

Block D: Drainage Systems



Plumbing Apprenticeship Program Level 2 Series

Block D: Drainage Systems

BC Plumbing Apprenticeship, Level 2

SKILLED TRADES BC

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

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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 D of the **Plumbing Apprenticeship Program Level 2 Series** focuses on the fundamentals of sanitary and storm drainage systems, providing apprentices with a comprehensive understanding of installation, maintenance, and repair processes. This section equips apprentices with essential skills to handle the complexities of both sanitary and storm drainage systems, ensuring effective installation and upkeep in various settings.

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.)

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<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.



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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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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.

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Glossary

“jet vac” trucks

A special truck that uses water and a strong vacuum to clean pipes and drains. It shoots high-pressure water to break up blockages, like dirt or grease, and then sucks up the waste to remove it. This helps keep pipes and drains clear and working properly. (Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

15-minute rain event

A standard time frame used to express storm drainage load calculations, based on the volume of rainfall (in litres) expected over a 15-minute period. This metric helps determine appropriate pipe sizing. (Section D-3.3 (#chapter-d-3-3-storm-drainage-code-requirements))

90° elbow

A fitting used to change the direction of the pipe by 90 degrees. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

acrylonitrile-butadiene-styrene (ABS) pipe

A type of plastic pipe that is lightweight, strong, and resistant to damage. It is often used in homes and buildings for carrying waste and venting air. However, because it can catch fire, it is usually only used in certain types of buildings. (Section D-1.4 (#chapter-d-1-4-acceptable-pipe-material-application))

adaptor plug

A fitting used to connect tubing of different sizes or types, ensuring a secure and leak-free transition between components in a water sampling system. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

additional circuit vent

A vent pipe installed between a circuit vent and a relief vent to provide additional air circulation. (Figure 1, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

air admittance valves

Air admittance valves are mechanical devices that let air into the plumbing system to prevent siphoning while stopping air from escaping. They are used when traditional venting isn't possible and should be installed in an accessible, ventilated area. (Figure 2, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

air break

An indirect connection between drainage pipes, created by a vertical gap of at least 25 mm (1 in.) to prevent contamination. It is commonly used for food prep sinks, drinking fountains, and ice makers. (Figure 3, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

Air pressure test

A test that checks for leaks by filling pipes with pressurized air and observing if the pressure drops. (Section D-4.1 (#chapter-d-4-1-drainage-system-testing-code-requirements))

Applied Science Technologists and Technicians of BC (ASTTBC)

The association for technology professionals and regulatory body that certifies wastewater professionals in BC. The ASTTBC registers practitioners once they have obtained the proper training. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

architectural drawing

the main plan of a building that shows its design, layout, materials, and finishes. It includes floor plans, elevations, sections, and detailed views to guide construction. These drawings are usually marked with an “A” followed by a page number (e.g., A-4). (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

as-built

The record drawings and documentation defining deviation to the designed information occurring during construction at the end of the project. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

as-constructed

The defects and deviations from the original design that occur during the construction process. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

Association of Professional Engineers and Geoscientists of British Columbia (APEGBC)

The licensing body for professional engineers and geoscientists. Only professional engineers and geoscientists are permitted to construct and/or maintain a Type 3 sewerage system. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

auger head

An attachment fitted to the end of a drill rod or casing, designed to bore into the ground and remove soil or sediment during well installation. (Section D-5.1 (#chapter-d-5-1-drain-cleaning-equipment))

authority having jurisdiction (AHJ)

The governmental body responsible for enforcing any part of the NPC. (Section D-1.2; (#chapter-d-1-2-dwv-terminology))Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

autoclave

A high-pressure, high-temperature chamber used to cure materials such as fibrocement pipe for strength and durability. (Section D-1.4 (#chapter-d-1-4-acceptable-pipe-material-application))

backflow

A reversal of the normal direction of the flow. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

backwater valve

A one-way flow control valve installed in a drainage system. Backwater valves are required to protect fixtures and drainage openings installed below grade, such as in a basement, where the possibility exists for the municipal sewage or stormwater systems to become overloaded and force wastewater back through your drains. Backwater valves are also required on any subsoil drainage pipe that connects into the sanitary drain to protect it from sewage backups. Under normal

conditions, it allows the wastewater to drain out of the system, but if a reversal of flow should occur, the valve is forced closed and protects the interior of the building from sewage backup. (Figures 4 and 5, Section D-1.2; (#chapter-d-1-2-dwv-terminology)Section D-2.3 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems))

ball test

A test that checks for proper slope and obstructions in pipes by rolling a dense ball through the system. (Section D-4.1 (#chapter-d-4-1-drainage-system-testing-code-requirements))

BaroTROLL

A pressure sensor used to measure and record barometric pressure at a well site, allowing for accurate correction of water level data obtained from submersible pressure loggers.

bathroom group

A group of plumbing fixtures installed in the same room, consisting of one domestic lavatory, one water closet, and either one bathtub (with or without a shower) or one single-head shower. The intent is that these three fixtures are located in a room occupied by only one person, so they are not normally in simultaneous use. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

BC Onsite Sewage Association (BCOSSA) and Western Canada Onsite Wastewater Management Association (WCOWMA)

These organizations develop educational programs for onsite wastewater practitioners and provide technical information to industry stakeholders and practitioners. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

BC Plumbing Code (BCPC)

The plumbing standard for British Columbia, historically based on the National Plumbing Code of Canada. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

bell trap

A type of drain used in the past, often in floor drains. Installation is prohibited by the NPC because it can cause problems with draining. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

bentonite chips

Small, pellet-like forms of bentonite clay used to seal the annular space in a monitoring well, preventing vertical water movement and protecting against contamination.

berm

A raised area of soil that is typically built along the edge of a trench or drain to hold back water, directing it into the drain for proper collection and drainage. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

borehole

A cylindrical hole drilled into the ground to access groundwater, collect geological data, or install monitoring equipment such as wells or piezometers.

branch

A sanitary drainage pipe connected at its upstream end to the junction of two or more sanitary drainage pipes or to a stack and connected at its downstream end to another branch, a sump, a stack, or a building drain. (Figure 6, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

branch vent

A vent pipe connected at its lower end to the junction of two or more vent pipes. At its upper end, it either terminates in the open air or connects to another branch vent, stack vent, vent stack, or vent header. (Figure 7, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

building code

A set of rules that tell people how to build safe and strong buildings. These rules make sure houses, schools, and other buildings are built properly so they don't fall down, catch fire easily, or have other dangers. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

building drain

The lowest horizontal piping, including any vertical offset that conducts sewage, clear-water waste, or stormwater by gravity to a building sewer. (Figure 8, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

building permit

An official permission from the city or town that allows people to build or change a building. It makes sure the plans follow the building code and keeps everyone safe. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

building sewer

A pipe that connects to a building drain 1 m (39 in.) outside the wall of a building and connects to a public sewer or private sewage disposal system. (Figure 8, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

building trap

A trap installed in a building drain or building sewer to prevent the circulation of air between a drainage system and a public sewer. New buildings do not have building traps installed, but these traps still exist in older homes and buildings. (Figure 9, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

bulkhead

A barrier or wall built within a building that may require plumbing installation adjustments for the DWV system. (Section D-2.2 (#chapter-d-2-2-planning-interior-dwv-system-layouts))

Canadian Commission on Building and Fire Codes (CCBFC)

A national committee responsible for developing and maintaining Canada's model building, fire, plumbing, and energy codes. The CCBFC operates under the National Research Council of Canada (NRC) and collaborates with provincial, territorial, and industry stakeholders to ensure codes align with safety, health, and environmental standards. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

catch basin

A ground-level stormwater collection point, often found in paved areas, that traps debris like leaves before directing

rainwater or stormwater into pipes for proper drainage. It has a grate on top to catch debris and prevent blockages, helping direct the water into storm sewers for discharge into natural water bodies. (Section D-3.2; (#chapter-d-3-2-functions-of-pipes-in-storm-drainage-systems) Section D-3.6 (#chapter-d-3-6-sumps-and-catch-basins))

ceiling drop installations

A method of lowering pipes or ducts from the ceiling to accommodate plumbing or electrical systems. This is done when it's necessary to route systems through spaces where the ceiling is lower or obstructed. (Section D-2.2 (#chapter-d-2-2-planning-interior-dwv-system-layouts))

certification mark

A special symbol or label on a product (such as ASME) that shows it has been tested and approved to meet safety and quality standards. It proves that the product is safe to use and works properly.

Note about **ASME certification marks**: the **ASME "H" or "U" stamp** is used on pressure vessels, boilers, and piping systems to indicate compliance with ASME codes. In plumbing, ASME standards apply to products like pipes, fittings, and fixtures, but the products themselves often carry certification marks from testing organizations like **CSA, NSF, or UL**, which certify that they meet ASME standards. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

certified product (plumbing)

A plumbing part that has been tested and approved to be safe and work properly. These products have a special mark or label to show they meet important safety and quality rules. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

chemical-dosing neutralization systems

Systems that use controlled injection of acid or base into a waste stream to neutralize chemicals. The chemicals react to form a salt and water mixture, which is then discharged. (Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

circuit vent

A type of vent that serves multiple fixtures on a horizontal drainage branch by utilizing the top portion of the pipe for ventilation. (Section D-1.8 (#chapter-d-1-8-sizing-branch-and-circuit-vents))

civil engineering

A branch of engineering that focuses on designing, building, and maintaining things like roads, bridges, buildings, and water systems. Civil engineers work to make sure these structures are safe, strong, and help people live and work better. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

clamping collar

A metal ring used to hold parts together, like a roof drain and the waterproof membrane, to make sure everything stays tightly in place and doesn't let water leak through. (Figure 2, Section D-3.5 (#chapter-d-3-5-installing-storm-drainage-systems))

cleanout

An access point installed in drainage and venting systems for cleaning and inspection services. (Section D-1.2 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems); Section D-1.3 (#chapter-d-1-3-functions-of-different-parts-in-a-dwv-system); Section D-2.3 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems))

clear-water waste

Wastewater with impurity levels not harmful to health. It may include cooling water and condensate drainage from refrigeration and air-conditioning equipment and cooled condensate from steam heating systems, but it does not include stormwater. (Section D-1.2; (#chapter-d-1-2-dwv-terminology) Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

clearwater waste

wastewater with impurity levels that will not be harmful to health and may include cooling water and condensate drainage from refrigeration and air-conditioning equipment and cooled condensate from steam heating systems but does not include storm water. (Section D-3.1)

closet auger

A special tool, named after the water closet, used to unclog toilets. It has a long, flexible rod with a spiral end that you insert into the toilet drain. When you turn the handle, the spiral helps break up or remove the blockage. (Section D-5.1)

cold-caulked joint

A type of joint sealed using a caulking compound, often used in bell and spigot pipe systems. The compound must be packed tightly to ensure a gas- and water-tight seal. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

combined building drain

A building drain intended to conduct sewage and stormwater. (Figure 10, Section D-1.2 (#chapter-d-1-2-dwv-terminology); Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology)) (#chapter-d-1-2-dwv-terminology)

combined building sewer

A building sewer intended to conduct sewage and storm water. (Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

combined sewer

A sewer intended to conduct sewage and stormwater. (Section D-1.2; (#chapter-d-1-2-dwv-terminology) Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

Combustible Gas Indicator (CGI)

A tool that helps workers find dangerous gases in the air that could catch fire or explode. It keeps people safe by warning them when gas levels are too high. (Section D-5.1)

combustible piping

Pipes made from materials that can burn, such as ABS and PVC, which have specific installation restrictions. (Section D-1.4 (#chapter-d-1-4-acceptable-pipe-material-application))

consumables

(Also known as consumable goods, non-durable goods, or soft goods); goods that can be consumed, dissipated, wasted, or spent. In plumbing construction projects, these may include materials such as solder, flux, sand cloth, fasteners, Teflon tape, and glue. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

contaminant

Any solid, liquid, or gas that may impair the quality of the potable water. (Section D-3.3 (#chapter-d-3-3-storm-drainage-code-requirements))

continuous vent

A vent pipe that is an extension of a vertical section of a branch or fixture drain. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

conveying

The process of transporting effluent, waste, or water from one location to another through piping or other means. (Section D-3.3 (#chapter-d-3-3-storm-drainage-code-requirements))

coordination with other trades

The process of working with other construction professionals to ensure smooth project execution. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

corrugated steel galvanized pipe

A type of durable, ribbed metal piping commonly used in stormwater systems such as culverts or detention systems. It must be joined with couplings that align pipes, resist separation, and prevent root or debris infiltration. (Section D-3.3 (#chapter-d-3-3-storm-drainage-code-requirements))

cross bore

A cross bore happens when one underground pipe accidentally goes through another pipe. For example, a new pipe might be drilled through a sewer pipe by mistake. This can be dangerous and cause clogs or leaks, so workers check carefully to make sure pipes don't cross like this. (Section D-5.1)

crown vented trap

A trap with a vent (small pipe) rising from the top of it. This design is prohibited by the NPC because the vent is too close to the trap, which can cause drainage problems. Clause 2.5.6.3.(1)(a) requires that the distance from the trap weir to the vent be not less than twice the size of the fixture drain. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

curtain drain

A French drain installed across a slope to intercept and drain water away from sensitive areas, such as septic

disposal fields, reducing water accumulation and lowering the water table. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

dead end

A pipe that terminates with a capped fitting. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

detail reference

Symbols that appear beside a part of a building plan that is drawn in detail at a larger scale on another page. The number in the top half of the detail reference symbol is the detail number. The number in the bottom half is the page on which the detail drawing can be found. This page number is usually a letter and number combination. (Figure 17, Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

detention system

A system that temporarily stores stormwater before releasing it slowly to reduce the risk of flooding and erosion. (Section D-3.8 (#chapter-d-3-8-storm-water-site-retention-systems))

developed length

The length along the centreline of the pipe and fittings. (Figure 12, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

dilution

The process of mixing chemical waste with water to reduce its concentration and stabilize it. This can be done through simple methods like flushing or using a dilution tank. (Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

dimensioning

The process of adding measurements to a drawing. (Section D-2.3 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems))

directly connected

Implies that two pipes are physically connected in such a way that water or gas cannot escape from the connection. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

double sanitary tee

A plumbing fitting used to connect two fixtures at the same elevation to a vertical wet vent or drain stack. (Section D-1.7 (#chapter-d-1-7-multi-storey-wet-vents))

double wye

A special pipe fitting that looks like the letter "Y" with two branches. It helps connect two drain pipes to a main pipe at an angle, so water flows smoothly without clogging. (Section D-1.7 (#chapter-d-1-7-multi-storey-wet-vents))

double wye and 45° combination

A plumbing fitting that allows two fixture drains to connect at an angle to improve drainage efficiency. (Section D-1.7 (#chapter-d-1-7-multi-storey-wet-vents))

drain tile

A type of pipe used in drainage systems, often made of clay, that helps collect and move water from the soil, typically used around foundations. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

drainage system

An assembly of pipes, fittings, fixtures, and traps used to convey sewage, clear-water waste, or stormwater to a public sewer or private sewage disposal system. It does not include subsoil drainage pipes. (Section D-1.1 (#chapter-d-1-1-codes-and-standards); Section D-1.2 (#chapter-d-1-2-dwv-terminology))

drainage troughs

A narrow channel or trench that collects and moves water away from areas like driveways or parking lots. Made of concrete or plastic, it has a grate on top for water to flow into, helping keep the area dry and safe. (Figure 4, Section D-3.6 (#chapter-d-3-6-sumps-and-catch-basins))

dry well

A large, deep hole filled with rocks or gravel where water can collect and slowly soak into the ground. It is used to manage excess rainwater and help prevent flooding by allowing the water to be absorbed instead of staying on the surface. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

dual vent

A vent pipe that serves two fixtures and connects at the junction of the trap arms. (Figure 13, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

duplex system

Two pumps in a sump, each with its own pipes and valves. Float switches inside the sump detect water levels, and a control panel automatically turns the pumps on or off. This setup ensures the system works even if one pump fails. (Section D-3.6 (#chapter-d-3-6-sumps-and-catch-basins))

DWV system

Stands for Drain, Waste, and Vent system, which removes wastewater and vent gases from a building, ensuring proper drainage and pressure balance. (Section D-1.3; (#chapter-d-1-3-functions-of-different-parts-in-a-dwv-system)Section D-2.3 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems))

electrical drawing

Drawings that show the layout of the electrical system in a building, including lights, switches, outlets, and electrical panels. They also show systems for heating, phone lines, and cable TV. Based on the floor plan, these drawings are created by an electrical engineer and are marked with an "E" before the drawing number (e.g., E-2). (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

elevation drawing

Vertical views of a building's outside, showing details like the roof slope and wall openings. It also displays the distance from the first floor to the basement. To find the basement elevation, subtract the space between floors from the first-floor elevation. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

elevation reference

Elevation preferences refer to the desired height levels for various parts of a building or site. These preferences are used to ensure that the building is properly positioned in relation to utilities, drainage, and other elements like the landscape, ensuring everything functions correctly and efficiently. The elevation reference symbol is shown on a plan view and indicates that an elevation drawing showing a vertical cross-section of the building at the point indicated by the symbol arrow has been prepared. (Figure 15, Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

elevations

Elevations show height differences between a building and nearby utilities, like water and sewer lines. They help determine if pipes will use gravity or need a pump to connect to municipal services. This information is found in drawings and notes, helping with the correct placement of pipes and septic tanks. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

emergency floor drain

A fixture used for overflow protection that does not receive regular discharge from other fixtures, other than from a trap primer. Any floor drain installed in a washroom is considered an emergency floor drain. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

emergency floor drains

A drainage fixture installed in areas prone to accidental water discharge, such as washrooms, mechanical rooms, laundry rooms, and commercial kitchens. Its purpose is to provide overflow protection by directing excess water to the drainage system, preventing flooding and water damage. Unlike regular floor drains, emergency floor drains are typically used as a backup and may remain dry under normal conditions. (Section D-1.5 (#chapter-d-1-5-sizing-sanitary-drainage-pipes))

Environmental Management Act

A law that helps protect the environment by making sure people and businesses follow rules about pollution, waste, and how they use natural resources. It helps keep the air, water, and land clean and safe for everyone.

fats, oils, and greases (FOGs)

A mixture of substances found in wastewater that can cause blockages and environmental damage if not properly treated and removed, often managed through grease interceptors. (Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

fibrocement (DWV) pipe

A type of strong, lightweight pipe made from cement and fibers instead of metal or plastic. It is used in drain, waste, and vent (DWV) systems to move water and waste in buildings. This pipe was created to replace older pipes that contained harmful materials like asbestos. (Section D-1.4 (#chapter-d-1-4-acceptable-pipe-material-application))

final plumbing inspection

Inspection after all fixtures are installed and operational. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

final test

A test performed after fixtures are installed to make sure the whole plumbing system is working properly and has no leaks. (Section D-4.1 (#chapter-d-4-1-drainage-system-testing-code-requirements))

fines

Small particles of dirt, sand, or silt that are tiny enough to pass through a sieve or filter. These particles can make soil harder to drain because they fill in the spaces between bigger particles. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

fire-stop system

A method used to seal penetrations in fire-rated walls or ceilings to prevent fire from spreading through the openings. (Section D-2.2 (#chapter-d-2-2-planning-interior-dwv-system-layouts))

fitting

A piece that connects pipes together, like elbows and T-joints.

fixture

A receptacle, appliance, apparatus, or other device that discharges sewage or clear-water waste and includes a floor drain. (Section D-1.2; (#chapter-d-1-2-dwv-terminology)Section D-2.3 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems))

fixture drain

The pipe that connects a trap serving a fixture to another part of a drainage system. (Figure 14, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

fixture outlet pipe

A pipe that connects the waste opening of a fixture to the inlet of the trap serving the fixture. (Figure 15, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

fixture schedule

A list detailing the location and specifications of plumbing fixtures. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

fixture unit (DWV)

The unit of measure based on the rate of discharge, time of operation, and frequency of use of a fixture that expresses the hydraulic load imposed by that fixture on the drainage system. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

fixture unit load

A way to measure how much water a plumbing fixture, like a sink or toilet, uses. It helps plumbers figure out how big the pipes need to be to handle the amount of water that flows through them. Each fixture has a specific number of fixture units based on how much water it uses. The higher the number of fixture units, the more water the fixture needs. (Section D-1.5 (#chapter-d-1-5-sizing-sanitary-drainage-pipes))

fixture units (FU)

A unit of measure used in sanitary drainage systems to represent the load-producing effect of a plumbing fixture. In combined systems, 1 FU = 9.1 L/15 min when total load exceeds 260 FUs. (Section D-3.3 (#chapter-d-3-3-storm-drainage-code-requirements))

flame spread rating (FSR)

A classification that indicates how quickly flames spread along a material's surface, relevant for building code compliance. (Section D-1.4 (#chapter-d-1-4-acceptable-pipe-material-application))

flashing

A material used to create a watertight seal around vent pipes where they penetrate a roof, preventing water intrusion. (Section D-2.5 (#chapter-d-2-5-installing-dwv-systems))

float switch

A device that controls water levels in tanks or pumps. It has a floating part that moves with the water level, and when the water gets too high or low, it sends a signal to turn the pump on or off to keep the water at the right level. (Section D-3.6 (#chapter-d-3-6-sumps-and-catch-basins))

flood level rim

The top edge at which water can overflow from a fixture or device. (Figure 16, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

floor plan

A horizontal view of one floor of a building, showing room layout, dimensions, materials, and fixture locations, critical for determining piping routes. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

footings

The strong, stable foundations or base structures that support the weight of a building or other construction. They help keep the building from sinking or shifting by spreading out the weight evenly onto the ground. Footings are usually made of concrete and are placed below the building to provide solid support, especially for heavy plumbing systems and pipes. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

forcemain

A pressurized sewer system that transports wastewater using pumps when gravity flow is insufficient. (Section D-1.4 (#chapter-d-1-4-acceptable-pipe-material-application))

French drain

A drainage system consisting of a trench filled with perforated pipe and clean rock, designed to direct surface water away from an area. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

fresh air inlet

A vent pipe installed in conjunction with a building trap and that terminates outdoors. It is used to prevent an air lock between the fixture traps and the building trap by allowing air circulation through the DWV system. (Figure 17, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

frost line

The depth below the ground surface where the soil freezes in cold climates. Pipes must be installed below this line to avoid freezing. (Section D-2.2 (#chapter-d-2-2-planning-interior-dwv-system-layouts))

geotextile fabric

A fabric material used in drainage systems to prevent the clogging of pipes by fine particles like silt while allowing water to pass through. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

grease interceptor

A device used to trap fats, oils, or grease from wastewater before it enters the drainage system, often used in kitchens, restaurants, or care facilities. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

green roof

A rooftop covered with vegetation that absorbs rainwater, reducing runoff and providing benefits like energy efficiency and improved air quality. (Figure 5, Section D-3.8 (#chapter-d-3-8-storm-water-site-retention-systems))

greywater

Water that comes from sinks, showers, and washing machines in your home. It's not dirty like sewage water, but it's not clean enough to drink either. Greywater can be reused for things like watering plants or flushing toilets to help save fresh water. (Section D-3.8 (#chapter-d-3-8-storm-water-site-retention-systems))

groundwork inspection

Inspection of underground plumbing before covering pipes. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

gutter sizing

The process of determining the correct gutter dimensions based on roof area, local rainfall intensity, and gutter slope. Though sizing is influenced by plumbing code data, installation is typically performed by specialized gutter contractors. (Section D-3.3 (#chapter-d-3-3-storm-drainage-code-requirements))

hand auger

A tool used to dig small holes in the ground. It has a long handle and a sharp, spiral bit at the end that you twist into the soil to make the hole. It's used for tasks like planting trees or installing posts. (Section D-5.1)

hoisting and rigging

The use of cranes, hoists, and rigging equipment to lift and position heavy materials safely on a construction site. (Section D-2.5 (#chapter-d-2-5-installing-dwv-systems))

hydraulic load

The amount of water moving through a system, like pipes or drains, over a certain time. Imagine pouring water into a funnel—if you pour too much too fast, it overflows. In plumbing and wastewater systems, hydraulic load helps

us understand how much water a system can handle before it gets too full or backs up. (Section D-1.5 (#chapter-d-1-5-sizing-sanitary-drainage-pipes))

hydrological cycle

The continuous movement of water on, above, and below the surface of the Earth, including processes like evaporation, condensation, and precipitation. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

hydrology

The scientific study of the movement, distribution, and management of water, including the water cycle and water resources. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

impervious surfaces

Surfaces that do not absorb water, such as concrete, asphalt, and buildings, which increase the volume of runoff. (Section D-3.8 (#chapter-d-3-8-storm-water-site-retention-systems))

indirect connections

Plumbing connections where a fixture or device is not directly connected but instead terminates above the flood level rim of a directly connected fixture, forming an air break. This type of connection is designed to prevent backflow. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

indirectly connected

A pipe that does not connect directly with the drainage system but conveys liquid wastes by discharging into a plumbing fixture, interceptor, or receptacle directly connected to the drainage system. An air break separates the two systems. The air break prevents the possibility of wastes backing up into a compartment or device and contaminating it. (Figure 18, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

individual vent

A vent pipe that serves one fixture. (Figure 19, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

inertial pump

A simple manual pump consisting of a foot valve and tubing, operated by a repetitive up-and-down motion to lift water to the surface.

infiltration

The process where stormwater is absorbed into the soil, reducing runoff and helping to restore the natural water balance. (Section D-3.8 (#chapter-d-3-8-storm-water-site-retention-systems))

interceptor

A receptacle installed to prevent unwanted materials from passing into a drainage system. There are three main types of interceptors: grease, oil, and solids. Each of them requires different considerations for sizing, operation, and maintenance. (Figure 20, Section D-1.2 (#chapter-d-1-2-dwv-terminology); Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

interceptor venting

The process of venting systems like oil interceptors, sewage sumps, and dilution tanks to ensure proper airflow and compliance with plumbing codes. Specific venting requirements are outlined in plumbing codes. (Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

inventory control

Managing materials to prevent shortages or delays in the project. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

isometric drawings (plumbing)

3-dimensional (3D) pictures that show how pipes in a building connect and work together. They help plumbers see where drain, waste, and vent pipes go and what size they should be. These drawings make it easier to plan and install plumbing systems correctly, whether in homes or larger buildings. (Section D-2.3 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems))

just-in-time delivery

A logistics strategy that ensures materials arrive exactly when needed. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

key plan

A small map on a drawing (usually near the title block) showing the location of the area depicted, especially if the drawing is of part of a larger structure. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

landscape plan

A drawing that shows the design and layout of the outdoor areas around a building, like gardens, walkways, and trees. It helps plan how the land will look and be used. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

leader (rainwater leader or RWL)

A pipe installed to carry stormwater from a roof to a storm building drain, sewer, or other place of disposal. (Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

limestone chip neutralization

A method where acidic waste is neutralized by mixing it with limestone chips (calcium carbonate). The process produces a chemical reaction that neutralizes the acid, and the mixture is then discharged. (Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

litres per 15 minutes (L/15 min)

The unit used to express drainage loads in storm and combined systems, aligning volume with a 15-minute rainfall time frame. Helps convert area and rainfall depth into actionable flow data. (Section D-3.3 (#chapter-d-3-3-storm-drainage-code-requirements))

local rainfall intensity

The amount of rain, measured in millimetres, expected to fall over a 15-minute period in a specific geographic

location. This data is obtained from the National Building Code and is critical to calculating drainage loads. (Section D-3.3 (#chapter-d-3-3-storm-drainage-code-requirements))

macerating toilet system

A type of plumbing system that uses a grinding or chopping mechanism to break down waste and toilet paper into a fine slurry before pumping it to the main sewer or septic line. It is commonly used in locations where traditional gravity drainage is not possible, such as basements or areas far from the main waste pipe. (Section D-1.9 (#chapter-d-1-9-stack-vents-vent-stacks-and-headers))

material availability

The impact of supply chain factors on project timelines. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

material handling

The process of safely receiving, storing, moving, and disposing of plumbing materials to prevent damage and ensure efficiency. (Section D-2.5 (#chapter-d-2-5-installing-dwv-systems))

materials take-off

(MTO) A list of materials required for a plumbing installation. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

mechanical drawing

(climate control plan); A type of drawing that shows the details of a building's heating, cooling, plumbing, and other mechanical systems. It helps understand how these systems are set up. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

minimum slopes

The smallest allowable incline for drainage pipes, typically 1:50 as per regulations like the NPC. In some cases, the slope may be reduced to 1:100 for building drains at least 100 mm (4 in.) in size to match other connected drainage systems. (Section D-3.5 (#chapter-d-3-5-installing-storm-drainage-systems))

Ministry of Environment and Climate Change Strategy

Regulates large community wastewater systems under the Environmental Management Act and the Municipal Wastewater Regulation. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

Ministry of Health

Regulates smaller, generally private, domestic sewerage systems, including on-site septic systems, under the Public Health Act and the Sewerage System Regulation. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

mole drain

A type of drain created using moling, where tunnels are formed in the soil to improve water drainage, commonly used in farming to address waterlogged soils with slow percolation rates. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

moling

A process in agriculture where a torpedo-shaped mandrel creates tunnels or voids in the soil without leaving a visible trench, often used to improve drainage in waterlogged fields. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

municipal bylaws

Rules made by a city or town to help keep things safe and organized, like where buildings can be built and how plumbing systems should be set up. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

municipality

A city or town that has its own local government to make decisions about things like roads, water, and public services. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

National Plumbing Code (NPC)

A model plumbing code developed by the National Research Council of Canada, updated every five years. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

neutralization

A chemical reaction between an acid and a base that produces a neutral solution of water and salt. This process can be achieved by dilution, limestone chips, or chemical dosing. (Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

nominal pipe size (NPS)

The nominal diameter by which a pipe, fitting, trap, or other similar item is commercially designated. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

nominally horizontal

A DWV piping arrangement installed at an angle of less than 45° with the horizontal. (Figure 21, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

nominally vertical

A DWV piping arrangement installed at an angle of not more than 45° with the vertical. (Figure 21, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

non-combustible piping

Pipes made from materials like cast iron and copper that do not burn and are often required in fire-rated construction. (Section D-1.4 (#chapter-d-1-4-acceptable-pipe-material-application))

north arrow

A symbol on a map or drawing (to the left of the key plan) that shows which direction is north in relation to the building. It helps you understand how the map or drawing is oriented and which way things are facing. It is not used to orient any elevation or sectional views on the same sheet. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

Occupational Health and Safety (OHS) Regulation

A set of rules and guidelines designed to protect workers' health and safety during construction and other work activities. These regulations must be followed to minimize risks and hazards on job sites. (Section D-3.5 (#chapter-d-3-5-installing-storm-drainage-systems))

offset

The piping that connects the ends of two parallel pipes. (Figure 22, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

offset relief vent

A relief vent that provides additional air circulation upstream and downstream of an offset in a stack. (Figure 23, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

oil interceptor

A device installed to capture oil or gasoline in wastewater to prevent it from entering the drainage system. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

one-time-only test caps

Disposable caps used to seal pipe openings during leak testing. they are designed for single-use applications and are typically removed and discarded after testing is complete. (Section D-4.2 (#chapter-d-4-2-testing-methods))

onsite sewage system

A decentralized sewage treatment system used in areas not connected to public sewer systems. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

open centre test plug

A type of test plug that is used to seal pipes during testing. It has a hole in the middle, so tools can be used to adjust or measure the pressure inside the pipe without taking the plug off. (Section D-4.2 (#chapter-d-4-2-testing-methods))

orthographic drawing

A 2D drawing that shows different views (top, front, side) of an object. (Section D-2.3 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems))

P-trap

A U-shaped pipe that prevents sewer gases, odors, and pests from entering a building by maintaining a water seal. (Section D-1.3 (#chapter-d-1-3-functions-of-different-parts-in-a-dwv-system))

penetration

A hole or opening made in a structural component, like a wall or floor, to allow for pipes, ducts, or other systems to pass through. (Section D-2.2 (#chapter-d-2-2-planning-interior-dwv-system-layouts))

penetration points

The location where a pipe passes through a floor or wall. (Section D-2.3 ([#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems](#)))

perforated pipe

A type of pipe with holes or slits along its length, used in drainage systems to allow water to enter the pipe from the surrounding soil. (Section D-3.7 ([#chapter-d-3-7-sub-soil-drainage-systems](#)))

permit application

A form people fill out to ask for permission from the city or government before starting work on things like plumbing or construction. (Section D-1.1 ([#chapter-d-1-1-codes-and-standards](#)))

personal protective equipment (PPE)

Safety gear, such as gloves, goggles, and respirators, required to protect plumbers from workplace hazards. (Section D-2.5 ([#chapter-d-2-5-installing-dwv-systems](#)))

pH

A measure of the hydrogen ion (H⁺) concentration in a liquid that classifies liquids as acidic, alkaline, or neutral. The scale ranges from 0 to 14, where values below 7 are acidic, values above 7 are alkaline, and 7 is neutral. (Section D-1.11 ([#chapter-d-1-11-trade-waste-systems](#)))

pipe markings

Identifiers that must be cast, stamped, or permanently marked on each pipe or fitting, indicating the manufacturer, weight, class, or quality. These must remain visible after installation to comply with code. (Section D-3.3 ([#chapter-d-3-3-storm-drainage-code-requirements](#)))

pipe supports

Structures or brackets that hold pipes in place, ensuring they are properly aligned, supported, and maintained at the correct slope for drainage. (Section D-2.2 ([#chapter-d-2-2-planning-interior-dwv-system-layouts](#)))

plot plan

A drawing showing the size and shape of the property lot, including utilities and contour lines to determine the slope of the land. These are usually shown on the first sheet of a set of drawings. (Section D-2.1 ([#chapter-d-2-1-types-of-dwv-drawings](#)))

plumbing code

A set of regulations that establishes minimum standards for plumbing installations to ensure health and safety. (Section D-1.4 ([#chapter-d-1-4-acceptable-pipe-material-application](#)))

plumbing plan

A two-dimensional plan view drawing showing the plumbing system. It is generated from the architectural floor plan showing the types and locations of the plumbing fixtures in the building. The plumbing plan describes the location, sizes, and types of all piping and fittings used in the system rough-in. The horizontal branches and fixture

drains are drawn to scale, but due to the two-dimensional properties of the drawing, only the locations of all vertical pipes are shown. (Section D-2.3 ([#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems](#)))

polyethylene plastic (PE) piping

A type of flexible plastic pipe that can bend without breaking. It is often used in plumbing because it is lightweight, strong, and resistant to damage. (Section D-1.4 ([#chapter-d-1-4-acceptable-pipe-material-application](#)))

prefabricated system

A plumbing system or part of a system that is built somewhere else (not at the building site) and then brought in and put into place. (Section D-4.1 ([#chapter-d-4-1-drainage-system-testing-code-requirements](#)))

prioritization

The process of ranking tasks by urgency using a grading system (A, B, C, D). (Section D-2.4 ([#chapter-d-2-4-organizing-a-plumbing-project](#)))

private sewage disposal system

A privately owned plant for treating and disposing of sewage (e.g., a septic tank with an absorption field). (Section D-1.2 ([#chapter-d-1-2-dwv-terminology](#)))

private use (plumbing fixtures)

Fixtures in residences, apartments, or in private bathrooms of hotels or other buildings intended for use by one family or an individual. (Section D-1.2 ([#chapter-d-1-2-dwv-terminology](#)))

procedural standards

Rules that explain the correct steps to follow when doing important work, like installing plumbing or testing water quality. (Section D-1.1 ([#chapter-d-1-1-codes-and-standards](#)))

profile wall pipe

(profile polyethylene sewer pipe) A type of sewer pipe with a smooth interior and a ribbed or corrugated exterior for added structural strength. (Section D-1.4 ([#chapter-d-1-4-acceptable-pipe-material-application](#)))

project scope

The defined objectives, requirements, and limitations of a project. (Section D-2.4 ([#chapter-d-2-4-organizing-a-plumbing-project](#)))

project specifications (specs)

Detailed documentation outlining materials, installation procedures, and performance requirements. (Section D-2.4 ([#chapter-d-2-4-organizing-a-plumbing-project](#)))

propeller-style blowers

A type of fan that blows air to test pipes or systems. The fan blades are connected directly to the motor, and it helps push air through the system to check for leaks. (Section D-4.2)

public use (plumbing fixtures)

Fixtures that may be used by multiple users in a public setting, such as washrooms in schools, gymnasiums, hotels, bars, public comfort stations, and other installations where fixtures are installed so that their use is unrestricted. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

quantity survey

Another term for materials take-off, used in cost estimation. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

radio transmitter

A device that sends out signals through the air, like a radio station sending music or a walkie-talkie sending messages. It turns electrical signals into radio waves that can travel through the air to other devices, like radios or phones, that can receive and play the signals. (Section D-5.1)

rainfall intensity

The quantity of rainfall related to a unit of time. For the purposes of the NPC, rainfall intensity is expressed in mm/15 min. (Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

rainwater reuse

The practice of collecting rainwater, particularly from rooftops, for non-potable uses such as irrigation or toilet flushing, reducing the demand on municipal water supplies and stormwater runoff. (Section D-3.8 (#chapter-d-3-8-storm-water-site-retention-systems))

reflected ceiling plan

A plan showing the layout of the ceiling, including light fixtures, sprinklers, and diffusers, as if viewed from below. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

relief vent

A vent pipe used in conjunction with a circuit vent to provide additional air circulation within a circuit-vented system. (Figure 24, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

residual water

Water that remains in a place after most of it has drained or evaporated, like water left behind in a puddle or in soil after it rains. (Section D-3.4 (#chapter-d-3-4-planning-the-storm-system))

retention system

A stormwater management system that allows water to be held and absorbed into the ground, reducing runoff and helping to recharge the water table. (Section D-3.8 (#chapter-d-3-8-storm-water-site-retention-systems))

roof drain

A fitting or device installed in the roof to allow stormwater to discharge into a leader (Figure 2, Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

roof gutter

An exterior channel installed at the base of a sloped roof to convey stormwater (Figure 3, Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

roof vent terminal

The opening or vent located on the roof of a building, allowing gases and odors to escape from the plumbing system. (Section D-2.2 (#chapter-d-2-2-planning-interior-dwv-system-layouts))

rough-in inspection

Inspection before wall coverings are installed. (Section D-2.3; (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems)) Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

routing

The planning and installation of plumbing pipes in a building, taking into account obstacles and the structure to ensure smooth, efficient plumbing connections. (Section D-2.2 (#chapter-d-2-2-planning-interior-dwv-system-layouts))

runoff

Water that flows over the ground after rainfall, often because it cannot infiltrate into the soil due to impervious surfaces like pavement. (Section D-3.8 (#chapter-d-3-8-storm-water-site-retention-systems))

S-trap

A drain shape that used to be common when pipes came up from the floor. It is now banned in most places because it can lose its water seal and cause bad smells to come back into the room. The s-trap shown in Figure 12 is prohibited by Clause 2.5.6.3.(1)(b), which limits the maximum fall on a trap arm fixture drain to not more than the inside diameter of the pipe. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

Safety Data Sheets (SDS)

A document providing information on hazardous materials, including handling, storage, and emergency procedures. (Section D-2.5 (#chapter-d-2-5-installing-dwv-systems))

sanitary building drain

A building drain that conducts sewage to a building sewer from the most upstream stack, branch, or fixture drain serving a water closet. (Section D-1.2 (#chapter-d-1-2-dwv-terminology); Section D-1.3 (#chapter-d-1-3-functions-of-different-parts-in-a-dwv-system))

sanitary building sewer

A building sewer that conducts sewage. (Figure 25, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

sanitary drainage pipe

A pipe in a sanitary drainage system. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

sanitary drainage system

A drainage system that conducts sewage. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

sanitary sewage sump

A pit or basin that collects and temporarily holds wastewater before it is pumped to a sewer system or treatment facility, commonly used in low-lying areas where gravity drainage is not possible. (Section D-1.9 (#chapter-d-1-9-stack-vents-vent-stacks-and-headers))

sanitary sewer

The main underground pipe that carries wastewater out of a building. (Section D-1.2; (#chapter-d-1-2-dwv-terminology)Section D-2.3 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems))

sanitary tee

A plumbing fitting used to connect a vent pipe to a drain pipe while ensuring proper air circulation. (Section D-1.6 (#chapter-d-1-6-sizing-single-storey-vents))

scale

The ratio used to shrink or enlarge a drawing while keeping proportions accurate. (Section D-2.3 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems))

schedule

Lists that show important details about parts of the building project, such as the types of doors, windows, or materials. Schedules help keep track of what needs to be used or installed. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

scuppers

An exterior, box-like device or opening in a parapet or wall that collects and drains stormwater from flat roofs. Scuppers serve as emergency overflow systems to prevent water buildup when primary roof drains are blocked. They are often used in combination with parapet walls and flow-control drains. Scuppers must be located no more than 30 m (100 ft) apart and be capable of handling up to 200% of local rainfall intensity when used with flow-control systems. (Section D-3.3 (#chapter-d-3-3-storm-drainage-code-requirements))

section references

section references: These are symbols on a drawing that point to a section view, which shows what a part of the building looks like from the inside. It helps you understand the building's structure in more detail. (Figure 16, Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

sectional view

Drawing showing a cut-through of a building to provide detailed information about wall construction and other interior elements (exterior and interior wall finish). Check these drawings for potential obstructions or conflicts for all locations where piping must penetrate walls. (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

secure storage

The practice of safeguarding plumbing materials and tools on-site. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

seismic forces

The forces exerted on structures during an earthquake, which plumbing systems must be designed to withstand. (Section D-2.2 ([#chapter-d-2-2-planning-interior-dwv-system-layouts](#)))

seismic restraint

The components and systems installed to protect mechanical systems, including piping, from seismic forces, ensuring that the system can withstand the stresses of an earthquake. (Section D-1.10 ([#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems](#)))

semi-continuous flow

When something moves in a steady way but with small breaks. In water systems, semi-continuous flow means water or waste moves through pipes or tanks in regular amounts, but not nonstop. (Section D-1.5 ([#chapter-d-1-5-sizing-sanitary-drainage-pipes](#)))

sequence of operation

The logical order of steps in a plumbing project, including inspections and permitting. (Section D-2.4 ([#chapter-d-2-4-organizing-a-plumbing-project](#)))

sewage

Any liquid waste other than clear-water waste or stormwater. (Section D-1.2 ([#chapter-d-1-2-dwv-terminology](#)))

sewage disposal regulation

See "Sewerage System Regulation" (Section D-1.1 ([#chapter-d-1-1-codes-and-standards](#)))

sewerage system regulation (SSR)

BC regulation governing the design, installation, and maintenance of onsite sewage systems. (Section D-1.1 ([#chapter-d-1-1-codes-and-standards](#)))

sheet metal leader

A vertical exterior pipe made of sheet metal that conveys rainwater from gutters to the ground. It is permitted for use only above ground and outside a building. (Section D-3.3 ([#chapter-d-3-3-storm-drainage-code-requirements](#)))

shop drawing

A detailed drawing created by the builder or contractor and used by prefabrication shops that shows how a specific part of the building will be made or installed, like custom furniture or a special part of the building. (Section D-2.1 ([#chapter-d-2-1-types-of-dwv-drawings](#)))

siphonic

A type of system that uses the power of water moving through pipes to drain rainwater very quickly. It works like a siphon, where water is pulled through a pipe faster than normal, helping to drain a lot of water quickly from roofs or other areas. (Section D-3.2) ([#chapter-d-3-2-functions-of-pipes-in-storm-drainage-systems](#))

site plan

A drawing that shows the layout of the building and how it fits on the land, including things like roads, utilities, and the property boundaries. It is a plot plan with a basic outline of the building superimposed on it, which helps understand the location and surroundings of the building. (Figure 2, Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

slope

(Grade); The angle or tilt of a pipe that helps waste flow in the right direction, usually downward. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

smoke candle

A small device that creates smoke when lit. It's used in smoke testing to help find leaks in pipes. When the candle is lit, the smoke is blown into the pipes to see if it escapes anywhere. (Section D-4.2)

smoke fluid system

A machine that creates smoke by turning a special fluid into smoke. This is used in smoke testing to check for leaks in pipes, just like the smoke candle. (Section D-4.2)

smoke testing

A method used to detect leaks in a drainage system using thick smoke. The smoke is blown into the pipes, and if it escapes from any area other than the designated openings, it means there's a leak. (Section D-4.2 (#chapter-d-4-2-testing-methods))

soil stability

The ability of soil to remain intact and not shift or collapse, which is crucial for maintaining the integrity of structures and landscapes. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

solids interceptors

Devices designed to trap solid materials, like food waste or precious metals, using gravity separation. These interceptors capture particles of various sizes and weights for disposal. (Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

source control

Stormwater management techniques that focus on reducing runoff at its origin, such as using green roofs or rainwater capture systems. (Section D-3.8 (#chapter-d-3-8-storm-water-site-retention-systems))

squirrel-cage blower

A type of blower that has a round fan inside it, kind of like a hamster wheel, to push air through a system. It can move a lot of air and is good for testing large pipes or systems.

stack

A vertical sanitary drainage pipe that passes through one or more storeys and includes any offset in the stack.

Previously referred to as a soil-or-waste stack or SOWS. (Section D-1.2; (#chapter-d-1-2-dwv-terminology))Section D-2.3 (#chapter-d-2-3-creating-plans-and-isometric-drawings-of-dwv-systems))

stack vent

A vent pipe that connects the top of a stack to a vent header or terminates to outside air. (Figure 26, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

standard dimension ratio (SDR)

A measure of the wall thickness of plastic piping relative to its diameter, affecting flexibility and pressure resistance. (Section D-1.4 (#chapter-d-1-4-acceptable-pipe-material-application))

Standards Council of Canada (SCC)

A group that makes sure Canadian products, systems, and safety rules meet the right standards to protect people and the environment. (Section D-1.1 (#chapter-d-1-1-codes-and-standards))

storey (as applied to plumbing)

The interval between two successive floor levels, including mezzanine floors that contain plumbing fixtures, or between a floor level and roof. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

storm building drain

A building drain that conducts storm water and is connected at its upstream end to a leader, sump, or catch basin and at its downstream end to a building sewer or a designated stormwater disposal location. (Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

storm building sewer

A building sewer that conveys stormwater. (Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

storm drainage system

A drainage system that conveys stormwater. (Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

storm sewer

A sewer that conveys stormwater. (Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

stormwater

Water discharged from a surface as a result of rainfall or snowfall. (Section D-3.1 (#chapter-d-3-1-storm-drainage-terminology))

structural drawing

A drawing that shows the building's framework, including the foundation, beams, and columns. It helps builders know how to build the building to make it strong and safe. The structural drawing is usually indicated by an S, which precedes the drawing page number (e.g., S-3). (Section D-2.1 (#chapter-d-2-1-types-of-dwv-drawings))

structure penetrations

Openings made in a building's walls, floors, or beams to allow pipes, ducts, or wires. These must be carefully planned

to avoid weakening the structure and must follow building codes and regulations, especially for load-bearing or fire-rated components. (Section D-2.2 ([#chapter-d-2-2-planning-interior-dwv-system-layouts](#)))

sub-drainage system

A network of pipes or drains placed underground to collect and carry away excess water from the soil. It helps prevent flooding or water buildup by directing water to safe areas, keeping the ground dry and stable. (Section D-3.6 ([#chapter-d-3-6-sumps-and-catch-basins](#)))

subsoil drainage pipe

A pipe installed underground to intercept and convey subsurface water (Figure 5). (Section D-3.1 ([#chapter-d-3-1-storm-drainage-terminology](#)))

subsoil drainage pipe (drain tile/weeping tile)

A pipe installed underground to intercept and convey subsurface water. (Section D-1.2 ([#chapter-d-1-2-dwv-terminology](#)))

sump

A pit or tank used to collect waste water that can't flow by itself into the sewer. (Section D-1.10 ([#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems](#)))

surface water

Water that is found on the surface of the Earth, like in rivers, lakes, ponds, or oceans. It comes from rainfall, melting snow, or water flowing from other places. (Section D-3.6 ([#chapter-d-3-6-sumps-and-catch-basins](#)))

tees

A type of pipe fitting shaped like the letter "T" that is used to join three pipes together. It allows water or other liquids to flow in two different directions from one main pipe. (Section D-3.7 ([#chapter-d-3-7-sub-soil-drainage-systems](#)))

test or measurement standards

Rules that explain how to check if something is the right size, strength, or quality. These standards make sure that tests are done the same way every time so results can be trusted and compared. (Section D-1.1 ([#chapter-d-1-1-codes-and-standards](#)))

Test plug

A device used to seal pipe openings during leak testing. Test plugs come in different types, including inflatable and expansion plugs, and help keep air or water sealed inside the system. (Section D-4.2 ([#chapter-d-4-2-testing-methods](#)))

title block

The part of a drawing that contains the project title, drawing number, scale, date, and other key project details. (Section D-2.1 ([#chapter-d-2-1-types-of-dwv-drawings](#)))

trade waste system

A system designed to manage sewage that is more heavily contaminated than domestic waste, often requiring specialized treatment to prevent harm to the drainage system, environment, or public health. (Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

transportation costs

The impact of distance and weight on material expenses. (Section D-2.4 (#chapter-d-2-4-organizing-a-plumbing-project))

trap

A fitting or device designed to hold a liquid seal that prevents the passage of gas while allowing the flow of liquid to continue without significant obstruction. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

trap arm

The portion of a fixture drain between the trap weir and the vent pipe connection. (Section D-1.2 (#chapter-d-1-2-dwv-terminology); Section D-1.3 (#chapter-d-1-3-functions-of-different-parts-in-a-dwv-system))

trap dip

The lowest part of the upper interior surface of a trap. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

trap seal depth

the vertical distance between the trap dip and the trap weir. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

trap standard

A trap for a fixture that is integral to the support for the fixture (Figure 28, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

trap weir

The highest part of the lower interior surface of a trap. (Figure 27, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

trenchless plow

A type of equipment used in moling that creates a narrow void or tunnel in the soil without disturbing the surface or creating a visible trench. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

vent header

A vent pipe that connects any combination of stack vents or vent stacks and terminates to outside air. (Figure 29, Section D-1.2 (#chapter-d-1-2-dwv-terminology))

vent pipe

A pipe that is part of a venting system. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

vent stack

A vent pipe that is connected at its upper end to a vent header or that terminates to outside air. It connects at its

lower end to the stack at or below the lowest sanitary drainage pipe connection (Figure 30, Section D-1.2 (#chapter-d-1-2-dwv-terminology)).

venting system

An assembly of pipes and fittings that connects a drainage system with outside air to circulate air and protect trap seals in the drainage system. (Section D-1.1 (#chapter-d-1-1-codes-and-standards); Section D-1.2 (#chapter-d-1-2-dwv-terminology))

vitreous clay pipe

A type of pipe made from baked clay that has a smooth, hard surface, like glass. It's used in plumbing and drainage systems because it's strong, durable, and resists wear and tear from water and chemicals. (Section D-3.7 (#chapter-d-3-7-sub-soil-drainage-systems))

waste water treatment

The process of treating effluent to remove harmful chemicals, ensuring the wastewater is safe for discharge into the sewer system. (Section D-1.11 (#chapter-d-1-11-trade-waste-systems))

water pressure test

A test that checks for leaks by filling pipes with water and keeping them pressurized for a set amount of time. (Section D-4.1 (#chapter-d-4-1-drainage-system-testing-code-requirements))

welded joint

A type of piping joint where sections of pipe are fused together through heat, creating a strong, permanent bond. Specific standards, like ASME B31.9, govern their installation in building services. (Section D-1.10 (#chapter-d-1-10-requirements-and-prohibitions-for-dwv-systems))

wet vent

A sanitary drainage pipe that also serves as a vent pipe and extends from the most downstream wet-vent fixture connection to the most upstream fixture dry-vent connection (Figure 31). A wet vent is a function of a branch, fixture drain, or stack and should be identified as a BR/WV, FD/WV, or a Stack/WV. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

work platforms

Equipment such as scissor lifts and boom lifts used to elevate workers and materials to perform overhead installations. (Section D-2.5 (#chapter-d-2-5-installing-dwv-systems))

wye fitting

A plumbing fitting shaped like a "y" that allows one pipe to join another at a 45-degree angle. It is commonly used to connect branch lines to a main drain line, helping to maintain smooth water flow and reduce clogs. (Section D-4.2 (#chapter-d-4-2-testing-methods))

yoke vent

A vent pipe connected at its lower end to a stack and at its upper end to a vent stack or to a branch vent connected to a vent stack. A yoke vent is required when serving a stack receiving discharge from more than 11 storeys (Figure

32). A yoke vent provides extra air circulation for the operation of the stack. (Section D-1.2 (#chapter-d-1-2-dwv-terminology))

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 D (<https://d-drainagesystems-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.

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Version	Date	Change	Details
1.0	September, 2025	Plumbing Apprenticeship Level 2 Block D learning resource from STBC content converted to open and freely accessible digital platform and published at TRU.	Published in September 2025; and released October 2025 by TRU Open Press.
1.01	November 24, 2025	Updates to Figures in D-1.10 and Figures and Answer key for Self-test D-1.8.	Figure 20 (D-1.10) – measurements removed; Figures 2P-28 and 2P-35 (Self-test D-1.8) – measurement and labels changed, Table 8 Answers key adjusted for H and I (Self-test D-1.8)