

Block A: Safety Related Functions



Plumbing Apprenticeship Program Level 1 Series

Block A: Safety Related Functions

BC Plumbing Apprenticeship, Level 1

SKILLEDTRADESBC

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

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Block A of the Plumbing Apprenticeship Program Level 1 Series features Skilled Trades BC industry-authority content on safety related functions in plumbing. Safety is a part of the job. When you take a job, you have a safety obligation to your employer, co-workers, family, and yourself. By recognizing and understanding the hazards in your work area, you can prevent the occurrence of many accidents. Most accidents are preventable. Both employees and employers must take responsibility for making the workplace safe.

Block A of the Plumbing Apprenticeship Program Level 1 Series focuses on the causes and results of workplace accidents, the short- and long-term hazards in the trades, general safety precautions and procedures, emergency equipment and facilities, how a workplace safety policy is established, lockout and tagout procedures, and ladder and scaffold usage.

Plumbing Apprenticeship Program Level 1 Series

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

Block A: Safety Related Functions

(<https://a-safetyfunctions-bcplumbingapprli.pressbooks.tru.ca>)

A-1: Workplace Hazards

A-2: WorkSafeBC Regulations

A-3: Safe Handling of Hazardous Materials

A-4: Personal Safety Practices

A-5: Fire Safety

Block B: Tools and Equipment

(<https://b-handmeasuringtools-bcplumbingapprli.pressbooks.tru.ca>)

B-1: Use Hand Tools and Measuring Tools

B-2: Use Portable Power Tools and Use

B-3: Use Access Equipment

B-4: Use Rigging, Hoisting, Lifting and Positioning Equipment, and Rigging

B-5: Use Soldering and Brazing Equipment and Oxy-Fuel Cutting Equipment

B-6: Use Welding Equipment

Block C: Routine Trade Activities and Electrical Concepts

(<https://c-tradeactivities-electrical-bcplumbingapprli.pressbooks.tru.ca>)

C-1: Mathematics and Science

C-2: Electrical Concepts and Principles of Electricity
C-3: Drawings and Specifications
C-4: Codes, Regulations and Standards
C-5: Manufacturer and Supplier Documentation

Block D: Piping and Components

(<https://d-pipingcomponents-bcplumbingappri1.pressbooks.tru.ca>)

D-1: Install Pipe and Tubing
D-2: Install Valves
D-3: Install Fittings
D-4: Penetrate Structures

Plumbing Apprenticeship Program Overview and Upcoming Resources

- **Plumbing Apprenticeship Program Level 1 Series** (<https://openpress.trubox.ca/2024/12/13/plumbing-apprentice-level-1/>) can be found in the TRU Open Press Collection.
- **Plumbing Apprenticeship Program Level 2 Series** (<https://openpress.trubox.ca/2024/04/26/bc-plumbing-apprenticeship-level-2/>) can be found in the TRU Open Press Collection.
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Safety Advisory

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

Acknowledgements

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

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- Line A: Safe Work Practices: Competency A-1: Control Workplace Hazards (<https://collection.bccampus.ca/resource/tQtm8KNK>)
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- Line A: Safe Work Practices: Competency A-3: Handle Hazardous Materials Safely (<https://collection.bccampus.ca/resource/PMfB6kHM>)
- Line A: Safe Work Practices: Competency A-4: Describe Personal Safety Practices (<https://collection.bccampus.ca/resource/xQpDrgQM>)
- Line A: Safe Work Practices: Competency A-5: Describe Fire Safety (<https://collection.bccampus.ca/resource/VPwUd4rq>)

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Resource Development Team 2024-2026

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

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

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

Author: SkilledTradesBC

Publishing Manager/ Copy Editing: Dani Collins, MEd

Production: Jessica Obando Almache, BCS

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

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

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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.



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References

- Camosun College. (n.d.). *Line A: Safe work practices*. BCcampus. <https://collection.bccampus.ca/textbook/tQtm8KNK/>
- SkilledTradesBC. (2025). Plumber program outline (Implementation date: August 18, 2025; Last revised: December 16, 2025) [PDF]. Province of British Columbia. <https://skilledtradesbc.ca/media/2776/download>
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A-4 PERSONAL SAFETY PRACTICES

Plumber Apprenticeship Program – Level 1



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A-4 Personal Safety Practices Introduction

This section describes the clothing and protective equipment workers must wear on the job site and the safety precautions they must take to protect themselves and others from injury.

Special personal protective equipment (PPE) is required on the job site. The equipment used will depend on the hazards anticipated.

When working at elevations, significant hazards are present, and fall protection is normally required. Knowing the hazards allows workers to select methods to reduce the hazard and prevent injury.

Workers often lift and move heavy and awkward objects. Failure to follow proper lifting procedures can cause serious and permanent back damage.

Learning Objectives

When you have completed this section, you should be able to:

- Describe safety precautions and procedures relating to personal apparel and personal protection equipment (PPE).
- Describe fall protection systems and the equipment.
- Describe the proper methods of lifting and moving objects.



You will be required to reference publications and videos available online at WorkSafeBC. (<https://www.worksafebc.com/en>)

Terminology

The following terms will be used throughout this section. A complete list of terms for this section can be found in the **Glossary**.

- **anchorage / anchor point:** A secure point where fall protection equipment is attached. (Section A-4.2)
- **air-purifying respirator:** A respirator that filters harmful particles or gases from the air. (Section A-4.1)
- **carabiner:** An oblong-shaped metal connecting device with a locking gate used to attach different components of a personal fall protection system. (Section A-4.2)
- **control zone:** A marked area within a minimum of 2 metres of the edge of a structure or building that has a flat or low-sloped roof where special safety rules apply. (Section A-4.2)
- **CSA approved:** Certified by the Canadian Standards Association to meet safety standards. (Section A-4.1)
- **deceleration device:** A safety device used in fall protection that slows down a person during a fall to reduce the force of impact and help prevent serious injury. (Section A-4.2)
- **dermatitis:** A skin problem that causes redness, dryness, or irritation. (Section A-4.1)
- **ergonomics:** How your body fits and works with your tools and workspace. (Section A-4.3)
- **high-visibility apparel:** Clothing that is bright and easy to see, especially around vehicles or machinery. (Section A-4.1)
- **hoist:** A device used to lift heavy objects using a rope or chain. (Section A-4.3)
- **mechanical assistance:** Machines or equipment used to help lift or move heavy objects. (Section A-4.3)
- **noise reduction ratings (NRR):** A number that shows how much noise hearing protection can block. (Section A-4.1)
- **personal protective equipment (PPE):** Safety gear such as gloves, goggles, or boots worn to protect the body. (Section A-4.1)
- **pivot:** To turn your whole body using your feet instead of twisting your back. (Section A-4.3)
- **positive pressure respirator:** A respirator that pushes clean air into the mask to keep harmful air out. (Section A-4.1)
- **rope-and-pulley system:** A lifting system that uses a rope and wheel to raise heavy items. (Section A-4.3)
- **rope grab:** A device used to connect the lanyard to a vertical lifeline; it moves along the lifeline and locks in place if a fall occurs. (Section A-4.2)
- **scaffold:** A temporary platform used to work at heights. (Section A-4.3)
- **self-contained breathing apparatus (SCBA):** A breathing device with its own air tank worn on the back. (Section A-4.1)
- **snap hook:** A self-locking metal hook used to connect lanyards to rope grabs, harnesses, and horizontal lifelines on fall protection equipment. (Section A-4.2)
- **suspension system:** The adjustable strap system inside a hard hat that helps absorb impact. (Section A-4.1)

A-4.1 Describe Safety Gear and Work Clothing

Before starting any task, every worker must consider how to protect themselves from potential hazards on the job. The first line of defence is always to eliminate or control hazards. When that isn't possible, **personal protective equipment (PPE)** becomes essential. PPE includes everything from safety boots and eye protection to gloves, hard hats, and hearing protection. Knowing when and how to use PPE equipment—and how to maintain it properly—helps keep workers safe and ensures work meets WorkSafeBC and industry standards.

One of the most important concepts to remember is that you are responsible for your own safety and the safety of others. Personal protective equipment (PPE) is the last line of defence against personal injury, so using it correctly and taking proper care of it are critical to protecting yourself on the job.

The best protective equipment is of no use to you unless you do the following four things:

1. Inspect it regularly.
2. Care for and maintain it properly.
3. Use it correctly and receive training when needed.
4. Never alter or modify it in any way.

The general areas that require your attention include:

- Personal apparel
- Personal protection equipment
- WorkSafeBC regulations

WorkSafeBC Regulations

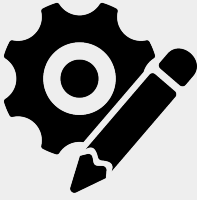
WorkSafeBC regulations state that a worker is responsible for providing:

- Clothing needed for protection against the natural elements
- General-purpose work gloves
- Appropriate footwear, including safety footwear
- Safety headgear

WorkSafeBC regulations state that the employer is responsible for providing, at no cost to the worker, all other items of personal protective equipment required by the regulations.

WorkSafeBC PPE Information Sheets

WorkSafeBC personal protective equipment (PPE) information sheets can be used to inform employers, supervisors and workers about PPE in general. These sheets are ideal for worker orientation and crew talks and for posting on bulletin boards. The sheets explain the PPE required by the regulations for specific industries and hazards as well as describing when and how different types of PPE must be worn.



Go to Personal protective equipment (PPE) (<https://www.worksafebc.com/en/health-safety/tools-machinery-equipment/personal-protective-equipment-ppe>) on the WorkSafeBC website to see examples of PPE information sheets.

Personal Apparel

Workers are required to supply the appropriate safety footwear and suitable clothing before being permitted to work in a shop or on a work site. There are a number of important safety considerations to be aware of for clothing, hair, and jewellery that are common to all job sites.

Clothing

Workers must wear close-fitting clothing (that is, not ragged or frayed) if they are working near moving machinery. Scarves, ties, shirts, pant cuffs, and gloves may become workplace hazards. For example, if your shirt cuff is loose, you risk getting it caught in a machine and injuring or breaking your arm if it is pulled around the shaft.

Oily, greasy, and/or synthetic clothes (e.g., rayon, nylon, polyester) are of concern when working near sparks or open flames. As well as being fire hazards, oily or greasy clothes may cause skin irritation.

Workers must use clothing to protect the body from as much dirt and as many chips and sparks as possible. Short pants, short-sleeved shirts, and sandals are not considered adequate on most job sites. Choose clothing that is appropriate for the task you are attempting.

Pant legs should not be tucked inside boots when working with or near a torch, grinder, or chipper. Hot pieces of metal may fall inside a boot and cause a bad burn before the boot can be removed. Workers may also require flame-resistant/retardant clothing if they are working where they may be exposed to flash fires or similar hot work hazards.

High-Visibility Apparel

Wear **high-visibility** clothing in a colour that contrasts with the environment so you can be seen at a distance. Make sure your high-visibility clothing is not covered by other garments. You must wear this clothing when:

- Working around any moving vehicles, equipment, or lines
- Working alone or in isolation

- Harvesting trees at night
- Performing traffic control in work areas where there is vehicle traffic moving through a work zone, or for falling operations
- Directing helicopter movements



Figure 1 High-visibility garments (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Loose-fitting high-visibility outer clothing must be “tear-away” if worn where it could get caught on moving equipment or on objects such as branches or limbs.

Hair and Beards

Workers with long hair should wear a cap or a hairnet. In addition, beards should be trimmed. Both hair and beards can get caught in machinery or catch fire from sparks or an open flame. Beards may also prevent respirators from fitting properly, which could result in the inhalation of hazardous materials.

Jewellery

Workers must not wear rings, metal watchbands, bracelets, neck chains, or necklaces on a job site. Wearing these items can cause:

- A bad burn, if a metal object (for example, a watchband) touches a hot battery terminal and some other grounding object
- A shock, if working on electrical equipment that has electrical power applied
- Loss of a finger, if a ring gets caught in a piece of machinery

Special Clothing and Gear for Various Weather Conditions

Since many tradespeople work in poor weather, workers must wear appropriate rain gear and warm clothing. Keeping dry is very important for staying warm because wet clothing causes the body to lose heat more quickly.

Some raincoats are designed with vents to help release and draw off perspiration. A raincoat should be large enough to allow arms to move freely and the collar should have a cloth cover or lining to protect the neck from the coat's cold, wet material.

Rain pants help keep the lower body dry. Wearing only a raincoat allows water to drip onto your legs, making them wet and uncomfortable. It's also important to keep your feet dry so they stay warm. Rubber boots with steel toe protection and steel sole plates are available for this purpose.

Protective clothing should also be considered to guard against sun exposure. The **ultraviolet protection factor (UPF)** measures how well clothing blocks **ultraviolet (UV) rays**. These ultraviolet rays are long wave (UVA) or shortwave (UVB). UVA rays penetrate deep into the skin's thicker layer of skin called the dermis, while UVB rays cause sunburn. Both UVA and UVB rays can lead to skin cancer.

Sunscreen has a **sun protection factor (SPF)**, which can be deceiving as it merely estimates how much longer you could be out in the sun before burning compared to unprotected skin without sunscreen. Not all sunscreens protect against both UVA and UVB rays. Read the labels on sunscreens carefully to help choose one that suits your needs. Clothing is often a more reliable form of sun protection. For example, clothing with a UPF rating of 20 allows only

$\frac{1}{20}$ (5%) of UV radiation to pass through, meaning 95% of UV radiation is blocked. A typical white cotton T-shirt has a UPF rating of about 5, and fabrics with a UPF rating below 15 are generally not considered effective UV protection.

To work safely in cold weather, it is important to wear properly insulated headgear, footwear, and gloves. Wear layered clothing, as layers allow warm air to stay trapped but do not trap perspiration next to the skin. The first layer of clothing should be a moisture-wicking fabric like polypropylene or knitted silk, which will allow the skin to breathe and keep sweat away from skin. The second layer should provide insulation while absorbing perspiration without allowing heat to escape. Wool is ideal because it keeps you warm even when wet. The final outer layer should protect against wind and water.

Personal Protection

On the job site, workers need to wear special personal protective equipment. The equipment you wear will depend on the specific hazards you may expect to encounter. You may be supplied with all or some of the following equipment:

- Goggles
- Face shield
- Gloves
- Safety lock
- Hard hat
- Welder's apron
- Coveralls
- Respirator

- Hearing protection
- High-visibility vest
- Body harness

Protective equipment can be divided into the following categories:

- Head protection
- Eye protection
- Hearing protection
- Respiratory protection
- Hand and skin protection
- Foot protection
- Fall protection

Selecting PPE

All PPE clothing and equipment should feature a safe design and construction and should be well maintained. Workers should consider the fit and comfort of PPE when selecting appropriate items for their workplace. Most protective devices are available in multiple sizes, and care should be taken to select the proper size. If several different types of PPE are worn together, make sure they are compatible. PPE that does not fit properly can make the difference between being safely covered or dangerously exposed. It may not provide the level of protection desired and may discourage use.

Head Protection

Hard hats protect workers where there is a hazard of head injury from falling, flying or thrown objects, or other harmful contacts. The headband made of webbing inside the hat (also known as a hard hat's **suspension system**) provides a space between the shell and your head, which lessens the impact of anything falling on your head. The headband is adjustable.

Most job sites require that hard hats be worn at all times while on the site. The shells of most hard hats are now almost always made from high-impact plastic, but a few are still made from metal alloys. **Do not** wear a metal alloy hard hat when working on electrical equipment.

Hard Hat Types

The proper type or class of hard hat required will vary for specific areas or for specific jobs. Different hard hats protect against different types of hazards, such as:

- Banging your head on a sharp or hard object
- Being hit by a falling object
- Receiving a shock when working near electrical apparatus



Figure 2 Three styles of protective headgear (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Hard hats must have either CSA or **ANSI approval**. These standards are similar but not exactly the same. Many manufacturers have their head protection tested to meet both standards. These standards are divided into two types:

- Type 1 for top protection only
- Type 2 for top and lateral protection

Hard hats are also divided into three industrial classes:

- **Class E (electrical)** – provides head protection against high voltage conductors (20 000 V electrical rating).
- **Class G (general)** – provides head protection against low voltage conductors (2200 V electrical rating).
- **Class C (conductive)** – provides lightweight comfort and impact protection but offer no protection from electrical hazards (no electrical rating).

See *Personal Protective Equipment: Headwear – Selecting Protective Headwear* (<https://www.ccohs.ca/oshanswers/prevention/ppe/protective-headwear.html>) by CCOHS (n.d.)

Another class of protective headgear on the market is called a “bump hat,” designed for use in areas with low head clearance. Bump hats are recommended for areas where protection is needed from head bumps and lacerations. They are not designed to protect against falling or flying objects.

Periodic cleaning and inspection will extend the useful life of protective headgear. A daily inspection of the hard hat shell, suspension system, and other accessories for holes, cracks, tears, or other damage that might compromise the protective value of the hat is essential. Paints, paint thinners, and some cleaning agents can weaken the shells of hard hats and may eliminate electrical resistance. Consult the helmet manufacturer for information on the effects of paint and cleaning materials on their hard hats. Never drill holes, paint, or apply labels to protective headgear, as doing so may reduce the integrity of the headgear’s materials. Do not store protective headgear in direct sunlight, such as on the rear window shelf of a car, since it can be damaged by sunlight and extreme heat.

Hard hats with any of the following defects should not be used and should be replaced:

- Perforation, cracking, or deformity of the brim or shell
- Any indication of exposure of the brim or shell to heat, chemicals, or ultraviolet light and other radiation (in addition to a loss of surface gloss, such signs include chalking or flaking)

Always replace a hard hat if it sustains an impact, even if damage is not noticeable. It is not necessary to replace the entire hard hat if just the suspension system is damaged. Suspension systems are available as replacement parts if they are damaged or show excessive wear.

Some workers are more comfortable wearing their hard hats backwards. This still meets WorkSafeBC requirements if the hat's suspension is also reversed, but if you can't reverse the suspension, you must not reverse the hard hat.

Eye Protection

Your eyes are among the most vulnerable parts of your body, and even a small particle or splash can cause permanent injury. On a busy job site, hazards can come from almost any direction — grinding sparks, flying debris, pressurized fluids, or bright welding arcs. Understanding the risks and choosing the right protective equipment is essential for working safely and confidently.

Eye protection is one of the most important safety concerns of people on the job site. Eye hazards include:

- Splashes from liquids, such as acids and caustics
- Sparks flying off of a grinder
- Dust kicked up by compressed air
- “Flash” from a welder working nearby
- Exposure to laser pointer light

There are many types and styles of eye protection available. Some of the most common types include:

- Safety glasses
- Goggles
- Face shields
- Welding helmets
- Laser safety goggles

Safety Glasses

These protective eyeglasses have safety frames constructed of metal or plastic and impact-resistant lenses. Side shields are available on some models.

Wear specially designed and manufactured safety glasses to protect your eyes in activities such as:

- Working on any live electrical equipment
- Using cutting pliers to cut material
- Soldering or de-soldering
- Using an electric hand drill
- Hammering
- Working with tool steel



Figure 3 Safety glasses (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Goggles

Goggles are a type of tight-fitting eye protection that completely cover the eyes, eye sockets and facial area immediately surrounding the eyes. They provide protection from impact, dust and splashes. Some goggles will fit over corrective lenses.

Wear goggles to protect your eyes when doing activities such as:

- Drilling or chipping, hammering and working with steel
- Using a powder-actuated tool



Figure 4 Goggles (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Face Shields

Face shields are transparent sheets of plastic that extend from the eyebrows to below the chin and across the entire width of the head. Some are polarized for glare protection. Face shields protect against nuisance dusts and potential splashes or sprays of hazardous liquids, but they will not provide adequate protection against impact hazards. Face shields used in combination with goggles or safety glasses will provide additional protection against impact hazards.

Wear a face shield to protect your face in activities such as:

- Using a grinder
- Using a drill press
- Using compressed air for cleaning



Figure 5 Face shield (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Welding Helmets

Constructed of vulcanized fibre or fibreglass and fitted with a filtered lens, welding helmets protect eyes from burns caused by infrared or intense radiant light. They also protect both the eyes and face from flying sparks, metal spatter, and slag chips produced during welding, brazing, soldering, and cutting operations. Filter lenses have a shade number appropriate to protect against the specific hazards of the work being performed and against harmful light radiation.



Figure 6 Welding helmets (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Laser Safety Goggles

These specialty goggles protect against intense concentrations of light produced by lasers. The type of laser safety goggles a worker chooses will depend on the equipment and operating conditions in the workplace.



Figure 7 Laser safety goggles (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Never assume that regular prescription glasses, sunglasses, or contact lenses can provide adequate eye protection. Dust particles, wood chips, sparks or welding flash may still cause eye damage if eyes are not properly protected.

Regardless of the job, whether grinding, chipping, drilling or welding, always use adequate eye protection (welding goggles or helmets are not acceptable for grinding). Choose a type or style of eye protection that will protect you in the job that you are doing (e.g., goggles when chipping concrete, a welder's helmet when welding). Also, always use safety-approved eye protection. Improper or faulty protection devices can also be hazardous.

Hearing Protection

Noise on the job site can affect you in different ways. Being exposed to high noise levels and moderate noise levels over a long period of time can impair your ability to hear specific types of sounds. For example, the noise from diesel-powered vehicles such as trucks can permanently damage your hearing. High noise levels can affect your state of mind, making you easily annoyed, irritable, and mentally fatigued, and can decrease your ability to concentrate and stay alert.

Hearing protection **noise reduction ratings (NRR)** are given in decibels (dB). If the noise level is 90 dB and a worker is wearing expandable foam plugs rated at 29 dB, the actual noise exposure will be $90 - 29 = 61$ dB. When choosing hearing protection devices, you should choose a device that will reduce the noise exposure to a maximum of 85 decibels.

There are four main points to remember when choosing hearing protection:

- Choose a type or style of protection suitable to the job you are doing.
- Ear plugs should be pliable, fit each ear tightly, and be kept clean and free from damage.
- Earmuffs make it easier to hear certain signals in noisy environments.
- Headphones designed for listening to music do not offer suitable protection.

Single-Use Earplugs

These earplugs are made from material like expandable PVC or urethane foam. They are self-forming and, when properly inserted, they work as well as most moulded earplugs.



Figure 8 Single-use earplugs (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Pre-Moulded Reusable Earplugs

Pre-moulded earplugs are made from biocompatible silicon, plastic, or rubber and are manufactured as either “one-size-fits-most” or in several sizes to fit small, medium, or large ear canals. Advantages of pre-moulded plugs are that they are relatively inexpensive, reusable, washable, convenient to carry, and come in a variety of sizes.



Figure 9 Pre-moulded earplugs (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Custom-Fitted Hearing Earplugs

Made from impressions taken of an individual's ear, custom-fitted earplugs completely fill the ear canal and match the ear shape of the wearer. Some custom-fitted plugs are designed to let the wearer hear conversations in noisy environments. Others have a communication speaker installed into them.



Figure 10 Custom-fitted earplugs (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Canal Caps

Canal caps resemble earplugs on a flexible plastic or metal band. The earplug tips of a canal cap may be made of a formable or pre-moulded material. These have the convenience of being easily removed and replaced as needed.

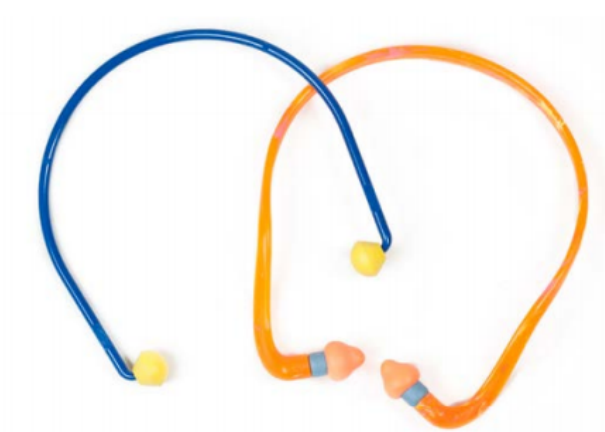


Figure 11 Canal caps (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Earmuffs

Earmuffs come in many models designed to fit most people, and some styles can be connected to a hard hat. They work by blocking out noise by completely covering the outer ear.

To work properly, earmuffs must be perfectly sealed around the ears. Their effect may be reduced if glasses, facial hair, or long hair compromise the seal. Facial movements such as chewing may also affect the seal.



Figure 12 Earmuffs (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Respiratory Protection

Airborne contaminants are among the most dangerous—and least visible—hazards in the workplace. Dust, fumes, mists, and vapours can damage the lungs or lead to long-term health problems even when they can't be seen or smelled. Understanding when respiratory protection is needed, how to select the right type, and how to maintain it properly is essential for every worker on the job site.

Workers must be aware of any airborne hazards present on the job and must take the necessary precautions to protect the respiratory system. Examples of hazards include airborne particles such as body filler, asbestos, or dust, as well as toxic gases or fumes. All of these are harmful if inhaled, but workers can protect themselves by wearing an approved **respirator**.

If you are required to use a respirator, you will need the appropriate training to select, test, wear, and maintain this equipment. Always use the appropriate respirator for the hazard involved and the extent and nature of the work to be performed, which includes choosing the correct type of cartridge and filter. Respirators must be kept clean and sterilized according to the manufacturer's instructions. It is very important to check a respirator carefully for damage and proper fit. All respirators must be properly fitted to your face, and the seal must be checked each time the respirator is used.

Before selecting your respirator, you should consider the environment and conditions that you are going to be working in. A **positive pressure respirator** will supply air to the inside of a face mask that will exceed the ambient air pressure on the outside of the respirator. **Self-contained breathing apparatus (SCBA)** and air respirators are examples of positive pressure respirators. A **negative-pressure respirator** will be under negative pressure when compared to the ambient air while the user inhales. **Air-purifying respirators** are negative-pressure respirators.

There are three types of respirators commonly used for various atmosphere conditions in the workplace. These are:

- Air-line or supplied air respirators

- Self-contained breathing apparatus (SCBA)
- Air-purifying respirators

Air-line Respirators



Figure 13 (OpenClipart-Vectors/Pixabay)
Content License (<https://pixabay.com/service/license-summary/>)

Air-line or supplied-air respirators have a mask or hood with a remote air supply available through a connected hose. This type of respirator is used where there is not enough oxygen or there are toxic gases or fumes in the air.

Self-Contained Breathing Apparatus (SCBA)

An SCBA draws air from a compressed-air cylinder, which is strapped to the worker's back.

This style of respirator is used when there is not enough oxygen on the work site or there are toxic gases or fumes in the air. An SCBA has the added advantage of an independent air supply without the need for hose, which is why this type of respirator is more commonly used in rescue and emergency situations.



Figure 14 SCBA (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Air-Purifying Respirators

There are two common types of air-purifying respirators:

- Dust/mist masks
- Cartridge respirators

These types of respirators cannot be used in an oxygen-deficient environment. The full face mask with a chemical canister can be used to protect against short exposure to dangerous gases or fumes, such as an emergency escape situation, as the cartridge in the respirator is able to neutralize the gases for a very short time only.

Dust/Mist Masks

Dust masks are made of paper or soft non-woven fibre and simply fit over the mouth and nose. These generally offer protection against nuisance dusts and fine mists only. Some models have a built-in exhaust valve for more comfort.



Figure 15 Dust mask (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Cartridge Respirators

Cartridge respirators are commonly used in conditions where there are low concentrations of organic gases, pesticides, and paint vapours. These come in half-mask or full-face piece designs. Both of these designs are also made in one- or two-cartridge styles. Do not use these types of respirators to protect against highly toxic gases.



Figure 16 Cartridge respirator (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Hand and Skin Protection

WorkSafeBC accident statistics indicate that over 30 percent of work injuries involve fingers, hands, and arms, and many of these accidents could be avoided by using appropriate hand protection. As a trades worker, you are ultimately responsible for ensuring that you use the correct hand protection for each hazardous situation.

Gloves

Gloves are manufactured from materials such as cotton, leather, rubber, metal and other synthetics and are tailored to meet every need for hand protection in every trade area:

- Leather or vinyl-coated gloves should be used when handling lumber or steel.
- Gauntlet-type welder's gloves should be used when welding or flame cutting.
- Special heat-resistant gloves should be used when handling hot metal.
- Rubber or approved plastic-treated gloves should be used when handling acids and cleaning solutions.

See *Personal Protective Equipment: Chemical Protective Clothing – Glove Selection* (<https://www.ccohs.ca/oshanswers/prevention/ppe/gloves.html>) by CCOHS (n.d.).



Figure 17 Types of work gloves (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Barrier Creams

If you are exposed to chemicals that can strip oils from your skin, you are susceptible to developing **dermatitis**. Avoid this condition by using proper gloves, along with a barrier cream, if you notice your skin drying out.

Foot Protection

Your feet deserve as much consideration as your eyes, ears, or hands.

Potential hazards to your feet include:

- Heavy objects falling on them
- Stepping on sharp objects
- Having hot sparks or slag fall inside your shoes

You must wear safety footwear appropriate to the job you are doing. For example, leather boots are required in the welding shop, where there are specific hazards from sparks and molten slag.

Leather is not impervious to all chemicals and, therefore, is not a good choice when walking in wet concrete. In that case, rubber boots with steel toe and sole protectors would be better. Footwear should be inspected regularly and replaced if worn out.

CSA Standards

Due to the dangers listed above, you must wear safety footwear that is **CSA approved**. Look for the green triangle with the CSA logo.



Figure 18 CSA footwear logo (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Fall Protection

Working at heights is one of the most common causes of serious injuries and fatalities in the construction and piping trades. Falls can happen quickly—from ladders, scaffolds, platforms, or even ground-level slips—which is why planning, training, and the right protective equipment are essential. Fall protection systems are designed to prevent falls or reduce the impact if one occurs, keeping workers safe while working above ground. This category is covered in detail in section A-4.2 Describe Fall Protection Systems.

General Care of PPE

Remember that PPE is the last line of defence against personal injury, so using it properly and taking care of it are very important. Be sure to do all of the following:

- Regularly inspect it.
- Properly store and care for it.
- Use it properly when it is needed.
- Never alter or modify it in any way.
- Maintain it.
- Refer to the manufacturer's documentation for further information.



Self-Test A-4.1: Describe Safety Gear and Work Clothing

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

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



An interactive H5P element has been excluded from this version of the text. You can view it online here:
<https://a-safetyfunctions-bcplumbingappr1.pressbooks.tru.ca/?p=1237#h5p-23> (<https://a-safetyfunctions-bcplumbingappr1.pressbooks.tru.ca/?p=1237#h5p-23>)

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- **Figure 13** Breather defense firefighter (<https://pixabay.com/vectors/breather-defense-firefighter-152093/>) by OpenClipart-Vectors on Pixabay is used under the Pixabay Content License (<https://pixabay.com/service/license-summary/>)

A-4.2 Describe Fall Protection Systems

There are different methods of providing fall protection. A fall protection system is defined in the OHS Regulation (Part 11) as:

- A fall restraint system
- A fall arrest system
- Work procedures that minimize the risk of injury, such as using a safety net, that are acceptable to WorkSafeBC

Fall Restraint System

Fall restraint systems prevent a worker from falling from a work position, or travelling to an unguarded edge from which the worker could fall. Examples are guardrails or a personal fall protection system. This may include the use of a **control zone** with a safety monitor when fall protection is not practical. A control zone is the area within a minimum of 2 metres of the edge of a structure or building that has a flat or low-sloped roof. The control zone and work area are separated with a raised warning line, limiting access to this unsafe area. The safety monitor supervises work in the control zone according to the fall protection plan. One safety monitor can supervise no more than eight workers. If workers will not enter the control zone and the pitch of the roof is less than $\frac{4}{12}$, a safety monitor or other fall protection is not required.



Figure 1 Fall restraint (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Watch the following video by WorkSafeBC (2009) titled “Fall Protection: Fall Restraint (3 of 6)” [2:15] on YouTube.



One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://a-safetyfunctions-bcplumbingapp1.pressbooks.tru.ca/?p=1239#oembed-1> (#oembed-1)

If you are using a printed copy, you can scan the QR code with your digital device to go directly to the video:
Fall restraint (<https://youtu.be/yCcBlhkGhTE>)



Fall Arrest System

Fall arrest systems stop a worker's fall before the worker hits the surface below.

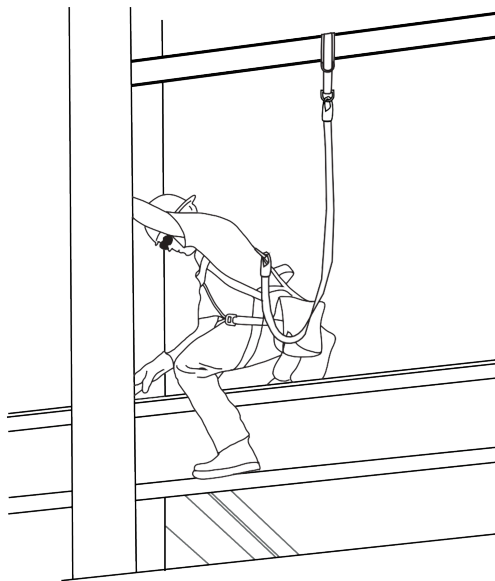


Figure 2 Fall arrest (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Watch “Fall Protection: Fall Arrest (4 of 6)” [3:13] by WorkSafeBC (2009) on YouTube.



One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://a-safetyfunctions-bcplumbingappri1.pressbooks.tru.ca/?p=1239#oembed-2> (#oembed-2)

If you are using a printed copy, you can scan the QR code with your digital device to go directly to the video:
Fall arrest (https://youtu.be/_dhlEovMkcw)



Fall Protection Equipment

A worker’s personal fall protection system will have different equipment depending on whether it is a fall arrest or a fall restraint system. It will include:

- A safety belt or full body harness
- A lanyard, lifeline, and any other connecting equipment that is used to secure the worker to an individual point of **anchorage** or to a horizontal lifeline system



Figure 3 Fall protection equipment (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)



Review OHS Regulation part 11 “Fall Protection (<https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-part-11>)” on the WorkSafeBC website.

Harness and Belts

When using personal fall protection equipment, wear a full body harness if you are at risk of falling. A full body harness consists of straps passed over the shoulders, across the chest, and around the legs. It also has a D-ring or support point at the rear between the shoulder blades.

In a fall, a full body harness will protect you more than a safety belt because the harness distributes the force of impact

over a greater area of your body. A belt should be used only as part of a fall restraint system. It is important to adjust the harness to fit your body. A poorly fitting harness is uncomfortable and may not protect you properly.



Figure 4 Full body harness (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Connecting Equipment

There are various types of equipment that can be used to connect the harness to the anchor point.

Lanyard

A **lanyard** is a flexible line of webbing, or a synthetic or wire rope used to secure a safety belt or full body harness to a lifeline or anchor.

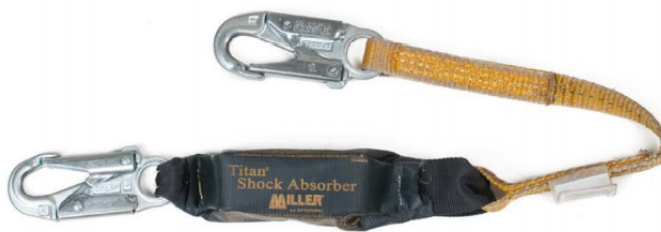


Figure 5 Lanyard (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Deceleration Device or Shock Absorber

A common method of reducing the impact strain on the body and the anchorage system is to use a **deceleration device**. These devices are designed to slowly release energy and absorb the initial shock. The device may use a spring or tear-webbing design. It is important to know that this shock absorber may increase the length of the lanyard during a fall by as much as 1.2 m (4 ft), which must be allowed for in the design of your personal fall protection system.

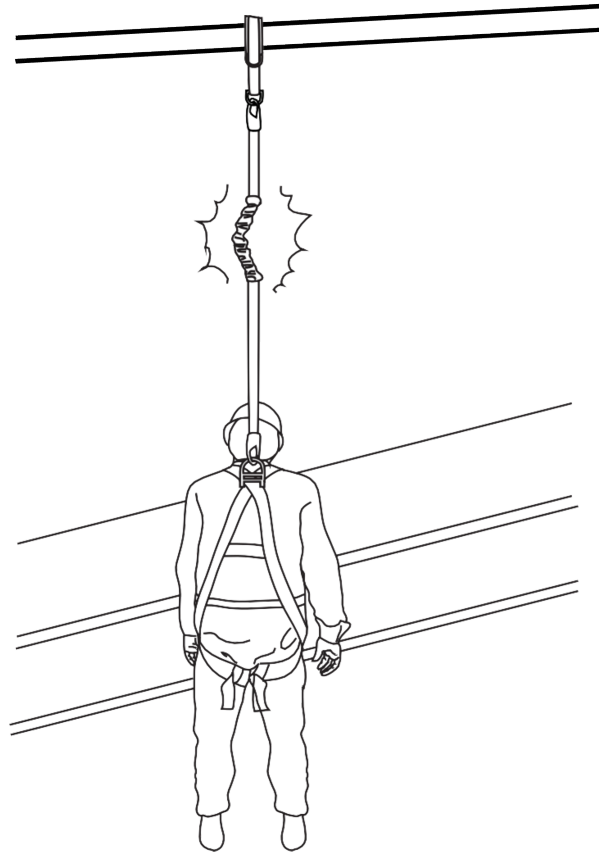


Figure 6 Deployed shock absorber (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Lifeline

Lifelines can be vertical or horizontal and made of synthetic fibre or steel wire rope. A retractable lifeline is a special type of vertical lifeline. It is fastened to a horizontal lifeline unless the manufacturer allows alternate use.

Vertical lifelines have a breaking strength of 26.7 kN (6,000 lb). Horizontal lifelines can be permanent or temporary and are installed between two secure anchor points. Permanent horizontal lifelines must be certified by a professional engineer.

Temporary horizontal lifelines are permitted with certain restrictions. They can be manufactured for commercial use,

provided the use and installation are in accordance with the manufacturer's written instructions. They can also be engineered and installed according to written instructions from a professional engineer.

Alternatively, they can be installed with many restrictions.

WorkSafeBC lists the following requirements:

- The horizontal lifeline is a minimum 12 mm ($\frac{1}{2}$ in.) diameter wire rope having a breaking strength specified by the manufacturer of at least 89 kN (20,000 lb.)
- The horizontal lifeline is free of splices except at the terminations
- Connecting hardware, such as shackles and turnbuckles, has an ultimate load capacity of at least 71 kN (16,000 lb.)
- The span is at least 6 m (20 ft) and not more than 18 m (60 ft)
- End anchors have an ultimate load capacity of at least 71 kN (16,000 lb.)
- The horizontal lifeline has an unloaded sag of approximately the span length divided by 60
- The elevation of the line at any point is at least 1 m (39 in.) above the working surface
- The free fall distance is limited to 1.2 m (4 ft)
- A minimum of 3.5 m (12 ft) of unobstructed clearance is available below the working surface
- No more than three (3) workers are secured to the horizontal lifeline
- The horizontal lifeline is positioned so it does not impede the safe movement of workers.

Refer to An Introduction to Personal Fall Protection Equipment (<https://www.worksafebc.com/en/resources/health-safety/books-guides/an-introduction-to-personal-fall-protection-equipment>) from WorkSafeBC (2014) for more information.

Retractable lifelines work like the seat belt in a car. These are under constant tension, and the moment you fall, the lifeline locks.

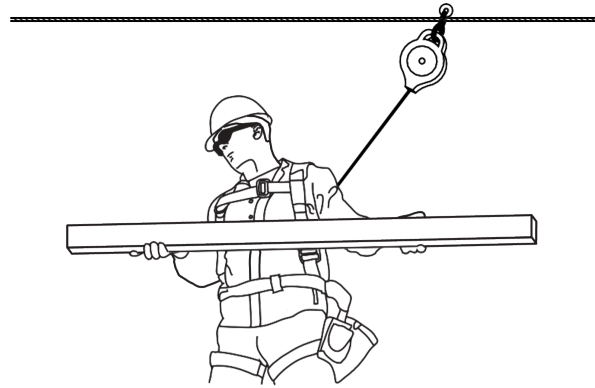


Figure 7 Retractable lifeline fastened to a horizontal lifeline (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Rope Grab

A **rope grab** is used to connect the lanyard to a vertical lifeline. The rope grab travels along the lifeline with you and will lock onto it if you fall.

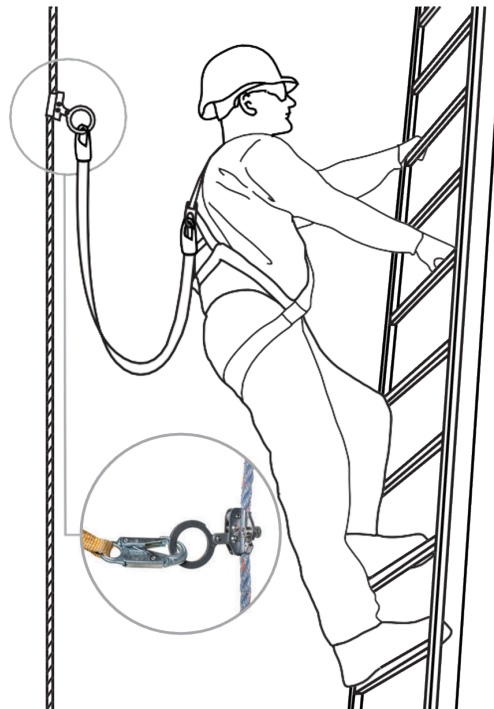


Figure 8 Rope grab fastened to a vertical lifeline (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Snap Hook or Carabiner

Snap hooks are used to connect lanyards to rope grabs, harnesses, and horizontal lifelines. Snap hooks must be self-locking, so that the hook can't be open unless you depress a separate locking mechanism before opening the keeper.



Figure 9 Locking snap hook (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

A **carabiner** is an oblong-shaped connecting device also used to attach different components of a personal fall protection system. A carabiner should have gates that are both self-closing and self-locking, with a breaking strength of at least 22 kN (5,000 lb.). It should also have the manufacturer's identity and load capacity clearly marked on it.



Figure 10 Carabiner (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Inspection, Storage, and Maintenance

To maintain service life and performance, all fall protection equipment should be inspected frequently. Damage can include burns, hardening due to chemical contact, and excessive wear. Fall protection equipment must be inspected by a qualified person and replaced or recertified if any damage is found. Always store fall protection equipment in a dry location away from any substances that could cause deterioration.



Self-Test A-4.2: Describe Fall Protection Systems

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

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



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<https://a-safetyfunctions-bcplumbingapprl1.pressbooks.tru.ca/?p=1239#h5p-24> (<https://a-safetyfunctions-bcplumbingapprl1.pressbooks.tru.ca/?p=1239#h5p-24>)

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WorkSafeBC. (2014, August). *An introduction to personal fall protection equipment*. <https://www.worksafebc.com/en/resources/health-safety/books-guides/an-introduction-to-personal-fall-protection-equipment>

WorkSafeBC. (n.d.). *OHS Guidelines: Part 11 – De-energization and lockout*. <https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-part-11>
(<https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-part-11>)

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A-4.3 Lift and Move Objects Safely

In the piping trades, moving tools, pipe, and equipment is part of everyday work. Knowing how to lift and carry objects safely helps prevent injuries and ensures you can work efficiently over the long term. This section explains how to protect your back and body through proper lifting techniques and ergonomic awareness.

Preventing lower back injury on the job is particularly important. You can keep your back healthy by paying attention to **ergonomics** (the relationship between you and your work environment) and the rules for safe lifting and carrying.

The design of the human body is such that the back is especially susceptible to injury if it is not treated with respect. Know your own strengths and limitations. A high percentage of all workplace injuries involve the back. Basic precautions and lifting techniques are easy to learn and apply and can greatly reduce the chances of serious back injury.

General Rules for Lifting and Moving Objects

Always follow these rules, even for lifting light objects:

- Place your feet apart for good balance.
- Bend your knees.
- Hold the object as close to your body as possible.
- Lift smoothly and slowly.
- **Pivot** with your feet; don't twist your back.
- Push, rather than pull, the load.
- Share the load; work with a partner.
- Get **mechanical assistance** for heavy loads.

Many of the objects you may have to lift and move can be heavy and awkward, including beams, planks, plywood, panel products, ladders, and wheelbarrows. The following safe lifting procedures are recommended for most tasks.

Table 1. Proper Body Positioning for Safe Lifting

Body Position	Recommended Safe Lifting Practice	Why It Matters
Feet	Stand with your feet spaced apart, with one foot slightly in front of the other.	Provides stability and balance when lifting heavy or awkward objects.
Back	Keep your back straight; do not bend, arch, or twist.	Reduces the risk of back strain or serious injury.
Chin	Keep your chin tucked toward your chest.	Helps keep your back straight and properly aligned.
Palms (Grip)	Use a full palm grip with fingers close together.	The palm is stronger than the fingers alone, allowing for safer lifting.
Body Weight	Keep your balance and distribute your weight evenly on both feet.	Improves control and reduces strain during the lift.
Arms	Keep your arms tucked close to your sides.	Allows you to carry more weight safely and reduces injury risk.

Procedures for Lifting Specific Objects

Before moving anything, make sure your path is clear of obstacles and that there is space to put the object or material down. Depending on how you have to move the object, your vision may be blocked on one side. Be sure you can see where you're going.



Watch out for overhead power lines when lifting and carrying ladders, pipes, and other long objects.

Plywood

To pick up and carry a sheet of plywood, wear leather gloves and use this procedure:

1. Stand the plywood on its narrow edge in a vertical position. If the plywood is lying flat on the ground, go to one end and pick up the narrow edge. Then lift and walk toward the plywood until it is standing vertically on its narrow edge. This method requires you to lift only half the weight of the plywood from the ground.
2. Place your hands at the midpoints of the long edges of the plywood. Roll the sheet onto your right or left hand. The sheet should be balanced in the carrying hand. This avoids straining your back when trying to keep the sheet from dropping at one end.
3. If your grip feels uncomfortable, put the sheet down on its narrow edge and take a new grip. If you lean the sheet of plywood into your shoulder, some of the weight will transfer from your hand. Figure 1 shows the correct way to hold and carry a large, lightweight panel product.



Figure 1 Carrying a large sheet of a panel product (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Always ask for help if you need it. For example, if there are obstacles to move around, get someone to help you carry the sheet. In this situation, there should be one person at each end. If it is windy, you may have difficulty carrying large sheets, so again, ask for help.

Planks and Beams

If they are not too heavy, planks and beams can be carried on your hip or shoulder. If the plank or beam is too heavy, get help or use mechanical assistance such as a **hoist** or **forklift**. The plank or beam should be off the floor on **blocking** so that you can easily get your hands under it. To place blocking under the plank or beam, you may have to turn it on its edge or use a crowbar to lift it up.

The following is the procedure for carrying a beam:

1. Bend down, keeping your back straight and your feet slightly apart, pointed in the direction that you want to move.
2. Place one hand on each side of the beam near the middle, one hand slightly forward and the other slightly behind.
3. Lift slightly to check the weight and the balance, then relocate your hands until you have the proper balance.
4. Stand up slowly, keeping your back straight and using your leg muscles.
5. Hold the plank or beam close to your body and let your hip carry some of the weight.

If you want to carry the plank or beam on your shoulder, pick it up from one end and walk and lift it toward the other end until it is on your shoulder. With the beam on your shoulder, adjust the balance so that slightly more of the weight is behind than in front. This way you can pull the plank or beam down in front of you to keep your balance.

Before you move a plank or beam, make sure that the way is clear and that there is a space to place it. Both planks and beams should be put down on blocking if they are not put directly into place in the building structure.

Do not twist your back when moving heavy weights. Use your feet to change direction of travel. Do not carry any more than you can comfortably handle and control at all times. If you are forced to drop your load or if you lose control of it, you risk injuring yourself or a co-worker.

Steel Pipe and Rebar

Steel pipe can be carried in the same manner as the beams or planks. If there is more than one pipe to carry at the same time, bundle and tie them together at each end and in the middle. If you try to carry more than one pipe at a time, you can easily lose control of them as they will want to go in different directions.

Ladders

Extension ladders come in various lengths, and the longer the ladder, the heavier it is. Most trades workers should be able to handle a 5 m (16 ft.) ladder by themselves. Longer ladders should be handled by two people.

A ladder is usually carried on the shoulder, with one arm placed between the rails and the other hand used to balance it. The ladder should be picked up in the same manner as beams or planks.

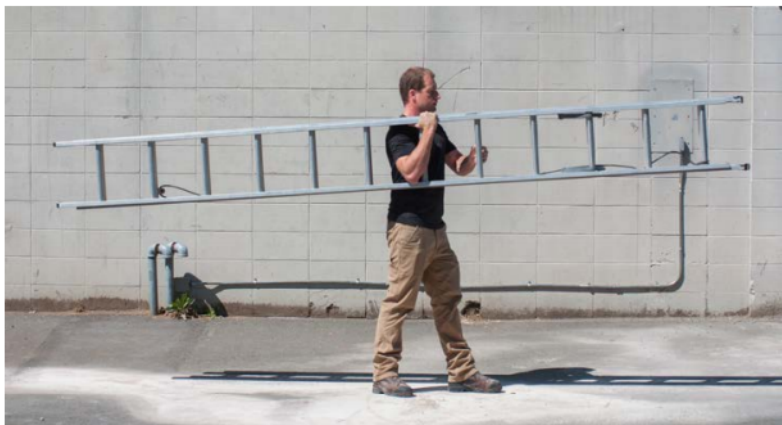


Figure 2 Lifting a ladder (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

Do not drop a ladder or let it hit anything. You could crack the side rails and make the ladder unsafe.

Wheelbarrows

One worker can carry a very heavy load (up to 300 kg) in a wheelbarrow. Before using a wheelbarrow, check that the wheel is properly inflated and centred on its **axle**.

When you use a wheelbarrow, always maintain your balance. Keep the bulk of the weight in a wheelbarrow toward its front for greater control, and make sure it's not overfilled. When turning a corner, tilt the barrow slightly in the direction of the turn, just as you would tilt a bicycle — not too sharply, or you may tip the load. When you go downhill, hold back the barrow to prevent losing control.

In the construction industry, wheelbarrows are primarily used to place concrete and gravel. They have a narrow spout to direct the concrete into the forms, and there is an extension of the handrails past the front wheel. This allows the barrow to be tipped and the contents dumped. Be sure to protect any surfaces that may break or chip from coming into direct contact with the handrail extensions when pouring.

When you move a wheelbarrow, use the following technique:

1. Bend your knees, keeping your back straight, your chin in, and your feet slightly apart.
2. Lift in a smooth motion and push the barrow in the direction you want to go, tilting the barrow to make the turns.
3. When you take a wheelbarrow up a ramp and you need help to move the barrow, only one person should do the pushing. The other should use a long hook on the front of the barrow and pull it up the ramp. If two people try to push the barrow, balance will be lost and the contents will spill.



Figure 3 Wheelbarrow (Sergei Starostin/Pexels) Pexels License
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Shovelling

Shovelling may seem like a simple task, but if done incorrectly, it can cause injury. There are basic rules for using a shovel comfortably and safely:

1. Keep your back as straight as possible.

2. Bend at the hips and keep your feet slightly apart, with one ahead of the other.
3. Place yourself in a comfortable position and have a cleared area to work in. You will find that a long-handled shovel is easiest to work with. Not only will it provide more leverage, but it will not require you to bend very far.
4. If you are right-handed, your left hand should grip the shovel just above the metal ferrule, and the right hand should be nearer the top of the shovel handle.
5. Slide or push the shovel into the material.
6. Drop the end of the shovel slightly to catch the material. Then draw the shovel toward you, allowing it to slide on the ground.
7. When the shovel is near you, you can then lift with your left hand and steady your right hand to move the material by tossing it off to the side or behind you.

You can also use your knee for leverage to help lift up a shovel. The motion of using the shovel should feel comfortable, without any strain. If the load on the shovel is too heavy, take smaller loads.

Learn to pace yourself. If you start too vigorously, you will quickly tire and be unable to maintain a steady pace.

The best shovelling method depends on the material to be moved. Drain rock or gravel should be picked up from the bottom edge of the pile, rather than from the middle or top. Sand can be picked up from any part of the pile.

Soil that has been dumped by truck can be taken near the bottom of the pile. Soil that has to be dug out of the ground may have to be loosened with a pick or maddock before it can be easily picked up.

Barrels and Drums

Large barrels or drums are moved by rolling them on their rims. If a barrel is lying on its side, it must be placed in the upright position by using the following procedure:

1. Stand at the top end of the barrel and bend your legs (but keep your back straight) so that you can get a good grip on each side of the rim near the bottom.
2. Lift the barrel toward the upright position and, as it reaches the balance point, be ready to change your grip so that you can prevent the barrel from dropping on its end.

If the barrel is full, you will need the help of a second person or the use of a barrel dolly, which is designed to pick up and move barrels.

Small Pails

Small pails (20 to 25 L, or 5 to 6 gal.) used for paints, adhesives, coatings, and the like are quite heavy, so you need to be careful when moving them.

Check that the handles are properly secured, inserted into the holders at the sides of the containers. If the handle slips, the container could fall and injure your foot.

To pick up a heavy container, bend your legs, keeping your back straight. Reach down and grip the handle and then stand erect and carry the container to the desired location. To keep your balance, you may find it easier to carry two pails at the same time.

Containers to be moved up to a **scaffold** platform should be raised with a **rope-and-pulley system**. They are usually too heavy to be pulled up by a rope only.

Boxes

Many items come in heavy boxes or sacks. To pick up boxes from the floor or ground safely:

1. Bend your legs, keeping your back straight and your feet apart, one foot slightly ahead and the other slightly behind.
2. Move close to the box. Place your left hand on the top left corner away from you and place your right hand on the lower right corner next to you.
3. Tilt the box away from you, keeping the weight of the box on the floor. Then tilt the box to judge its weight.
4. Using the palm grip, grasp the bottom edges of the box (Figure 4) and use your leg muscles to stand up. Turn your feet in the direction you want to move.
5. When carrying a heavy object, do not twist your back to change direction.

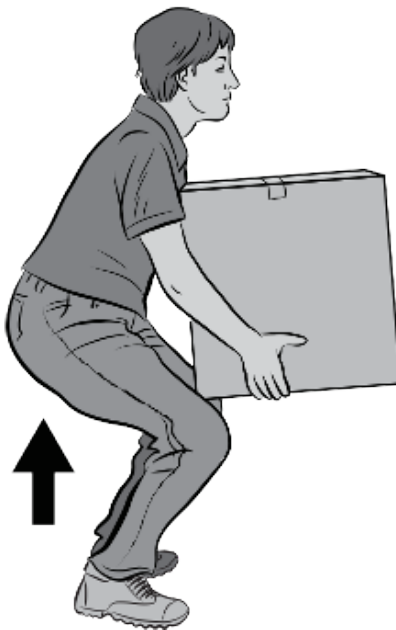


Figure 4 Lifting a box (BC Industry Training Authority, 2019). CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>)

The instructions for lowering the box are the reverse of the directions for lifting. If the box is too heavy, get someone to help you. If it is too heavy for two people to lift, use mechanical equipment such as a forklift.

Back Maintenance

Strong, flexible muscles are essential for a healthy back. They support the **spinal column** and determine **posture**, which is key to preventing injury. If your muscles are weak or tight, back injuries are more likely and recovery is more difficult.

Exercise and Your Back

Stay fit by exercising regularly to maintain flexibility, strength, and endurance. If you are receiving professional back care, do only those exercises you have been instructed to perform.

Stretching

Athletes warm up and do stretching exercises before practices and events to limber up the joints and get blood flowing to muscles. The same principles apply to lifting. By stretching and warming up, along with taking basic precautions and following proper lifting techniques, you can greatly reduce your chances of serious injury.



Go to the WorkSafeBC (2014) website to review Back Talk: An Owner's Manual for Backs (<http://www.worksafebc.com/en/resources/health-safety/books-guides/back-talk-an-owners-manual-for-backs>) and additional information on back care and maintenance.



Self-Test A-4.3: Lift and Move Objects Safely

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

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



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- **Figure 3** Wheelbarrow (<https://www.pexels.com/photo/construction-workers-collaborating-outdoors-29181481/>) by Sergei Starostin from Pexels is used under the Pexels License (<https://www.pexels.com/license/>)

Self-Test A-4.1: Describe Safety Gear and Work Clothing

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

1. It is the worker's responsibility to wear proper safety equipment on the job site.
 - a. True
 - b. False
2. What makes loose or sloppy clothing dangerous in mechanical shops?
 - a. May catch fire
 - b. May get caught in moving machinery
 - c. May cover your hands, interfering with your grip
 - d. Sleeves may get into the solvent when washing parts
3. You should tuck your pant legs inside your boots when working near a torch or grinder.
 - a. True
 - b. False
4. Rings and metal watchbands constitute a hazard on the job and can contribute to a shock or a burn.
 - a. True
 - b. False
5. What PPE are workers responsible for supplying?
 - a. Headgear, eye protection, and ear protection
 - b. Gloves, safety headgear, and safety footwear
 - c. Safety boots, gloves, and eye and ear protection
 - d. Fall-arresting, buoyancy, eye and ear protection devices
6. Bump hats are designed to be used in areas with low head clearance. They are used to protect against head bumps and lacerations, but can also be used to protect against falling or flying objects.
 - a. True
 - b. False
7. What type of footwear must be worn when working in the welding shop?
 - a. Rubber boots
 - b. Caulked boots
 - c. Steel-toed work boots
 - d. Running shoes with safety toes
8. Never paint on or apply labels to a hard hat.
 - a. True
 - b. False
9. When must hard hats be worn?
 - a. Whenever working outdoors
 - b. If requested by your supervisor
 - c. If it is necessary to be identified as an employee
 - d. Whenever a hazard of flying or falling objects exists
10. When a hard hat has sustained an impact, it doesn't need to be replaced unless it has noticeable damage.

- a. True
 - b. False
11. What PPE must be worn when performing an operation that could create flying particles or chips?
- a. Gloves
 - b. Coveralls
 - c. Ear protection
 - d. Eye and face protection
12. Which of the following is required for face protection when grinding?
- a. Safety glasses
 - b. Plastic goggles
 - c. Full face shield
 - d. Laser safety goggles
13. When handling chemicals, what are rubber gloves and a face shield worn to protect against?
- a. Explosions
 - b. Toxic vapours
 - c. Spills and splashes
 - d. Contaminating the product
14. What type of hearing protection can have a communication speaker installed into it?
- a. Canal caps
 - b. Single-use earplugs
 - c. Pre-moulded earplugs
 - d. Custom-fitted earplugs
15. When wearing a respirator for lung protection, it is necessary to use the correct cartridge for the type of hazards to which you are exposed.
- a. True
 - b. False
16. Cartridge respirators are commonly used when performing work in an environment contaminated with highly toxic gases.
- a. True
 - b. False
17. Leather gloves should be used for handling acids, caustics, or solvents.
- a. True
 - b. False
18. What type of solar radiation will contribute to a sunburn?
- a. UVA
 - b. UVB
 - c. SPF
 - d. UPF
19. What type of respirator would be considered to be a negative-pressure respirator?
- a. SCBA
 - b. SCUBA
 - c. Cartridge respirator
 - d. Air/line respirators

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

Answer Key: Self-Test A-4.1

1. a. True
2. b. May get caught in moving machinery.
3. b. False
4. a. True
5. b. Gloves, safety headgear, and safety footwear
6. b. False
7. c. Steel-toed work boots
8. a. True
9. d. Whenever a hazard of flying or falling objects exists
10. b. False
11. d. Eye and face protection
12. c. Full face shield
13. c. Spills and splashes
14. d. Custom-fitted earplugs
15. a. True
16. b. False
17. b. False
18. b. UVB
19. c. Cartridge respirator

Self-Test A-4.2: Describe Fall Protection Systems

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

1. What term best describes the combination of PPE that is used to protect workers who fall?
 - a. Full body harness
 - b. Fall arrest system
 - c. Fall restraint system
 - d. Fall protection system
2. What is the fall protection component that connects a safety belt or harness to an anchor point?
 - a. Lanyard
 - b. Lifeline
 - c. Rope grab
 - d. Carabiner
3. A safety belt could be used as a component of what type of fall protection system?
 - a. Fall arrest system
 - b. Fall restraint system
 - c. Confined space system
 - d. A safety belt is not approved for any fall protection system
4. What piece of fall protection equipment reduces the impact on the body when a fall happens?
 - a. Safety net
 - b. Rope grabs
 - c. Carabiners
 - d. Deceleration device
5. What piece of fall protection equipment must be self-locking?
 - a. Lifeline
 - b. Snag hook
 - c. Snap hook
 - d. Rope grab
6. When using a shock absorber lanyard, what must be accounted for in the fall protection system design?
 - a. Harness should be adjusted to fit loosely
 - b. Lanyard length may increase by up to 1.2 m (4 ft.) during a fall
 - c. Lanyard length may decrease by up to 1.2 m (4 ft.) during a fall
 - d. Lanyard must be connected to the front of your body harness
7. What is the maximum number of workers that a safety monitor is allowed to supervise?
 - a. 4
 - b. 6
 - c. 8
 - d. 10
8. What breaking point shall a vertical life be rated for?
 - a. 2.67 (600 lb)
 - b. 26.7 kN (6000 lb)
 - c. 71 kN (16,000 lb)
 - d. 89 kN (20,000 lb)

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

Answer Key: Self-Test A-4.2

1. b. Fall arrest system
2. a. Lanyard
3. b. Fall restraint system
4. d. Deceleration device
5. c. Snap hook
6. b. The lanyard length may increase by up to 1.2 m (4 ft.) during a fall.
7. c. 8
8. b. 26.7kN (6000 lb)

Self-Test A-4.3: Lift and Move Objects Safely

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

1. How far should the arms be from the body when lifting?
 - a. Fully extended
 - b. As close as possible
 - c. Does not make any difference
 - d. About 30 cm (1 ft.) out from the shoulder
2. When preparing to lift an object, how should you position your feet?
 - a. Wider than shoulder width
 - b. Foot position is not important
 - c. One slightly ahead of the other
 - d. Close together so the heels touch
3. When setting down an object, after having lifted it, what must be done?
 - a. Drop the load
 - b. Shift the back
 - c. Bend the back
 - d. Bend the knees
4. What should you do to turn or move an object in another direction?
 - a. Just lift and twist
 - b. Lift the object then turn your feet
 - c. Twist your back and turn your feet
 - d. Clear area and twist your back to move object
5. Where should the weight be positioned when lifting?
 - a. At your elbows
 - b. Below the knees
 - c. Close to the body
 - d. Far from the body
6. Lifting should be done primarily with the:
 - a. Legs
 - b. Arms
 - c. Back
 - d. Shoulders
7. When lifting, the back should be:
 - a. Straight
 - b. Immobile
 - c. Slightly bent
 - d. Perfectly horizontal
8. How far apart should the feet be when lifting?
 - a. Very close
 - b. Arm's length apart
 - c. Shoulder width apart
 - d. 1½ shoulder width apart

9. Most back injuries are the result of:
- a. Incorrect posture
 - b. Sitting on very soft chairs
 - c. Failure to use a good back support
 - d. Improper bending and lifting techniques
10. When standing for long periods of time at a working position, back strain can be reduced by:
- a. Leaning forward
 - b. Leaning backward
 - c. Resting one foot on a block about 20 cm (8 in.) high
 - d. Resting one foot on a block about 50 cm (20 in.) high

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

Answer Key: Self-Test A-4.3

1. b. As close as possible
2. c. One slightly ahead of the other
3. d. Bend the knees
4. b. Lift the object then turn your feet
5. c. Close to the body
6. a. Legs
7. a. Straight
8. c. Shoulder width apart
9. d. Improper bending and lifting techniques
10. c. Resting one foot on a block about 20 cm (8 in.) high

Sample Safety Data Sheet for Chromium Acetate Hydroxide

Printable PDF: Cr-Ac-OH-MSDS_SigmaAldrich (http://a-safetyfunctions-bcplumbingapprl1.pressbooks.tru.ca/wp-content/uploads/sites/241/2025/01/Cr-Ac-OH-MSDS_SigmaAldrich.pdf)

Material Safety Data Sheet

Version 4.1
Revision Date 10/23/2010
Print Date 02/08/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	: Chromium(III) acetate hydroxide	
Product Number	: 318108	
Brand	: Aldrich	
Product Use	: For laboratory research purposes.	
Supplier	: Sigma-Aldrich Canada, Ltd 2149 Winston Park Drive OAKVILLE ON L6H 6J8 CANADA	Manufacturer : Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 63103 USA
Telephone	: +19058299500	
Fax	: +19058299292	
Emergency Phone # (For both supplier and manufacturer)	: 1-800-424-9300	
Preparation Information	: Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956	

2. HAZARDS IDENTIFICATION

Emergency Overview

WHMIS Classification

Not WHMIS controlled.

Not WHMIS controlled.

GHS Classification

Acute toxicity, Inhalation (Category 4)
Acute toxicity, Dermal (Category 4)
Acute toxicity, Oral (Category 4)
Skin irritation (Category 2)
Eye irritation (Category 2A)
Specific target organ toxicity - single exposure (Category 3)

GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302 + H312	Harmful if swallowed or in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P312	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER or doctor/ physician if you feel unwell.
P322 Specific measures (see supplemental first aid instructions on this label).
P330 Rinse mouth.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard: 0
Flammability: 0
Physical hazards: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{14}H_{23}Cr_3O_{16}$
Molecular Weight : 603.31 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Chromium(III) acetate hydroxide			
39430-51-8	254-447-3	-	-

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Conditions of flammability

Not flammable or combustible.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Chromium oxides

Explosion data - sensitivity to mechanical impact

no data available

Explosion data - sensitivity to static discharge

no data available

6. ACCIDENTAL RELEASE MEASURES**Personal precautions**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions

Do not let product enter drains.

Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE**Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment**Respiratory protection**

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Specific engineering controls

Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder
Colour	green

Safety data

pH	no data available
Melting/freezing point	no data available
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

no data available

Materials to avoid

Strong oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Chromium oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

no data available

Inhalation LC50

Dermal LD50

Other information on acute toxicity

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects

no data available

Additional Information

RTECS: Not available

12. ECOLOGICAL INFORMATION**Toxicity**

no data available

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

DSL Status

This product contains the following components listed on the Canadian NDSL list. All other components are on the Canadian DSL list.

Chromium(III) acetate hydroxide

CAS-No.

39430-51-8

WHMIS Classification

Not WHMIS controlled.

Not WHMIS controlled.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Referred to in A-3.4 Describe Information to be Disclosed on a Safety Data Sheet (SDS)

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Version History

This page provides a record of changes made to this learning resource, Plumbing Apprenticeship Level 1, Block A (<https://a-safetyfunctions-bcplumbingappr1.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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If you identify an error in this resource, please report it using the TRU Open Education Resource Error Form.

Version	Date	Change	Details
1.0	May, 2026	Plumbing Apprenticeship Level 1 Block A learning resource from STBC content converted to open and freely accessible digital platform and published at TRU.	

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.