

Level Three

IE Code	IE Competency Title	Credit	OAC Ref.
IE104-3WC	Use safe lifting and rigging techniques	1	C6
IE105-3WC	Follow safe procedures for working in confined spaces	1	B7
IE125-3WC	Lead teams and manage electrical installation and maintenance projects	3	A8
IE127-3WC	Apply knowledge of analytical troubleshooting techniques	4	A6
IE130-3WC	Use phase rotation meter	1	E4
IE136-3WC	Install and maintain PLC hardware	7	M4
IE137-3WC	Install and maintain PLC networks	7	M5
IE139-3WC	Read and write programming language and install and maintain PLC software	5	M6
IE142-3WC	Install and maintain low voltage circuits	12	H8
IE151-3WC	Install and maintain AC motors	9	L4
IE196-3WC	Use a computerized maintenance management system	3	K1

Assessment

With training and guidance you will acquire the skills and knowledge to enable you to competently demonstrate completion of these tasks to your assessor. You must keep a record, on the diary pages included, of the details of the work done when completing the tasks to help the assessor see the experience you have gained prior to the assessment decision being made.

Evidence

Assessment of this standard requires the following types of evidence be gathered by you and presented by you to your assessor:

- Completed apprentice work diary for each task – add more pages if you need to
- Observation by the assessor of you completing the relevant tasks
- Task verification – another person who has observed you completing the tasks to the appropriate standard
- Copies of work records, where applicable, or reference to work records to show when the tasks were completed.

The specific evidence requirements you must present are listed on the following pages.

SPECIFICATION

People credited with this standard are able to:

- **Safely lift and rig heavy objects.**

Credit 1

Prerequisite

Competency Standard IE101-1TC, Demonstrate knowledge of safe working practices for electrical workers.

Assessment

For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Quality Assurance

Any assessor assessing against this competency standard must be competent in the Code of Practice in The Hoisting and Rigging Safety Manual.

References

The Hoisting and Rigging Safety Manual, Construction Safety Association of Ontario, 1997

Task 1: Demonstrate safe rigging techniques and perform lifting operations safely in accordance with best practice.

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:

C6 Use safe rigging techniques

Task 1: Demonstrate safe rigging techniques and perform lifting operations safely in accordance with best practice.

Apprentice Diary – Rig an object safely (1.1)

Date/s	Task 1 requires you to rig an object safely so that it is ready for lifting. Provide details and dates of when you rigged the object in the diary below the object that you have prepared for lifting. Include: details of the object, type of slings, rating of slings.
	Object
	Sling type
	Sling/equipment load rating

Sketch below the load rigged, ready for lifting or attach photo. (1.1)

Hand signals

Identify a lifting job and date of job where you have used hand signals and identify which hand signals that you used. (1.2)

Apprentice Diary - Inspection of lifting device (1.3)

Date/s	Identify a lifting device that you have checked for safety prior to lifting and the dates.

What inspection techniques did you use to check the lifting device? (1.3)

What lifting device information/data was included on the device label? (1.3)

What was the outcome of the inspection? Was there any wear or signs of fatigue? (1.3)

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Use slings following safe industry practice: (1.1)

- sling types were selected appropriate to the task (correct load rating etc)
 load was securely prepared.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- Standard hand signals were used to direct crane operation. (1.2)

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- Lifting devices were inspected to check that they met design specifications: (1.3)

- apprentice followed logical equipment inspection techniques
 apprentice checked label data on equipment
 any signs of wear and fatigue on the equipment was identified.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.

SPECIFICATION

People credited with this standard are able to:

- **Demonstrate safe practices and procedures when working in confined spaces.**

Credit 1**Prerequisite**

Competency Standard IE101-1TC, Demonstrate knowledge of safe working practices for electrical workers.

Assessment

For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Quality Assurance

Any assessor assessing against this competency standard is required to demonstrate proof of training working in confined spaces in accordance with WorkSafeBC Occupational Health and Safety regulations, and have completed the assessor registration competency.

References

The Canadian Electrical Code, Part I, Canadian Standards Association, most current edition (CEC)

WorkSafeBC Occupational Health and Safety (OHS) regulations

Sector References

Mines Act [RSBC 1996] CHAPTER 293

CAN/CSA-M421-00 (R2005) - Use of electricity in mines

Task 1: Demonstrate safe practices in confined spaces.

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:

B7 Follow safe procedures for working in confined spaces

Task 1: Demonstrate safe practices in confined spaces.

Apprentice Diary

(1.1)

Date/s	Choose an instance when you have worked in a confined space and outline that dates of work and details of the environment.

What safety equipment was used in the above instance?

(1.1)

What type/s of air mover/s were used?

(1.1)

Provide details of the emergency response plan for the instance identified above in the apprentice diary. (1.1)

Apprentice Diary - Using gas testing equipment

(1.1)

Date/s	<p>Provide details and dates of your use of gas testing equipment to measure the state of the atmosphere – this should include identification of the different types of gasses and may include poisonous gases, explosive gases and oxygen depleted atmospheres.</p> <p>Explain any choices you have made.</p>	(1.1)

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

Demonstrate safe practices in confined spaces.

- Complied with WorkSafeBC requirements for work in confined spaces:

 - safety equipment was identified
 - air movers were identified/described
 - emergency response plan was identified.
(1.1)

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- Gas testing equipment was used to measure the state of the atmosphere.

(1.2)

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.

SPECIFICATION

People credited with this standard are able to:

- **Lead teams and manage electrical maintenance and installation projects.**

Credit 3

Prerequisite

Competency Standard IE124-3TCm Demonstrate knowledge of leading teams.

Assessment

For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessment note the goal of this competency is to reinforce cross trade and cross team communication and troubleshooting.

Definition

Leading a team - may be on a temporary or a rotating basis.

Task 1: Use principles of effective communication working with, planning the work of and leading a team on a rotating basis to accomplish assigned goals safely and efficiently.

Task 2: Use techniques to ensure the safe execution of maintenance and installation procedures with a variety of personnel and in a variety of industrial settings.

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:

A8 Lead teams and manage electrical installation and maintenance projects

Task 1: Use principles of effective communication working with, planning the work of and leading a team on a rotating basis to accomplish assigned goals safely and efficiently.

Apprentice Diary

(1.1)

Date/s	Describe the team/s that you have led and dates and your function as a leader using effective communication (such as a case study project). Include instances in your diary where you have: <ul style="list-style-type: none"> • used active communication • planned according to the capabilities and skills of team members • demonstrated leadership that encouraged people to motivate themselves • acted as a mentor to support and encourage team members • set goals for the team • enabled the team to achieve objectives while under pressure.

What industry supervisory and reporting practices have you used in this project?

(1.2)

What style of leadership did you use?

(1.3)

How do you know it was effective?

Task 2: Use techniques to ensure the safe execution of maintenance and installation procedures with a variety of personnel and in a variety of industrial settings.

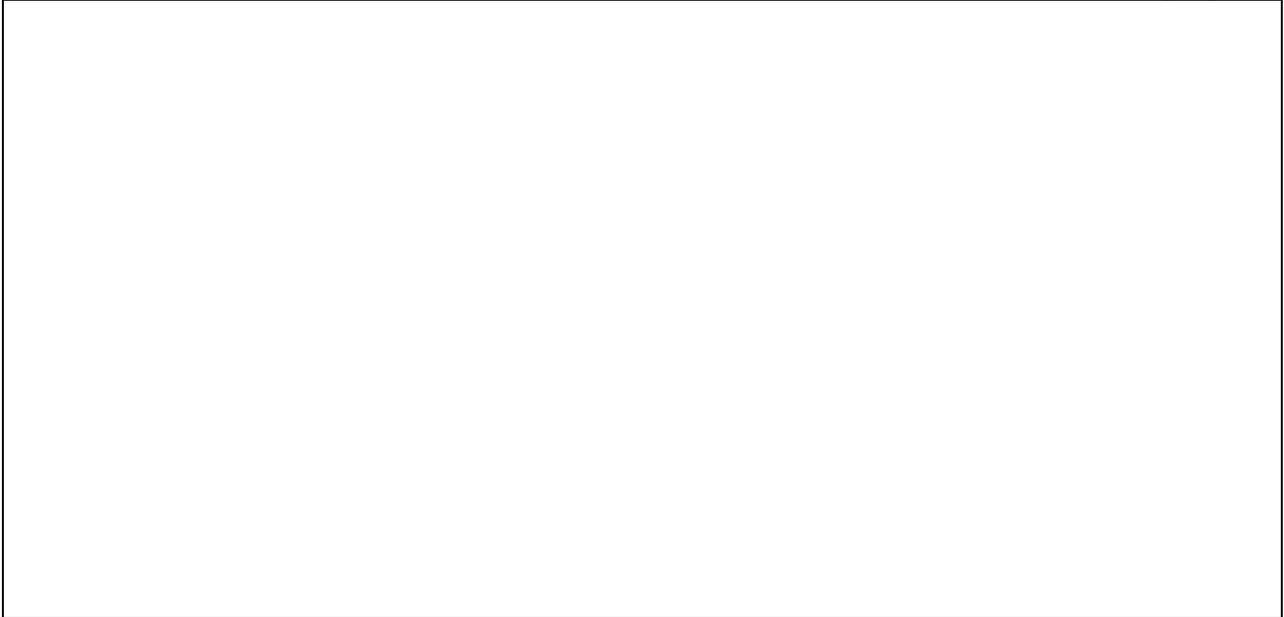
Apprentice Diary

(2.1, 2.2)

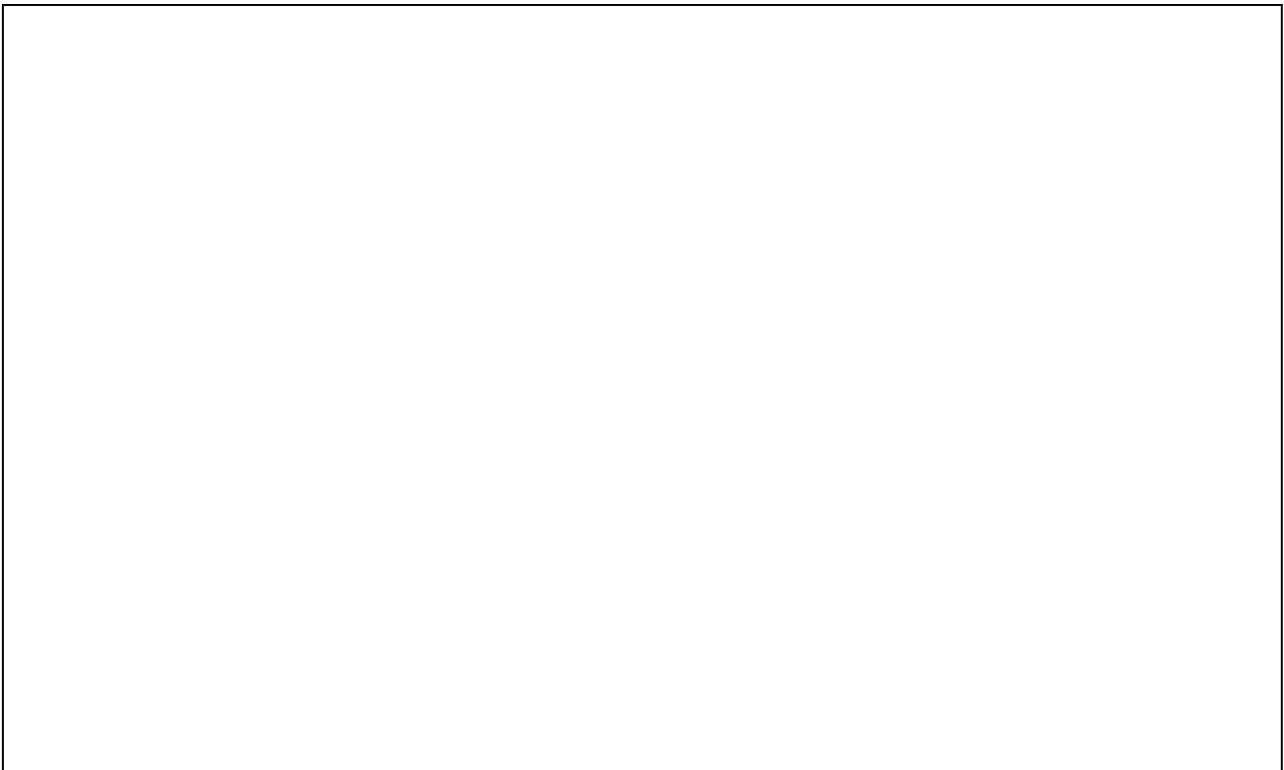
Date/s	Provide a sample project plan for a particular project that you have been involved with (could be installation or maintenance). Include: <ul style="list-style-type: none"> • Work breakdown schedule that identifies the tasks/work packages • Timeline - outlining the approx times expected for each task • Approx human resources required • Contingency allowance.

Attach plan here or provide specific details about the plan and dates of the project.

(2.1, 2.2)



Provide a simplified version of the project plan or task instructions that can be used to communicate task information to team members. Alternatively, describe how you communicate the project plan to team members in a specific non-verbal way. (2.1, 2.2)



Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Apprentice demonstrated elements of effective communication: (1.1)

- used active communication
- planned tasks relevant to the skills and suitability of team members
- assisted team members to motivate themselves
- acted as a mentor to team members where appropriate
- set goals
- achieved objectives under pressure.

Assessor / verifier name: _____ **Signature:** _____ **Date:** _____

- Used industry supervisory and reporting standards. (1.2)

Assessor / verifier name: _____ **Signature:** _____ **Date:** _____

- Demonstrated effective leadership. (1.3)

Assessor / verifier name: _____ **Signature:** _____ **Date:** _____

- Apprentice used methods for describing and managing complex procedures so that the work is carried out safely (2.1)

- task and step breakdown schedule was developed
- feedback from projects was considered and incorporated into future projects
- contingency was included in project planning.

Assessor / verifier name: _____ **Signature:** _____ **Date:** _____

- Demonstrated planning skills in mapping out tasks. (2.2)

- work instructions were relevant to the audience's level of technical understanding
- planning was completed ahead of task to enable control of the task completion.

Assessor / verifier name: _____ **Signature:** _____ **Date:** _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor / verifier name: _____ **Signature:** _____ **Date:** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.

SPECIFICATION

- **Apply knowledge of systematic procedures for efficiently identifying the source and type of malfunction or fault in equipment.**

Credit 4

Prerequisite

Competency Standard IE126-1TC, Demonstrate knowledge of analytical troubleshooting techniques.

Assessment

For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Quality Assurance

Any assessor assessing against this competency standard must be a qualified electrician.

Task 1: Use flow charts, process charts and other analytical troubleshooting techniques to identify malfunctions and recommend solutions to repair equipment and circuits.

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:

A6 *Apply analytical troubleshooting techniques*

Task 1: Use flow charts, process charts and other analytical troubleshooting techniques to identify malfunctions and recommend solutions to repair equipment and circuits.

Apprentice Diary

(1.1, 1.2, 1.3)

Date/s	<p>This assessment requires a “case study assessment problem” (or problems) that you have troubleshot and repaired. Outline the troubleshooting plan that you broadly followed. Detail the resources that you used to assist with solving the problem – such as manuals, schematics, charts, equipment specs, internet resources. Attach the supporting documents – identify them in the supporting evidence section.</p> <p>Evidence must be provided of reference to the following charts/information sources</p> <ul style="list-style-type: none"> • flow charts • logic charts • process charts • blueprints • programmable logic controllers/digital control systems interfaces • explain any choices you have made

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Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Applied troubleshooting techniques to accurately break systems down to isolate problems areas. (1.1)
- Determined equipment specifications and operating parameters: (1.2)
 - manuals were referred to
 - schematics were referred to
 - internet resources were referred to
- Used charts and system information interfaces to identify problems and determine solutions: (1.3)
 - flow charts were used
 - logic charts were used
 - process charts were used
 - blueprints were used
 - programmable logic controllers or digital controls were used to determine system problems
- All apprentice’s explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.

SPECIFICATION

People credited with this standard are able to:

- **Use the phase rotation meter to troubleshoot and check installation of three-phase power circuits.**

Credit 1**Prerequisite**

Competency Standard IE129-3TC, Demonstrate knowledge of three-phase theory; and
Competency Standard IE128-1TC, Demonstrate and apply knowledge of basic test equipment.

Assessment

For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations and industry practice.

Quality Assurance

Any assessor assessing against this competency standard must be a qualified electrician.

References

The Canadian Electrical Code, Part I, Canadian Standards Association, most current edition (CEC)
WorkSafeBC Occupational Health and Safety (OHS) regulations

Task 1: Demonstrate proper techniques to troubleshoot and test three-phase circuits with the phase meter, correctly identifying missing phases.

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:

E4 Use phase rotation meter

Task 1: Demonstrate proper techniques to troubleshoot and test three-phase circuits with the phase meter, correctly identifying missing phases.

Apprentice Diary

(1.1)

Date/s	Description of work done over a period of time troubleshooting and testing three-phase circuits. Include details and dates of the jobs carried out. Attach any supporting documentation to the supporting documentation section.

(1.2)

Date/s	Identify/ describe the details of your safe use and maintenance of a phase rotation meter.

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Phase rotation meter was properly maintained for safe operation. (1.1)
- Safety precautions were observed during use and care of phase rotation meter. (1.1)
- Phase rotation meter was properly used to troubleshoot and test three-phase circuits: (1.2)
 - circuit was measured using phase rotation meter to obtain information about the circuit (may include voltage)
 - safety was considered and meter was used in accordance with accepted practice and regulations
 - use of the meter identified missing phases
 - proof testing was correctly carried out
 - direction of rotation was determined using meter
- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.

SPECIFICATION

People credited with this standard are able to:

- **Install PLC hardware to CEC and maintain at an acceptable operational standard.**

<p>Credit 7</p> <p>Prerequisite</p> <p>Competency Standard IE134-3TC, Demonstrate and apply knowledge of PLC operation, installation and maintenance; and Competency Standard IE135-3TC, Demonstrate and apply knowledge of communication buses and PLC interface</p> <p>Assessment</p> <p>For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations and industry practice.</p> <p>Quality Assurance</p> <p>Any assessor assessing against this competency standard must be a qualified electrician.</p> <p>References</p> <p>The Canadian Electrical Code, Part I, Canadian Standards Association, most current edition (CEC) WorkSafeBC Occupational Health and Safety (OHS) regulations</p> <p>Definitions</p> <p><i>PLC</i> - programmable logic controller.</p>
<p>Task 1: Install common PLC hardware types in accordance with CEC rules and manufacturer specifications, including:</p> <ul style="list-style-type: none"> - preparation for installation of PLCs - installation of PLCs <p>Task 2: Maintain PLC hardware components to acceptable operational standard.</p>

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:

M4 *Install and maintain PLC hardware*

Task 1: Install common PLC hardware types in accordance with CEC rules and manufacturer specifications.

Apprentice Diary - PLC hardware installation

(1.1 - 1.2)

Date/s	Description of work done over a period of time. Include details and dates of the PLCs that you have installed, all specification used for installation reference and applicable CEC rules. Explain any choices you have made. <ul style="list-style-type: none"> • Preparation for installation of PLC • Installation of PLC

What documentation was prepared to support the installation? (1.3)

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Preparation for installation** of PLC components was carried out: (1.1)
 - system specifications were accessed and manufacturer installation parameters determined
 - compatibility of PLC with environment was established
 - power supply suitability and regulation was established as being within required parameters
 - blueprints and drawings for PLC installation were located
 - I/O lists were developed/located
 - I/O modules were determined/identified

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- PLC hardware components were **installed to manufacturer specifications:** (1.2)
 - wiring and terminations were carried out correctly
 - grounding and shielding was carried out correctly
 - software was installed and diagnostics checked
 - fusing and overload protection was carried out correctly
 - blueprints and drawings were followed correctly.

Note: re-installing may be used to assess competency as long as all installation considerations are demonstrated. Simulation of installation is possible on training PLCs in the workplace.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- Installation was **documented** to comply with company standards. (1.3)

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Task 2: Maintain PLC hardware components to acceptable operational standard.

Note: assessment can be simulated on the PLC trainer or simulator in the workplace. Fibre Optic termination is site specific.

Apprentice Diary – PLC hardware maintenance

(2.1)

Date/s	Description of work done over a period of time. Include details of diagnosing faults using troubleshooting techniques and solutions applied. Must include: <ul style="list-style-type: none"> • test procedures and commands • wiring faults and corrosion • adjustment and repair techniques to hardware • procedures to verify system integrity • check connections • back-up software or program • add cable terminations • explain any choices you have made

What documentation was prepared to support the installation? (2.2)

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Diagnosed faults using logical troubleshooting techniques and applied appropriate solutions: (2.1)
 - test procedures were correctly carried out and commands entered
 - wiring faults due to corrosion were identified
 - hardware adjustment and repair was carried out
 - procedures to verify system integrity were carried out
 - connections/terminations were checked
 - software was backed-up prior to diagnosis
 - cable was terminated.

Note: Assessment can be simulated on the PLC trainer or simulator in the workplace. Fibre Optic termination is site specific.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- Maintenance was **documented** to comply with company standards. (2.2)

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.

SPECIFICATION

People credited with this standard are able to:

- **Maintain PLC networks to manufacturer specifications, CEC rules and to acceptable operational standard.**

<p>Credit 7</p> <p>Prerequisite</p> <p>Competency Standard IE134-3TC, Demonstrate and apply knowledge of PLC operation, installation and maintenance; and Competency Standard IE135-3TC, Demonstrate and apply knowledge of communication buses and PLC interfaces.</p> <p>Assessment</p> <p>For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations and industry practice.</p> <p>Quality Assurance</p> <p>Any assessor assessing against this competency standard must be a qualified electrician.</p> <p>References</p> <p>The Canadian Electrical Code, Part I, Canadian Standards Association, most current edition (CEC) WorkSafeBC Occupational Health and Safety (OHS) regulations</p> <p>Definitions</p> <p><i>PLC</i> - programmable logic controller</p>
<p>Task 1: Install PLC communication networks that allow PLC devices to communicate to operational standards.</p> <p>Task 2: Maintain PLC networks to allow PLC devices to communicate.</p>

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:
M5 Install and maintain PLC networks

Task 1: Install PLC communication networks that allow PLC devices to communicate to operational standards.

Apprentice Diary - PLC network installation

(1.1, 1.2)

Date/s	Description of work done over a period of time. Provide details of PLC network/s installed, devices connected, dates, preparation and rules or specifications that applied. Explain any choices you have made.

Identify the documentation prepared to support the PLC installation.

(1.3)

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Prepared for installation and connection of PLC networks: (1.1)
 - system specifications and manufacturer installation parameters were accessed
 - electrical drawings were accessed
 - suitability of installation confirmed OK for operating environment

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- PLC networks were **installed and connected**: (1.2)
 - conductors were terminated correctly.

Note: re-installing or replacing may be used to assess competency on installing as long as all installation considerations are demonstrated.

Examples of network installation may include:

- set-up and installation of switching racks
- installation and set-up routers
- installation and set up of modems and converters
- optimization of system speed

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- Installation was **documented** correctly to comply with company practice. (1.3)

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Task 2: Maintain PLC networks to allow PLC devices to communicate.

Apprentice Diary – PLC network maintenance

(2.1)

Date/s	Provide details of PLC network/s maintained, devices connected, dates and rules or specifications that applied and explain any choices made. Include: <ul style="list-style-type: none"> • testing procedures • test commands • device conflicts and repair • communications errors • adjustment and repair techniques to software • check terminations • add cable terminations • back up PLC and network

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Identify the documentation prepared to support the PLC maintenance. (2.2)

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Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Maintained PLC networks: (2.1)
 - correct testing procedures were carried out
 - correct test commands were entered
 - device conflicts were identified and repaired where necessary
 - communication errors were identified and rectified
 - software was adjusted and repaired
 - terminations were checked and any faults remedied
 - PLC was backed up and networked.

Note: May include ensuring that the PLC is in the correct mode.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- Maintenance was documented in accordance with company standards. (2.2)

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.

SPECIFICATION

People credited with this standard are able to:

- **Read and write programming language for PLCs and install and maintain common software applications to operate PLCs.**

Credit 5**Prerequisite**

Competency Standard IE138-3TC, Demonstrate knowledge of programming language and of installing and maintaining PLC software.

Assessment

For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Quality Assurance

Any assessor assessing against this competency standard must be a qualified electrician.

References

The Canadian Electrical Code, Part I, Canadian Standards Association, most current edition (CEC)
WorkSafeBC Occupational Health and Safety (OHS) regulations.

Definitions

PLC – programmable logic controller

I/O – input/output

Task 1: Install and maintain PLC software to manufacturer specifications, adjust as required to fit operating parameters and to allow error free communication between devices.

Task 2: Read programming to troubleshoot PLCs and write functional programming to install and adjust PLCs and associated networks so they function in accordance with manufacturer specifications.

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:

M6 *Read and write programming language and install and maintain PLC software*

Task 1: Install and maintain PLC software to manufacturer specifications, adjust as required to fit operating parameters and to allow error free communication between devices.

Apprentice Diary - Loading and running programs

(1.1)

Date/s	Description of work done loading and running PLC programs - may be a particular job or a combination of a series of jobs - include dates and overall details of the PLC/installation, explain any choices you have made and: details of PC interface configuration network communication setup/requirements advantages and disadvantages of different configurations. <i>Note: make sure you cover 'online', 'offline' and 'equal' states.</i>

Apprentice Diary – Maintenance of PLC software

(1.2)

Date/s	Description of maintenance work done on PLC software – likely to be a log of a series of jobs proving your competence in the bulleted points below – include dates and overall details of the maintenance, explain any choices you have made and: <ul style="list-style-type: none"> use of programming terminals use of handheld programmers communication software used back up details PLC programs used diagnostics carried out.

Provide details of installation documents and evidence such as work sheets, invoices etc that may be used to supplement the diary log.

(1.3)

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Apprentice has loaded and run programs: (1.1)
- used pc interface
 - configured PLC correctly (and understands advantages and disadvantages of different configuration possibilities)
 - identified/determined network communication requirements
 - determined/controlled PLC state - online/offline/equal.

Assessor/ verifier name: _____ ***Signature:*** _____ ***Date:*** _____

- Apprentice has maintained PLC software: (1.2)
- programming terminals were identified and accessed
 - hand held programmers have been used
 - communication software used successfully
 - back ups made - appropriate to the situation
 - diagnostics carried out.

Assessor/ verifier name: _____ ***Signature:*** _____ ***Date:*** _____

- Documentation of installation was carried out according to company standards. (1.3)
- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ ***Signature:*** _____ ***Date:*** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Task 2: Read programming to troubleshoot PLCs and write functional programming to install and adjust PLCs and associated networks so they function in accordance with manufacturer specifications.

Select appropriate software programs for the situation. Outline the following: (2.1)

- vendor types and proprietary standards
- manufacturer manuals
- programming specifications and guides.

Apprentice Diary - Interpreting and writing functional programming (2.2)

Date/s	<p>Provide details and dates to support the use of functional programming to interpret, install and/or adjust PLCs.</p> <p>The range of competence included in the log should include use of:</p> <ul style="list-style-type: none"> • ladder logic • function blocks • scaling • symbols • PLC operating modes • on-line / off-line programming • programming instructions • I/O image tables • integer files • timers and counters.

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Documenting functional programming

(2.3)

Provide details of back-up documentation for interpreting and writing functional programming (or attach copies).

Documentation includes:

- uploading and back-up details
- programming notes
- logic diagrams
- test and debug of program info (safely)
- reports and hard copies of programming.



Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Appropriate programming software was selected. (2.1)
References used in selection included:
- vendor types and proprietary standards set by vendors
 - manufacturer manuals
 - programming specifications and guides.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- Functional PLC programming language was read and written. (2.2)
The following elements were interpreted or used in the programming:
- ladder logic
 - function blocks
 - scaling
 - symbols
 - PLC operating modes
 - online/offline programming
 - programming instructions
 - I/O image tables
 - integer files
 - timers and counters.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- Programming was documented and secured in accordance with company standards. (2.3)
- Uploading and backup was documented:
- programming notes were made
 - logic diagrams made/interpreted accordingly
 - testing and debugging recorded
 - reports and hardcopy of programming created.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.

SPECIFICATION

People credited with this standard are able to:

- **Install, maintain and document low voltage circuits to CEC rules and all applicable installation guidelines.**

<p>Credit 12</p> <p>Prerequisite</p> <p>Competency Standard IE141-2TC, Demonstrate knowledge of the installation and maintenance of low voltage circuits.</p> <p>Assessment</p> <p>For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.</p> <p>Quality Assurance</p> <p>Any assessor assessing against this competency standard must be a qualified electrician.</p> <p>References</p> <p>The Canadian Electrical Code, Part I, Canadian Standards Association, most current edition (CEC) WorkSafeBC Occupational Health and Safety (OHS) regulations.</p> <p>Sector References</p> <p>Mines Act [RSBC 1996] CHAPTER 293 CAN/CSA-M421-00 (R2005) - Use of electricity in mines</p> <p>Definitions</p> <p><i>IEEE</i> - Institute of Electrical and Electronic Engineers <i>ULC</i> - Underwriters Laboratories of Canada <i>ISO</i> - International standards organization <i>NEMA</i> - National Electrical Manufacturers Association</p>
<p>Task 1: Install and maintain low voltage circuits to equipment specifications and safety standards.</p> <p>Task 2: Install and maintain low voltage distribution equipment to applicable safety standards and manufacturer specifications.</p>

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:
H8 Install and maintain low voltage circuits

Task 1: Install and maintain low voltage circuits to equipment specifications and safety standards.

Use of drawings

Identify examples when you have used the following drawing/circuit diagram types: (1.1)

Drawing type	Job	Date
Symbol sets		
Standards		
Schematics and construction blueprints		
Drawing updates and standards		

Apprentice Diary – Installation of low voltage circuits (1.2)

Note: the CEC rules define the standards to which correct installations take place and therefore are the guide to assessing installations.

Date/s	Description and dates of installation work done over a period of time. Include: <ul style="list-style-type: none"> reference to appropriate circuit diagrams and drawings reference to environmental specifications. Commission, testing equipment, termination, layout and secure, install wire and cable, control points, environmental considerations. Explain any choices you have made.

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Apprentice Diary – Maintenance of low voltage circuits

(1.3)

Note: effective maintenance procedures vary between operations and are dictated by operational standards – for instance in coal mines cleanliness standards differ from the standards in gas compression plants.

Date/s	Description of maintenance work done over a period of time. Explain choices you have made and include: <ul style="list-style-type: none"> • testing operation • termination • test safeties and controls • check terminal blocks • check connections.

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Used low voltage diagrams and drawings (1.1)
 - recognized symbol sets
 - followed standards
 - interpreted schematics and construction blue prints
 - translated drawing updates and standards

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- Installed low voltage circuits that comply with CEC rules: (1.2)
 - used testing equipment
 - completed appropriate termination
 - finalized layout and secured safely
 - installed and cable wire
 - determined control points
 - environmental specifications

Note: the CEC rules define the standards to which correct installations take place and therefore are the standard for assessing installations.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- Maintained low voltage circuits to equipment specifications: (1.3)
 - used testing equipment
 - checked terminations
 - inspected layout and secure
 - inspected running wire
 - confirmed control points

Note: effective maintenance procedures vary by industry sector and are dictated by operational standards – for instance in coal mines cleanliness standards differ from the standards in gas compression plants.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- All apprentice’s explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Task 2: Install and maintain low voltage distribution equipment to applicable safety standards and manufacturer specifications.

Describe:

- the low voltage equipment that you have installed and matching of equipment to load ratings
- the regulatory standards applicable to the equipment.

Note: proper selection of required equipment varies across applications.

(2.1)

Apprentice Diary – Installation of low voltage distribution equipment.

(2.2)

Note: specific attention needs to be paid to shielding, bonding and grounding as this is a fundamental key to operation and safety.

Date/s	Description of power distribution equipment installation over a period of time. Include: <ul style="list-style-type: none"> • wiring • shielding and bonding • access manufacturer specifications and manuals • test and tune • secure and restraining equipment. • explain any choices you have made.

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Apprentice Diary – Maintenance of low voltage distribution equipment

(2.3)

Note: this may be simulated for assessment purposes if no workplace opportunity occurs, as component replacement may occur rarely in some workplaces.

Date/s	Description of maintenance work done over a period of time. Explain any choices you have made and include: <ul style="list-style-type: none"> • test and troubleshoot • protect and clean components • grounding • check connections • component replacement.

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Used the appropriate power distribution equipment types that meet the requirements of power distribution standards: (2.1)
- used correct types of equipment for load ratings
 - complied with appropriate standards - identify which:
 - Canadian Electrical Code (CEC)
 - Canadian Standards Association (CSA)
 - Underwriter Laboratory Canada (ULC)
 - International Standards Organization (ISO)

Note: proper selection of required equipment varies across applications.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- Installed low voltage equipment to comply with environmental factors and manufacturer specifications: (2.2)
- determined load calculation
 - used appropriate wiring
 - shielded and bonded as required
 - referred to manufacturer specifications and manuals
 - tested and tuned equipment
 - secured and restrained equipment.

Note: specific attention needs to be paid to shielding, bonding and grounding as this is a fundamental key to operation and safety.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- Maintained low voltage equipment to comply with manufacturer specifications and company preventative maintenance routines: (2.3)
- performed tests and troubleshooting
 - protected and cleaned components
 - followed safety procedures for component replacement
 - checked grounding.

Note: this may be simulated for assessment purposes if no workplace opportunity occurs, as component replacement may occur rarely in some workplaces.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.

SPECIFICATION

People credited with this standard are able to:

- **Install and maintain AC motors to CEC rules and equipment manufacturer specifications.**

<p>Credit 9</p> <p>Prerequisite</p> <p>Competency Standard IE150-3TC, Demonstrate knowledge of AC motors.</p> <p>Assessment</p> <p>For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.</p> <p>Quality Assurance</p> <p>Any assessor assessing against this competency standard must be a qualified electrician.</p> <p>References</p> <p>The Canadian Electrical Code, Part I, Canadian Standards Association, most current edition (CEC) WorkSafeBC Occupational Health and Safety (OHS) regulations.</p> <p>Other useful references</p> <p>Rosenberg’s motor theory manual Electrical Apparatus Service Association (EASA) Electrical Engineering Pocket Handbook American Electrician Motor Handbook (Electrician) Ugly’s electrical references</p> <p>Definitions</p> <p><i>Properly</i> - to CEC rules and in a manner that complies with WorkSafeBC regulations.</p>
<p>Task 1: Install single-phase induction and three-phase induction AC motors to CEC code standards and manufacturer specifications appropriate to the type of motor and the application.</p> <p>Task 2: Maintain and troubleshoot single-phase induction and three-phase induction AC motors to applicable CEC rules and manufacturer specifications.</p>

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:

LA Install and maintain AC motors

Task 1: Install single-phase induction and three-phase induction AC motors to CEC code standards and manufacturer specifications appropriate to the type of motor and the application.

Describe 2 example motors name plate data that you have installed in the tables below.

Single-phase

(1.1)

Criteria	Description
frame size and characteristics	
horsepower	
amps	
voltage	
rotation speed	
service factor	
insulation class	
ambient temperature class	
Grease type	
manufacturer	
weight	
efficiency	

Three-phase

(1.1)

Criteria	Description
frame size and characteristics	
horsepower	
amps	
voltage	
rotation speed	
service factor	
insulation class	
ambient temperature class	
Grease type	
manufacturer	
weight	
efficiency	

Include the following preliminary information about the installations.

(1.1)

Type of information	Details
pre-installation communication carried out	
activities accessing and interpreting operation and specification manuals	
junction box positioning	
type, size and verify rotation (if required by installation set up - i.e. large pumps)	
electrical classification	
manufacturer	
verify starter	
insulation test	
leads/conductor sizing	
motor terminal wiring configuration	
supply conductor temperature and voltage rating	
cooling methods	

Apprentice Diary – Single-phase AC Motor installation

(1.1, 1.2)

Note: re-installing may be used to assess competency on installing as long as all installation considerations are demonstrated.

Date/s	Describe the installation – single-phase. <ul style="list-style-type: none"> • Include installation, safety measures, manuals used, dates and times, verification of starter test, commissioning procedures, grounding and bonding details and documentation prepared. • Explain any choices you have made.

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Apprentice Diary – Three-phase AC Motor installation

(1.1, 1.2)

Note: re-installing may be used to assess competency on installing as long as all installation considerations are demonstrated.

Date/s	Describe the installation – three-phase.
	<ul style="list-style-type: none"> • Include installation, safety measures, manuals used, dates and times, verification of starter and megger test, commissioning procedures, grounding and bonding details and documentation prepared. • Explain any choices you have made.

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Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Preparation for installation and set-up of AC motors was carried out: (must have observed for both single and three-phase) (1.1)
 - pre-installation communication was carried out to verify the installation parameters
 - manuals and information were correctly interpreted in preparation for installation
 - junction box positioning was determined
 - name plate data was verified including manufacturer and:
 - frame size and characteristics
 - horsepower
 - amps
 - voltage
 - rotation speed
 - service factor
 - insulation class
 - ambient temperature class
 - grease type
 - manufacturer
 - weight
 - efficiency
 - electrical classification was determined
 - starter was verified
 - insulation test
 - leads / conductor sizing
 - motor terminal wiring configuration
 - supply conductor temperature and voltage rating
 - cooling methods

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- AC motors were properly installed and set-up: (must have observed for both single and three-phase) (1.2)
 - single phase
 - three phase.
 - commissioning procedures were followed correctly
 - grounding, shielding and bonding were carried out correctly
 - motor and wiring was protected

- installation was checked and tested including load test, current check and rotation verification.

Note: re-installing may be used to assess installing as long as all installation considerations are demonstrated.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- Installation was documented in accordance with company procedures. (1.3)

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Task 2: Maintain and troubleshoot single-phase induction and three-phase induction AC motors to applicable CEC rules and manufacturer specifications.

Apprentice Diary – Single-phase motor maintenance

(2.1, 2.2, 2.3)

Note: maintenance procedures vary by industry sector in accordance with operational requirements (i.e. dust tolerance). Vibration analysis may deploy a variety of analysis techniques, some very specialized requiring specific test equipment, and should be assessed appropriately.

Date/s	Description of work done over a period of time. Include details and dates of: <ul style="list-style-type: none"> • safety procedures • troubleshooting techniques • preventative maintenance procedures • lubricate • lubrication schedule • vibration analysis • clean • current check • insulation test • listen to motor Explain any choices you have made.

Apprentice Diary – Three-phase motor maintenance

(2.1, 2.2, 2.3)

*Note: maintenance procedures vary by industry sector in accordance with operational requirements (i.e. dust tolerance).
Vibration analysis may deploy a variety of analysis techniques, some very specialized requiring specific test equipment, and should be assessed appropriately.*

Date/s	Description of work done over a period of time. Include details and dates of: <ul style="list-style-type: none"> • safety procedures • troubleshooting techniques • preventative maintenance procedures • lubricate • lubrication schedule • vibration analysis • clean • current check • insulation test • listen to motor Explain any choices you have made.

Documentation

Describe the documentation that you have prepared to support the maintenance (2.3)

Single-phase

Three-phase

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Prepared for maintenance of AC motors: (2.1)
 - accessed and interpreted operation and specification manuals, and maintenance records.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- Properly maintained AC motors: (2.2)
 - safety procedures were observed
 - troubleshooting techniques were used to determine required maintenance
 - preventative maintenance was carried out as part of the overall maintenance process
 - motor was lubricated
 - motor was cleaned
 - vibration analysis carried out
 - current check carried out
 - insulation test carried out
 - pump listened to

Note: maintenance procedures vary by industry sector in accordance with operational requirements (i.e. dust tolerance). Vibration analysis may deploy a variety of analysis techniques, some very specialized requiring specific test equipment, and should be assessed appropriately.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- Documented maintenance to company standards. (2.3)

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ *Signature:* _____ *Date:* _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.

SPECIFICATION

People credited with this standard are able to:

- **Use a computerized maintenance management system to schedule and record preventative and emergency maintenance.**

Credit 3**Prerequisite**

Competency Standard IE140-2TC, Demonstrate knowledge of computerized maintenance management systems and electronic log books.

Assessment

For assessment purposes, all explanations, descriptions, and activities must comply with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations and industry practice.

Quality Assurance

Any assessor assessing against this competency standard must be a qualified electrician.

References

The Canadian Electrical Code, Part I, Canadian Standards Association, most current edition (CEC), WorkSafeBC Occupational Health and Safety (OHS) regulations.

Task 1: Use a computerized maintenance management database to record equipment maintenance.

This unit relates to the following competency number and topic in the provincial OAC and Program Outline:

K1 Use computerized maintenance management systems

Task 1: Use a computerized maintenance management database to record equipment maintenance.

Describe the software database system used in your workplace to manage equipment maintenance:(1.1)

Summarize the features of the system that allows it to track and plan: (1.1)

- equipment maintenance
- repairs maintenance
- purchasing of inventory
- parts and equipment requisition and ordering

Note: ordering may be demonstrated by filling out work orders/maintenance records.

You may attach:

- screen shots of the system as a means of summarizing
- work records or maintenance logs that have been outputted by the system.

Complete the diary below to describe your use of the maintenance system.

(1.2, 1.3)

Note: ordering may be demonstrated by filling out work orders/maintenance records.

Date/s	Description of use over a period of time <ul style="list-style-type: none"> • Include details/reference to the life cycle maintenance, vendors' maintenance requirements and warranty and service details. • Include details/reference to purchase orders you have created and work that you have scheduled.

Tracking maintenance history

Identify occasions where you have used a computerized maintenance management system to examine equipment history and maintenance work.

(1.4)

Date/s	Include: <ul style="list-style-type: none"> • life cycle maintenance • previous maintenance • previous emergency repairs • past parts consumption.

Assessor Checklist

I verify the apprentice is able to perform the following task(s) to the standard outlined and attest to his/her competence.

- Demonstrated knowledge of the relationship between maintenance, purchasing inventory/stores, and planning functions: (1.1)
maintenance schedules were identified
 - repair schedules were identified
 - principles of ordering/purchasing and keeping an inventory were identified
 - work planning functions of the system were identified
 - parts and equipment requisition and ordering functions were identified.

Note: ordering may be demonstrated by filling out work orders/maintenance records.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- Used management software to identify and record maintenance work (1.2)
 - life cycle maintenance functions were used
 - vendors' maintenance requirements for equipment were managed within the system
 - warranty and service details were recorded.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- Used software to schedule works and order materials (may include costing as well). (1.3)

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- Used a computerized maintenance management system to examine equipment history and maintenance work including: (1.4)
 - life cycle maintenance
 - previous maintenance
 - previous emergency repairs
 - past parts consumption.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

- All apprentice's explanations, descriptions, and activities complied with current legislation, including the Canadian Electrical Code, WorkSafeBC or other applicable regulations, and industry practice.

Assessor/ verifier name: _____ **Signature:** _____ **Date:** _____

Note: if simulation was used for any of the tasks, attach a brief description of the exercise to this competency.

Additional Supporting Evidence

(To be completed by the apprentice and signed by the assessor)

Describe what workplace records are available to verify you performed this work.

Describe where a moderator can locate these records to verify your work when doing a quality check.

Name and describe the CEC rules required when you performed these tasks.

Name applicable manufacturer guidelines that were followed when doing these tasks.

Apprentice Signature: _____ ***Date:*** _____

Assessor Signature: _____ ***Date:*** _____

Additional Questions

Attach written notes of any additional questions asked of the apprentice and answers given. Ensure they are signed and dated by both the apprentice and assessor.