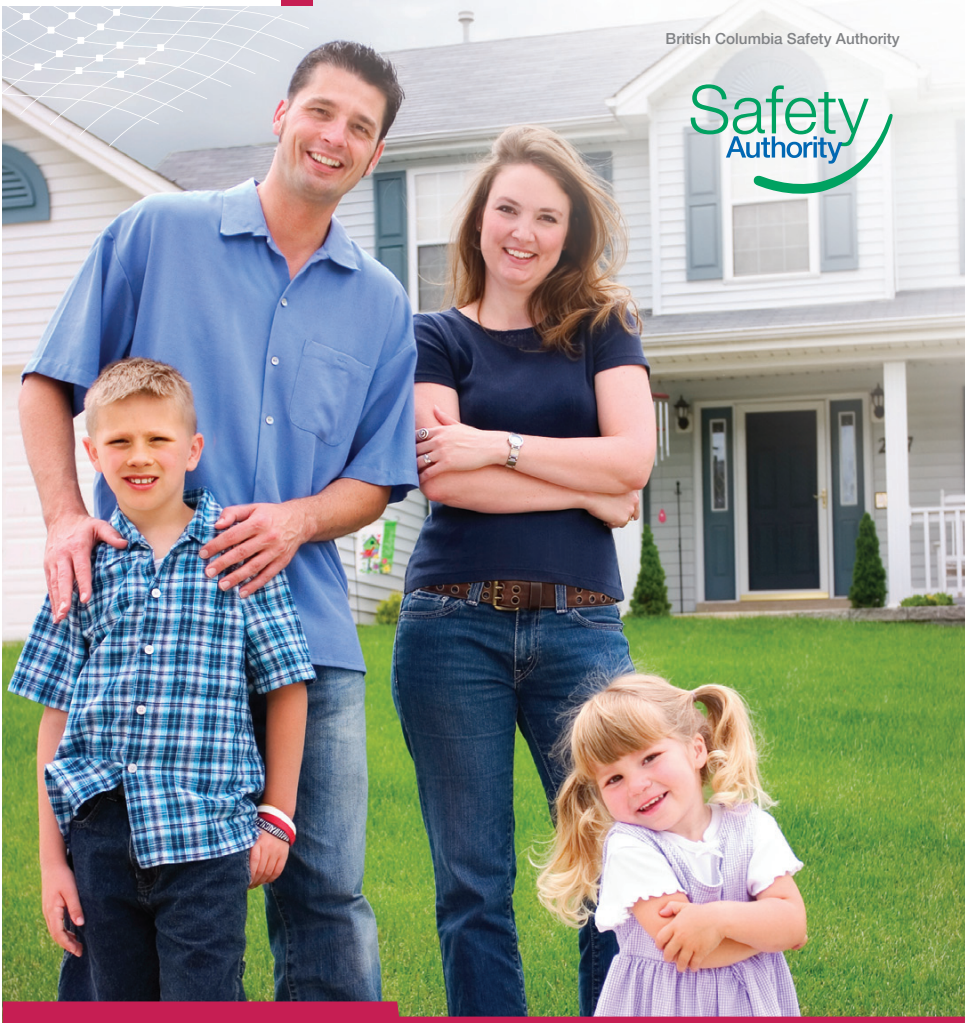
British Columbia Safety Authority

Safety Authority



Homeowner Information Guide
Electrical Safety

The following information should be carefully reviewed **before** performing any electrical work.

The information contained in this guide will provide a good understanding of the procedures and requirements for completing electrical work under a Homeowner Permit issued by the BC Safety Authority.

If you have someone helping you, it is important for that person to also **review** this information.

Contents

Introduction

Like many homeowners in BC, you may enjoy the challenge of doing your own electrical work. Learning about electrical **safety rules** and **regulations** and obtaining the appropriate **permits** will help keep you and your family safe.

The object of the Code is to prevent fire and shock hazards by establishing safety standards for the installation and maintenance of electrical equipment.

This booklet is not intended as a “how to” guide on doing electrical work, rather it is intended to assist you in understanding BC Safety Authority (BCSA) procedures and requirements as set out by regulations and BCSA policies.

Below are explanations of some common terms that you will need to become familiar with:

Safety Standards Act

In British Columbia, electrical work is regulated under the *Safety Standards Act* and the regulations adopted under this Act.

Safety Standards General Regulation and Electrical Safety Regulation

The Safety Standards General Regulation and the Electrical Safety Regulation describe the requirements for performing electrical work. This includes: who can do electrical work, permit requirements, obtaining inspections, what electrical equipment is permitted to be used in BC, and so forth. The complete Safety Standards General Regulation and the Electrical Safety Regulation can be found in the Regulations and Consultation section of the BC Safety Authority website at www.safetyauthority.ca.

BC Electrical Code (the Code)

Electrical wiring and equipment must be installed to meet the minimum requirements of the BC Electrical Code (the Code). The Code is not an instruction manual on how to do electrical work. The object of the Code is to prevent fire and shock hazards by establishing safety standards for the installation and maintenance of electrical equipment. It is important to understand that the Code is a **minimum** requirement. In order to prevent the risk of electrical fire and shock hazards, any electrical wiring must meet or exceed this standard. Since the Code is a minimum standard, an electrical installation that does not meet this standard can not be considered safe. Do some research and educate yourself regarding these standards to ensure that your electrical work complies with BC regulations. The regulations and code rules explained in this booklet are provided to help homeowners, like you, avoid some of the most common mistakes found by Electrical Safety Officers.

Introduction

All electrical work performed in the province of British Columbia must be inspected for compliance with the BC Electrical Code Regulation. For work performed under homeowner permits, these inspections must be performed by an Electrical Safety Officer.

Shock and Fire Hazards

Electrical shock can cause death. If you have ever experienced an electrical shock resulting in only a slight tingle, you may be under the impression that household voltages are not dangerous. This is not so. You survived that shock because you were lucky, and your body was not the principal path of current to ground. Many people have been seriously injured or killed after receiving an electrical shock at 120 volts (normal household voltage). The amount of damage or injury is determined mainly by the amount of current (measured in amperes) that passes through the body. Electrical shock can often cause internal damage that may not be immediately apparent. **Less than 50 milliamperes can be fatal.** That is approximately the same electrical current required to power a single 6 watt light bulb.

Your home is probably the largest financial investment you will ever make and it is also where you and your family live and sleep. Avoid the potential tragedy of an electrical fire. When wiring is done in your home, make sure that it is done correctly. If in doubt, obtain the services of a licensed electrical contractor to do the work for you. You can find a BCSA licensed electrical contractor by searching our online contractor list at www.safetyauthority.ca.

Where to Get Information

This booklet does not provide a list of the code rules that you must follow. For that information, refer to a copy of the British Columbia Electrical Code or purchase one of the many other publications that contain the code rules and explanations of the rules necessary for the work that you plan to do.

The British Columbia Electrical Code is the Canadian Electrical Code amended for use in BC. You may obtain a copy of the Canadian Electrical Code through electrical wholesale outlets, electrical associations, the Canadian Standards Association, and most public libraries. Amendments are available in the Regulations and Consultation section of the BC Safety Authority website at www.safetyauthority.ca. The Electrical Code is re-issued approximately every three years so make sure that you are using the current edition.

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Another solution is to obtain one of the very helpful books available at most electrical retail outlets, which will give you the information you need to do most residential electrical work. Installation codes may vary depending on where the book was written, so make sure that the book applies to British Columbia.

It is important that you consult your local Electrical Safety Officer if you need to have a rule explained. Your Electrical Safety Officer would prefer to help you do the job correctly the first time, rather than find out later that there are problems which might be safety hazards and require you to remove and redo your work. **For general inquiries call the BC Safety Authority at 1-866-566-7233 (8:00 am to 5:00 pm, Monday to Friday).**

Finally, if the job appears too large or if you feel unsure of your ability to do it properly, contact a licensed electrical contractor. It is important to make sure that the contractor you hire is licensed with the BC Safety Authority. To find electrical contractors licensed in BC, visit the BC Safety Authority website at www.safetyauthority.ca

Permits

As a homeowner, you are required to **obtain a permit before** beginning any regulated electrical work.

Types of Buildings that Can be Wired by Homeowners

You are entitled to do electrical work in a fully detached residential dwelling that you occupy or intend to occupy. Your dwelling may not contain a suite. Fully detached dwellings are buildings that are designed for single family use only.

You are **not allowed** to do electrical work in or on any buildings if:

- you do not live in or intend to live in the dwelling,
- any part of the building includes a separate self-contained suite or occupancy,
- the building, or any part of the building is being used to provide rental income, or
- the building, or any part of the building is used for commercial purposes.

Electrical work on other structures located on the same property, and recreational properties that are owned by the permit holder may be allowed. Approval from an Electrical Safety Officer may be required before a permit is issued for these buildings.

Electrical Safety Regulation, Section 17 and Directive No. D-E3 040607 1 describes in detail when a homeowner may perform electrical work under a permit. This information is available in the Regulations and Consultation section of the BC Safety Authority website at www.safetyauthority.ca.

Mobile Homes

A mobile home is considered to be a single family dwelling. However, when a mobile home is located on a commercial property such as an RV site or a mobile home park, there are restrictions. If located on a commercial property, the owner is restricted to working on circuits on the load side of the main breaker located within the mobile home.

Note: Security alarm systems are regulated under the Security Services Act. Contact the Ministry of Public Safety and Solicitor General, to find out whether you are allowed to install a security alarm system for your home.

Homeowner Qualifications

Section 4 of the Electrical Safety Regulation describes who is entitled to do electrical work. This section allows homeowners to do electrical work if they are doing the work under a permit. A permit for electrical work helps to ensure that persons who are doing the work know and understand how to do it properly and safely, and that the work will be inspected to ensure that it is safe.

Before applying for a permit, you should have a good understanding of your obligations under the *Safety Standards Act*. **You must also read the terms and conditions set out on the back of the permit application form before signing and submitting the form.** You, the applicant, must sign the application, accepting these terms and conditions, before the permit will be issued. You must also read this information guide before proceeding with any work.

In some cases, an Electrical Safety Officer may need to review your permit application before the permit will be issued. You may be required to provide evidence that you are qualified to perform the electrical work safely. After reviewing your permit application, an Electrical Safety Officer may set additional terms and conditions when issuing the permit. You will be expected to acknowledge this written agreement prior to permit issuance.

Note: Homeowner permits are only issued to homeowners who will be doing the work themselves, or with the unpaid assistance of a qualified tradesperson. Persons who have been hired to do electrical work must obtain their own permits for the work they are doing.

For a complete listing of BC Safety Authority offices, please visit our website at www.safetyauthority.ca/contact

Permits

Obtaining a Permit

Electrical permits may be obtained from:

1) Permit issuing offices of the BC Safety Authority. For a complete listing of offices, please visit our website at www.safetyauthority.ca/contact
2) Most Service BC offices.
3) A number of cities and municipalities in British Columbia maintain their own electrical inspection service. For a complete listing visit the Permits, Approvals and Design Registrations section of the BC Safety Authority website at www.safetyauthority.ca. If the installation is located in one of these areas, contact the city or municipal office directly for their permit and inspection requirements.

Information You Will Need to Have With You When Applying for a Permit

- The site address
- The phone number where you can be contacted.
- The characteristics of your main service.
- A load calculation.
- A description of the electrical work being proposed.
- The name(s) of anyone who will be assisting you with the electrical work.
- Your estimate of the value of the work being performed. This value is based on the market value of all electrical materials (minus utilization equipment), which will be used to complete the electrical work.

Important Note: The site address must be posted in a conspicuous location at the job site. A map or directions may also be provided if necessary.

Permit Fees

For Homeowner Electrical Installation Permits, BC Safety Authority permit fees are based on the value of the electrical materials to be used in the installation. This excludes utilization equipment such as lighting fixtures, heaters, furnaces, motors, etc. Plan your work carefully. You should have an estimate of the anticipated cost of materials necessary to complete the project. A fee schedule is available at any BC Safety Authority office as well as on the BC Safety Authority website at www.safetyauthority.ca/electrical-fee-schedule

Note: The value of materials is based on the actual value of the materials regardless of whether (or how much) you paid for them.

The Inspection Process

Depending on the fee you paid, your permit comes with a limited number of inspections. Check the **Electrical Fee Schedule** when you apply for your permit.

Inspections

You will need to verify the number of inspections on the permit application. BCSA customer service representatives may provide you with assistance in determining the number of inspections. **If you require more inspections than your permit fee entitlement allows, you may be charged additional fees at an hourly rate as set out in the Electrical Fee Schedule.**

Note: Please check with a customer service representative, or the Electrical Safety Officer in your area for inspection scheduling information.

Requesting Inspections

Most electrical installation work will require at least two inspections. All inspections must be completed by an Electrical Safety Officer. Inspections may be requested by:

a) Mailing, faxing, emailing, or hand delivering to the nearest BC Safety Authority office, a completed “Homeowner Inspection Request” form supplied by the BC Safety Authority, or

b) Telephoning a BC Safety Authority office to arrange for an inspection. **Note: This method cannot be used for a final inspection request.** The permit holder must provide the permit number when making the request and complete the “Homeowner Inspection Request” form supplied by the BC Safety Authority. When requesting an inspection by phone, always leave the completed form at the job site for the Electrical Safety Officer to collect at the time of the inspection. The homeowner must provide the Electrical Safety Officer with the location of the form and means to gain access in order to perform the inspection.

The Inspection Process

Inspections are required before any electrical work is concealed or connected to an electrical supply. **You must request at least one inspection in every 180 day period.** This means that you must request an inspection within 180 days from the time the permit is issued to you, and you must request at least one inspection within 180 days from the date of your last inspection. This is necessary to ensure that the electrical installation remains in a safe condition and is required even if no electrical work has been done since the last inspection.

You should receive a letter reminding you that your permit is about to expire. **DO NOT IGNORE THIS LETTER. CONTACT THE ELECTRICAL SAFETY OFFICER IMMEDIATELY.** If you do not request an inspection within the 180 day period your permit will expire.

Most electrical installation work will require at least two inspections. All inspections must be completed by an Electrical Safety Officer.

If your permit has expired, you will not be allowed to do any further work until you have had the permit amended and have paid the additional fee. If your permit expires, the Electrical Safety Officer will attempt to notify you and provide you with further instructions. You will be required to make arrangements for the required inspection within the time frame specified by the Electrical Safety Officer. If you do not respond to the Electrical Safety Officer or if the request is ignored, your permit may be cancelled and you will be required to obtain the services of a licensed Electrical Contractor to complete the electrical work.

If you have been granted approval for connection of your wiring, the approval is temporary. Failure to respond to the Electrical Safety Officer could result in expiration or revocation of this approval. This could mean disconnection of your electrical service. In some cases, a Safety Officer may issue a Compliance Order. If you do not comply with such an order, you could be subject to monetary penalties. Please make sure that you request inspections regularly and respond to Electrical Safety Officer's requests when they try to contact you.

First Inspection (Rough-Wiring Inspection)

Usually referred to as a "rough-wire" inspection, the First Inspection must be done before **any** part of the electrical installation is covered or concealed.

This inspection is required in all cases where any raceways or wiring are to be covered or concealed in any way. It includes underground as well as structure raceways and wiring. Before requesting a rough-wire inspection, please ensure that:

- All electrical wiring (including boxes, cables and raceways) is exposed for inspection. This includes underground raceways and cables.
- All branch circuit wiring is completed. All boxes, cables, raceways and fittings are properly installed and supported.
- All splices are complete and conductors are properly terminated.
- All bonding conductors are terminated to the appropriate lug or screw, in outlet or junction boxes.
- Devices such as receptacles, switches and light fixtures are not installed at this stage.

Before requesting a rough-wire inspection that includes connection for your electrical service, or "service connection", please ensure that (if and when applicable):

- The installation of all electrical service equipment has been completed.
- Work involving consumer's service cables and/or raceways and fittings, meter base, main service box, and grounding and bonding systems are completed.
- Branch circuit wiring has been entered into the panel, using approved connectors.
- Bonding and neutral conductors have been terminated to their respective busses within the panelboard.
- At least one circuit is completed with devices, covers and circuit breaker installed. This is normally a circuit which provides power during construction, and could simply be a single receptacle installed below the electrical panel.

Note: You must have written approval from a Safety Officer before energizing any circuits. In order to avoid the risk of electrical shock, branch circuit wiring should not be connected to a circuit breaker until the circuit has been completed and all devices and covers have been installed.

The Inspection Process

Final Inspection (All Work Complete Inspection)

For the Final Inspection, all electrical work must be completed. It is not necessary to have other non-electrical work completed (such as drywall, painting, plumbing, etc.). The branch circuits must be connected to the circuit breakers, with the circuit breakers left in the "off" position, unless an Electrical Safety Officer has provided written authorization allowing you to energize circuits. Also, ensure that your panel directory is completed and accurate. The Electrical Safety Officer will authorize the circuits to be permanently energized after the installation has passed final inspection.

Note: You may obtain approval from the Electrical Safety Officer to temporarily energize circuits for testing purposes or for use of tools during construction.

Rough Wiring Inspection and Final Inspection Request Forms

You can obtain Inspection Request Forms from your electrical inspection authority or online at www.safetyauthority.ca/form-1011

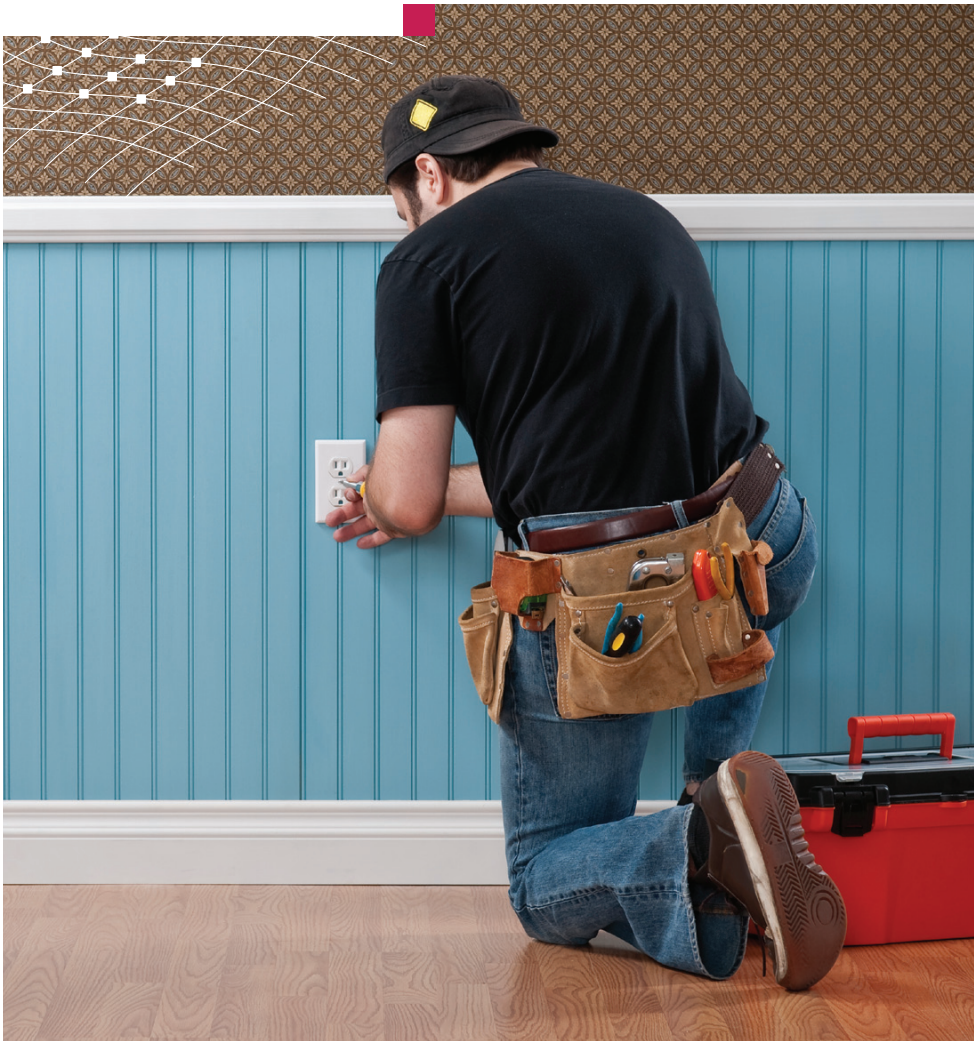
You must remember to request an inspection within the 180 day period.

180 Day Safety Inspection (Work in Progress Inspection)

It is understandable that delays sometimes occur. However, it is important to monitor the safety of electrical work while it is in progress. Even if you haven't finished the next phase of your work, or if you haven't done any additional electrical work since your last inspection, **you must remember to request an inspection within the 180 day period.** This inspection is necessary to ensure that the electrical work performed remains in safe condition throughout the job. Your permit will expire if this inspection is not requested. An expired permit will cost you additional money and may cause unnecessary delays.

Certificate of Inspection

After the inspection has been completed, the Electrical Safety Officer will provide you with a Certificate of Inspection showing the results of the inspection. Once the installation has been accepted by the Electrical Safety Officer, insulation, interior sheathing, backfilling of trenches, or pouring of concrete may proceed.



You can obtain current versions of all applicable forms from your electrical inspection authority or online at www.safetyauthority.ca

Temporary Construction Service Connection

Homeowners are **never** permitted to work on **energized systems or equipment.**

If you are building a new home, you may need to have power during the construction. You can accomplish this in one of two ways:

1. Temporary Construction Service

A temporary construction service is normally placed on a pole. Directive No. D-E3 101110 1 provides some guidance on this and is available in the Regulations and Consultation section of the BC Safety Authority website at www.safetyauthority.ca.

Temporary Construction Service Installations will be accepted if constructed in accordance with the sketches provided in the Directive. A 150 mm x 150 mm (6" x 6") wooden timber, with gain and suitable bracing, will be accepted for use in lieu of a class 6 pole, to comply with *Rule 76-002(4).*

2. Temporary Connection to a Permanent Service

Permanent services, which are connected in order to provide temporary power for construction purposes, must be installed in accordance with the requirements of Section 76 and:

a) Be protected from the weather and mechanical damage by location or by installing the equipment within an enclosure which has been made weather proof.
b) The equipment must be capable of being locked.
c) All panel covers must be installed while the equipment is energized.
d) 15 and 20 amp receptacles supplying temporary power for construction purposes must be GFCI protected *Rule 76-016*.

Selecting the Panelboard

Rule 8-108 of the BC Electrical Code specifies the minimum number of spaces for circuit breakers that must be provided in a panelboard.

Your panelboard will need to have sufficient spaces for overcurrent devices based on the size of your service, and whether or not you will have a central electric furnace. Ensure that your panel will have enough spaces available for the number of circuits you plan to install.

The following table outlines the minimum requirements for breaker spaces in a panelboard:

Table 3 – Minimum Service Panelboard Size

Service Size	Branch Circuits	Branch Circuits (with a central electric furnace)
60A	16	16
100A	24	24
125A	30	24
200A	40	30

Note:

1. In all cases, at least half of the spaces must be able to accommodate double pole devices.
2. At least two spare spaces must be provided for future additional loads.

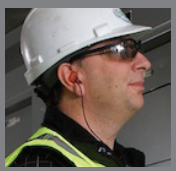
Working With The Electrical Utility (Supply Authority)

If your project involves work on the main electrical service, contact your local Electrical Utility (Supply Authority) and an Electrical Safety Officer prior to starting work.

When relocating or installing a new service, you must check with the Electrical Utility and the Electrical Safety Officer to ensure that the location of the meter base and service equipment is acceptable to both.

Homeowners are never permitted to work on energized systems or equipment. If your work requires a disconnection by the Utility ensure that you coordinate between the Electrical Safety Officer and the Utility. Arrangements to have the Utility disconnect your existing service can be made at any time, however, before the Utility can reconnect your service, you will need to have an Electrical Safety Officer inspect your work and authorize the reconnection. So, make sure that you communicate with both the Utility and the Electrical Safety Officer so that you can co-ordinate and schedule your work with them.

Important: Once your service has been disconnected, it cannot be reconnected until an Electrical Safety Officer has inspected and authorized reconnection, so plan carefully.



If your work requires a disconnection by the Utility ensure that you coordinate between the Electrical Safety Officer and the Utility.

Selecting Your Material

Most **electrical supply companies** in British Columbia will be very helpful in assisting you with **selection** of the materials.

It is a requirement of the regulations that all electrical equipment be certified for its use and must have a marking showing that it is approved.

You can find examples of what these markings look like by viewing the Approved Certification Marks for Electrical Products Information Bulletin in the Regulations and Consultation section of the BC Safety Authority website at www.safetyauthority.ca.

If you have any doubt as to the validity of a label or mark on a piece of equipment, call your Electrical Safety Officer before you install it. It can be very difficult and perhaps expensive to replace it after it has been installed.

Before applying for a permit, you should have a good understanding of your obligations under the *Safety Standards Act*.

Do not try to use any products or devices not specifically intended or approved as electrical equipment. For example, you can not use plumbing pipe or fittings as a substitute for electrical conduit or as a home made power pole.

Consider using the best quality of equipment you can find. The electrical wiring must provide service for the life of the building so there is good reason to use quality materials.

If you have any doubt as to the validity of a label or mark on a piece of equipment, call your Electrical Safety Officer before you install it.

Tips and Things to Know

- **Bonding Bushings:** Metal raceways ahead of the main disconnect switch or main breaker, can not rely on locknuts to ensure that the raceway is properly bonded to ground. Where the raceway has been secured to a box or cabinet, through the use of standard locknuts, the raceway must be bonded to ground by a bonding bushing and bonding jumper (see *Rule 6-606).* This includes all raceways ahead of the main service disconnecting means,regardless of length or size.

- **Grounding Electrodes:** To get a service connection, your grounding electrode must be properly installed. Plate electrodes must be installed a minimum depth of 600mm (2 feet). Rod electrodes must be driven full length and spaced a minimum of 3 metres (approximately 10 feet) apart.

- **Grounding Conductors:** The grounding conductor must be one continuous copper conductor and may not be spliced. The grounding conductor must be connected directly to the electrode and the main neutral buss ahead of the main disconnect switch.

- No circuits should be energized unless you have obtained written authorization from an Electrical Safety Officer.

- All panel covers must be in place at the time of inspection.

- Underground raceways need to be inspected before you can cover them.

- You must provide a point of attachment for overhead service conductors. Clearances for overhead conductors must be at least: 3.5 m over pedestrian area, 4 m over driveways, 5.5 m over streets or highways.

- The weatherhead for overhead conduit or cable must be 150 mm to 300 mm above attachment point for overhead wires.

- Ground wire to go into main breaker section of panel not through branch circuit section.

- Mechanical protection is usually required where underground cables and raceways rise above ground.

- Conduits coming directly out of the ground need to have provision for settling of earth (most commonly an expansion joint).
- Almost every “dead end” power pole requires a guy wire.
- Branch circuit wiring may not go through the main breaker section of the service panel.
- Recessed lighting junction boxes may only be used for connection of fixture or multiple fixtures. They may not be used as junction boxes for other branch circuit wiring connections.
- The hot wire is the one to be switched for a light fixture – not the neutral (or grounded circuit conductor).
- Receptacles within 1.5 m of any sink must be GFCI protected.
- All peninsulas and kitchen islands (other than portable islands) require an appliance receptacle.
- Underground Armoured cable or raceways is to be buried minimum 450 mm from TOP of cable or conduit to final grade. Non-armoured cable requires 600 mm of coverage.
- Smoke detectors must be on a lighting circuit, but not one protected by an Arc fault breaker, or GFCI device.
- Marking tape is required to be installed half way between all underground cables and raceways, and finished grade.

Get To Know Us

At the British Columbia Safety Authority **we keep people safe.** As the Province's delegated authority, we mandate the safe installation and use of technical equipment.

We're a not-for-profit that administers safety standards through education, and through issuing permits and licences. We also enforce compliance to standards to ensure consistency and fairness, and conduct onsite inspections – particularly in high-risk situations. We continuously research trends to advance the standard of safe practices in our province.

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505 - 6th Street, Suite 200
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V3L 0E1

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Notes

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