

# Trade Profile

## Industrial Electrician



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# Trade profile

## Industrial Electrician



# Structure of the Trade Profile

This profile has two sections that provide a snapshot of the trade's description, and all trade activities as they are organized in the Red Seal Occupational Standard:

**Description of the Industrial Electrician trade:** An overview of the trade's duties, work environment, job requirements, similar occupations and career progression

**Task Matrix:** a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard

**Major Work Activity (MWA):** the largest division within the standard that is comprised of a distinct set of trade activities

**Task:** distinct actions that describe the activities within a major work activity

**Sub-task:** distinct actions that describe the activities within a task

# Description of the Industrial Electrician Trade

“Industrial Electrician” is this trade’s official Red Seal occupational title approved by the CCDA. This standard covers tasks performed by an industrial electrician. Industrial electricians install, maintain, test, troubleshoot, service and repair industrial electrical equipment and associated electrical protection and controls. These include equipment or components directly or indirectly exposed to electrical power such as motors, generators, pumps and lighting systems. Industrial electricians are employed by utilities, electrical contractors and maintenance departments of plants, mines, manufacturing facilities, government and other industrial establishments.

Industrial electricians must read and interpret standards, prints, drawings and codes for layout and installation of electrical equipment. They install, service and maintain electrical components such as lighting fixtures, switches, conduit and electrical controls. They test electrical systems and continuity of circuits using test equipment to ensure system safety and compatibility. They conduct preventative and predictive maintenance programs and keep maintenance records. Industrial electricians may specialize in maintenance functions in areas such as high voltage, building automation and process control.

Industrial electricians must possess manual dexterity, and good planning, organizational and communication skills. They also require strong analytical, mathematical and problem-solving skills in order to read and interpret schematics, drawings and specifications. They should have good mechanical aptitude to install, troubleshoot and repair equipment. It is important for industrial electricians to have a good grasp of digital technology because many of the skills and technology for an industrial electrician are computer based. They must also have good vision and hearing, the ability to distinguish colours and a willingness to upgrade their skills to adapt to new developments in the trade.

The work environment of industrial electricians can expose them to hazards. Their work is performed indoors or outdoors in diverse climate conditions, and may be at variable heights or in confined spaces. Occupational risks include electrical shocks, arc flashes, falls, and injury from lifting and kneeling.

This occupational standard recognizes similarities or overlaps with the work of construction electricians, powerline technicians, instrumentation and control technicians, electric motor systems technicians, heating, ventilation and air conditioning (HVAC) technicians, telecommunications technicians and industrial mechanics (millwrights). Industrial electricians also work with process operators, engineers and inspectors.

With experience, industrial electricians may act as mentors and trainers to apprentices in the trade. They may also advance to managerial, inspection, facilitation or teaching positions.

# Industrial Electrician

## Task Matrix and Weightings

### A - Performs common occupational skills

9%

<p><b>Task A-1</b> Performs safety-related functions <b>22%</b></p>	<p>A-1.01 Maintains safe work environment</p>	<p>A-1.02 Uses personal protective equipment (PPE) and safety equipment</p>	<p>A-1.03 Performs lock-out and tag-out procedures</p>
	<p>A-1.04 Identifies environmental conditions</p>		
<p><b>Task A-2</b> Uses tools and equipment <b>18%</b></p>	<p>A-2.01 Uses common and specialty tools and equipment</p>	<p>A-2.02 Uses access equipment</p>	<p>A-2.03 Uses rigging, hoisting and lifting equipment</p>
<p><b>Task A-3</b> Organizes work <b>18%</b></p>	<p>A-3.01 Interprets plans, drawings and specifications</p>	<p>A-3.02 Identifies hazardous installations</p>	<p>A-3.03 Organizes materials and supplies</p>
	<p>A-3.04 Plans project tasks and procedures</p>	<p>A-3.05 Prepares specific location in facility</p>	<p>A-3.06 Finalizes required documentation</p>
<p><b>Task A-4</b> Fabricates and installs support components <b>15%</b></p>	<p>A-4.01 Fabricates support structures</p>	<p>A-4.02 Installs brackets, hangers and fasteners</p>	<p>A-4.03 Installs seismic restraint systems</p>
<p><b>Task A-5</b> Commissions and decommissions electrical systems <b>21%</b></p>	<p>A-5.01 Commissions systems</p>	<p>A-5.02 Performs shutdown and startup procedures</p>	<p>A-5.03 Decommissions systems</p>
<p><b>Task A-6</b> Uses communication and mentoring techniques <b>6%</b></p>	<p>A-6.01 Uses communication techniques</p>	<p>A-6.02 Uses mentoring techniques</p>	

## B - Installs and maintains generating, transmission, distribution and service systems

23%

<p><b>Task B-7</b> Installs and maintains utility and non-utility supply services and metering equipment</p> <p><b>11%</b></p>	<p><b>B-7.01</b> Installs single-phase utility and non-utility supply services and metering equipment</p>	<p><b>B-7.02</b> Maintains single-phase utility and non-utility supply services and metering equipment</p>	<p><b>B-7.03</b> Installs three-phase utility and non-utility supply services and metering equipment</p>
	<p><b>B-7.04</b> Maintains three-phase utility and non-utility supply services and metering equipment</p>		
<p><b>Task B-8</b> Installs and maintains protection devices</p> <p><b>16%</b></p>	<p><b>B-8.01</b> Installs overcurrent protection devices</p>	<p><b>B-8.02</b> Maintains overcurrent protection devices</p>	<p><b>B-8.03</b> Installs ground fault, arc fault and surge protection devices</p>
	<p><b>B-8.04</b> Maintains ground fault, arc fault and surge protection devices</p>	<p><b>B-8.05</b> Installs under- and over-voltage protection devices</p>	<p><b>B-8.06</b> Maintains under- and over-voltage protection devices</p>
<p><b>Task B-9</b> Installs and maintains low-voltage distribution systems</p> <p><b>14%</b></p>	<p><b>B-9.01</b> Installs low-voltage distribution equipment</p>	<p><b>B-9.02</b> Maintains low-voltage distribution equipment</p>	
<p><b>Task B-10</b> Installs and maintains power conditioning systems</p> <p><b>10%</b></p>	<p><b>B-10.01</b> Installs power conditioning systems</p>	<p><b>B-10.02</b> Maintains power conditioning systems</p>	
<p><b>Task B-11</b> Installs and maintains bonding, grounding and ground-fault protection and detection systems</p> <p><b>12%</b></p>	<p><b>B-11.01</b> Installs grounding systems</p>	<p><b>B-11.02</b> Maintains grounding systems</p>	<p><b>B-11.03</b> Installs bonding systems</p>
	<p><b>B-11.04</b> Maintains bonding systems</p>	<p><b>B-11.05</b> Installs ground-fault protection and detection systems</p>	<p><b>B-11.06</b> Maintains ground-fault protection and detection systems</p>

**Task B-12**  
**Installs and maintains power generating and conversion systems**  
**9%**

**B-12.01 Installs alternating current (AC) generating systems**

**B-12.02 Maintains alternating current (AC) generating systems**

**B-12.03 Installs direct current (DC) generating and conversion systems**

**B-12.04 Maintains direct current (DC) generating and conversion systems**

**Task B-13**  
**Installs and maintains renewable energy generating and energy storage systems**  
**6%**

**B-13.01 Installs renewable energy generating and energy storage systems**

**B-13.02 Maintains renewable energy generating and energy storage systems**

**Task B-14**  
**Installs and maintains high-voltage systems**  
**10%**

**B-14.01 Installs high-voltage systems**

**B-14.02 Maintains high-voltage systems**

**Task B-15**  
**Installs and maintains transformers**  
**12%**

**B-15.01 Installs extra-low-voltage transformers**

**B-15.02 Maintains extra-low-voltage transformers**

**B-15.03 Installs low-voltage single-phase transformers**

**B-15.04 Maintains low-voltage single-phase transformers**

**B-15.05 Installs low-voltage three-phase transformers**

**B-15.06 Maintains low-voltage three-phase transformers**

**B-15.07 Installs high-voltage transformers**

**B-15.08 Maintains high-voltage transformers**

# C - Installs and maintains wiring systems

20%

**Task C-16**  
Installs and maintains raceways, cables, conductors and enclosures  
**26%**

C-16.01 Installs conductors and cables	C-16.02 Maintains conductors and cables	C-16.03 Installs conduit, tubing and fittings
C-16.04 Installs raceways	C-16.05 Installs boxes and enclosures	C-16.06 Maintains conduit, tubing, fittings, raceways, boxes and enclosures

**Task C-17**  
Installs and maintains branch circuitry and devices  
**26%**

C-17.01 Installs luminaires	C-17.02 Maintains luminaires	C-17.03 Installs wiring devices
C-17.04 Maintains wiring devices		

**Task C-18**  
Installs and maintains heating, ventilation and air-conditioning (HVAC) electrical components  
**14%**

C-18.01 Connects power to heating, ventilation and air-conditioning (HVAC) systems and associated equipment	C-18.02 Installs heating, ventilation and air-conditioning (HVAC) controls	C-18.03 Maintains heating, ventilation and air-conditioning (HVAC) electrical components
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**Task C-19**  
Installs and maintains electric heating systems and controls  
**15%**

C-19.01 Installs electric heating systems and controls	C-19.02 Maintains electric heating systems and controls
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**Task C-20**  
Installs and maintains exit and emergency lighting systems  
**12%**

C-20.01 Installs exit and emergency lighting systems	C-20.02 Maintains exit and emergency lighting systems
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**Task C-21**  
Installs and maintains cathodic protection systems  
**7%**

C-21.01 Installs cathodic protection systems	C-21.02 Maintains cathodic protection systems
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# D - Installs and maintains rotating and other fixed equipment and control systems

**21%**

<p><b>Task D-22</b> Installs and maintains motor starters and control devices <b>34%</b></p>	<p><b>D-22.01</b> Installs motor starters</p>	<p><b>D-22.02</b> Maintains motor starters</p>	<p><b>D-22.03</b> Installs motor control devices</p>
	<p><b>D-22.04</b> Maintains motor control devices</p>		
<p><b>Task D-23</b> Installs and maintains drives <b>23%</b></p>	<p><b>D-23.01</b> Installs alternating current (AC) drives</p>	<p><b>D-23.02</b> Maintains alternating current (AC) drives</p>	<p><b>D-23.03</b> Installs direct current (DC) drives</p>
	<p><b>D-23.04</b> Maintains direct current (DC) drives</p>		
<p><b>Task D-24</b> Installs and maintains other fixed equipment and associated controls <b>14%</b></p>	<p><b>D-24.01</b> Installs other fixed equipment and associated controls</p>	<p><b>D-24.02</b> Maintains other fixed equipment and associated controls</p>	
<p><b>Task D-25</b> Installs and maintains motors <b>29%</b></p>	<p><b>D-25.01</b> Installs single-phase motors</p>	<p><b>D-25.02</b> Maintains single-phase motors</p>	<p><b>D-25.03</b> Installs three-phase motors</p>
	<p><b>D-25.04</b> Maintains three-phase motors</p>	<p><b>D-25.05</b> Installs direct current (DC) motors</p>	<p><b>D-25.06</b> Maintains direct current (DC) motors</p>

## E - Installs and maintains signalling and communication systems

10%

<b>Task E-26</b> Installs and maintains signalling systems <b>35%</b>	<b>E-26.01 Installs fire alarm systems</b>	<b>E-26.02 Maintains fire alarm systems</b>	<b>E-26.03 Installs security and surveillance systems</b>
	<b>E-26.04 Maintains security and surveillance systems</b>		
<b>Task E-27</b> Installs and maintains communication systems <b>32%</b>	<b>E-27.01 Installs communication systems</b>	<b>E-27.02 Maintains communication systems</b>	
<b>Task E-28</b> Installs and maintains building automation systems <b>33%</b>	<b>E-28.01 Installs building automation systems</b>	<b>E-28.02 Maintains building automation systems</b>	

## F - Installs and maintains process control systems

17%

**Task F-29**  
Installs and maintains input/output (I/O) devices

48%

F-29.01 Installs discrete input/output (I/O) devices

F-29.02 Maintains discrete input/output (I/O) devices

F-29.03 Installs analog input/output (I/O) devices

F-29.04 Maintains analog input/output (I/O) devices

**Task F-30**  
Installs, programs and maintains automated control systems

37%

F-30.01 Installs automated control systems

F-30.02 Maintains automated control systems

F-30.03 Programs automated control systems

F-30.04 Optimizes system performance

**Task F-31**  
Installs and maintains pneumatic and hydraulic control systems

15%

F-31.01 Installs pneumatic control systems

F-31.02 Maintains pneumatic control systems

F-31.03 Installs hydraulic control systems

F-31.04 Maintains hydraulic control systems