



## Release of Updated Training Standard Log Book

<b>Trade Name &amp; Code</b>	Industrial Electrician (442A)
<b>Implementation Date of New Standard</b>	February 1 <sup>st</sup> , 2018, released as Version 300
<b>Implementation Plan</b>	<ul style="list-style-type: none"> <li>• Apprentices who began their apprenticeship on the former 2011 Training Standard can complete their program using that standard.</li> <li>• All apprentices with initial training agreements registered on or after February 1<sup>st</sup>, 2018 must be trained to this new standard.</li> <li>• Similar to the previous Standard, the Industrial Electrician Standard log book utilizes a Completion Chart which sets out the minimum sign-off requirements for completion.</li> <li>• On or after February 1<sup>st</sup>, 2018, any apprentice who loses his or her training standard must be trained to and completed with the new standard even if they began their apprenticeship with the 2011 version.</li> </ul>
<b>Impact on Curriculum Standards or Related Trades</b>	<ul style="list-style-type: none"> <li>• The Construction Electrician Apprenticeship Training Standard log book is also being updated. Although there is shared competencies between the two trades, it is important to note that there are now key variations, especially in relation to completion requirements, mandatory vs. optional skills and a distinction between the skills required of the two trades.</li> </ul>
<b>Training Standard Access</b>	<p>As of February 1<sup>st</sup>, 2017:</p> <ul style="list-style-type: none"> <li>• The new log book will be available on the Ontario College of Trades (the 'College') website.</li> <li>• The College will mail a printed log book to each apprentice who becomes a new member of their Apprentices Class in the Industrial Electrician trade when they are mailed their Apprentice's Statement of Membership card.</li> <li>• The log book is available for download/print from the College of Trades' website.</li> </ul>
<b>Skill(s) &amp;/or Skill Set(s) Added</b>	<p>No new skill sets have been added to this Training Standard. However, skill sets have been re-titled and broadened to include different skills.</p> <p>Skills added to skill set <b>8050 Protect Self and Others</b>:</p> <ul style="list-style-type: none"> <li>- <b>8050.02– (Identify hazards and hazardous conditions, equipment and material)</b> It is important to identify a hazard or hazardous condition prior to controlling it. In an industrial setting, there is usually a structured chain of command that the apprentice needs to learn and follow. The competency related to controlling the hazard was in the former standard (8050.03).</li> </ul>



- **8050.04– (Follow safety procedures when working with hazardous substances)**  
This skill was added based on recommendations from the Ministry of Labour during review of the Industrial Electrician training standard.
- **8050.05 and 8050.06– (Identify electrical hazards and Control electrical hazards)**  
Because electrical hazards are the most primary concerns for electricians, the Industrial Electricians requested that the electrical hazard skills be separated from non-electrical hazards because of their importance and because the skills and requirements are different.
- **8050.10– (Follow procedures for reporting electrical incidents)**  
This new skill was separated from the skill on applying first aid and CPR (8050.09) because the reporting requirements are different.
- **8050.12 – (Use and maintain arc flash and arc blast rated personal protective equipment)** This skill was added based on recommendations from the Ministry of Labour during review of the Industrial Electrician training standard.
- **8050.14, 8050.15, 8050.16– (Determine if the system is live or de-energized, De-energize live systems and Follow electrical safety program and procedures when performing live work)** This skill was added based on recommendations from the Ministry of Labour during review of the Industrial Electrician training standard.

Skills added to Skill Set **8051.0 Schematics, Drawings and Specifications:**

- **8051.01– (Create Sketches) and 8051.02 (Modify drawings)**  
These skills were separated because each competency is different. Modification refers more to 'as-built' and creation refers more to diagrams and schematics.
- **8051.09– (Create a materials and equipment list)**  
This is an important skill for Industrial Electricians who are performing a lot of maintenance and troubleshooting.

Skill added to skill set **8052 Tools and Equipment:**

- **8052.01 and 8052.02 – (Use and maintain hand tools (non-power) and Use and maintain power tools and accessories (electric, hydraulic, pneumatic))**  
These were separated into two different skills to reflect the different competencies in using power tools. The latter was also broadened to include electric, hydraulic and pneumatic (previously just electric).
- **8052.03 – (Use rigging and hoisting equipment) and 8052.04 (Use scaffolds, lifting devices and elevating platforms)**  
These skills were modified to exclude the verb 'maintain'. For Industrial Electricians, unlike Construction Electricians, they would use the equipment, but someone else will likely maintain the equipment (i.e. facility maintenance personnel).



- **8052.07– (Identify electrical material and equipment requirements)**  
The verb was changed from 'schedule' to 'identify'. For Industrial Electricians, unlike Construction Electricians, they would usually not schedule materials. Because they usually work in a plant setting, they would identify requirements and put forward a request to others who would schedule or the equipment may already be there. Industrial Electricians would more typically schedule, receive and secure equipment not Construction Electricians.
- **8052.08– (Use bending and threading tools), 8052.09 (Use and maintain powder actuated tools) and 8052.10 (Use thermit welding tools)**  
These tool related skills were added but were made optional as not all Industrial Electricians would be exposed to these skills and some of the tools are outdated (i.e. powder actuated tools).

Skill added to skill set **8054 Instrumentation Devices and Automated Control Systems:**

- **8054.04, 8054.05, 8054.06– (Install automated control systems, Troubleshoot automated control systems, Maintain automated control systems)**  
These new skills replace the existing skill on distributed control systems (DCS) (formerly 7252.02). DCS is just one example of an automated control system. PLCs and HMIs are other common examples. By broadening the skills to use the term 'automated control systems' it is more inclusive and reflective of terminology used in the Red Seal Occupational Standard.

Skill added to skill set **8055 Wiring Systems:**

- **8055.06 and 8055.07– (Install single conductor (metallic and non-metallic) cables and Install multi-conductor (metallic and non-metallic) cables)**  
These skills replace the previous joint skill (7244.06 -Select, lay out and install feeder cables for single and multi-conductor cables, metallic and non-metallic cables). It was important to separate single conductors and multi-conductors because different skills needed to be addressed.
- **8055.08 – (Install non-metallic tubing and conduits)** – this skill replaces the more narrow skill 7244.07 (Select, lay out and install rigid Poly Vinyl Chloride (conduits) New replacement skill is much broader to include all non-metallic tubing and conduits not just PVC. PVC is an example of many including RTRC and ENT. No need to specifically single out PVC as its own skill.
- **8055.09– (Install metallic conduits and tubing)**  
This skill counters the previous skill related to non-metallic tubing and conduits and focuses on all metallic including EMT, rigid, flexible and liquid tight.
- **8055.11– (Troubleshoot electric heating systems)**  
This skill was previously missing from the existing standard. Troubleshooting these systems is a key part of the Industrial Electricians' role and reflect the RSOS.



- **8055.12– (Maintain electric heating systems)**  
This skill was previously missing from the existing standard . Preventative and predicative maintenance on these systems is a key part of the Industrial Electricians’ role and reflect the RSOS
- **8055.15 & 8055.16– (Install direct buried underground cables & Install direct buried underground conduits)** – these skills replace 7244.11 (Select, lay out and install underground distribution systems). There are distinct skills for conduits vs. cables so they needed to be separated.
- **8055.17 & 8055.18 – (Install Cathodic protection systems & Maintain Cathodic protection systems)**  
These additions parallel the skills in the Red Seal occupational standard but are optional because there are very specialized systems.
- **8055.19, 8055.20 & 8055.21 – (Connect supply to HVAC/R systems, Install HVAC/R controls and Maintain HVAC/R electrical connections and controls)**  
These additions parallel the skills in the Red Seal Occupational Standard. They are mandatory skills but are very narrow to ensure they focus on the electrical components so as not to infringe on the role of a Refrigeration and Air Conditioning Systems Mechanic.

Skill added to skill set **8056 Power Distribution Equipment Systems:**

- **8056.01– (Install power and energy metering systems)** – this skill replaces 7251.01 (Layout and install power and energy metering equipment) that was previously under test and measuring equipment. The former skill did not belong in Test and Measuring Equipment. These systems are actually metering systems and not test equipment.
- **8056.04 & 8056.05– (Install low voltage protection and control devices & Maintain low voltage protection and control devices)**  
These new skills parallel the existing related skills on high voltage protection and control devices as well as replacing some of the competencies from the removed skills on secondary services.
- **8056.06, 8056.07, 8056.08– (Install high voltage oil and dry type distribution transformers, Install low voltage oil and dry type distribution transformers & Maintain high and low oil and dry type voltage transformers)** – these skills replace and expand upon the two existing transformer skills (7245.06 & 7245.07) which did not distinguish between high and low voltage. The distinction in the skill level between high and low voltage at the install stage is critical as the skills are different. Also, this reflects the updates to the Red Seal Occupational Standard where there is a new task devoted to transformers.
- **8056.11, 8056.12, 8056.13, 8056.14– (Install ground fault detection, Maintain ground fault detection, Install ground fault protection & Maintain ground fault protection)**



- The additions of these skills related to ground fault protection and ground fault detection parallel the skills on ground fault circuit interrupters and reflect tasks and sub-tasks in the new Red Seal Occupational Standard.
- **8056.21 & 8056.22– (Install DC protective devices, Install AC protective devices)** these skills replace the previous single skill 7245.18 (Select and install AC/DC protective devices) Different competencies for AC vs DC. Skills needed to be separated.
- **8056.21** is optional because is a less than common system

Skill added to skill set **8057 Lighting Systems:**

- **8057.01, 8057.02, 8057.03, 8057.04– (Install non external-ballasted lighting, Troubleshoot and maintain non-external ballasted lighting, Install external ballasted/driver lighting, Troubleshoot and maintain external ballasted/driver lighting)**- these skills replace previous skills 7246.01, 7246.02, 7246.03, 7246.04 (Layout and install incandescent lighting, Maintain incandescent lighting, Layout and install fluorescent lighting & Maintain fluorescent lighting). Reorganizing types of lighting systems by the new categories of ballasted and non-ballasted is more inclusive as it allows fluorescent, compact fluorescent, neon, LED and incandescent types to be included and allows for the further distinction in competencies because competencies related to ballasted lighting is very different from non-ballasted. The word “external” was also added to all four skills to reflect new technology. The word “driver” was added to 8057.03 and 8057.04 for accuracy.
- **8057.09 & 8057.10 – (Install exit and emergency lighting & Troubleshoot and maintain exit and emergency lighting)** – these skills replace 7246.09 (Layout, install and maintain exit and emergency lighting) as it was important to divide up installation from maintenance and troubleshooting.

Skill added to skill set **8058 Rotating Equipment and Associated Control Systems:**

- **8058.02 – (Troubleshoot brush assemblies, slip rings and commutators)**  
For Industrial Electricians, the skill related to troubleshooting for these components is a key part of their job, separate from predicative and preventative maintenance. Industrial Electricians conduct significant troubleshooting on these components.
- **8058.03 Install DC motors and generators**
- This skill regarding installation was added but made optional because though it does exist, the requirement to install is rare for most Industrial Electricians.
- **8058.06 (Install AC motors and generators)**  
The installation reference was previously missing from the Industrial Electrician standard. Though Industrial Electricians typically do more inspection, maintenance and troubleshooting, they may also install.



- **8058.19 – (Troubleshoot relays, solid state devices and controls)**  
For Industrial Electricians, the skill related to troubleshooting for these components is a key part of their job, separate from predicative and preventative maintenance. Industrial Electricians conduct significant troubleshooting on these components. For these components, it is all about diagnostics.
- **8058.22– (Trouble shoot protective devices)**  
For Industrial Electricians, the skill related to troubleshooting for these devices is a key part of their job, separate from predicative and preventative maintenance. Industrial Electricians conduct significant troubleshooting on these devices. For these devices, it is all about diagnostics. Previously there were install and maintain skills.
- **8058.24 – (Troubleshoot control panels and related control devices)**  
For Industrial Electricians, the skill related to troubleshooting for these devices is a key part of their job, separate from predicative and preventative maintenance. Industrial Electricians conduct significant troubleshooting on these devices. For these devices, it is all about diagnostics. Previously there was only an install skill.
- **8058.26 & 8058.27 – (Maintain external mechanical/remote field devices & Troubleshoot external mechanical/remote field devices)**  
For these devices, maintenance and troubleshooting are a key part of the Industrial Electricians' role. The previous skill only had install references. Troubleshooting and maintenance should be separate skills for the reasons listed in 8058.24. These additions also reflect the new Red Seal occupational standard.

Skill added to skill set **8059 Motor Drives and Associated Control Systems:**

- **8059.03, 8059.04, 8059.07 & 8059.08– (Install adjustable speed DC drives, Maintain and Troubleshoot adjustable speed DC drives, Install adjustable speed AC drives & Maintain adjustable speed AC drives)**  
These skills replace 7248.02 and 7248.04. The terminology “adjustable speed” is broader than “solid state and variable” and used in the sector.
- **8059.11 and 8059.12 (Install safety systems and associated components & Maintain safety systems and associated components)**  
New/missing competencies. Safety systems are becoming critical in many facilities.

Skill added to skill set **8060 Power Generating Systems and Associated Equipment:**

This entire skill set has been renamed from Stand-by power systems and associated equipment to Power generating Systems and Associated equipment  
The new title/terminology is much broader to include alternate and renewable energy sources and reflects the terminology in the new Red Seal occupational standard.

- **8060.06– (Maintain stand-by generation equipment)**  
Old standard only had an installation skill. Maintenance was missing. This becomes mandatory for Industrial Electrician only (optional for Industrial Electrician).



	<ul style="list-style-type: none"> <li>- <b>8060.07 &amp; 8060.08– (Install renewable energy and storage systems &amp; Maintain renewable energy and storage systems)</b> Reflects new technologies and competencies in the new Red Seal occupational standard.</li> </ul> <p>Skill added to skill set <b>8061 Communication and Signalling Systems:</b> This skill set has been retitled from communication systems to communication and signalling systems. Note – most of the skills in this skill set have an added reference to the Telecommunications Industry Association (TIA). Reflects terminology in Red Seal occupational standard.</p> <ul style="list-style-type: none"> <li>- <b>8061.10, 8061.11 &amp; 8061.12 – (Install low voltage communication systems, Troubleshoot low voltage communication systems &amp; Maintain low voltage communication systems)</b> – these skills replace 7250.06, 7250.07, 725.08, 7250.09, 7250.10, 7250.11 related to the following systems; paging, clock, patient care, security, audio-visual) Merger of these skills was done because the competencies are the same for each system type – no need for skills to be at such a micro level.</li> </ul> <p>Skill added to skill set <b>8062 Communication in the Workplace:</b></p> <ul style="list-style-type: none"> <li>- <b>8062.05 – (Use communication devices and computers)</b> – this skill reflects a merger of 7253.05 &amp; 7253.06 Technology change – no need for computers and other devices to be separate from each other anymore.</li> </ul>
<p><b>Optional Skills Become Mandatory</b></p>	<ul style="list-style-type: none"> <li>• Not applicable</li> </ul>
<p><b>Change: New Optional Skills (shaded) or Mandatory Skills (unshaded) Become Optional</b></p>	<p>The following skills are shaded:</p> <ul style="list-style-type: none"> <li>- <b>8052.06 (Perform trade-specific oxy-fuel cutting and welding procedures)</b> Most Industrial Electricians would not perform this skill (even rarer for Industrial Electricians).</li> <li>- <b>8053.03 (Use and maintain oscilloscopes) and 8053.06 (Use and maintain electronic test equipment).</b> Multi-meters perform similar functions therefore skill was made optional (though unlike Industrial Electricians, these skills were not completely removed as they are still used in industrial plants).</li> <li>- <b>8055.14 (Install overhead distribution systems)</b> Overhead distribution systems are only employed where there is no option for underground distribution or more than one building/facility at a site. Therefore, not all Industrial Electricians would gain experience in this skill.</li> <li>- <b>8055.17 &amp; 8055.18 – (Install Cathodic protection systems &amp; Maintain Cathodic protection systems)</b></li> </ul>





These additions parallel the skills in the Red Seal occupational standard but are optional because there are very specialized systems.

- **8056.09 (Install power distribution panels)**

The installation side is done primarily by Industrial Electricians.

- **8056.17 & 8056.18 (Install power factor correction equipment & Maintain power factor correction equipment)**

This type of equipment is not typically present at an industrial site.

- **8056.19 & 8056.20 (Install direct current (DC) power distribution systems & Maintain direct current (DC) power distribution systems)**

This is extremely old technology (1920s). However, because the technology has had a small resurgence, particularly in data centres. Therefore, it should remain in the log book but become optional for now. Also, direct current (DC) power distribution systems are not that common.

- **8058.04 & 8058.05– (Maintain DC motors and generators & Troubleshoot DC motors and generators)**

This is old technology (used in the 1920s). The technology has generally been supplanted by AC motors and drives. Will likely only see the DC equipment in facilities who have not upgraded their equipment.

- **8059.01 & 8059.02 (Install DC constant voltage drives & Maintain and troubleshoot DC constant voltage drives)**

This is old technology (20 years +). The technology has generally been supplanted by AC motors and drives. Will likely only see the DC equipment in facilities who have not upgraded their equipment. Also, this is almost an obsolete technology. Equipment 20 years or older used this.

- **8059.13 & 8059.14 (Install CNC systems & Maintain and Troubleshoot CNC systems)**

Not all Industrial Electricians are exposed to this. This skill set is typically seen in a manufacturing environment. For example, electricians in hospitals, pulp and paper industries would not be exposed to this.

- **8061.08 & U8061.09 (Maintain fire alarm systems & Troubleshoot fire alarm systems)**

To do this work, additional certification is required. On industrial sites, plants usually have someone designated and certified. The regulation in Ontario indicates that fire alarm maintenance tasks that include the altering of the internal components of a fire alarm panel, wiring operations, or the replacing of an external device shall only be carried out by technicians that have successfully completed an acceptable fire alarm training program.

**New Optional (shaded) Skills 8052.08– (Use bending and threading tools), 8052.09 (Use and maintain powder actuated tools) and 8052.10 (Use thermit welding tools)** These tool related skills were added but were made optional as not all Industrial Electricians would be exposed to these skills and some of the tools are outdated (i.e. powder actuated tools)





<b>Skills Moved</b>	<p>Entire Skill Set <b>8052.0 Test and Measuring Equipment</b> was moved to follow Tools and Equipment skill set to better reflect work-flow procedures.</p> <p>Entire Skill Set <b>8054.0 Instrumentation and Automated Control Devices and Systems</b> was moved to better reflect work-flow procedures.</p>
<b>Skill(s) or Skill Set(s) Removed</b>	<p>No skill sets were removed from this updated standard. However, significant revisions were made to all skill sets. In the case of skills that have been removed, in most cases, they have been replaced by more relevant, updated skills. The below skills were removed and not replaced.</p> <ul style="list-style-type: none"><li>• <b>Removed Skills 7245.01 &amp; 7245.02 (Lay out and install secondary services &amp; Maintain secondary services)</b> The term ‘secondary services’ was confusing and unclear for the working group. It is not a term that is widely used in the sector for the original purpose for which it was used in the 2011 standard. The skills referenced in these original skills are now covered in other skills.</li><li>• <b>Removed Skill 7245.05 (Calculate requirements for secondary service loads, fuses and feeders)</b> The act of “calculating” is part of the “by” or “how” statements in other skills now. Calculating is not a task unto itself but a competency/basic skill needed to achieve the task at hand.</li><li>• <b>Removed Skills 7245.14 &amp; 7245.15 (Install low voltage power distribution systems &amp; Troubleshoot and maintain low voltage power distribution systems)</b> The competencies covered in these old skills are now covered elsewhere.</li><li>• <b>Removed Skills 7248.05 (Install, maintain and troubleshoot computer based interface systems)</b> The competencies covered in these old skills are now covered elsewhere.</li></ul>
<b>General Notes &amp; Rationale</b>	<ul style="list-style-type: none"><li>• The updated Training Standard includes 13 skill sets with 178 skills. The previous standard had 13 skill sets and 119 skills.</li><li>• The Industrial Electrician Training Standard was last updated in 2011 and was no longer reflective of industry needs. All of the changes reflect the evolution of the trade and industry’s needs. The changes also reflect harmonization with the new Red Seal Occupational Standard as well as a more accurate parallel and contrast with the Construction Electrician Training Standard.</li><li>• The following points summarize the key changes to the Industrial Electrician Training Standard:<ul style="list-style-type: none"><li>- The 2011 Standard did not accurately separate skills to reflect the varying competencies that the apprentice needed to achieve. In many cases 5-6 verbs were grouped together in one skill. In general, the action in a skill should reflect one verb (maybe two if they are intertwined). The highest taxonomy of verb (i.e. install, troubleshoot, or maintain) were placed in the new skills and lower verbs like “layout”, “select” were integrated into the how statements of the skill. This is the primary reason there are 59 more skills in this new log book.</li></ul></li></ul>



- Previous references to “client or customer” in many parts of the document was changed to “company” or “company management” as Industrial Electricians in Ontario work for companies not customers.
- Two Skill Sets were reordered to reflect a more logical order/sequence – Updated Skill Set 8053 – Test and Measuring equipment now follows Tools and Equipment (8052). This skill set was previously the third last skill set. Skill Set #8054 – Instrumentation and Automated Control Devices and Systems now follows Test and Measuring Equipment. It was previously the second last skill.
- Many skills were merged to reflect a broader (less micro level) approach to skill documentation. This was particularly true in the tools and equipment (8052) skill set and the communication and signalling systems skill set (8061).
- Key terminology changes were made to reflect the Red Seal Occupational Standard. This was especially true for skill set 8060 – Power Generating Systems and Associated Equipment. Power Generating Systems is the term used on the Red Seal standard and more broadly includes Stand by systems (old name) as well as alternate energy systems.
- New skills were added to reflect new technologies and systems (i.e. renewable energy).
- Skills were changed from mandatory to optional (particularly tool related skills) to reflect changes in technology use.
- Addition of statement to template regarding working with de-energized vs live systems
- The General Performance Objective paragraph was removed (redundant) and replaced with a Skill Set Summary that provides a quick overview of what the skill set, some health and safety recommendations as well as links with other skill sets.
- New and updated acronyms list.