Skilled Trades Ontario | Métiers spécialisés Ontario

Apprenticeship
Training Standard
Logbook

Industrial Electrician

442A

2018

Apprenticeship Training Standard

The Apprenticeship Training Standard or herein after referred to as “Logbook” is a document issued to Apprentices who sign a Registered Training Agreement in the Province of Ontario as an official record of training. It is to be used by the Apprentice and Sponsor/trainer to guide the process of skills development in a particular trade.

Training As An Apprentice

- ✓ Ensure you, your sponsor, and your witness sign a Training Agreement with the Ministry of Labour, Immigration, Training and Skills Development. Once it is registered, you will receive a copy of the registered Training Agreement for your records.
- ✓ Notify the local Service Delivery Office **immediately** if any changes to contact information or training agreement, especially if you change sponsors.
- ✓ Review the Logbook regularly with your trainer and sponsor to discuss your progress, ask questions, seek feedback and have the trainer **sign-off on competencies**
- ✓ Keep an accurate record of the hours you work.
- ✓ Attend classroom training when it is offered.
- ✓ Apply for the financial incentives for which you are eligible.

Completing Your Logbook

- ✓ **Complete the Sponsor Record Form –** A form must be completed for each Sponsor/Trainer used during your apprenticeship.

- ✓ **Confirm Skill Sign-off is Complete**
  - **You and your trainer** sign-off each required skill to confirm that you have demonstrated competency in that skill.
  - Shaded boxes in your Logbook mean the skills are optional and do not have to be confirmed by your trainer or sponsor. However, you are encouraged to complete them as part of your training.

- ✓ **Confirm Skill Set Sign-off is Complete**
  - After you and your trainer have signed-off all the required skills in a skill set, your sponsor signs the signature box on the form in **Appendix C – *“Skill Set Completion for Sponsors”*** to confirm your completion of all competencies within each skill set.

This document is the property of the apprentice named inside and represents the official record of your training. For information about completing your apprenticeship, see inside of back cover**.**

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Apprentice Name: _____

Address: _____

_____

Phone Number: _____

Email Address: _____

Trade: _____

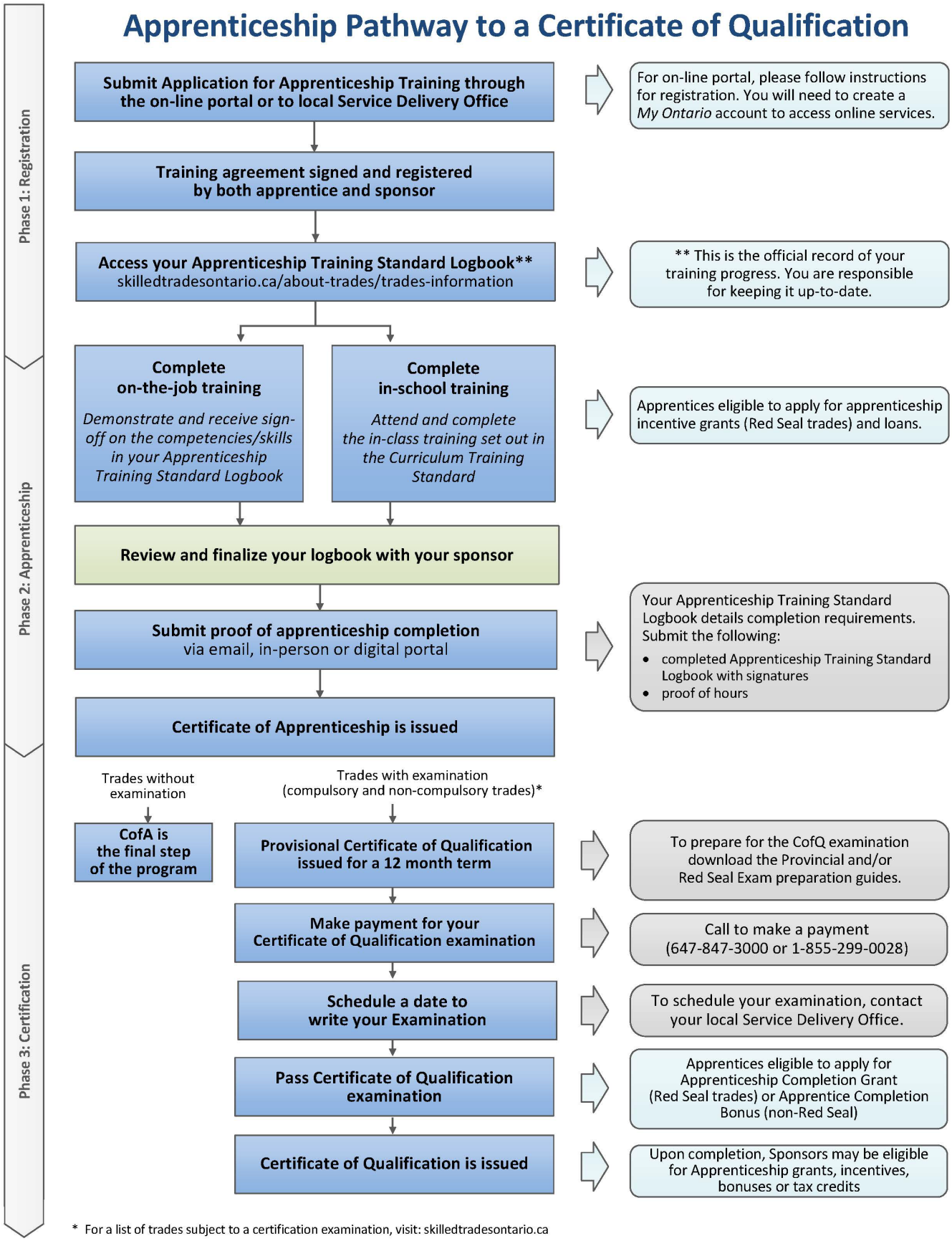
Training Agreement # (for Compulsory and Non-Compulsory trades):

STO Account No. (for Compulsory trades only):

This document is the property of the Apprentice named herein and represents the official record of their training.

If you have questions about the use of this Logbook or about your Apprenticeship program, contact your local Service Delivery Office (see Appendix D in this book) or the Employment Ontario hotline at: 1-800-387-5656.

Apprenticeship Pathway to a Certificate of Qualification



* For a list of trades subject to a certification examination, visit: skilledtradesontario.ca

Draft version: 2022-03-16

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Please Note: This Standard has been revised to reflect the visual identity of Skilled Trades Ontario (STO) which replaced the Ontario College of Trades on January 1, 2022. The content of this Standard may refer to the former organization; however, all trade specific information or content remains relevant and accurate based on the original date of publishing.

Please refer to STO's website: skilledtradesontario.ca for the most accurate and up to date information. For information about BOSTA and its regulations, please visit *Building Opportunities in the Skilled Trades Act, 2021* (BOSTA).

Any updates to this publication are available on-line; to download this document in PDF format, please follow the link: Skilled Trades Ontario.ca.

Maintained with transfer to Skilled Trades Ontario 2018 (V100)

Foreword: Purpose, Terms and Conditions of the registered Training Agreement

Purpose:

- Prior to starting official apprenticeship activities, the apprentice, sponsor and a witness are required to sign a Training Agreement.
- The Training Agreement that you have signed is an important legal document that outlines your responsibilities as an apprentice and the responsibilities of your sponsor.
- Once registered, this training agreement (or contract) marks the start of your formal agreement between the apprentice, the sponsor and the Ministry.
- For compulsory trades, the apprenticeship registration document must be accessible when working.

The Apprentice agrees:

- **To inform the local Service Delivery Office of any change to your contact information or change in sponsor within 7 days;**
- To follow the Sponsor's and Trainer's lawful instructions and make every effort to acquire the skills identified in the Logbook for the Trade which is part of the apprenticeship program established by Skilled Trades Ontario for the trade;
- To obtain written verification from the Sponsor and the Trainer(s) that the requirements in the Logbook for the trade have been met.
- When you receive an "Offer of Classroom Training", confirm your attendance by following the instructions in the offer. Failure to do so may result in losing your opportunity to attend school which delays the completion of your apprenticeship.

The Sponsor agrees:

- To ensure that the Apprentice is provided with the training required as part of the apprenticeship program established by Skilled Trades Ontario for this trade;
- To review the progress of training with the Apprentice, and with the Trainer(s) where the Sponsor and the Trainer are not the same party.
- Release your apprentice from work to attend in-school training without penalty to the apprentice.
- To maintain the journeyperson/apprentice ratio for your trade, if applicable.
- To monitor their apprentice(s) progress
- To ensure that the Trainer(s) verifies, in writing, when each skill identified in the Logbook for the trade has been successfully completed by the Apprentice;
- To contact the Ministry should any changes in your capacity to train, your contact information, or your apprentice's status in the program change.

Trade Specific Resources and Links

Trade Specific Resource	Link
Red Seal Program	red-seal.ca
Apprenticeship in Ontario	ontario.ca/page/apprenticeship-ontario
Employment Ontario	employmentontario.ca
Service Canada	servicecanada.gc.ca
Building Opportunities in the Skilled Trades Act, 2021	Building Opportunities in the Skilled Trades Act, 2021, S.O. 2021, c. 28 - Bill 288 (ontario.ca)
Ministry of Labour, Immigration, Training and Skills Development	Ministry of Labour, Immigration, Training and Skills Development | ontario.ca
Exam Preparation Guide	Exam Resources – Skilled Trades Ontario
Skills Zone (Ontario Skills Passport)	http://www.skillszone.ca/
Electrical Safety Authority	www.esasafe.com
Electrical Contractors Association of Ontario	www.ecao.org
Canadian Standards Association	www.csagroup.org
Ontario Electrical League	www.oel.org
Infrastructure Health and Safety Association	http://www.ihsa.ca

**Please note, all website addresses are current at time of printing*

Methodology-Standard Development

A standard is developed with a broad group of trade representatives who form the initial working group. This includes subject matter experts/ tradespeople/ instructors and employers from a cross section of the sector/industry, with varying years of work experience in the field. The working group reviews, develops and recommends revision to the content of the standard. Their role also involves harmonizing and updating other supporting content for the product.

An essential part of the standard development is the validation process. This is the opportunity to have a broader representation of the sector and provide feedback on the content of draft standard. This process is conducted in various ways and may include sending out a survey or the draft document (or both) directly to the sector. The comments received are reviewed by the working group and revisions are made as required based on a consensus model.

Introduction to the Logbook

This “on-the job” Logbook is the training standard for Industrial Electrician 442A and was developed by Skilled Trades Ontario in consultation with representatives from industry. It identifies all the skills associated with and required to learn the trade.

The Logbook is divided into skill sets, which are further divided into skills. These skill sets and skills are written in statements that describe what the Apprentice must perform and to what standard, in order to be considered competent in that skill.

The successful performance of these skills is tracked in the Logbook. Once achieved, this skills’ sign-off, along with the completion of in-school program requirements or equivalent, is how the apprenticeship program is completed and apprentices receive a Certificate of Apprenticeship.

The Sponsor/trainer and Apprentice are required to sign-off and date each skill after the Apprentice has demonstrated proficiency in these skills. However, if a skill is shaded, it is optional and does not need to be signed-off, though it has been defined as a part of the scope of practice for the trade.

All practices described in this standard must be performed by the apprentice according to the specific criteria identified. In general, the standard of performance for this trade is to be performed according to all applicable jurisdictional codes and standards and all health and safety standards must be respected and observed.

All skills within the Apprenticeship Training Standard are to be performed, as applicable, according to and in compliance with the following:

- Occupational Health and Safety Legislation and Regulations;
- Other applicable legislation, regulation, codes and standards;
- Industry best practices;
- Company policies and procedures.

The information presented in this standard is, to the best of our knowledge, current at time of printing and is intended for general application. Please refer to the Skilled Trades Ontario website for the most accurate and up-to-date information: skilledtradesontario.ca

Roles and Responsibilities

Under the *Building Opportunities in the Skilled Trades Act, 2021* (BOSTA)

Skilled Trades Ontario (STO) is responsible for:

- Establishing and maintaining qualifications;
- Establishing Apprenticeship Programs and other training programs including training Standards, curriculum standards and certifying examinations;
- Issuing certificates for the purposes of this Act such as Certificates of Qualification;
- Maintaining a Public Registry for compulsory trades skilledtradesontario.ca/public-register/;
- Determining whether the experience and qualifications obtained by applicants for a certificate of qualification who do not complete an apprenticeship are equivalent to those received through completing an apprenticeship (Trade Equivalency Assessments)
- Promoting the skilled trades and conducting research.
- Conducting research and evaluate whether a trade should be prescribed as a trade for the purposes of this Act and to make recommendations on these matters to the Minister.

Ministry of Labour, Immigration, Training and Skills Development (MLITSD) is responsible for:

- Classifying trades as compulsory trades;
- Prescribing scopes of practice for trades;
- Approving which persons may provide in-class training for apprenticeship programs (TDAs);
- Registering Training Agreements;
- Providing those who successfully complete an apprenticeship program with a certificate of apprenticeship (CofA);
- Administering examinations, including certifying examinations;
- Promoting the skilled trades and conducting research;
- Exercising such other powers and perform such other duties and functions as are provided for in this Act or the regulations.

For any matter related to your registered Training Agreement or completing your apprenticeship, you must contact your local Service Delivery Office.

Roles and Responsibilities of the Apprentice

An Apprentice is an individual who has entered into a registered Training Agreement (refer to Foreword: *"Purpose, Terms and Conditions of TA" page 1)* with a Sponsor to receive training in a trade as part of an apprenticeship program established by Skilled Trades Ontario. As an Apprentice, you have certain roles and responsibilities to follow throughout your apprenticeship training:

1. As an Apprentice, you signed the Training Agreement and have entered into a contract with the Ministry of Labour, Immigration, Training and Skills Development and your Sponsor.
2. If you are registered as an Apprentice in a compulsory trade, your name will automatically appear in the Skilled Trades Ontario Public Register.
3. You are responsible for informing the staff at your local Service Delivery Office regarding changes to the following:
    - Your Sponsor's address;
    - Your name and address; and/or,
    - Your Sponsor, including starting employment with a new Sponsor
4. As an Apprentice, you are responsible for completing skills or skill sets in this Logbook (as detailed in the *"Eligibility for Apprenticeship Program Completion"* section of this document) and ensuring that they are dated and signed by both you and your Trainer.
5. Once you have demonstrated competency in all the mandatory skills and received a sign off on each skill by your sponsor/trainer, you must have the Skill Set Completion Form completed and signed by your current Sponsor.
6. Submit your Logbook to your local Service Delivery Office.
7. Present your Apprentice Completion Form (Please refer to Appendix B), along with your authorized Logbook to your local Service Delivery Office.

Roles and Responsibilities of Sponsors and Trainers

Sponsors are responsible for ensuring all terms are met as per the registered Training Agreement. They are named on the registered Training Agreement as the entity responsible for ensuring Apprentices receive the training required as part of an apprenticeship program. As a signatory to this agreement, they are designated as the 'Signing Authority' for the Apprentice's Skill Set Completion Form and are required to attest to successful achievement by signing the appropriate box at the completion of each skill set. Some sponsors may also act as the Trainer.

A **Trainer** is an individual who oversees the performance of a task and sets the workplace expectations and practices for the Apprentice.

In compulsory trades, a Trainer must hold a valid Certificate of Qualification and be registered with Skilled Trades Ontario.

In non-compulsory trades, a Trainer is an individual who holds one of the following:

- A Certificate of Qualification;
- A Certificate of Apprenticeship in the trade; or,
- Has completed both the workplace-based training (competencies and/or hours as applicable) and classroom training components of the trade's apprenticeship program; or,
- Has workplace experience equivalent to the apprenticeship program) and has the skills outlined in the Logbook.

Competency means being able to perform to the required standard (please refer to *"Introduction to the Logbook").* Trainers/Sponsors and Apprentices are required to sign-off and date the skills in the Logbook following each successful acquisition. The Logbook forms a record of this achievement.

The Trainer must provide their signature based on their assessment and professional judgment that the apprentice is competent in the skills described above. The Trainer's signature is not a general warranty or guarantee of the apprentice's future conduct.

Sponsors participating in this training program will be designated as the Signing Authority and are required to attest to successful achievement by signing the appropriate box included at the end of each skill set.

Health and Safety

Safe working procedures and conditions, accident prevention and the preservation of health are of primary importance for apprenticeship programs in Ontario. These responsibilities are shared and require the joint efforts of government, sponsors, employers, supervisors, workers, apprentices and the public to achieve the goal of making Ontario's workplaces safe and healthy.

The Occupational Health and Safety Act (OHSA) provides us with the legal framework and the tools to do this. It sets out the rights and duties of all parties in the workplace, placing ultimate responsibility on the employer for the health and safety of workers (in this case apprentices) by ensuring procedures, controls, and training are established for dealing with workplace hazards. Therefore, it is imperative that all parties become aware of circumstances that may lead to injury, illness or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to or cause an accident, injury or illness.

A sponsor who is not the employer is reminded that the employer has legal responsibilities respecting health and safety over the apprentice who is their worker. The sponsor should encourage safe work habits and adherence to the employer's occupational health and safety requirements for the workplace.

It is generally recognized that a positive attitude about safety in partnership with health and safety competency contributes to an accident-free environment. Everyone will benefit as a result of a healthy attitude towards the prevention of accidents.

Workers and apprentices can be exposed to a multitude of hazards and, therefore, should be familiar with the Occupational Health and Safety Act and regulations.

The Internal Responsibility System:

One of the primary purposes of the Occupational Health and Safety Act (OHSA) is to facilitate a strong Internal Responsibility System (IRS) in the workplace. To this end, the OHSA lays out the duties of employers, supervisors, workers, apprentices, constructors and workplace owners.

Workplace parties' compliance with their respective statutory duties is essential to the establishment of a strong IRS in the workplace.

Simply put, the IRS means that everyone in the workplace has a role to play in keeping workplaces safe and healthy. Workers and apprentices in the workplace who see a health and safety problem such as a hazard or contravention of the OHSA in the workplace have a statutory duty to report the situation to the employer or a supervisor. Employers and supervisors are, in turn, required to address those situations and acquaint workers with any hazard in the work that they do.

The IRS helps support a safe and healthy workplace. In addition to the workplace parties' compliance with their legal duties, the IRS is further supported by well-defined health and safety policies and programs, including the design, control, monitoring and supervision of the work being performed.

Roles and Responsibilities under the Occupational Health and Safety Act

Employer's Responsibilities include but are not limited to the following:

- Instruct, inform and supervise workers and apprentices to protect their health and safety.
- Appoint competent persons as supervisors.
- Inform a worker, apprentice, or a person in authority, about any hazard in the workplace and train them in the handling, storage, use, disposal and transport of any equipment, substances, tools, material, etc.
- Take every precaution reasonable in the circumstances for the protection of a worker/apprentice.
- In workplaces in which more than five workers are regularly employed, prepare and post a written occupational health and safety policy and set up and maintain a program to implement it.
- Prepare and post policies with respect to workplace violence and workplace harassment and develop programs supporting workplace harassment and workplace violence policies.
- Ensure knowledge of applicable legislative, regulatory, codes and standards so requirements to be followed are clear to all workers/apprentices.

Trainer/Supervisor Responsibilities include but are not limited to the following:

- Ensure that a worker or apprentice works in compliance with the Act and regulations.
- Ensure that any equipment, protective device or clothing required by the employer is used or worn by the worker or apprentice.
- Advise a worker/apprentice of any potential or actual health or safety dangers known by the supervisor.
- Take every precaution reasonable in the circumstances for the protection of workers.

Worker/Apprentice Responsibilities include but are not limited to the following:

- Work in compliance with the Act and regulations.
- Use or wear any equipment, protective devices or clothing required by the employer.
- Report to the employer or supervisor any known missing or defective equipment or protective device that may endanger the worker or another worker.
- Report any hazard or contravention of the Act or regulations to the employer or supervisor.
- Not remove or make ineffective any protective device required by the employer or by the regulations.
- Not use or operate any equipment or work in a way that may endanger any worker.

The Three Rights of Workers/Apprentices

The OHSA gives workers and apprentices three important rights:

1. The right to know about hazards in their work and get information, supervision and instruction to protect their health and safety on the job.
2. The right to participate in identifying and solving workplace health and safety problems either through a health and safety representative or a worker member of a joint health and safety committee.
3. The right to refuse work that they believe is dangerous to their health and safety or that of any other worker in the workplace.

Ministry of Labour, Immigration, Training and Skills Development

The Ministry of Labour, Immigration, Training and Skills Development conducts periodic inspections of workplaces to ensure that safety acts and regulations are being followed. Please direct any questions to the Occupational Health and Safety Contact Centre at 1-877-202-0008.

Important Considerations for Electrical Work: De-energized vs Live Systems

Rules for Electrical Work

When performing work functions, individuals may be working with live or de-energized systems. The first rule of work for workers and apprentices is that systems should always be treated as live until de-energization is confirmed. When possible, work should always be completed in a de- energized state. Prior to beginning work, qualified individuals must `determine if work can be done in a de-energized environment or obtain employer rationale for not being able to de- energize.

Apprenticeship Program Summary/Guidelines

Scope of Practice

The Scope of Practice for the trade of Industrial Electrician is set out in section 72 of Ontario Regulation 875/21 under BOSTA and reads as follows:

- Installing, maintaining, testing, troubleshooting and repairing industrial electrical equipment, and associated electrical and electronic controls, and hydraulic and pneumatic equipment in industrial, manufacturing and power plants.

*While the Logbook draws on the scope of practice regulation (Section 72 of Ontario Regulation 875/21 under BOSTA). The Logbook does not purport to add to or modify the scope of practice as provided in regulation. *

Program Guidelines

On-the-Job Training Duration
Industry has identified 8160 hours as the benchmark necessary for any Apprentice to become competent in the skills required. There may be circumstances in which the duration varies from this guideline.

In-Class Training Duration
Industry has identified 840 hours of in-school training as the duration necessary for an Apprentice to complete the in-school curriculum for this program.

Total Training Hours
9000 hours

Journeyperson to Apprentice Ratio

Ratios in Regulation:
If a trade has been prescribed as being subject to an apprentice to journeyperson ratio, the number of apprentices who may be sponsored or employed by a person in the trade in relation to the number of journeypersons employed or otherwise engaged by the person in the trade **shall not exceed one apprentice for each journeyperson**; Further information can be found in the Apprenticeship section of the Government of Ontario website at ontario.ca/page/hire-apprentice

Industry Recommended Ratios:
While some of the trades regulated under BOSTA are subject to Journeyperson to Apprentice ratios set out in regulation, this trade is not one of them. Instead, **industry has recommended a Journeyperson to Apprentice ratio guideline of 1 Journeyperson (or individual who is deemed equivalent to a journeyperson)** to 1 Apprentice as the ratio necessary for an Apprentice to be properly trained on the job in this program.

Program Requirements

Compulsory and Non-compulsory Classification

Regulations *Building Opportunities in the Skilled Trades Act, 2021* and the classification of each trade as either “compulsory” or non-compulsory.” This trade is non-compulsory.

It is the responsibility of an Apprentice to maintain a training record in the form of a Logbook. The Sponsor and Trainer are required to sign-off when competencies in the trade are achieved.

Skills for Success Summary

Skills for Success are needed in a quickly changing world for work, learning and life. They are foundational for building other skills and important for effective social interaction. Everyone benefits from having these skills as they help individuals get a job, progress at their current job and change jobs. They also help individuals become active members of their community and succeed in learning.

Through extensive research and consultations, the Government of Canada launched the new Skills for Success model renewing the previous Essential Skills framework to better reflect the needs of the current and future labour market.

The occupational specific Essential Skills profiles are available online. These will be updated over time to align with the new Skills for Success model found here: Skills for Success model

Standard of Performance

In general, the standard of performance for this trade are to be performed, as applicable, according to and in compliance with the following:

Industry Safety Standards which are based upon:

- Occupational Health and Safety Legislation and Regulations;
- Jurisdictional legislation and regulations, codes and standards (municipal bylaws etc.)
- Company policies and procedures
- All applicable manufacturers specifications and engineering specifications

For Industrial Electrician there are applicable legislative, regulatory, codes and standards that outline requirements to be followed when performing tasks outlined in this standard. In most cases, these references set out the criterion against which the skill is measured. For Industrial Electricians, these may include:

- Canadian Electrical Code (CEC);
- Ontario Electrical Safety Code (OESC)
- Occupational Health and Safety Act (OHSA);
- Canadian Standards Association (CSA)
- Ontario Building Code (OBC)
- Ontario Fire Code (OFC);
- National Fire Protection Association (NFPA);
- Environmental Protection Act (EPA);
- Dangerous Goods Transportation Act (DGTA);
- Workplace Safety Insurance Act (WSIA);
- Institute of Electrical and Electronic Engineers (IEEE);
- Illumination Engineering Society Standards (IESS);
- Technical Standards and Safety Authority (TSSA) Safety Legislation
- Electrical Safety Authority (ESA) Legislation;
- Underwriters Laboratory of Canada (ULC);
- Municipal/Sector Requirements

Other Suggested or Required Certification(s) and Training

While an apprentice receives health, safety and occupational specific training and/or certification in a variety of fields during their apprenticeship, it is important to be aware that other occupational health and safety training and certification renewal or updating may also be required during their career before performing new types of work.

Industrial Electrician may choose to obtain the following certifications or training depending on legislative, regulatory, or other requirements:

- First Aid and CPR
- Workplace Hazardous Materials Information System (WHMIS)
- Working at Heights
- Lock out and tag out training
- Worker Health and Safety Awareness
- Canadian Standards Association (CSA) Z462 training
- Confined Space Awareness
- Fire alarm certification
- Asbestos
- Electrical Safety Awareness (ESA)
- Rigging and Hoisting
- Elevated Work Platforms
- Forklifts and Telehandlers
- Network Cabling

Training the Apprentice - Tips for Apprentices, Sponsors and Trainers

Tips for Apprentices

Remember, it takes time to learn. The following is a list of additional tips and tools to help make the most of your apprenticeship training:

- Practice safe work procedures early to create good habits;
- Use your Logbook as a journal to keep track of the skills you have achieved;
- Review your training plan with your Training Consultant, Trainer, or Sponsor;
- Discuss your training needs with your Trainer and/or Sponsor;
- Listen to the suggestions of your Trainer;
- Ask your Trainer questions if you are unsure of any skill you need to perform or any tools or equipment you need to use to perform your duties;
- Show enthusiasm and develop good work habits; and,
- Upon demonstration of competency, ensure that you and your Trainer sign-off the individual skills.

To get the most from this mentoring experience, request exposure to the full scope of the trade; meet regularly with your Sponsor/Trainer to discuss your progress, ask questions, and seek feedback.

Tips for Sponsors

- Select Trainers with good communication skills and who work well with others;
- Ensure that the Apprentice always works under the direction of or has access to a qualified Trainer;
- Encourage Trainers to take upgrading courses (e.g. Train the Trainer, Mentor, Coach, etc.);
- Set out clear expectations and involve both the Apprentice and Trainer in developing the training plan
- Encourage safe work habits;
- Allow time for the Trainer to train and demonstrate skills to the Apprentice;
- Provide opportunities and time for the Apprentice to learn the trade;
- Ensure that the Apprentice receives the varied on-the-job trade training experience outlined in this document;
- Recognize good performance;
- Observe frequently;
- Provide constructive feedback and conduct regular performance reviews involving the Apprentice and Trainer;
- Use the Logbook as a monitoring tool and a part of regular performance evaluations; and,
- Complete the Skill Set Completion Form once the Apprentice has demonstrated

competency in the skills.
- The detailed content listed for each skill is not intended to represent an inclusive list; rather, it is included to illustrate the intended direction for the skill acquisition.

Tips for Trainers

Trainers are responsible for ensuring the Apprentice is developing the skills outlined in this document. Here is a list of tips and tools to help Trainers in their supervision of Apprentices:

- Demonstrate model safe work habits;
- Provide opportunities and time for the Apprentice to learn the trade;
- Treat Apprentices fairly and with respect;
- Review the Logbook with the Apprentice and develop a training plan;
- Set out clear expectations and recognize good performance;
- Expose Apprentices to the full scope of the trade by providing training on the skills outlined in this document;
- Encourage and respond to all questions;
- Be patient;
- Explain, show and demonstrate the skill;
- **Meet regularly with the Apprentice to discuss the apprentice's progress**
- Provide continuous feedback;
- Sign-off skills when your Apprentice demonstrates competency, and,
- Use the Logbook as a guide to evaluate competence in each skill area. By using the Logbook, Trainers will be able to guide the process to and assist Apprentices to develop skills outlined in this document.

The best mentoring experience is when an Apprentice is given as much training/exposure to the full scope of the trade as possible. If this is not possible, help them to determine other ways this may be possible.

Notice of Collection of Personal Information

1. At any time during your apprenticeship training, you may be required to show this Logbook to the local Service Delivery Office. You will be required to submit the signed Apprenticeship Completion form to the Service Delivery Office in order to complete your program. The Service Delivery Office will use your personal information to administer and finance Ontario's apprenticeship training system, including confirming your completion and issuing your Certificate of Apprenticeship.

2. The Service Delivery Office will disclose information about your program completion and your Certificate of Apprenticeship to Skilled Trades Ontario, as it is necessary for Skilled Trades Ontario to carry out its responsibilities.

3. Your personal information is collected, used and disclosed by the Ministry of Labour, Immigration, Training and Skills Development under the authority of the *Building Opportunities in the Skilled Trades Act, 2021 (BOSTA).*

4. Questions about the collection, use and disclosure of your personal information by the Ministry may be addressed to the:

   Manager, Employment Ontario Contact Centre
   Ministry of Labour, Immigration, Training and Skills Development
   33 Bloor St. E, 2nd floor, Toronto, Ontario M7A 2S3
   Toll-free: 1-800-387-5656; Toronto: 416-326-5656
   TTY: 1-866-533-6339 or 416-325-4084

Industrial Electrician - Completion Requirements Chart

In order to support foundational competency development and acquisition, Skilled Trades Ontario Industrial Electrician Industry Experts have established the following minimum Logbook sign-off requirements for all apprentices for the purpose of apprenticeship program completion:

Skill Set Number	Title of Skill Set	Total Number of Skills in Skill Set	Minimum Sign-off Requirements
8050	Protect Self and Others	16	All (16/16)
8051	Schematics, Drawings and Documentation	9	All (9/9)
8052	Tools and Equipment	7	7/10 Any 7 skills (shaded or unshaded)
8053	Test and Measuring Equipment	9	9/11 Any 9 skills (shaded or unshaded)
8054	Instrumentation Devices and Automated Control Systems	6	5/6
8055	Wiring Systems	21	15/21 Any 15 skills (shaded or unshaded)
8056	Power Distribution Equipment Systems	23	18/23 Any 18 skills (shaded or unshaded)
8057	Lighting Systems	11	All (11/11)
8058	Rotating Equipment & Associated Control Systems	27	24/27 Any 24 skills (shaded or unshaded)
8059	Motor Drives and Associated Control Systems	16	11/16 Any 11 skills (shaded or unshaded)
8060	Power Generating Systems and Associated Equipment	8	6/8
8061	Communications and Signaling Systems	15	13/15 Any 13 skills (shaded or unshaded)
8062	Communication in the Workplace	5	All (5/5)

List of Trainers

Trainer's Name (Please Print)	Trainer's Signature	Date of start with Trainer (day/month/year)

8050.0 Protect Self and Others

While an apprentice receives health, safety and occupational specific training and/or certification in a variety of fields during their apprenticeship, it is important to be aware that other occupational health and safety training and certification renewal or updating may also be required during their career before performing new types of work. Industrial Electricians typically work in settings where annual renewal and updating of health and safety certifications and competencies are typically part of company policies and procedures.

Skills

8050.01 Apply applicable Acts, regulations, codes and directives such as the Occupational Health and Safety Act (OHSA); Environmental Protection Act (EPA); Dangerous Goods Transportation Act (DGTA); Workplace Safety Insurance Act (WSIA); Ontario Building Code (OBC): Canadian Electrical Code (CEC); Ontario Electrical Safety Code (OESC); Ontario Fire Code (OFC); Workplace Hazardous Materials Information System (WHMIS); Infrastructure Health & Safety Association (IHSA); Canadian Welding Bureau (CWB); National Fire Protection Association (NFPA); American Society of Mechanical Engineers (ASME); Institute of Electrical and Electronic Engineers (IEEE); Illumination Engineering Society Standards (IESS); Technical Standards and Safety Authority (TSSA); Electrical Safety Authority (ESA); Canadian Standards Association (CSA); Workplace Safety & Prevention Services (WSPS); Underwriters Laboratory of Canada (ULC); municipal requirements, job specifications, company policies and procedures by:

- Identifying the act, regulation, code or directive applicable
- Interpreting the act, regulation, code or directive as it relates to the circumstances at hand
- Complying with the act, regulation, code or directive

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8050.02 **Identify hazards and hazardous conditions, equipment and material** such as work site conditions, confined spaces, heavy equipment operations, crane hoisting and lifting operations, overhead and trenching operations, material handling and storage, and welding operations, ensuring that procedures are in compliance with Occupational Health and Safety Act (OHSA), WHMIS, applicable codes, regulations, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.03 **Control hazards and hazardous conditions, equipment and material** such as energized equipment, work site conditions, heavy equipment operations, crane hoisting and lifting operations, overhead and trenching operations, material handling and storage, and welding operations by:

- Recognizing the hazard or hazardous condition
- Assessing the situation
- conducting a risk assessment; and
- employing effective risk reduction techniques

According to OHSA, WHMIS, CSA Z460, Z462, Z463, applicable codes, regulations, job specifications and company policies and procedures.

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8050.04 **Follow safety procedures when working with designated substances** such as asbestos, lead paint, silica dust, mercury vapour by:

- reviewing list of designated substances prior to starting work
- determining temperature as required
- determining if substance contains PCBs
- selecting and wearing personal protective equipment accordingly; and
- ensuring designated substance report is completed

According to the Ministry of the Environment, Ministry of Labour, legislation, regulation, site procedures and company policy

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.05 **Identify electrical hazards** such as safe approach limits, clearances, voltage levels, incident energy levels, touch and step voltage, stored emergency devices, grounding and bonding ensuring that procedures are in compliance with ESA, CSA, OHSA, applicable codes, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.06 **Control electrical hazards** such as safe approach limits, clearances, voltage levels, incident energy levels, touch and step voltage, stored emergency devices, grounding and bonding ensuring that procedures are in compliance with ESA, CSA, OHSA, applicable codes, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.07 **Use fire extinguishers and fire-fighting equipment** such as portable Class A, B, C, D and K extinguishers by:

- identifying the applicable equipment for the situation

According to the Occupational Health and Safety Act (OHSA), Infrastructure Health and Safety Association (IHSA), Ontario Fire Code (OFC), National Fire Protection Association (NFPA), Underwriters Laboratory of Canada (ULC)

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.08 **Perform housekeeping duties** to ensure a safe working environment by:

- removing and disposing excess or unwanted materials
- positioning equipment
- identifying the location of first aid supplies and equipment
- maintaining adequate heat, light and ventilation
- storing flammable fuels
- ensuring the work site meets company's expectations of cleanliness; and
- erecting protective barriers and signs

According to OESC, OHSA, TSSA, Z432, Z462, Z463 and job specifications, company policy and procedures and expectations of cleanliness.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.09 **Follow procedures for applying first aid and CPR for emergency situations** by:

- applying the procedure applicable to the incident/emergency
- (such as treatment of burns, abrasions, bleeding, cuts, wounds, chemical inhalation, electrical shock and contamination of eyes)
- identifying designated contact persons

So that the condition of the victim is stabilized and prepared for further treatment:
According to the Occupational Health and Safety Act (OHSA), the reporting requirements of the appropriate authority having jurisdiction (AHJ), job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.10 **Follow procedures for reporting electrical incidents** by:

- applying the procedure applicable to the incident/emergency
- identifying designated contact persons

According to the Occupational Health and Safety Act (OHSA), the reporting requirements of the Electrical Safety Authority (ESA), job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.11 **Use and maintain personal protective apparel and equipment** such as hard hats, gloves, glasses, goggles, masks, face shields, ear protectors/plugs, coveralls, reflector vests, safety footwear, fall protection equipment, respirators, harnesses, breathing apparatus, air samplers, gas detectors and radiation badges by:

- selecting the apparel and equipment applicable to the situation
- checking certifications (such as expiry dates)
- inspecting conditionings (such as worn, cracks, holes)
- adjusting for fit; and
- calibrating as required

To prevent arc flash and arc blast;
To ensure the safety of self and others:
According to OHSA, IHSA, CSA Z462, Z463, job specifications company policies and procedures and manufacturer's instructions.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.12 **Use and maintain arc flash and arc blast rated personal protective equipment** such as gloves and face shields by:

- selecting the apparel and equipment applicable to the situation
- following specified rating requirements
- checking certifications (such as expiry dates)
- inspecting conditionings (such as worn, cracks, holes)
- adjusting for fit; and
- calibrating as required

To ensure the safety of self and others
According to CSA Z462, Occupational Health and Safety Act (OHSA), legislation, regulation, manufacturer's instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.13 **Perform lock out, tagging and test procedures by:**

- advising the appropriate authorities holding jurisdiction (AHJ)
- installing lock out device and retaining the key
- attaching and dating tags
- communicating with other trades and affected parties (such as business owner)
- using energy isolating devices such as locks, spades, temporary portable grounds
- following hold off procedures as required
- repairing the problem if required; and
- removing the lockout device on completion of work To isolate and control sources of hazardous energy:

According to OHSA, manufacturer's instructions, CEC, OESC, CSA Z460, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.14 Determine if the system is live or de-energized by:

- wearing personal protective equipment as required;
- testing for voltage and amperage;
- following the system looking for lock out and tags:

To prevent electrocution, electrical burns, fires, blasts or other injuries to the worker and public. According to the Occupational Health and Safety Act (OHSA), applicable regulations, Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), legislation, regulation, manufacturer's instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.15 De-energize live systems by:

- isolating source voltages
- draining existing stored energy (such as capacitors, hydraulic accumulators, air pressure tanks and
- locking out all sources of power

According to the Occupational Health and Safety Act (OHSA), Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), legislation, regulation, manufacturer's instructions, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8050.16 Follow electrical safety program and procedures when performing live work by:

- determining procedures for working live in a safe manner; and
- following safety precautions and procedures (including precautions related to hazardous atmospheres that could lead to explosions and fires)

According to the Occupational Health and Safety Act (OHSA), Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), legislation, regulation, manufacturer's instructions, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8051.0 Create, Modify and Interpret Schematics, Drawings and Specifications

Electricians create, modify and interpret schematics, drawings and specifications as part of their job. When working with schematics, drawings and specifications it is important for electricians to understand how to read and interpret electrical symbols as well as recognize and apply the different types of drawings and their uses. Electricians should use schematics, drawings and specifications to anticipate hazards on the worksite. Industrial Electricians need to understand electrical drawings and schematics for servicing and troubleshooting facility and industrial electrical systems. Industrial Electricians work with different diagrams and schematics including but not limited to; block diagrams, pictorials, one-line diagrams, wiring diagrams, terminal diagrams, schematics, electrical floor plans.

Skills

8051.01 Create sketches such as schematics, elevations, isometric, interference, wiring diagrams, layout by:

- using available tools and technology
- referencing existing drawings and specifications such as vendor drawings, cut sheets;
- relating drawings and specifications to the actual site
- visualizing completed project/system
- identifying distances, clearances, mounting heights, location of other equipment and components:

To ensure that the sketch is accurate in order to facilitate the completion of the work.

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8051.02 **Modify drawings such as as-built, schematics, elevations, isometric, interference and logic** by:

- using available tools and technology
- obtain approval for changes
- recording changes, additions and substitutions on the drawings:

To ensure that the drawing set is complete and up-to-date in order to facilitate the completion of the work to the requirements of the approving authorities

According to industry standards , job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8051.03 **Interpret architectural drawings and specifications** including structural and site drawings and specifications by:

- reading the drawing title block and/or title page
- determining the logical sequence of the architectural and shop drawings
- cross-checking to ensure that the set is complete
- identifying and interpreting symbols used on drawings, charts, guides and schedules; and,
- verifying the latest revision/work document:

To ensure the interpretations are correct:

According to industry standards.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8051.04 **Interpret mechanical drawings and specifications** by:

- reading the drawing title block and/or title page
- determining the logical sequence of mechanical and shop drawings
- cross checking to ensure the set is complete
- identifying and interpreting symbols used on drawings, charts, guides and schedules; and
- verifying the latest revision/work document To ensure the interpretations are correct:

According to industry standards.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8051.05 **Interpret power distribution drawings and specifications** by:

- reading the drawing title block and/or title page
- determining the logical sequence of architectural and shop drawings
- cross checking to ensure the set is complete
- identifying and interpreting the symbols used on the drawings, charts, guides and schedules; and,
- verifying the latest revision/working document Ensuring the interpretations are correct:

According to industry standards.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8051.06 **Interpret instrumentation and communication drawings and specifications** by:

- reading the drawing block title and/or title page
- determining the logical sequence of the instrumentation, communication and shop drawings
- cross checking to ensure the set is complete
- identifying and interpreting symbols used on drawings, charts, guides and schedules; and,
- verifying the latest revision/working document Ensuring the interpretations are correct:

According to industry standards.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8051.07 **Interpret electrical drawings and specifications** by:

- reading the drawing title block and/or title page;
- determining the logical sequence of architectural and shop drawings;
- cross checking to ensure the set is complete; and, identifying and interpreting the symbols used on the drawings, charts, guides and schedules; and,
- verifying the latest revision/working document: Ensuring the interpretations are correct:

According to industry standards.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8051.08 **Interpret relay, solid state and logic drawings and specifications** by:

- determining the logical sequence of architectural and shop drawings
- cross checking to ensure the set is complete
- identifying and interpreting the symbols used on the drawings, charts, guides and schedules; and
- verifying the latest revision/working document:

Ensuring the interpretations are correct:
According to industry standards.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8051.09 **Create a materials and equipment list** based on drawings and specifications in order to complete the work; According to legislation, regulation, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8052.0 Use and Maintain Tools and Equipment

Electricians use various tools and equipment to perform their job. These may include; hand tools, power tools, rigging/hoisting/pulling equipment, access equipment, scaffolding and elevated work platforms and other specialty tools and equipment. Electricians must ensure that these tools are used and maintained properly for the safety of themselves, colleagues and others in their facility. Electricians may receive training and certification in the use and maintenance of these tools and equipment

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Skills

8052.01 **Use and maintain hand tools (non-power)** such as wrenches, pliers, fastening tools, measuring tools, cutting tools, joining tools, levelling tools, rigging tools, A-frame and other material handling equipment by:

- selecting the tool, ensuring that the hand tool and accessory matches the application
- ensuring the hand tool and accessory are in specified working condition
- cleaning and lubricating as per manufacturer's specifications
- repairing or disposing of defective tools and accessories
- ordering and replacing accessories and components as required; and
- reporting defects as required:

So that no damage is caused to the tool or injury to the operator:
According to manufacturer's recommendations, Occupational Health and Safety Act (OHSA), WHMIS, job specifications and company policies and procedures.

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8052.02 **Use and maintain power tools and accessories (electric, hydraulic, pneumatic)** such as drills, grinders, circular saws, drill presses, , cut-off saws, hole saws, soldering equipment, drill bits, saw blades, and grinding wheels by:

- selecting the tool and accessory
- ensuring that the power tool and accessory matches the application
- ensuring the power tool and accessories are in specified working condition including inspecting cords, connecting devices, housings, control devices
- ensuring the tool is ground fault circuit interrupted (GFCI) as required
- cleaning and lubricating as per manufacturer's specifications
- ensuring that the power tool and accessories have approval markings as required
- repairing or disposing of defective tools and accessories
- ordering and replacing accessories and components as required and
- reporting defects as required

So that no damage is caused to the power tool or injury to the operator:
According to Occupational Health and Safety Act (OHSA), Infrastructure Health and Safety
Association (IHSA), manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8052.03 **Use and maintain rigging and hoisting equipment** by:

- selecting the applicable equipment
- ensuring that the size and type matches the site location, operation and conditions
- ensuring the equipment is in specified working order
- ensuring the operation is controlled by use of hand and/or voice signals
- ordering and replacing accessories and components as required; and
- reporting defects or problems as required:

So that no damage is caused to the equipment or injury to the operator
According to Occupational Health and Safety Act (OHSA), Infrastructure Health and Safety
Association (IHSA), manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8052.04 **Use scaffolds, lifting devices and elevating platforms** such as personnel lifts, scissor lifts, bucket lifts, swing stages and bosun's chairs: to install and repair electrical installations by:

- selecting the applicable device or platform
- ensuring that the size and type matches the site location, operation and conditions
- ensuring the device or platform and components are in specified working order
- ensuring the operation is controlled by use of hand and/or voice signals: and
- reporting defects or problems as required

so that no damage is caused to the device/platform or injury to the operator: according to engineering drawings, site conditions, OHSA, IHSA, TSSA, manufacturer's recommendations, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8052.05 **Store scaffolds, lifting devices and elevating platforms** such as personnel lifts, scissor lifts, bucket lifts, swing stages and bosun's chairs: to install and repair electrical installations

- dismantling and disassembling devices, platforms and components
- storing and labelling devices, platforms and components as required; and
- reporting defects or problems as required

so that no damage is caused to the device/platform or injury to the operator: according to engineering drawings, site conditions, OHSA, IHSA, TSSA, manufacturer's recommendations, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8052.06 **Perform trade-specific oxy-fuel cutting and welding procedures by:**

- selecting the applicable cutting or welding device
- ensuring that the device matches the application
- ensuring the devices are in specified working condition through inspection; and
- reporting defects as required

to install brackets, hangers and struts using applicable safety equipment to ensure strength of weld in accordance with OHSA, IHSA, CWB, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8052.07 **Identify electrical material and equipment requirements** by:

- locating and sequencing the material requirements
- reviewing delivery schedules, ensuring storage space is available
- keeping a complete record of inventory materials
- ensuring all electrical equipment is approved; and
- maintaining an adequate supply on hand of frequently used items:

According to site specifications, government regulations, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8052.08 **Use conduit bending and threading tools** such as manual and power threaders and bender by:

- selecting the applicable tool and accessory
- ensuring that the tool and accessory matches the application
- ensuring that the tool and accessory is in specified working condition
- maintaining the tool as required including preventative and predictive maintenance
- repairing or replacing the tool and components as required; and
- reporting defects as required

So that no damage is caused to the tool or injury to the operator and the conduit for installation is finished

According to CSA, OESC and CEC, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8052.09 **Use and maintain powder actuated tools** by:

- selecting and wearing personal protective equipment;
- selecting the tool, ensuring that the tool and accessory matches the application;
- ensuring the powder actuated tool and accessory are in specified working condition;
- setting up the tool for the application;
- cleaning as per manufacturer's specifications;
- repairing or disposing of defective tools and accessories;
- removing failed or misfired cartridges/shots and ensuring safe disposal;
- ordering and replacing accessories and components as required; and,
- reporting defects as required; and,
- taking out of service as required:

So that no damage is caused to the tool or injury to the operator:
According to manufacturer's recommendations, Occupational Health and Safety Act (OHSA), Regulations for Industrial Establishments, WHMIS, job specifications and company policy and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8052.10 **Use thermit welding tools** by:

- wearing personal protective equipment such as respiratory protection and ventilation control;
- removing hazards;
- assessing environmental conditions;
- ensuring no moisture in the molds;
- ensuring fire protective devices are available;
- ensuring that the device matches the application;
- ensuring the devices are in specified working condition through inspection;
- follow operating instructions; and,
- reporting defects as required:

To bond conductors to other conductors or metallic components, or metallic components to other metallic components:
To prevent burns and the inhalation of toxic fumes:
According to the Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), Occupational Health and Safety Act (OHSA), Canadian Standards Association (CSA), Regulations for Industrial Establishments, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8053.0 Use and Maintain Test and Measuring Equipment

As technology evolves, the use of test and measuring equipment continues to become important for electricians to perform their job. These may include; ammeters, multi-meters, oscilloscopes, thermographic imaging devices, ultrasonic testing equipment, resistance testers and others.
Electricians must ensure that these tools and devices are used and maintained properly for the safety of themselves, their colleagues and those entering their facility. Electricians may receive training and certification in the use and maintenance of these testers and measuring equipment, especially with changes in technology. Companies are continuing to manufacture new and diverse measuring and testing equipment to meet the needs of electricians.

Skills

8053.01 Use and maintain analog and digital multi-meters by:

- wearing personal protective equipment
- selecting and setting the device that matches the application
- ensuring the item selected has the appropriate category (CAT) rating, is approved, meets the voltage, current, resistance requirements as applicable to the system being tested
- calibrating the meter as required
- verifying the meter operation against a known source before and after testing to ensure function
- ensuring the user follows all recommended test procedures; and,
- maintaining the device as required including preventative and predictive maintenance:

According to CSA Z462 and Z463, manufacturer's specifications, job specifications company policies and procedures.

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8053.02 **Use and maintain insulation testers** such as megger™ testers by:

- wearing personal protective equipment as required
- selecting the applicable device for the task
- calibrating the device as required
- ensuring the circuit or equipment being tested is de-energized and isolated
- isolating public and other workers from the hazard or equipment as required
- ensuring the user follows all recommended test procedures; and
- maintaining the device as required

According to Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), manufacturer's specifications, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

- selecting the applicable device for the task
- calibrating the device as required
- ensuring the device is approved and matches the application; and
- maintaining the device as required including preventative and predictive maintenance

According to legislation, regulation, manufacturer's specifications, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8053.04 **Use and maintain fault locators** by:

- selecting the applicable device for the task;
- calibrating the device as required;
- ensuring the device is approved and matches the application; and,
- maintaining the device as required including preventative and predictive maintenance:

According to legislation, regulation, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8053.05 **Use and maintain high voltage test equipment** such as voltage detectors, meters by:

- wearing personal protective equipment;
- selecting the applicable device that matches the application;
- calibrating the device as required;
- ensuring the device matches the application;
- ensuring the user follows all recommended test procedures;
- obtaining recertification for the device as required; and,
- maintaining the device as required:

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8053.06 **Use and maintain electronic test equipment** such as logic probes, milliamp loop calibrators, resistance temperature detector (RTD), thermocouple calibrators, signal generators oscilloscopes by:

- wearing personal protective equipment as required
- selecting the applicable equipment for the task
- calibrating the equipment as required
- ensuring the equipment is approved when required; and
- maintaining the equipment as required including preventative and predictive maintenance According to the Occupational Health and Safety Act, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8053.07 **Use and maintain computer-based testing and recording equipment** such as human machine interface (HMI), programmable logic controller (PLC) troubleshooting software, data collection software by:

- wearing personal protective equipment as required;
- selecting the applicable equipment that matches application;
- programming the equipment as required; and,
- maintaining the equipment as required:

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8053.08 **Use and maintain chart recorders** such as network, power quality, logic, thermal and vibration analyzers by:

- selecting the applicable device for the task
- calibrating
- the device as required
- ensuring the device is approved and matches the application; and
- maintaining the device:

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8053.09 **Use and maintain special electrical test equipment** such as phase rotation meters, power meters, energy recorders and power quality analyzers by:

- wearing personal protective equipment such as arc flash gear as required
- selecting the applicable equipment for the task
- calibrating the equipment as required
- ensuring the item selected has the appropriate CAT rating, is approved, meets the voltage, current, resistance and impedance requirements as applicable to the system being tested
- assessing hazardous conditions
- ensuring the user follows all recommended test procedures; and
- maintaining the equipment as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8053.10 **Use and maintain special test equipment** such as infrared thermography (IRT), non- contact sensing devices (such as temperature and voltage), illumination testers and vibration analyzers, ultrasound test equipment by:

- wearing personal protective equipment as required
- selecting the applicable equipment that matches application
- calibrating or configuring the equipment as required; and
- maintaining the equipment as required

According to legislation, regulation, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8053.11 **Use and maintain network testers** for communication networks such as Ethernet, Device Net, Modbus and supervisory control and data acquisition (SCADA) by:

- selecting the applicable equipment for the task;
- calibrating the equipment as required;
- ensuring the device matches the application; and,
- maintaining the equipment as required:

According to CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8054.0 Instrumentation Devices and Automated Control Systems

An instrumentation system is a collection of instruments used to measure, monitor, and control a process. This is particularly relevant for industrial electricians working in a production or manufacturing environment. This skill set refers to work done by electricians on instrumentation devices such as proportional-integral-derivative (PID) devices, automated control systems such as distributed control systems, PLCs, Human Machine Interfaces (HMI). When working with some of these systems, electricians should be mindful of health and safety requirements such as guarding and lockout requirements.

Skills

8054.01 **Install instrumentation devices** such as 4 to 20 milliamp and 1 to 5 volt control devices (loop and output), proportional-integral-derivative (PID) devices by:

- selecting cabling, equipment and components that match application
- reading and interpreting job reference material and drawings
- mounting system and components
- determining shielding cable requirements
- bonding and grounding system and components
- configuring system and device parameters
- calibrating devices
- selecting and verifying cable pathway
- selecting and verifying cable installation
- splicing and terminating
- verifying the operation and proofing the performance
- testing operation; and
- completing documentation as required

According to Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

*** A Trainer may be a Supervisor or the competent employee designated by the Apprentice's Sponsor.**

8054.02 **Troubleshoot instrumentation devices** such as 4 to 20 milliamp and 1 to 5 volt control devices (loop and output), proportional-integral-derivative (PID) devices by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- checking status
- checking for faults
- checking for performance
- conducting field assessments using diagnostic and test equipment to determine source of malfunction
- referencing installation specifications and drawings
- checking connections and terminations
- determining root cause
- replacing components as required
- recalibrating devices as required
- confirming operational requirements
- returning the system to operational status; and
- completing documentation as required

According to Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8054.03 **Maintain instrumentation devices** such as 4 to 20 milliamp and 1 to 5 volt control devices (loop and output), proportional integral-derivative (PID) devices by:

- conducting visual inspection of the system
- conducting operational and functional tests
- cleaning components
- completing documentation as required; and
- calibrating devices

According to Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8054.04 **Install automated control systems** such as distributed control systems, PLCs, Human Machine Interfaces (HMI) by:

- selecting cabling, equipment and components that match application and meet the environmental condition
- selecting input/output (I/O) devices to match the application and meet the environmental condition
- identifying software and determining compatibility with other process control systems i.e. AC drives
- reading and interpreting job reference material and drawings
- mounting system and components
- determining shielding cable requirements
- bonding and grounding system and components
- identifying communication networks and protocols
- installing operating software
- connecting communication links
- configuring system and device parameters
- programming devices and systems
- selecting and verifying cable pathway
- selecting and verifying cable installation
- splicing and terminating
- verifying the operation and proofing the performance
- conducting I/O verification
- testing operation; and
- completing documentation as required

According to Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), Canadian Standards Association (CSA), manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8054.05 **Troubleshoot automated control systems** such as distributed control systems, PLCs, Human Machine Interfaces (HMI) by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- checking status
- checking for faults
- checking for performance
- conducting field assessments using diagnostic and test equipment to determine source of malfunction
- referencing installation specifications and drawings
- checking connections and terminations
- determining root cause
- replacing components as required
- recalibrating devices as required
- using software to ensure functionality
- bypassing non-safety devices by installing jumpers or isolating as required
- using diagnostic procedures and software
- reloading or downloading software as required
- confirming operational requirements
- returning the system to operational status; and
- completing documentation as required

According to Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), Canadian Standards Association (CSA), manufacturer's specifications, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8054.06 **Maintain automated control systems** such as distributed control systems, PLCs, Human Machine Interfaces (HMI) by:

- conducting visual inspection of the system
- conducting operational and functional tests
- cleaning components
- replacing filters
- optimizing software and system
- updating and backing up programs and systems; and
- completing documentation as required

According to Canadian Electrical Code (CEC), Ontario Electrical Safety Code (OESC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.0 Install, Troubleshoot, Repair and Maintain Wiring Systems

When working with wiring installations, electricians should always determine the system status (live or de-energized) and follow applicable safety protocols. Electricians should also consider using mechanical equipment and tools (i.e. pullers, benders) to reduce the physical demands associated with the installation, troubleshooting, repair and maintenance of wiring installations.

Skills

8055.01 **Install busway systems** such as feeder duct (bus duct), plug-in devices, supports, mechanical protection and fire stops by:

- selecting and using components that match the application
- torqueing the electrical connections as required
- mounting and supporting (horizontally and vertically)
- terminating; and
- conducting tests to ensure free from shorts and grounds

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), plans and specifications, environmental conditions, manufacturer's specifications, job specifications and company policies and procedures.

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8055.02 **Maintain busway systems** such as feeder duct (bus ducts), plug-in devices, supports, mechanical protection and fire stops by:

- inspecting to identify and correct deficiencies
- ensuring there is no connection deterioration (i.e. thermal and visual)
- cleaning the interior and exterior surfaces as required
- conducting tests to ensure insulation integrity (no shorts or grounds)

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), plans and specifications, environmental conditions, manufacturer's specifications, job specifications and company policies and procedures.

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8055.03 **Install branch circuit wiring for loads** such as lighting, receptacles, heating and motors by:

- selecting and using components that match the application
- laying out branch circuit wiring
- providing bonding to ground
- selecting overcurrent protection, and
- selecting conductor size, voltage rating, type and material (i.e. insulation, copper aluminum):

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.04 **Troubleshoot branch circuit wiring for loads** such as lighting, receptacles, heating and motors by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- inspecting and investigating to determine root cause of any faults
- correcting and repairing problem
- testing operation to ensure functionality is restored
- returning to operational service

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
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8055.05 **Install cable trays for use with power, data and communication cable wiring systems** by:

- selecting cable trays and components that match the application (considering cable size, weight and application type)
- completing layout
- installing supports (vertical and horizontal) as required
- bonding cable trays to ground as required
- ensuring clearance requirements are met
- ensuring ventilation requirements are met
- ensuring fire stops are installed where required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.06 **Install single conductor (metallic and non-metallic) cables** by:

- selecting cables and components that match the application (considering cable size, weight and application type)
- completing layout
- installing supports (vertical, horizontal, non-ferrous) as required
- bonding metallic jackets to ground as required
- ensuring clearance requirements between cables are met

- ensuring configuration of phases when running cables in parallel
- ensuring fire stops are installed where required
- selecting termination fittings as required to match enclosure designation and cable type; and
- terminating as required to limit sheath and eddy currents

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.07 **Install multi-conductor (metallic and non-metallic) cables** by:

- selecting cables and components that match the application (considering cable size, weight and application type)
- completing layout
- installing supports (vertical, horizontal) as required
- bonding metallic jackets to ground as required
- ensuring clearance requirements between cables are met
- ensuring fire stops are installed where required
- selecting termination fittings as required to match enclosure designation and cable type
- terminating as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures

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8055.08 **Install non-metallic conduits and tubing** such as Poly Vinyl Chloride (PVC), Reinforced Thermosetting Resin Conduit (RTRC) and Electrical Non-metallic tubing (ENT) by:

- selecting conduit and tubing that match the application (considering conductor size, expansion and contraction, flame spreading requirements, exposure to sunlight and application type);
- completing layout
- installing supports (vertical, horizontal, expansion and contraction) as required
- installing bonding conductors as required
- ensuring penetration of fire separations meet industry requirements as required
- providing sealing to prevent the ingress of moisture and gas as required; and
- matching fittings as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8055.09 **Install metallic conduits and tubing** such as rigid, flexible, liquid-tight and Electrical Metallic Tubing (EMT) by:

- selecting conduit and tubing that match the application (considering conductor size, vibration, expansion and contraction, and application type)
- completing layout
- installing supports (vertical, horizontal, expansion and contraction) as required
- installing bonding conductors as required
- ensuring penetration of fire separations meet industry requirements as required
- providing sealing to prevent the ingress of moisture and gas as required; and
- matching fittings as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8055.10 **Install electric heating systems** such as electric forced air furnace, electric boiler, convection heaters, radiant heaters, heat tracing cables, duct heater, heating cables, inline heaters (circulation and immersion), exchangers, thermostats, high and operating limit safeties by:

- selecting systems, equipment and components that match application
- completing layout
- connecting equipment and controls; and
- monitoring for ground faults as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.11 **Troubleshoot electric heating systems** such as electric forced air furnace, electric boiler, convection heaters, radiant heaters, heat tracing cables, duct heater, heating cables, inline heaters (circulation and immersion), exchangers, thermostats, high and operating limit safeties by:

- conducting field assessments using diagnostic and test equipment to determine source of malfunction
- checking for continuity
- checking for faults
- checking voltage
- checking for current
- checking control systems (i.e. high/low systems)
- checking connections and terminations; and
- referencing installation specifications and drawings

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.12 **Repair electric heating systems** such as electric forced air furnace, electric boiler, convection heaters, radiant heaters, heat tracing cables, duct heater, heating cables, inline heaters (circulation and immersion), exchangers, thermostats, high and operating limit safeties by:

- identifying and removing defective heating components and controls
- replacing heating components and controls as required
- resetting controls
- repairing identified faults
- cleaning and adjusting components
- conduct tests of systems and controls after repair; and
- recording tests and repairs as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures

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8055.13 **Install wiring for hazardous locations including new installations and modifications** by:

- following safety precautions and procedures (including precautions related to hazardous atmospheres that could lead to explosions and fires)
- selecting systems, equipment, tools and components that match application
- identifying zones and divisions as per the area classification
- selecting wiring methods that match the application
- completing layout
- completing connections
- sealing components as required; and
- testing operation of the system

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), Technical Safety and Standards Association (TSSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
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8055.14 **Install overhead distribution systems** such as single-phase and three-phase power, communication, data and fibre optic systems, by:

- selecting systems, equipment and components that match application
- completing layout
- determining clearances from ground and buildings and existing electrical installations
- selecting and installing conductor supports (i.e. polls, racks)
- checking maximum span
- determining bonding and grounding requirements
- installing bonding to ground
- installing overcurrent protection, and
- guying

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), Infrastructure Health and Safety Association (IHSA), environmental conditions, utility specifications, manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.15 **Install direct buried underground cables** for single-phase and three-phase power, data, communication and fibre optic systems by:

- selecting cables, equipment and components that match application
- completing layout
- selecting depth of coverage, mechanical protection, spacing in trench, and backfill;
- selecting and installing locating/marking tape
- determining bonding and grounding requirements
- determining expansion and contraction such movement and settlement caused by environmental conditions; and
- installing overcurrent protection as required:

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), Infrastructure Health and Safety Association (IHSA), environmental conditions, utility specifications, manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8055.16 **Install underground conduits** for single-phase and three-phase power, data, communication and fibre optic systems by:

- selecting conduits, equipment and components that match application
- completing layout
- selecting depth of coverage, mechanical protection, spacing in trench, backfill, and supports,
- selecting and installing locating/marking tape
- determining bonding and grounding requirements
- determining expansion and contraction such movement and settlement caused by environmental conditions
- installing overcurrent protection as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), Infrastructure Health and Safety Association (IHSA), environmental conditions, utility specifications, manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
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8055.17 **Install Cathodic Protection systems** such as rectifiers, sacrificial anodes and equipment connections by:

- selecting cabling, equipment and components that match application
- reading and interpreting job reference material and drawings
- mounting system and components
- bonding and grounding system and components
- selecting and verifying cable pathway
- selecting and verifying cable installation
- terminating
- verifying the operation and proofing the performance
- testing operation; and
- completing documentation as required:

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Occupational Health and Safety Act (OHSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.18 **Maintain Cathodic Protection systems** such as rectifiers, sacrificial anodes and equipment connections by:

- conducting visual inspection of the system
- conducting operational and functional tests
- cleaning components
- installing bypass jumpers as required; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Occupational Health and Safety Act (OHSA), manufacturer's specifications, industry standards, company policies and client specifications.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.19 **Connect supply to HVAC/R systems** by:

- determining connected load requirements
- selecting and installing branch circuit wiring
- terminating and labelling conductors
- mounting isolation switches
- bonding and grounding system and components
- testing operation; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Occupational Health and Safety Act (OHSA), manufacturer's specifications, industry standards, job specifications, company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.20 **Install HVAC/R controls** by:

- selecting cabling, equipment and components that match application and meet the environmental condition;
- selecting input/output (I/O) devices to match the application and meet the environmental condition;
- reading and interpreting job reference material and drawings
- selecting, locating and mounting control devices
- selecting and verifying cable pathway
- selecting and verifying cable installation
- labelling and terminating conductors
- verifying operation; and
- completing documentation as required:

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Occupational Health and Safety Act (OHSA), manufacturer's specifications, industry standards, job specifications, company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8055.21 **Maintain HVAC/R electrical connections and controls** by:

- locking out and tagging out
- conducting visual inspection of the system
- conducting operational and functional tests
- cleaning components; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Occupational Health and Safety Act (OHSA), manufacturer's specifications, industry standards, job specifications, company policies and procedures.

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8056.0 Install, Maintain and Troubleshoot Power Distribution Equipment Systems

Distribution equipment provides and facilitates the efficient distribution of power to electrical systems and equipment, thereby allowing for the safe use of electricity.

Skills

8056.01 **Install power and energy metering systems** such as revenue billing devices, energy monitoring systems, current transformers, potential transformers, metering equipment by:

- selecting the equipment that matches the system;
- completing layout
- installing system, equipment and components
- complete connections; and
- testing system operation

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), local distribution companies (LDCs), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8056.02 **Install high voltage protection and control devices** such as disconnects, lightening arresters, fuses and circuit breakers by:

- selecting devices, equipment and components to match design drawings and specifications
- completing layout of equipment and components
- installing and completing connections such as stress cones and potheads
- setting overcurrent devices as per design and coordination requirements; and,
- testing to verify functionality and commissioning

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Infrastructure Health and Safety Association (IHSA), Institute of Electrical and Electronics Engineers (IEEE), local distribution companies (LDCs), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.03 **Maintain high voltage protection and control devices** such as disconnects, lightening arresters, fuses and circuit breakers by:

- completing lock out and tag out requirements as required
- installing temporary protective grounds as required
- communicating with affected parties including the utility and company management
- conducting tests such as visual, thermographic imaging, insulation resistance
- troubleshooting reported defects or faults
- making repairs and replacing components as required
- verifying test results

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Infrastructure Health and Safety Association (IHSA), Institute of Electrical and Electronics Engineers (IEEE), local distribution companies (LDCs), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8056.04 **Install low voltage protection and control devices** such as disconnects, lightening arresters, fuses and circuit breakers by:

- selecting devices, equipment and components to match calculations, design drawings and specifications
- completing layout of equipment and components
- installing and completing connections such as conductors and buses
- setting overcurrent devices as per design and coordination requirements; and
- testing to verify functionality and commissioning

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Infrastructure Health and Safety Association (IHSA), Institute of Electrical and Electronics Engineers (IEEE), local distribution companies (LDCs), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8056.05 **Maintain low voltage protection and control devices** such as disconnects, lightening arresters, fuses and circuit breakers by:

- completing lock out and tag out requirements as required
- installing temporary protective grounds as required
- communicating with affected parties including company management
- conducting tests such as visual, thermographic imaging, insulation resistance
- troubleshooting reported defects or faults
- making repairs and replacing components as required
- verifying test results

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Infrastructure Health and Safety Association (IHSA), Institute of Electrical and Electronics Engineers (IEEE), local distribution companies (LDCs), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8056.06 **Install high voltage oil and dry type distribution transformers** by:

- Selecting transformers based on size and type to match design drawings and specifications;
- completing layout
- configuring and terminating primary and secondary conductors such as busbars, delta, wye, stress cones and potheads
- selecting primary and secondary voltage taps
- installing and terminating grounding as required
- following manufacturer energization procedures such as soaking
- testing to verify primary and secondary voltage; and
- testing to verify functionality of auxiliary equipment such as ventilation, oil pump, temperature and level sensors

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Infrastructure Health and Safety Association (IHSA), Ontario Building Code (OBC), local distribution companies (LDCs), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.07 **Install low voltage oil and dry type distribution transformers** by:

- Selecting transformers based on load, size and type to match calculations, design drawings and specifications
- determining mounting requirements, including suitability to support the size of the selected transformer, such as ceiling, pole, wall, pad or floor
- completing layout
- configuring and terminating primary and secondary conductors such as busbars, delta, wye, autotransformers, zigzag
- selecting primary and secondary voltage taps
- installing and terminating grounding as required
- following manufacturer energization procedures such as soaking
- testing to verify primary and secondary voltage; and
- testing to verify functionality of auxiliary equipment such as ventilation, oil pump, temperature and level sensors

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Infrastructure Health and Safety Association (IHSA), Ontario Building Code (OBC), local distribution companies (LDCs), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8056.08 **Maintain high and low voltage oil and dry type distribution transformers** by:

- determine if transformer oil contains PCBs and select and wear personal protective equipment accordingly
- determine oil temperature
- conducting tests such as visual, thermographic imaging, insulation resistance, turn ratio, oil sampling
- communicating with affected parties including the utility and company management
- completing lock out and tag out requirements as required
- cleaning components such as insulators, ventilation louvers, filters as required
- troubleshooting reported defects or faults
- making repairs and replacing components as required
- verifying test results; and
- completing documentation (including designated substance report) as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Infrastructure Health and Safety Association (IHSA), Ontario Building Code (OBC), local distribution companies (LDCs), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8056.09 **Install power distribution panels** by:

- selecting panels by determining loads, size, and type to match the calculations, design drawings and specifications
- selecting panel enclosures to match the application or environment
- determining mounting requirements
- completing layout by determining required clearances
- terminating conductors including high and low voltage types
- installing and terminating bonding and grounding as required
- setting overcurrent devices as per design and coordination requirements
- testing to verify functionality such as key interlocking, trip settings and coordination; and,
- energizing the systems as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.10 **Maintain power distribution panels** by:

- conducting tests such as visual, thermographic imaging
- communicating with affected parties including company management
- completing lock out and tag out requirements as required
- cleaning components as required
- troubleshooting reported defects or faults
- making repairs and replacing components as required such as circuit breakers;
- verifying test results; and
- completing documentation as required.

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.11 **Install ground fault detection** by:

- selecting type of ground fault detection to match design drawings and specifications, voltage levels;
- determining mounting requirements
- completing layout
- terminating conductors
- installing and terminating bonding and grounding as required
- setting trip settings as required; and
- testing to verify functionality

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8056.12 **Maintain ground fault detection** by:

- conducting testing as required including leakage current testing
- completing lock out and tag out requirements as required
- troubleshooting reported defects or faults such as indicator failure and incorrect trip settings
- making repairs and replacing components as required
- verifying test results; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

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8056.13 **Install ground fault protection** by:

- Selecting type of ground fault protection such as zero sequencing or ground return path to match design drawings and specifications, current and voltage levels
- determining mounting requirements
- completing layout
- terminating conductors
- installing and terminating bonding and grounding as required
- setting trip settings such as leakage current settings; and
- testing to verify functionality

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.14 **Maintain ground fault detection** by:

- conducting testing as required including leakage current testing
- communicating with affected parties including company management
- troubleshooting reported defects or faults such as indicator failure and incorrect trip settings
- making repairs and replacing components as required
- verifying test results; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.15 **Install ground fault circuit interrupters (GFCI)** including circuit breakers and other integrated devices (non-class A) by:

- selecting type of GFCI to match design drawings and specifications, current and voltage levels
- determining mounting requirements
- completing layout
- terminating conductors
- installing and terminating bonding and grounding as required
- setting trip settings as required; and
- testing to verify functionality

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.16 **Maintain ground fault circuit interrupters (GFCI)** including circuit breakers and other integrated devices (non-class A) by:

- conducting leakage current testing
- communicating with affected parties including company management
- troubleshooting reported defects or faults
- making repairs and replacing components as required
- verifying test results; and
- completing documentation as required:

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.17 **Install power factor correction equipment** such as capacitors, zigzag transformers, synchronous motors by:

- selecting type, size of equipment based on power correction calculation
- completing layout
- determining mounting requirements
- completing connections
- testing functionality as required; and
- validating the correction as per the calculations:

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), local supply authority, manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.18 **Maintain power factor correction equipment** such as capacitors, zigzag transformers, synchronous motors by:

- taking power factor readings
- discharging as required
- conducting tests such as thermographic imaging, dielectric strength
- making repairs and replacing components as required
- verifying functionality
- disposing of components as per environmental requirements and regulations; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), local supply authority, manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.19 **Install direct current (DC) power distribution systems** such as emergency equipment, renewable energy systems, data centre systems, energy storage systems, process based systems by:

- selecting the system and equipment by determining loads, size, and type to match the calculations, design drawings and specifications
- selecting panel enclosures to match the application or environment
- determining mounting requirements
- completing layout by determining required clearances
- terminating conductors
- installing and terminating bonding and grounding as required
- setting overcurrent devices
- testing to verify functionality; and
- energizing the systems as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.20 **Maintain direct current (DC) power distribution systems** such as emergency equipment, renewable energy systems, data centre systems, energy storage systems, process based systems by:

- conducting tests such as visual, thermographic imaging, insulation resistance, ventilation requirements
- communicating with affected parties including company management
- completing lock out and tag out requirements as required
- cleaning components as required
- troubleshooting reported defects or faults
- making repairs and replacing components as required such as circuit breakers, power supplies, rectifiers, ventilation
- verifying test results; and
- completing documentation as required:

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.21 **Install direct current (DC) protective devices** such as arc fault circuit interrupters, lightening arresters, surge arresters, primary and secondary protectors, supplementary protectors, and ground fault protective devices by:

- selecting the device by determining loads, size, and type to match the calculations, design drawings and specifications
- determining mounting requirements
- completing layout
- terminating conductors
- installing and terminating bonding and grounding as required
- testing to verify functionality; and
- energizing the device as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.22 **Install AC protective devices such as** such as arc fault circuit interrupters, lightening arresters, surge arresters, supplementary protectors, and GFCI devices (class A) by:

- selecting the device by determining loads, size, and type to match the calculations, design drawings and specifications
- determining mounting requirements
- completing layout
- terminating conductors
- installing and terminating bonding and grounding as required
- testing to verify functionality as required
- energizing the device as required:

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8056.23 **Maintain AC/DC protective devices such as** such as arc fault circuit interrupters, lightening arresters, surge arresters, primary and secondary protectors, supplementary protectors, and ground fault protective devices, GFCI devices (class A) by:

- conducting tests such as visual, thermographic imaging, insulation resistance
- communicating with affected parties including company management
- completing lock out and tag out requirements as required
- troubleshooting reported defects or faults
- making repairs and replacing components as required
- verifying test results; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8057.0 Install, Troubleshoot and Maintain Lighting Systems

Electricians who work on lighting systems typically work at heights. The selection and use of ladders, lifting devices and work platforms to provide access to lighting systems is critical for the safety of the electrician and the public. Electricians should ensure they have the appropriate fall protection and/or guarding in place. De-energization is also important when working with lighting systems.

Skills

8057.01 **Install non-external ballasted lighting** such as incandescent, compact florescent, LED by:

- selecting components that match application
- determining quantity, type and wiring requirements
- completing layout
- terminating conductors
- performing installation; and
- testing operation

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

*** A Trainer may be a Supervisor or the competent employee designated by the Apprentice's Sponsor.**

8057.02 **Troubleshoot and maintain non-external ballasted lighting** such as incandescent, compact florescent, LED by:

- conducting tests such as voltage and illumination levels
- communicating with affected parties as required
- completing lock out and tag out requirements as required
- troubleshooting reported defects or faults such as reduced lighting levels, premature bulb failure, wiring connections
- cleaning components such as reflectors, globes, lenses
- repairing and replacing components such as lamps, sockets, holders as required
- verifying operation; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8057.03 **Install external ballasted/driver** lighting such as florescent, compact fluorescent, neon, LED by:

- selecting units/systems such that match design drawings and specifications
- determining quantity, type and wiring requirements
- completing layout
- terminating conductors
- performing installation; and
- testing operation

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8057.04 **Troubleshoot and maintain external ballasted/driver lighting** such as florescent, compact fluorescent, neon, LED by:

- conducting tests such as voltage and illumination levels
- communicating with affected parties as required
- completing lock out and tag out requirements as required
- troubleshooting reported defects or faults such as reduced lighting levels, premature bulb failure, noise level, wiring connections
- cleaning components such as reflectors, globes, lenses
- repairing, replacing or retrofitting (using approved kit) components such as lamps, sockets, holders, ballasts, drivers, power supply rectifiers as required
- matching components between ballast and lamps as required
- verifying operation; and,
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8057.05 **Install high intensity discharge lighting** such as mercury vapour, metal halide and high/low pressure sodium by:

- selecting units/systems that match design drawings and specifications
- determining quantity, type and wiring requirements
- completing layout
- terminating conductors
- performing installation; and
- testing operation

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8057.06 **Troubleshoot and maintain high intensity discharge lighting** such as mercury vapour, metal halide and high/low pressure sodium by:

- conducting tests such as maintenance log check (lamp life), voltage, illumination levels;
- communicating with affected parties as required
- completing lock out and tag out requirements as required
- troubleshooting reported defects or faults such as reduced lighting levels, premature bulb failure, wiring connections, lamp cycling
- cleaning components such as reflectors, globes, lenses
- repairing, replacing or retrofitting (using approved kit) components such as lamps, sockets, holders, ballasts as required
- matching components between ballast and lamps as required;
- verifying operation; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8057.07 **Install light dimming and control systems and components** such as dimmers, switching devices, timers, occupancy/vacancy sensors, daylight harvesting, building monitoring systems by:

- selecting components and systems that match design drawings and specifications
- determining quantity, type and wiring requirements
- configuring components as required
- completing layout
- terminating conductors
- performing installation; and
- testing operation

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8057.08 **Troubleshoot and maintain light dimming and control systems** such as dimmers, switching devices, timers, occupancy/vacancy sensors, daylight harvesting, building monitoring systems by**:**

- conducting tests for functionality of system and components
- communicating with affected parties as required
- completing lock out and tag out requirements as required
- troubleshooting reported defects or faults
- repairing, replacing or retrofitting components as required
- matching components between ballast and control systems
- verifying operation; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8057.09 **Install exit and emergency lighting powered by unit equipment, emergency power supply** by:

- selecting components and systems that match design drawings and specifications
- determining quantity, type and wiring requirements
- making load calculations based on the voltage and wattage requirements with consideration of voltage drop
- completing layout
- mounting equipment and components
- terminating conductors; and
- testing operation:

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8057.10 **Troubleshoot and maintain exit and emergency lighting powered by unit equipment, emergency power supply** by:

- conducting tests for functionality of system and components as required
- troubleshooting reported defects or faults
- repairing, replacing or retrofitting components as required
- matching components as required
- verifying operation; and
- completing documentation as required

According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8057.11 **Report illumination levels** by:

- measuring
- recording; and
- completing documentation as required

To maintain lighting quality: in support of health and safety.
According to the Ontario Electrical Safety Code (OESC), Canadian Electrical Code (CEC), Canadian Standards Association (CSA), Ontario Building Code (OBC), manufacturer's specifications, industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.0 Install, Maintain and Troubleshoot Rotating Equipment and Associated Control Systems

Electricians install and maintain rotating equipment and their associated control systems. For safety reasons, especially during the troubleshooting, maintenance and testing stages of a job, de-energization is important in preventing the inadvertent starting of equipment that could injure workers and others.

Skills

8058.01 Maintain brush assemblies, slip rings and commutators by:

- completing lock out and tag out requirements as required
- conducting visual tests
- troubleshooting defects or faults
- making repairs and replacing components such as brushes, brush holders, springs as required
- adjusting position
- cleaning commutators, slip rings and brush holders
- resurfacing commutators and slip rings as required
- testing operation; and
- completing documentation as required

According to manufacturer's specifications and instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

*** A Trainer may be a Supervisor or the competent employee designated by the Apprentice's Sponsor.**

8058.02 Troubleshoot brush assemblies, slip rings and commutators:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- diagnosing and determining root cause of problems
- repairing or replacing components as required
- testing operation; and
- completing documentation as required:

According to manufacturer's specifications and instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

- selecting motors, generators, equipment and components that match design drawings and specifications
- determining location, type and wiring requirements
- calculating conductor size
- terminating conductors; and
- testing operation:

According to the manufacturer's specifications, CEC, OESC, CSA, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.04 Maintain DC motors and generators by:

- completing lock out and tag out requirements as required;
- conducting tests such as insulation resistance, visual, vibration analysis, thermographic imaging, physical inspection
- troubleshooting defects or faults
- making repairs and replacing components as required
- cleaning surfaces, ventilation, openings
- testing operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications and instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.05 Troubleshoot DC motors and generators by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- diagnosing and determining root cause; and
- repairing or replacing components as required
- testing operation; and
- completing documentation as required:

According to the CEC, OESC, CSA, manufacturer's specifications and instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.06 **Install AC motors and generators** by:

- selecting motors, generators, equipment and components that match design drawings and specifications
- determining location, type and wiring requirements
- meeting cable shielding requirements (variable frequency AC motors)
- calculating conductor size
- terminating conductors; and
- testing operation:

According to the manufacturer's specifications, CEC, OESC, CSA, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.07 **Maintain AC motors and generators** by:

- completing lock out and tag out requirements as required
- conducting tests such as insulation resistance, visual, vibration analysis, thermographic imaging, physical inspection
- troubleshooting defects or faults
- making repairs and replacing components such as couplings, bearings, capacitors, centrifugal switches as required
- cleaning surfaces, ventilation, openings
- testing operation; and
- completing documentation as required

According to the manufacturer's specifications and instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.08 **Troubleshoot AC motors and generators** by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- diagnosing and determining root cause of problem
- repairing or replacing components as required
- testing operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications and instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.09 **Install mechanical, electrical and auxiliary protective equipment** such as proximity switches, limit switches, speed switches, encoders, over-temperature devices by:

- selecting equipment and components that match design drawings and specifications
- determining location, type and wiring requirements
- terminating conductors; and
- testing operation

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.10 **Maintain mechanical, electrical and auxiliary protective equipment** such as proximity switches, limit switches, speed switches, encoders, over-temperature devices by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- making repairs and replacing components as required
- cleaning and lubricating as required
- testing operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.11 **Troubleshoot mechanical, electrical and auxiliary protective equipment** such as proximity switches, limit switches, speed switches, encoders, over-temperature devices by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- diagnosing and determining root cause
- troubleshooting defects or faults
- repairing or replacing components as required
- testing operation; and
- completing documentation as required:

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.12 **Maintain lubrication systems and components** by;

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- performing preventative and predictive maintenance as required
- making repairs and replacing components as required
- selecting and applying lubricant that matches the application
- ensuring applicable grease levels and that grease is cavity is not overfilled or underfilled
- regreasing as required
- testing and verifying operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.13 **Troubleshoot lubrication systems and components** by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- diagnosing and determining root cause of problem
- troubleshooting defects or faults
- repairing and/ or replacing components as required
- testing and verifying operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.14 **Maintain braking and clutch systems and components** by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- performing preventative and predictive maintenance as required
- checking for overheating, torque loss or coil failure
- ensuring alignment of bearings and shafts
- checking for worn components
- checking friction surfaces
- making repairs and replacing components as required
- cleaning as required
- testing and verifying operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.15 **Troubleshoot braking and clutch systems and components** by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- diagnosing and determining root cause of problem
- troubleshooting defects or faults
- repairing or replacing components as required
- cleaning as required
- testing and verifying operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.16 **Start-up and shut-down rotating equipment** by:

- identifying requirements for start-up and shut down
- notifying affected parties as required
- following sequencing as required
- using associated control systems
- completing lock out and tag out requirements as required

According to the OHSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.17 **Install relays, solid state devices and controls** by:

- selecting devices and components that match design drawings and specifications
- determining location, type and wiring requirements
- mounting devices and components
- terminating conductors
- configuring operation as required; and
- testing operation

According to CEC, OESC, CSA manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.18 **Maintain relays, solid state devices and controls** by:

- completing lock out and tag out requirements as required
- conducting functionality and visual tests as required
- making repairs and replacing components as required
- testing operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.19 **Troubleshoot relays, solid state devices and controls** by:

- completing lock out and tag out requirements as required
- conducting functionality and visual tests as required
- diagnosing and determining root cause of problem
- troubleshooting defects or faults
- repairing and replacing components as required
- testing and verifying operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.20 **Install protective devices** such as overloads, relays, fuses, phase loss and voltage monitoring relays, and circuit breakers by:

- selecting devices and components that match design drawings and specifications and application such as fuse classifications, circuit breaker settings, self-protected combination motor controls
- determining location, type and wiring requirements
- mounting devices and components
- terminating conductors
- configuring operation as required; and
- testing operation:

According to CEC, OESC, CSA, manufacturer's specifications, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.21 **Maintain protective devices** such as overloads, relays, fuses, phase loss and voltage monitoring relays, and circuit breakers by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- troubleshooting defects or faults
- making repairs and replacing components as required
- testing operation; and
- completing documentation as required:

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.22 **Troubleshoot protective devices** such as overloads, relays, fuses and circuit breakers control systems by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- diagnosing and determining root cause of problem
- troubleshooting defects or faults
- repairing or replacing components as required
- testing and verifying operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.23 **Install control panels and related control devices** such as start stop stations, equipment control stations by:

- selecting components that match application
- determining location, type and wiring requirements
- installing and wiring components within the enclosure as required
- mounting panels and components
- terminating conductors; and
- testing operation:

According to CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.24 **Troubleshoot control panels and related control devices** by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- diagnosing and determining root cause of problem
- troubleshooting defects or faults
- repairing or replacing components as required
- testing and
- verifying operation; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.25 **Install external mechanical/remote field devices** such as analog I/O, digital I/O by:

- determining the control requirements; and
- selecting, laying out and installing field devices; and
- testing to confirm operation and connections
- selecting devices and components that match application
- determining location, type and wiring requirements
- mounting panels and components
- terminating conductors; and
- testing operation

According to CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.26 **Maintain external mechanical/remote field devices** such as analog I/O, digital I/O by:

- completing lock out and tag out requirements as required;
- conducting functionality tests as required;
- performing preventative and predictive maintenance as required;
- cleaning components such as limit switches, push buttons, optical detectors as required;
- making repairs and replacing components as required;
- testing and verifying operation and connections; and,
- completing documentation as required:

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8058.27 **Troubleshoot external mechanical/remote field devices** such as analog I/O, digital I/O by:

- completing lock out and tag out requirements as required
- conducting functionality tests as required
- diagnosing and determining root cause
- troubleshooting defects or faults
- cleaning components such as limit switches, push buttons, optical detectors as required
- repairing or replacing components as required
- testing and verifying operation and connections; and
- completing documentation as required

According to the CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.0 Install, Maintain and Troubleshoot Motor Drives and Associated Control Systems

Electricians install and maintain motor drives and their associated control systems. Drives and associated controls provide speed, frequency, torque, current, time and braking control to motors. Industrial electricians must be able to install, service, troubleshoot and repair these systems in order to ensure efficient operation and reduce unscheduled disruptions. For safety reasons, especially during the troubleshooting, maintenance and testing stages of a job, de- energization is important in preventing consequential movement and cycling that could injure workers and others.

Skills

- selecting drives and components that match the motor
- determining location, type and wiring requirements
- calculating conductor size
- mounting drives and components
- terminating conductors
- configuring operation as required; and
- testing operation

According to CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

*** A Trainer may be a Supervisor or the competent employee designated by the Apprentice's Sponsor.**

8059.02 Maintain and troubleshoot DC constant voltage drives by:

- completing lock out and tag out requirements as required
- conducting operational tests as required
- troubleshooting defects or faults
- making repairs and replacing components as required
- testing operation; and
- completing documentation as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.03 Install adjustable speed DC drives by:

- selecting drives and components that match the motor
- determining location, type and wiring requirements
- calculating conductor size
- mounting drives and components
- terminating conductors
- configuring operating parameters as required; and
- testing operation

According to CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.04 **Maintain and troubleshoot adjustable speed DC drives** by:

- completing lock out and tag out requirements as required
- conducting operational tests as required
- troubleshooting defects or faults
- repairing and replacing components as required
- reconfigure operating parameters as required
- testing operation; and
- completing documentation as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.05 **Install AC constant voltage drives** by:

- selecting drives and components that match the motor
- determining location, type and wiring requirements
- calculating conductor size
- mounting drives and components
- terminating conductors
- configuring operation as required; and
- testing operation:

According to CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.06 **Maintain and troubleshoot AC constant voltage drives** by:

- completing lock out and tag out requirements as required
- conducting operational tests as required
- troubleshooting defects or faults
- repairing and replacing components as required
- testing operation; and
- completing documentation as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.07 **Install adjustable speed AC drives** by:

- selecting drives and components that match the motor
- determining location, type and wiring requirements
- meeting cable shielding requirements
- calculating conductor size
- mounting drives and components
- terminating conductors
- configuring operating parameters as required; and
  - testing operation:According to CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.08 **Maintain and troubleshoot adjustable speed AC drives** by:

- completing lock out and tag out requirements as required;
- conducting operational tests as required
- troubleshooting defects or faults
- repairing and replacing components as required
- reconfiguring operating parameters as required
- testing operation; and
- completing documentation as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.09 **Install, programmable logic controller (PLC) systems** by:

- selecting systems that match the design, specifications and application
- determining location, quality, type and wiring requirements
- considering the operation and surrounding conditions
- determining the requirements and programming parameters
- selecting, and installing hardware, cables, devices and controls
- mounting system and components
- ensuring adequate ventilation for cooling
- ensuring access for maintenance
- terminating conductors
- configuring and programming as required; and
- testing operation:

According to CEC, OESC, CSA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.10 **Maintain and troubleshoot programmable logic controller (PLC) systems by:**

- conducting operational and functional tests as required
- checking power supply
- performing preventative and predictive maintenance as required
- determining root cause of problems
- troubleshooting defects or faults
- repairing and replacing components as required such as I/O module, power supplies, controllers
- reconfiguring or reprogramming as required
- testing and confirming operation and connections; and
- completing documentation as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.11 **Install, safety systems and associated components** such as light curtains, safety mats, proximity sensors, safety PLCs and associated guarding, relays and controls:

- selecting systems and components that match the design, specifications and application
- determining location, quality, type and wiring requirements
- determining the requirements and programming parameters
- identifying hazards and determining separation or safety distance
- mounting system and components
- terminating conductors
- configuring and programming as required; and
- testing operation and function (ensuring safety of tester(s) in a failure):

According to CEC, OESC, CSA manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.12 **Maintain and troubleshoot safety systems and associated components** such as light curtains, safety mats, proximity sensors, safety PLCs and associated guarding, relays and controls by:

- completing lock out and tag out requirements as required
- conducting operational and functional tests as required
- checking power supply
- performing preventative and predictive maintenance as required
- determining root cause of problems
- troubleshooting defects or faults
- repairing and replacing components as required
- reconfiguring or reprogramming as required
- testing and confirming operation and connections
- testing operation and function (ensuring safety of tester(s) in a failure); and,
- completing documentation as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

- selecting systems and components that match the design, specifications and application
- determining location, quality, type and wiring requirements
- determining the requirements and programming parameters
- mounting system and components
- terminating conductors
- configuring and programming as required; and
- testing operation and function (ensuring safety of tester(s) in a failure)

According to CEC, OESC, CSA manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.14 **Maintain and troubleshoot computerized numerical control (CNC) systems** by:

- completing lock out and tag out requirements as required
- conducting operational and functional tests as required
- checking power supply
- performing preventative and predictive maintenance as required
- determining root cause of problems
- troubleshooting defects or faults
- repairing and replacing components as required
- reconfiguring or reprogramming as required
- testing and confirming operation and connections
- testing operation and function (ensuring safety of tester(s) in a failure); and
- completing documentation as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.15 **Install robotic systems** by:

- selecting systems and components that match the design, specifications and application
- determining location, quality, type and wiring requirements
- mounting system and components
- terminating conductors
- configuring, calibrating and programming as required; and
- testing operation and function (ensuring safety of tester(s) in a failure)

According to CEC, OESC, CSA manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8059.16 **Maintain and troubleshoot robotic systems** by:

- completing lock out and tag out requirements as required
- conducting operational and functional tests as required
- interpreting event logs
- checking power supply
- performing preventative and predictive maintenance as required
- determining root cause of problems as required
- troubleshooting defects or faults
- repairing and replacing components as required
- reconfiguring recalibrate or reprogramming as required
- performing fine calibration and calibration offset
- testing and confirming operation and connections
- testing operation and function (ensuring safety of tester(s) in a failure); and
- completing documentation as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8060.0 Install, Maintain and Troubleshoot Power Generating Systems and Associated Equipment

Power generating systems convert different types of energy into electricity. These may include battery and other stand-by systems that provide auxiliary power used during power failures, UPS systems as well as renewable and alternate energy and storage systems such as fuel cells, wind turbines, photovoltaic modules and others. When working with these different systems, it is important for electricians to understand their unique health and safety needs such as eye wash stations and showers for battery systems and fall protection requirements for renewable energy systems (i.e. wind turbines). In the case of some renewable energy systems that cannot be de-energized, electricians need to ensure they take health and safety precautions.

Skills

8060.01 Install uninterruptible power supply (UPS) systems to provide stand-by power by:

- selecting systems and components that match the design, specifications and application;
- determining layout, location, type and wiring requirements
- mounting system and components
- terminating conductors
- connect stand-by energy source (batteries, fuel cells)
- configuring and programming as required; and
- testing operation

According to CEC, OESC, OBC, CSA manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

*** A Trainer may be a Supervisor or the competent employee designated by the Apprentice's Sponsor.**

8060.02 **Maintain uninterruptible power supply (UPS) systems to provide stand-by power** by:

- completing lock out and tag out requirements as required
- conducting operational and functional tests as required
- troubleshooting defects or faults
- repairing and replacing components as required
- testing operation; and
- completing documentation as required:

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8060.03 **Install battery stand-by systems to provide auxiliary power during power failure** by:

- selecting systems and components that match the design, specifications and application such as transfer switches, power supplies, rectifiers, battery chargers, disconnects
- determining location, type, wiring and ventilation requirements
- mounting system and components
- terminating conductors
- connect batteries
- configuring system as required such as depth of discharge and charging, transfer rates;
- testing operation

According to CEC, OESC, CSA manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8060.04 **Maintain and troubleshoot battery stand-by systems to provide auxiliary power during power failure** by:

- completing lock out and tag out requirements as required
- performing preventative and predictive maintenance as required
- determining root cause of problem as required
- checking power supply
- confirming electrolyte levels, battery charger performance, connections as required
- conducting operational and functional tests as required
- troubleshooting defects or faults
- repairing and replacing components as required
- cleaning components such as the ventilator fan, terminal posts
- testing and confirming operation and connections; and
- completing documentation as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8060.05 **Install stand-by generation equipment** by:

- selecting systems and components that match the design, specifications and application such as life safety, off-grid power, mandatory and non-mandatory emergency loads
- determining location, type, size, wiring and ventilation requirements
- mounting system and components
- terminating conductors
- configuring system as required; and
- testing operation

According to CEC, OESC, CSA, OBC, Ministry of the Environment, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8060.06 **Maintain stand-by generation equipment** by:

- completing lock out and tag out requirements as required
- conducting operational and functional tests as required
- troubleshooting defects or faults
- repairing and replacing components as required
- cleaning components as required
- testing operation; and
- completing documentation as required

According to manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8060.07 **Install renewable energy and storage systems** such as fuel cells, wind turbines, photovoltaic modules, hydrokinetic, geothermal, hydraulic turbine, tidal, compressed air storage, flow batteries by:

- selecting systems and components that match the design, specifications and application
- determining location, type, size, wiring requirements;
- mounting system and components;
- terminating conductors;
- bonding and grounding system and components;
- configuring system as required; and,
- testing operation:

According to CEC, OESC, CSA, OBC, Ministry of the Environment, Ministry of Labour, LDC, specifications, job specifications and company policies and procedures

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8060.08 **Maintain renewable energy and storage systems** such as fuel cells, wind turbines, photovoltaic modules, hydrokinetic, geothermal, hydraulic turbine, tidal, compressed air storage, flow batteries by:

- completing lock out and tag out requirements as required;
- conducting operational and functional tests as required;
- troubleshooting defects or faults;
- repairing and replacing components as required;
- cleaning components as required;
- testing operation; and,
- completing documentation as required:

According to the Ministry of Labour, manufacturers' specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.0 Install, Maintain and Troubleshoot Communications and Signalling Systems

Electricians may work with a variety of communication and signalling systems including but not limited to voice, video, sound, phone and data systems. Examples of these systems include but are not limited to fire alarm systems, low voltage communication systems such as audio-visual systems, patient care systems, security systems, paging systems, and clock system and automation systems.

Skills

8061.01 Install fibre optic cabling and equipment by:

- selecting cabling, equipment and components that match application;
- reading and interpreting job reference material and drawings;
- mounting system and components;
- bonding and grounding system and components;
- configuring system and device parameters;
- selecting and verifying cable pathway;
- selecting and verifying cable installation;
- splicing and terminating;
- certifying the operation and proofing the performance;
- testing operation;
- completing documentation as required:

According to CEC, OESC, CSA, OBC, TIA (Telecommunication Industry Association), manufacturer's specifications, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

*** A Trainer may be a Supervisor or the competent employee designated by the Apprentice's Sponsor.**

8061.02 **Maintain fibre optic cabling and equipment** by:

- conducting visual inspection of the system;
- conducting operational and functional tests;
- cleaning components;
- completing documentation as required:

According to CEC, OESC, CSA, OBC, TIA, manufacturer's specifications, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.03 **Troubleshoot fibre optic cabling and equipment** by:

- conducting functionality tests as required;
- checking status;
- checking for faults;
- checking for performance;
- conducting field assessments using diagnostic and test equipment to determine source of malfunction;
- referencing installation specifications and drawings;
- checking connections and terminations;
- determining root cause;
- repairing or replacing components as required;
- confirming operational requirements;
- returning the system to operational status; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC, TIA, manufacturer's specifications, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.04 **Install data and communication cables and equipment** by:

- selecting cabling, equipment and components that match application;
- reading and interpreting job reference material and drawings;
- mounting system and components;
- bonding and grounding system and components;
- configuring system and device parameters;
- selecting and verifying cable pathway;
- selecting and verifying cable installation;
- splicing and terminating;
- certifying the operation and proofing the performance;
- testing operation; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC, TIA, manufacturer's specifications, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.05 **Maintain data and communication cabling and equipment** by:

- conducting visual inspection of the system;
- conducting operational and functional tests;
- cleaning components;
- completing documentation as required:

According to CEC, OESC, CSA, OBC, TIA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.06 **Troubleshoot data and communication cables and equipment** by:

- conducting functionality tests as required;
- checking status;
- checking for faults;
- checking for performance;
- conducting field assessments using diagnostic and test equipment to determine source of malfunction;
- referencing installation specifications and drawings;
- checking connections and terminations;
- determining root cause;
- repairing or replacing components as required;
- confirming operational requirements;
- returning the system to operational status; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC, TIA, manufacturer's specifications, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.07 **Install fire alarm systems** by:

- reading and interpreting job reference material and drawings;
- mounting system and components;
- selecting and using components that match the application;
- laying out signalling, annunciation and auxiliary wiring;
- bonding and grounding system and components;
- selecting overcurrent protection;
- selecting conductor size, type and material:
- configuring system and device parameters;
- terminating;
- verifying the operation and proofing the performance;
- testing operation;
- working with manufacturer to ensure system certification; and,
- completing documentation as required:

According to CEC, OESC, CSA, NBC, OBC, OFC, NFPA, ULC (Underwriters Laboratory of Canada), manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.08 **Maintain fire alarm systems by:**

- notifying all affected parties;
- conducting tests such as visual, physical inspection;
- checking signalling devices for compliance such as sound levels, visual display, vibration;
- checking activation and detecting devices such as heat, smoke, pull station, flow switches;
- checking remote and local annunciators;
- checking ancillary devices such as door holders, fan shut down, elevator recall, external notification devices, pumps;
- setting the sensitivity;
- replacing components as required;
- cleaning surfaces, openings;
- testing operation; and,
- ensuring system verification with manufacturer as required; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC, OFC, ULC, NFPA, NBC manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.09 **Troubleshoot fire alarm systems by:**

- conducting functionality tests as required;
- checking status;
- checking for faults;
- checking for performance;
- conducting field assessments using diagnostic and test equipment to determine source of malfunction;
- referencing installation specifications and drawings;
- checking connections and terminations;
- determining root cause;
- replacing components as required;
- confirming operational requirements;
- returning the system to operational status;
- ensuring system verification with manufacturer as required; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC, OFC, NFPA, ULC, NBC manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.10 **Install low voltage communications systems** such as audio-visual systems, patient care systems, security systems, paging systems, and clock system by:

- selecting cabling, equipment and components that match application;
- reading and interpreting job reference material and drawings;
- mounting system and components;
- bonding and grounding system and components;
- configuring system and device parameters;
- selecting and verifying cable pathway;
- selecting and verifying cable installation;
- splicing and terminating;
- verifying the operation and proofing the performance;
- testing operation; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC, TIA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.11 **Maintain low voltage communication systems** such as audio-visual systems, patient care systems, security systems, paging systems, and clock system by:

- conducting visual inspection of the system;
- conducting operational and functional tests;
- cleaning components; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC, TIA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.12 **Troubleshoot low voltage communications systems** such as audio-visual systems, patient care systems, security systems, paging systems, and clock system by:

- checking status;
- checking for faults;
- checking for performance;
- conducting field assessments using diagnostic and test equipment to determine source of malfunction;
- referencing installation specifications and drawings;
- checking connections and terminations;
- determining root cause;
- repairing or replacing components as required;
- confirming operational requirements;
- returning the system to operational status; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC, TIA, manufacturer's specifications, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.13 **Install automation systems** such as building automation systems, control automation systems, campus systems, enterprise platforms, energy management systems, environmental management systems by:

- using communication protocols such as Ethernet, DeviceNet, Modbus
- monitoring energy systems such as SCADA
- selecting cabling, equipment and components that match application;
- reading and interpreting job reference material and drawings;
- mounting system and components;
- bonding and grounding system and components;
- configuring system and device parameters;
- selecting and verifying cable pathway;
- selecting and verifying cable installation;
- splicing and terminating;
- verifying the operation and proofing the performance;
- testing operation; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC/NBC, TIA, specifications, and instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.14 **Maintain automation system** such as building automation systems, control automation systems, campus systems, enterprise platforms, energy management systems, environmental management systems by:

- conducting visual inspection of the system;
- conducting operational and functional tests;
- cleaning components; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC/NBC, TIA, specifications, and instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8061.15 **Troubleshoot automation systems** such as building automation systems, control automation systems, campus systems, enterprise platforms, energy management systems, environmental management systems by:

- completing lock out and tag out requirements as required;
- conducting functionality tests as required;
- using communication protocols such as Ethernet, DeviceNet, Modbus
- monitoring energy systems such as SCADA
- checking status;
- checking for faults;
- checking for performance;
- conducting field assessments using diagnostic and test equipment to determine source of malfunction;
- referencing installation specifications and drawings;
- checking connections and terminations;
- determining root cause;
- repairing or replacing components as required;
- confirming operational requirements;
- returning the system to operational status; and,
- completing documentation as required:

According to CEC, OESC, CSA, OBC/NBC, TIA, specifications, and instructions, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8062 Communicate in the Workplace

While working in the field, it is important for electricians to develop a vast array of communication skills in order to successfully interact and inter-relate with different individuals such as co-workers, other tradespeople, vendors and manufacturers. In Ontario, workplace violence and harassment policies are set out in legislation.

Skills

8062.01 **Write job related documents** such as work orders, change orders, office memoranda, letters, accident reports and forms, logbook entries, risk assessments for workplace hazards: ensuring that documents are written clearly, legibly and completely: according to legislation, regulation, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

*** A Trainer may be a Supervisor or the competent employee designated by the Apprentice's Sponsor.**

8062.02 **Communicate instructions (verbal, written and other) with others** such as co- workers, vendors, manufacturers, and other trades by:

- giving, receiving and conveying instructions;
- identifying steps to be followed;
- setting out conditions under which the instructions are to be completed;
- determining time frames; and,
- documenting and recording as required:

Ensuring that the recipient can complete the assigned task and understands the instructions given:
According to industry standards, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8062.03 **Demonstrate interpersonal skills** by:

- listening attentively;
- using verbal and non-verbal signals to convey messages;
- using language acceptable in the work place;
- recognizing the chain of command on a work site;
- explaining problems and procedures;
- identifying alternate solutions and obtaining approvals; and,
- obtaining verification feedback:

According to legislation, regulation, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8062.04 **Present professional image** by:

- wearing appropriate apparel;
- observing personal hygiene standards;
- maintaining clean clothing; and,
- following a hygiene regimen:

According to legislation, regulation, industry, job specifications, company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

8062.05 **Use communication devices and computers** such as public address systems, telephones, radios and wireless devices: to ensure that correct and accurate instruction and procedures are conveyed safely and efficiently: According to government regulations, job specifications and company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

Acronyms	
AC	Alternating Current
AHJ	Authorities having jurisdiction
ASME	American Society of Mechanical Engineers
CEC	Canadian Electrical Code
CNC	Computerized Numerical Control
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
DC	Direct Current
DCS	Distributed Control Systems
DGTA	Dangerous Goods Transportation Act
EMT	Electrical Metallic Tubing
ESA	Electrical Safety Authority
EPA	Environmental Protection Act
GFCI	Ground Fault Circuit Interrupters
HMI	Human Machine Interface
HVAC/R	Heating, ventilation and air conditioning/refrigeration
IEEE	Institute of Electrical and Electronics Engineers
IESS	Illumination Engineering Society Standards
IHSA	Infrastructure Health and Safety Association
IRT	Infrared Thermography
LDC	Local Distribution Companies

LED	Light emitting diode
NBC	National Building Code
NFPA	National Fire Protection Association
OBC	Ontario Building Code
OESC	Ontario Electrical Safety Code
OFC	Ontario Fire Code
OHSA	Occupational Health and Safety Act
PID	Proportional-integral-derivative
PLC	Programmable Logic Controller
PVC	Poly Vinyl Chloride
RTD	Resistance Temperature Detector
SCADA	Supervisory Control and Data Acquisition
TIA	Telecommunications Industry Association
TSSA	Technical Safety and Standards Association
UPS	Uninterruptable Power Supply
ULC	Underwriters Laboratories of Canada
WHMIS	Workplace Hazardous Materials Information System
WSIA	Workplace Safety Insurance Act
WSPA	Workplace Safety & Prevention Services

Definitions

Apprentice

- An individual who, pursuant to a registered Training Agreement, is receiving or is to receive training in a trade that is required as part of an apprenticeship program
- Holds a Training Agreement in either a compulsory or non-compulsory trade;
- Are subject to any ratios that have been set out in regulation and or recommended by industry for their trade(s);
- Remain as an Apprentice until they receive their Certificate of Apprenticeship

BOSTA
Building Opportunities in the Skilled Trades Act, 2021 (BOSTA)

Certificate of Apprenticeship (C of A)
A certificate issued to individuals who have demonstrated that they have completed an apprenticeship program in Ontario.

Certificate of Qualification (C of Q)
A certificate issued to an individual who has completed an apprenticeship or equivalent AND passed the Certificate of Qualification examination.

Competence
The ability of an individual to perform a skill, consistently without assistance, in the workplace as set out in the Logbook.

Competency Analysis Profile (CAP Chart)
A chart that identifies the training needs of an individual trade and details the skills/skill sets that must be demonstrated during an apprenticeship program.

Journeyperson
Journeyperson means an individual who holds a certificate of qualification (in a compulsory or non-compulsory trade) and/or an individual who practices as a journeyperson in a non-compulsory trade who does not hold a certificate of qualification and has equivalent experience in that trade.

Mandatory Skill
Status assigned to unshaded individual skills, skill sets or general performance objectives which must be signed-off for the Apprentice to complete their program.

Optional Skill
Status assigned to shaded individual skills, skills sets or general performance objectives for which sign-off is not required for the Apprentice to complete the program.

Provisional Certificates of Qualification

- A Provisional Certificate of Qualification is issued to an individual who has obtained a Certificate of Apprenticeship (in both compulsory and non-compulsory trades) in a program that has a Certificate of Qualification examination, to which the individual has not yet passed the Certificate of Qualification examination.
- A Provisional Certificate of Qualification shall have the prescribed term or, if no term is prescribed, a term of one year.
- In a compulsory trade, the Provisional Certificate of Qualification allows a person to continue working legally in the trade for up to 12 months while they work to pass the certifying exam.
- Individuals with a Provisional Certificate of Qualification are subject to any ratios that have been set out for their trade(s).

Ratios

For the purpose of an Apprenticeship program, a ratio is the maximum number of Journeypersons to Apprentices. The purpose of ratios is to provide consistent supervision, training and continuity of work.

Red Seal Program

The Interprovincial Standards Red Seal Program (also known as the Red Seal Program) was established more than 50 years ago to provide greater mobility across Canada for skilled workers and represents a standard of excellence for industry. Through the program, individuals are able to obtain a Red Seal endorsement on their provincial/territorial certificates by achieving 70% or higher on an interprovincial Red Seal examination.

The Interprovincial Standards Red Seal Program acknowledges their competence and ensures recognition of their certification throughout Canada without further examination. There are currently over 50 Red Seal designated trades. **The Red Seal Program is recognized as the interprovincial *standard of excellence* in the skilled trades.** The Interprovincial Standards Red Seal Program is a partnership between the Government of Canada, the Provinces, the Territories and various stakeholders.

Sign-off

Signature of the Sponsor of record, or an individual to whom that Sponsor has delegated signing authority, (e.g. Trainer) indicating an Apprentice’s demonstration of competence.

Skill

Individual competency/task described in the Logbook.

Skill Sets

Group or selection of individual skills found in the Logbook.

Skill Set Completion for Sponsors
Listing for all skill sets and includes space for sign-off by Sponsor of record.

Sponsor
Means a person that has entered into a registered Training Agreement under which the person is required to ensure that an individual is provided with workplace-based training in a trade as part of an apprenticeship program.

Sponsor of Record
Refers to the Sponsor documented as being signatory to the registered Training Agreement or Contract of Apprenticeship. In order for a Sponsor to be considered for the training of Apprentices, they must identify that the workplace has qualified persons or the equivalent on site, and can identify that the workplace has the tools, equipment, materials, and processes which have been identified by the Industry representatives for the trade.

Trainer
An individual who oversees the performance of a task and sets the workplace expectations and practices for the Apprentice. For a compulsory trade, a qualified Trainer is an individual who holds a Certificate of Qualification. In a non-compulsory trade, a Trainer is an individual who either holds a CofQ, CofA, or is considered equivalent.

Ready to Write Your Exam?

Many of the skilled trades in Ontario have a final certification examination that you must pass to become certified in your trade. Passing the examination gives you the right to hold yourself out as a Journeyperson and receive a Certificate of Qualification in your trade.

There are two types of trade certification examinations in Ontario:

1. Provincial (Ontario) examinations - which lead to a Certificate of Qualification.
2. Red Seal examinations – which lead to a Certificate of Qualification with an Interprovincial Red Seal endorsement.

If a trade is designated as Red Seal in Ontario, you will be writing the Red Seal examination. To access the Red Seal preparation guide please visit: red-seal.ca

Ontario's Exam Preparation Guide
Exam Resources – Skilled Trades Ontario

Basic Examination Details for You to Know

- You will have **up to four hours to write your examination.**
- Accommodations must be requested and approved prior to scheduling your examination.
- You can leave the examination centre if you complete the examination in less than four hours.
- Exam questions are multiple choice with four options from which you must choose the correct answer. Your examination may have between 90 and 150 multiple choice questions.
- You need a mark of 70% to pass.

Scheduling Your Examination
The examination scheduling process is currently outlined in detail on the Skilled Trades Ontario website: Exam Scheduling – Skilled Trades Ontario

Remember these 3 basic steps:

1. Confirm your eligibility to write the examination with Skilled Trades Ontario.
2. Contact Client Services at Skilled Trades Ontario to pay your examination fee.
3. Contact the local Service Delivery Office to schedule your examination in their examination centre: https://www.ontario.ca/page/employment-ontario-apprenticeship-offices

Instructions for Recording a Change in Sponsor

1. Record your first sponsor's information in Sponsor Record #1 – this would be the sponsor who has signed your initial apprenticeship Training Agreement for this trade.
2. If you do change sponsors prior to completing this apprenticeship, please contact your local Service Delivery Office immediately to update your sponsor record.
3. Please make sure you record all the information regarding any additional sponsors of record towards your apprenticeship using the Sponsor Records on the following pages (if applicable).

   You must fill out a Change of Sponsor Record each time you change your sponsor.

Sponsor Record #1

Sponsor Information		
Apprentice Name		
Training Agreement #		**Date (mm/dd/yy)**
Sponsor Name		
Address		
Telephone		
E-mail Address		

Summary of Training	
Employment Start Date	
Employment End Date	
Total hours of training & instruction between dates of employment.	
Skill Sets Completed	

As the Sponsor, I hereby confirm that the above information is true and accurate to the best of my knowledge.

Signature: _____ Date: (mm/dd/yy)_____

The Sponsor is required to sign-off and date the skills after the Apprentice has proven competence in those skills. However, if a skill is shaded, it is optional and does not need to be signed-off.

***If you need additional copies of the Sponsor Record, visit SkilledTradesOntario.ca and search Sponsor Record Form.**

Change of Sponsor Record #2

Sponsor Information		
Apprentice Name		
Training Agreement #		**Date (mm/dd/yy)**
Sponsor Name		
Address		
Telephone		
E-mail Address		

Summary of Training	
Employment Start Date	
Employment End Date	
Total hours of training & instruction between dates of employment.	
Skill Sets Completed	

As the Sponsor, I hereby confirm that the above information is true and accurate to the best of my knowledge.

Signature: _____ Date: (mm/dd/yy)_____

The Sponsor is required to sign-off and date the skills after the Apprentice has proven competence in those skills. However, if a skill is shaded, it is optional and does not need to be signed-off.

***If you need additional copies of the Sponsor Record, visit SkilledTradesOntario.ca and search Sponsor Record Form.**

Change of Sponsor Record #3

Sponsor Information		
Apprentice Name		
Training Agreement #		**Date (mm/dd/yy)**
Sponsor Name		
Address		
Telephone		
E-mail Address		

Summary of Training	
Employment Start Date	
Employment End Date	
Total hours of training & instruction between dates of employment.	
Skill Sets Completed	

As the Sponsor, I hereby confirm that the above information is true and accurate to the best of my knowledge.

Signature: _____ Date: (mm/dd/yy) _____

The Sponsor is required to sign-off and date the skills after the Apprentice has proven competence in those skills. However, if a skill is shaded, it is optional and does not need to be signed-off.

***If you need additional copies of the Sponsor Record, visit SkilledTradesOntario.ca and search Sponsor Record Form.**

Change of Sponsor Record #4

Sponsor Information		
Apprentice Name		
Training Agreement #		**Date (mm/dd/yy)**
Sponsor Name		
Address		
Telephone		
E-mail Address		

Summary of Training	
Employment Start Date	
Employment End Date	
Total hours of training & instruction between dates of employment.	
Skill Sets Completed	

As the Sponsor, I hereby confirm that the above information is true and accurate to the best of my knowledge.

Signature: _____ Date: (mm/dd/yy) _____

The Sponsor is required to sign-off and date the skills after the Apprentice has proven competence in those skills. However, if a skill is shaded, it is optional and does not need to be signed-off.

***If you need additional copies of the Sponsor Record, visit SkilledTradesOntario.ca and search Sponsor Record Form.**

Appendix A — Instructions for Apprenticeship Program Completion

Once an Apprentice has completed all the classroom training and benchmark on-the-job hours specified for the trade and has acquired all the mandatory skills included in this Logbook.

The Apprentice and the Sponsor complete the Apprentice Completion Form and the Skill Set Completion for Sponsors Form located on the following pages.

1. They sign the forms and submit them to their local Service Delivery Office. To find the closest office, check the contact information at ontario.ca/page/employment-ontario-apprenticeship-offices *or call the Employment Ontario toll free number at (1-800-387-5656).*

2. For All Trades: All mandatory skills (or the combination indicated in the completion requirements for the trade) in the Logbook must be signed-off. The recommended hours are a benchmark. If the Sponsor is completing the Apprentice before the industry recommended training hours are done, staff may request further information regarding the Apprentice's on-the-job training. An example of a request would be a letter from the Sponsor confirming the Apprentice worked for some time in the trade before the initial Training Agreement was registered, thereby acquiring some skills beforehand.

If Apprentices are submitting the completion request form and supporting documentation to their local Service Delivery Office by mail, fax, or email (as a scanned document), they should not include their Logbook; if they are presenting this form in person at the local Service Delivery Office, they should bring their Logbook with them.

After staff verifies all the information in the completion request, they may contact either the Apprentice or the Sponsor for further information or documentation. Once the completion has been confirmed, the local Service Delivery Office will issue a Certificate of Apprenticeship to the Apprentice.

Skilled Trades Ontario will receive notification of this completion.

- If the Apprentice has completed a program in a **compulsory trade,** Skilled Trades Ontario will automatically register the Apprentice for a Provisional Certificate of Qualification to continue to work legally for one year while preparing for the certification examination.
- If an Apprentice completes their apprenticeship in a **non-compulsory trade** and there is a Certificate of Qualification exam, they must write and pass the exam to receive a Certificate of Qualification from Skilled Trades Ontario.

For permission to schedule an exam once completion is confirmed, the individual must first contact the Skilled Trades Ontario Client Services Department at 647-847-3000 or toll free at 1-855-299-0028 to pay the certification examination fee. Once you have paid your exam fee with Skilled Trades Ontario, book your exam by contacting your nearest Employment Ontario local Service Delivery Office.

Appendix B — Apprentice Completion Form

Please fill out both sides of this form, including the Skill Set Completion for Sponsors (see back of form). Once both sides are completed, submit the form to your local Service Delivery Office (find contact information at ontario.ca/page/employment-ontario-apprenticeship-offices or by calling Employment Ontario at (1-800-387-5656).

Apprentice Information	
Name (print)	
Client ID # Issued by Ministry	
Telephone Number(s)	

Sponsor Information	
Legal Name	
Address	
Telephone Number(s)	
Sponsor's Signing Authority *(print name)*	
E-mail Address	

Program Information			
Trade Name			
Number of hours required as per Training Agreement *(hours-based trades only)*			
Hours completed? *(documentation attached)*	Yes ( )	No ( )	Not applicable ( )
Classroom training completed or exempt?	Yes ( )	No ( )	Not applicable ( )

I hereby confirm that the information submitted on both sides of this form is true and accurate.

X_____ **X** _____

Apprentice's Signature Date **Signature of Sponsor's Signing Authority Date**

Appendix C — Skill Set Completion for Sponsors

You will find the skill set numbers and titles in the Logbook's Table of Contents. By signing off each skill set in the table below, you are providing final confirmation, as the Apprentice's Sponsor, that the Apprentice has demonstrated competency in all the mandatory skills included in the skill set.

Skill Set #	Skill Set Title	Signing Authority Signature
8050	Protect Self and Others	
8051	Create, Modify and Interpret Schematics, Drawings and Specifications	
8052	Use and Maintain Tools and Equipment	
8053	Use and Maintain Test and Measuring Equipment	
8054	Instrumentation Devices and Automated Control Systems	
8055	Install, Troubleshoot, Repair and Maintain Wiring Systems	
8056	Install, Maintain and Troubleshoot Power Distribution Equipment Systems	
8057	Install, Troubleshoot and Maintain Lighting Systems	
8058	Install, Maintain and Troubleshoot Rotating Equipment & Associated Control Systems	
8059	Install, Maintain and Troubleshoot Motor Drives and Associated Control Systems	
8060	Install, Maintain and Troubleshoot Power Generating Systems & Associated Equipment	
8061	Install, Maintain and Troubleshoot Communications and Signalling Systems	
8062	Communication in the Workplace	

Ministry of Labour, Immigration, Training and Skills Development use only:

Sponsor verified as most recent sponsor of record: Yes ( ) No ( )

Documentation to support completion of hours attached: Yes ( ) No ( )

Completion of classroom training verified: Yes ( ) No ( )

Staff Name _____ Signature _____

Date _____

Appendix D — Local Service Delivery Offices in Ontario

For current office listings visit: *ontario.ca/page/employment-Ontario-apprenticeship-offices*

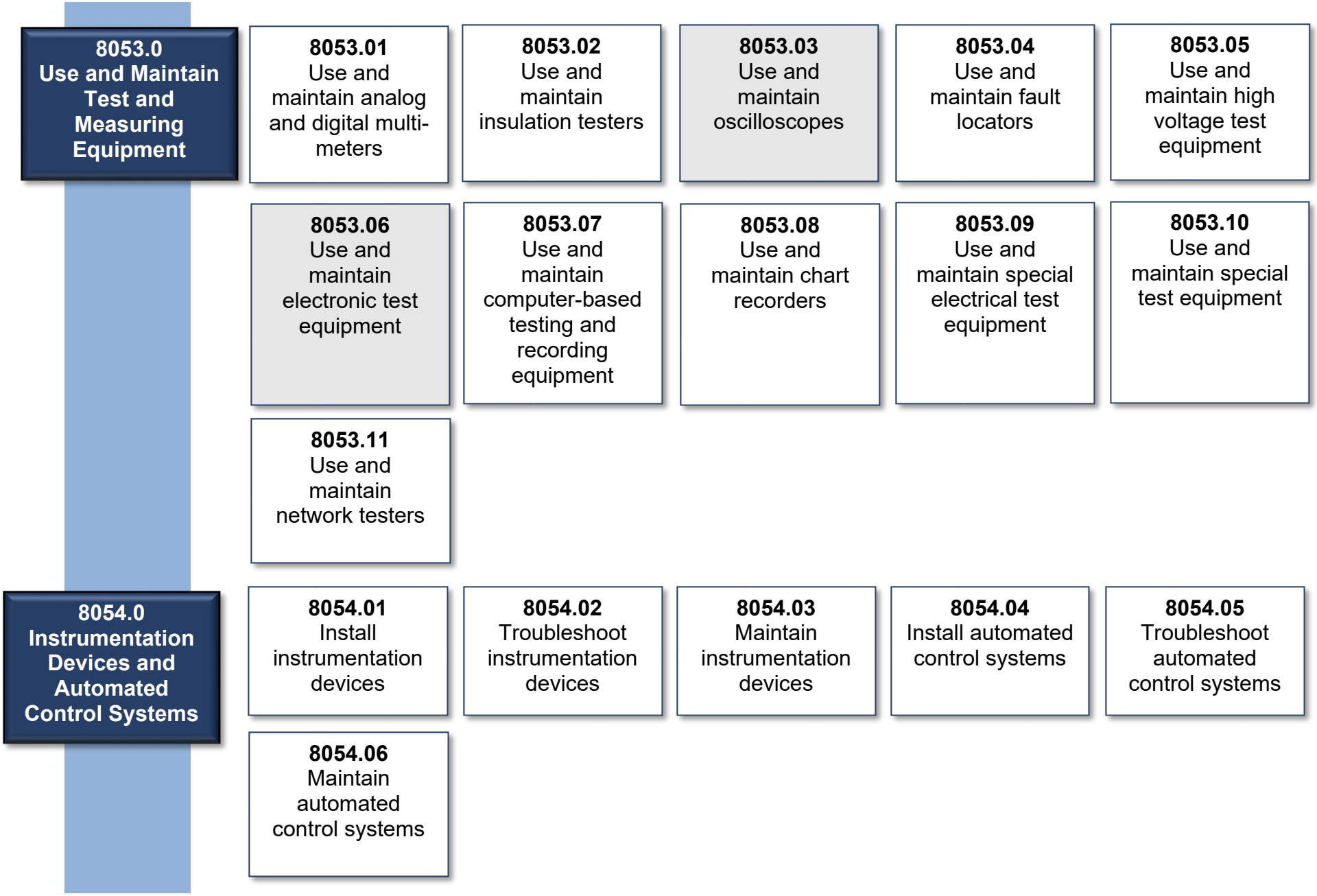
Location	Contact	Location	Contact
Barrie 705-737-1431	55 Cedar Pointe Dr Unit 609, Barrie, ON L4N 5R7	**Marathon** 807-346-1550	52 Peninsula Road, Suite 103 Marathon, Ontario, P0T 2E0
Belleville 613-968-5558 1-800-953-6885	135 North Front St, Belleville, ON K8P 3B5	**Markham** 905-513-2695	140 Allstate Parkway, Suite 505, Markham, Ontario L3R 5Y8
Brantford 519-756-5197	505 Park Rd North Suite 201, Brantford, ON N3R 7K8	**North Bay** 705-495-8515 1-800-236-0744	200 First Ave West, North Bay, ON P1B 3B9
Chatham 519-354-2766 1-800-214-8284	870 Richmond St West 1st Floor, Chatham, ON N7M 5J5	**Ottawa** 613-731-7100 1-877-221-1220	Preston Square, 347 Preston Street, Suite 310, Ottawa, ON K1S 3H8
Cornwall 613-938-9702 1-877-668-6604	132 Second St East Ste 202, Cornwall, ON K6H 1Y4	**Owen Sound** 519-376-5790 1-800-838-9468	1450 1st Ave West, Suite 100, Owen Sound, ON N4K 6W2
Dryden 807-456-2665 1-800-734-9572	Provincial Government Building, 479 Government St, Dryden, ON P8N 3K9	**Peel** 905-279-7333 1-800-736-5520	The Emerald Centre, 10 Kingsbridge Garden Circle, Suite 404, Mississauga, ON L5R 3K6
Durham 905-433-0595 1-800-461-4608	78 Richmond Street West, Oshawa, ON L1G 1E1	**Pembroke** 613-735-3911 1-800-807-0227	615 Pembroke St East, Pembroke, ON K8A 3L7
Elliot Lake 1-800-236-8817	50 Hillside Dr North, Elliot Lake, ON P5A 1X4	**Peterborough** 705-745-1918 1-877-433-6555	901 Lansdowne St West, Peterborough, ON K9J 1Z5
Fort Frances 807-274-8634	922 Scott St 2nd Flr, Fort Frances, ON P9A 1J4	**Sarnia** 519-542-7705 1-800-363-8453	Bayside Mall, 150 Christina St North, Sarnia, ON N7T 7W5
Geraldton 807-854-1966	208 Beamish Avenue West Geraldton, Ontario P0T 1M0	**Sault Ste. Marie** 705-945-6815 1-800-236-8817	477 Queen St East 4th Flr, Sault Ste Marie, ON P6A 1Z5
Halton 905-842-5105 1-844-901-5105	700 Dorval Dr., Suite 201, Oakville, ON L6K 3V3	**St Catharines** 905-704-2991 1-800-263-4475	Garden City Tower, 301 St Paul St East, 10th Flr, St Catharines, ON L2R 7R4
Hamilton 905-521-7764 1-800-668-4479	Ellen Fairclough Bldg, 119 King St West 8th Flr, Hamilton, ON L8P 4Y7	**Sudbury** 705-564-3030 1-800-603-5999	159 Cedar St Ste 506, Sudbury, ON P3E 6A5
Kapuskasing 705-465-5785 705-235-1950	Ontario Government Complex, 122 Government Rd West, Kapuskasing, ON P5N 2X8	**Thunder Bay** 807-346-1550 1-800-439-5493	189 Red River Rd Suite 103, Thunder Bay, ON P7B 1A2
Kenora 807-468-2879 1-800-734-9572	227 1/2 Second St South, Kenora, ON P9N 1G4	**Timmins** 705-235-1950 1-877-275-5139	Ontario Government Complex, 5520 Highway 101 East Wing B, South Porcupine, ON P0N 1H0
Kingston 613-548-1151 1-866-973-4043	Alliance Business Centre, 299 Concession St Ste 201, Kingston, ON K7K 2B9	**Toronto Centre** 416-927-7366 1-800-387-5656	2 St Clair West, 11th floor Toronto, ON M4A 1L5
Kitchener 519-653-5758 1-866-877-0099	4275 King St East, Kitchener, ON N2P 2E9	**Toronto South** 416-326-5800	625 Church St 1st Fl, Toronto, ON M7A 2B5
London 519-675-7788 1-800-265-1050	1200 Commissioners Rd E, Unit 72, London, ON N5Z 4R3	**Windsor** 519-973-1441	Roundhouse Centre, 3155 Howard Ave 2nd Fl, Suite 200, Windsor, ON N8X 4Y8

Competency Analysis Profile (CAP) Chart

8050.0
Protect Self and Others

8050.01 Apply applicable Acts, regulations, codes and directives	**8050.02** Identify hazards and hazardous conditions, equipment and material	**8050.03** Control hazards and hazardous conditions, equipment, and material	**8050.04** Follow safety procedures when working with designated substances	**8050.05** Identify electrical hazards
8050.06 Control electrical hazards	**8050.07** Use fire extinguishers and fire-fighting equipment	**8050.08** Perform housekeeping duties	**8050.09** Follow procedures for applying first aid and CPR for emergency situations	**8050.10** Follow procedures for reporting electrical incidents
8050.11 Use and maintain personal protective apparel and equipment	**8050.12** Use and maintain arc flash and arc blast rated personal protective equipment	**8050.13** Perform lock out, tagging and test procedures	**8050.14** Determine if the system is live or de-energized	**8050.15** De-energize live systems
8050.16 Follow electrical safety program and procedures when performing live work				

8051.0 Create, Modify and Interpret Schematics, Drawings And Specifications	**8051.01** Create sketches such as schematics, elevations, isometric, interference, wiring diagrams, layout	**8051.02** Modify drawings such as as-built, schematics, elevations, isometric, interference and logic	**8051.03** Interpret architectural drawings and specifications	**8051.04** Interpret mechanical drawings and specifications	**8051.05** Interpret power distribution drawings and specifications
	8051.06 Interpret instrumentation and communication drawings and specifications	**8051.07** Interpret electrical drawings and specifications	**8051.08** Interpret relay, solid state and logic drawings and specifications	**8051.09** Create a materials and equipment list	
8052.0 Use and Maintain Tools And Equipment	**8052.01** Use and maintain hand tools (non-power)	**8052.02** Use and maintain power tools and accessories (electric, hydraulic, pneumatic)	**8052.03** Use and maintain rigging and hoisting equipment	**8052.04** Use scaffolds, lifting devices and elevating platforms	**8052.05** Store scaffolds, lifting devices and elevating platforms
	8052.06 Perform trade-specific oxy-fuel cutting and welding procedures	**8052.07** Identify electrical material and equipment requirements	**8052.08** Use conduit bending and threading tools	**8052.09** Use and maintain powder actuated tools	**8052.10** Use thermit welding tools


8053.0
Use and Maintain Test and Measuring Equipment
8053.01
Use and maintain analog and digital multi-meters
8053.02
Use and maintain insulation testers
8053.03
Use and maintain oscilloscopes
8053.04
Use and maintain fault locators
8053.05
Use and maintain high voltage test equipment
8053.06
Use and maintain electronic test equipment
8053.07
Use and maintain computer-based testing and recording equipment
8053.08
Use and maintain chart recorders
8053.09
Use and maintain special electrical test equipment
8053.10
Use and maintain special test equipment
8053.11
Use and maintain network testers
8054.0
Instrumentation Devices and Automated Control Systems
8054.01
Install instrumentation devices
8054.02
Troubleshoot instrumentation devices
8054.03
Maintain instrumentation devices
8054.04
Install automated control systems
8054.05
Troubleshoot automated control systems
8054.06
Maintain automated control systems

8055.0 Install, Troubleshoot, Repair and Maintain Wiring Systems

8055.01 Install busway systems	**8055.02** Maintain busway systems	**8055.03** Install branch circuit wiring for loads	**8055.04** Troubleshoot branch circuit wiring for loads	**8055.05** Install cable trays for use with power, data and communication cable wiring systems
8055.06 Install single conductor (metallic and non- metallic) cables	**8055.07** Install multi-conductor (metallic and non- metallic) cables	**8055.08** Install non-metallic conduits and tubing	**8055.09** Install metallic conduits and tubing	**8055.10** Install electric heating systems
8055.11 Troubleshoot electric heating systems	**8055.12** Repair electric heating systems	**8055.13** Install wiring for hazardous locations including new installations	**8055.14** Install overhead distribution systems	**8055.15** Install direct buried underground cables
8055.16 Install underground conduits	**8055.17** Install Cathodic Protection systems	**8055.18** Maintain Cathodic Protection systems	**8055.19** Connect supply to HVAC/R systems	**8055.20** Install HVAC/R controls
8055.21 Maintain HVAC/R electrical connections and controls				

8056.0 Install, Maintain and Troubleshoot Power Distribution Equipment Systems

8056.01 Install power and energy metering systems	**8056.02** Install high voltage protection and control devices	**8056.03** Maintain high voltage protection and control devices	**8056.04** Install low voltage protection and control devices	**8056.05** Maintain low voltage protection and control devices
8056.06 Install high voltage oil and dry type distribution transformers	**8056.07** Install low voltage oil and dry type distribution transformers	**8056.08** Maintain high and low voltage oil and dry type distribution transformers	**8056.09** Install power distribution panels	**8056.10** Maintain power distribution panels
8056.11 Install ground fault detection	**8056.12** Maintain ground fault detection	**8056.13** Install ground fault protection	**8056.14** Maintain ground fault detection	**8056.15** Install ground fault circuit interrupters (GFCI)
8056.16 Maintain ground fault circuit interrupters (GFCI)	**8056.17** Install power factor correction equipment	**8056.18** Maintain power factor correction equipment	**8056.19** Install direct current (DC) power distribution systems	**8056.20** Maintain direct current (DC) power distribution systems
8056.21 Install direct current (DC) protective devices	**8056.22** Install AC protective devices	**8056.23** Maintain AC/DC protective devices		

8057.0 Install, Troubleshoot and Maintain Lighting Systems	**8057.01** Install non-external ballasted lighting	**8057.02** Troubleshoot and maintain non- external ballasted lighting	**8057.03** Install external ballasted/driver	**8057.04** Troubleshoot and maintain external ballasted/driver lighting	**8057.05** Install high intensity discharge lighting
	8057.06 Troubleshoot and maintain high intensity discharge lighting	**8057.07** Install light dimming and control systems and components	**8057.08** Troubleshoot and maintain light dimming and control systems	**8057.09** Install exit and emergency lighting powered by unit equipment, emergency power supply	**8057.10** Troubleshoot and maintain exit and emergency lighting powered by unit equipment, emergency power supply
	8057.11 Report illumination levels				
8058.0 Install, Maintain and Troubleshoot Rotating Equipment and Associated Control Systems	**8058.01** Maintain brush assemblies, slip rings and commutators	**8058.02** Troubleshoot brush assemblies, slip rings and commutators	**8058.03** Install DC motors and generators	**8058.04** Maintain DC motors and generators	**8058.05** Troubleshoot DC motors and generators

8058.06 Install AC motors and generators	**8058.07** Maintain AC motors and generators	**8058.08** Troubleshoot AC motors and generators	**8058.09** Install mechanical, electrical and auxiliary protective equipment	**8058.10** Maintain mechanical, electrical and auxiliary protective equipment
8058.11 Troubleshoot mechanical, electrical and auxiliary protective	**8058.12** Maintain lubrication systems and components	**8058.13** Troubleshoot lubrication systems and components	**8058.14** Maintain braking and clutch systems and components	**8058.15** Troubleshoot braking and clutch systems and components
8058.16 Start-up and shut- down rotating equipment	**8058.17** Install relays, solid state devices and controls	**8058.18** Maintain relays, solid state devices and controls	**8058.19** Troubleshoot relays, solid state devices and controls	**8058.20** Install protective devices
8058.21 Maintain protective devices	**8058.22** Troubleshoot protective devices	**8058.23** Install control panels and related control devices	**8058.24** Troubleshoot relays, solid state devices and controls	**8058.25** Install external mechanical/remo te field devices
8058.26 Maintain external mechanical/ remote field devices	**8058.27** Troubleshoot external mechanical/remo te field devices			

8059.0 Install, Maintain and Troubleshoot Motor Drives and Associated Control Systems

8059.01 Install, DC constant voltage drives	**8059.02** Maintain and troubleshoot DC constant voltage drives	**8059.03** Install adjustable speed DC drives	**8059.04** Maintain and troubleshoot adjustable speed DC drives	**8059.05** Install AC constant voltage drives
8059.06 Maintain and troubleshoot AC constant voltage drives	**8059.07** Install adjustable speed AC drives	**8059.08** Maintain and troubleshoot adjustable speed AC drives	**8059.09** Install, programmable logic controller (PLC) systems	**8059.10** Maintain and troubleshoot programmable logic controller (PLC) systems
8059.11 Install, safety systems and associated components	**8059.12** Maintain and troubleshoot safety systems and associated components	**8059.13** Install, computerized numerical control (CNC) systems	**8059.14** Maintain and troubleshoot computerized numerical control (CNC) systems	**8059.15** Install robotic systems
8059.16 Maintain and troubleshoot robotic systems				

8060.0 Install, Maintain and Troubleshoot Power Generating Systems and Associated Equipment	**8060.01** Install uninterruptible power supply (UPS) systems to provide stand-by power	**8060.02** Maintain uninterruptible power supply (UPS) systems to provide stand-by power	**8060.03** Install battery stand-by systems to provide auxiliary power during power failure	**8060.04** Maintain and troubleshoot battery stand-by systems to provide auxiliary power during power failure	**8060.05** Install stand-by generation equipment
	8060.06 Maintain stand-by generation equipment	**8060.07** Install renewable energy and storage systems	**8060.08** Maintain renewable energy and storage systems		
8061.0 Install, Maintain and Troubleshoot Communications and Signalling Systems	**8061.01** Install fibre optic cabling and equipment	**8061.02** Maintain fibre optic cabling and equipment	**8061.03** Troubleshoot fibre optic cabling and equipment	**8061.04** Install data and communication cables and equipment	**8061.05** Maintain data and communication cabling and equipment
	8061.06 Troubleshoot data and communication cables and equipment	**8061.07** Install fire alarm systems	**8061.08** Maintain fire alarm systems	**8061.09** Troubleshoot fire alarm systems	**8061.10** Install low voltage communications systems
	8061.11 Maintain low voltage communication systems	**8061.12** Troubleshoot low voltage communications systems	**8061.13** Install automation systems	**8061.14** Maintain automation system	**8061.15** Troubleshoot automation systems

8062 Communicate in the Workplace

8062.01 Write job related documents	**8062.02** Communicate instructions (verbal, written and other) with others	**8062.03** Demonstrate interpersonal skills	**8062.04** Present professional image	**8062.05** Use communication devices and computers

Notes

Completing Your Apprenticeship Program

Once your sponsor agrees you are competent in the required skills, your hours are complete and you have completed all the levels of classroom training required for your trade:

- ✓ Follow the completion instructions on the Completion Form (Appendix A) in the Logbook.
- ✓ Answer any questions that MLITSD staff may have and provide any additional completion documentation that may be required.
- ✓ Once completion is confirmed, MLITSD will issue you a Certificate of Apprenticeship and notify Skilled Trades Ontario.

After Your Apprenticeship

If you are in a trade with a certification exam, Skilled Trades Ontario will receive notice of your completion.

For compulsory trades, you will be issued a Provisional Certificate of Qualification which will allow you to work legally for up to 12 months until you write and pass your examination.

For a non-compulsory trade, once you pass your examination, you will be issued a Certificate of Qualification for your trade.

Preparing For Your Exam

- **To pay for a Certificate of Qualification examination, contact Skilled Trades Ontario** Client Services Department at: 647-847-3000 or toll free at 1-855-299-0028
- **To schedule your exam:** Once you have paid, contact your local Service Delivery Office to book your exam.
- **Download Skilled Trades Ontario exam preparation guide at:** Exam Resources – Skilled Trades Ontario **and/or view the exam preparation guide for Red Seal trades at:** red-seal.ca

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Industrial Electrician