Skilled Trades Ontario | Métiers spécialisés Ontario

Apprenticeship
Training Standard
Logbook

Residential Air Conditioning Systems Mechanic

313D

Apprenticeship Training Standard

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

Training As An Apprentice

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

Completing Your Logbook

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

- ✓ **Confirm Skill Sign-off is Complete**
  - **You and your trainer** sign-off each required skill to confirm that you have demonstrated competency in that skill.

  - Shaded boxes in your Logbook mean the skills are optional and do not have to be confirmed by your trainer or sponsor. However, you are encouraged to complete them as part of your training.

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

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

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Apprentice Name:_____

Address: _____

_____

Phone Number: _____

Email Address: _____

Trade: _____

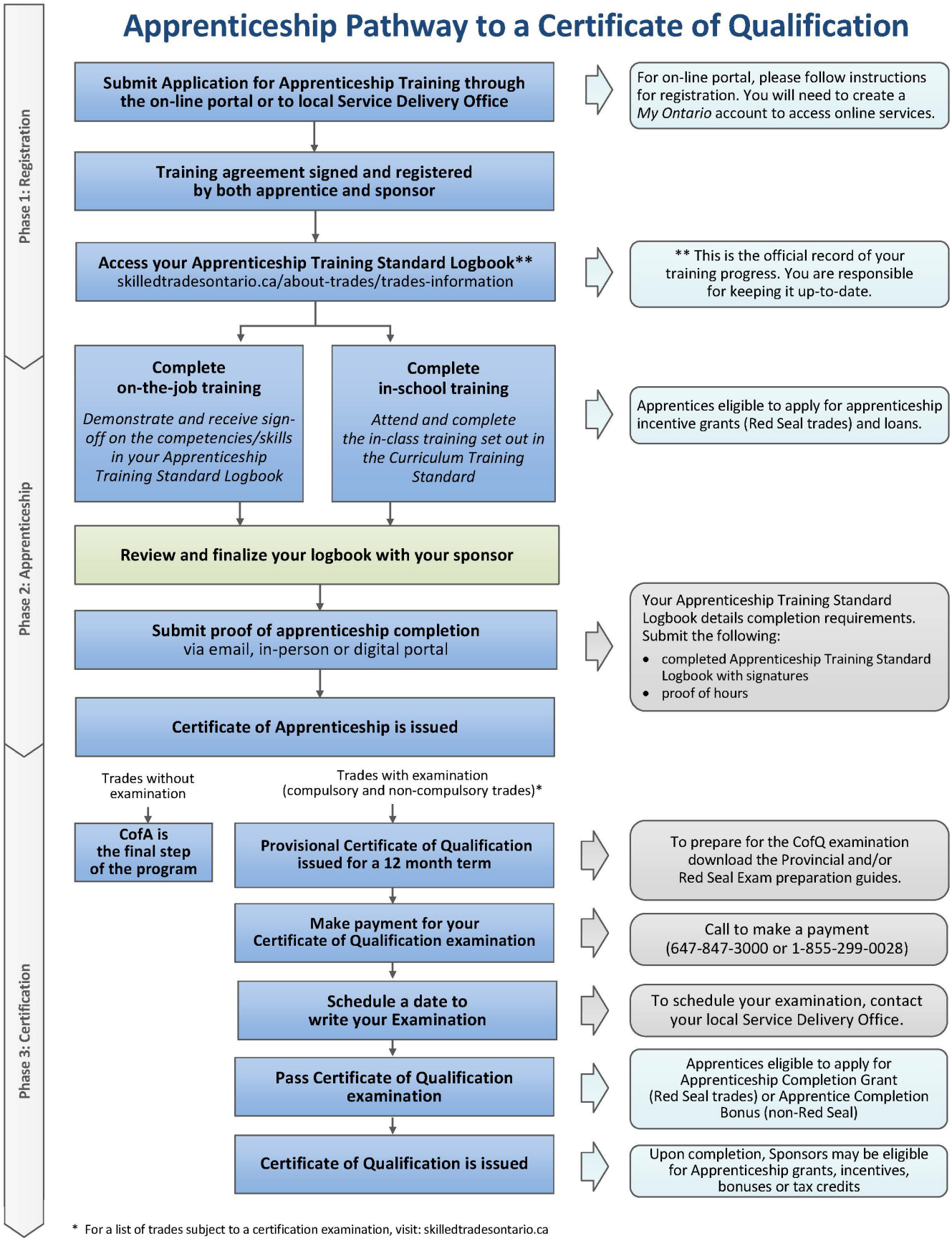
Training Agreement # (for Compulsory and Non-Compulsory trades):

STO Account No. (for Compulsory trades only):

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

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

Apprenticeship Pathway to a Certificate of Qualification



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

Draft version: 2022-03-16

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

Revised 2022 (V300)

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

Purpose:

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

The Apprentice agrees:

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

The Sponsor agrees:

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

Trade Specific Resources and Links

Trade Specific Resource	Link
Red Seal Program	red-seal.ca
Apprenticeship in Ontario	ontario.ca/page/apprenticeship-ontario
Employment Ontario	employmentontario.ca
Service Canada	servicecanada.gc.ca
Building Opportunities in the Skilled Trades Act, 2021	Building Opportunities in the Skilled Trades Act, 2021, S.O. 2021, c. 28 - Bill 288 (ontario.ca)
Ministry of Labour, Immigration, Training and Skills Development	Ministry of Labour, Immigration, Training and Skills Development | ontario.ca
Exam Preparation Guide	Exam Resources – Skilled Trades Ontario
Skills Zone (Ontario Skills Passport)	http://www.skillszone.ca/
Canadian Standards Association (CSA)	http://www.csagroup.org
Ontario Construction Secretariat (OCS)	http://iciconstruction.com
Infrastructure Health and Safety Association (IHSA)	http://www.ihsa.ca
Ministry of the Environment, Conservation and Parks	https://www.ontario.ca/page/ministry-environment-conservation-parks
The Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)	http://www.hrai.ca
Workplace Safety and Insurance Board	http://www.wsib.on.ca
Handling Refrigerants – Certification Renewal	https://www.ontario.ca/page/certificate-handle-refrigerants
Technical Standards and Safety Authority (TSSA)	https://www.tssa.org
Electrical Safety Authority	https://www.esasafe.com

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

Methodology-Standard Development

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

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

Introduction to the Logbook

This “on-the job” Logbook is the training standard for **Residential Air Conditioning Systems Mechanic (313D)** and was developed by Skilled Trades Ontario in consultation with representatives from industry. It identifies all the skills associated with and required to learn the trade.

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

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

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

All practices described in this standard must be performed by the apprentice according to the specific criteria identified.

In general, the standard of performance for the trade of **Residential Air Conditioning Systems Mechanic (313D)** is as follows:

All skills within the **Residential Air Conditioning Systems Mechanic (313D)** Apprenticeship Training Standard are to be performed, as applicable, according to and in compliance with the following:

- Occupational Health and Safety Legislation and Regulations;
- Other applicable Acts, Regulations and Codes;
- Design specifications;
- Manufacturer’s specifications;
- Industry standards and best practices;
- Job specifications;
- Company standards/policies;
- Work orders;
- Client requirements

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

Roles and Responsibilities

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

Skilled Trades Ontario (STO) is responsible for:

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

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

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

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

Roles and Responsibilities of the Apprentice

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

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

Roles and Responsibilities of Sponsors and Trainers

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

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

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

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

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

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

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

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

Health and Safety

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

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

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

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

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

The Internal Responsibility System:

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

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

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

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

Roles and Responsibilities under the Occupational Health and Safety Act

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

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

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

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

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

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

The Three Rights of Workers/Apprentices

The OHSA gives workers and apprentices three important rights:

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

For construction projects applying to construction trades a Constructor is also identified

On all projects, either the owner or someone hired by the owner is the constructor.

The intent of the Occupational Health and Safety Act is to have one person with overall authority for health and safety matters on a project. This person is the constructor of the project.

The constructor is the party with the greatest degree of control over health and safety at the entire project and is ultimately responsible for the health and safety of all workers and apprentices. The constructor must ensure that all the employers, apprentices and workers on the project comply with the Act and its regulations.

Constructor's duties include the following:

- To ensure that the measures and procedures in the Act and regulations are carried out.
- To ensure that every employer, apprentice and worker on the project complies with the Act and regulations.
- To ensure that the health and safety of workers/apprentices on the project are protected.

Ministry of Labour, Immigration, Training and Skills Development

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

Important Considerations for Residential Air Conditioning Systems Mechanics (Environmental Protection, Responsibility, and Public Safety)

Residential Air Conditioning System Mechanics (313D) are charged with the handling and disposal of chemical refrigerants and must abide by the *Montreal Protocols* in relation to substances that deplete the ozone layer and help reduce climate change.

For more information on the Montreal Protocols, go to: https://ozone.unep.org

Handling Refrigerants in Ontario - https://www.ontario.ca/page/certificate-handle-refrigerants

By law, a certified technician is the only person who can remove, discharge, handle and dispose of:

- refrigerants that contain ozone depleting substances such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs)
- other halocarbons such as hydrofluorocarbons (HFCs)

To purchase and handle refrigerants in Ontario, you need an Ozone Depletion Prevention (ODP) certificate card.

Apprenticeship Program Summary/Guidelines

Scope of Practice

The Scope of Practice for the trade of (Residential Air Conditioning Systems Mechanic) is set out in section 119 of Ontario Regulation 875/21 under BOSTA and reads as follows:

> **119.** (1) The scope of practice for the trade of residential air conditioning systems mechanic is the same as the scope of practice of a refrigeration and air conditioning systems mechanic, but is limited to work performed with respect to residential air conditioning systems that meet the following requirements:
>
> 1. The system must be installed as an independent unit in a residential family dwelling.
> 2. The system must operate at no more than 240 volts single phase power with a maximum branch circuit capacity of 60 amps, a maximum cooling capacity of 60,000 British thermal units per hour and a saturated suction temperature above 2 degrees Celsius (35 degrees Fahrenheit) in the cooling cycle.
>
> (2) The scope of practice for the trade of residential air conditioning systems mechanic does not include work performed by a person engaged in the repair or installation of single phase hermetically sealed self-contained portable plug-in appliances with a maximum voltage of 240 volts and with factory produced systems precharged with refrigerant.

*While the Logbook draws on the scope of practice regulation (Section 119 of Ontario Regulation 875/21 under BOSTA). The Logbook does not purport to add to or modify the scope of practice as provided in regulation. *

Program Guidelines

On-the-Job Training Duration

Industry has identified 4020 hours as the benchmark necessary for any Apprentice to become competent in the skills required. There may be circumstances in which the duration varies from this guideline.

In-Class Training Duration

Industry has identified 480 hours of in-school training as the duration necessary for an Apprentice to complete the in-school curriculum for this program.

Total Training Hours

4500 hours

Journeyperson to Apprentice Ratio

Ratios in Regulation:

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

Program Requirements

Compulsory and Non-compulsory Classification

Regulations under the *Building Opportunities in the Skilled Trades Act, 2021* classify each trade as either "compulsory" or non-compulsory." The trade of Residential Air Conditioning Systems Mechanic (313D) is compulsory.

Eligibility for Apprenticeship Program Completion

The Apprentice must:

- Achieve competency in 80% of the skills identified in each skill set within this Logbook
- Complete the in-school training as outlined in the Curriculum Standard
- Complete on the job hours as identified in the Logbook

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

Skills for Success Summary

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

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

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

Standard of Performance

All skills within the **Residential Air Conditioning Systems Mechanic (313D)** Apprenticeship Training Standard are to be performed, as applicable, according to and in compliance with the following:

- *Occupational Health and Safety Legislation and Regulations;*
- *Other applicable Acts, Regulations and Codes;*
- *Design specifications;*
- *Manufacturer's specifications;*
- *Industry standards and best practices;*
- *Job specifications;*
- *Company standards/policies;*
- *Work orders;*
- *Client requirements.*

Other Suggested or Required Certification(s) and Training

Residential Air Conditioning Systems Mechanics (313D) may choose to obtain the following certifications or training depending on legislative, regulatory, company or other requirements:

- Ozone Depletion Prevention (ODP)
- Gas Technician
- First Aid and Cardio-Pulmonary Resuscitation (CPR)
- Workplace Hazardous Materials Information System (WHMIS)/ (Global Harmonized system (GHS))
- Working at Heights
- Lock out and tag out
- Elevated Work Platforms
- Transportation of Dangerous Goods

Training the Apprentice - Tips for Apprentices, Sponsors and Trainers

Tips for Apprentices

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

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

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

Tips for Sponsors

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

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

Tips for Trainers

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

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

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

Notice of Collection of Personal Information

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

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

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

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

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

List of Trainers

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

Skill Sets

9117 Protect Self, Others and the Environment

Skill Set Descriptor

Residential Air Conditioning Systems Mechanics (313D) are tasked with handling and disposing of highly volatile and toxic substances. Health, safety as well as environmental protocols are critical to support the safety of the worker, public and environment.

Skills

9117.01 Comply with applicable Acts, regulations, Codes and safety directives such as hot work and confined space permits by:

- identifying the act, regulation, code or directive applicable;
- reading, interpreting and applying the act, regulation, code or directive as it relates to the circumstances at hand;
- keeping up to date with changes; and
- applying requirements to job functions

according to codes, regulations and legislation such as the *Occupational Health and Safety Act* (OHSA), *Worker's Compensation Act* (WCA), environmental regulations, *Dangerous Goods Transportation Act* (DGTA), Workplace Hazardous Materials Information System (WHMIS), Confined Space regulations, Ontario Fire Code (OFC), Canadian Electrical Code (CEC), Mechanical Refrigeration Code (B52), *Technical Standards and Safety Authority Act* (TSSA) and regulations.

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

*** For a compulsory trade, a Trainer must hold a certificate of Qualification in that trade as per section 10(1) of BOSTA and be registered with Skilled Trades Ontario.**

9117.02 **Use personal protective equipment (PPE)** such as safety and rubber boots, hard hats, gloves, glasses, goggles, masks, respirators, face shields, coveralls, fall-arrest equipment, and ear protection by:

- selecting the apparel and equipment applicable to the situation;
- checking certifications (such as expiry dates);
- inspecting conditions (such as worn, cracks, holes);
- verifying fit;
- adjusting for fit;
- calibrating as required; and
- optimizing protection for the wearer and the task being performed

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.03 **Maintain personal protective equipment (PPE)** such as safety and rubber boots, hard hats, gloves, glasses, goggles, masks, respirators, face shields, coveralls, fall-arrest equipment, and ear protection by:

- checking certifications (such as expiry dates);
- inspecting the equipment for breaks, signs of wear, tears, cracks, leakage, loose and defective components to ensure safety of the user and extend service life of the equipment;
- calibrating as required:
- analyzing equipment performance and function;
- placing and storing the equipment in a safe location to prevent damage;
- noting/tagging deficiencies; and
- removing from service if necessary

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.04 Maintain a safe, clean and organized work environment by:

- removing and disposing excess or unwanted materials;
- cleaning up spills and leaks;
- keeping work area clean and clear of obstructions;
- positioning equipment;
- identifying the location of first aid supplies and equipment;
- maintaining adequate heat, light and ventilation;
- storing materials as required;
- confirming the work site meets customer's expectations of cleanliness;
- erecting protective barriers and signs; and
- storing tools or equipment

according to company standards/policies and applicable codes, regulations and legislation.

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

9117.05 **Handle hazardous substances** such as refrigerants, oils and other hazardous materials to protect self and others from injury or harm and the environment from contamination by:

- identifying the substance;
- reviewing list of designated substances prior to starting work;
- selecting and using personal protective equipment (PPE);
- following labels and safety data sheets (SDS) sheets;
- using specified handling, storage and transfer equipment and following recommended procedures;
- cleaning and disposing of substances; and
- completing designated substance report

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.06 **Identify occupant specific safety hazards in residential setting** to reduce potential for accident, injury or property damage such as fire, hazardous fumes, falling objects, electrical and other workplace hazards by:

- checking for potential hazards and obstacles;
- removing or labelling hazards as required at end of workday; and
- providing instructions/recommendations/notifications to occupants

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.07 **Identify worker specific safety hazards in residential setting** such as guard dogs, animals and exotic pets to reduce potential for accident or injury by:

- making inquiries with homeowner;
- creating solutions that meets both worker and homeowner needs;
- inspecting as required;
- notifying homeowner and supervisor of concerns; and,
- vacating the premises as needed

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.08 **Identify biohazards** such as insect infestation, animal feces to reduce potential for accident, cross contamination and other environmental problems by:

- inspecting the premises;
- notifying homeowner and supervisor of concerns as required; and,
- providing instructions/recommendations/notifications as required

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.09 **Handle compressed gases** by:

- using recommended equipment;
- securing in an upright position;
- stabilizing so that containers are never rolled; and
- verifying there is a protective cap over the valve when not being used

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.10 **Transport compressed gases** by:

- using recommended transport equipment;
- securing in an upright position during transport;
- stabilizing so that containers are never rolled during transport;
- verifying there is a protective cap over the valve during transport; and
- following recommended storage procedures

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.11 **Follow fire safety procedures** by:

- locating and assessing the severity of the fire;
- handling fire extinguishing equipment;
- suppressing minor fires;
- activating alarms; and
- reporting incidents

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.12 **Report injuries** to supervisor and first aid personnel by:

- verifying that the injured person is attended to;
- describing how incident occurred;
- completing required documentation; and
- reporting information precisely and accurately

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.13 **Lock out, tag out or isolate equipment for repair or maintenance** to prevent damage or injury to the operator or equipment by:

- shutting down the system;
- de-energizing equipment;
- verifying a zero-energy state;
- tagging equipment;
- confirming all applicable energy sources (e.g., electrical, hydraulic, pneumatic etc..) are off and locked out prior to commencing maintenance or service; and,
- removing lock-out and re-energizing equipment following completion

according to company standards/policies, manufacturer's specifications and applicable codes, regulations and legislation.

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

9117.14 Minimize the environmental footprint by:

- using and maintaining vehicles in an environmentally responsible way (carbon footprint);
- reducing idling times to reduce emissions and noise pollution;
- following the Montreal Protocols and legislated and recommended requirements when handling any refrigerants (as listed in American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE));
- following legislated and recommended protocols when handling chemicals, used refrigeration lubrication oils, other fluids (e.g., glycol, brine);
- following legislated and recommended protocols regarding the disposal of hazardous materials and controlled substances;
- following procedures for decommissioning of equipment;
- operating equipment within manufacturer's specifications;
- cleaning the work area;
- reviewing cleaning practices to minimize use of toxic chemicals;
- following spill control procedures;
- reporting any damage with environmental implications as required; and
- encouraging and collaborating with co-workers to do positive things for the environment and be more sustainable in their own lives (toolbox talks)

according to company standards/policies, manufacturer's specifications, environmental protocols and applicable codes, regulations and legislation.

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

9117.15 Clean-up worksite and equipment by:

- storing equipment, tools and materials as required;
- cleaning up liquids, broken pieces, and debris;
- organizing materials;
- removing materials and obstructions;
- removing construction waste;
- lubricating tools and equipment as required;
- using brooms or wet/dry vac, hoses;
- following procedures related to disposal of hazardous materials; and
- transporting and returning equipment, tools and materials as required

according to company standards/policies, manufacturer's specifications, environmental protocols and applicable codes, regulations and legislation.

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

9118 Demonstrate Business Practices

Skill Set Descriptor

Residential Air Conditioning Systems System Mechanics (313D) directly engage with the public and consumers on an ongoing basis. Consequently, it is critical that the Residential Air Conditioning Systems Mechanic (313D) demonstrates strong business practice and customer service skills.

Skills

9118.01 **Determine nature of service or maintenance call** to identify and understand client concerns before proceeding with diagnostic check by:

- discussing problems with client;
- asking clear and concise questions;
- listening; and
- repeating back what is heard

according to company standards/policies.

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

◊ **For a compulsory trade, a Trainer must hold a certificate of Qualification in that trade as per section 10(1) of BOSTA and be registered with Skilled Trades Ontario.**

9118.02 **Conduct a site evaluation** to determine the nature and scope of installation, service or maintenance request by:

- checking the general condition of the system, equipment, and surrounding environment; and
- completing documentation/reporting requirements

according to company standards/policies, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9118.03 **Perform a diagnostic inspection** to identify defects or faults for further servicing or maintenance by:

- reading and interpreting installation, operation and maintenance (IOM) documentation, work order, manufacturer's specifications, architectural and mechanical engineering drawings, and applicable codes, regulations and legislation;
- identifying the type, size, and capacity of equipment, system components and parts;
- inspecting and checking operation and integrity of system;
- performing tests and checks of all parts of the system;
- determining set-points of each part of the system; and
- checking efficiency outputs and parameters of the system

according to company standards/policies, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9118.04 **Estimate costs of service or maintenance call** by:

- determining corrective actions or options for repair or replacement;
- calculating time frames, labour, parts or equipment costs;
- using work orders, costing lists, manuals and other documentation;
- communicating with employer or shop personnel to confirm the estimates;
- completing estimation sheet and bill of materials;
- reviewing quote with client; and
- obtaining client's signature of approval prior to undertaking service or maintenance work

according to company standards/policies.

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

9118.05 **Complete installation, service or maintenance schedule** by:

- detailing servicing or maintenance parameters and procedures;
- documenting parts, labour, inspection personnel and sub-trade requirements;
- confirming material handling equipment, permits, hand tools, power tools need;
- verifying location and layout of system, dates and times, and work orders; and
- obtaining approval by employer and client

according to company standards/policies.

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

9118.06 **Complete job documentation** such as work orders, installation records, start-up documentation and close out documents after installation and service or maintenance work completion by:

- identifying parts and components used, time taken, unit identification, warranty coverage and obligations, tools and equipment used, completion dates and system operation parameters;
- documenting labour costs, nature and scope of service or maintenance work;
- recording information on manufacturers or company servicing or maintenance check lists and warranty forms; and
- documenting in a clear, legible and timely manner

according to company standards/policies, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9118.07 **Instruct clients** on equipment operation, routine maintenance or servicing procedures and location of controls or safety devices to obtain client sign off by:

- using verbal communication, written job specifications, and manufacturer's specifications;
- providing instructions in a clear, concise and precise manner; and
- applying conflict resolution skills

according to company standards/policies, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9118.08 **Communicate with clients, co-workers, vendors and integrated design team** by:

- using common trade or layperson's terminology;
- explaining processes and ideas in a clear, concise and precise manner;
- identifying and/or confirming items such as previous job operations, availability of tools, parts, and equipment, scheduling requirements, permits or inspections, and any other information needed to plan the installation or service; and
- verifying comprehension by all parties

according to company standards/policies, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9118.09 **Resolve conflicts** by:

- identifying an escalating situation;
- remaining calm;
- asking questions;
- restating concerns;
- focusing on resolving the problem;
- recommending options including alternative solutions and services; and
- notifying supervisor as required

according to company standards/policies, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9118.10 Perform customer service functions by:

- actively listening to address customers' concerns and needs;
- acknowledging the client request;
- explaining, in detail, the problem and solution for the issue at hand; and
- making recommendations and suggestions for future service

according to company standards/policies and client requests.

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

9118.11 Mentor other apprentices and colleagues by:

- providing support and guidance to others;
- communicating ideas;
- demonstrating performance of a skill or task;
- providing feedback, assessment and recommendations;
- staying current with trade trends, changes, new technology and innovations; and
- participating in continuous learning

according to company standards/policies, industry standards and best practices.

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

9119 Use and Maintain Tools, Devices and Equipment

Skill Set Descriptor

Residential Air Conditioning Systems Mechanics (313D) use hand and power tools, measuring devices (electric, digital and analogue), pressure, temperature and flow measuring devices, specialty instruments, brazing, soldering, welding, cutting and purging equipment, digital technology, material handling equipment and working elevating equipment to install, service and maintain residential HVAC systems.

Skills

9119.01 **Use hand tools** such as gauge manifolds, flaring tools, swaging tool, tubing cutters, reamers, spanners, pipe cutters, metal snips, dies, pop-rivet guns, , levels, layout tools, screw drivers, pliers, wrenches, hammer, sockets, ratchets, saws, chisels, and specialty tools by:

- selecting and using personal protective equipment (PPE);
- identifying the tools for the job;
- verifying that tools are in safe working condition;
- inspecting tools for wear, damage, defects or expiry;
- cleaning and lubricating as required;
- removing defective tools and accessories from service;
- replacing defective tools and accessories; and
- storing in designated areas

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

◊ For a compulsory trade, a Trainer must hold a certificate of Qualification in that trade as per section 10(1) of BOSTA and be registered with Skilled Trades Ontario.

9119.02 **Maintain hand tools** such as gauge manifolds, flaring tools, swaging tool, tubing cutters, reamers, spanners, pipe cutters, metal snips, dies, pop-rivet guns, , levels, layout tools, screw drivers, pliers, wrenches, hammer, sockets, ratchets, saws, chisels, and specialty tools by:

- selecting and using personal protective equipment (PPE);
- inspecting tools for defects and taking remedial action such as repairing, replacing the tool or tool component;
- tagging defective tools;
- cleaning and lubricating as required;
- repairing or disposing of defective tools and accessories;
- storing in designated areas;
- ordering and replacing accessories and components;
- reporting defects; and
- taking equipment out of service as required

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9119.03 **Use power tools** such as drills, saws, pipe threaders, vacuum pumps, recovery units, pressure washers, and explosive-actuated tools by:

- selecting and using personal protective equipment (PPE);
- identifying the tools for the job;
- verifying that the tool and accessory matches the application;
- verifying that the tool is in safe working condition;
- verifying that the operator has been trained on the tool;
- inspecting tools for wear, damage, defects or expiry including inspecting cords, connecting devices, control devices;
- verifying that the tool and accessories have required approval markings;
- cleaning and lubricating as required;
- monitoring tool function and performance;
- tagging defective tools;
- removing defective tools and accessories from service;
- replacing defective tools and accessories;
- ordering and/or replacing accessories and components; and
- storing in designated areas

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9119.04 **Maintain power tools** such as drills, saws, pipe threaders, vacuum pumps, recovery units, pressure washers, and explosive-actuated tools by:

- selecting and using personal protective equipment (PPE);
- inspecting power tools and accessories for defects and taking remedial action such as repairing, replacing;
- tagging defective tools;
- cleaning and lubricating as required;
- repairing or disposing of defective tools and accessories;
- storing in designated areas;
- ordering and replacing accessories and components;
- reporting defects; and
- taking equipment out of service as required

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9119.05 **Use measuring devices (electrical, digital, analog)** such as ammeters, voltmeters, ohmmeters, multimeters, recorders, phase detectors, megohmmeters, watt meters, gauges and specialty instruments by:

- selecting and using personal protective equipment (PPE);
- selecting the measuring device for the job;
- verifying the device is in safe working condition;
- verifying that the operator has been trained on the device;
- inspecting devices;
- calibrating as required;
- verifying that device is ready for use;
- following operating procedures; and
- monitoring function/operation

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9119.06 **Use HVAC pressure, temperature, and flow measuring devices** such as manifold gauges, manometers, thermometers, anemometers, hydrometers, hygrometers, velometers, psychrometers, thermo-couples, and tachometers by:

- selecting and using personal protective equipment (PPE);
- selecting the pressure, temperature and flow measuring devices for the job;
- verifying the devices are applicable to measuring the operating parameters of the system;
- verifying that the device is in safe working condition;
- verifying the operator has been trained on the device;
- inspecting devices;
- calibrating as required;
- verifying that devices are ready for use;
- following operating procedures; and
- monitoring function/operation

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9119.07 **Use HVAC specialty instruments** such as leaking testing devices, hazardous gas analyzers, micron gauges, refrigerant gauges, tachometers, scales, measuring and infrared instruments by:

- selecting and using personal protective equipment (PPE);
- selecting the necessary instruments to determine conditions and quantities of system;
- verifying the operator has been trained on the instrument;
- verifying the instruments are cleaned, calibrated, operational, and functioning:
- verifying that the instruments are ready for use;
- following operating procedures; and
- monitoring function/operation

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9119.08 **Use brazing, soldering, welding, cutting or purging equipment** such as compressed gases, manifold, regulators gauges/hoses, torches, welding, brazing or soldering materials, flux, abrasives by:

- selecting and using personal protective equipment (PPE);
- selecting the brazing, soldering, welding, cutting or purging equipment applicable for the job;
- verifying the operator has been trained on the equipment;
- confirming that all equipment is cleaned, maintained and ready for use;
- following operating procedures;
- following applicable hot work area procedures; and
- monitoring function/operation

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9119.09 **Use digital technology** such as direct digital control, programmable logic controller (PLC), microprocessor, communication protocols, software by:

- selecting the technology applicable to the job;
- identifying and applying hardware and software required to connect to control systems;
- connecting electronic devices such as computers, smart phones, user interface modules and tablets to control systems;
- using electronic devices to configure parameters;
- monitoring and diagnosing problems; and
- retrieving data

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9119.10 **Use material handling equipment** such as hoists, cranes, slings, cables, dollies, chain falls, stair climbers, suspension equipment and materials, levelling equipment and fasteners to install, move, remove or store materials, parts and equipment by:

- selecting and using personal protective equipment (PPE);
- selecting the equipment applicable for the job/system;
- verifying that materials are available and ready for use;
- verifying that equipment is ready for use;
- positioning equipment for use;
- following recommended equipment operating procedures;
- monitoring function/operation;
- following recommended shut down procedures;
- reporting technical or safety issues and concerns; and
- removing equipment from service as required

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9119.11 **Use worker elevating equipment** such as ladders, boom truck, buckets, scaffolding, scissor lift and articulating man lift by:

- selecting and using personal protective equipment (PPE).
- identifying and selecting the equipment and/or method applicable for the job;
- verifying equipment selection meets job requirements to lift and move equipment and personnel;
- following fall prevention measures;
- applying procedures for bending, lifting, transporting, or climbing;
- positioning equipment for use;
- following operating procedures;
- monitoring function/operation;
- following shut down procedures;
- reporting technical or safety issues and concerns; and
- removing from service as required

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9120 Plan and Prepare for the Installation, Maintenance, or Service of Residential HVAC Systems, Components and Accessories

Skill Set Descriptor

Prior to initiating installation, maintenance or service work, it is critical for Residential Air Conditioning Systems Mechanics (313D) to plan and prepare. This includes reviewing documentation, completing calculations, as well as identifying, selecting and verifying the systems, components and accessories. In the case of Residential Air Conditioning Systems Mechanics (313D), planning also includes consultations with residents/homeowners.

Skills

9120.01 **Interpret job documentation** such as work orders, manufacturer's specifications, architectural and mechanical engineering drawings, wiring diagrams, manufacturer's installation, operation, and maintenance specifications (IOM), and applicable codes, regulations and legislation by:

- reading job documentation;
- identifying the type and size of equipment;
- identifying type and components of system;
- verifying design and operating parameters of system;
- confirming required permits and licenses;
- confirming installation, servicing, or maintenance procedures;
- identifying location of mechanical causeways;
- identifying material handling equipment, required tools, equipment, and materials; and
- applying the information to the job task

according to company standards/policies, work orders, design parameters, job specifications, IOM specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

◊ For a compulsory trade, a Trainer must hold a certificate of Qualification in that trade as per section 10(1) of BOSTA and be registered with Skilled Trades Ontario.

9120.02 **Calculate heating and cooling load requirements** such as heat loss/gain, ventilation, humidity, and filtration/purification parameters to confirm that the system has the required parameters for application by:

- reading and interpreting industry standard charts, psychrometric charts, tables, or manuals, and
- using software, tape measure, calculators

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9120.03 **Select residential HVAC systems, components and equipment** such as compressors, variable speed drives (VSD), heat recovery ventilator (HRV), controls, dampers, actuators, condensing unit, heat pump, energy recovery ventilator (ERV), condensate systems, air or water cooled condensing unit or cooling tower unit, dry coolers, evaporators, chillers, air handlers, heat and energy recovery exchangers, fans, humidifier/dehumidifier, filtration system, brine, refrigerant, and motors and pumps by:

- reading and interpreting job specifications such as work orders, manufacturer's specifications, and architectural and mechanical engineering drawings; and
- identifying the HVAC system components and equipment applicable

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9120.04 **Identify design parameters of residential HVAC systems** to determine type, size, capacity and operating parameters of the equipment, system components and parts; to determine required permits, tools, equipment, materials and/or sub-trades; to determine installation or service procedures; to determine location and layout of system and any other information needed to plan the installation by:

- reading and interpreting work orders and manufacturer's specifications;
- reviewing architectural and mechanical engineering drawings, and wiring diagrams;
- verifying building code and other legislative/regulatory/code requirements;
- confirming safety requirements;
- checking American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) standards and guidelines; and
- verifying Mechanical Refrigeration Code (MRC) – B52, manufacturer's installation, operation and maintenance (IOM) specifications

according to company standards/policies, work orders, design parameters, job specifications, IOM specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9120.05 **Calculate residential HVAC systems operating parameters** to determine the type, size, capacity and operating parameters of the equipment and system components and parts, to determine required permits, tools, equipment, materials and sub-trades, to determine location and layout of the system and any other information needed to plan the installation of the system by:

- reading and interpreting industry standards, charts, psychrometric charts, tables, and manuals; and
- using tape measures, calculators, scaled rules, and software, system analyzers and electrical measuring devices:

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9120.06 **Select residential HVAC systems operating and capacity controls** such as microprocessors and process control board, sensors, defrost controllers, pressure controls, switches, humidity and temperature controls, multi-staging and metering by:

- identifying the HVAC systems operating and capacity controls applicable;
- matching control requirements to the HVAC system; and
- confirming control operation

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9120.07 **Select residential HVAC systems safety controls** such as fluid (oil, water, refrigerant, air), electrical, temperature, pressure, failure switches, relief valves, and overcurrent devices by:

- identifying the HVAC system safety controls applicable;
- matching control requirements to the HVAC system; and
- confirming control operation

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9120.08 **Select residential HVAC systems accessories** such as filter driers, oil separators, liquid moisture indicators, accumulators, vibration absorbers and indicator lights by:

- identifying the HVAC system accessories applicable:
- verifying applicability of accessories for the HVAC system; and
- confirming operation

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9120.09 **Coordinate permits, inspections and sub-trades** by:

- verifying permit, inspection and sub-trade requirements for the job at hand;
- communicating with permit offices and sub-trades;
- arranging and/or confirming the arrangement of all permits (such as hot work permit, building permit, confined space, road closure) prior to installation;
- arranging and/or confirming the arrangement of inspections prior to installation; and
- arranging and/or confirming that all sub-trades have been contacted and scheduled

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

9120.10 **Complete planning work sheets** by:

- verifying that work order, permits, sign-off sheets, or manufacturer's check lists are available and ready for use;
- confirming that all installation, service and maintenance needs are identified, recorded and scheduled; and
- notifying supervisor and/or client of any concerns

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

9121 Install Residential HVAC Systems, Components and Accessories

Skill Set Descriptor

There are a wide variety of considerations and tasks for Residential Air Conditioning Systems Mechanics (313D) when performing installation work. While installing HVAC systems, components, accessories and equipment, Residential Air Conditioning Systems Mechanics (313D) inspect, assemble, measure, connect and verify as part of the installation process.

Skills

9121.01 Inspect residential HVAC systems, equipment, components and accessories at worksite by:

- receiving and verifying delivered materials,
- removing packaging;
- inspecting unit(s), accessories and components for damage;
- checking equipment design parameters; and
- verifying that system parameters conform to work order, architectural and mechanical engineering drawings, manufacturer's specifications

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
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◊ For a compulsory trade, a Trainer must hold a certificate of Qualification in that trade as per section 10(1) of BOSTA and be registered with Skilled Trades Ontario.

9121.02 **Perform a worksite evaluation** by:

- visually inspecting site for obstructions;
- measuring equipment parameters;
- evaluating effectiveness and viability of installation site design;
- locating service points;
- checking that required utilities (such as power, gas, and fluids) are available;
- checking that equipment complies with job documentation;
- laying out mechanical chaseways;
- reviewing and clarifying the scope of the installation with client; and
- confirming that the installation plan coincides with the scope of work, design parameters, client requirements, industry and company policies/standards and legislation/regulation/code requirements

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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9121.03 **Prepare worksite for installation** by:

- setting up and arranging installation tools and equipment;
- checking job site conditions against the layout documentation;
- connecting to available energy resources to run tools and equipment;
- recovering, reusing, or deposing of hazardous materials (such as refrigerant, glycol, compressor oils);
- removing and disposing of existing equipment including air handling equipment, heat pump, evaporator coils, condensing unit, or refrigerant piping;
- coordinating site access for equipment;
- eliminating or controlling work area obstacles and hazards; and
- placing accessories and components to layout design

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9121.04 **Coordinate material handling equipment and worker elevating platforms onsite** by:

- visually checking site;
- verifying that the equipment is identified, selected, and available for the size
  and weight of the load, height of the lift and distance to be covered; and
- moving, setting up, placing and/or positioning the equipment for use

according to client requirements, company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9121.05 **Coordinate mounting and support equipment** so that mounts or supports are located, positioned and aligned onsite by:

- visually checking site;
- checking job site conditions against the layout documentation;
- locating equipment; and
- placing equipment on required mounts or supports such as slabs, curbs, brackets, sleepers, pads, and hangers

according to client requirements, company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

9121.06 Install residential HVAC systems, components and accessories by:

- lifting, moving and using material handling equipment;
- assembling air handler, filtering equipment, and refrigerated boxes;
- assembling piping and components such as condensate and water lines, water regulating valves, pressure valves, strainers, chemical feeders, hangers, and floats;
- connecting and fitting primary and secondary refrigerant piping and tubing;
- placing and connecting condensing unit, evaporator coil, refrigerant accessories, piping, piping accessories and fittings, insulation, electrical controls and wiring, drain line, condensate pump, indoor air quality equipment (such as humidifiers/dehumidifiers, filter equipment, air handlers), heat recovery ventilator (HRV), energy recovery ventilator (ERV), and mechanical ventilation;
- levelling equipment using shims, fasteners, and required tools;
- soldering, brazing, welding, anchoring or fastening system components;
- tying in/connecting condensate line to open drain;
- cutting pathway for piping, wiring, and duct work; and
- measuring and checking installation

according to client requirements, company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9121.07 **Join residential HVAC systems piping, tubing and components** to convey all types of refrigerants by:

- setting up oxyfuel equipment including hoses, regulators, torch accessories and fire extinguishers;
- using flux, filler rods, soldering and brazing alloys and purging inert gases (such as nitrogen for copper tubing/piping, for stainless steel and other ferrous based systems);
- soldering, brazing and/or welding;
- fabricating and connecting tubing/pipe joints;
- measuring, cutting, deburring, swaging, flaring, sanding and cleaning connection surfaces;
- threading, reaming, cutting, beveling, grooving connection surfaces;
- inspecting integrity and cleanliness;
- forming tubing joints;
- extracting, swaging and flaring;
- manually installing and torquing bolts and flares and installing gaskets, O-rings and sealing materials to complete a mechanical connection;
- aligning piping, tubing, joints and component connection surfaces;
- bending and forming tubing;
- installing piping/tubing support devices and verifying stability;
- using mechanical compression and press fit joining;
- using fusion techniques including chemical, plastic welding; and
- verifying that leak-proof joints are formed and piping is installed

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9121.08 **Check residential HVAC system and components for gas and fluid leaks** to verify that there are no leaks and that the system integrity conforms with design parameters by:

- visually inspecting;
- pressuring system to the required level using air, dry/inert gas, water, etc.;
- performing various leak tests using, nitrogen, gauges, soap solutions, electronic leak detectors, infrared, dye additives or dry air; and
- performing vacuum confirmation

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

9121.09 **Evacuate residential HVAC system** so that all moisture and non-condensable are removed from system and equipment is cleaned and ready for use by:

- using hand tools, manifold gauges, vacuum pumps, vacuum gauges, micron gauges, heating devices;
- connecting hoses and components;
- keeping the oil in the pump clean and testing the pump regularly;
- determining vacuuming time for desired results;
- opening the valves;
- turning on the pump;
- removing moisture and non-condensable gases;
- releasing nitrogen from system;
- shutting off the vacuum pump;
- closing the valves;
- observing the vacuum reading with closed valves;
- resuming vacuuming if required; and
- finding and repairing leaks if vacuum reading changes

according to company standards/policies, work orders, design parameters, job specifications, manufacturer's specifications, and applicable codes, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
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9121.10 **Install residential HVAC mechanical systems, components and accessories** such as any cooling system or heating-cooling combination system, condensing unit, inside fan coil unit, drain systems, hydronic systems, evaporative cooling systems, geo-systems by:

- reading and interpreting diagrams, schematics, and installation, operation and maintenance (IOM) specifications;
- assembling and connecting components and accessories;
- visually inspecting to confirm installation requirements are met; and
- checking and verifying operation of system controls, components and accessories (such as pumps, protectors, flow switches, reliefs, pressure switches, check valves, safeties, piping and insulation)

according to company standards/policies, work orders, installation plan, design parameters, job specifications, manufacturer's specifications, IOM specifications, and applicable codes, regulations and legislation.

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

9121.11 Install residential HVAC electrical system components and accessories by:

- using required hand or power tools, measuring devices, and electrical measuring devices;
- inspecting fuses, internal unit power wiring, system control wiring, and controls;
- reading and interpreting electrical diagrams, schematics, and installation, operation and maintenance (IOM) specifications;
- coordinating required sub-trades;
- checking permits;
- checking power capacity and voltage;
- checking system control wiring and controls;
- assembling components and accessories;
- installing valves, controls, switches, wiring, and motors;
- inspecting fuses, internal unit power wiring, system control wiring, and controls
- bending and fabricating electrical metallic and non-metallic tubing; and
- installing relays, controls, actuators, switches, wiring, motors, transformers and other required electrical and electronic devices

according to company standards/policies, work orders, installation plan, design parameters, job specifications, manufacturer's specifications, IOM specifications, and applicable codes, regulations and legislation.

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

9121.12 **Install residential HVAC electronic systems, components and accessories** by:

- reading and interpreting electrical diagrams, schematics, and installation, operation and maintenance (IOM) specifications;
- visually inspecting wiring to confirm installation;
- checking power capacity and voltage;
- checking system control wiring and controls;
- inspecting fuses, internal unit power wiring, system control wiring, and controls;
- assembling accessories and components as required;
- bending and fabricating electrical metallic and non-metallic tubing; and,
- installing relays, controls, actuators, switches, wiring, motors, transformers and other required electrical and electronic devices

according to company standards/policies, work orders, installation plan, design parameters, job specifications, manufacturer's specifications, installation, operation and maintenance (IOM) specifications, and applicable codes, regulations and legislation.

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

9121.13 Install branch circuit wiring for residential HVAC equipment limited to 240 volts, single phase 60 amps by:

- using hand or power tools, measuring instruments or electrical measuring instruments;
- reading and interpreting electrical diagrams, schematics, installation, operation and maintenance (IOM) data, specifications or job documentation;
- locating the nameplate on the air conditioning (A/C) unit and verifying the specifications;
- calculating requirements such as ampacity requirements, rating requirements for safety disconnect, circuit breaker rating;
- preparing wiring chaseway:
- mounting the safety disconnect switch;
- routing the cables;
- installing cable connectors as required;
- routing the circuit conductors and attaching as required;
- connecting to terminal box;
- connecting neutral and ground conductors as required; and
- visually inspecting wiring

according to company standards/policies, work orders, installation plan, design parameters, job specifications, manufacturer's specifications, IOM specifications, and applicable codes, regulations and legislation.

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9121.14 Charge residential HVAC systems with refrigerant by:

- using hand tools, manifold gauges, hoses, weigh scales, and charging cylinders, thermometers;
- reading and interpreting rating and installation, operation and maintenance (IOM) specifications;
- confirming refrigerant type, characteristics and amounts for compatibility purposes;
- transferring refrigerant into system in liquid or vapour form depending on refrigerant type;
- following required charging procedures; and
- adjusting charge as needed

according to company standards/policies, work orders, installation plan, design parameters, job specifications, manufacturer's specifications, IOM specifications, and applicable codes, regulations and legislation.

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9121.15 Charge other fluids such as glycol, oil, water, brines and processed chemicals to confirm system operation and function at specified parameters by:

- using hand tools, flow meters, gauges, hydrometer, refractometer;
- determining additional fluids required;
- determining volume of fluid required;
- determining mixture ratios of contents;
- adding fluid;
- purging air from secondary system; and
- adjusting charge as required

according to company standards/policies, work orders, installation plan, design parameters, job specifications, manufacturer's specifications, IOM specifications, and applicable codes, regulations and legislation.

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

9122 Maintain Residential HVAC Systems, Components and Accessories

Skill Set Descriptor

By maintaining systems, Residential Air Conditioning System Mechanics (313D) support the ongoing provision of clean air through the effective and efficient operation of residential air conditioning (A/C) systems.

Skills

9122.01 **Maintain residential HVAC filters, strainers and components** such as controls, rack, frames, filter, filter media, drive components mechanisms, air-flow sensors, drain systems, and heat recovery ventilators (HRVs) and energy recovery ventilators (ERVs) to restore air flow parameters to design parameters by:

- using required tools and equipment;
- performing shut down and lock out procedures;
- verifying a zero-energy state;
- visually inspecting the components;
- checking filter loading;
- verifying fluid flow;
- documenting defective parts, problems and deficiencies
- replacing filter or filter media;
- cleaning filter and components;
- lubricating moving parts; and
- documenting results

according to company standards/policies, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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9122.02 **Maintain residential HVAC condenser, evaporator, components and accessories** such as receivers, heat exchangers, pumps, drain pan, motors, coils, fans, dampers, and drive mechanisms to restore water flow and air flow parameters to design parameters by:

- using required tools and equipment;
- performing shut down and lock out procedures;
- verifying a zero-energy state;
- inspecting system and components;
- checking temperatures, leaks, flow rates, vibration, noise, dirt, odour, and levels;
- cleaning components by scraping, flushing, washing, and brushing;
- blowing out with compressed air; and,
- documenting results

according to company standards/policies, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9122.03 **Maintain residential HVAC humidifier, components and accessories** such as media, cylinders, controls, safeties, valves, floats, pans, lights, elements, and strainers to restore the level of humidification to set points by:

- using required lubricants, tools, and equipment:
- performing shut down and lock out procedures;
- verifying a zero-energy state;
- checking water level, flow feeds, condensate drain systems, controls, safeties, media, electrical devices, reservoir, dirt, and scaling;
- cleaning by scraping, brushing, flushing contaminants, and vacuuming;
- lubricating moving parts; and
- documenting results

according to company standards/policies, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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9122.04 **Maintain residential HVAC electrical components** such as contactors, relays, heaters, solenoids, wiring, switches, and controls so that electrical components are operational and functioning to design parameters by:

- using required tools, and equipment;
- performing shut down and lock out procedures;
- verifying a zero-energy state;
- inspecting components including checking for discolouration, temperatures, pitting, voltage or amperage, resistance, wiring, and insulation;
- reviewing control settings; and,
- brushing;
- vacuuming; and
- documenting results

according to company standards/policies, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

9122.05 Maintain residential HVAC actuator and damper/zone controls by:

- using hand or power tools, solvents, lubricants, multimeters, simulators, and specialty tools;
- checking and replacing electric and electronic actuators;
- checking and replacing solid state devices or transducers;
- cleaning and lubricating damper bearings;
- checking and replacing defective controls;
- checking and replacing dampers; and
- documenting results

according to company standards/policies, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

9123 Service Residential HVAC Systems, Components and Accessories

Skill Set Descriptor

When problems and failures occur, Residential Air Conditioning Systems Mechanics (313D) diagnose, troubleshoot and service residential HVAC systems, components and accessories to maintain temperature and air quality in residential settings. In this section, actions for repair or adjust also include replacement of systems, components and accessories.

Skills

9123.01 Troubleshoot residential HVAC systems, components and accessories to determine the extent of the service required by:

- discussing with client to determine the nature of call;
- reading and interpreting documentation;
- performing an inspection and diagnostic check;
- using meters, gauges, and price lists:
- taking initial measurements;
- determining corrective actions or options;
- writing up work sheet; and
- estimating cost of job

according to client requirements, work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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9123.02 **Repair residential HVAC components and accessories** such as HRV/ERV, Geo-exchange System, Variable refrigerant flow systems (VRF) and Variable refrigerant volume systems (VRV), Electronic Commutated Motors (ECM), humidifier, pressure controls, dampers, actuators, pumps, fluid loops, heat exchangers, heat transfer devices by:

- performing shut down and lock out procedures;
- verifying a zero-energy state;
- using required hand tools, brazing and soldering equipment, computerized interfaces, and lubricants;
- replacing or repairing defective components;
- replacing or repairing evaporators and condensers;
- repairing damaged coils by soldering, brazing or using other repairing methods;
- adjusting pressure, electronic, electrical, hydraulic and mechanical controls;
- confirming there are no fluid leaks;
- verifying operation of the new components;
- lubricating devices as required; and
- documenting results

according to client requirements, work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9123.03 **Repair residential HVAC mechanical components and accessories** such as fluid moving devices, drive mechanism, fans, variable air volume systems (VAV), zoning components, belts, pulleys, sheaves, bearings, linkage, dampers, actuators and switches so that components are operational and functioning to design parameters by:

- performing shut down and lock out procedures;
- verifying a zero-energy state;
- using required testing devices, tools and equipment;
- inspecting alignment, belts, drives, bearings, linkage, dampers, actuators and switches;
- testing clearances, operations, flows, pressures, temperatures, voltage, and amperage;
- checking for wear, cracks, mismatches, shredding, tension, slippage, grooving, noise, and vibration;
- making proactive adjustments to prevent reoccurring failure;
- adjusting pressure, electronic, electrical, hydraulic and mechanical controls;
- replacing or repairing defective components;
- verifying there are no fluid leaks;
- verifying operation of the new components;
- lubricating devices; and
- documenting results

according to client requirements, work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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9123.04 **Replace residential HVAC compressors** by:

- visually inspecting compressor;
- determining cause of compressor failure;
- using hand or power tools, multimeters, compound gauges, recovery equipment, vacuum pump, and brazing equipment as required;
- performing acid test;
- removing defective compressors;
- repairing defective compressor components;
- installing new compressors (if being fully replaced);
- recharging system;
- performing start-up of compressors;
- cleaning up work area;
- documenting start-up parameters; and
- confirming that the compressors are operational and functioning to design parameters

according to client requirements, work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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mm/dd/yy	Apprentice Print Name	Apprentice Signature

9123.05 **Repair residential HVAC controls and systems** such as operating and safety controls by:

- performing shut down procedures;
- using thermometers, pressure gauges, hygrometers, psychrometers, multimeters, ammeters, voltmeters, ohmmeters, and manometers as required;
- checking and testing operations, resistance, amperage, voltage, temperature, pressure, humidity;
- checking for damaged or defective controls;
- checking integrity of controls and wiring;
- repairing or replacing defective components;
- simulating conditions to check functions of controls;
- calibrating set points;
- verifying operation of the new components;
- adjusting pressure, electronic, electrical, hydraulic and mechanical controls;
- verifying there are no fluid leaks;
- lubricating devices;
- verifying controls are operational and functioning; and
- documenting results

according to client requirements, work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9123.06 **Repair residential HVAC electrical, electronic and direct digital controls (DDC) systems and components** such as fuses, systems control wiring and controls, switches, and safety devices, electronic valves, actuators, transducers, electronic air cleaners, logic controllers, heaters, and motors so that electrical or electronic systems are restored to design parameters by:

- performing shut down and lock out procedures;
- verifying a zero-energy state;
- using required hand or power tools, measuring instruments, or electrical measuring devices, multimeters, simulators;
- reading and interpreting electrical diagrams, schematics, and installation, operation and maintenance (IOM) specifications;
- coordinating required sub-trades;
- inspecting or verifying the inspection of fuses, systems control wiring and controls, switches, and safety devices;
- inspecting for defects, discolouration, odour, corrosion, and moisture;
- checking operation and functions of components;
- checking power capacity and voltage;
- checking control wiring and controls;
- checking for oil leakage, defects, and discolouration;
- checking and replacing valves, controls, switches, actuators, transducers, electronic components, electronic air cleaners, electronic and logic controllers, heaters, and motors;
- verifying grounding components;
- checking operational sequences and set up;
- replacing batteries as required in items such as thermostats, back up alarm systems and electronic expansion valve;
- cleaning components;
- replacing defective components such as capacitors, transformers, relays, terminal blocks, fuse blocks, contactors, coils, circuit breakers, thermal overloads, fuses, fusible links, connectors, wiring, or switches;
- adding thermal conductive and corrosion resistive compounds;
- adjusting pressure, electronic, electrical, hydraulic and mechanical controls;
- performing an operational test;
- verifying operation of the new components;
- verifying systems are restored to design parameters; and
- documenting results

according to client requirements, work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, IOM specifications, manufacturer’s specifications, and applicable codes, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
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9123.07 **Repair residential HVAC system wiring** such as communication wiring, low and line voltage wiring by:

- performing shut down and lock out procedures;
- verifying zero-energy state;
- inspecting for defects, discolouration, odours, and defective supports;
- using hand or power tools, wire gauge, and electrical measuring equipment;
- re-wiring systems;
- inspecting and tightening all connections;
- checking for required wire size and wire supports;
- checking wiring chaseways;
- checking integrity of the exterior or interior system wiring;
- verifying that the wiring integrity is restored to design parameters; and
- documenting results

according to client requirements, work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
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9123.08 **Repair residential HVAC piping, components and accessories** such as oil separators, mufflers, vibration isolators, solenoids, sight glasses, filter dryers, clamps, hangers, insulation, fittings, relief devices and service valves, pressure gauges so that the flow of fluids is maintained to design parameters by:

- performing shut down and lock out procedures;
- verifying a zero-energy state;
- checking leaks, cracks, wear, rust, bulges, insulation, heat tracing, supports, flow, and pressures;
- using required piping, materials, tools, and equipment;
- selecting materials to repair or replace;
- replacing defective piping, components, and supports;
- restoring defective insulation;
- repairing defective components by cutting, fitting, brazing, soldering, welding, gluing, flaring, and swaging;
- checking pumps, strainers, valves, gauges, insulation, supports, and piping;
- verifying there are no fluid leaks;
- verifying operation of the new components;
- lubricating threaded joints;
- verifying that the flow of fluids is maintained to design parameters; and
- documenting results

according to client requirements, work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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9123.09 **Repair residential HVAC refrigerant systems, components, accessories and metering devices** such as evaporators, condensers, valves, system protectors, capacity control devices, pressure regulators, lubricating fluids, heat transfer fluids and gases so that the devices are restored and the system performance confirms to design parameters by:

- performing shut down and lock out procedures;
- verifying a zero-energy state;
- using required refrigerants, tools, testing devices, and equipment;
- inspecting and verifying the operating components, piping integrity, supports, receivers, fluid level indicators, liquid moisture indicator, filter driers, compressor, and metering devices;
- checking pressures, temperatures, voltages, fluid levels, leaks, and insulations;
- checking fluid and refrigerant levels, pressures, temperatures, concentration, and leaks;
- performing pressure and leak tests to confirm system integrity;
- flushing and cleaning system and components;
- evacuating system contaminants;
- removing and replacing lubricating fluids;
- recovering refrigerants for reuse or disposal;
- capturing and transferring heat transfer fluids for recycling and reuse
- replacing defective parts by brazing, soldering, welding, gluing, fitting and/or cutting;
- replacing insulation, supports, gaskets, cages, valves, and screens;
- replacing driers, capacity controls, pressure regulators, and compressors;
- tightening and confirming valves and packings are leak free;
- verifying bulbs, power elements and sensors are conducting effectively;
- repairing defective piping, insulation, and supports;
- recharging system with refrigerant or heat transfer fluids;
- verifying that the devices are restored and that the system performance conforms to design parameters; and
- documenting results

according to client requirements, work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer’s specifications, and applicable codes, regulations and legislation.

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

9123.10 **Repair residential HVAC prime movers** such as open, semi-hermetic, or hermetic compressor to restore the efficiency of the compressor to design parameters by:

- using required lubricants, chemicals, testing devices, tools, and equipment:
- checking and testing amperage draw, operating pressures, temperatures, motor winding resistance, capacity controls, vibration, clearances, oil levels, lubrication, safeties, and motors;
- performing shut down and lock out procedures;
- verifying a zero-energy state;
- isolating compressor from system;
- pumping down refrigerant;
- replacing oil pumps, heads, valve plates, gaskets, mounts/supports, filters, switches, safeties, electrical connectors, and lubricants;
- verifying compressor operation and efficiency; and
- documenting results

according to work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9123.11 **Repair residential HVAC pneumatics** to maintain pneumatic control pressure by:

- using required tools and equipment;
- checking or testing pressures, filters, auto drains, motors, compressors, belts, pulleys, oil levels, driers, controls, safety devices, solenoids, calibration, piping, air leaks, and supports;
- performing shut down procedures;
- cleaning components;
- repairing by soldering and swaging;
- calibrating pneumatics;
- replacing defective components;
- verifying operation; and
- documenting results

according to work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9123.12 **Repair variable air volume (VAV) components** to maintain air flow volumes to design parameters by:

- using required testing devices, tools, and equipment;
- checking or testing open or close motions, modulation variables, calibration, travel, and pressures;
- verifying a zero-energy state;
- cleaning;
- sealing;
- tightening;
- soldering;
- making required adjustments;
- calibrating set points;
- replacing defective components including damper motors, linkages, dampers, sensors, controls, or safety devices;
- verifying that air flow volumes are maintained to design parameters; and
- documenting results

according to work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9123.13 **Adjust heat transfer medium fluids** to maintain the quality and quantity of the transfer medium by:

- using required hand tools, gauges, psychrometers, thermometers, pressure gauges, hydrometers, refractometers, and chemicals;
- visually checking air and fluid levels;
- checking air volumes, water, glycol strength, and refrigerant charge;
- adjusting levels;
- replacing mediums; and
- documenting resulting

according to work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9123.14 **Check residential HVAC systems for leakage** to confirm the system is leak free and functioning to design parameters by:

- using hand tools, pressure gauges, and detectors as required;
- checking gas and power sources;
- checking water, lubricants, and refrigerants;
- visually inspecting duct work and making necessary adjustments;
- verifying the system is leak free and functioning to design parameters; and
- documenting results

according to work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9123.15 Check operations and functions of total system by:

- discussing with the client to determine air quality and to define problems;
- using hand tools, pressure gauges, thermometers, and psychrometers as required;
- inspecting and checking operation and integrity of system;
- calibrating and making adjustments;
- verifying that the system is operating to maximize performance; and
- documenting results

according to work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9123.16 Decommission packaged residential HVAC equipment and split system HVAC equipment for resale, renovation, or long-term storage so that the packaged system is ready for transportation and the split system is sealed and ready for transportation by:

- using required hand or power tools, material handling equipment, and safety equipment;
- discussing with client to determine what is happening with the system after decommissioning;
- checking that utilities connected to the system have been shut off and locked out;
- verifying a zero-energy state;
- disconnecting system and accessories;
- removing fluids subject to freezing;
- sealing system (split system);
- packing system in required containers; and
- completing documentation

according to work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9123.17 Decommission residential HVAC equipment for demolition so that all fluids are reclaimed for storage or disposal and the AC system is ready for demolition by:

- discussing with client which system is being demolished;
- using required hand or power tools, fluid containers, and safety equipment;
- checking that utilities connected to the system have been shut off and locked out;
- verifying a zero-energy state;
- disconnecting system and accessories;
- pumping down system to recover fluids including refrigerants, oils, secondary refrigerants, brines, and glycol solutions;
- placing tags indicating that system has been decommissioned; and
- documenting results

according to work orders, company standards/policies, job specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9124 Commission Residential HVAC Systems, Components and Accessories

Skill Set Descriptor

The commissioning process is important to save and conserve energy, particularly in the sustainable and high-performance building industry.

When commissioning systems, Residential Air Conditioning Systems Mechanics (313D) start up systems after periods of dormancy or for a new installation. During this process, the Residential Air Conditioning Systems Mechanic (313D) will make and confirm that the system is ready for operation prior to start up as per original design specifications.

Skills

9124.01 Interpret residential HVAC installation and start-up documentation such as installation, operation and maintenance instructions (IOM), manufacturer's specifications, architectural and mechanical engineering drawings, wiring diagrams, job specifications and applicable codes, regulations and legislation by:

- identifying equipment requirements (e.g., type, size)
- identifying required permits;
- confirming required sub-trades;
- verifying installation sequence and procedures;
- confirming required parts, accessories, material handling equipment, locations, tools; and,
- confirming work schedules and other information needed to plan the commissioning process

according to company standards/policies, job specifications, IOM specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

◊ **For a compulsory trade, a Trainer must hold a certificate of Qualification in that trade as per section 10(1) of BOSTA and be registered with Skilled Trades Ontario.**

9124.02 **Start-up residential HVAC systems, components and accessories for commissioning** by:

- preparing systems, components and accessories for commissioning,
- confirm valves are open; and
- confirming energy

according to company standards/policies, job specifications, IOM specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9124.03 **Set of residential HVAC electrical, electronic, and automated control systems** so that all control parameters are set to the pre-set operational parameters by:

- turning power on;
- using hand tools, specialty tools, gauges, temperature measuring instruments, electrical measuring instruments, simulators, and analyzers;
- checking primary and secondary voltage delivery, motor rotation, and oil levels;
- setting controls;
- adjusting hi/low pressure controls;
- testing defrost controls on heat pumps;
- checking crankcase heaters, fan cycling accessories, off cycle timers, electronic or manual thermostat operations, zone control functions, and air quality accessory controls;
- verifying settings; and
- documenting results

according to company standards/policies, job specifications, IOM specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9124.04 **Check air flow, water and glycol levels** to confirm the system is operational and functioning at the specified parameters by:

- using hand tools, flow meters, gauges, and hydrometers;
- inspecting levels; and
- adjusting as required

according to company standards/policies, job specifications, IOM specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9124.05 **Verify charging of residential HVAC system** to confirm that pressures, temperatures, flows, and levels are operating at the specified parameters by:

- reading and interpreting superheat and sub-cooling charts;
- using hand tools, manifold gauges, thermometers, psychometer, weigh scales, and reclaimers;
- checking refrigerant charge and oil levels;
- making necessary adjustments; and
- documenting adjustments to refrigerants

according to company standards/policies, job specifications, IOM specifications, industry standards and best practices, design parameters, manufacturer's
specifications, and applicable codes, regulations and legislation.

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

9124.06 **Verify residential HVAC system operating parameters** such as pressures, temperatures, flow rate, voltages, amperage, fluid levels and speeds by:

- using hand tools, pressure gauges, temperature measuring instruments, flow measuring instruments, electrical measuring instruments, level indicators, simulators, and tachometers to check; and
- documenting results

according to company standards/policies, job specifications, IOM specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

9124.07 **Commission residential HVAC system** to verify the operation and function of the total system by:

- using hand or power tools, pressure gauges, temperature measuring instruments, flow measuring instruments, electrical measuring devices, or tachometer;
- verifying that all sub-trade work has been inspected and certified;
- verifying that all gas operations have been checked and certified;
- turning on power and starting up system;
- setting limit, operating, and safety controls;
- testing system parameters including pressures, temperatures, flow rate, voltage, amperage, fluid levels, and speeds;
- making required adjustments; and
- documenting results

according to company standards/policies, job specifications, IOM specifications, industry standards and best practices, design parameters, manufacturer's specifications, and applicable codes, regulations and legislation.

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

Acronyms	
A/C	air conditioning
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
BOSTA	*Building Opportunities in the Skilled Trades Act*
CAP	Competency Analysis Profile
CEC	Canadian Electrical Code
CFC	chlorofluorocarbons
CofA	Certificate of Apprenticeship
CofQ	Certificate of Qualification
CPR	cardio-pulmonary resuscitation
CSA	Canadian Standards Association
DDC	direct digital controls
DGTA	*Dangerous Goods Transportation Act*
ECM	electronic commutated motors
ERV	energy recovery ventilator
GHS	Globally Harmonized Systems
HCFC	hydrochlorofluorocarbons
HFC	hydrofluorocarbons
HRV	heat recovery ventilator
HRAI	Heating, Refrigeration and Air Conditioning Institute of Canada
HVAC	heating, ventilation and air conditioning
IHSA	Infrastructure Health and Safety Association
IOM	Installation, Operation and Maintenance

IRS	Internal responsibility system
MLITSD	Ministry of Labour, Immigration, Training and Skills Development
MRC	Mechanical Refrigeration Code
NFPA	National Fire Protection Association
OCS	Ontario Construction Secretariat
ODP	Ozone depletion prevention
OFC	Ontario Fire Code
OHSA	*Occupational Health and Safety Act*
PLC	programmable logic controller
PPE	personal protective equipment
SDS	safety data sheets
STO	Skilled Trades Ontario
TSSA	Technical Standards and Safety Authority
VAV	variable air volume
VRF	variable refrigerant flow
VRV	variable refrigerant volume
VSD	variable speed drives
WCA	*Workers Compensation Act*
WHMIS	Workplace hazardous materials information system

Definitions

Apprentice

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

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

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

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

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

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

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

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

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

Provisional Certificates of Qualification

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

Ratios

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

Sign-off

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

Skill

Individual competency/task described in the Logbook.

Skill Sets

Group or selection of individual skills found in the Logbook.

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

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

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

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

Ready to Write Your Exam?

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

There are two types of trade certification examinations in Ontario:

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

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

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

Basic Examination Details for You to Know

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

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

Remember these 3 basic steps:

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

Instructions for Recording a Change in Sponsor

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

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

Change of Sponsor Records

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

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

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

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

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

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

Sponsor Record #2

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

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

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

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

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

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

Sponsor Record #3

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

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

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

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

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

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

Appendix A — Instructions for Apprenticeship Program Completion

Once an Apprentice has completed all the classroom training and benchmark on-the-job hours specified for the trade and has acquired all the mandatory skills included in this Logbook.

The Apprentice and the Sponsor complete the Apprentice Completion Form and the Skill Set Completion for Sponsors Form located on the following pages.

1. They sign the forms and submit them to their local Service Delivery Office. To find the closest office, check the contact information at ontario.ca/page/employment-ontario-apprenticeship-offices *or call the Employment Ontario toll free number at (1-800-387-5656).*

2. For All Trades: All mandatory skills (or the combination indicated in the completion requirements for the trade) in the Logbook must be signed-off. The recommended hours are a benchmark. If the Sponsor is completing the Apprentice before the industry recommended training hours are done, staff may request further information regarding the Apprentice's on-the-job training. An example of a request would be a letter from the Sponsor confirming the Apprentice worked for some time in the trade before the initial Training Agreement was registered, thereby acquiring some skills beforehand.

If Apprentices are submitting the completion request form and supporting documentation to their local Service Delivery Office by mail, fax, or email (as a scanned document), they should not include their Logbook; if they are presenting this form in person at the local Service Delivery Office, they should bring their Logbook with them.

After staff verifies all the information in the completion request, they may contact either the Apprentice or the Sponsor for further information or documentation. Once the completion has been confirmed, the local Service Delivery Office will issue a Certificate of Apprenticeship to the Apprentice.

Skilled Trades Ontario will receive notification of this completion.

- If the Apprentice has completed a program in a **compulsory trade,** Skilled Trades Ontario will automatically register the Apprentice for a Provisional Certificate of Qualification to continue to work legally for one year while preparing for the certification examination.
- If an Apprentice completes their apprenticeship in a **non-compulsory trade** and there is a Certificate of Qualification exam, they must write and pass the exam to receive a Certificate of Qualification from Skilled Trades Ontario.

For permission to schedule an exam once completion is confirmed, the individual must first contact the Skilled Trades Ontario Client Services Department at 647-847-3000 or toll free at 1-855-299-0028 to pay the certification examination fee. Once you have paid your exam fee with Skilled Trades Ontario, book your exam by contacting your nearest Employment Ontario local Service Delivery Office.

Appendix B — Apprentice Completion Form

Please fill out both sides of this form, including the Skill Set Completion for Sponsors (see back of form). Once both sides are completed, submit the form to your local Service Delivery Office (find contact information at ontario.ca/page/employment-ontario-apprenticeship-offices or by calling Employment Ontario at (1-800-387-5656).

Apprentice Information	
Name (print)	
Client ID # Issued by Ministry	
Telephone Number(s)	

Sponsor Information	
Legal Name	
Address	
Telephone Number(s)	
Sponsor's Signing Authority *(print name)*	
E-mail Address	

Program Information			
Trade Name			
Number of hours required as per Training Agreement *(hours-based trades only)*			
Hours completed? *(documentation attached)*	Yes ( )	No ( )	Not applicable ( )
Classroom training completed or exempt?	Yes ( )	No ( )	Not applicable ( )

I hereby confirm that the information submitted on both sides of this form is true and accurate.

X_____ **X**_____

Apprentice's Signature Date **Signature of Sponsor's Signing Authority Date**

Appendix C — Skill Set Completion for Sponsors

You will find the skill set numbers and titles in the Logbook's Table of Contents. By signing off each skill set in the table below, you are providing final confirmation, as the Apprentice's Sponsor, that the Apprentice has demonstrated competency in all the mandatory skills included in the skill set.

Skill Set #	Skill Set Title	Signing Authority Signature
9117	Protect Self, Others and the Environment	
9118	Demonstrate Business Practices	
9119	Use and Maintain Tools, Devices and Equipment	
9120	Plan and Prepare for the Installation, Maintenance and Service of Residential HVAC Systems, Components and Accessories	
9121	Install Residential HVAC Systems, Components and Accessories	
9122	Maintain Residential HVAC Systems, Components and Accessories	
9123	Service Residential HVAC Systems, Components and Accessories	
9124	Commission Residential HVAC Systems, Components and Accessories	

Ministry of Labour, Immigration, Training and Skills Development use only:

Sponsor verified as most recent sponsor of record: Yes ( ) No ( )

Documentation to support completion of hours attached: Yes ( ) No ( )

Completion of classroom training verified: Yes ( ) No ( )

Staff Name_____ Signature _____

Date _____

Appendix D — Local Service Delivery Offices in Ontario

For current office listings visit: *ontario.ca/page/employment-Ontario-apprenticeship-offices*

Location	Contact	Location	Contact
Barrie 705-737-1431	55 Cedar Pointe Dr Unit 609, Barrie, ON L4N 5R7	**Marathon** 807-346-1550	52 Peninsula Road, Suite 103 Marathon, Ontario, P0T 2E0
Belleville 613-968-5558 1-800-953-6885	135 North Front St, Belleville, ON K8P 3B5	**Markham** 905-513-2695	140 Allstate Parkway, Suite 505, Markham, Ontario L3R 5Y8
Brantford 519-756-5197	505 Park Rd North Suite 201, Brantford, ON N3R 7K8	**North Bay** 705-495-8515 1-800-236-0744	200 First Ave West, North Bay, ON P1B 3B9
Chatham 519-354-2766 1-800-214-8284	870 Richmond St West 1st Floor, Chatham, ON N7M 5J5	**Ottawa** 613-731-7100 1-877-221-1220	Preston Square, 347 Preston Street, Suite 310, Ottawa, ON K1S 3H8
Cornwall 613-938-9702 1-877-668-6604	132 Second St East Ste 202, Cornwall, ON K6H 1Y4	**Owen Sound** 519-376-5790 1-800-838-9468	1450 1st Ave West, Suite 100, Owen Sound, ON N4K 6W2
Dryden 807-456-2665 1-800-734-9572	Provincial Government Building, 479 Government St, Dryden, ON P8N 3K9	**Peel** 905-279-7333 1-800-736-5520	The Emerald Centre, 10 Kingsbridge Garden Circle, Suite 404, Mississauga, ON L5R 3K6
Durham 905-433-0595 1-800-461-4608	78 Richmond Street West, Oshawa, ON L1G 1E1	**Pembroke** 613-735-3911 1-800-807-0227	615 Pembroke St East, Pembroke, ON K8A 3L7
Elliot Lake 1-800-236-8817	50 Hillside Dr North, Elliot Lake, ON P5A 1X4	**Peterborough** 705-745-1918 1-877-433-6555	901 Lansdowne St West, Peterborough, ON K9J 1Z5
Fort Frances 807-274-8634	922 Scott St 2nd Flr, Fort Frances, ON P9A 1J4	**Sarnia** 519-542-7705 1-800-363-8453	Bayside Mall, 150 Christina St North, Sarnia, ON N7T 7W5
Geraldton 807-854-1966	208 Beamish Avenue West Geraldton, Ontario P0T 1M0	**Sault Ste. Marie** 705-945-6815 1-800-236-8817	477 Queen St East 4th Flr, Sault Ste Marie, ON P6A 1Z5
Halton 905-842-5105 1-844-901-5105	700 Dorval Dr., Suite 201, Oakville, ON L6K 3V3	**St Catharines** 905-704-2991 1-800-263-4475	Garden City Tower, 301 St Paul St East, 10th Flr, St Catharines, ON L2R 7R4
Hamilton 905-521-7764 1-800-668-4479	Ellen Fairclough Bldg, 119 King St West 8th Flr, Hamilton, ON L8P 4Y7	**Sudbury** 705-564-3030 1-800-603-5999	159 Cedar St Ste 506, Sudbury, ON P3E 6A5
Kapuskasing 705-465-5785 705-235-1950	Ontario Government Complex, 122 Government Rd West, Kapuskasing, ON P5N 2X8	**Thunder Bay** 807-346-1550 1-800-439-5493	189 Red River Rd Suite 103, Thunder Bay, ON P7B 1A2
Kenora 807-468-2879 1-800-734-9572	227 1/2 Second St South, Kenora, ON P9N 1G4	**Timmins** 705-235-1950 1-877-275-5139	Ontario Government Complex, 5520 Highway 101 East Wing B, South Porcupine, ON P0N 1H0
Kingston 613-548-1151 1-866-973-4043	Alliance Business Centre, 299 Concession St Ste 201, Kingston, ON K7K 2B9	**Toronto Centre** 416-927-7366 1-800-387-5656	2 St Clair West, 11th floor Toronto, ON M4A 1L5
Kitchener 519-653-5758 1-866-877-0099	4275 King St East, Kitchener, ON N2P 2E9	**Toronto South** 416-326-5800	625 Church St 1st Fl, Toronto, ON M7A 2B5
London 519-675-7788 1-800-265-1050	1200 Commissioners Rd E, Unit 72, London, ON N5Z 4R3	**Windsor** 519-973-1441	Roundhouse Centre, 3155 Howard Ave 2nd Fl, Suite 200, Windsor, ON N8X 4Y8

Competency Analysis Profile (CAP) Chart

Protect Self, Others and the Environment 9117	**9117.01** Comply with applicable Acts, Regulations, Codes and Safety Directives	**9117.02** Use personal protective equipment (PPE)	**9117.03** Maintain personal protective equipment (PPE)	**9117.04** Maintain a safe, clean and organized work environment	**9117.05** Handle hazardous substances
	9117.06 Identify occupant safety hazards in residential setting	**9117.07** Identify worker safety hazards in residential setting	**9117.08** Identify biohazards	**9117.09** Handle compressed gases	**9117.10** Transport compressed gases
	9117.11 Follow fire safety procedures	**9117.12** Report injuries	**9117.13** Lock out, tag out or isolate equipment for repair or maintenance	**9117.14** Minimize the environmental footprint	**9117.15** Clean-up worksite and equipment
Demonstrate Business Practices 9118	**9118.01** Determine nature of service or maintenance call	**9118.02** Conduct a site evaluation	**9118.03** Perform a diagnostic inspection	**9118.04** Estimate costs of service or maintenance call	**9118.05** Complete installation, service or maintenance schedule
	9118.06 Complete job documentation	**9118.07** Instruct clients	**9118.08** Communicate with clients, co-workers, vendors and integrated design team	**9118.09** Resolve conflicts	**9118.10** Perform customer service functions
	9118.11 Mentor/ coach other apprentices and colleagues				

Use and Maintain Tools, Devices and Equipment 9119

9119.01 Use hand tools	**9119.02** Maintain hand tools	**9119.03** Use power tools	**9119.04** Maintain power tools	**9119.05** Use measuring devices (electrical, digital, analog)
9119.06 Use HVAC pressure, temperature, and flow measuring devices	**9119.07** Use HVAC specialty instruments	**9119.08** Use brazing, soldering, welding, cutting or purging equipment	**9119.09** Use digital technology	**9119.10** Use material handling
9119.11 Use worker elevating equipment				

Plan and Prepare for the Installation, Maintenance and Service of Residential HVAC Systems, Components and Accessories 9120

9120.01 Interpret job documentation	**9120.02** Calculate heating and cooling load requirements	**9120.03** Select residential HVAC systems, components and equipment	**9120.04** Identify design parameters of residential HVAC systems	**9120.05** Calculate residential HVAC systems operating parameters
9120.06 Select residential HVAC systems operating and capacity controls	**9120.07** Select residential HVAC systems safety controls	**9120.08** Select residential HVAC systems accessories	**9120.09** Coordinate permits, inspections, and sub-trades	**9120.10** Complete planning work sheets

Install Residential HVAC Systems, Components and Accessories 9121

9121.01 Inspect the residential HVAC equipment, systems, components and accessories at worksite	**9121.02** Perform a worksite evaluation	**9121.03** Prepare worksite for installation	**9121.04** Coordinate material handling equipment and worker elevating platforms onsite	**9121.05** Coordinate mounting and support equipment
9121.06 Install residential HVAC systems, components and accessories	**9121.07** Join residential HVAC systems piping, tubing and components	**9121.08** Check residential HVAC system and components for gas and fluid leaks	**9121.09** Evacuate residential HVAC system	**9121.10** Install residential HVAC mechanical system components and accessories
9121.11 Install residential HVAC electrical systems, components and accessories	**9121.12** Install residential HVAC electronic systems, components and accessories	**9121.13** Install branch circuit wiring for residential HVAC equipment limited to 240 volts, single phase 60 amps	**9121.14** Charge residential HVAC systems with refrigerant	**9121.15** Charge other fluids such as glycol, oil, water, brines, processed chemicals

Perform Planned and Predictive Maintenance on Residential HVAC Systems, Components and Accessories 9122

9122.01 Maintain residential HVAC filters, strainers and components	**9122.02** Maintain residential HVAC condenser, evaporator, components and accessories	**9122.03** Maintain residential HVAC humidifier, components and accessories	**9122.04** Maintain residential HVAC electrical components	**9122.05** Maintain residential HVAC actuator and damper/zone controls

Service Residential HVAC Systems, Components and Accessories 9123

9123.01 Troubleshoot residential HVAC systems, components and accessories

9123.02 Repair residential HVAC components and accessories

9123.03 Repair residential HVAC mechanical components and accessories

9123.04 Replace residential HVAC compressors

9123.05 Repair residential HVAC controls and systems

9123.06 Repair residential HVAC electrical, electronic and direct digital controls (DDC) systems and components

9123.07 Repair residential HVAC system wiring

9123.08 Repair residential HVAC piping, components and accessories

9123.09 Repair residential HVAC refrigerant system, components, accessories and metering devices

9123.10 Repair residential HVAC prime movers

9123.11 Repair residential HVAC pneumatics

9123.12 Repair or replace Variable Air Volume (VAV) components

9123.13 Adjust heat transfer medium fluids

9123.14 Check residential HVAC systems for leakage

9123.15 Check operations and functions of total system

9123.16 Decommission packaged residential HVAC equipment and split system HVAC equipment for resale, renovation, or long-term storage

9123.17 Decommission residential HVAC equipment for demolition

Commission Residential HVAC Systems, Components and Accessories 9124

9124.01 Interpret residential HVAC installation and start-up documentation	**9124.02** Start-up residential HVAC systems, components and accessories for commissioning	**9124.03** Set residential HVAC electrical, electronic, and automated control systems	**9124.04** Check air flow, water and glycol levels	**9124.05** Verify charging of residential HVAC system
9124.06 Verify residential HVAC system operating parameters	**9124.07** Commission residential HVAC system			

Notes

Completing Your Apprenticeship Program

Once your sponsor agrees you are competent in the required skills, your hours are complete and you have completed all the levels of classroom training required for your trade:

- ✓ Follow the completion instructions on the Completion Form (Appendix A) in the Logbook.
- ✓ Answer any questions that MLITSD staff may have and provide any additional completion documentation that may be required.
- ✓ Once completion is confirmed, MLITSD will issue you a Certificate of Apprenticeship and notify Skilled Trades Ontario.

After Your Apprenticeship

If you are in a trade with a certification exam, Skilled Trades Ontario will receive notice of your completion.

For compulsory trades, you will be issued a Provisional Certificate of Qualification which will allow you to work legally for up to 12 months until you write and pass your examination.

For a non-compulsory trade, once you pass your examination, you will be issued a Certificate of Qualification for your trade.

Preparing For Your Exam

- **To pay for a Certificate of Qualification examination, contact Skilled Trades Ontario** Client Services Department at: 647-847-3000 or toll free at 1-855-299-0028
- **To schedule your exam:** Once you have paid, contact your local Service Delivery Office to book your exam.
- **Download Skilled Trades Ontario exam preparation guide at:** Exam Resources – Skilled Trades Ontario **and/or view the exam preparation guide for Red Seal trades at:** red-seal.ca

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