)
- SkilledTradesBC (<https://skilledtradesbc.ca/>)
- Standards Council of Canada (SCC) (<https://scc-ccn.ca/>)
- Toto USA (<https://www.toto.com/en/corporate/>)

Any additional adapted versions of this content would require additional copyright permissions from the rights holders.

Creative Commons and site license images:

- Enameled bathtub (<https://pixabay.com/photos/bathtub-tub-bathroom-bath-white-2485957/>) by ErikaWittlieb on Pixabay (<https://pixabay.com/service/license-summary/>)
- Hand-hammered copper tub (<https://www.flickr.com/photos/dorasmith/11429171415/>) [modified] is by Dora Smith on Flickr, and used under a CC BY-NC 2.0 (<https://creativecommons.org/licenses/by-nc/2.0/>) license.
- Pink bathroom suite, Skaill House, Orkney (https://commons.wikimedia.org/wiki/File:Pink_bathroom_suite,_Skaill_House,_Orkney.jpg) [cropped – “Acrylic Tub”] by Mike Shaw, via Wikimedia Commons, is used under a CC BY SA 4.0 (<https://creativecommons.org/licenses/by-sa/4.0/deed.en>) license.
- Black Wooden Sink Cabinet with Mirror (<https://www.pexels.com/photo/black-wooden-sink-cabinet-with-mirror-10511536/>) (Marble basin) by Andrea Davis, via Pexels is used under the Pexels License (<https://www.pexels.com/license/>).
- Commode (<https://freepngimg.com/png/45777-commode-download-image-png-free-photo>) (Floor-mounted, bottom outlet, close-coupled, tank-type water closet or toilet). by Rosalie Boucher on FreePNGimg.com is used under a CC BY-NC 4.0 (<https://creativecommons.org/licenses/by-nc/4.0/>) license.
- Old toilet with elevated cistern and chain (https://commons.wikimedia.org/wiki/File:Old_toilet_with_elevated_cistern_and_chain.jpg) (Floor-mounted, bottom outlet, high tank water closet) is by Gregorydavid at English Wikipedia (<https://en.wikipedia.org/wiki/>) and is used under a CC BY-SA 3.0 (<https://creativecommons.org/licenses/by-sa/3.0/deed.en>) license.
- Siphon jet water closet (https://commons.wikimedia.org/wiki/File:Diagram_of_a_jet-siphonic_WC_bowl.svg) by SouthHamsian, via Wikimedia Commons, is used under a CC BY-SA 4.0 (<https://creativecommons.org/licenses/by-sa/4.0/deed.en>) license.
- Stainless steel trough urinal (<https://www.flickr.com/photos/daquellamanera/166265446>) by Daniel Lobo, via Flickr, is in the public domain (https://en.wikipedia.org/wiki/Public_domain).
- Countertop lavatory for hair salon (<https://pixabay.com/photos/beauty-salon-hair-dresser-table-3277314/>) [modified], by Michelle Raponi, on Pixabay is used under the Pixabay License (<https://pixabay.com/service/license-summary/>).
- Double compartment stainless steel kitchen sink (<https://pixabay.com/photos/basin-sink-kitchen-sink-tap-drain-1502544/>) by Brett Hondow on Pixabay is used under the Pixabay License (<https://pixabay.com/service/license-summary/>).
- Freestanding clawfoot tub (https://www.freepik.com/free-photo/beautiful-luxury-elegance-white-bathtub-decoration-interior-bathroom-spa-relax_4323999.htm) by lifeforstock on Freepik is used under the Freepik License (<https://www.freepik.com/legal/terms-of-use#nav-freepik-license>).
- Whirlpool tub (<https://www.flickr.com/photos/jingdianjiaju2/3967329315>) by jingdianjiaju2, on Flickr is used under a CC BY-SA 2.0 (<https://creativecommons.org/licenses/by-sa/2.0/>) license.
- Hospital autopsy table (<https://commons.wikimedia.org/wiki/File:2010-07-23-rechtsmedizin-berlin-8.jpg>) by Ralf Roletschek, via Wikimedia Commons, is used under a CC BY-NC-ND 3.0 (<https://creativecommons.org/licenses/by-nc-nd/3.0/>) license.
- Stainless steel one-piece prison washroom unit (https://commons.wikimedia.org/wiki/File:Bloc_sanitaire_d'une_cellule_de_la_prison_Jacques-Cartier,_Rennes,_France.jpg) by Édouard Hue, via Wikimedia Commons is used under a CC BY-SA 3.0 (<https://creativecommons.org/licenses/>)

by-sa/3.0/deed.en) license.

- Luxurious Modern Bathroom with Whirlpool Tub (<https://www.pexels.com/photo/luxurious-modern-bathroom-with-whirlpool-tub-29887335/>) by Alexander Mass via Pexels is used under the Pexels license. (<https://www.pexels.com/license/>)

All symbol icons are from the Noun Project and are used under a CC BY license:

- Important by Larea from Noun Project (<https://thenounproject.com/browse/icons/term/important/>) (CC BY 3.0 (<https://creativecommons.org/licenses/by/3.0/deed.en>))
- Skull and Crossbones by Luis Prado from Noun Project (<https://thenounproject.com/browse/icons/term/skull-and-crossbones/>) (CC BY 3.0 (<https://creativecommons.org/licenses/by/3.0/deed.en>))
- Resources by popcornarts from Noun Project (<https://thenounproject.com/browse/icons/term/resources/>) (CC BY 3.0 (<https://creativecommons.org/licenses/by/3.0/deed.en>))
- Flammable by yogi rista from Noun Project (<https://thenounproject.com/browse/icons/term/flammable/>) (CC BY 3.0 (<https://creativecommons.org/licenses/by/3.0/deed.en>))
- Checkbox by ims.icon from Noun Project (<https://thenounproject.com/browse/icons/term/checkbox/>) (CC BY 3.0 (<https://creativecommons.org/licenses/by/3.0/deed.en>))
- Explosive Materials by Ervin Bolat from Noun Project (<https://thenounproject.com/browse/icons/term/explosive-materials/>) (CC BY 3.0 (<https://creativecommons.org/licenses/by/3.0/deed.en>))
- Work gloves by perilous graphic from Noun Project (<https://thenounproject.com/browse/icons/term/work-gloves/>) (CC BY 3.0 (<https://creativecommons.org/licenses/by/3.0/deed.en>))
- Danger by Alice Design from Noun Project (<https://thenounproject.com/browse/icons/term/danger/>) (CC BY 3.0 (<https://creativecommons.org/licenses/by/3.0/deed.en>))
- Electricity by Alice Design from Noun Project (<https://thenounproject.com/browse/icons/term/electricity/>) (CC BY 3.0 (<https://creativecommons.org/licenses/by/3.0/deed.en>))



TRU Wolves (<https://www.flickr.com/photos/thompsonrivers/52667199689/>) (Thompson Rivers University/Flickr) CC BY-NC-SA 2.0 (<https://creativecommons.org/licenses/by-nc-sa/2.0/>)

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.

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 (<https://www.youtube.com/watch?v=OQgwdP0rNog>)



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 (<https://www.youtube.com/watch?v=OQgwdP0rNog>) (2022) on YouTube.



One or more interactive elements has been excluded from this version of the text. You can view them online here: [#oembed-1](https://c-plumbfixappliance-bcplumbingappri2.pressbooks.tru.ca/?p=22#oembed-1)

References

Skilled Trades BC. (2021). Book 1: Fuel gas systems, Heating and cooling Systems. Plumber apprenticeship program level 2 book 1 Harmonized. Crown Publications: King's Printer for British Columbia.

SkilledTradesBC. (2022, December 1). Introducing Skilled Trades BC. YouTube. <https://www.youtube.com/watch?v=OQgwdP0rNog>

Trades Training BC. (2021). A-1: Introduction to gas-fired appliances. In: *Plumber Apprenticeship Program: Level 2*. Industry Training Authority, BC.

Accessibility

The web version of Block C: Plumbing Fixtures and Appliances (<https://c-plumbfixappliance-bcplumbingapprl2.pressbooks.tru.ca/>) has been designed to meet Web Content Accessibility Guidelines 2.0 (<https://www.w3.org/TR/WCAG20/>), level AA. In addition, it follows all guidelines in Appendix A: Checklist for Accessibility (<https://opentextbc.ca/accessibilitytoolkit/back-matter/appendix-checklist-for-accessibility-toolkit/>) of the Accessibility Toolkit – 2nd Edition (<https://opentextbc.ca/accessibilitytoolkit/>).

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.	Yes
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.	Yes
Images	Images and text do not rely on colour to convey information.	Yes
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.)	Yes
Tables	Tables include row and/or column headers with the correct scope assigned.	Yes
Tables	Tables include a title or caption.	Yes
Tables	Tables do not have merged or split cells.	Yes
Tables	Tables have adequate cell padding.	Yes
Links	The link text describes the destination of the link.	Yes
Links	Links do not open new windows or tabs. If they do, a textual reference is included in the link text.	Yes
Links	Links to files include the file type in the link text.	Yes
Video	All videos include high-quality (i.e., not machine generated) captions of all speech content and relevant non-speech content.	Yes
Video	All videos with contextual visuals (graphs, charts, etc.) are described audibly in the video.	Yes
H5P	All H5P activities have been tested for accessibility by the H5P team and have passed their testing.	Yes
H5P	All H5P activities that include images, videos, and/or audio content meet the accessibility requirements for those media types.	Yes
Font	Font size is 12 point or higher for body text.	Yes
Font	Font size is 9 point for footnotes or endnotes.	Yes
Font	Font size can be zoomed to 200% in the webbook or eBook formats.	Yes
Mobile Check	Layout displays properly on smaller screen sizes and is mobile-friendly.	

(Accessibility Table originally created by the Rebus Community (<https://press.rebus.community/the-rebus-guide-to-publishing-open-textbooks/back-matter/accessibility-assessment/>) and shared under a CC BY 4.0 License) (<https://creativecommons.org/licenses/by/4.0/>).

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.
- These videos do not have edited captions:
 - Introducing SkilledTradesBC (<https://www.youtube.com/watch?v=OQgwdP0rNog>) by Skilled Trades BC (2022)

Adapted from the Accessibility Toolkit – 2nd Edition (<https://opentextbc.ca/accessibilitytoolkit/>) by BCcampus, licensed under CC-BY (<https://creativecommons.org/licenses/by/4.0/>).

Other Formats Available

In addition to the web version, this book is available in a number of file formats, including PDF, EPUB (for eReaders), and various editable files. The Digital PDF has passed the Adobe Accessibility Check.

Are you having an issue accessing this resource?

If you have problems accessing this resource, or if you have an idea for how to make this resource more accessible, please contact us to let us know!

Please include the following information:

- The name of the resource
- The location of the problem by providing a web address or page description.
- A description of the problem
- The computer, software, browser, and any assistive technology you are using that can help us diagnose and solve your issue (e.g., Windows 10, Google Chrome (Version 65.0.3325.181), NVDA screen reader)

Contact OpenPress@tru.ca (mailto:OpenPress@tru.ca).

Glossary

angle stop

A small shutoff valve installed at the water supply stub to control water flow to a fixture. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

architectural drawings

Drawings that provide room dimensions, fixture arrangements, and building materials, serving as a primary reference for rough-in work. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

back lip

The rear edge of a bathtub that is supported by a horizontal ledge to provide stability and prevent movement. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

backflow preventer

A plumbing device designed to prevent contaminated water from flowing back into the clean water supply. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

backing

Support materials (e.g., plywood, lumber, metal) installed behind finished walls to secure fixtures like lavatories and shower curtain rods. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

backsiphonage

When dirty water flows backward into clean water pipes by accident. This can happen if water pressure drops, like when a water main breaks or a lot of water is used at once. It can let harmful stuff, like bacteria or chemicals, get into the drinking water supply. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

beer cabinets

A refrigeration unit used to store and cool beer, sometimes equipped with a glass rinser for preparing glasses before pouring. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

booster heater

A device that raises water temperature, often used in high-temperature dishwashers to ensure proper sanitization. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

carrier arms

Metal brackets used to support wall-hung fixtures, ensuring they are securely attached to the wall structure. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

carriers

Steel frames used to provide additional support for fixtures such as wall-hung water closets, especially for persons with disabilities. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

cartridge faucets

A type of faucet that control the flow of water using a cartridge inside. The cartridge is a small, replaceable part that moves to let water flow in or out when you turn the handle. These faucets are easy to use and can help control both the temperature and the amount of water that comes out. (Section C-1.1 (#chapter-chapter-1))

centrelines

Reference lines used in plumbing rough-in to accurately position piping and fixture supports. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

clearance

The minimum space required between fixtures and walls or other structures, as regulated by codes and specifications. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

close-coupled

A type of toilet where the tank and the bowl are joined closely together as one unit. The water tank sits right on top of the bowl, making it compact and easy to install. (Section C-1.1 (#chapter-chapter-1))

closet flange

A fitting that connects the water closet to the waste pipe, ensuring a secure connection. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

clothes washer

(Washing Machine); A household appliance that washes laundry using water, detergent, and an internal agitation mechanism. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

composite stone

A strong material made by mixing crushed natural stone with glue or resin. It looks like real stone but is made in factories and is often used for countertops, floors, and walls. (Section C-1.1 (#chapter-chapter-1))

compression faucets

A type of faucet that works by turning the handles to press down on washers inside the faucet. This creates a seal that stops the water from flowing. When you turn the handle, it lifts the washer to allow water to flow, and when you turn it back, the washer closes to stop the water. These faucets are commonly found in older sinks. (Section C-1.1 (#chapter-chapter-1))

compression fitting

A plumbing connection method that uses a nut and ferrule to create a watertight seal on supply lines. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

corrosion

When metals slowly get damaged or worn away because of reactions with air, water, or other substances. A common example is rust forming on iron when it gets wet. (Section C-1.1 (#chapter-chapter-1))

dielectric union

A specialized plumbing fitting that prevents galvanic corrosion between different metal pipes. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

dishwasher

An electrical and mechanical appliance that cleans dishes by spraying them with hot water and detergent, followed by rinsing and drying cycles. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

dishwasher drain hose

A flexible tube that connects a dishwasher to a drainage system to remove wastewater. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

diverter valve

A valve in a combination tub-shower fixture that directs water either to the tub spout or the showerhead. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

drain pan

A shallow tray placed beneath a water heater to collect and direct water from leaks or pressure relief discharge. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

Drainage, Waste, and Vent (DWV) System

A network of pipes that remove wastewater and provide ventilation to prevent sewer gases from entering buildings. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

drop ear

A type of shower arm fitting with mounting ears for secure attachment to wall framing. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

drop-ear fitting

A fitting used to anchor the showerhead securely to the wall, often with a female iron pipe thread (FIP). (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

electric immersion elements

A heating element inside a water heater that converts electrical energy into heat to warm water. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

electrical drawings

Diagrams showing the layout of electrical lines, outlets, and fixtures to prevent conflicts with plumbing installations. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

escutcheons

A decorative cover or plate used in plumbing to hide gaps or holes around pipes, faucets, or other fixtures. It helps make the area look neat and clean by covering the space where a pipe or fixture meets the wall or surface.

Escutcheons are often used in sinks, showers, and toilets to improve the appearance and prevent water from leaking behind the fixture. (Section C-1.1 (#chapter-chapter-1))

fire stop rating

A classification system indicating how long a barrier (e.g., firewall, floor) can prevent the spread of fire. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

fixture

A plumbing device, like a sink or toilet, that uses water. (Section C-1.1) (#chapter-chapter-1)

fixture supply tubes

(Also known as supply risers, supply connectors or supply lines); The flexible pipes that bring water from the main water supply to a plumbing fixture, like a sink, toilet, or shower. They connect the fixture to the water lines, allowing water to flow in and out. These tubes are usually made of materials like copper, stainless steel, or plastic, and they are designed to be easy to install and connect to the fixture. (Section C-1.1 (#chapter-chapter-1))

flanged drain

A type of sink drain connection where a flat, circular rim (flange) helps secure the drain to the sink. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

flushometer valves

A special valve used in public bathrooms instead of a regular toilet tank. It releases a strong burst of water to flush the toilet or urinal quickly and refills right away, so it can be used often without waiting. Direct-flush valves are a “tankless” design that uses water pressure from the supply line rather than a tank of water to flush the fixture (Figure 10, Section C-1.1 (#chapter-chapter-1))

garbage disposal

(Garburator); A device installed under a kitchen sink that uses a motorized grinder to break down food waste into a slurry that can be washed down the drain. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

gasket

A sealing material used to prevent leaks between two surfaces, such as between a faucet and sink. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

grey water or process water

Used water from sinks, showers, bathtubs, and washing machines. It is not dirty like toilet water and can sometimes be cleaned and reused for things like watering plants or flushing toilets. (Section C-1.1 (#chapter-chapter-1))

High-efficiency toilets (HET)

Toilets that use less water to flush but still work just as well as regular toilets. They help save water and lower water bills. (Section C-1.1 (#chapter-chapter-1))

ice maker

A device that automatically produces ice cubes, commonly found in refrigerators or as standalone units. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

isometric drawing

A three-dimensional technical drawing that illustrates the layout, connections, and travel path of plumbing pipes. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

laundry box

A recessed box that simplifies connections for washing machine supply lines and drainage. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

lavatories

Sinks with running water used for washing hands and face, usually found in bathrooms. (Section C-1.1 (#chapter-chapter-1))

locknut

A threaded fastener used to secure plumbing fixtures and fittings in place. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

master mixing valve

A device that blends hot and cold water to deliver tempered water at a safe temperature to fixtures. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

mechanical drawings

Plans that depict the layout of supply piping, waste and vent lines, and other mechanical systems within a building. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

mortar base

A continuous bed of mortar used to support the bottom of certain types of bathtubs, such as jetted tubs and whirlpools. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

notching

In construction, means cutting a small section out of wood or another material to help pieces fit together properly. It is often done to make space for pipes, wires, or to join beams and boards securely. (Section C-1.1 (#chapter-chapter-1))

overflow gasket

A seal placed on the back of the bathtub overflow opening to prevent leaks. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

P-trap

A U-shaped pipe that prevents sewer gases from entering a home by trapping water. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

pedestal basin

A type of sink supported by a freestanding pedestal that conceals plumbing connections. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

perimeter lip (tiling flange)

A raised edge on a bathtub or shower base that sits behind the finished wall to prevent water from seeping behind the unit. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

pipng layout drawing

A detailed plan showing the exact placement of pipes, fittings, and connections needed for plumbing installations. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

plumber's putty

A pliable sealing compound used to create watertight seals around drains and fixtures. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

pop-up drain assembly

A drain mechanism with a pivot rod that allows the stopper to be raised or lowered using a lift rod. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

pressure-assist

A toilet system that uses compressed air to create a stronger flush. As the tank refills, a vessel captures and compresses air, which helps push the water into the bowl more quickly. This results in a more powerful and efficient flush, using less water while improving cleaning performance. (Section C-1.1 (#chapter-chapter-1))

reclaimed water

Water that has been used before and cleaned so it can be used again for things like watering plants, flushing toilets, or washing streets. It is not for drinking, but it helps save fresh water. (Section C-1.1 (#chapter-chapter-1))

reverse osmosis

A water purification process that removes contaminants by forcing water through a semipermeable membrane. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

reverse trap

A special type of plumbing pipe that helps prevent bad smells or gases from coming back into a building. It works by trapping a small amount of water in the pipe, but instead of the water being higher, like in a regular trap, it's lower. This helps keep the pipes clear and stops odors from escaping. (Section C-1.1 (#chapter-chapter-1))

rough-in

The initial stage of plumbing installation before walls and floors are finished. (Section C-1.1) (#chapter-chapter-1)

rough-in documentation

Manufacturer-provided specifications detailing fixture dimensions, pipe connection points, and installation guidelines. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

seismic restraint kit

A set of straps and brackets used to secure a water heater to a structural component to prevent movement during an earthquake. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

self-rimming basin

A sink with a built-in lip or rim that rests on the countertop, requiring minimal installation support. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

shower pipe riser

A vertical pipe that connects to the shower arm and directs water to the showerhead. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

silicone caulking

A flexible sealant used to waterproof joints and seams, especially in synthetic materials where putty may cause staining. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

siphon jet

A part of a toilet that helps flush water quickly and powerfully. It pushes water through a small opening to create suction, which helps remove waste from the bowl. (Section C-1.1 (#chapter-chapter-1))

solenoid valve

An electrically controlled valve that regulates the flow of liquids or gases in appliances such as washing machines and dishwashers. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

specification sheet

A document that includes technical details about a fixture, including rough-in dimensions and installation requirements. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

standpipe

A vertical section of pipe for washing machine drainage, ensuring proper waste disposal. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

steam shower

A self-contained shower unit with an integrated steam generator for steam bathing. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

stop valve

A shutoff valve used to control the flow of water to an appliance, such as a dishwasher or clothes washer. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

storage tank water heater

A water heater that continuously stores and heats a supply of water in a cylindrical tank. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

structural drawings

Plans that indicate load-bearing elements of a building, ensuring that plumbing modifications do not weaken the structure. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

tankless water heater

(Also called on-demand water heaters); A water heating system that heats water on demand without storing it in a tank. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

thermal expansion

A small tank installed in a water heating system to absorb excess pressure caused by thermal expansion of water. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

thermostat

A device that controls the temperature of a water heater by regulating the activation of heating elements. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

threaded flange

A type of drain flange with threads that allow for a secure connection to plumbing fittings. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

trapway

The curved pipe at the bottom of a toilet or sink that helps carry away water and waste. It also keeps a little bit of water inside to stop bad smells from coming back up. (Section C-1.1 (#chapter-chapter-1))

tub-filler valve

A valve used to blend hot and cold water, controlling the flow to a bathtub or shower. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

ultraviolet (UV) sterilizers

A water purification device that uses UV light to kill bacteria and viruses. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

vacuum relief valve

A valve that prevents a water heater tank from collapsing due to negative pressure caused by backsiphonage. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

vacuum-assist

A system in some toilets that helps the flush work more powerfully. It uses air pressure to help pull the waste and water down the drain quickly, using less water. (Section C-1.1 (#chapter-chapter-1))

vitified porcelain

Also known as vitreous china; a type of very strong and smooth ceramic material made by heating special clay at a very high temperature. This process makes it hard, waterproof, and glass-like, so it doesn't absorb water and is very durable. It is often used for making sinks, toilets, and tiles. (Section C-1.1 (#chapter-chapter-1))

waste and overflow fittings

Plumbing components that connect the bathtub drain to the trap, preventing overflow. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

waste condensate

Water that forms when warm air touches a cold surface, like the water droplets on a cold drink. In buildings, this water comes from air conditioners, refrigerators, or pipes and is usually drained away as waste. (Section C-1.1 (#chapter-chapter-1))

water closets

Another name for toilets, which are used for flushing away waste. (Section C-1.1 (#chapter-chapter-1))

water-hammer arrestor

A device installed on water supply lines to absorb shock and prevent noise caused by the sudden closing of valves. (Section C-2.2 (#chapter-c-2-2-plumbing-appliance-installation))

weir

The top edge of the water inside a toilet or sink drain trap (the trapway's highest point). It helps control the flow of water and keeps some water in the trap to block bad smells from coming back up. (Section C-1.1 (#chapter-chapter-1))

whirlpool tub

A bathtub equipped with jets that mix air and water to create a massaging effect. (Section C-2.1 (#chapter-c-2-1-types-of-plumbing-appliances))

wing back elbow

A pipe fitting with mounting wings that allows secure attachment to a backing board, commonly used for shower and tub spouts. (Section C-1.2 (#chapter-c-1-2-fixtures-and-trim-installation))

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** (<https://skilledtradesbc.ca/plumber>) – Overview of plumbing training, certification requirements, and apprenticeship pathways in British Columbia.
- **Red Seal Program – Plumber** (<https://www.red-seal.ca/eng/trades/plumbers/overview.shtml>) – National certification program with exam prep guides and trade mobility information.
- **BC Building Codes & Standards** (<https://www.bccodes.ca/>) – Official building and plumbing codes for British Columbia.

Workplace Safety & Regulations

- **WorkSafeBC** (<https://www.worksafebc.com/en>) – Essential safety resources for plumbers, including:
 - Health & Safety – WorkSafeBC (<https://www.worksafebc.com/en/health-safety>)
 - Report Unsafe Working Conditions (<https://www.worksafebc.com/en/contact-us/departments-and-services/health-safety-prevention>)
 - Report a Workplace Injury or Disease (<https://www.worksafebc.com/en/claims/report-workplace-injury-illness>)
 - Submit a Notice of Project Form (<https://www.worksafebc.com/en/for-employers/just-for-you/submit-notice-project>)
 - Get Health and Safety Resources (Videos, Posters, Publications, and More) (<https://www.worksafebc.com/en/resources-health-safety>)
 - Search the OHS Regulations (and Related Materials) (<https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation>)
 - Conduct an Incident Investigation (<https://www.worksafebc.com/en/health-safety/create-manage/incident-investigations/conducting-employer-investigation>)
- **CCOHS: OHS Answers Fact Sheets – Plumber** (https://www.ccohs.ca/oshanswers/occup_workplace/plumber.html) – Safety guidelines and best practices for plumbers in various work environments.

Financial Supports

- **Financial Support (SkilledTradesBC)** (<https://skilledtradesbc.ca/financial-support>) – Information about grants, tax credits, Canada apprentice loans, employment insurance, and the Indigenous Skills and Employment Training

(ISET) program.

- **StudentAidBC** (<https://studentaidbc.ca/>) – Complete post-secondary education through student loans, grants, and scholarships. There is also programs that help with loan repayment.
- **WorkBC (Government of BC)** (<https://www.workbc.ca/find-loans-and-grants/students-and-adult-learners/services-apprentices-and-employers>) – Services for apprentices and employers.

Mental Health & Wellness Support

- **HealthLink BC – Mental Health and Substance Use** (<https://www.healthlinkbc.ca/mental-health-and-substance-use>) – HealthLink BC resources for mental health and wellness support.
- **Here2Talk** (<https://here2talk.ca/>) – Free and confidential counseling services available to all post-secondary students registered at a BC school.
- **Help Starts Here** (<https://helpstartshere.gov.bc.ca/>) – A database with over 2,500 listings of services related to mental health and substance use supports.
- **Hope for Wellness Helpline** (<https://www.hopeforwellness.ca/>) – 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] (<https://www.fnha.ca/Documents/FNHA-mental-health-and-wellness-supports-for-indigenous-people.pdf>) by First Nations health Authority – List of culturally safe services for Indigenous people.
- **HeretoHelp – BC** (<https://www.heretohelp.bc.ca/>) – Mental health resources, including videos, articles, and support services in BC.
- **BC Construction Industry Rehabilitation Plan** (<https://www.constructionrehabplan.com/>) – Mental health and substance use services for CLRA and BCBT members and their families.
- **Virtual Mental Health Supports (Government of BC)** (<https://www2.gov.bc.ca/gov/content/health/managing-your-health/mental-health-substance-use/virtual-mental-health-supports>) – 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 (tel:+1-888-353-2273) for 24/7 emotional support, crisis intervention, and community resource information.
- **Talk Suicide Chat Service** (<https://talksuicide.ca/>) – An alternative if calling is difficult; available for crisis intervention.
- **310Mental Health Support** – Call 250-310-6789 (tel:+1-250-310-6789) for emotional support, information, and resources specific to mental health.
- **1-800-SUICIDE** – Call 1-800-784-2433 (tel:+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 (tel:+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 (tel:+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 (tel:+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 2, Block C (<https://c-plumbfixappliance-bcplumbingapprl2.pressbooks.tru.ca/>). Each update increases the version number by 0.1. The most recent version is reflected in the exported files for this resource.

Important Notice: This book contains content used with permission from Skilled Trades BC, Trades Training BC, and various third-party contributors, with all third-party content identified and attributed throughout. To create your own version, you must obtain explicit permission from Skilled Trades BC and the respective third-party content owners.

If you identify an error in this resource, please report it using the TRU Open Education Resource Error ([#back-matter-tru-open-education-resource-error-form](#)) Form.

Version	Date	Change	Details
1.0	September, 2025	Plumbing Apprenticeship Level 2 Block C learning resource from STBC content converted to open and freely accessible digital platform and published at TRU.	