



1997-12-03

ELECTRICAL SAFETY

1. BACKGROUND

1. It is mandatory for all government departments and agencies to ensure compliance with the legislation and regulations established for electrical safety. In keeping with this responsibility, it is necessary for Public Works and Government Services Canada (PWGSC), to adopt a program for electrical safety to ensure that the requirements of the Canada Labour Code, *Part II*, the *Canada Occupational Safety and Health Regulations*, the Canadian Electrical Code and corresponding Provincial/Territorial Electrical Codes are addressed.

2. This program will ensure that all electrical repairs, renovations and installations are undertaken by qualified persons and that this work is inspected, as required, by the local Electrical Inspection Authorities. In addition only qualified persons, with the required training and experience, are authorized to undertake work on electrical equipment or installations. This program will also ensure that current information regarding electrical equipment and installations, and the work that has been undertaken, is readily available and properly maintained.

3. This structured approach will ensure that employees are provided with the appropriate training for the duties and tasks they are required to perform, and that approved procedures and safe practices that relate to the specific worksites and the activities to be undertaken are developed and implemented.

2. POLICY

Public Works and Government Services Canada shall develop, implement and maintain a comprehensive departmental electrical safety program that is in accordance with the *Canada Labour Code*, *Part II*, the *Canada Occupational Safety and Health Regulations*, the Canadian Electrical Code and the corresponding Provincial/Territorial Electrical Codes, to ensure that:

1. electrical safety procedures are developed and implemented to ensure the safety and well being of all employees;
2. all electrical repairs, renovations, alterations and installations are undertaken by qualified electricians, or by apprentices as per the conditions of the Provincial/Territorial Act respecting manpower vocational training and qualification;
3. all electrical repairs, renovations, alterations and installations are inspected, as required, by the local Electrical Inspection Authorities;

4. all electrical repairs, renovations, alterations and installations are recorded, as required, and that all operating procedures, schematics and related documents are promptly updated upon completion of the work.

3. SCOPE

This departmental policy and code of practice apply to all managers, supervisors and employees of Public Works and Government Services Canada where the duties required to be undertaken involve working on electrical equipment or installations or near live electrical equipment or installations. This departmental policy and code of practice do not apply to new construction, major renovation or demolition projects carried out by private sector contractors.

4. DEFINITIONS

See Annex A.

5. ROLES AND RESPONSIBILITIES

See Annex B.

6. GUIDELINES

Monitoring

The requirements of the electrical safety program will be monitored on a quarterly basis by the Regional Manager responsible for Safety and Health and the network of Workplace Safety and Health Committees and Representatives, to ensure that:

1. log books and related records of minor electrical repair and renovation projects are established and maintained;
 2. appropriate electrical safety procedures have been developed and implemented;
- and
3. appropriate signage is posted as required.

Inconsistencies with requirements, or other issues related to electrical safety that cannot be resolved at the workplace level shall be reported to the Regional Safety and Health Committee. Issues that cannot be resolved at the Regional level shall be reported to the National Safety and Health Committee.

7. PROCEDURES

Annex C - Code of Practice.

8. COMPLIANCE

Compliance with this departmental policy is mandatory and in accordance with all existing safety and health legislation. The refusal of an employee at any level to comply with this departmental policy or with the provisions of the prescribed codes, standards, regulations, and/or departmental policies will be considered as misconduct.

9. REFERENCES

Acts and Regulations:

- *Canada Labour Code, Part II;*
- *Canada Occupational Safety and Health Regulations:*
 - Part VIII - Electrical Safety;
 - Part XI - Confined Spaces;
 - Part XII - Safety Materials, Equipment, Devices and Clothing.

Treasury Board Publications:

- Personal Protective Equipment and Clothing Directive;
- Electrical Directive;
- Hazardous Confined Spaces Directive.

Other Publications:

- Canadian Electrical Code:
 - Provincial Electrical Safety Code (applicable for the province where the work is to be undertaken).

PWGSC Publications:

- DP 007 - *Health and Safety Policy;*
- DP 016 - *First-Aid PWGSC;*
- DP 017 - *Personal Protective Equipment for Employees;*
- DP 018 - *Hazardous Occurrence/Investigation, Reporting and Recording;*
- DP 022 - *Employees Working Alone;*
- DP 036 - *Entry into Confined Spaces;*
- DP 037 - *Workplace Hazardous Materials Information System (WHMIS) Policy.*

10. INQUIRIES

Departmental:

Director
Corporate Environment
Safety and Health

Regional:

Regional Managers responsible for Safety and Health



R. A. Quail
Deputy Minister and
Deputy Receiver General for Canada

Annex A - Definitions

Authorized person (*personne autorisée*) means a qualified person who has been provided authorization by the employer to have access to areas containing, or structures supporting, electrical equipment or installations.

De-energize (*mettre hors tension*) means to isolate and safely ground electrical equipment and installations.

Department (*ministère*) means Public Works and Government Services Canada (PWGSC).

Electrical equipment (*appareillage électrique*) means equipment for the generation, distribution or use of electricity.

Electrical installation (*installation électrique*) means the installation of electrical wiring and equipment in or upon any land, building, or premise, from the point, or points, where electrical power or energy is delivered, to the point, or points, where the power or energy can be used by any electrical equipment, including the connection of the wiring with the equipment, and any part of the wiring system, and also includes the maintenance, alteration, extension and repair of the wiring and equipment.

Employee (*employé*) means a person employed by the department.

Employer (*employeur*) means a supervisor who is responsible for the work of one or more employees at the workplace.

Guarantee of isolation (*attestation de coupure à la source*) means a guarantee, in writing, by the qualified person in charge of electrical equipment or an electrical installation, that it is isolated.

Guarantor (*garant*) means the Property/Facility Manager, or designated representative, responsible for the electrical equipment or the electrical installation, and authorized by the department to provide a guarantee of isolation.

Guarded (*protégé*) means that electrical equipment or an electrical installation is covered, shielded, fenced, enclosed, inaccessible by location, in order to prevent or reduce the danger to any person who might touch or go near that equipment or installation.

Hazardous occurrence (*situation dangereuse*) means an event occurring at a PWGSC managed building or worksite, or through the course of an employee's work that results in, or has the potential to result in, a fatality, injury, property damage or an escapement of a hazardous material. For the purpose of investigating, recording and reporting hazardous occurrences, the following are included under this term: Critical Incidents; Disabling Injuries; Non-Disabling Injuries; Minor Injuries; Minor Occurrences and Near-Misses.

High voltage (*haute tension*) means a voltage of more than 750 volts between any two conductors or between any conductor and ground.

Insulate (*isoler*) means to separate from other conducting surfaces by a dielectric material or air space that has a degree of resistance that is sufficiently high to prevent the passage of current and disruptive discharge.

Isolate (*couper à la source*) means to separate or disconnect electrical equipment or an electrical installation from every source of electrical, mechanical, hydraulic, pneumatic or any other energy that is capable of making the equipment or installation dangerous.

Lock out (*verrouillage*) means that electrical equipment or an electrical installation has been

rendered inoperative, and cannot be operated or energized by another person without the consent of the person who rendered it inoperative.

Manager in Charge of Worksite (*gestionnaire responsable du lieu de travail*) means the person to whom the supervisor reports directly.

Person in Charge (*personne responsable*) means a qualified person, appointed by management, to ensure the safe and proper conduct of an operation, or the work of employees.

Personal protective equipment (*équipement de protection individuelle*) means any clothing, equipment or device worn or used by a person to protect that person from injury or illness.

Preventative measures (*mesures de prévention*) means the provision of personal protective equipment and/or devices in combination with all or any required information/education sessions.

Qualified electrician (*électricien qualifié*) means a person who, because of knowledge, training and experience, is licensed and qualified to safely and properly perform a specified job.

Qualified person (*personne qualifiée*) means, with respect to a specified duty, an individual who, because of knowledge, training and experience, is qualified to safely and properly perform the duty.

Safety ground or safety grounding (*prise de terre ou mise à la terre*) means a system of conductors, electrodes and clamps, connections or devices that electrically connect an isolated electrical facility to ground for the purpose of protecting persons working on electrical equipment or installations from dangerous electrical shock.

Safety officer (*agent de sécurité*) means a person designed as a Safety Officer by the Minister of Human Resources Development, pursuant to the Canada Labour Code, Part II.

Safety watcher (*gardien de sécurité*) means a qualified person trained in electrical safety procedures and emergency procedures who remains in attendance during the time that the work is being carried out.

Senior employer representative (*représentant supérieur de l'employeur*) means the individual with the delegated authority to make and carry out decisions of an operational nature, on behalf of the department, for the workplace.

Supervisor (*superviseur*) means the person at the workplace to whom the employee(s) report(s) directly.

Voltage (*tension*) means the greatest root-mean-square (RMS) voltage between any two conductors of an electrical circuit, or between any conductor of a circuit and ground and in respect to a direct current electrical circuit, means the greatest voltage between any two conductors of the circuit or between any conductor of the circuit and ground.

Workplace (*lieu de travail*) means any place where any employee is engaged in work for the department.

Annex B - Roles and Responsibilities

1. **Branch/Agency Heads** are accountable for the implementation of this departmental policy within their areas of responsibility. This accountability is further referenced in DP 007, Annex A - Accountability Framework for the Health and Safety function.
2. **Senior Employer Representatives** are responsible for ensuring that all workplaces within their area of responsibility implement the requirements of this departmental policy and code of practice.
3. The **Director, Corporate Environment, Safety and Health** is responsible for:
 1. monitoring the departmental program to ensure that requirements for electrical safety are met and that procedures are established and implemented;
 2. liaising, on behalf of the department, with regulatory bodies and central agencies on related matters.
4. **Regional Managers responsible for Safety and Health** are responsible for:
 1. providing advice with respect to the appropriate procedures, PPE and tools to meet electrical safety requirements for specific tasks or worksites, based on approved standards and/or consultation with specialists and with the Workplace Safety and Health Committee or Representative;
 2. monitoring workplaces and log books periodically to ensure that requirements with respect to electrical safety are adhered to;
 3. ensuring that log books of minor electrical repairs and renovations are reviewed at three-month intervals;
 4. ensuring that annual electrical inspections are carried out by the authority having jurisdiction;
 5. investigating specific workplace complaints concerning electrical safety and taking appropriate action.
5. **Workplace Safety and Health Committees and Representatives** are responsible for:
 1. reviewing electrical safety records on a quarterly basis to verify that the Request for Electrical Isolation Forms, Procedures for Isolation Forms and log books are properly completed and maintained;
 2. monitoring worksites to ensure that the required signage is in place, that single-line drawings and as-built drawings and specifications have been updated and are posted as required, and that procedures have been developed and implemented;
 3. consulting the Regional Manager responsible for Safety and Health regarding electrical safety issues;
 4. reporting immediately, specific workplace complaints regarding electrical safety, that cannot be resolved, to the Regional Manager responsible for Safety and Health.
6. **Managers in Charge of Worksites** and **Supervisors** shall implement this departmental policy and code of practice as required by the nature of the tasks for which they are responsible, by:
 1. establishing and implementing, in consultation with the employees and the Workplace Safety and Health Committee or Representative, the appropriate electrical safety procedures;

2. consulting the Regional Manager responsible for Safety and Health concerning electrical safety procedures to meet specific requirements;
 3. ensuring that each person working on electrical equipment or installations is qualified for the duties they are required to perform;
 4. ensuring that all required PPE and tools are provided for the specific tasks to be undertaken;
 5. ensuring that testing, maintenance and storage routines are established and implemented for all PPE and tools;
 6. ensuring that appropriate procedures for the isolation of electrical equipment or installations (to de-energize and to re-energize) are prepared by a qualified person, and that the Procedures for Electrical Isolation Form is properly completed and reviewed prior to commencement of the work;
 7. arranging for the inspection of major electrical repair and renovation projects, where the work has been done by a departmental employee, by Electrical Inspection Authorities immediately upon completion of the work;
 8. ensuring that all replacements, modifications or additions to electrical equipment or installations are reflected in revised single-line drawings;
 9. ensuring that as-built drawings are routinely updated;
 10. identifying a qualified person to undertake the duties of the Person in Charge;
 11. ensuring that electrical safety records, i.e., Request for Electrical Isolation Forms, Procedures for Isolation Forms, and single-line drawings are properly completed and maintained;
 12. ensuring that updated single-line drawings are posted in electrical and mechanical rooms, as required;
 13. notifying the Guarantor, in writing, of any modifications or additions that have been made to electrical equipment or installations and providing copies of updated line drawings, as applicable;
 14. implementing the required reporting procedures, in the event of a hazardous occurrence related to electrical safety.
7. The **Person in Charge** is responsible for:
1. obtaining authorization for isolation by initiating the Request for Electrical Isolation Form for signature of the Guarantor;
 2. preparing written procedures for the isolation of electrical equipment or installations and completing the Procedures for Isolation Form;
 3. presenting the completed Procedures for Isolation Form for review and approval prior to commencement of the work;
 4. ensuring that the completed Request for Electrical Isolation Form is on site and available to the employees during the time that they are performing the work;
 5. ensuring that the required precautionary measures have been implemented before work commences, i.e., lock-out and tag-out procedures; grounding; guarding, etc.;

6. reviewing with the employees, the procedures to be followed and the PPE and tools to be utilised;
 7. ensuring that, where appropriate, the equipment or installation is isolated and grounded (de-energized) prior to the work being started;
 8. determining the requirement for a Safety Watcher, and selecting a qualified person, suitable to perform these duties;
 9. overseeing the work to ensure that established procedures are implemented;
 10. implementing emergency procedures if and when required;
 11. informing the Guarantor and the Manager in Charge of Worksite or the Supervisor of an unscheduled electrical interruption;
 12. ensuring that line drawings are updated, as required, upon completion of the work;
 13. returning the Request for Electrical Isolation Form and the Procedures for Isolation Form to the Manager in Charge of Worksite or the Supervisor.
8. The **Safety Watcher** is responsible for:
1. ensuring that electrical safety procedures are observed;
 2. ensuring that all required PPE and safety equipment and devices are worn and/or utilized as prescribed, and have been properly inspected and tested;
 3. stopping immediately work that he/she considers dangerous;
 4. implementing emergency procedures, as required.
9. **Employees** are responsible for:
1. adhering to instructions, training and established procedures related to electrical safety;
 2. following all safety instructions from the Person in Charge and the Safety Watcher;
 3. immediately reporting unsafe conditions or practices to the Person in Charge;
 4. immediately reporting a hazardous occurrence to the Person in Charge.
10. The **Guarantor** is responsible for:
1. developing and implementing procedures to ensure that only authorized persons are provided access to electrical cabinets and transformer rooms;
 2. ensuring that the required signage is posted at each approach to live high voltage electrical equipment;
 3. providing authorization for isolation by completing the Request for Electrical Isolation Form and making the necessary arrangements for the specific time-frame;
 4. ensuring there is no other work being undertaken at the time of isolation, that will interfere, until isolation time has expired, and it is safe to commence the other activity;

5. informing all occupants, who will be affected, of the isolation;
6. providing information to all occupants affected, as soon as possible, in the event of an unscheduled electrical interruption;
7. ensuring that a log of minor electrical repair and renovation projects is established and maintained, and arranging for an annual inspection of this work by the local Electrical Inspection Authorities.

Annex C - Code of Practice - Electrical Safety - PWGSC

1. General Electrical Safety Requirements

Signage

Approved signage shall be posted in a prominent location, at each approach to live, high voltage electrical equipment when required, e.g., equipment has not been guarded.

Signs shall include the words "Danger - High Voltage" and "Danger - Haute Tension", and meet the following requirements:

- legible lettering, not less than 50 mm in height;
- contrasting background colour in order to effectively distinguish the lettering.

Switches and Control Devices

Each control device shall be designated and located so as to permit quick and safe operation at all times.

Access to all electrical switches, control devices and meters shall be free from obstruction. Flammable materials shall not be stored or placed in the same area as electrical switches, transformers, control devices and meters.

Note: Locking of electrical cabinets will limit access by unauthorized individuals, and will be considered for those cabinets that are easily accessible. Devices can be utilized that will provide access to the panel for light switches, but will limit access to operating parts above 30 volts.

Electrical Rooms and Closets and Transformer Rooms

Electrical rooms and closets and transformer rooms shall be kept locked to ensure that unauthorized persons do not have access to them.

Access shall only be provided by the Guarantor or the individual authorized by the Guarantor, for work that has been scheduled, or in an emergency situation.

These areas shall not be used for storage purposes.

Battery Rooms

Approved signage shall be posted at the entrance to all battery rooms or areas.

Signs shall include the words "Danger - No Smoking or Open Flame" and shall meet the following requirements:

- legible lettering, not less than 50 mm in height;
- contrasting background colour in order to effectively distinguish the lettering.

Each battery charging room or area shall be adequately ventilated to prevent the accumulation of flammable gases. Each room or area shall be tested for air quality, and shall be operated and maintained in accordance with approved industrial safety practices.

Unscheduled Electrical Interruptions

The Person in Charge shall report an unscheduled interruption to the Manager in Charge of Worksite or the Supervisor and to the Guarantor.

Interruptions that occur during working hours shall be reported immediately. Interruptions that occur during the silent hours shall be reported the following morning.

When partial or complete isolation is required in an emergency situation, the work shall be coordinated as necessary and undertaken by qualified individuals.

In the event of an emergency situation and the requirement to isolate, all possible advance notice shall be provided to the Guarantor prior to isolation. The Guarantor shall, upon being notified, inform all occupants, or client departments affected by the unscheduled isolation.

General Safety Precautions

Safe work practices shall be implemented to safeguard employees working on or near, exposed electrical conductors or circuit parts that are, or may become, energized. The safe work procedures implemented shall be consistent with the type of work to be undertaken and the extent of the electrical hazards.

Employees registered in a provincial apprenticeship program, who are undergoing "on-the-job training" shall be permitted, under the direct supervision of a qualified electrician, to perform specific tasks. The activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

When employees who are not qualified electricians are required to undertake non-electrical tasks or activities in close proximity to a limited approach boundary, (see Annex C, Appendix 1 - Required Distances From Live Electrical Parts), the work shall be coordinated through the Manager in Charge of the Workplace or the Supervisor. Where there are live exposed busbars, etc., only qualified electricians shall be permitted to work in the area. Where work is permitted, all safety precautions shall be implemented and all employees shall be provided with the necessary instruction with regard to the related hazards, prior to commencement of the work.

If there is a requirement for non-electrical work or activities to be performed within the limited approach boundary, the employee shall be provided with all necessary instruction with regard to related hazards and all required safety precautions shall be implemented. A qualified electrician shall be selected as the Safety Watcher. The Safety Watcher shall have the authority to remove any worker who he/she determines is not conducting himself/herself in an appropriate manner.

Only qualified electricians shall be permitted entry within a restricted approach boundary. See Appendix 1, Required Distances From Live Electrical Parts.

Contracts for Electrical Work

Contracts for electrical work shall include a clause which indicates that all safety requirements necessary to undertake the work have been met by the contractor. In addition the contract shall state that the contractor is responsible to ensure that the individual(s) who will undertake the work is (are) qualified to perform the work as per the requirements of the Canadian Electrical Code.

The general conditions of a contract stipulate the requirement for a permit to be obtained prior to commencement of the work. Proof of this permit shall be provided before permission to undertake the work is granted.

2. Electrical Safety Procedures

Development and Implementation of Worksite Procedures

The Manager in Charge of Worksite or the Supervisor shall ensure that safety procedures,

appropriate to the requirements of the work that is to be undertaken, are developed and implemented.

Personal Protective Equipment and Tools

Managers in Charge of Worksites and Supervisors shall ensure that required Personal Protective Equipment (PPE), tools, and equipment approved for the work to be undertaken on electrical equipment and installations, are provided to employees.

All PPE and tools shall be CSA approved, for the intended purpose. Employees shall be provided with the required instruction and training in the proper use of the PPE and tools that they are required to use.

All PPE, tools and equipment shall be **stored, maintained, inspected** and **tested** by a qualified person, as per the prescribed procedures for each specific article of equipment. Maintenance records shall be maintained at the workplace.

All testing equipment shall be kept in good working condition and shall be calibrated to traceable standards of the National Bureau of Standards.

Protective clothing, insulated tools or equipment, that fail when tested, shall be immediately removed from service. The article shall be identified, tagged and disabled (if applicable) so as to prevent its use until it has been repaired or removed from the workplace.

Each employee shall care for assigned PPE and tools in accordance with training and instructions. PPE or tools that no longer provide the protection for which they were designed, shall be immediately reported to the Person in Charge, or the Manager in Charge of the Worksite or the Supervisor.

Employees shall wear the specified insulated protective clothing and use the insulated tools and equipment as required when: working on; testing; repairing; adjusting or operating electrical equipment.

Employees required to work on electrical equipment and installations shall wear:

- protective headwear that complies with Class B requirements of CSA Standard Z94.1-M, Industrial Protective Headwear;
- protective footwear that is in accordance with CSA Standard Z-195-M, Grade 1, indicated by green triangle, with electrical shock resistance protective feature;
- safety glasses or other eye protection that complies with the requirements stipulated by CSA Standard Z94.3, Eye Protectors, and is specifically designed for the work to be carried out;
- when working on high voltage electrical equipment or installations, rubber insulating gloves or mitts that comply with CSA Standard Z259.4-M, Rubber Insulating Gloves and Mitts;
- when working on or near high voltage equipment or installations, outer clothing with full length sleeves fastened at the wrists, and fabricated from either tightly woven natural wool, a non flammable material or some other material that is equally resistant to ignition and manufactured as per the requirements stipulated in Treasury Board Standard 2-14.

Note: The following shall not be worn, or shall be tied, fitted, covered or otherwise secured prior to entering a workplace where machinery or energized electrical equipment is in operation, so as to prevent hazard:

1. loose clothing;

2. long hair;
3. dangling accessories, rings, or other jewellery that may become entangled in machinery or metal items or clothing that may come into contact with energized electrical equipment.

Conductive Equipment

Electrically conductive equipment or materials, i.e., metal rules; measuring tapes; fishing wire; wire-reinforced fabric tape; wire-bound hydraulic hoses; portable metal or metal-reinforced ladders, etc., shall not be used so near to live electrical equipment that there is a possibility that this conductive equipment or material may become live.

Authorization for Electrical Isolation

Authorization shall be obtained from the Guarantor responsible for the electrical equipment or installation prior to isolation. The Person in Charge shall complete a Request for Electrical Isolation Form, PWGSC-TPSGC 13, and shall present this form to the Guarantor for authorization. See Appendix 2, for a sample of this form and instructions for completion.

Authorization for a planned, complete power isolation must be received from the Guarantor at least one week prior to commencement of the work. Confirmation of the isolation shall be made on the preceding regular workday, and reconfirmed immediately preceding the planned power shut down.

Authorization for a partial power isolation shall be obtained from the individual responsible for the operation of the equipment or installation affected. Arrangements shall be made, with acceptable advance notice, and reconfirmed on the preceding regular workday.

The Guarantor shall be responsible for informing all occupants or client departments affected by the isolation.

The Person in Charge shall ensure that no more than one Guarantor is approached to authorize isolation of electrical equipment or an installation for the same time period.

Note: When an entire building will be affected, the approval for isolation shall be coordinated through one Guarantor. If there are a number of buildings supplied from the same electrical distribution centre, the isolation shall be coordinated through one Guarantor.

In emergency situations, an unscheduled isolation shall be undertaken as required. All possible notice shall be provided. If the interruption occurs during normal working hours, it shall be reported immediately to the Manager in Charge of the Worksite or the Supervisor. If occurring during the silent hours, the interruption shall be reported immediately the next morning.

Examples of equipment and installations that are subject to isolation are as follows:

- main building power feeders
- feeder supply panels and sub-panels
- bus ducts
- motor control centres
- emergency power circuits
- fire alarm and fire protection equipment
- mechanical protective equipment
- alarm circuit for building services, including all heating, ventilating and air conditioning equipment
- circuits supplying more than one (1) piece of equipment
- circuits affecting one (1) single piece of equipment used in a cooling or heating system.

The Request for Electrical Isolation Form shall be kept on site for examination by the employees while the work is being undertaken. Copies of all Request for Electrical Isolation Forms shall be maintained by the Manager in Charge of Worksite or the Supervisor for a period of one year.

Procedures for Isolation Form

When high voltage equipment or installations are isolated, a Procedures for Isolation Form shall be prepared by the Person in Charge and a copy of this form shall be maintained by the Manager in Charge of Worksite or the Supervisor for a period of one year.

When equipment is to be isolated, the Person in Charge shall, prior to the isolation, prepare and provide to the employee, a completed Procedures for Isolation Form, PWGSC-TPSGC 12. See Appendix 3, for a sample of this form and instructions for completion.

The Procedures for Isolation Form includes written instructions regarding the correct sequence to follow in the isolation process and the procedure to follow to re-energize the equipment or installation upon completion of the work. This form also includes pertinent information relating to the isolation procedure, i.e., date and time of preparation, verification, issue, performance of work, operating diagram adjustment and the names and signatures of those involved in the process. See Preparation of Isolation Procedures, pages 11 to 12, and Appendix 3, for a sample of this form and instructions for completion.

Safety Watcher

A Safety Watcher shall be selected by the Person in Charge when required. This safety measure shall be implemented when work to be undertaken is on, or near, an electrical facility that is live or may become live. The circumstances under which the work is to be performed, i.e., the nature of the work, or the location where the work must be performed shall determine this requirement.

The Safety Watcher shall be a qualified electrician with the required certification, or a combination of certification and technical training for the work that is to be undertaken. In addition, this individual must possess the necessary training in safety and emergency procedures.

Note:

- The Safety Watcher shall be free of all other duties that are not related to the duties of the Safety Watcher.
- This person must be clearly identified as the Safety Watcher to those performing the work.

The Safety Watcher is authorized to immediately stop any part of the work that he/she considers dangerous.

Lock Out and Danger Tags

PWGSC Danger Tags shall be utilised by departmental employees when work on, or a live test of, electrical equipment or an installation is to be undertaken. (See Annex C, Appendix 4, Danger Tag.)

Lock out, when possible, and tag out shall be undertaken prior to commencing with work.

Managers in Charge of Worksites and Supervisors shall ensure that Danger Tags are issued to employees who perform duties that require the use of these tags. Employees shall be provided with instruction as to the proper completion and use of the tags.

Note: When more than one employee is working on the electrical equipment, one tag shall be

attached for each employee.

Danger tags shall be properly completed and shall include the following information: Employee Name; Signature and Phone Number; Isolation Request Number; Description of the Work to be Undertaken and the Date and Hour that the work was started. See Annex C, Appendix 4, for a sample of the Danger Tag.

Danger tags shall be properly completed and attached prior to beginning work, or conducting a live test.

Prior to isolating equipment or installations, the Person in Charge shall investigate and be satisfied that the isolation of the circuit will not create unplanned operational difficulties.

A danger tag should only be removed by the employee who completed and attached it, and shall never be removed without the prior knowledge of this employee.

Once the work is completed and the equipment is ready to be returned to service, the employee shall remove, initial and return the tag to the Person in Charge.

All used tags shall be returned to the Manager in Charge of the Worksite or the Supervisor, who shall maintain them on file for a period of one year.

Note: When work has been started by one employee, but will be completed by another employee, or employees, the following steps shall be implemented:

- the employee who started the work shall remove their danger tag, sign it and return it to the Person In Charge;
- the second employee, or succeeding employees shall properly complete and attach their danger tag before starting work;
- all remaining tags shall be removed by the person, or persons, who first installed them before the equipment or installation is re-energized.

Preparation of Isolation Procedures

When isolation of electrical equipment or an installation requires more than one operation, the Person in Charge shall prepare an isolation procedure. This procedure shall include the following:

- a sequence of operation to allow for an orderly shutdown;
- a list of safety equipment required;
- the point for safety grounding;
- the location and number of danger tags required; and
- a sequence of operation to allow for orderly re-energizing.

Prior to the preparation of isolation procedures, the Person in Charge shall become familiar with the equipment or installation. This is undertaken in order to determine the existence of potentially dangerous equipment, and the requirement for the implementation of additional precautionary measures to prevent accidents. These requirements shall be included in the isolation procedure.

Examples of situations where existing equipment requires that additional precautionary measures be implemented, are as follows:

- auxiliary power supplies that start automatically;
- uninterruptable power supplies (static or rotary);
- solid state controllers equipped with silicon controlled rectifier, (SCR's);
- capacitors utilized for power factor correction and in motor circuits.

The need to determine the existence of an auxiliary power supply relates to the fact that numerous auxiliary power supplies are in use. The manufacturer's recommendations shall be followed when isolating equipment or installations where these power supplies exist.

In addition, precautionary measures shall be taken when a circuit supplying solid state power equipment is to be isolated.

A Procedures for Isolation Form shall be prepared and issued for all isolations of high voltage equipment or installations. A copy of this Isolation Procedure Form shall be retained by the Manager in Charge of the Worksite or the Supervisor for a period of one year.

See Appendix 3, for a sample of the Procedures for Isolation Form PWGSC-TPSGC 12 and the instructions for completion.

Note:

- When an interruption of high voltage equipment or an installation occurs, a Procedures for Isolation Form shall be completed. This form shall include the cause (relay annunciation), location, equipment and other pertinent information. The sequence to re-energize shall also be provided.
- Work shall not be carried out on live equipment or installations when arrangements can be made to de-energize.
- Any interruption to service shall be undertaken as per the requirements indicated for Authorization for Electrical Isolation.

Sequence To De-Energize

Procedures to de-energize electrical equipment or installations shall be undertaken in accordance with accepted trade practices as approved by the National Electrical Code and the Canadian Standards Association.

The following is an example of procedures to be undertaken first to de-energize electrical equipment or installations, before proceeding on to the next sequence, as per the procedures to isolate:

1. Verify disconnecting means for possible defects;
2. Open disconnecting means using the appropriate safety measures;
3. Ensure that all knife switches are disengaged by performing a visual check;
4. Verify with voltmeter that the system is isolated;
5. Draw breaker out
or
If of a fixed type, lock in open position;
6. Lock out and tag out the disconnecting means;
7. Install and tag temporary grounding devices, if required;
8. Proceed with the next sequence as provided in the isolation procedures.

Live Electrical Equipment or Installations

GUARDING

When work is to be undertaken on or near live equipment or installations, or those that may become live, the Person in Charge shall ensure that the equipment or installation is appropriately guarded, when possible, and that warning signs are attached as required.

INSULATING

When it is not practical to utilize guarding, protection shall be provided to employees through the use of approved equipment and methods that will insulate the employee from the equipment, or will insulate the employee from ground.

DISTANCES FROM LIVE ELECTRICAL PARTS

When live electrical equipment is not guarded or insulated, or when an employee is not insulated from ground, it is necessary to implement the requirements indicated in Annex C, Appendix 1 - Required Distances From Live Electrical Parts Table.

These distances shall be strictly observed. No person shall work near an exposed live electrical part when there is the possibility that an unintentional movement would bring the employee's body, or any item that the employee is in contact with, closer to the live part than the table illustrated in Appendix 1.

Safety Grounding

Electrical equipment shall be tested to ensure isolation before any safety grounds or tags are attached. An overview of the equipment shall also be undertaken to ensure that there is no possibility of backfeed, and that the approved procedures to discharge the equipment have been properly implemented.

Temporary ground devices, when required by the *Canadian Electrical Code* or CSA, shall be installed between the location where the work is being carried out and all possible sources of electrical supply.

Ground devices shall be connected to a low resistance ground (e.g., ground grid) before being brought into contact with any isolated conductors. When these devices are removed, they shall first be removed from the conductors and then removed from the ground connection.

As work is being carried out on de-energized equipment, temporary grounding devices shall be installed on each system link that can be isolated from positive grounding by the status change of a disconnecting means.

Temporary grounding devices shall not be attached immediately upon isolation of electrical equipment supplied with capacitors. A waiting period shall be required, based on the safety specifications for each capacitor, prior to work being undertaken.

When it is required that temporary grounding devices remain on de-energized equipment at the end of the workday, information detailing the status of the de-energized equipment shall be attached to the existing tag.

When work has been started by one employee, but will be completed by another employee, the procedures to exchange danger tags shall be followed. See Lockout and Danger Tags.

Elevated Structures and Poles

The Manager in Charge of the Worksite or the Supervisor shall ensure that employees required to climb poles or elevated structures to perform their work, are provided with the necessary instruction and training in the inspection and testing of poles and structures.

Inspection tests shall be carried out before climbing.

Pike poles shall not be used as the only means of temporary support when it has been determined, as a result of inspection and testing, that temporary supports are required.

Employees shall receive instruction and training in rescue operations before being permitted to work on poles or elevated structures.

All poles and elevated structures embedded in the ground and used to support electrical equipment shall meet current standards set out in the CSA Standard for Wood Utility Poles and Reinforcing Studs, and the CSA Standard for Concrete Poles.

3. Training and Instruction

Training and instruction relating to electrical safety shall be provided based on the duties and responsibilities that employees are required to undertake. The development and implementation of training methods for electrical safety shall be undertaken as per DP 024 - *Safety and Health Training*.

Standard Electrical Safety Information, relevant to all employees in the workplace shall be developed and provided by the Director, Corporate Environment, Safety and Health. This will ensure that basic instruction and related electrical safety steps and tips are provided to all employees, in order to increase general awareness and understanding.

General Electrical Safety Training shall be provided to those employees who must have an understanding of their duties in relation to the requirements of the departmental electrical safety program and the associated legislation and codes. This training will also provide safety and emergency procedures, and shall be developed and directed towards the following employees:

- Managers and Supervisors required to manage the work of electricians undertaking electrical maintenance work;
- Property and Facility Managers required to provide authorization for the undertaking of electrical maintenance work in the buildings or facilities for which they are responsible;
- Safety and Health Committee Members and Representatives involved in review procedures related to the electrical safety program in the workplace.

Technical Electrical Safety Training shall be developed and provided to those employees who undertake electrical maintenance work, and will include training related specifically to their duties, i.e., Refresher Courses on Provincial Electrical Codes; High Voltage Work; Life Safety Systems; Motor Controls; Building Environment Control Systems, etc.

4. Records and Recording

Electrical Work - Minor Projects Log

A log of Electrical Work - Minor Projects shall be implemented and maintained by each Property Manager or Facility Manager.

This log shall provide a written record of all minor electrical maintenance projects undertaken in buildings or facilities, that require certification by the local Electrical Inspection Authorities. See Item 5., Certification of Electrical Maintenance Work, for additional information related to these minor projects.

This log shall be presented for inspection at the time of certification by local Electrical Inspection Authorities. See Appendix 5, for a sample of the suggested Log Form, PWGSC-TPSGC 69, Record of Electrical Work For Minor Projects and instructions for completion.

Request for Electrical Isolation Form

A Request for Isolation Form, PWGSC-TPSGC 13, shall be completed by the Person in Charge and shall be presented for signature of the Guarantor.

The Guarantor shall ensure, prior to providing authorization, that there is no other work being undertaken, that will interfere during the requested time for isolation.

The Request for Electrical Isolation Form shall be kept on site for the examination of employees while the work is being undertaken.

Upon completion of the work, the Person in Charge shall present the Request for Electrical Isolation Form to the Manager in Charge of Worksite or the Supervisor.

The Manager in Charge of Worksite or the Supervisor shall forward a completed copy of the Request for Electrical Isolation Form to the Guarantor, and shall retain a copy that shall be kept on file for a period of one year. See Appendix 2 for a sample of this form and instructions for completion.

NOTE: The Request for Electrical Isolation Form indicates if the work requires the update of single line drawings. A copy of the updated line drawing shall also be forwarded to the Guarantor when applicable.

As-built drawings shall be updated on a regular basis to ensure that current information is represented.

Procedures for Isolation Form

A Procedures for Isolation Form, PWGSC-TPSGC 12, shall be prepared by the Person in Charge when the isolation of high voltage equipment or installations is required.

The Procedures for Isolation Form shall be kept on site for the examination of employees while the work is being undertaken.

Upon completion of the work, the Person in Charge shall present the Procedures for Isolation Form to the Manager in Charge of Worksite or the Supervisor.

The Manager in Charge of Worksite or the Supervisor shall forward a completed copy of the Procedures for Isolation Form to the Guarantor, and shall retain the original copy that shall be kept on file for a period of one year.

See Appendix 3, for a copy of this form and instructions for completion.

5. Certification of Electrical Maintenance Work

Categories of Work

Electrical work is classified by three categories. These categories indicate that the work to be undertaken has been determined to be a Major or a Minor electrical repair or renovation project, or is considered to be General Electrical Maintenance Work. Each project to be carried out is classified as a Major or Minor Electrical Project, based on the type of work to be undertaken.

All Major and Minor electrical repair and renovation projects are subject to certification by the local inspection authorities. See Appendix 6, for examples of Major and Minor Projects.

Major Projects shall be certified immediately upon completion. Minor Projects, where the electrical installation will remain exposed and can be inspected at a later date, shall be logged into an Electrical Maintenance Work Log for presentation at a later date. See Appendix 5, for a sample of the Electrical Work - Minor Projects Log Form and instructions for completion.

NOTE: Minor Projects, where the electrical work will be covered when the project is finished, must be inspected while the work is exposed, and not at a later date.

General Maintenance Work does not require certification. See Appendix 6, for examples of Maintenance Work.

Inspection Requirements for Completed Electrical Work

MAJOR PROJECTS

Major projects require inspection during and immediately upon completion of the work. The Manager in Charge of Worksite or the Supervisor shall ensure that procedures are implemented so that all major projects are inspected as required.

When electrical equipment or installations described in the Electrical Distribution Network Groupings, Appendix 7, Items A, B, C, D, E, or F, are repaired or modified, an electrical inspection certificate must be obtained from the local authority immediately upon completion of the work. In addition, line drawings, panel schedules and other related information must be updated accordingly.

MINOR ELECTRICAL PROJECTS

Minor projects require that an inspection certificate be obtained for the work that has been completed. Certification of minor projects is not normally required immediately upon completion of the work.

Minor projects are logged into the Record of Electrical Work for Minor Projects (PWGSC-TPSGC 69) for inspection at a later time. Inspections of minor projects are normally undertaken on an annual basis. At the time of certification, the Record of Electrical Work for Minor Projects (PWGSC-TPSGC 69) and all other relevant and required information related to the minor projects are presented for review.

NOTE: Minor projects, where the electrical work will be covered when the project is finished, shall be inspected while the work is exposed, and not at a later date.

The Guarantor shall ensure that all minor projects are properly recorded using the Record of Electrical Work for Minor Projects (PWGSC-TPSGC 69). (See Appendix 5 for a sample of this form and instructions for completion.)

NOTE: Line drawings for minor project work shall be updated immediately upon completion of the work.

This Record of Electrical Work for Minor Projects (PWGSC-TPSGC 69) shall be maintained by the Guarantor and shall be made readily available for inspection by the Electrical Inspection Authority.

When electrical equipment or installations described in items D, G, H and I of the Electrical Distribution Network Groupings (see Appendix 7), are new installations, or modified or repaired, an inspection certificate is required. When the work undertaken involves a new installation, the line-drawings shall be updated as soon as the work is completed. When any equipment in this grouping is replaced, modified or added to the existing installation, an electrical inspection certificate is required and the line drawings shall be revised to reflect the changes made.

NOTE: If a component that forms an integral part of an assembly, i.e., contact; potential or current transformer; lightning arrestor, or selector switch, is replaced by an approved replacement part, that will not compromise the integrity of the CSA approval, an electrical

inspection certificate is not required.

GENERAL MAINTENANCE WORK

General maintenance work does not require an inspection certificate. See Appendix 6, for examples of items that are considered to be maintenance work.

Annex C - Appendix 1 - Required Distances from Live Electrical Parts

Item	Column I Voltage Range of Part: Part to Ground	Columns II Distance in Metres NOT QUALIFIED	Column III Distance in Metres QUALIFIED ELECTRICIAN
1	Over 425 to 12,000	3	0.9
2	Over 12,000 to 22,000	3	1.2
3	Over 22,000 to 50,000	3	1.5
4	Over 50,000 to 90,000	4.5	1.8
5	Over 90,000 to 120,000	4.5	2.1
6	Over 120,000 to 150,000	6	2.7
7	Over 150,000 to 250,000	6	3.3
8	Over 250,000 to 300,000	7.5	3.9
9	Over 300,000 to 350,000	7.5	4.5
10	Over 350,000 to 400,000	9	5.4

Annex C - Appendix 2 - Request for Electrical Isolation Form

Click [here](#) to view the Adobe Acrobat (also known as PDF) version of the Form PWGSC-TPSGC 13.

Instructions

Section A

To be completed by the Person in Charge and submitted to the Guarantor for approval, prior to the commencement of work.

Isolation Request Number - the number that has been assigned to the project.

Date and Time of Request - the Year, Month Day and Hour when the Person in Charge makes the request to the Guarantor.

Isolation to Start On - the Year, Month, Day and Hour for which the Request for Electrical Isolation is being made and it is expected that the isolation will start.

Isolation to End On - the Year, Month, Day and Hour when the requested time for isolation will be over and it is anticipated that the work will be complete.

Specific Location of Installation or Equipment to be Isolated - the complete address and name of the building, and the exact location within the building where the equipment or installation is located, i.e., floor, wing, room no., cabinet no., etc.

Description of Installation or Equipment to be Isolated - a brief description of the installation or equipment to be isolated.

Procedures for Isolation - the isolation and grounding procedures to be followed.

Voltage - the highest voltage that will be encountered in undertaking the work as described here.

NOTE:

- If procedures require more than one operation, a Procedures for Isolation Form (PWGSC-TPSGC 12) must be completed and attached to this form.
- When high voltage equipment is to be isolated, a Procedures for Isolation Form must be completed and attached.

Update of Line Drawings Required Upon Completion - the Person in Charge will indicate the requirement for updates to line drawings, based on the nature of the work to be undertaken.

Requested By - Name of the Person in Charge, the Signature of the Person in Charge and the Date (Year, Month, Day and Hour) when this portion of the form is completed and forwarded to the Guarantor for approval.

Section B

To be completed by the Guarantor prior to commencement of the work.

Name of Guarantor - Name of the Guarantor, Signature of the Guarantor, and the Date (Year, Month, Day and Hour) that the Guarantor provides approval for the Isolation Start and Complete times specified in Section A of this form.

Section C

To be completed by the Person in Charge prior to commencement of the work.

Name of Person in Charge - Name of the Person in Charge, Signature of the Person in Charge and the Date (Year, Month, Day and Hour) when the Person in Charge has ensured that the isolation has been tested and it is safe for the work to be performed.

Section D

Completion of Requested Isolation Time and Completion Of Work Confirmed. To be completed by the Person in Charge upon completion of the work.

Name of Person in Charge - the Name of Person in Charge, Signature of Person in Charge, and the Date (Year, Month Day and Hour) when the Person in Charge confirms that the requirement for isolation is over, the work has been completed, and the equipment or installation has been re-energized, and line-drawings have been updated as required.

Section E

Approval of Completion of Work - To be completed by the Manager in Charge of the Worksite or the Supervisor.

Name of Manager in Charge of Worksite or Supervisor - the name of the Manager in Charge of the Worksite or the Supervisor, Signature of the Manager in Charge of the Worksite or the Supervisor, and the Date (Year, Month, Day and Hour) when the Manager in Charge of the Worksite or the Supervisor provides approval of the completion of the work and confirms that the equipment or installation has been returned to its previous state before the isolation.

Copy 1(White) - To be retained by the Manager in Charge of the Worksite or the Supervisor for a period of one year following completion of the work.

Copy 2 (Yellow) - To be submitted to the Guarantor upon completion of the work. This copy shall be retained by the Guarantor for a period of one year following completion of the work.

Annex C - Appendix 3 - Procedures for Isolation Form

Click [here](#) to view the Adobe Acrobat (also known as PDF) version of the Form PWGSC-TPSGC 12.

Instructions

To be completed by a qualified person and reviewed by the Manager in Charge of the Worksite or the Supervisor prior to commencement of the work.

This form must be completed and attached to the Request for Electrical Isolation Form when high voltage equipment or installations are to be isolated OR when more than one operation is required in the isolation process.

Request for Isolation Number and Date - the Request for Isolation that these procedures have been prepared for (located in the right hand corner of the Request for Electrical Isolation Form), and the date of the Request.

Purpose of the Order - A brief description of the work to be undertaken, as indicated on the Request for Electrical Isolation.

Sequence No. - the sequence of the procedures to be followed in the isolation process and the sequence of procedures to follow to re-energize, once work is completed.

NOTE: Sequence must be followed without deviation.

Sequence Number and Description of Tasks - indicate the number sequence, starting with the first task, (no. 1) at the beginning of the process to isolate, to the final step in re-energizing the equipment or installation.

Equipment Affected - the equipment that is affected by this isolation sequence.

Tag Number Installed - the tag number that will be installed on the equipment.

Functions to be Performed and Specific Safety Measures Required - a detailed description of each function to be performed and the safety measures that are required for each function.

Initials - initials of the person who has completed each specific sequence to indicate the completion.

Prepared by - Name and Signature of the qualified person who has prepared the isolation procedures.

Time and Date - the Year, Month, Day and Time when these procedures were completed and submitted for review.

Checked by - Name and Signature of the Manager in Charge of the Worksite or the Supervisor, upon review of the procedures for completion and upon verification of the date and time of preparation.

Time and Date - the Year, Month, Day and Time when the procedures have been checked and verified.

Issued by - Name and Signature of the Manager in Charge of the Worksite or the Supervisor issuing these isolation procedures.

Time and Date - the Year, Month, Day and Time when the procedures are issued.

Performed by - Name and Signature of the person who has performed the isolation procedures.

Time and Date - the Year, Month, Day and Time when all procedures are completed.

Operating Diagram Adjusted by - the name of the Manager in Charge of the Worksite or the Supervisor responsible for adjusting the status indicator of the circuit's switching device.

Time and Date - the Year, Month, Day and Time when adjustment has been completed.

Copy 1(White) - To be maintained by the Manager in Charge of the Worksite or Supervisor for a period of one year upon completion of the work.

Copy 2 (Yellow) -To be maintained by the Originator of the procedures for a period of one year upon completion of the work.

Appendix 4 - Danger Tag

Form PWGSC-TPSGC 14 is available in ELF.

Annex C - Appendix 5 - Instructions to Complete the Record of Electrical Work for Minor Projects

Click [here](#) to view the Adobe Acrobat (also known as PDF) version of the Form PWGSC-TPSGC 69.

Instructions

1. **Isolation Request Number** - the number that was assigned to the project, as indicated on the Request for Electrical Isolation Form.
2. **Location** - the exact location of the equipment or installation where the work was undertaken: Building, Floor, Room, Panel No., etc.
3. **Started** - date and time that the work was started.
4. **Completed** - date and time that the work was completed.
5. **Name of Manager or Supervisor** - name of the Manager in Charge of the Worksite or the Supervisor.
6. **Name of Employee and Contracting Company** - name of the employee who performed the work and the name of the company (if applicable) responsible for the work.
7. **Date of Certification by Local Electrical Authority** - date when inspection of Minor Projects has been completed and approved by the local Electrical Inspection Authority.
8. **Other Related Information** - additional information related to the work (if required).

Annex C - Appendix 6 - Examples of Major and Minor Projects and Maintenance Work

EXAMPLES OF MAJOR PROJECTS - IMMEDIATE INSPECTION REQUIRED

- replacement of a high or low voltage cable (complete or section of);
- replacement of a cable by different type of material, i.e., lead to XLPE, or teck;
- alteration or modification of bus-bars including those in a high or low voltage switchgear;
- upgrade or modification of the protective devices of an electrical installation;
NOTE: When these changes are under consideration, a coordination study shall be conducted to ensure that the integrity of the electrical system is retained.
- modification or alteration of the interlocks of an electrical installation;
- addition of, or size increase to, a combination starter;
- insertion of a variable drive controller into a motor circuit;
- modification or alteration to a fire alarm system;
- modification or alteration to a life support system;
- electrical panel modification or replacement;
- addition or replacement of power transformers;
- addition or replacement of protective devices (if different from the original);
- any additions or modification to the main grounding system;
- addition of capacitors;
- power and control wiring.

EXAMPLES OF MINOR PROJECTS - INSPECTION CERTIFICATE NOT REQUIRED IMMEDIATELY UPON EXECUTION OF WORK

- installation of a new 15 amp circuit for receptacles/lights (minor project);
- installation of lights, receptacles, dimmer switches and jiffy poles;
- installation of a conduit for communication or data network;
- installation of a receptacle for a PC or photocopier;
- retro-fitting of light fixtures (minor project);
- installation or relocation of new or existing floor receptacles (provided installation can be completely inspected at a later date - otherwise, inspection must be made upon completion of the electrical work);
- replacement of defective fuses, or unfused disconnects (provided replacement is made with fuses of similar type and capacity).

NOTE: ELECTRICAL WORK THAT WILL BE COVERED ONCE THE PROJECT IS COMPLETE, MUST BE INSPECTED PRIOR TO BEING COVERED, AND NOT AT A LATER DATE.

EXAMPLES OF MAINTENANCE WORK

Work classified as maintenance work does not require an inspection certificate. Examples of maintenance work are as follows:

- replacement of fuses;
- overloads;
- control transformers;
- power contacts;
- auto transformers;
- controls (all types);
- fused or unfused disconnects;
- ballasts;
- receptacles;

- switches;
- relays;
- light dimmers;
- plug-in disconnects;
- contactors;
- combination starter;
- motors;
- breakers.

Annex C - Appendix 7 - Electrical Distribution Network - Groupings

In order to assist in determining the category of an electrical project as a Major or Minor project, the electrical distribution network has been divided into separate groups, as follows: (See Item 5. Certification of Electrical Work: Categories of Work; Inspection Requirements for Completed Electrical Work.)

1. High Voltage Distribution:

(above 750 volts)

- Cables
- Bus-Bars
- Grounding
- Terminations
- Load Break Switches
- Isolating Switches
- Circuit Breakers
- Interlocks
- Protective Devices
- Lightning Arrestors
- Fuse Cutouts
- Insulators
- Transformers
- Motor Controls
- Motors

2. Main Distribution:

(below 750 volts)

- Circuit Breakers
- Disconnects
- Interlocks
- Transformers

3. Motor Control Centres:

(Below 750 volts)

- Circuit Breakers
- Disconnects
- Bus-Bars
- Contactors
- Grounding
- Protective Devices
- Interlocks
- Control Circuits
- Incoming Conductors

4. Life Safety Systems:

- Generators
- Emergency Panels
- Fire Alarm Systems
- Exit Lights
- Emergency Lights

5. Motors:

(below 750 volts)

- Terminators
- Protective Devices
- Grounding
- Cables
- Flex

6. Bus-Duct:

(below 750 volts)

- Section of Bus-Duct
- Fire Barrier
- Plug-in Disconnects
- Feeder Junction Box
- Terminations
- Weight Bearing Supports

7. Distribution Centres:

(below 750 volts)

- Circuit Breakers
- Disconnects
- Bus-Bars
- Grounding

8. Disconnects:

(below 750 volts)

- Fuse Clips
- Terminations
- Arc Chutes
- Insulated Supports

9. Lighting and Power Panels:

(below 750 volts)

- Circuit Breakers
- Relay
- Contactors
- Grounding

10. Outlets:

(below 750 volts)

- Switches
- Receptacles