Electricity Human Resources Canada is a non-profit organization supporting the human resources needs of the Canadian electricity sector.

Our Vision
Keeping the lights on in Canada by preparing and empowering a world-class workforce for the entire electricity industry.

Our Mission
Working to strengthen the ability of the Canadian electricity industry in meeting current and future needs for their workforce—one that is safety-focused, highly skilled, diverse and productive.

Our Values
We are a values-driven organization, committed to the improvement of our sector, the growth of Canada’s economy, and the stability of our power grid. Our core values are:

Collaboration
Working with all stakeholders in Canada’s electricity sector for our mutual benefit.

Trust
Forging relationships and products built on unwavering integrity.

Innovation
Leading the industry to be future-ready.
National Occupational Standards (NOS)

NOS are voluntary guidelines that have been developed to provide businesses, educators, trainers, and job seekers with practical guidance.

How are NOS used?

Employers, employees, and educational institutions can put NOS to a wide variety of uses supporting effective workforce planning:

- Support personnel certification or accreditation programs.
- Inform curricula for colleges and apprenticeships.
- Assist recruitment by informing job descriptions and providing a benchmark for employee appraisals.
- Identify career paths in order to promote employee retention.
- Help employers evaluate and determine the competencies of potential employees, including Internationally Trained Workers (ITWs).

Electricity Human Resources Canada has developed National Occupational Standards for a range of in-demand occupations.

Visit electricityhr.ca for more information.

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Key Terms within the National Occupational Standard:

<table>
<thead>
<tr>
<th>Major Category</th>
<th>A general functional area within the industry</th>
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</thead>
<tbody>
<tr>
<td>Competency Area</td>
<td>A specific area of responsibility within a Major Category</td>
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<tr>
<td>Competency Unit</td>
<td>A specific task that contains a description of the knowledge and performance components that are needed for successful, safe and effective completion</td>
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</tbody>
</table>

Each Competency within the National Occupational Standard is made up of (some or all of) the following elements:

- **Purpose:** A statement that describes what the competency is, and why it is important.
- **Performance:** What a job incumbent must be able to do to perform the competency.
- **Knowledge:** What a job incumbent must know to perform the competency.
- **Glossary:** Definitions for key terms used in the competency.
- **Range of Context:** Specific variables or situations that may impact the way that the competency is performed.
- **Level of Practice:** The level of job incumbent that typically performs the competency.
- **Adapted Bloom’s Taxonomy:** The level of cognitive performance required for the competency (of particular interest to trainers/educators).
- **RWATEM:** The Requisite Work Aids, Tools, Equipment and Materials used by job incumbents to perform the competency.
This Chart outlines the competencies (also known as skills and knowledge) that are performed by Level 2 EVSE Installers.

Key: Tasks included in Red Seal Occupational Standards for Construction Electrician and/or Industrial Electrician

<table>
<thead>
<tr>
<th>Major Category</th>
<th>Competency Area</th>
<th>Competency Unit</th>
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</thead>
<tbody>
<tr>
<td>Construction and</td>
<td>Plan Installation</td>
<td>Develop Level 2 Electrical Vehicle Supply Equipment (EVSE) installation plan</td>
</tr>
<tr>
<td>Installation</td>
<td></td>
<td>Organize materials and equipment for installation</td>
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<tr>
<td></td>
<td></td>
<td>Coordinate installation activities with others</td>
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<tr>
<td></td>
<td>Perform Foundational Electrical Installation Tasks</td>
<td>Install brackets, hangers and fasteners</td>
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<td>Install bonding systems</td>
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<tr>
<td></td>
<td>Install Level 2 Electric Vehicle Supply Equipment</td>
<td>Install Level 2 electrical supply components</td>
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<tr>
<td></td>
<td>and Components</td>
<td>Install Level 2 Electric Vehicle Supply Equipment (EVSE)</td>
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<tr>
<td></td>
<td>Install Generating, Distribution and Service Equipment</td>
<td>Install overcurrent protection devices</td>
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<td>Install low voltage distribution equipment</td>
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<td></td>
<td>Complete Installation Process</td>
<td>Troubleshoot installation issues</td>
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<td>Install operation and identification tags</td>
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<td></td>
<td>Commission Equipment and Systems</td>
<td>Verify equipment/system operation and functionality</td>
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<td>Document equipment/system performance</td>
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<td>Perform site cleanup</td>
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<td></td>
<td></td>
<td>Demonstrate system to client/end-user</td>
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<tr>
<td></td>
<td>Failing a Safe Working Environment</td>
<td>Follow safe work practices</td>
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<tr>
<td></td>
<td></td>
<td>Use personal protective equipment (PPE)</td>
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<td></td>
<td></td>
<td>Participate in safety meetings and emergency drills</td>
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<tr>
<td></td>
<td>Maintain a Sustainable Environment</td>
<td>Work in confined spaces</td>
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<tr>
<td></td>
<td></td>
<td>Isolate component, equipment or system</td>
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<tr>
<td></td>
<td>Respond to Emergencies</td>
<td>Participate in incident and accident investigations</td>
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<td></td>
<td>Perform lock-out tag-out procedures</td>
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<tr>
<td></td>
<td>Safety</td>
<td>Maintain a Safe Working Environment</td>
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<td>Maintain a Sustainable Environment</td>
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<td>Respond to Emergencies</td>
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<td>Follow Security Practices</td>
<td>Follow security practices for physical work environment</td>
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<td>Follow cybersecurity procedures</td>
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<td>Organization Policies and Procedures</td>
<td>Follow organizational policies and procedures</td>
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<td>Use communication applications</td>
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<td>Use navigation and mapping applications</td>
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<td>Use Organization’s ICT System</td>
<td>Use organization’s ICT system</td>
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<td>Use electrical measuring and testing equipment</td>
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<td>Foundational Trades Skills</td>
<td>Perform Routine Trade Tasks</td>
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<td>Use hand and power tools</td>
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<td></td>
<td>Perform lock-out tag-out procedures</td>
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<tr>
<td></td>
<td>Personal Competencies</td>
<td>Demonstrate Professional</td>
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<td>Work as member of a team</td>
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<td>Develop professionally</td>
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<td>Demonstrate professional and ethical conduct</td>
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<td>Mentor/coach others</td>
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<td>Manage stress</td>
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<td>Manage time</td>
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<td>Communicate Effectively</td>
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<td>Use active listening skills</td>
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<td>Use speaking skills</td>
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<td>Use writing skills</td>
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<td></td>
<td>Negotiate with internal and external stakeholders</td>
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<tr>
<td></td>
<td></td>
<td>Exchange information with internal and external stakeholders</td>
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</tbody>
</table>

Level 2 EVSE Installers install Level 2 (240V AC) electric vehicle supply equipment intended to supply electric energy to the onboard charger in an electric vehicle in accordance with the Canadian Electrical Code and jurisdictional requirements. Installation activities include connecting the conductors, connectors and all associated fittings, devices, power outlets or apparatuses mounted at the premises that are directly involved in delivering energy from the premises’ electrical distribution to the electric vehicle supply equipment (aka electric vehicle charging station).

An EVSE Installer must be a Qualified Electrician.
Purpose

Developing a Level 2 EVSE installation plan is important to ensure the installation proceeds safely and efficiently. If this is not performed correctly, it can cause delays and can compromise the safety of the installer and the clients.

Performance/Abilities

P1 Conduct site visit with client:
- wear appropriate PPE for site visit, e.g. safety footwear
- discuss client's needs, e.g. energy monitoring, access management
- determine when EVSE is likely to be used, e.g. overnight
- advise client of available rebates and incentives, if applicable

P2 Determine if existing service is adequate for the installation:
- refer to manufacturer's specifications for required power of EVSE to be installed
- access information on existing kWh usage, if possible, e.g. from utility, from client's long-term tracking
- calculate existing and projected load
- determine need for energy management control equipment

P3 Verify client's desired location of service

P4 Analyze potential installation sites and mounting methods for suitability, considering:
- cord lengths
- lighting
- security
- clearances and underground services
- environmental conditions, e.g. damp, cold, hot
- exposure to weather
- exposure to hazards, e.g. flooding
- need for barrier-free access
- availability of Wi-Fi or cellular signal if networked

P5 Choose location and mounting method for installation:
- ensure equipment will be physically protected
- ensure clearances will be maintained
- ensure equipment can be securely mounted
- determine trenching method, as required
- ensure adequate Wi-Fi or cellular signal will be available, if required

P6 Calculate voltage drop in accordance with Canadian Electrical Code (i.e. CE code)

P7 Size conductors and overcurrent protection in accordance with CE code

P8 Determine location of disconnect means in accordance with CE code, as required

P9 Determine bonding requirements in accordance with CE code

P10 Determine wiring methods in accordance with CE code

P11 Identify utility metering options, if applicable

P12 Determine signage required according to CE code and jurisdictional requirements

P13 Verify that appropriate permits have been obtained for the installation, as required

P14 Verify any relevant approvals have been obtained, as required, e.g. homeowners’ association

P15 Discuss options with client, as required

Document EVSE installation plan:
- ensure client signs/initials installation plan, as required

Knowledge

K1 Organization policies, procedures and plans, e.g. safety protocols
K2 Relevant CSA Standards, e.g. Canadian Electrical Code (CE code)
K3 Jurisdictional requirements including bylaws, permit requirements, accessibility requirements
K4 Barrier-free requirements applicable to location, if required
K5 Manufacturer’s specifications for equipment and system being installed
K6 Other documents relevant to the installation, e.g. technical drawings, client requirements, scope of work
K7 Industry best practices for specific installation
K8 Potential safety hazards and mitigation strategies
K9 Trenching methods
K10 Terms used in the EV industry
K11 EVSE types, features, advantages/disadvantages (e.g. charge times) and safety requirements
K12 Components used in EVSE installations
K13 Organizational document management system
K14 Roles and responsibilities of all involved in installation, e.g. client, contractor, supplier, co-workers, inspectors, subcontractor
K15 Available rebates and tax incentives

Contextual Variables

Range of Context

- Complexity of this competency depends upon the type and size of installation and specific installation site.
- Installers may be installing a single electric vehicle charging station, or multiple, such as in a fleet installation.
- This will increase the complexity of the competency.
- Installation may or may not include an energy management system, which must be accommodated in calculations and require additional wiring.
- EVSE may be single or dual head, or multiple EVSE stations may be on same pedestal, which must be accommodated in calculations.
- Some EVSE installations may integrate solar panels, which will add complexity and affect the choice of installation location.

Level of Practice

QA Frontline
QA Manager/Executive
QA Supervisor
QA Recall, Remember
QA Understand
QA Apply
QA Analyze
QA Evaluate
QA Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Personal protective equipment (PPE)
- CE code
- Manufacturer's specifications
- Site maps
- Underground locate for existing utility services
- Technical drawings
- Measuring tools, e.g. measuring tape, level
- Camera/cellular phone/smartphone

National Occupational Standard

Level 2 EVSE Installer

5
Contextual Variables

Range of Context
- Number and types of materials and equipment will vary with size/scope of the project. For example, commercial installation has more complexity, different types of material used, and more individuals to coordinate with. The scope of commercial work is larger than residential.
- Job specifications and on-site conditions can vary the way this skill is performed.

Level of Practice
- Frontline: Recall, Remember
- Supervisor: Understand
- Manager/Executive: Apply

Adapted Bloom’s Taxonomy
- Recall
- Remember
- Understand
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Manufacturer’s specifications
- Technical drawings, specifications and equipment lists
- Software, e.g. identification and documentation of equipment on site
- Clipboard/paper
- Digital camera
- Computer/tablet/smartphone

Purpose
Organizing material and equipment for an installation is important to ensure everything is ready to begin the installation. This helps to ensure that the installation is completed efficiently and safely.

Performance/Abilities
P1 Determine materials and equipment needed, for example:
- analyze technical drawings and specifications
- reference job plan
- size equipment and components
- access material lists of suppliers and pricing based on system specifications

P2 Ensure availability of materials and equipment for installation:
- use inventory/procurement system, i.e. ordering and purchasing procedures
- schedule delivery, as required

P3 Coordinate delivery of materials and equipment on site, as required:
- verify delivery matches order, e.g. type, quantity
- document delivery
- inspect materials and equipment for damage
- contact purchasing department or suppliers for replacements, as required

P4 Stage materials and equipment on site:
- coordinate with other tradespeople
- secure materials and equipment

P5 Stock vehicle(s)/equipment, as required:
- ensure standard stocking levels are met, if required
- ensure required site-specific materials and equipment are in vehicle(s)/equipment
- organize materials and equipment within vehicle(s)/equipment

P6 Communicate issues with obtaining materials and equipment to appropriate personnel, e.g. project manager, general contractor, client, supplier

Knowledge
K1 Organization policies, procedures and plans, e.g. purchasing procedures, emergency plan
K2 Relevant CSA Standards, e.g. Canadian Electrical Code (CE code)
K3 Jurisdictional requirements, including permit requirements, e.g. OH&S
K4 Manufacturer’s specifications for equipment and system being installed
K5 Other documents relevant to the installation, e.g. technical drawings, client requirements
K6 Organizational document management system
K7 Inspection procedures for materials and equipment, including common issues with materials and equipment
K8 Site/installation requirements
K9 Sensitive areas/areas to be avoided on-site, e.g. First Nations, archeological
Purpose
Coordinating installation activities is important to ensure that all involved with the installation are aware of their roles and responsibilities. This helps to ensure that the installation is completed efficiently and safely.

Performance/Abilities

P1 Review installation plan with sub-trades, customers, contractors, and suppliers, as required:
- provide own qualifications, as required
- reference technical drawings and specifications, as required
- reference job plan, as required

P2 Modify installation plan based on discussions, as required

P3 Coordinate activities with co-workers

P4 Coordinate activities with General Contractor (GC) and sub-trades, as required:
- follow established communication protocols
- attend and complete site safety orientation meeting (and test) and display valid hard hat decal
- attend regular tailgate meetings as required by GC

P5 Coordinate activities with suppliers:
- consider logistics and timing requirements of goods and services
- confirm arrival of goods and services

P6 Coordinate activities with homeowner/building operator, as required:
- consider impact of installation on surrounding environment and properties

P7 Interact with inspectors, as required

P8 Complete documentation, for example:
- make notes on paper or app
- modify plan
- obtain email confirmation
- record changes to calendar
- maintain digital photograph history of installation milestones

Knowledge

K1 Organization policies, procedures and plans, e.g. communication protocols
K2 Organization/project goals, vision and status
K3 Relevant CSA Standards, e.g. Canadian Electrical Code (CE code)
K4 Relevant qualifications/certifications for the installation
K5 Jurisdictional requirements, including permit requirements
K6 Manufacturer’s specifications for system being installed
K7 Organizational document management system
K8 Documents relevant to the installation, e.g. technical drawings, client requirements, scope of work
K9 Roles and responsibilities of all involved in installation, for example:
- client
- sub-trades

Contextual Variables

Range of Context
- Types of individuals and number of individuals involved with an installation will vary with the size and complexity of the work.
- More coordination may be required for large projects or for installations that encounter unusual conditions.
- Commercial installation has more complexity, different types of material used, and more individuals to coordinate with. The scope of work is larger than residential.

Level of Practice
- Frontline: Recall, Remember
- Supervisor: Understand, Evaluate
- Manager/Executive: Apply, Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Communication tools, e.g. email, telephone
- Cell phone apps
- Calendars
- Computer/tablet/smartphone
- Digital camera
Install brackets, hangers and fasteners

Purpose
Installing brackets, hangers and fasteners correctly is important to protect and support equipment and components. This reduces hazards including the risk of damage to equipment and structures, as well as the risk of injury to persons.

Performance/Abilities

P1 Wear appropriate PPE, e.g. safety glasses, hard hat, fall arrest equipment
P2 Select appropriate tools to install or remove fastening and retaining devices
P3 Select brackets, hangers and fasteners according to task, manufacturer’s specifications, engineered drawings, and site conditions
P4 Review installation location:
  • review installation plan
  • measure installation site
  • plan how to avoid obstructions
P5 Secure brackets, hangers and fasteners to structure according to industry best practices, ensuring they are:
  • level
  • square
  • following building lines
P6 Communicate issues to relevant personnel, e.g. co-workers, project manager
P7 Clean tools after use, as required
P8 Store tools and supplies in designated location

Knowledge
K1 Organization policies, procedures and plans, e.g. safety protocols
K2 Relevant standards and regulations, e.g. Canadian Standards Association standards, Underwriters Laboratories of Canada standards, Canadian Electrical Code (CE code), building code
K3 Required permits
K4 Manufacturer’s specifications for system being installed
K5 Other documents relevant to installation, e.g. technical drawings, client requirements
K6 Industry best practices for installing brackets, hangers and fasteners
K7 Organizational document management system
K8 Types of safety hazards on site
K9 Types of safety hazards associated with brackets, hangers and fasteners
K10 Types of brackets, hangers and fasteners, their characteristics and applications
K11 Measurement and layout techniques
K12 Consequences of using incorrect brackets, hangers and fasteners, or installing them incorrectly
K13 PPE required for specific tasks
K14 Terminology related to brackets, hangers and fasteners
K15 Hoisting and lifting techniques
K16 Different types of roof configurations and materials and their impact on safety and installation procedures
K17 Torquing and tensioning techniques, e.g. pneumatics, mechanical means

Glossary
Industry best practices: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

Contextual Variables
Range of Context
- Weather and site conditions can affect the way this skill is performed.
- Brackets can be installed with support structures or conductors and cables.

Level of Practice
Frontline
Recall, Remember
Supervisor
Analyze
Manager/Executive
Understand
Evaluate
Manager/Executive
Apply
Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- PPE, e.g. safety glasses, hard hat, fall arrest equipment
- Site plans and drawings
- Hangers, e.g. trapezes, pipe clamps, beam clamps
- Brackets, e.g. angle brackets, T-brackets, L-brackets, floor brackets, ceiling brackets
- Fasteners, e.g. spring nuts, bolts, screws, concrete anchors
- Hand and power tools, e.g. measuring tape, screwdriver, power drill, wrenches
- Hoisting and lifting equipment
### Purpose
Installing bonding systems correctly is important to protect persons and equipment from transient and fault current.

### Performance/Abilities

| P1 | Adhere to Canadian Electrical Code (CE code) |
| P2 | Wear appropriate PPE, e.g. safety glasses, hard hat, fall arrest equipment |
| P3 | Select appropriate tools for bonding systems |
| P4 | Select bonding method based on:  
  - environment  
  - amperage  
  - voltage  
  - mechanical protection  
  - conductor material and size |
| P5 | Select bonding conductor size based on engineering specifications |
| P6 | Determine installation location according to industry best practices |
| P7 | Install bonding components according to industry best practices:  
  - consider layout, site conditions, jurisdictional requirements  
  - ensure continuity between non-current carrying components or apparatus of electrical systems and other metallic components  
  - ensure components facilitate function of overcurrent devices (fault current) |
| P8 | Terminate bonding system components according to industry best practices:  
  - interconnect, as required  
  - document results, if required |
| P9 | Perform continuity and resistance tests:  
  - interconnect, as required  
  - document results, if required |
| P10 | Communicate issues to relevant personnel, e.g. co-workers, project manager |
| P11 | Clean tools after use, as required |
| P12 | Store tools and supplies in designated location |

### Knowledge

| K1 | Organization policies, procedures and plans, e.g. safety protocols |
| K2 | Relevant standards and regulations, e.g. Canadian Standards Association standards, Underwriters Laboratories of Canada standards, Canadian Electrical Code (CE code), building code |
| K3 | Required permits |
| K4 | Manufacturer's specifications for system being installed |
| K5 | Other documents relevant to the installation, e.g. technical drawings, client requirements |
| K6 | Tasks that require trades certification |
| K7 | Industry best practices for bonding |
| K8 | Organization's information/record management system |

### Glossary

- **Bonding**: A low impedance path obtained by permanently joining all non-current-carrying metal parts to ensure electrical continuity and having the capacity to safely conduct any current likely to be imposed on it.
- **Industry best practices**: Methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

### Contextual Variables

- **Range of Context**:  
  - Weather and site conditions can affect the way this competency is performed.  
  - Installers must be aware that this competency applies to the installation of any exposed metal surfaces.

### Level of Practice

<table>
<thead>
<tr>
<th>Adapted Bloom’s Taxonomy</th>
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<tbody>
<tr>
<td>Frontline</td>
</tr>
<tr>
<td>Get理解</td>
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<tr>
<td>Analyze</td>
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</tbody>
</table>

### RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- **PPE**, e.g. safety glasses, hard hat, fall arrest equipment  
- **Bonding components**, e.g. metallic raceways, cables, copper or aluminum conductors, connectors, locknuts, terminations  
- **Tools**, e.g. screwdriver, drill, wrenches
Purpose
Installing conductors and cables correctly is important to ensure proper operation and safety of equipment.

Performance/Abilities

P1 Wear appropriate PPE, e.g. safety glasses, hard hat, fall arrest equipment, arc flash clothing, rubber gloves
P2 Select appropriate tools for installing conductors and cables
P3 Select correct size, type and number of conductors and cables for task, considering:
• Canadian Electrical Code (CE code) requirements
• site-specific conditions
• jurisdictional requirements
• drawings and technical specifications
• organization and client requirements
P4 Install conductors, cables and associated components (e.g. fittings, supports, plates) according to industry best practices, site conditions and CE code
P5 Prepare conductors and cables for termination:
• clean, as required
P6 Terminate conductors and cables according to industry best practices
P7 Update documentation, as required, e.g. as-builts, warning labels, fire plan
P8 Remove existing conductors, cables and associated components, as required:
• dispose of components according to organization’s policy
P9 Label conductors, cables and associated components and all parts integral to system
P10 Communicate issues to relevant personnel, e.g. co-workers, project manager
P11 Clean tools after use, as required
P12 Store tools and supplies in designated location
P13 Types of conductors, cables and associated components, their characteristics and applications

Knowledge

K1 Organization policies, procedures and plans, e.g. safety protocols
K2 Relevant standards and regulations, e.g. Canadian Standards Association standards, Underwriters Laboratories of Canada standards, Canadian Electrical Code (CE code), building code
K3 Required permits
K4 Manufacturers’ specifications for equipment and system being installed
K5 Other documents relevant to the installation, e.g. technical drawings, client requirements
K6 Tasks that require trades certification
K7 Industry best practices for installing conductors and cables
K8 Organization’s information/record management system
K9 Types of safety hazards on site
K10 Color-coding used to identify conductors and cables
K11 Installation procedures for conductors and cables

Glossary

• Industry best practices: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

Contextual Variables

Range of Context
• Weather, site and installation conditions (e.g. hazardous, wet, underground) can affect the way this competency is performed.
• In some jurisdictions, performance of some tasks in this competency may require certification in the electrical trade.

Level of Practice

Frontline
Recall, Remember
Analyze

Supervisor
Understand
Evaluate

Manager/Executive
Apply
Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

• PPE, e.g. safety glasses, hard hat, fall arrest equipment, arc flash clothing, rubber gloves
• Conductors and cables
• Components for conductor and cable installation, e.g. mechanical fittings, compression fittings, supports, straps, connectors, hangers, heat shrink, anti-oxidant compounds, non-ferrous and/or non-conductive plates and connectors
• Tools, e.g. drills, pipe bender, hammer drill
• Documentation, e.g. schematics, panel schedules, log sheets, shop drawings, terminal identification, warning labels, as-builts
Purpose
Installing conduit, tubings and fittings correctly is important to protect wiring and to prevent damage to property, personal injury, or death.

Performance/Abilities

P1 Wear appropriate PPE, e.g. gloves, eye protection, hard hat, high visibility vest
P2 Select appropriate tools for installing conduit and tubing
P3 Select correct size and type of conduit, tubing and fittings for task, considering:
   • Canadian Electrical Code (CE code) requirements
   • site-specific conditions
   • jurisdictional requirements
   • drawings and technical specifications
   • organization and client requirements
P4 Determine routing of conduit and tubing, considering:
   • suitability for application
   • other tradesperson's activities
P5 Measure conduit and tubing according to industry best practices:
   • size for installation, as required e.g. cut, thread, bend conduit or tubing
P6 Assemble conduit, tubing and fittings according to industry best practices
P7 Install conduit, tubing and fittings according to industry best practices and site conditions:
   • position conduit and tubing
   • mount conduit and tubing, e.g. ensure support is provided
P8 Update documentation, as required, e.g. as-builds
P9 Remove existing conduit and tubing, as required:
   • dispose of according to organizational policy
P10 Communicate issues to relevant personnel, e.g. co-workers, project manager
P11 Clean tools after use, as required
P12 Store tools and supplies in designated location

Knowledge

K1 Organization policies, procedures and plans, e.g. safety protocols
K2 Relevant CSA Standards, e.g. Canadian Electrical Code (CE code)
K3 Jurisdictional requirements, including permit requirements
K4 Manufacturer's specifications for equipment and system being installed
K5 Client requirements
K6 Industry best practices for installing conduit and tubing
K7 Organizational information/record management system
K8 Types of safety hazards on site
K9 Types of conduit and tubing, their characteristics and applications

Glossary

- **Industry best practices**: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

Contextual Variables

Range of Context
- Weather, site and installation conditions (e.g. hazardous, wet, underground, indoor) can affect the way this competency is performed.
- Types of conduit and tubing vary (e.g. rigid metal, rigid Poly Vinyl Chloride (PVC), electrical metallic tubing (EMT), coated rigid, non-metallic flex) and this affects the performance of this competency, i.e. procedures for sizing.
- In some jurisdictions, performance of some tasks in this competency may require certification in the electrical trade.

Level of Practice

- **Frontline**: Recall, Remember
- **Supervisor**: Recall, Remember, Understand
- **Manager/Executive**: Recall, Remember, Understand, Evaluate, Apply, Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- PPE, e.g. gloves, eye protection, hard hat, high visibility vest, as site requires
- Required conduit and tubing
- Fittings
- Tools, e.g. drills, hand tools, explosive-actuated tools
- Documentation, e.g. schematics, technical drawings, prints, manufacturer's specifications
Installing raceways correctly is important to protect wiring and to prevent damage to property and personal injury or death.

**Performance/Abilities**

| P1 | Wear appropriate PPE, e.g. gloves, hard hat, eye protection |
| P2 | Select appropriate tools for installing raceways |
| P3 | Select correct size and type of raceway for task, considering: |
| | • Canadian Electrical Code (CE code) requirements |
| | • site-specific conditions |
| | • jurisdictional requirements |
| | • drawings and technical specifications |
| | • organization and client requirements |
| P4 | Determine routing of raceways, considering: |
| | • suitability for application |
| | • other tradesperson's activities |
| P5 | Measure raceways according to industry best practices: |
| | • size for installation, as required e.g. cut or form raceway |
| P6 | Assemble raceways according to industry best practices |
| P7 | Install raceways according to industry best practices and site conditions: |
| | • position raceways |
| | • mount raceways, e.g. ensure support is provided |
| P8 | Update documentation, as required, e.g. as-builts |
| P9 | Remove existing raceways, as required: |
| | • dispose of according to organizational policy |
| P10 | Communicate issues to relevant personnel, e.g. co-workers, project manager |
| P11 | Clean tools after use, as required |
| P12 | Store tools and supplies in designated location |

**Knowledge**

| K1 | Organization policies, procedures and plans, e.g. safety protocols |
| K2 | Relevant CSA Standards, e.g. Canadian Electrical Code (CE code) |
| K3 | Jurisdictional requirements, including permit requirements |
| K4 | Manufacturer’s specifications for equipment and system being installed |
| K5 | Client requirements |
| K6 | Industry best practices for installing raceways |
| K7 | Organizational information/record management system |
| K8 | Types of safety hazards on site |

**Glossary**

- **Industry best practices**: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

**Contextual Variables**

**Range of Context**

- Weather, site and installation conditions (e.g. hazardous, wet, underground, indoor) can affect the way this competency is performed.
- Types of raceways vary (e.g. cable-tray wireways, underfloor raceways, busways, cellular raceways, surface raceways), which affects the performance of this competency, i.e. procedures for sizing.
- In some jurisdictions, performance of some tasks in this competency may require certification in the electrical trade.

**Level of Practice**

- **Frontline**: Recall, Remember
- **Supervisor**: Understand
- **Manager/Executive**: Analyze, Evaluate, Create/Transform

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**

- PPE, e.g. gloves, hard hat, eye protection, as site requires
- Required raceways
- Raceway components, e.g. fittings, supports
- Tools, e.g. drills, hand tools
- Documentation, e.g. schematics, as-builts, technical drawings, manufacturer’s specifications
Purpose
Installing boxes and enclosures correctly is important to protect wiring, connections and controls. Properly installed boxes and enclosures can prevent damage to property and personal injury or death.

Performance/Abilities

P1 Wear appropriate PPE, e.g. hard hat, eye protection, gloves
P2 Select appropriate tools for installing boxes and enclosures
P3 Select correct size and type of box/enclosure for task, considering:
   • Canadian Electrical Code (CE code) requirements
   • site-specific conditions
   • jurisdictional requirements
   • drawings and technical specifications
   • organization and client requirements
P4 Determine installation location of boxes and enclosures, considering:
   • suitability for application
   • other tradesperson's activities
P5 Assemble boxes and enclosures according to industry best practices
P6 Install boxes and enclosures according to industry best practices and site conditions:
   • position boxes and enclosures
   • mount boxes and enclosures, e.g. ensure support is provided
P7 Update documentation, as required e.g. as-builts
P8 Remove existing boxes and enclosures, as required:
   • dispose of according to organizational policy
P9 Communicate issues to relevant personnel, e.g. co-workers, project manager
P10 Clean tools after use, as required
P11 Store tools and supplies in designated location

Knowledge

K1 Organization policies, procedures and plans, e.g. safety protocols
K2 Relevant CSA Standards, e.g. Canadian Electrical Code (CE code)
K3 Jurisdictional requirements, including permit requirements
K4 Manufacturer's specifications for equipment and system being installed
K5 Client requirements
K6 Industry best practices and procedures for installing boxes and enclosures
K7 Organizational information/record management system
K8 Types of safety hazards on site
K9 Types of boxes and enclosures, their characteristics and applications
K10 Consequences of incorrectly installing boxes and enclosures

Glossary

Industry best practices: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

Contextual Variables

Range of Context
• Weather, site and installation conditions (e.g. hazardous, wet, underground, indoor) can affect the way this competency is performed.
• In some jurisdictions, performance of some tasks in this competency may require certification in the electrical trade.

Level of Practice

Frontline
Recall, Remember
Supervisor
Understand
Manager/Executive
Apply
Manager/Executive
Evaluate
Manager/Executive
Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
• PPE, e.g. hard hat, eye protection, gloves
• Required boxes and enclosures
• Fittings/supports for boxes and enclosures
• Tools, e.g. drills, hand tools, explosive-actuated tools
• Documentation, e.g. schematics, technical drawings, manufacturer’s specifications
Purpose
Installing wiring devices correctly is important to ensure the device operates safely and efficiently, protects and prevents property damage, and prevents personal injury and death.

Performance/Abilities

P1 Wear appropriate PPE, e.g. gloves, eye protection, hard hat, steel-toe boots
P2 Select appropriate tools for installing wiring devices
P3 Select correct size and type of wiring device for task, considering:
   - Canadian Electrical Code (CE code) requirements
   - site-specific conditions
   - jurisdictional requirements
   - drawings and technical specifications
   - organization and client requirements
P4 Determine installation location of wiring device using industry best practices
P5 Select branch circuit wiring for task, considering:
   - CE code requirements
   - site-specific conditions
   - jurisdictional requirements
   - drawings
   - organization and client specifications
P6 Install branch circuit wiring according to industry best practices and site conditions
P7 Install wiring devices according to industry best practices and site conditions
P8 Terminate conductors according to industry best practices, ensuring no excessive bare conductors or loose strands
P9 Test operation:
   - ensure circuit has specified voltage and phasing, as required
P10 Install faceplate according to industry best practices, as required
P11 Update documentation, as required e.g. as-builds
P12 Remove existing wiring devices, as required:
   - dispose of according to organizational policy
P13 Communicate issues to relevant personnel, e.g. co-workers, project manager
P14 Clean tools after use, as required
P15 Store tools and supplies in designated location

Knowledge

K1 Organization policies, procedures and plans, e.g. safety protocols
K2 Relevant CSA Standards, e.g. Canadian Electrical Code (CE code)
K3 Jurisdictional requirements, including permit requirements
K4 Manufacturer’s specifications for equipment and system being installed

Glossary

- **Industry best practices**: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

Contextual Variables

Range of Context

- Weather, site and installation conditions (e.g. hazardous, wet, outdoors, indoors) can affect the way this competency is performed.
- In some jurisdictions, performance of some tasks in this competency may require certification in the electrical trade.

Level of Practice

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<thead>
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RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- PPE, e.g. gloves, eye protection, hard hat, steel-toe boots
- Specified wiring devices, e.g. lamp holders, switches, timers, sensors, relays, controllers, safety switches, power outlets, receptacles
- Tools, e.g. hand tools
- Documentation, e.g. schematics, technical drawings, manufacturer’s specifications
Purpose

Installing the Level 2 electrical supply components is important to ensure that equipment operates as expected when activated. Components must be installed correctly to ensure the safety of persons, equipment and vehicles. Equipment supplied from power distribution may be wall-mounted or stand-alone (such as within a pedestal) and may be hard-wired or cord-and-plug connected.

Performance/Abilities

P1 Wear appropriate PPE, e.g. hard hat, safety glasses, safety footwear
P2 Ensure installation work is ready to begin, including:
  • potential hazards identified
  • underground services identified
  • required materials and equipment on site
  • barricades and signage around work zone if in public area
P3 Ensure existing service is adequate for the installation:
  • refer to installation plan for load requirements
  • add new circuits, as required, e.g. install two-pole breaker, torque wires to manufacturer’s specifications
P4 Install conduit or cable from power distribution to EVSE receptacle or EVSE disconnecting means
P5 Install junction box/outlet in chosen location according to industry best practices, if required:
  • ensure location of receptacle can be reached by EVSE when mounted
  • install receptacle and receptacle cover according to industry best practices, as required
P6 Interconnect wiring according to industry best practices
P7 Install pedestal unit, if required:
  • ensure pedestal post has sleeve or conduit stub-up
  • ensure concrete pad meets requirements, e.g. Building Code, required distance from curb or bollard
  • install anchor bolts according to manufacturer’s instructions
  • mount pedestal post:
    • feed service conductors through inside of post
    • ensure post is level
  • install conduit assembly
  • install mounting plates and brackets
  • install head assembly, if required
P8 Install communication cable and conduit for energy management or access management, as required
P9 Communicate installation issues to appropriate personnel, e.g. project manager, client

Knowledge

K1 Organization policies, procedures and plans, e.g. safety protocols
K2 Relevant CSA Standards, e.g. Canadian Electrical Code (CE code)
K3 Jurisdictional requirements including permit requirements, accessibility requirements
K4 Manufacturer’s specifications for equipment and system being installed
## Major Category
Construction and Installation

## Competency Area
Install Level 2 Electric Vehicle Supply Equipment (EVSE) and Components

## Competency Unit
Install Level 2 Electric Vehicle Supply Equipment (EVSE)

### Purpose
Installing the Level 2 EVSE is important to ensure that equipment operates as expected and is installed according to manufacturer’s specifications and CE code. Installing the equipment incorrectly may void the warranty. Equipment may be wall-mounted or stand-alone, and may be hard-wired or cord-and-plug connected.

### Performance/Abilities

| P1 | Wear appropriate PPE, e.g. hard hat, safety glasses, safety footwear |
| P2 | Ensure chosen location for EVSE meets requirements, including: |
|    | • cord reaches location where vehicle will be parked |
|    | • unit can be easily hard-wired or plug will reach intended receptacle for charging |
|    | • manufacturer’s minimum clearances are maintained |
|    | • unit is protected from exposure to hazards |
|    | • physical protection is provided, as required |
| P3 | Install mounting brackets according to industry best practices, if required: |
|    | • install anchors, as required, e.g. for concrete or masonry surfaces |
|    | • attach brackets securely, e.g. to structures, to stud |
|    | • ensure brackets are level |
| P4 | Hard-wire unit according to manufacturer’s instructions, if required: |
|    | • remove protective cover |
|    | • wire conductors into device from conduit or cable |
|    | • torque lugs to manufacturer’s specifications |
|    | • secure protective cover |
| P5 | Install energy monitoring equipment (remote metering) according to industry best practices, if required |
| P6 | Install energy load control equipment according to industry best practices, if required |
| P7 | Secure EVSE, e.g. attach to mounting brackets, secure to pedestal |
| P8 | Interconnect wiring according to industry best practices |
| P9 | Attach cable clamps, as required |
| P10 | Communicate installation issues to appropriate personnel, e.g. project manager, client |

### Knowledge

| K1 | Organization policies, procedures and plans, e.g. safety protocols |
| K2 | Relevant CSA Standards, e.g. Canadian Electrical Code (CE code) |
| K3 | Jurisdictional requirements including permit requirements, accessibility requirements |
| K4 | Manufacturer’s specifications for equipment and system being installed |
| K5 | Other documents relevant to the installation, e.g. technical drawings, client requirements, scope of work |
| K6 | Industry best practices for specific installation |
| K7 | Potential safety hazards and mitigation strategies |
| K8 | Terms used in the EV industry |
| K9 | EVSE type being installed, including features, advantages/disadvantages (e.g. charge times) and safety requirements |

### Glossary
- **Industry best practices**: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

### Contextual Variables

#### Range of Context
- Complexity of this competency will vary with type and size of system being installed.
- EVSE may be plug-and-cord or hard-wired; components will vary for each type.
- Installers may be installing single EVSE, or multiple, such as in a fleet installation. This will increase the complexity of the competency.
- EVSE may be single or dual head, or multiple EVSE stations may be on same pedestal, which may increase the complexity of the installation.
- Some EVSE installations may integrate solar panels, which will add complexity.

#### Level of Practice

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#### RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Personal protective equipment (PPE)
- CE code
- CSA Z462 Standard: Workplace Electrical Safety
- Manufacturer’s specifications
- EVSE Installation Plan
- Hand and power tools, e.g. screwdriver, cordless drill, torque wrench/screwdriver
- Measuring tools, e.g. measuring tape, level
- EVSE and mounting brackets
Purpose
Installing the energy monitoring and control systems is important to be able to ensure vehicles are charging effectively and to monitor energy usage.

Performance/Abilities

P1 Consult with network specialist, as required, for example:
- contact system administrator for online access
- arrange to work with specialist on site for set-up

P2 Connect EVSE to access management system according to manufacturer’s specifications, for example:
- connect system to local Wi-Fi
- insert SIM card
- set up authorities, e.g. administrator, password

P3 Configure system, for example:
- set language
- enable power sharing
- set charging hours and times
- enable energy monitoring
- enable energy management

P4 Activate cards and fobs, as required
P5 Verify network is connected
P6 Communicate installation issues to appropriate personnel, e.g. project manager, client

Knowledge
K1 Organization policies, procedures and plans, e.g. safety protocols
K2 Relevant CSA Standards, e.g. Canadian Electrical Code (CE code)
K3 Manufacturer’s specifications for equipment and system being installed
K4 Industry best practices for specific installation
K5 Potential safety hazards and mitigation strategies
K6 Terms used in the EV industry
K7 EVSE type being installed, including features, advantages/disadvantages (e.g. charge times) and safety requirements
K8 Components used in EVSE installations
K9 Planned usage of EVSE, e.g. charge times
K10 Types of activation cards and fobs, e.g. magnetic stripe, radio-frequency identification (RFID)
K11 Organizational document management system
K12 Roles and responsibilities of all involved in installation, e.g. client, contractor, supplier, co-workers, inspectors
Refer to the following task within the Red Seal Occupational Standard (RSOS) for Industrial Electrician and Red Seal Occupational Standard (RSOS) for Construction Electrician for more details on how to perform this Competency:

**Industrial Electrician**

**Block B:** INSTALLS AND MAINTAINS GENERATING, DISTRIBUTION AND SERVICE SYSTEMS  
**Task 8:** Installs and maintains protection devices  
**Skill 2:** Installs overcurrent protection devices

**Construction Electrician**

**Block B:** INSTALLS, SERVICES AND MAINTAINS GENERATING, DISTRIBUTION AND SERVICE SYSTEMS  
**Task 8:** Installs, services and maintains protection devices  
**Skill 1:** Installs overcurrent protection devices

Purpose

Construction and installation issues can vary in scope, from a piece of equipment not working correctly to structural changes that impact original installation plans. It is important to be able to address these issues, either immediately or to present options that can still meet the original plan's goals, or to provide options based on professional expertise and industry best practices. Consideration must be given to additional resource requirements, e.g. time, cost, personnel.

Performance/Abilities

**P1** Determine cause of installation issue, (e.g. equipment operation, structural changes), for example:  
- review manufacturer's installation instructions/manual  
- review as-builts to original drawings installation was based on  
- review requirements for installation, e.g. building and electrical code  
- contact technical support, if necessary

**P2** Inspect installation to identify any potential errors:  
- wear appropriate PPE  
- make corrections to equipment, if able, using industry best practices

**P3** Consult other professionals, as necessary, e.g. co-worker, supervisor, engineer

**P4** Determine potential adjustment options, for example:  
- replacement of equipment  
- relocation of installation  
- re-orientation of equipment  
- different type or size of equipment

**P5** Determine viability of options, e.g. availability of other equipment, required regulatory approvals

**P6** Present potential options, including:  
- impact on project, e.g. changes to functionality, extra cost, personnel  
- impact on further work, e.g. other trades  
- impact on schedule, e.g. delays to order new equipment, additional time for change installation location  
- make recommendations

**P7** Obtain approval to make adjustments, if required:  
- ensure approval is documented, if required

**P8** Document troubleshooting solution:  
- ensure changes are in as-builts

Knowledge

**K1** Organization's policies and procedures, e.g. record management system  
**K2** Relevant CSA Standards, e.g. Canadian Electrical Code (CE code)  
**K3** Jurisdictional requirements, including installation requirements and codes  
**K4** Different types of equipment systems, components, characteristics and operation  
**K5** Industry best practices for installation  
**K6** Safety hazards
Glossary

Industry best practices: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

Contextual Variables

Level of Practice | Adapted Bloom’s Taxonomy
---|---
Frontline | Recall, Remember
Supervisor | Understand
Manager/Executive | Apply

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Drawings and prints, including as-builts
- Manufacturer’s manuals, specifications
- PPE
- Testing equipment, e.g. voltmeter, pressure gauge
- Hand and power tools, e.g. drills, screwdrivers, pliers

Purpose

Tagging and labelling system equipment and components helps to foster the client’s understanding of the system and its operation. It provides a common language when discussing the system and makes it easier for technicians when called in for repairs or maintenance. Incomplete or incorrect tags and labels can lead to miscommunication about issues, unnecessary repair or maintenance costs, and potentially dangerous conditions.

Performance/Abilities

P1 Wear appropriate PPE

P2 Determine components that require labelling, e.g. inverters, controls, supply and return pipes, grounding equipment, valves:
- review CSA/Canadian Electrical Code (CE code) requirements
- review prints, drawings and manufacturer’s specifications

P3 Use industry-accepted markings for equipment tags and labels

P4 Install tags and labels:
- ensure printing is legible and permanent
- ensure tags and labels are visible
- ensure tags and labels are secure
- ensure tags and labels are oriented correctly, i.e. arrows in correct direction
- sign off on tags and labels, if required

P5 Identify markings on any drawings or instructions provided to clients, as required

Knowledge

K1 Organization’s policies and procedures, e.g. PPE, client documentation
K2 CSA/ Canadian Electrical Code (CE code) requirements for tags and labels
K3 Jurisdictional requirement for tags and labels
K4 System, components, and operation

CONTEXTUAL VARIABLES

Range of Context

- Proprietary equipment may have specific terminology that may differ from industry terminology.
Purpose
As part of the commissioning process it is important that all equipment, systems and other infrastructure are inspected, test results reviewed, deficiencies addressed, and functionality of the entire system tested before making the system operational. This ensures that clients can be confident of the system’s capabilities when they take over its operation. Failure to verify the system’s functionality could result in extraneous costs, damage to equipment and injury to personnel.

Performance/Abilities
P1 Wear appropriate PPE, e.g. steel-toe boots, safety glasses, gloves
P2 Review installation prints, as-builts, test results
P3 Inspect installed components for deficiencies:
   • in workmanship, e.g. leaks, lines are straight, control wiring is correctly installed
   • in materials, e.g. required number of units, free of visual defects
P4 Troubleshoot deficiencies, according to industry best practices:
   • correct issue, e.g. repair, replace
   • document actions
P5 Inspect installed mechanical components, e.g. ensure fasteners are properly secured to system
P6 Inspect installed electrical components:
   • review electrical test results
   • verify deficiencies have been addressed
   • conduct spot checks
P7 Inspect system plumbing, if applicable:
   • compare to schematics
   • check for visible leaks or issues
P8 Verify system operation:
   • make note of operating conditions, e.g. weather conditions, instrument readings
   • energize system or notify appropriate personnel to energize system, if required
   • observe system operation
   • use controls to check operation and performance
   • determine if there are issues or deficiencies
   • shut down system
P10 Troubleshoot deficiencies:
   • correct issue, e.g. repair, service
   • document actions
P11 Update prints:
   • create or ensure as-builts are accurate, e.g. verify drawing revisions match field wiring
P12 Complete equipment database, if applicable
   • list equipment by type (e.g. relays, meters), including serial numbers, make, model
   • document equipment settings, e.g. dates, controller set points, volumes, pressures
   • document test results
Knowledge

K1 Organization policies, procedures and plans, e.g. testing and commissioning protocols, safety
K2 Organizational information/record management system
K3 Relevant standards and regulations, e.g. Canadian Standards Association standards, Underwriters Laboratories of Canada standards, Canadian Electrical Code (CE code), building code
K4 Required permits
K5 Principles of electricity
K6 Principles of fluid flow, if applicable
K7 Principles of protection and control
K8 Principles of Process Control (PID Control) if applicable
K9 Scope and limitations of electrical testing
K10 Tasks that require trades certification
K11 Industry best practices for inspecting system for commissioning
K12 Manufacturer’s equipment, specifications, characteristics, and operation
K13 Safety hazards associated with commissioning

Glossary

• Industry best practices: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

CONTEXTUAL VARIABLES

Range of Context

• Scope, size, complexity and type of installation may affect what has to be inspected and how long it takes to perform this competency.
• In some jurisdictions, some of the tasks in this competency may require certification in the electrical, HVAC, or plumbing trades in order to be carried out.

Level of Practice

Frontline Recall, Remember
Supervisor Analyze
Manager/Executive Evaluate

Adapted Bloom’s Taxonomy

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

• Manufacturer’s manuals and specifications for installed equipment
• Installation prints and as-builts
• PPE, e.g. hard hat, safety glasses
• Hand tools, e.g. pressure and temperature gauge, multimeter, flow meters

Purpose

The commissioning report represents the due diligence taken through the construction and installation of a project. This applies to every aspect of a project, including all the components of the electrical system. Failure to provide required information could lead to potential liability for damage and injury.

Performance/Abilities

P1 Compile testing results, including:
• results and methods of control testing, if applicable
• results and methods of function testing
• results of protection testing, e.g. relay and meter test results
P2 Complete equipment database, if applicable:
• list equipment by type, e.g. relays, meters
• document serial numbers, make, model style
• document equipment settings, e.g. dates, controller set points, volumes, pressures
• document test results
P3 Write equipment evaluation reports, if applicable:
• review equipment test results
• analyze results, considering manufacturer’s specifications, industry standards
• provide maintenance requirements based on manufacturer’s and designer’s recommendations
P4 Prepare training materials:
• develop training materials e.g. based on manufacturer’s equipment manuals, blueprints, bench testing experience
• present training, if required
P5 Write fault analysis report, if applicable:
• review relay test results e.g. determine targets, identify fault records
• check Supervisory Control and Data Acquisition (SCADA) alarm records
• obtain Sequence of Events Recorder (SER) documentation
• develop report based on pre-operational testing
P6 Submit documentation and database for commissioning report to appropriate personnel

Knowledge

K1 Organization policies, procedures and plans, e.g. testing and commissioning protocols, safety
K2 Organizational information/record management system
K3 Relevant standards and regulations, e.g. Canadian Standards Association standards, Underwriters Laboratories of Canada standards, Canadian Electrical Code (CE code), building code
K4 Required permits
K5 Principles of electricity
K6 Principles of fluid flow, if applicable
K7 Principles of protection and control
K8 Scope and limitations of electrical testing
Glossary

- **Industry best practices**: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.
- **Sequence of Events Recorder (SER)**: a system that records events and time stamps them as they happen. As an application, the software gathers and stores this data for analysis, often used for root-cause analysis.
- **Supervisory control and data acquisition (SCADA) system**: a process automation system consisting of software and programmable logic controllers (PLCs) that collects data from instruments and sensors in remote locations (e.g. substations) and transmits it to a control centre for monitoring or controlling purposes.

**CONTEXTUAL VARIABLES**

Range of Context

- The scope, size and complexity of the project could impact the amount of debris to be removed to bring the site to an acceptable condition.

Level of Practice

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<td>Create/Transform</td>
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</tbody>
</table>

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**

- Manufacturer’s manuals and specifications
- Equipment test results, e.g. relay, metering, control system, communication system
- Record keeping device or document, e.g. tablet, computer, Toughbook, applicable testing results form

**Purpose**

When preparing to hand off a new system to a client, it is important to restore the site to as close as possible to what it was before the work was done or to what was agreed upon with the client. It presents a professional image of the personnel doing the work and the organization they represent.

**Performance/Abilities**

**P1** Wear appropriate PPE
**P2** Remove work debris:
- clean up refuse from installation, e.g. packaging, leftover hardware
- dispose of unwanted materials in waste bin for appropriate disposal
- dispose of hazardous material as required, e.g. follow WHMIS guidelines, use specified disposal site
**P3** Ensure sub-trades perform site cleanup after their work
**P4** Verify site is in acceptable condition:
- meet terms as agreed upon with client
- use before and after photographs, if available or work order description, if applicable
**P5** Have client sign-off on acceptable site condition, if required

**Knowledge**

**K1** Organization policies, procedures and plans, e.g. client handover procedures, safety, information/record management system
**K2** Relevant standards and regulations, e.g. Canadian Standards Association standards, Underwriters Laboratories of Canada standards, Canadian Electrical Code (CE code), building code
**K3** Required permits
**K4** Workplace Hazardous Material Information System (WHMIS) and Safety Data Sheets (SDS) guidelines for appropriate hazardous material handling and disposal

**Glossary**

- **Workplace Hazardous Material Information System (WHMIS)**: a federal government mandated program that provides information on the safe use, storage, handling, and disposal of hazardous materials that may be in the workplace.
- **Safety Data Sheets (SDS)**: part of the WHMIS program, these sheets contain comprehensive information on sixteen aspects of a hazardous material, including handling and storage, disposal consideration, and transport information.
Purpose

A responsible demonstration of the installation to the client and/or end-user is the final step in commissioning. Providing clients and end-users with thorough instructions on how to operate and maintain their new system results in less call-backs and greater client satisfaction. Failure to provide a demonstration to clients may result in unintentional damage to system by client or end-user.

Performance/Abilities

P1 Wear appropriate PPE, e.g. safety boots, safety glasses, hard hat, fall arrest protection
P2 Prepare for demonstration and handover:
   • gather relevant documentation, e.g. equipment manuals and specifications, permit and inspection reports
P3 Demonstrate start up and shut down procedures
P4 Demonstrate functionality and performance, according to industry best practices, including:
   • normal operation
   • emergency shut down procedures
   • by-pass mode
   • expected operating parameters
   • reset procedure
P5 Demonstrate simple, routine maintenance procedures
P6 Demonstrate basic diagnostic procedures
P7 Indicate markings and labels for all components
P8 Provide safety information
P9 Activate system, according to industry best practices
P10 Review system equipment warranties and requirements
P11 Provide relevant documentation to client or end-user
P12 Obtain client’s sign-off on project

Knowledge

K1 Organization policies, procedures and plans, e.g. commissioning protocols, safety
K2 Organizational information/record management system
K3 Relevant standards and regulations, e.g. Canadian Standards Association standards, Underwriters Laboratories of Canada standards, Canadian Electrical Code (CE code), building code
K4 Required permits
K5 Principles of electricity
K6 Principles of fluid flow, if applicable
K7 Principles of protection and control
K8 Industry terminology
K9 Manufacturer’s equipment, specifications, characteristics, and operation
K10 Industry best practices for demonstration and client handover
K11 Documents to be handed over to client/end-user, e.g. as-builts, system design, warranties, commissioning documents, operation manuals, maintenance documents

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Garbage bags or bins
- Vehicle to haul debris to disposal sites
- Hazardous material storage containers, if required
- Required PPE, e.g. hard hat, safety boots, safety glasses
- Client agreement, or pre-construction photos, if applicable
Glossary

- **Industry best practices**: methods that meet or exceed jurisdictional requirements, e.g. Canadian Electrical Code (CE code), bylaws.

**CONTEXTUAL VARIABLES**

**Range of Context**

- Scope, size, complexity and type of installation may affect the level of detail required and the time it takes to complete this competency.

**Level of Practice Adapted Bloom’s Taxonomy**

- **Frontline**
  - Recall, Remember
  - Apply

- **Supervisor**
  - Understand
  - Evaluate

- **Manager/Executive**
  - Analyze
  - Create/Transform

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**

- PPE, e.g. gloves, safety glasses, hard hat
- Documentation, e.g. manufacturer’s manuals and specifications, inspection reports
- Online monitoring platform, e.g. log in credentials, review functions

**Major Category**

**Safety**

**Competency Area**

Maintain a Safe Working Environment

**Competency Unit**

Follow safe work practices

**Purpose**

Following safe work practices is critical to protect employees, contractors, customers and the general public against injury or death, and to protect the organization and its assets from loss and liability.

**Performance/Abilities**

- **P1** Participate in safety orientations and training
- **P2** Complete safety certifications, as required, e.g. confined space
- **P3** Identify locations of:
  - first aid kit
  - emergency equipment
  - emergency access routes
- **P4** Participate in daily safety meeting/tail-board meetings
- **P5** Follow safety policies and procedures on site, e.g. limits of approach
- **P6** Respect physical limitations of self and others
- **P7** Use protection systems, as required, e.g. lock-out tag-out, card system
- **P8** Inspect safety systems, as required, e.g. guards, emergency stops
- **P9** Perform tests, as required, e.g. test voltage level
- **P10** Establish exclusion zones, when required, e.g. around open trench or working heavy equipment:
  - place barriers and/or signage
- **P11** Identify hazards on site, e.g. personal safety, work site, environmental:
  - monitor weather conditions, as necessary
- **P12** Minimize or remove hazards, as necessary, for example:
  - protect self from weather-related conditions, e.g. wear sunscreen and sunglasses, keep hydrated, wear warm clothing
- **P13** Use equipment only as intended/classified:
  - ensure equipment is appropriate for work site conditions
- **P14** Maintain clean, orderly work area
- **P15** Dispose of waste materials, as required:
  - dispose of hazardous materials (e.g. chemicals, batteries) according to legislation and organizational policies
- **P16** Store materials and equipment in designated areas
- **P17** Communicate issues to relevant personnel, e.g. co-workers, project manager:
  - document work safety issues, as required

**Knowledge**

- **K1** Relevant legislation, including Occupational Health and Safety (OH&S)
- **K2** Safety Management Plan
- **K3** Organizational safety policies and procedures, including OH&S
- **K4** Workplace Hazardous Materials Information System (WHMIS)
K5 Required training and certifications for specific work, e.g. confined space
K6 Required personal protective equipment (PPE)
K7 Types of safety hazards on site
K8 Available emergency response services and their contact information
K9 Available equipment on worksite/in vehicles, e.g. first aid, containment equipment
K10 Procedures for safe excavation, if required
K11 Safety reporting procedures

**CONTEXTUAL VARIABLES**

**Range of Context**
- Quantity and type of safety hazards varies with type of work and work location.

**Level of Practice**
- Frontline: Recall, Remember
- Supervisor: Revise, Remember
- Manager/Executive: Apply

**Adapted Bloom’s Taxonomy**
- Recall, Remember
- Understand
- Analyze
- Evaluate
- Create/Transform

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**
- First aid kits
- Safety equipment, e.g. spill kit, fire extinguisher
- Safety features on equipment
- Personal protective equipment (PPE)
- Rated tools, e.g. screwdriver rated for particular voltage

**Major Category**
- Safety

**Competency Area**
- Maintain a Safe Working Environment

**Competency Unit**
- Use personal protective equipment (PPE)

**Purpose**
Using PPE correctly protects employees against injury or death, and protects the organization and its assets from loss and liability.

**Performance/Abilities**
- P1 Ensure required training is up to date, e.g. fall arrest equipment training
- P2 Select equipment appropriate to task and work environment
- P3 Inspect/test PPE before use:
  - check expiry dates, if applicable
  - document condition
- P4 Ensure PPE is properly fitted and adjusted
- P5 Use PPE only for intended purpose
- P6 Communicate issues with PPE to relevant personnel, e.g. co-workers, supervisor
- P7 Tag defective equipment:
  - turn in to relevant personnel or department
- P8 Clean PPE after use:
  - store in designated location

**Knowledge**
- K1 Relevant legislation, including Occupational Health and Safety (OH&S)
- K2 Organizational safety policies and procedures, including OH&S
- K3 Potential safety hazards on site
- K4 PPE required for specific tasks, equipment and environments

**Contextual Variables**

**Range of Context**
- Quantity and type of PPE varies with type of work and work location.

**Level of Practice**
- Frontline: Recall, Remember
- Supervisor: Revise, Remember
- Manager/Executive: Apply

**Adapted Bloom’s Taxonomy**
- Recall, Remember
- Understand
- Analyze
- Evaluate
- Create/Transform

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**
- PPE, e.g. hard hats, safety glasses, safety boots, rubber gloves, fall arrest and restraint equipment, fire-retardant clothing, shock hazard PPE, arc flash hazard PPE, hearing protection, respiratory protection equipment
**Purpose**

Participating in safety meetings and emergency drills is important to ensure employees, contractors and customers work in a safe manner and are prepared for unexpected events. This also protects the organization and its assets against loss and liability.

**Performance/Abilities**

- **P1** Attend meetings and drills at scheduled times
- **P2** Identify role of self and team members in meetings and drills
- **P3** Share knowledge and skills with co-workers
- **P4** Communicate work issues to the group
- **P5** Participate in emergency drills, e.g., evacuation, fire, environmental, sabotage/terrorist/bomb threat, electrical restoration
- **P6** Debrief drills and exercises:
  - provide feedback
- **P7** Take notes, if applicable

**Knowledge**

- **K1** Relevant legislation
- **K2** Organizational safety policies and procedures, including communication protocols
- **K3** Own and others’ roles and responsibilities during emergencies
- **K4** Contact information for emergency services
- **K5** Types of safety hazards on site

**CONTEXTUAL VARIABLES**

**Range of Context**

- Types of meetings and emergency drills will vary with organization, type of work and work location.

**Level of Practice**

- Frontline
- Supervisor
- Manager/Executive

**Adapted Bloom’s Taxonomy**

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

**Purpose**

Isolation procedures must be performed correctly to protect self and others (e.g., other employees, contractors, customers and the public) in preparation for work on powered components, equipment or systems. Performing this task incorrectly can lead to serious injury or death. This task also protects the organization and its assets against loss and liability.

**Performance/Abilities**

- **P1** Identify all sources of hazardous energy that may be encountered when performing work on component, equipment or system
- **P2** Disconnect each hazardous energy source in component, equipment or system, e.g., disconnect linkages, open breakers, open disconnect switch
- **P3** De-energize component, equipment or system, if required:
  - release stored or residual energy, for example:
    - ground electrical devices, e.g., capacitors, batteries/UPS, accumulators
    - release hydraulic liquid
    - vent air pressure
    - brake mechanical movement
- **P4** Perform lock-out tag-out procedures
- **P5** Verify isolation using one of following methods:
  - activate controls to ensure no response:
    - complete visual inspection, ensure electrical connections are open
    - test component, equipment or system to ensure zero potential energy, for example:
      - test circuitry
      - check pressure gauges to ensure energy removed
      - check temperature gauges to ensure thermal energy discharged
- **P6** Document, as required
- **P7** Return component, equipment or system to normal configuration
- **P8** Ensure component, equipment or system can be safely re-energized, e.g., phase testing, Megger testing
- **P9** Re-energize component, equipment or system, if no other locks on equipment or system:
  - coordinate re-energization with controlling authority
- **P10** Test component, equipment or system to ensure operating properly
- **P11** Document processes, as required

**Knowledge**

- **K1** Relevant regulations, e.g., work protection, grounding and bonding code
- **K2** Organization’s policies and procedures, e.g., electrical safety, arc-flash policies, hazard assessment, lock-out tag-out procedures
- **K3** Type and rating of PPE required for isolation
- **K4** Testing procedures
- **K5** Electrical and mechanical principles, e.g., AC and DC, pressure
Glossary

- **De-energize (aka depressurize):** A process used to remove residual or stored energy from an isolated component, equipment, or system to eliminate the chance that residual or stored energy could accidentally harm workers.
- **Isolate:** A process used to disconnect an element of equipment or system from a primary source of energy to eliminate the chance that the primary source of energy in the component, equipment, or system could accidentally harm workers.
- **Lock-out tag-out (LOTO):** A safety procedure used to ensure that components, equipment, or systems are locked off and not able to be started up again prior to the completion of maintenance or repair work. It requires that hazardous energy sources be isolated and rendered inoperative before work is started on the component, equipment, or system in question.

- **Tag-out:** A labelling process that is always used when lock-out is required; the process involves attaching or using an information tag or indicator (usually a standardized label) that includes tag #, name of component, equipment, or system that has been isolated or re-configured, why lockout is required, the time of application, and the name of the authorized person who attached lock and tag.

**CONTEXTUAL VARIABLES**

**Range of Context**
- A multi-point isolation procedure requires more than one lock and may need more than one worker to execute.

**Level of Practice - Adapted Bloom’s Taxonomy**
- **Frontline**
  - Recall, Remember
- **Supervisor**
  - Analyze
- **Manager/Executive**
  - Evaluate
  - Create/Transform

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**
- PPE, e.g. arc flash protection equipment, safety glasses, steel-toed boots, hard hats
- Lock-out tag-out devices, e.g. breaker lock, multi-lock, lock box, tag, hold cards
- Energy testing equipment, e.g. voltmeters, pressure gauges
- Energy removal devices, e.g. ground straps
- Locking devices, e.g. rotor pins

**Purpose**
Lock-out tag-out procedures are performed for self-protection and as part of work protection procedures. These safety procedures eliminate the chance that equipment or systems could harm people through the unintended release of energy or the unintended start-up or motion of equipment or components. Not following proper lock-out tag-out procedures can lead to serious injury or death. These procedures also protect the organization and its assets against loss and liability.

**Performance/Abilities**

**P1** Ensure required training is up to date.

**P2** Plan lock-out tag-out with relevant personnel:
- Clarify scope of work to be done
- Identify potential energy sources that must be controlled
- Identify equipment and/or system to be locked-out tagged-out:
  - Refer to panel schedules, drawings, single-line diagrams, cable and equipment tags
- Confirm details:
  - When lock-out tag-out will begin
  - How long it will continue
  - Authorized person responsible for applying locks and tags
  - Affected persons to inform of lock-out tag-out

**P3** Inform affected persons of lock-out tag-out.

**P4** Select appropriate PPE.

**P5** Isolate component, equipment or system:
- De-energize component, equipment or system, if required
- Coordinate with controlling authority, if required

**P6** Apply locking mechanisms or approved devices (e.g. locking pins, rotor locks), on component, equipment or system, as required.

**P7** Apply approved tag with required information, including:
- Tag number
- Name of component, equipment, or system that is locked out
- Why lock-out is required
- Time component, equipment, or system was locked out
- Name of authorized person who attached tag and lock

**P8** Verify component, equipment or system is locked out and tagged out properly:
- Conduct visual inspection, e.g. tag filled out correctly

**P9** Remove lock-out devices and tags when maintenance or repair activities are completed.

**Knowledge**

**K1** Organizational safety policies and procedures, including lock-out tag-out procedures.

**K2** Relevant legislation.

**K3** Training renewal requirements for lock-out tag-out.
Adapted Bloom's Taxonomy

- Evaluate
- Create/Transform
- Maintain a Sustainable Environment

Purpose
Following sustainable work practices is critical to protect the environment and to protect employees, contractors and the general public against personal injury. It creates a positive public impression of the organization and its commitment to social responsibility, and protects the organization from loss and liability.

Performance/Abilities

P1 Ensure required training is up to date, e.g. WHMIS
P2 Identify potential environmental hazards, including:
  • contaminants of water, air and soil
  • hazardous materials
P3 Identify locations of:
  • first aid kit
  • spill kits
  • emergency access routes and personnel
  • Safety Data Sheets (SDS)
P4 Monitor weather conditions, as necessary, e.g. consider direction of chemical drift
P5 Follow waste management practices:
  • sort waste by type
  • place waste in correct disposal container or area
P6 Use recycled products and materials when possible
P7 Store hazardous materials and equipment in designated areas
P8 Dispose of hazardous materials (e.g. chemicals, batteries) according to legislation and organizational policies
P9 Communicate issues to relevant personnel, e.g. co-workers, supervisor:
  • document issues, as required

Knowledge

K1 Relevant legislation, including Occupational Health and Safety (OH&S)
K2 Organizational safety policies and procedures, including OH&S
K3 Sustainability plan and practices, e.g. energy and water conservation, commitment to low-carbon energy
K4 Importance of sustainable practices, e.g. controlled use of ozone depleting substances
K5 Safety Management Plan
K6 Workplace Hazardous Materials Information System (WHMIS)
K7 Types of hazardous materials associated with specific work activities
K8 Available emergency response services and their contact information
K9 Available equipment on site or in vehicles, e.g. first aid, containment equipment
K10 Procedures for safe evacuation, if required
K11 Procedures for containment, if required
K12 Safety reporting procedures

Glossary

- De-energize (aka depressurize): a process used to remove residual or stored energy from isolated component, equipment or system to eliminate the chance that residual or stored energy could accidentally harm workers.
- Isolate: a process used to disconnect component, equipment or system from a primary source of energy to eliminate the chance that the primary source of energy in component, equipment or system could accidentally harm workers.
- Lock-out tag-out (LOTO): a safety procedure used to ensure that components, equipment or systems are locked off and not able to be started up again prior to the completion of maintenance or repair work. It requires that hazardous energy sources be isolated and rendered inoperative before work is started on the component, equipment or system in question.
- Tag-out: a labelling process that is always used when lock-out is required; the process involves attaching or using an information tag or indicator (typically a standardized label) that includes tag #, name of component, equipment or system that has been isolated or re-configured, why lock-out is required, the time of application, and the name of the authorized person who attached lock and tag.

CONTEXTUAL VARIABLES

Range of Context

- Types of systems that may be locked out vary, e.g. electrical, mechanical, hydraulic, pneumatic.
- Approved devices used to lock-out equipment/systems vary depending on the types of energy involved.
- Types of approved devices and voltage-rated equipment used to perform this task vary.
- A multi-point isolation procedure requires more than one lock and may need more than one worker to execute.
- The procedures for lock-out and tag-out may vary when provided as part of work protection.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom’s Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Locking mechanisms or devices, e.g. locking pins, rotor locks, bars, cribbing, chains
- Tag devices, e.g. test and operate cards, hold cards
- Approved safety devices, e.g. arc flash protection equipment, energy removal devices, PPE
- Potential energy testing equipment, e.g. voltmeters, pressure gauges
CONTEXTUAL VARIABLES

Range of Context

- Quantity and type of hazards vary with type of work and work location.

Level of Practice | Adapted Bloom’s Taxonomy
--- | ---
Frontline | Recall, Remember, Apply
Supervisor | Understand, Analyze, Evaluate
Manager/Executive | 

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- First aid kits
- Spill kit
- Personal protective equipment
- Safety Data Sheets (SDS)

Major Category | Safety
--- | ---
Competency Area | Respond to Emergencies
Competency Unit | Participate in incident and accident investigations

Purpose

Participating in the investigation of an incident or accident will help to determine what happened, why it occurred, and how to prevent similar events from occurring in the future.

Performance/Abilities

P1 | Survey scene, as required:
- make the scene safe
- secure the scene, as necessary
- tag relevant equipment or materials
- photograph environment, as necessary

P2 | Gather information, as required, for example:
- people directly and indirectly involved
- relevant equipment or material
- site
- process, i.e. work procedures, instructions, training, safety records

P3 | Participate in interviews with relevant parties, e.g. emergency authority, Worker’s Compensation Board (WCB), supervisor:
- describe events in own words

P4 | Document events, as necessary, e.g. write witness report

P5 | Participate in root-cause analysis, as required

Knowledge

K1 | Relevant legislation
K2 | Safe work procedures
K3 | Incident investigation and reporting requirements
K4 | Types of safety hazards on site

Glossary

- **Accident**: an accident is an unplanned, unwanted event that disrupts the orderly flow of the work process. It involves the motion of people, objects or substances.
- **Incident**: an accident or other occurrence which resulted in or had the potential to cause injury or occupational disease. The term incident includes “close-call” or “near-miss” events.
- **Worker’s Compensation Board (WCB)**: WCB is an insurance program that covers injuries in the workplace. It covers wage replacement for injured workers, healthcare costs and rehabilitation costs. It is paid for by employers and is no fault.

CONTEXTUAL VARIABLES

Range of Context

- Complexity of investigation and required reports will depend upon the accident/incident, type of work and work location.
Purpose

Following practices to protect the physical work environment is critical to protect project/organizational assets, employees, contractors, customers and the general public.

Performance/Abilities

P1 Adhere to security procedures, including:
- participate in NERC training, as required
- use tools and equipment, e.g. access cards
- identify situations that may cause security issues, e.g. door propped open, gate access point unmanned

P2 Update procedures/tools on regular basis, as required, e.g. use new codes

P3 Report unsafe or suspicious activity, e.g. unauthorized visitors, equipment being removed from site unexpectedly

P4 Document work security issues

Knowledge

K1 Relevant legislation
K2 NERC Standards
K3 Organizational/project security policies and procedures
K4 Types of security hazards on site
K5 Authorized access systems and their use

CONTEXTUAL VARIABLES

Range of Context

- Quantity and type of security hazards varies with type of work and work location.

Level of Practice

Frontline
- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

Supervisor
- Recall, Remember
- Understand
- Analyze
- Evaluate
- Create/Transform

Manager/Executive
- Recall, Remember
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Camera
- Notebook
- Computer software
- Legal forms related to incident/accident reporting
- Personal protective equipment (PPE)
Purpose

Along with Information and Communication Technology (ICT) security functions that are built into an organization's computer system, it is essential for users to follow cybersecurity protocols to prevent intentional damage to an organization through cyberattacks. Users following security protocols are another layer of protection from external threats.

Performance/Abilities

P1 Follow system log-in/out protocols:
- log out of system when work is completed
P2 Participate in organization's cybersecurity training
P3 Use passwords:
- change passwords when requested or required by organization's ICT procedures
- do not share passwords with others
- do not write passwords down in a visible place
- use a mix of characters, letters and numbers for passwords
P4 Operate organization's computer system in a secure manner, for example:
- use computers and smart mobile devices approved by organization
- do not leave computer equipment unattended, e.g. computer, smart phone, tablet, flash drives, hard drives
- do not plug unauthorized flash drives or smart phones into computer
- use organization's sites and applications for field devices
- comply with assigned permissions and access limits
- upload security updates as directed, and use newest versions of application software
P5 Carry out work on organization's computer system securely, for example:
- use approved web browsers and search engines
- check all URLs for indications of a phishing site, e.g. spelling errors, complete “https://” on secure sites
- avoid using links, when possible, even on secure websites
- do not download from unknown websites
- do not work using unsecured internet connections or public computers
P6 Use communication applications in a secure manner:
- do not accept or open mail or attachments from unknown senders
- use approved communication channels and protocols, especially when communicating with other organizations
- do not provide confidential work information to an unknown email source/caller:
P7 Do not upload personal applications or access personal websites on organization’s devices
P8 Do not post unauthorized work information on social networks
P9 Back up files to specified drives and at specified times, as directed
P10 Contact ICT immediately when:
- computer device is unresponsive or is operating in odd manner
- windows or communications open with unusual messages, demands, or instructions, especially when system will not respond
- there are frequent information or data disruptions, misconfigurations, and gaps or unexplained changes

Knowledge

K1 Organization's cybersecurity protocols
K2 Approved applications
K3 Personal password for access to system
K4 Access permissions and restrictions
K5 Indicators of data corruption
K6 Potential risks to system, e.g. viruses, malware, ransomware
K7 Normal application operations
K8 Indicators of unsecured or fraudulent websites

GLOSSARY

Cybersecurity: the practice of protecting systems, networks, and programs from digital attacks that interrupt normal business operations. Digital or cyberattacks try to:
- access confidential and/or sensitive information to use for illegal purposes, e.g. identity theft;
- destroy or change confidential and/or sensitive information to disrupt business operations; or,
- extort money from users by holding their systems hostage until some form of payment is received.

Malware: software that is specifically designed to access and/or damage a computer without owner of the computer being aware of what is happening, e.g. viruses, worms, spyware.

Ransomware: software that prevents users from accessing their own data until the user pays a ransom.

Phishing: a scam to obtain personal information to commit fraud, often involving social engineering, e.g. email or phone calls from distant relative requesting money, phony websites with sign up forms, message from bank requiring confirmation of account information.

Social engineering: attempts to obtain personal or confidential information or to get the user to perform certain tasks by what appears to be a legitimate source or person; a component of phishing.

CONTEXTUAL VARIABLES

Range of Context

- While many cybersecurity safeguards are built into the design of the system software, users working from home, working remotely in the field, or on personal devices, e.g. smart phones, may change the performance of this skill.

Level of Practice

Adapted Bloom’s Taxonomy

- Frontline
- Recall, Remember
- Apply
- Supervisor
- Understand
- Create/Transform
- Manager/Executive
- Evaluate
- Level 2 EVSE Installer

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Passwords
- Computers, mobile devices
- Cybersecurity software
- Key fob, e.g. RSA SecurID token
Purpose
Following policies and procedures is important to create a consistent work environment for employees and to provide consistent service delivery to internal/external customers.

Performance/Abilities
- **P1** Review organizational policies and procedures
- **P2** Participate in orientation and on-the-job training
- **P3** Complete all work-related tasks according to organizational policies and procedures
- **P4** Identify opportunities for improvement to policies and procedures:
  - communicate to team members and supervisors, as appropriate
- **P5** Keep up to date with changes to policies and procedures, e.g. access online library for updates

Knowledge
- **K1** Organization policies, procedures and plans, e.g. occupational health and safety, workplace health and wellness
- **K2** Organization/project goals, vision and status
- **K3** Organizational document management system, e.g. where to find latest policies and communication documents

CONTEXTUAL VARIABLES
Range of Context
- Number of policies and procedures to be followed will vary.

Level of Practice | Adapted Bloom’s Taxonomy
--- | ---
Frontline | Recall, Remember, Understand
Supervisor | Analyze, Evaluate
Manager/Executive | Apply, Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Organizational policies and procedures manual
- Documents associated with organizational policies and procedures, including forms, checklists

Purpose
Maintaining technical information and data is important so that critical and up to date information is available. This data is the basis for setting goals and objectives for the short-, medium- and long-term. It also ensures that legislative requirements are met.

Performance/Abilities
- **P1** Identify types of information/records that are required, for example:
  - operations and maintenance manual
  - bill of material parts
  - asset related information, e.g. type of equipment, location
  - event and call logs
  - drawings
  - test results
- **P2** Provide information as required, e.g. fill out online or paper forms:
  - ensure information is provided/records are completed within required timelines, e.g. daily, weekly, monthly
- **P3** Ensure information recorded is accurate and complete
- **P4** Complete field mark-ups, as required
- **P5** Verify that drawing revisions match field wiring, as required
- **P6** Update drawings or ensure drawings are sent for update, as required
- **P7** File revised drawings according to information/record management protocols

Knowledge
- **K1** Legislation, e.g. NERC Standards
- **K2** Organization policies, procedures and plans
- **K3** Organization/project goals, vision and status
- **K4** Organizational document management system
- **K5** Use of relevant software, e.g. CAD, GIS

CONTEXTUAL VARIABLES
Range of Context
- Work environment can make this skill challenging to perform, e.g. outdoors.

Level of Practice | Adapted Bloom’s Taxonomy
--- | ---
Frontline | Recall, Remember, Understand
Supervisor | Analyze, Evaluate
Manager/Executive | Apply, Create/Transform
**Major Category**

**Information and Communication Technology Foundations**

**Competency Area**

Use Digital Technology

**Competency Unit**

Use communication applications

---

**Purpose**

Communication applications allow efficiencies when sending and receiving messages. This includes combinations of visual and audio communication and document sharing over distance which in turn allow for virtual meetings, educational webinars, and other communication formats that can save time and money.

**Performance/Abilities**

<table>
<thead>
<tr>
<th>Performance/Abilities</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P1</strong></td>
<td>Open desired communication application on system, online, or on cell phone e.g. email, text messaging</td>
</tr>
<tr>
<td><strong>P2</strong></td>
<td>Verify message before sending</td>
</tr>
<tr>
<td><strong>P3</strong></td>
<td>Select communication recipients:</td>
</tr>
<tr>
<td></td>
<td>• verify who will receive message, e.g. only include relevant parties</td>
</tr>
<tr>
<td><strong>P4</strong></td>
<td>Use email:</td>
</tr>
<tr>
<td></td>
<td>• follow email etiquette, e.g. do not use all uppercase, keep message professional in tone</td>
</tr>
<tr>
<td></td>
<td>• include purpose of message in subject line</td>
</tr>
<tr>
<td></td>
<td>• create concise and clear message</td>
</tr>
<tr>
<td></td>
<td>• add attachments following email application protocols, e.g. drop and click, select file using paperclip icon:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• close message with appropriate salutation and sign-off, e.g. organization logo and contact information</td>
</tr>
<tr>
<td></td>
<td>• proofread message before sending</td>
</tr>
<tr>
<td></td>
<td>• manage mailboxes:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P5</strong></td>
<td>Use text messaging:</td>
</tr>
<tr>
<td></td>
<td>• keep messages brief</td>
</tr>
<tr>
<td></td>
<td>• do not use texting abbreviations, e.g. lol, btw</td>
</tr>
<tr>
<td></td>
<td>• do not use emojis and animated images, e.g. GIFs</td>
</tr>
<tr>
<td><strong>P6</strong></td>
<td>Use conferencing applications authorized by organization:</td>
</tr>
<tr>
<td></td>
<td>• ensure appropriate documents are open and screen background is appropriate when screen sharing</td>
</tr>
<tr>
<td></td>
<td>• ensure quiet environment when using audio</td>
</tr>
<tr>
<td></td>
<td>• mute microphone when not speaking</td>
</tr>
<tr>
<td></td>
<td>• consider lag time when speaking and sharing documents</td>
</tr>
<tr>
<td></td>
<td>• announce name when entering conference and before speaking, if appropriate</td>
</tr>
</tbody>
</table>

**Knowledge**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>K1</strong></td>
<td>Organization’s policies and procedures, e.g. cybersecurity, logging into applications</td>
</tr>
<tr>
<td><strong>K2</strong></td>
<td>Application functions and icons, e.g. trash can, flags, reply</td>
</tr>
<tr>
<td><strong>K3</strong></td>
<td>Purpose of communication</td>
</tr>
<tr>
<td><strong>K4</strong></td>
<td>Audience</td>
</tr>
<tr>
<td><strong>K5</strong></td>
<td>Writing protocols for email and text messages</td>
</tr>
<tr>
<td><strong>K6</strong></td>
<td>Communication considerations, e.g. background noise, time lag, pitch of voice</td>
</tr>
</tbody>
</table>
Glossary

- **Cybersecurity**: the practice of protecting systems, networks, and programs from digital attacks that interrupt normal business operations. Digital or cyberattacks try to:
  - access confidential and/or sensitive information to use for illegal purposes, e.g. identity theft;
  - destroy or change confidential and/or sensitive information to disrupt business operations; or,
  - extort money from users by holding their systems hostage until some form of payment is received.

- **Emoji**: a small digital icon used to express a feeling or idea.

- **GIF**: series of images encoded to automatically replay back as an animated sequence.

**CONTEXTUAL VARIABLES**

**Range of Context**

- Communication applications on mobile devices may differ from desktop system and clarity of communication may vary.
- Communication applications differ depending on system and device being used.

**Level of Practice**

- **Adapted Bloom’s Taxonomy**
  - Frontline: Recall, Remember
  - Supervisor: Understand
  - Manager/Executive: Apply

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**

- Computer
- Tablet
- Cell phone
- Communication software applications
- Headsets

**Glossary**

- **Cybersecurity**: the practice of protecting systems, networks, and programs from digital attacks that interrupt normal business operations. Digital or cyberattacks try to:
  - access confidential and/or sensitive information to use for illegal purposes, e.g. identity theft;
  - destroy or change confidential and/or sensitive information to disrupt business operations; or,
  - extort money from users by holding their systems hostage until some form of payment is received.

**CONTEXTUAL VARIABLES**

**Range of Context**

- Applications will differ depending on device and operating systems.

**Level of Practice**

- **Adapted Bloom’s Taxonomy**
  - Frontline: Recall, Remember
  - Supervisor: Understand
  - Manager/Executive: Apply

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**

- Computer
- Tablet
- Cell phone
- Common software applications
Purpose
Navigation and mapping applications are used to ensure accurate identification and documentation of asset and work locations, as well as ensure the safety of personnel in the field and the efficient use of resources.

Performance/Abilities

P1 Use global positioning system (GPS) and geographical information system (GIS) device required for tasks e.g. GPS receiver, truck tracker, cell phone

P2 Follow manufacturer’s instructions

P3 Ensure correct types of maps of field work area are uploaded or correct views selected, for example:
- street maps
- topographical maps
- satellite view

P4 Comply with GPS features in vehicles and personal tracking fob requirements when working in field

Knowledge

K1 Manufacturer’s instructions
K2 Organization’s policies and procedures, e.g. safety
K3 Capabilities and limitations of different types of devices and applications
K4 Types of maps
K5 Geographical coordinates
K6 Functions of navigation and mapping applications

Glossary
- Geographic information system (GIS): a computer application that captures, stores, checks and displays data related to positions on Earth’s surface; may include cartographic data, photographic data, digital data, or data in spreadsheets.
- Geographic coordinates: a grid system consisting of lines of latitude (north-south) and lines of longitude (east-west) that allow users to define a precise location on the earth’s surface. Expressed in degrees and minutes.
- Global Positioning System (GPS): a computer program that uses triangulation to determine a user’s location on the earth by feedback received from at least three satellites orbiting the earth.
- Waypoint: is the marking of a location by obtaining the geographic coordinates with a GPS unit.

CONTEXTUAL VARIABLES

Range of Context
- Locating assets may require both GIS and GPS.
- There is generally no cellular or wireless service in remote destinations which may impact the type of GPS device that can be used.

Level of Practice

Frontline
- Recall
- Remember

Supervisor
- Understand
- Evaluate

Manager/Executive
- Apply
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- GPS receiver
- Cell phone
- Computer
**Major Category**
Information and Communication Technology Foundations

**Competency Area**
Use Digital Technology

**Competency Unit**
Use digital mobile radios

---

## Purpose

Digital mobile radios (DMRs) are used for internal communications between departments and work groups for the purposes of primary and emergency backup communication.

## Performance/Abilities

**P1** Use digital mobile radios as required, for example:
- from field to office
- between work groups
- within own work group
- for emergency communications

**P2** Follow manufacturer's instructions

**P3** Comply with organization's policies and guidelines

**P4** Comply with Industry Canada's radio communication regulations, e.g. licensing requirements

## Knowledge

**K1** Applicable legislation, e.g. Industry Canada's radio communication regulations

**K2** Manufacturer's instructions and recommendations

**K3** Organization's policies and procedures, e.g. safety, communication protocols

**K4** Capabilities and limitations of different types of devices

---

**Major Category**
Information and Communication Technology Foundations

**Competency Area**
Use Organization's ICT System

**Competency Unit**
Use organization's ICT system

---

## Purpose

Following the organization’s protocols to enter and retrieve information in the computer system is essential to ensure the organized, accurate, and secure documentation of an organization's activities across various types of computerized equipment.

## Performance/Abilities

**P1** Follow organization's policies and procedures, e.g. data entry, cybersecurity

**P2** Retrieve required information from saved files or databases, for example:
- access information from saved files or databases as permitted from:
  - computer hard drive
  - organization's shared drive(s)
- use appropriate search terms to find required information, e.g. file name, subject matter, customer name

**P3** Enter/update information, for example:
- complete all data fields accurately
- check accuracy of manual data entry
- do not enter same data more than once
- do not edit or change data without appropriate permissions

**P4** Upload information, e.g. files, photographs, prints, data:
- ensure information sources are secure

**P5** Save work:
- use file naming protocol
- save in appropriate drive(s) and folder

## Knowledge

**K1** Organization's protocols, for example:
- cybersecurity
- access permissions
- file naming
- organization of shared drives
- printing
- file sharing

**K2** Applications purposes and functions

**K3** Consequences of inaccurate or incomplete data

**K4** Different uses of data

**K5** Allowable data requests

**K6** Organization of shared drive(s)

**K7** Uploading and downloading of documents, files, drawings and photos

---

**CONTEXTUAL VARIABLES**

<table>
<thead>
<tr>
<th>Level of Practice</th>
<th>Adapted Bloom’s Taxonomy</th>
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</thead>
<tbody>
<tr>
<td>☒ Frontline</td>
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<td>☐ Understand</td>
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<tr>
<td>☐ Manager/Executive</td>
<td>☐ Apply</td>
</tr>
<tr>
<td>☐ ☐ Analyze</td>
<td>☐ Evaluate</td>
</tr>
<tr>
<td>☐ ☐ Create/Transform</td>
<td></td>
</tr>
</tbody>
</table>

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**

- Digital mobile radio
Glossary

- **Computer Aided Design (CAD):** a computer application that is used to produce 2- and 3-dimensional drawings of an engineered design that details the physical components and layout.

- **Cybersecurity:** the practice of protecting systems, networks, and programs from digital attacks that interrupt normal business operations. Digital or cyberattacks try to:
  - access confidential and/or sensitive information to use for illegal purposes, e.g. identity theft;
  - destroy or change confidential and/or sensitive information to disrupt business operations; or,
  - extort money from users by holding their systems hostage until some form of payment is received.

- **Geographic Information Systems (GIS):** a computer application that manages geographic information, which can be manipulated to display aspects of geographical information in a map format.

**CONTEXTUAL VARIABLES**

### Range of Context

- Organizations will have different levels of permissions and access to different applications and shared drives based on occupational requirements and responsibilities.
- Organizations may use proprietary closed computer systems and networks.
- Access to system and applications may differ if using a mobile device.
- Cybersecurity protocols may differ in levels of automation and auto-surveillance, e.g. audit trails.
- Organizations may use different purchased applications.

### Level of Practice

- **Frontline:** Recall, Remember
- **Supervisor:** Understand
- **Manager/Executive:** Apply

### RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Computer or mobile device
- Software programs

### Purpose

Correctly using hand and power tools protects employees against injury or death and protects the organization from loss and liability.

### Performance/Abilities

1. Follow organization’s policies and procedures, e.g. ensure required training is completed
2. Follow manufacturer’s instructions, e.g. inspection, preparation, cleaning
3. Wear appropriate PPE, e.g. safety glasses
4. Inspect hand and power tools before use
5. Ensure hand or power tool is appropriate and rated for task
6. Use tools for intended purpose only
7. Communicate issues with tools to relevant personnel, e.g. co-workers, supervisor
8. Tag defective tools:
   - turn in to relevant personnel or department
9. Clean tools after use:
   - store in designated location

### Knowledge

1. Relevant legislation, e.g. Occupational Health and Safety (OH&S)
2. Organizational safety policies and procedures, e.g. OH&S
3. Types of safety hazards on site and mitigation methods, e.g. limits of approach, barriers
4. Types of safety hazards associated with hand and power tools
5. PPE required for specific tasks
6. Types of hand and power tools, their components and procedures for use
7. Manufacturer’s instructions and recommendations, including ratings
RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Personal protective equipment, e.g. safety glasses, gloves, safety boots, hearing protection
- Hand and power tools, e.g. standard hand tools, drill press, pneumatic wrenches

Purpose
Correctly using electrical measuring and testing equipment protects employees and contractors against injury or death, and protects the organization from loss and liability. It also helps to ensure that data being analyzed is accurate.

Performance/Abilities

<table>
<thead>
<tr>
<th>Performance/Abilities</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Follow relevant legislation, e.g. Occupational Health &amp; Safety</td>
</tr>
<tr>
<td>P2</td>
<td>Follow organization’s policies and procedures, e.g. ensure required training is completed</td>
</tr>
<tr>
<td>P3</td>
<td>Follow manufacturer’s instructions, e.g. inspection, preparation, calibration, grounding</td>
</tr>
<tr>
<td>P4</td>
<td>Wear appropriate personal protective equipment (PPE), e.g. safety glasses, gloves</td>
</tr>
<tr>
<td>P5</td>
<td>Inspect equipment before use</td>
</tr>
<tr>
<td>P6</td>
<td>Ensure equipment is appropriate and rated for task</td>
</tr>
<tr>
<td>P7</td>
<td>Use equipment for intended purpose only</td>
</tr>
<tr>
<td>P8</td>
<td>Communicate issues with equipment to relevant personnel, e.g. co-workers, supervisor</td>
</tr>
<tr>
<td>P9</td>
<td>Tag defective equipment:</td>
</tr>
<tr>
<td></td>
<td>• turn in to relevant personnel or department</td>
</tr>
<tr>
<td>P10</td>
<td>Clean equipment after use:</td>
</tr>
<tr>
<td></td>
<td>• store in designated location</td>
</tr>
</tbody>
</table>

Knowledge

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>Relevant legislation, including Occupational Health and Safety (OH&amp;S)</td>
</tr>
<tr>
<td>K2</td>
<td>Organizational safety policies and procedures, e.g. OH&amp;S and training requirements</td>
</tr>
<tr>
<td>K3</td>
<td>Types of safety hazards on site and mitigation methods, e.g. limits of approach, barriers</td>
</tr>
<tr>
<td>K4</td>
<td>Types of safety hazards associated with electrical measuring and testing equipment</td>
</tr>
<tr>
<td>K5</td>
<td>PPE required for specific tasks</td>
</tr>
<tr>
<td>K6</td>
<td>Types of electrical measuring and testing equipment, their components and procedures for use</td>
</tr>
<tr>
<td>K7</td>
<td>Inspection procedures for electrical measuring and testing equipment</td>
</tr>
<tr>
<td>K8</td>
<td>Calibration procedures for electrical measuring and testing equipment</td>
</tr>
</tbody>
</table>

CONTEXTUAL VARIABLES

Range of Context
- Types of equipment will vary with type of work and work location.

Level of Practice | Adapted Bloom’s Taxonomy
- Frontline | Recall, Remember
- Supervisor | Understand
- Manager/Executive | Apply
- Analyze
- Evaluate
- Create/Transform
**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**

- Personal protective equipment, e.g. gloves, safety glasses
- Electrical measuring and testing equipment, e.g. multi-meters, power level meters, frequency selective meters, hi-pot tester, non-contact tester, diagnostic test equipment

**Major Category**

**Competency Area**

**Personal Competencies**

**Competency Unit**

**Demonstrate Professionalism**

**Work as a member of a team**

**Purpose**

Working as a member of a team helps to ensure that operations run smoothly, and allows project managers, supervisors, employees and contractors to be proactive before small issues become large problems.

**Performance/Abilities**

**P1** Demonstrate respect and empathy towards others:
- respect diversity
- respect differing perspectives
- promote an inclusive work environment
- recognize changes in team members’ behaviours, e.g. mental health strain

**P2** Be accountable:
- report unexpected conditions
- be punctual
- comply with schedule
- take action when issues arise

**P3** Initiate contact with other team members on regular basis:
- ask questions

**P4** Share knowledge and skills

**P5** Recognize others’ contributions and success

**P6** Accept and provide constructive feedback

**P7** Ask for help, when needed

**P8** Offer help to team members

**P9** Respond to requests in a timely manner

**P10** Be open to change

**P11** Participate actively in team meetings

**Knowledge**

**K1** Organization policies, procedures and plans

**K2** Organization/project goals, vision and status

**K3** Roles and responsibilities of team members, including own role

**K4** Team members’ contact information

**K5** Sector and project terminology and common abbreviations

**K6** Symptoms of psychological strain, e.g. decreased quality of work, withdrawal

**CONTEXTUAL VARIABLES**

**Range of Context**

- Team members will vary, for instance, there may be a range of small, temporary working groups and more permanent, long-term working groups.
- Physically locations may change the way this skill is performed, e.g. communication may have to occur via distance means.
Level of Practice
- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom’s Taxonomy
- Recall, Remember
- Understand
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. email, telephone

Major Category
- Personal Competencies

Competency Area
- Demonstrate Professionalism

Competency Unit
- Develop professionally

Purpose
Developing professionally is important to keep current with sector trends, products and services. It improves an individual’s attitude, knowledge, self-confidence and skills.

Performance/Abilities

P1: Maintain qualifications and certifications, as required, e.g. trade license, professional designation, First Aid, CPR

P2: Assess own skills, knowledge and abilities:
- reflect on feedback from peers and supervisor
- identify areas for improvement

P3: Identify areas of interest where new skill and knowledge development might be useful, e.g. new methods/products used in the sector

P4: Upgrade skills and knowledge, for example:
- attend courses offered by equipment manufacturers
- read sector-specific publications
- conduct research
- enroll in educational and professional development courses and programs
- participate in mentorship programs
- ask for assistance or instruction

P5: Participate in local trade and business organizations, as applicable

P6: Network with professional peers, e.g. attend conferences or trade shows

P7: Join and participate in associations, as applicable

P8: Ensure professional development is documented in organization’s record management system, as required

Knowledge

K1: Organization policies, procedures and plans
K2: Organization/project goals, vision and status
K3: Own skills, knowledge and abilities
K4: Roles and responsibilities of team members, including own role
K5: Where to find up-to-date and accurate information on the sector
K6: Relevant training providers and their offerings

CONTEXTUAL VARIABLES

Range of Context
- Access to resources may affect the way this skill is performed, e.g. organization’s professional development budget, individuals may only attend provided professional development sessions during work time.
- Physical location may change the way this skill is performed, e.g. all professional development may have to be pursued via distance means.
<table>
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</tbody>
</table>

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**

- Computer access
- Mentoring/coaching program
- Education grant program, if available
- Collective agreement

**Purpose**

Demonstrating professional and ethical conduct is important to build trust and respect in relationships with others. It also helps to promote a positive image of the organization and the sector.

**Performance/Abilities**

**P1** Participate in relevant training, e.g. conflict of interest, code of conduct, ethics

**P2** Support high standards and practices that protect public and bring credibility to organization, sector, and community, for example:
- follow professional code of ethics/code of conduct, as applicable
- implement responsible policies
- avoid degrading or malicious discussion
- recognize potential conflict of interest

**P3** Demonstrate professional attributes, including:
- approachability, e.g. be available to coworkers and clients
- composure, e.g. remain calm in emergency
- empathy, e.g. show concern for others’ problems
- emotional intelligence, e.g. awareness of own and others’ emotional states
- fairness, e.g. treat all equally
- flexibility, e.g. be open to new situations and approaches
- being proactive, e.g. address issues before they become large problems
- initiative
- QA/QC principles in relation to work, e.g. catching potential errors prior to issues
- trustworthiness, e.g. honour commitments
- social responsibility, e.g. report injured wildlife to appropriate authorities

**P4** Ensure appearance is professional, e.g. wear uniform or organizational id/tag, ensure attire is in good repair

**P5** Comply with legal requirements, e.g. high visibility clothing, NERC requirements, conflict of interest

**P6** Maintain confidentiality of information, as required

**P7** Maintain accurate records

**P8** Show respect for organization’s assets, e.g. take proper care of tools and equipment

**Knowledge**

**K1** Relevant legislation, e.g. Freedom of Information and Protection of Privacy (FOIP), NERC Standards

**K2** Organization policies, procedures and plans

**K3** Organization/project goals, vision and status

**K4** Code of conduct/Code of ethics

**K5** Own skills, knowledge and abilities

**K6** Roles and responsibilities of team members, including own role

**K7** Where to find up-to-date and accurate information on standards and practices
CONTEXTUAL VARIABLES

Range of Context
- Formal codes of ethics may exist in some subsectors and not others.

Level of Practice | Adapted Bloom’s Taxonomy
--- | ---
Frontline | Recall, Remember
Supervisor | Understand
Manager/Executive | Apply

Purpose
Mentoring/coaching others is important to help create an environment of continuous learning within the organization. It helps to ensure consistency in the work being completed, and assists with building positive workplace relationships. It contributes to an improvement of both individual and team performance.

Performance/Abilities

**P1** Initiate contact with other team members/learners on regular basis:
- ask questions

**P2** Use positive approach to help team members/learners solve problems:
- ask questions to help focus on problem
- guide resolution/performance
- demonstrate patience

**P3** Demonstrate tasks for others, as required:
- explain importance of and reasons for process/tasks
- link learning to other tasks and overall job

**P4** Set up environment for learner to practice skills, as required:
- ensure safety of learning environment

**P5** Recognize success, e.g. praise team member/learner

**P6** Assess learners’ progress, as appropriate

**P7** Provide supportive and corrective feedback

**P8** Ask for feedback on own performance as coach/mentor

Knowledge

**K1** Organization policies, procedures and plans

**K2** Organization/project goals, vision and status

**K3** Roles and responsibilities of team members/learners, including own role

**K4** Role of workplace mentor/coach

**K5** Sector and project terminology and common abbreviations

**K6** Different ways of learning/learning needs and strategies to address them, e.g. language proficiency, learning preference

**K7** How to adjust to different learning styles

**K8** Importance of, and techniques for, providing effective feedback

CONTEXTUAL VARIABLES

Range of Context
- Mentoring/coaching may be a formalized or informal process, which will affect how this skill is performed.
Level of Practice
- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom’s Taxonomy
- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. email, telephone

Major Category
- Personal Competencies

Competency Area
- Demonstrate Professionalism

Competency Unit
- Manage stress

Purpose
Managing stress is important to improve one's own ability to balance personal and professional demands, perform one's job competently, and contribute to a harmonious workplace.

Performance/Abilities
P1 Attend to own physical, emotional, spiritual, family and financial needs:
  • ask for help, if needed
P2 Recognize own limitations and those of others, e.g. know when to say no
P3 Recognize how your stress affects others
P4 Manage time effectively:
  • prioritize tasks to be done
  • ensure schedule is realistic
  • negotiate or discuss with team members/supervisor, as required
P5 Delegate responsibilities, when appropriate
P6 Adapt to shift work, as required, for example:
  • prepare self for shifts
  • ensure proper rest/sleep
  • ensure proper nutrition
P7 Maintain open communication with others
P8 Identify coping strategies, e.g. maintain a sense of humour

Knowledge
K1 Organization policies, procedures and plans
K2 Organization/project goals, vision and status
K3 Organization's wellness program, e.g. available gym memberships, counselling programs
K4 Own skills, knowledge and abilities
K5 Roles and responsibilities of team members, including own role
K6 Symptoms of psychological strain, e.g. fatigue, irritability, difficulty concentrating, isolation

CONTEXTUAL VARIABLES

Range of Context
- Availability of an organization wellness program, and its associated offerings, may alter the way this skill is performed.
### Purpose

Managing time is important to support efficiency and productivity by allowing the required time to be spent on the areas/tasks of most importance, and ensures that all tasks can be completed according to schedule.

### Performance/Abilities

**P1** Set goals:
- ensure goals are realistic and relevant
- outline objectives to be achieved for each goal

**P2** Identify tasks that need to be achieved for each objective:
- prioritize based on importance and urgency

**P3** Determine amount of time each task will take, considering:
- previous experience
- available resources
- competing priorities
- possible delays

**P4** Use time management system, e.g. electronic calendar, daytimer:
- record appointments, meetings and critical dates

**P5** Create action plan:
- identify timelines and critical dates

**P6** Schedule tasks:
- delegate tasks, as required

**P7** Monitor progress of tasks and action plan:
- review/update timelines regularly

**P8** Identify incomplete tasks:
- develop plan for completion

**P9** Review goals and objectives periodically:
- review time management system
- evaluate own tasks
- evaluate progress toward goals
- make adjustments, as required

### Knowledge

**K1** Organization policies, procedures and plans

**K2** Organization/project goals, vision and status

**K3** Own skills, knowledge and abilities

**K4** Roles and responsibilities of team members, including own role
CONTEXTUAL VARIABLES

Range of Context

• Complexity of time management will vary with job role and current tasks.
• Goals, objectives and action plans may be provided, depending upon job role and organization.
• Unplanned situations, including emergencies, can make it difficult to perform this skill.
• Collaboration may or may not be required, e.g. some activities need to be coordinated with others/other work teams.

Level of Practice | Adapted Bloom’s Taxonomy
--- | ---
Frontline | Recall, Remember
Supervisor | Understand
Manager/Executive | Apply

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

• Time management systems, e.g. electronic calendar, daytimer
• Software, e.g. project management software

Purpose

Using active listening skills helps to ensure that all parties understand each other. This promotes effective teamwork, improves productivity and reduces stress.

Performance/Abilities

P1 Choose appropriate time and place to listen, if possible:
• remove distractions, as required

P2 Listen carefully to message:
• be open-minded
• use attentive body language, e.g. face speaker
• listen until message is complete, i.e. do not interrupt
• give speaker undivided attention

P3 Watch for nonverbal indicators that reinforce or contradict message, e.g. nod, rolling eyes

P4 Respond to message, for example:
• use nonverbal indicators, e.g. nod, smile
• offer comments
• use questions to seek additional information or clarify details
• paraphrase to confirm understanding

Knowledge

K1 Relevant legislation, e.g. Freedom of Information and Protection of Privacy
K2 Organization policies, procedures and plans
K3 Organization/project goals, vision and status
K4 Effective communication practices, e.g. verbal versus non-verbal, characteristics of respectful communication
K5 Sector, trade and project terminology and common abbreviations
K6 Question types, e.g. open-ended, closed, probing, mirror
K7 Communication that constitutes harassment and discrimination

CONTEXTUAL VARIABLES

Range of Context

• Physical location may change the way this skill is performed, e.g. all listening may have to occur via distance means.

Level of Practice | Adapted Bloom’s Taxonomy
--- | ---
Frontline | Recall, Remember
Supervisor | Understand
Manager/Executive | Apply

Cost of Failure

• Time and money spent on incorrect information
• Frustration and reduced productivity

Level of Practice

Frontline
Recall, Remember
Supervisor
Understand
Manager/Executive
Apply
RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. telephone

Purpose
Using speaking skills helps to ensure that all parties understand each other, and reduces errors due to misinterpretation. This promotes effective teamwork, improves productivity and reduces stress.

Performance/Abilities
- **P1** Identify purpose of message
- **P2** Consider needs and limitations of listeners
- **P3** Organize ideas before speaking
- **P4** Determine appropriate time and place to deliver message
- **P5** Determine appropriate format, e.g. formal/informal, group/individual
- **P6** Make final revisions to message
- **P7** Communicate message:
  - be concise
  - speak clearly
  - use proper grammar
  - vary tone, volume, inflection and rate of speech
  - make eye contact
  - use positive language whenever possible
  - ensure that verbal and non-verbal communication convey same message
- **P8** Adjust message to listener, if appropriate, for example:
  - simplify technical information
  - use different question types to determine listener’s needs
  - avoid using slang, jargon, profanity or sarcasm
  - consider impact of message on listener, e.g. time restrictions, emotional impact
- **P9** Confirm understanding:
  - ask for questions and feedback
  - review what was explained
- **P10** Encourage additional questions at later date, if appropriate
- **P11** Answer questions or know where to find answer:
  - follow up with listener who asked question

Knowledge
- **K1** Relevant legislation, e.g. Freedom of Information and Protection of Privacy
- **K2** Organization policies, procedures and plans
- **K3** Organization/project goals, vision and status
- **K4** Organizational communication protocols, e.g. who needs what information, speaking to media
- **K5** Effective communication practices, e.g. verbal versus non-verbal, characteristics of respectful communication
- **K6** Sector, trade and project terminology and common abbreviations
- **K7** Question types, e.g. open-ended, closed, probing, mirror
- **K8** Communication that constitutes harassment and discrimination
**CONTEXTUAL VARIABLES**

**Range of Context**
- Physical location may change the way this skill is performed, e.g. speaking may have to occur via distance means.

**Level of Practice**
- Frontline
- Supervisor
- Manager/Executive

**Adapted Bloom’s Taxonomy**
- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**
- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. telephone

**Major Category**
- Communicate Effectively

**Personal Competencies**
- Use writing skills

**COMPETENCY AREA**
- Communicate Effectively

**COMPETENCY UNIT**
- Use writing skills

**Purpose**
Using writing skills helps to ensure that all parties understand each other, and reduces errors due to misinterpretation. This promotes effective teamwork, improves productivity and reduces stress.

**Performance/Abilities**
- P1 Determine purpose of message
- P2 Identify target audience
- P3 Provide accurate, complete and concise information
- P4 Use format, tone, and style suited to purpose, e.g. email, business letter, report
- P5 Consider reader’s:
  - perceptions
  - reading ability
  - needs
  - technical understanding
- P6 Write first draft, if required:
  - arrange ideas logically
  - be clear and concise
- P7 Proofread message:
  - correct errors
- P8 Produce final copy:
  - send to reader(s)/recipient(s)
- P9 File copy according to organizational/project protocol
- P10 Follow up, as required, e.g. ensure message was received

**Knowledge**
- K1 Relevant legislation, e.g. Freedom of Information and Protection of Privacy
- K2 Organization policies, procedures and plans
- K3 Organization/project goals, vision and status
- K4 Organizational document management system
- K5 Organizational communication protocols, e.g. who needs what information
- K6 Basic spelling and grammar
- K7 Sector, trade and project terminology and common abbreviations
- K8 Communication that constitutes harassment and discrimination

**CONTEXTUAL VARIABLES**

**Range of Context**
- Depending upon the message and audience, process may be formal or informal.
### Level of Practice
- **Frontline**
- **Supervisor**
- **Manager/Executive**

### Adapted Bloom’s Taxonomy
- ‣ Recall, Remember
- ‣ Understand
- ‣ Apply
- ‣ Analyze
- ‣ Evaluate
- ‣ Create/Transform

### RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- • Software, e.g. Microsoft Word
- • Communication tools, e.g. email

### Major Category
- **Personal Competencies**

### Competency Area
- **Communicate Effectively**

### Competency Unit
- **Negotiate with internal and external stakeholders**

### Purpose
Negotiating effectively with internal and external stakeholders helps to ensure all parties are satisfied with the resulting outcomes.

### Performance/Abilities
- **P1** Determine who needs to be involved in negotiation
- **P2** Determine own position:
  - represent project/organization's position, as required
- **P3** Identify what is flexible and what is not
- **P4** Present offer to other party
- **P5** Acknowledge position or offer of other party
- **P6** Discuss possible outcomes with other party:
  - remain open, honest and flexible
  - focus on positive outcomes
  - clarify position, as required, e.g. provide supporting information, discuss ramifications
  - focus on issue at hand
  - suggest alternatives
- **P7** Analyze impacts of possible outcomes, e.g. schedule, resources/cost
- **P8** Facilitate agreement
- **P9** Confirm agreement in writing:
  - file agreement according to project/organizational protocol

### Knowledge
- **K1** Relevant legislation, e.g. Freedom of Information and Protection of Privacy
- **K2** Organization policies, procedures and plans
- **K3** Organization/project goals, vision and status
- **K4** Organizational document management system
- **K5** Effective communication practices, e.g. verbal versus non-verbal, characteristics of respectful communication
- **K6** Project stakeholders and their contact information
- **K7** Relevant government agencies and their contact information
- **K8** Sector and project terminology and common abbreviations
- **K9** Negotiation techniques and strategies

### Glossary
- **Stakeholders**: individuals and groups who are impacted by the activities or decisions of others; the individuals and groups could be within (internal) or outside (external) of the organization or project, e.g. co-workers, supervisors, contractors, customers, the public, government, union, shareholders.
CONTEXTUAL VARIABLES

Range of Context
- Stakeholders involved in interactions will vary, e.g. tradespeople, team members, managers, agency representatives, and this may affect the tone of the communication, i.e. formal or informal.
- Physical location may change the way this skill is performed, e.g. all communication may have to occur via distance means.

Level of Practice | Adapted Bloom's Taxonomy
--- | ---
Frontline | Recall, Remember
Supervisor | Understand
Manager/Executive | Apply

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Software, e.g. video chat, virtual meeting, Microsoft Word, project management software
- Communication tools, e.g. email, telephone

Major Category | Personal Competencies
--- | ---
Communicate Effectively | Exchange information with internal and external stakeholders

Purpose
Interacting effectively and appropriately with internal and external stakeholders helps to ensure that operations run smoothly and allows managers, supervisors, co-workers, customers and other stakeholders to be proactive before small issues become large problems. Exchanging relevant and accurate information in a timely manner is essential for good performance and relations between individuals and stakeholder groups.

Performance/Abilities
P1 Determine what information needs to be shared and within what timeframe:
- respect confidentiality of sensitive information
- tailor message to audience
- collect information from stakeholders to make decisions or take action, e.g. communicate with host of co-genera station to meet their needs
P2 Determine who needs information, e.g. department head, team members, customers, government agency
P3 Determine best method for communicating information, e.g. conduct meeting, hold conference call, send email, share data analysis via SCADA
P4 Share information through best method, including:
- conduct or participate in face-to-face meetings
- communicate over distance, e.g. call department of environment about a log jam in dam, share video or photos of equipment and systems with maintenance team
- email information and updates to have permanent record of exchanges
- use specialized communication/reporting software, e.g. OASIS, Reliability Coordinator Information System
- use three-way communication to confirm understanding and ensure safety
P5 Monitor own communication devices frequently, e.g. smartphone, email
P6 Document communication, as necessary:
- file according to organization’s information/record management system

Knowledge
K1 Relevant legislation, e.g. NERC Standards of Conduct, Freedom of Information and Protection of Privacy
K2 Organization policies, procedures and plans
K3 Organizational goals, vision and status
K4 Organizational information/record management system
K5 Effective communication practices, e.g. verbal versus non-verbal, characteristics of respectful communication, three-way communication
K6 Relevant stakeholders, e.g. team members, other departments, contractors, customers, government agencies,
K7 Information needs of stakeholders
K8 Industry terminology and common abbreviations
K9 Basics of how overall electricity system works and how components impact each other, e.g. how distribution and transmission affect generation
Glossary

- **Stakeholders**: individuals and groups who are impacted by the activities or decisions of others; the individuals and groups could be within (internal) or outside (external) of the organization or project, e.g. co-workers, supervisors, contractors, customers, the public, government, union, shareholders.

- **Three-way communication**: sharing a message in three steps: 1. sender states message, 2. receiver repeats message, 3. sender confirms that receiver has repeated message correctly or corrects any misunderstandings.

**CONTEXTUAL VARIABLES**

**Range of Context**

- Stakeholders involved in interactions will vary, e.g. tradespeople, team members, managers, agency representatives, and this may affect the tone of the communication, i.e. formal or informal.
- Physical location may change the way this skill is performed, e.g. all communication may have to occur via distance means.
- Continuous training for proper communication, and monitoring of practice, is commonplace for many occupations within the industry.

**Level of Practice**

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**RWATEM (Requisite Work Aids, Tools, Equipment or Materials)**

- Software, e.g. video chat, virtual meeting, OASIS, RCIS
- Communication devices, e.g. email, telephone
Electricity Human Resources Canada would like to acknowledge all of the industry subject matter experts from across Canada who were involved in drafting, reviewing and validating this National Occupational Standard.