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Red Seal Occupational Standard

Oil Heat System Technician

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Canada

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Oil Heat System Technician

Title: Oil Heat System Technician

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Foreword

The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this Red Seal Occupational Standard (RSOS) as the national standard for the Oil Heat System Technician trade.

Background

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to cooperate with provincial and territorial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. Employment and Social Development Canada (ESDC) funds the Red Seal Program, which, under the guidance of the CCDA, develops a national occupational standard for each of the Red Seal trades.

Standards have the following objectives:

- to describe and group the tasks performed by skilled workers
- to identify which tasks are performed in every province and territory
- to develop instruments for use in the preparation of Interprovincial Red Seal Examinations and assessment tools for apprenticeship and certification authorities
- to develop common tools for apprenticeship on-the-job and technical training in Canada
- to facilitate the mobility of apprentices and skilled workers in Canada
- to supply employers, employees, associations, industries, training institutions and governments with occupational standards

Any questions, comments, or suggestions for changes, corrections, or revisions to this standard or any of its related products may be forwarded to:

Trades and Apprenticeship Division
Apprenticeship and Sectoral Initiatives Directorate
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- Gabriel Cyr, RSE – New Brunswick,
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- Sean Hiscock, RSE – Nova Scotia
- Richard Martin, RSE – New Brunswick
- Janet O'Reilly, RSE – Newfoundland and Labrador
- John Pearson, RSE – Nunavut
- Joseph Putulik, RSE – Nunavut

This standard was prepared by the Apprenticeship and Sectoral Initiatives Directorate of ESDC. The coordinating, facilitating and processing of this standard were undertaken by employees of the standards development team of the Trades and Apprenticeship Division and of Nova Scotia, the host jurisdiction for this trade.

Structure of the Occupational Standard

This standard contains the following sections:

Methodology: an overview of the process for development, review, validation and weighting of the standard

Description of the Oil Heat System Technician Trade: an overview of the trade's duties, work environment, job requirements, similar occupations and career progression

Trends in the Oil Heat System Technician Trade: some of the trends identified by industry as being the most important for workers in this trade

Skills for Success Summary: an overview of how each of the skills for success (formerly called essential skills) is applied in this trade

Roles and Opportunities for Skilled Trades in a Sustainable Future: an overarching description of how in the context of climate change, skilled trades play a large role in implementing solutions and adjusting to changes in the world. In addition to highlighting the importance of this awareness, the standard may also contain more details on activities, skills and knowledge elements that are specific to the trade

Industry Expected Performance: description of the expectations regarding the level of performance of the tasks, including information related to specific codes, regulations and standards that must be observed

Language Requirements: description of the language requirements for working and studying in this trade in Canada

Pie Chart of Red Seal Examination Weightings: a graph which depicts the national percentages of exam questions assigned to the major work activities

Task Matrix and Weightings: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard and the national percentages of exam questions assigned to the major work activities and tasks

Harmonization of Apprenticeship Training: the aspects of apprenticeship training that participating provinces and territories have agreed upon to substantively align apprenticeship systems across Canada

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

- **Task:** distinct actions that describe the activities within a major work activity
  - **Task Descriptor:** a general description of the task
    - **Sub-task:** distinct actions that describe the activities within a task
      - **Skills:**
        - **Performance Criteria:** description of the activities that are done as the sub-task is performed
        - **Evidence of Attainment:** proof that the activities of the sub-task meet the expected performance of a tradesperson who has reached journeyperson level
        - **Range of Variables:** elements and examples (not all-inclusive) that provide a more in-depth description of a term used in the performance criteria and evidence of attainment
      - **Knowledge:**
        - **Learning Outcomes:** describes what should be learned relating to a sub-task while participating in technical or in-school training
        - **Learning Objectives:** topics to be covered during technical or in-school training in order to meet the learning outcomes for the sub-task
        - **Range of Variables:** elements and examples (not all-inclusive) that provide a more in-depth description of a term used in the learning outcomes and learning objectives

- **Appendix A – Acronyms:** a list of acronyms used in the standard with their full name
- **Appendix B – Tools and Equipment / Outils et Équipement:** a bilingual non-exhaustive list of tools and equipment used in this trade
- **Appendix C – Glossary / Glossaire:** bilingual definitions or explanations of selected technical terms used in the standard

Methodology

Development of the Standard

A draft standard is developed by a broad group of trade representatives, including tradespeople, instructors and employers at a National Workshop led by a team of facilitators. This draft standard breaks down all the tasks performed in the occupation and describes the knowledge and abilities required for a tradesperson to demonstrate competence in the trade.

Harmonization of Apprenticeship Training

An analysis of all provinces' and territories' apprenticeship programs is performed, and recommendations are made on harmonizing the name of the trade, the hours of training required and the number of levels of training. Provinces and territories consult with their respective industry stakeholders on these elements and revisions are discussed until consensus is reached. Following the development of the workshop draft of the RSOS, participants discuss and come to consensus on the sequence of training topics, as expressed in the new standard. Their sequencing recommendations are reviewed by stakeholders in participating provinces and territories and further discussions are convened to reach consensus and to identify any exceptions.

Online Survey

Stakeholders are asked to review and validate the activities described in the new standard via an online survey. These stakeholders are invited to participate in this consultation through apprenticeship authorities, as well as national stakeholder groups.

Draft Review

The RSOS development team forwards a copy of the standard to provincial and territorial authorities who consult with industry representatives to review it. Their recommendations are assessed and incorporated into the standard.

Validation and Weighting

Participating provinces and territories also consult with industry to validate and weight the document for the purpose of planning the makeup of the Red Seal Interprovincial Examination for the trade. They validate and weight the major work activities (MWA), tasks and sub-tasks of the standard, as follows:

- MWA - Each jurisdiction assigns a percentage of questions to each MWA for an examination that would cover the entire trade.
- Tasks - Each jurisdiction assigns a percentage of exam questions to each task within a MWA.
- Sub-tasks - Each jurisdiction indicates, with a "yes" or "no", whether or not each sub-task is performed by skilled workers within the occupation in its jurisdiction.

The results of this exercise are submitted to the RSOS development team who then analyzes the data and incorporates it into the document. The RSOS provides the individual jurisdictional validation results as well as the national averages of all responses. The national averages for MWA and task weighting guide the Interprovincial Red Seal Examination plan for the trade.

The validation of the RSOS is used to identify common core sub-tasks across Canada for the occupation. If at least 70% of the responding jurisdictions' industry performs a sub-task, it shall be considered common core. Interprovincial Red Seal Examination questions are limited to the common core sub-tasks identified through this validation process.

Definitions for Validation and Weighting

yes	sub-task performed by qualified workers in the occupation in that province or territory
no	sub-task not performed by qualified workers in the occupation in that province or territory
NV	standard Not Validated by that province or territory
ND	trade Not Designated in a province or territory
Not Common Core (NCC)	sub-task, task or MWA performed less than 70% of responding jurisdictions; these will not be tested by the Interprovincial Red Seal Examination for the trade
National Average %	average percentage of questions assigned to each MWA and task in Interprovincial Red Seal Examination for the trade

Provincial/Territorial Abbreviations

NL	Newfoundland and Labrador
NS	Nova Scotia
PE	Prince Edward Island
NB	New Brunswick
QC	Quebec
ON	Ontario
MB	Manitoba
SK	Saskatchewan
AB	Alberta
BC	British Columbia
NT	Northwest Territories
YT	Yukon Territory
NU	Nunavut

Description of the Oil Heat System Technician Trade

"Oil Heat System Technician" is this trade's official Red Seal occupational title approved by the CCDA. This standard covers tasks performed by oil heat system technicians.

Oil heat system technicians install, repair, maintain and retrofit all types of oil-fired domestic and commercial appliances, equipment, components and systems. On new installations, they may design, assemble and install the heating and ventilation systems, install oil burner components such as control devices, associated wiring, chimney and venting systems, install fuel supply systems and connect the plumbing to mechanical and electrical systems. They may also install, maintain and repair wood/oil heating systems.

Oil heat system technicians work in the residential, commercial and industrial sectors. They may be self-employed or employed by heating, ventilation and air conditioning (HVAC) installation and service companies.

Service calls and emergency calls may take place anytime: days, evenings or weekends. Full time and seasonal employment opportunities are available.

Oil heat system technicians must have good mechanical aptitude, problem-solving skills and good customer relations skills. A good understanding of basic electrical/electronic theory and "The House as a System" is also required. They may give cost estimates for required work and explain the operation and maintenance of appliances and systems.

This standard recognizes similarities or overlaps with the work of refrigeration and air conditioning mechanics, gasfitters, plumbers and sheet metal workers.

Experienced oil heat system technicians may advance into supervisory and management positions, move into self-employment or become mentors and trainers of apprentices.

Trends in the Oil Heat System Technician Trade

Technology

There are many advancements in oil heat system equipment. For example, programmable electronic controls that allow fine tuning of controls to match the system (e.g., pre-purge and post-purge). Outdoor reset / system reset controls monitor changes in water temperatures and differences with outdoor air temperature.

Due to the need for equipment to meet current industry standards, manufacturers are developing equipment with variable speed drives, controls and other technologies. Advancements in technology allow for more accurate monitoring and controlling of temperature, humidity, air quality, pressure, flow and occupancy.

Systems are more complicated than in the past and may require that oil heat system technicians be trained directly by the manufacturer to access system controls. Design has become significantly more crucial than before for ensuring correct, safe and efficient operation.

Some original equipment manufacturer (OEM) components and control systems are not compatible with generic components and are not manufactured to be retrofitted or are not permitted by jurisdictional regulations to be used for retrofitting. Specialized manufacturer training or approval from the authority having jurisdiction (e.g., Canadian Standards Association [CSA], fuel safety authority) may be required.

There is a global mandate for sustainability and green technology resulting in improved control systems and heat transfer methods continuing to emerge and evolve. These include heat recovery systems, variable speed equipment and components, electronically commutated motors (ECM), multi-zone equipment, solid-state control systems, electronic control valves, and flow control valves for hydronic heating. Remote assisted technologies, such as augmented reality and artificial intelligence (AI), may be introduced in the future to aid technicians.

Remote diagnostics and predictive maintenance using the Internet of Things (IoT) or communication devices are becoming more widely incorporated in equipment.

Health and Safety

Personal protective equipment (PPE) is a crucial component of safety as jurisdictional and industry standards evolve for worker protection. Improved comfort and wearability allow PPE to be worn by an inclusive workforce when completing tasks.

Tools and Equipment

Smart tools that may be system-specific require manufacturer training to operate.

There are new tools and equipment for installing piping. Battery-powered tools such as powered threaders and press connect fitting tools assist in installing piping in a safer and more efficient manner.

There is an increased variety of Bluetooth or Wi-Fi wireless probes such as pressure gauges, thermometers, hygrometers, vacuum gauges, temperature sensors, manometers, anemometers, and combustion analyzers that allow better logging, tracking and reporting of the results.

As systems evolve, specific tools to maintain and service components have become necessary. Multimeters, draft gauges, oil pressure and vacuum gauges, ignition testers, and electronic combustion analyzers are all examples of tools that are required by an oil heat system technician.

Products/Materials

90+% efficiency condensing appliances are becoming more common due to their improvements in efficiency. This is more cost-effective for customers and lowers emissions.

Environmental

Biofuels are increasingly being used for heating buildings. Biofuels are renewable and can be used to replace or supplement heating oil in oil-fired burners and other heating products with little or no modifications. Oil heat system technicians need specific training around biofuel applications and properties.

Legislative and Regulatory

A new edition of the CSA Installation Code for Oil Burning Equipment (B139) was released in 2024. Adoption by each authority is expected in the years following.

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 application of these skills may be described throughout this document within the skills and knowledge which support each sub-task of the trade. The following are summaries of the requirements in each of the Skills for Success.

Adaptability

Strong adaptability skills help oil heat system technicians deal effectively with change and to learn new skills and behaviours when needed, stay focused on their responsibilities and goals, and not give up when situations are difficult. Oil heat system technicians use this skill to change work plans to meet new deadlines, learn how to work with new tools, adapt to changing technologies and improve their skills through feedback. These skills help them stay positive and manage the stress that can come from changes in the workplace.

Collaboration

Modern workplaces are more diverse, and oil heat system technicians may often work with other tradespeople from different backgrounds and cultures to complete tasks and solve problems. It is important to be able to work respectfully with people who have different professions, experiences, cultures, and backgrounds.

Collaboration skills help oil heat system technicians perform better in a team by understanding how to support and value others, manage difficult interactions and contribute to the team's work. Strong collaboration skills help oil heat system technicians build and maintain positive relationships with others at work.

Communication

Oil heat system technicians communicate with other tradespeople to coordinate the installation, maintenance and service of oil-fired domestic and commercial appliances, equipment, components and systems. They interact with clients to identify system requirements and to obtain problem descriptions. They may also call suppliers to order parts, speak with manufacturers' representatives to obtain technical information and engineers to discuss design specifications. They may also interact with jurisdictional officials to discuss compliance with regulations.

Creativity and Innovation

Creativity and innovation skills help oil heat system technicians come up with new, unique, or “outside the box” ideas or to approach something differently than in the past. A curious mindset that finds inspiration from a broad range of experiences and perspectives helps develop creativity and innovation skills. With strong creativity and innovation skills, oil heat system technicians can also support and inspire others to develop their own creativity and innovation.

Digital

Oil heat system technicians adjust parameters on automated control systems. They use remote access and on-board functions to monitor and diagnose problems. Oil heat system technicians use electronic instruments for diagnosis. They may use software, electronic devices and the Internet during their work.

Numeracy

Oil heat system technicians use numeracy in a range of tasks. For example, they measure lengths of ducting and piping. They calculate areas and volumes of ducting and piping assemblies to meet operating specifications. When designing and sizing oil-fired systems, they perform heat load and heat loss calculations. They use diagnostic and measurement tools to troubleshoot and verify the proper operation of equipment. They compare equipment temperature and pressure trend graphs to equipment specifications and operating parameters to monitor systems. They also estimate time and material costs.

Problem-solving

Oil heat system technicians require problem-solving skills to identify, analyze, propose solutions, and make decisions. The ability to think, make decisions, and solve problems effectively improves the way oil heat system technicians carry out activities and meet goals and deadlines at work.

Reading

Oil heat system technicians read a variety of materials including codes, regulations, technical bulletins, manufacturers’ specifications and manuals to obtain detailed information on equipment installation and troubleshooting procedures. They read maintenance and service logs to ensure that the correct piece of equipment is being installed or maintained according to client requirements, and to learn about the equipment history. They may also refer to wholesaler catalogues to assist in the selection and ordering of parts and equipment.

Writing

Oil heat system technicians update logbooks and complete written documents such as service reports, work orders, correspondence, warranty claim forms, permits, and legislated and company documents. They may prepare sketches and update as-built drawings.

Roles and Opportunities for Skilled Trades in a Sustainable Future

Climate change affects all of us. Trades play a large role in implementing solutions and adjusting to changes in the world.

Throughout this standard, there may be specific references to tasks, skills and knowledge that clearly show this trade's role in a more sustainable future. Each trade has different roles to play and contributions to make in their own way.

For example:

- Construction tradespeople need to consider the materials they are using, building methods, and improvements to mechanical and electrical installations. There are important changes to codes and standards to help meet the climate change goals and commitments set for 2030 and 2050. Retrofits and new construction of low-energy buildings provide enormous opportunities for workers in this sector. Concepts, such as energy efficiency and regarding buildings as systems are foundational.
- Automotive and mechanical trades are seeing a shift towards the electrification of vehicles and equipment. As a result, new skills and knowledge will be required for tradespeople working in this sector. There are mandates for sales of new light-duty zero-emission vehicles (ZEV) in Canada, with the goal of achieving 100% ZEV sales by 2035. Due to this mandate, the demand for these vehicles is growing quickly among consumers and fleets. With this escalating demand, the need for skilled workers to maintain and repair these vehicles is also increasing.
- In industrial and resource sectors, there is pressure to move towards increased electrification of industrial processes. Many industrial and commercial facilities are also being upgraded to improve energy efficiency in areas such as lighting systems, and new production processes and technologies. There are also opportunities in carbon capture, utilization and storage (CCUS), as well as the production and export of low-carbon hydrogen.
- Trades in the service sector may also need to be aware of responsible sourcing, as well as efficient use of products and materials. New ways of working better are always a part of the job.

There are fast-moving changes in guidelines, codes, regulations and specifications. Many are being implemented for the purpose of energy efficiency and climate change. Those that affect specific trades may be mentioned within the standard. Examples of these guidelines and legislation include:

- *National Energy Code of Canada for Buildings* (NECB).
- Canadian Net-Zero Emissions Accountability Act (CNZEAA).
- Programs that encourage sustainable building design and construction such as Leadership in Energy and Environmental Design (LEED) and the Zero Carbon Building (ZCB) standards.
- Montreal Protocol for phasing out R22 refrigerants.

- Energy efficiency programs such as ENERGY STAR.
- Principles of the United Nations Declaration for the Rights of Indigenous Peoples pertaining to energy sector development.

Apprentices and tradespeople need to increase their climate literacy and reinforce their own understanding of energy issues and environmental practices. It is important for them to understand why these changes are happening and their effect on trades' work. While individual tradespeople and apprentices may not be able to choose certain elements like; the architectural design of buildings, building material selection, regulatory requirements, use of electric vehicles and technologies, they must understand the impact of using these elements in their work. Impacts include using environmentally friendly products and following requirements related to the disposal and recycling of materials.

In apprenticeship, as well as in ongoing professional development, employers and instructors should encourage learning about these concepts, why they are important, how they are implemented, and the overarching targets they are aiming to achieve.

All in all, it's about doing the work better and building a better world.

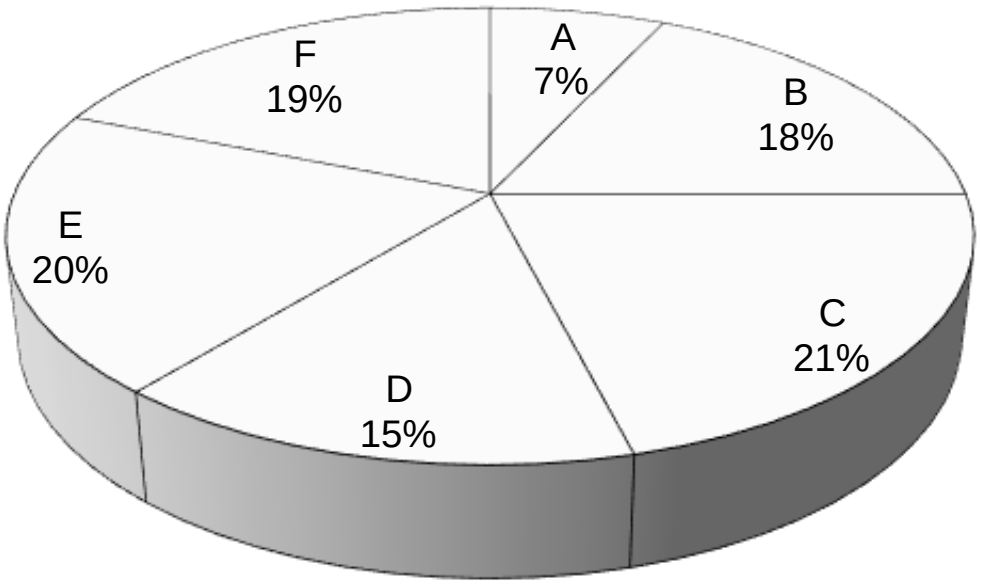
Industry Expected Performance

All tasks must be performed according to the applicable jurisdictional codes and standards. All health and safety standards must be respected and observed. Work should be performed efficiently and to a high quality without material waste or environmental damage. All requirements of employers, engineers, designers, manufacturers, clients and quality control policies must be met. At a journeyperson level of performance, all tasks must be done with minimal direction and supervision. As a journeyperson progresses in their career there is an expectation that they continue to upgrade their skills and knowledge to maintain pace with industry and promote continuous learning in their trade through mentoring of apprentices.

Language Requirements

It is expected that journeypersons are able to understand and communicate in either English or French, which are Canada's official languages. English or French are the common languages of business as well as languages of instruction in apprenticeship programs.

Pie Chart of Red Seal Examination and Weightings



Major Work Activity	Percentage
A - Performs common occupational skills	7%
B - Installs fuel supply and storage systems	18%
C - Installs oil-fired heating systems	21%
D - Installs venting systems, and combustion air and make-up air equipment and components	15%
E - Installs and tests electrical and electronic systems	20%
F - Performs maintenance, diagnosis, repair and removal	19%

This pie chart represents a breakdown of the interprovincial Red Seal examination. Percentages are based on the collective input from workers from the trade from across Canada. The Task Matrix on the next pages indicates the breakdown of tasks and sub-tasks within each Major Work Activity and the breakdown of questions assigned to the Tasks. The Interprovincial examination for this trade has 110 questions.

Task Matrix and Weightings

Major Work Activity A – Performs common occupational skills 7%

Task A-1 Maintains safe and healthy workplace 23%	Sub-task A-1.01 Maintains clean and safe work environment	Sub-task A-1.02 Uses personal protective equipment (PPE) and safety equipment	Sub-task A-1.03 Participates in healthy and respectful work environment
Task A-2 Uses tools and equipment 40%	Sub-task A-2.01 Uses hand tools	Sub-task A-2.02 Uses power tools	Sub-task A-2.03 Uses powder-actuated tools
	Sub-task A-2.04 Uses measuring and testing equipment	Sub-task A-2.05 Uses hoisting, rigging and lifting equipment	Sub-task A-2.06 Uses access equipment
	Sub-task A-2.07 Uses soldering, flaring and threading equipment		
Task A-3 Organizes work 37%	Sub-task A-3.01 Interprets drawings, codes and documentation	Sub-task A-3.02 Completes documentation	Sub-task A-3.03 Performs basic distribution layout
	Sub-task A-3.04 Organizes material and components	Sub-task A-3.05 Commissions appliances and components	

Task A-4 Maintains continuous learning 0%	Sub-task A-4.01 Upskills in new trade practices and procedures	Sub-task A-4.02 Upskills in emerging technologies
Task A-5 Uses communication and mentoring techniques 0%	Sub-task A-5.01 Uses communication techniques	Sub-task A-5.02 Uses mentoring techniques

Major Work Activity B – Installs fuel supply and storage systems 18%

Task B-6 Installs fuel storage tanks 50%	Sub-task B-6.01 Selects fuel storage tanks	Sub-task B-6.02 Determines fuel storage tank location	Sub-task B-6.03 Positions fuel storage tanks
	Sub-task B-6.04 Installs fuel storage tank components	Sub-task B-6.05 Installs fill and vent pipes	
Task B-7 Installs fuel supply systems 50%	Sub-task B-7.01 Selects fuel supply components	Sub-task B-7.02 Installs fuel supply components	

Major Work Activity C – Installs oil-fired heating systems 21%

Task C-8 Installs and retrofits oil-fired and wood/oil appliances and components 23%	Sub-task C-8.01 Selects appliances	Sub-task C-8.02 Positions appliances	Sub-task C-8.03 Installs components on appliance
	Sub-task C-8.04 Connects fuel supply to appliance	Sub-task C-8.05 Connects electrical supply to appliance	Sub-task C-8.06 Connects vent/exhaust piping to appliance
	Sub-task C-8.07 Installs dump zones	Sub-task C-8.08 Connects drain to appliance	
Task C-9 Installs and retrofits forced-air heating systems 35%	Sub-task C-9.01 Assembles ductwork	Sub-task C-9.02 Installs ductwork	
Task C-10 Installs and retrofits hydronic heating systems 43%	Sub-task C-10.01 Assembles boilers	Sub-task C-10.02 Installs hydronic distribution system and heating system components	Sub-task C-10.03 Installs indirect water heater
	Sub-task C-10.04 Installs oil-fired water heater		

Major Work Activity D – Installs venting systems, and combustion air and make-up air equipment and components 15%

Task D-11 Installs venting systems 50%	Sub-task D-11.01 Selects venting system	Sub-task D-11.02 Prepares locations for termination	Sub-task D-11.03 Installs venting components
	Sub-task D-11.04 Secures venting system to structure		
Task D-12 Installs equipment and components for combustion air and make-up air 50%	Sub-task D-12.01 Selects equipment and components	Sub-task D-12.02 Prepares location for equipment and components for combustion air and make-up air	Sub-task D-12.03 Assembles equipment and components
	Sub-task D-12.04 Secures equipment and components to structure		

Major Work Activity E – Installs and tests electrical and electronic systems 20%

Task E-13 Installs electrical and electronic systems 47%	Sub-task E-13.01 Selects controls and components	Sub-task E-13.02 Selects location of controls and components	Sub-task E-13.03 Installs controls and components
Task E-14 Tests electrical and electronic systems 53%	Sub-task E-14.01 Cycles appliance controls	Sub-task E-14.02 Checks operating and safety controls	Sub-task E-14.03 Checks accessories and components
	Sub-task E-14.04 Sets up operating parameters		

Major Work Activity F – Performs maintenance, diagnosis, repair and removal 19%

Task F-15 Maintains oil-fired heating systems and components 25%	Sub-task F-15.01 Checks oil-fired heating system and components	Sub-task F-15.02 Cleans oil-fired heating appliances and components	Sub-task F-15.03 Changes preventative maintenance components
	Sub-task F-15.04 Lubricates moving components		
Task F-16 Diagnoses oil-fired heating systems and components 36%	Sub-task F-16.01 Checks for electrical problems	Sub-task F-16.02 Checks for burner problems	Sub-task F-16.03 Checks for distribution problems
	Sub-task F-16.04 Checks for problems with distribution system for combustion air and make-up air		
Task F-17 Repairs oil-fired heating systems and components 30%	Sub-task F-17.01 Corrects electrical problems	Sub-task F-17.02 Corrects burner problems	Sub-task F-17.03 Corrects distribution problems
Task F-18 Removes appliances and components 10%	Sub-task F-18.01 Decommissions appliances and components	Sub-task F-18.02 Disposes of waste products	

Harmonization of Apprenticeship Training

Provincial and territorial apprenticeship authorities are each responsible for their respective apprenticeship programs. In the spirit of continual improvement, and to facilitate mobility among apprentices in Canada, participating authorities have agreed to work towards harmonizing certain aspects of their programs where possible. After consulting with their stakeholders in the trade, they have reached consensus on the following elements. Note that implementation of these elements may vary from jurisdiction to jurisdiction, depending on their own circumstances. For more information on the implementation in any province and territory, please contact that jurisdiction's apprenticeship authority.

1. Trade Name

The official Red Seal name for this trade is Oil Heat System Technician.

2. Number of Levels of Apprenticeship

The number of levels of technical training recommended for this trade is 3 (three).

3. Total Training Hours

The total hours of training, including both on-the-job and in-school training for this trade is 5400.

4. Sequencing Topics and Related Sub-tasks

The topic titles in the table below are placed in a column for each apprenticeship level for technical training. Each topic is accompanied by the sub-tasks and their reference number. The topics in the grey shaded cells represent those that are covered "in context" with other training in the subsequent years.

Level 1	Level 2	Level 3
Safe and Healthy Workplace 1.01 Maintains clean and safe work environment 1.02 Uses personal protective equipment (PPE) and safety equipment 1.03 Participates in healthy and respectful work environment		**Safe and Healthy Workplace** 1.02 Uses personal protective equipment (PPE) and safety equipment

Level 1	Level 2	Level 3
Tools and Equipment 2.01 Uses hand tools 2.02 Uses power tools 2.03 Uses powder-actuated tools 2.04 Uses measuring and testing equipment 2.05 Uses hoisting, rigging and lifting equipment 2.06 Uses access equipment 2.07 Uses soldering, flaring and threading equipment		**Tools and Equipment** 2.04 Uses measuring and testing equipment 2.07 Uses soldering, flaring and threading equipment
Organizes Work 3.01 Interprets drawings, codes and documentation 3.02 Completes documentation 3.03 Performs basic distribution layout	**Organizes Work** 3.03 Performs basic distribution layout 3.04 Organizes material and components	**Organizes Work** 3.04 Organizes material and components 3.05 Commissions appliances and components
		Continuous Learning 4.01 Upskills in new trade practices and procedures 4.02 Upskills in emerging technologies
Communication and Mentoring 5.01 Uses communication techniques	**Communication and Mentoring** 5.01 Uses communication techniques	**Communication and Mentoring** 5.02 Uses mentoring techniques

Level 1	Level 2	Level 3
Fuel Storage Tank Installation 6.01 Selects fuel storage tanks 6.02 Determines fuel storage tank location 6.03 Positions fuel storage tanks 6.04 Installs fuel storage tank components 6.05 Installs fill and vent pipes		
Fuel Supply System Installation 7.01 Selects fuel supply components 7.02 Installs fuel supply components	**Fuel Supply System Installation** 7.01 Selects fuel supply components 7.02 Installs fuel supply components	**Fuel Supply System Installation** 7.01 Selects fuel supply components 7.02 Installs fuel supply components
Oil-Fired and Wood/Oil Appliances and Components - Installation and Retrofit 8.04 Connects fuel supply to appliance 8.05 Connects electrical supply to appliance 8.06 Connects vent/exhaust piping to appliance	**Oil-Fired and Wood/Oil Appliances and Components - Installation and Retrofit** 8.01 Selects appliances 8.02 Positions appliances 8.03 Installs components on appliance 8.04 Connects fuel supply to appliance 8.05 Connects electrical supply to appliance 8.06 Connects vent/exhaust piping to appliance 8.08 Connects drain to appliance	**Oil-Fired and Wood/Oil Appliances and Components - Installation and Retrofit** 8.01 Selects appliances 8.03 Installs components on appliance 8.04 Connects fuel supply to appliance 8.05 Connects electrical supply to appliance 8.06 Connects vent/exhaust piping to appliance 8.07 Installs dump zones
Forced-Air Heating System - Installation and Retrofit 9.01 Assembles ductwork	**Forced-Air Heating System - Installation and Retrofit** 9.01 Assembles ductwork 9.02 Installs ductwork	**Forced-Air Heating System - Installation and Retrofit** 9.01 Assembles ductwork

Level 1	Level 2	Level 3
	Hydronic Heating System - Installation and Retrofit 10.01 Assembles boilers 10.02 Installs hydronic distribution system and heating system components 10.03 Installs indirect water heater 10.04 Installs oil-fired water heater	
	Venting System Installation 11.01 Selects venting system 11.02 Prepares locations for termination 11.03 Installs venting components 11.04 Secures venting system to structure	**Venting System Installation** 11.02 Prepares locations for termination 11.03 Installs venting components
Combustion Air and Make-Up Air Equipment and Component Installation 12.01 Selects equipment and components 12.02 Prepares location for equipment and components for combustion air and make-up air 12.04 Secures equipment and components to structure	**Combustion Air and Make-Up Air Equipment and Component Installation** 12.01 Selects equipment and components 12.03 Assembles equipment and components 12.04 Secures equipment and components to structure	**Combustion Air and Make-Up Air Equipment and Component Installation** 12.02 Prepares location for equipment and components for combustion air and make-up air
	Electrical and Electronic System Installation 13.01 Selects controls and components 13.02 Selects location of controls and components 13.03 Installs controls and components	

Level 1	Level 2	Level 3
Electrical and Electronic System Testing 14.03 Checks accessories and components	**Electrical and Electronic System Testing** 14.01 Cycles appliance controls 14.02 Checks operating and safety controls 14.03 Checks accessories and components 14.04 Sets up operating parameters	
Oil-Fired Heating System and Component Maintenance 15.02 Cleans oil-fired heating appliances and components 15.03 Changes preventative maintenance components 15.04 Lubricates moving components	**Oil-Fired Heating System and Component Maintenance** 15.01 Checks oil-fired heating system and components 15.02 Cleans oil-fired heating appliances and components 15.03 Changes preventative maintenance components 15.04 Lubricates moving components	**Oil-Fired Heating System and Component Maintenance** 15.01 Checks oil-fired heating system and components 15.02 Cleans oil-fired heating appliances and components 15.03 Changes preventative maintenance components
Oil-Fired Heating System and Component Diagnosis 16.01 Checks for electrical problems 16.04 Checks for problems with distribution system for combustion air and make-up air	**Oil-Fired Heating System and Component Diagnosis** 16.01 Checks for electrical problems 16.02 Checks for burner problems 16.03 Checks for distribution problems 16.04 Checks for problems with distribution system for combustion air and make-up air	**Oil-Fired Heating System and Component Diagnosis** 16.01 Checks for electrical problems 16.02 Checks for burner problems 16.03 Checks for distribution problems 16.04 Checks for problems with distribution system for combustion air and make-up air

Level 1	Level 2	Level 3
Oil-Fired Heating System and Component Repair 17.01 Corrects electrical problems 17.03 Corrects distribution problems	**Oil-Fired Heating System and Component Repair** 17.01 Corrects electrical problems 17.02 Corrects burner problems 17.03 Corrects distribution problems	**Oil-Fired Heating System and Component Repair** 17.01 Corrects electrical problems 17.02 Corrects burner problems 17.03 Corrects distribution problems
Appliance and Component Removal 18.01 Decommissions appliances and components 18.02 Disposes of waste products	**Appliance and Component Removal** 18.01 Decommissions appliances and components	**Appliance and Component Removal** 18.02 Disposes of waste products

Major Work Activity A – Performs common occupational skills

Task A-1 Maintains safe and healthy workplace

Task Descriptor

Oil heat system technicians must be able to recognize hazards and protect themselves and others. They must also protect property and the environment. They must participate in ensuring a healthy and inclusive workplace.

A-1.01 Maintains clean and safe work environment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-1.01.01P	recognize workplace **hazards**	workplace **hazards** are recognized according to hazard assessment
A-1.01.02P	recognize and report unsafe conditions	unsafe conditions are recognized and reported according to company policies and procedures, and jurisdictional regulations so that they may be rectified
A-1.01.03P	maintain clean and tidy workplace	clean and tidy workplace is maintained to avoid injuries to self and others
A-1.01.04P	manage **hazardous materials**	**hazardous materials** are managed according to company policies and procedures, and safe work practices and regulations

Range of Variables (include, but not limited to)

hazards: electrical shock, confined spaces, fire, asbestos, silica fibre, heavy lifting, oil spills, sharp edges, flying debris, weather, extreme working temperatures, power lines, excavations, excessive loads, equipment damage, uneven ground, slippery surfaces

hazardous materials: combustible materials, biological contaminants (i.e., mould, bacteria), carcinogenic products, toxic products, corrosive chemicals, batteries

Knowledge

Reference Code	Learning Outcomes and Objectives
A-1.01.01L	demonstrate knowledge of maintaining clean and safe work environment
a.	identify workplace **hazards**
b.	describe procedures to maintain safe work environment
c.	describe procedures to recognize and rectify potential dangers related to workplace **hazards**
A-1.01.02L	demonstrate knowledge of training and certification requirements to maintain clean and safe work environment
a.	identify training and certification requirements to maintain clean and safe work environment
A-1.01.03L	demonstrate knowledge of regulatory requirements pertaining to workplace health and safety
a.	identify and interpret codes, standards and regulations pertaining to workplace health and safety
A-1.01.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

hazards: electrical shock, confined spaces, fire, asbestos, silica fibre, heavy lifting, oil spills, sharp edges, flying debris, weather, extreme working temperatures, power lines, excavations, excessive loads, equipment damage, uneven ground, slippery surfaces

A-1.02 Uses personal protective equipment (PPE) and safety equipment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-1.02.01P	inspect and identify expired, defective or damaged PPE and safety equipment	expired, defective or damaged PPE is identified, removed from service, repaired, replaced and recertified according to company policies and procedures, and jurisdictional regulations
A-1.02.02P	select, wear and ensure proper fit of PPE	PPE is selected, worn and fitted according to task, site and company policies and procedures, manufacturers' specifications and jurisdictional regulations
A-1.02.03P	locate and use safety equipment	safety equipment is located and used according to job requirements, hazard assessments, manufacturers' specifications and jurisdictional regulations
A-1.02.04P	maintain PPE and safety equipment	PPE and safety equipment are maintained according to manufacturers' specifications
A-1.02.05P	store PPE and safety equipment	PPE and safety equipment are stored according to manufacturers' specifications, and company policies and procedures

Knowledge

Reference Code	Learning Outcomes and Objectives
A-1.02.01L	demonstrate knowledge of PPE and safety equipment, their characteristics, applications, maintenance and procedures for use
a.	identify types of PPE and safety equipment, and describe their characteristics and applications
b.	interpret information pertaining to PPE and safety equipment found in specifications
c.	describe procedures to use PPE and safety equipment
d.	describe procedures to maintain and store PPE and safety equipment
A-1.02.02L	demonstrate knowledge of training and certification requirements to use PPE and safety equipment
a.	identify training and certification requirements to use PPE and safety equipment
A-1.02.03L	demonstrate knowledge of regulatory requirements pertaining to PPE and safety equipment
a.	identify standards and regulations pertaining to PPE and safety equipment
A-1.02.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

A-1.03 Participates in healthy and respectful work environment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-1.03.01P	perform self-assessment of physical and mental health	self-assessment of physical and mental health is performed, and signs and symptoms of fatigue and stress are identified
A-1.03.02P	identify **supports and resources** for personal mental health	**supports and resources** for personal mental health are identified

Reference Code	Performance Criteria	Evidence of Attainment
A-1.03.03P	identify **techniques to manage health and wellness**	**techniques to manage health and wellness** are identified
A-1.03.04P	assess **personal job satisfaction**	**personal job satisfaction** is assessed, and concerns are discussed with management
A-1.03.05P	create plan to manage work-life balance	plan is created to manage work-life balance and discussed with supervisors
A-1.03.06P	support and promote anti-**harassment** and anti-**discrimination** practices in workplace	workplace is **harassment** and **discrimination**-free

Range of Variables (include, but not limited to)

supports and resources: professional networks and associations, collaboration with colleagues and community members, counselling, mentoring, peer support groups

techniques to manage health and wellness: practicing techniques for remaining physically, mentally and emotionally "fit for work"; managing personal and work life; recognizing effects and consequences of alcohol and drugs before, during and after work; using personal hygiene habits

personal job satisfaction: financial, hours, flexibility, supports, working conditions

harassment: as defined by the Canadian and jurisdictional Human Rights Commissions

discrimination: as defined by the Canadian Human Rights Act and jurisdictional human rights laws

Knowledge

Reference Code	Learning Outcomes and Objectives
A-1.03.01L	demonstrate knowledge of personal health and well-being
a.	describe how personal health and well-being impacts professional practice and healthy work environments
b.	identify and describe physical and emotional requirements of trade
c.	identify workplace stressors
d.	describe elements of healthy organizational cultures and importance of sense of collaboration and community
e.	identify **behaviours** that affect physical and mental health

Reference Code	Learning Outcomes and Objectives
A-1.03.02L	demonstrate knowledge of **techniques to manage health and wellness**
a.	describe stress and time management techniques
b.	describe **techniques to manage health and wellness**
A-1.03.03L	demonstrate knowledge of professionalism and **professional ethics**
a.	identify characteristics and purpose of professionalism and **professional ethics**
b.	describe **factors** that impact professionalism
c.	identify **elements of codes of ethics, codes of conduct and other professional standards**, and describe their characteristics and applications
A-1.03.04L	demonstrate knowledge of value of diversity, equity, inclusion and belonging in workplace
a.	define diversity and differences between individuals
b.	define equity and importance of individual's access to opportunities and resources
c.	define inclusion and creation of respectful work environments
d.	identify communication that constitutes **harassment** and **discrimination**

Range of Variables (include, but not limited to)

behaviours: diet, fitness, sleep, managing stress and emotions

techniques to manage health and wellness: practicing techniques for remaining physically, mentally and emotionally "fit for work"; managing personal and work life; recognizing effects and consequences of alcohol and drugs before, during and after work; using personal hygiene habits

professional ethics: are personal and/or corporate standards of behavior expected by professionals, values and guiding principles to guide individuals in performing job functions

factors: presentation of self (appearance, hygiene), communication (verbal, written, body language, social media profile), conduct

elements of codes of ethics, codes of conduct and other professional standards: professional obligations; how to engage in the practice in a professional way to signal accountability to the public, maintain public trust and credibility of the profession; define misconduct; support and promote anti-harassment and anti-discrimination practices

harassment: as defined by the Canadian and jurisdictional Human Rights Commissions

discrimination: as defined by the Canadian Human Rights Act and jurisdictional human rights laws

Task A-2 Uses tools and equipment

Task Descriptor

The use of tools and equipment is important to oil heat system technicians in order to properly perform their tasks. Using, maintaining and storing tools properly increases efficiency, productivity, safety and quality of work.

A-2.01 Uses hand tools

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-2.01.01P	select hand tools	hand tools are selected according to task
A-2.01.02P	inspect hand tools	hand tools are inspected, and damaged or worn hand tools are removed from service
A-2.01.03P	maintain hand tools	hand tools are maintained according to manufacturers' specifications
A-2.01.04P	organize hand tools	hand tools are organized according to industry best practices
A-2.01.05P	store hand tools	hand tools are stored according to industry best practices

Knowledge

Reference Code	Learning Outcomes and Objectives
A-2.01.01L	demonstrate knowledge of hand tools, their characteristics, applications, maintenance and procedures for use
a.	identify hazards and describe safe work practices pertaining to use of hand tools

Reference Code	Learning Outcomes and Objectives
	b. identify types of hand tools and describe their characteristics and applications
	c. describe procedures to inspect, use, maintain, organize and store hand tools

A-2.02 Uses power tools

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-2.02.01P	select power tools	power tools are selected according to task
A-2.02.02P	inspect power tools	power tools are inspected, and damaged or worn power tools are identified and removed from service
A-2.02.03P	inspect **power tool parts**	**power tool parts** are inspected, and defects, faults and wear are identified and corrected
A-2.02.04P	maintain power tools	power tools are maintained according to manufacturers' specifications to ensure safe operation
A-2.02.05P	organize power tools	power tools are organized according to industry best practices
A-2.02.06P	store power tools	power tools are stored according to manufacturers' specifications and industry best practices

Range of Variables (include, but not limited to)

power tool parts: cutting blades, bits, dies, drill chucks

Knowledge

Reference Code	Learning Outcomes and Objectives
A-2.02.01L	demonstrate knowledge of power tools, their **parts**, characteristics, applications, maintenance and procedures for use
a.	identify hazards and describe safe work practices pertaining to use of power tools
b.	identify types of power tools and their **parts**, and describe their characteristics and applications
c.	describe procedures to inspect, use, maintain, organize and store power tools
A-2.02.02L	demonstrate knowledge of training and certification requirements to use power tools
a.	identify training and certification requirements to use power tools

Range of Variables (include, but not limited to)

power tool parts: cutting blades, bits, dies, drill chucks

A-2.03 Uses powder-actuated tools

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-2.03.01P	select powder-actuated tools	powder-actuated tools are selected according to task
A-2.03.02P	inspect powder-actuated tools	powder-actuated tools are inspected, and damaged or worn powder-actuated tools are identified and removed from service
A-2.03.03P	maintain powder-actuated tools	powder-actuated tools are maintained according to manufacturers' specifications

Reference Code	Performance Criteria	Evidence of Attainment
A-2.03.04P	organize powder-actuated tools	powder-actuated tools are organized according to industry best practices
A-2.03.05P	store powder-actuated tools	powder-actuated tools are stored according to manufacturers' specifications and industry best practices

Knowledge

Reference Code	Learning Outcomes and Objectives
A-2.03.01L	demonstrate knowledge of powder-actuated tools, their characteristics, applications, maintenance and procedures for use
a.	identify hazards and describe safe work practices pertaining to use of powder-actuated tools
b.	identify types of powder-actuated tools and describe their characteristics and applications
c.	describe operating principles of powder-actuated tools
d.	identify types of boosters and loads, and describe their characteristics and applications
e.	describe procedures to inspect, use, maintain, organize and store powder-actuated tools
A-2.03.02L	demonstrate knowledge of training and certification requirements to use powder-actuated tools
a.	identify training and certification requirements to use powder-actuated tools
A-2.03.03L	demonstrate knowledge of regulatory requirements pertaining to powder-actuated tools
a.	identify codes, standards and regulations pertaining to powder-actuated tools

A-2.04 Uses measuring and testing equipment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-2.04.01P	select measuring and testing equipment	measuring and testing equipment are selected according to task
A-2.04.02P	perform basic calculations	basic calculations are performed according to task
A-2.04.03P	convert between imperial and metric measurements	conversions between imperial and metric measurements are performed
A-2.04.04P	interpret measurements	measurements are interpreted
A-2.04.05P	inspect measuring and testing equipment	measuring and testing equipment are inspected, and damaged or worn measuring and testing equipment are identified and removed from service
A-2.04.06P	maintain measuring and testing equipment	measuring and testing equipment are maintained according to manufacturers' specifications
A-2.04.07P	verify calibration of measuring and testing equipment	calibration of measuring and testing equipment is verified after third-party calibration
A-2.04.08P	organize measuring and testing equipment	measuring and testing equipment are organized according to industry best practices
A-2.04.09P	store measuring and testing equipment	measuring and testing equipment are stored in clean and dry location according to manufacturers' specifications and industry best practices

Knowledge

Reference Code	Learning Outcomes and Objectives
A-2.04.01L	demonstrate knowledge of measuring and testing equipment, their characteristics, applications, maintenance and procedures for use
a.	identify hazards and describe safe work practices pertaining to use of measuring and testing equipment
b.	identify types of measuring and testing equipment and describe their characteristics and applications
c.	describe operating principles of measuring and testing equipment
d.	describe procedures to inspect, use, maintain, organize and store measuring and testing equipment
A-2.04.02L	demonstrate knowledge of performing calculations and interpreting measurements
a.	describe procedures to perform basic calculations
b.	describe procedures to interpret measurements
c.	describe imperial and metric systems of measurements and how to perform conversions
A-2.04.03L	demonstrate knowledge of regulatory requirements pertaining to measuring and testing equipment
a.	identify codes, standards and regulations pertaining to measuring and testing equipment
A-2.04.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

A-2.05 Uses hoisting, rigging and lifting equipment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-2.05.01P	select and use hoisting, rigging and lifting equipment	hoisting, rigging and lifting equipment are selected and used according to task and **factors**
A-2.05.02P	inspect chains, straps and slings	chains, straps and slings are inspected, and worn or damaged equipment is removed from service
A-2.05.03P	identify hazards	hazards are identified according to hazard risk assessment
A-2.05.04P	verify load size and parameters	load size and parameters are verified according to job and manufacturers' specifications
A-2.05.05P	identify safe lifting locations or points	safe lifting locations or points are identified
A-2.05.06P	guide and position loads	loads are guided and positioned using tag lines
A-2.05.07P	rig loads	loads are rigged according to rigging procedures, **factors**, manufacturers' specifications and jurisdictional regulations to ensure safety
A-2.05.08P	communicate with equipment operators	equipment operators are communicated with using approved **communication methods**
A-2.05.09P	maintain hoisting, rigging and lifting equipment	hoisting, rigging and lifting equipment are maintained according to manufacturers' specifications
A-2.05.10P	store hoisting, rigging and lifting equipment	hoisting, rigging and lifting equipment are stored according to manufacturers' specifications and industry best practices

Range of Variables (include, but not limited to)

factors (when selecting): load characteristics, environment, safety, distance to be travelled, obstacles
factors (when rigging): load characteristics, equipment and accessories, environmental factors, anchor points, sling angles
communication methods: hand signals, electronic communications, audible/visual

Knowledge

Reference Code	Learning Outcomes and Objectives
A-2.05.01L	demonstrate knowledge of hoisting, rigging and lifting equipment, their accessories, characteristics, applications, maintenance and procedures for use
a.	identify types of hoisting, rigging and lifting equipment and their accessories, and describe their characteristics and applications
b.	describe operating principles of hoisting, rigging and lifting equipment
c.	interpret information pertaining to hoisting, rigging and lifting equipment found in specifications
d.	identify hazards, and describe safe work practices pertaining to use of hoisting, rigging and lifting equipment
e.	identify factors to consider when selecting hoisting, rigging and lifting equipment
f.	describe procedures to inspect, use, maintain and store hoisting, rigging and lifting equipment
A-2.05.02L	demonstrate knowledge of procedures and techniques used to perform hoisting, rigging and lifting operations
a.	describe procedures to rig and secure a load (material and equipment) for lifting and hoisting
b.	describe **procedures to perform lift**
c.	describe procedures to perform calculations to determine weight of load
d.	identify types of knots, hitches, splices and bends, and describe their applications and associated procedures
e.	identify and interpret **communication methods** used during hoisting, rigging and lifting, and describe their associated procedures
f.	describe **procedures to ensure work area is safe for lifting**

Reference Code	Learning Outcomes and Objectives
A-2.05.03L	demonstrate knowledge of training and certification requirements pertaining to hoisting, rigging and lifting
a.	identify training and certification requirements pertaining to hoisting, rigging and lifting
A-2.05.04L	demonstrate knowledge of regulatory requirements pertaining to hoisting, rigging and lifting equipment
a.	identify codes, standards and regulations pertaining to hoisting, rigging and lifting equipment

Range of Variables (include, but not limited to)

procedures to perform lift: load determination, communication methods, pre-lift checks, placement of load, post-lift inspection

communication methods: hand signals, electronic communications, audible/visual

procedures to ensure work area is safe for lifting: supervision of lift, securing work area, communication

A-2.06 Uses access equipment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-2.06.01P	select and use access equipment	access equipment is selected and used within operating limitations according to task, site conditions, jurisdictional regulations, manufacturers' specifications and certification requirements
A-2.06.02P	inspect and document pre-use condition of access equipment	access equipment is inspected, and pre-use condition documentation is completed
A-2.06.03P	identify hazards when erecting ladders and scaffolding	hazards are identified when erecting ladders and scaffolding, and mitigated

Reference Code	Performance Criteria	Evidence of Attainment
A-2.06.04P	erect, secure, level and dismantle access equipment	access equipment is erected, secured, levelled and dismantled according to jurisdictional regulations, and company policies and procedures
A-2.06.05P	inspect access equipment	access equipment is inspected, and worn, damaged or uncertified access equipment is removed from service
A-2.06.06P	maintain access equipment	access equipment is maintained according to manufacturers' specifications and industry best practices
A-2.06.07P	store access equipment	access equipment is stored according to company polices and procedures, manufacturers' specifications and industry best practices

Knowledge

Reference Code	Learning Outcomes and Objectives
A-2.06.01L	demonstrate knowledge of access equipment, their characteristics, applications, maintenance and procedures for use
a.	identify types of access equipment and describe their characteristics and applications
b.	identify hazards and describe safe work practices pertaining to use of access equipment
c.	describe operating principles of access equipment
d.	interpret information pertaining to access equipment found in manufacturers' specifications
e.	describe procedures to inspect, use, maintain and store access equipment
A-2.06.02L	demonstrate knowledge of training and certification requirements to use access equipment
a.	identify training and certification requirements to use access equipment

Reference Code	Learning Outcomes and Objectives
A-2.06.03L	demonstrate knowledge of regulatory requirements pertaining to access equipment
a.	identify codes, standards and regulations pertaining to access equipment

A-2.07 Uses soldering, flaring and threading equipment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-2.07.01P	select soldering, flaring and threading equipment	soldering, flaring and threading equipment are selected according to task
A-2.07.02P	inspect soldering, flaring and threading equipment	soldering, flaring and threading equipment are inspected, and worn, damaged or uncertified soldering, flaring and threading equipment is removed from service
A-2.07.03P	set up, adjust and shut down soldering, flaring and threading equipment	soldering, flaring and threading equipment are set up, adjusted and shut down according to manufacturers' specifications and industry best practices
A-2.07.04P	identify flammable materials	flammable materials are identified
A-2.07.05P	match **material** to specific component to be soldered, flared and threaded	**material** is matched to specific component to be soldered, flared and threaded according to task
A-2.07.06P	organize soldering, flaring and threading equipment	soldering, flaring and threading equipment are organized

Reference Code	Performance Criteria	Evidence of Attainment
A-2.07.07P	maintain soldering, flaring and threading equipment	soldering, flaring and threading equipment are maintained according to manufacturers' specifications and industry best practices
A-2.07.08P	store soldering, flaring and threading equipment	soldering, flaring and threading equipment are stored in clean and dry location according to company polices and procedures, manufacturers' specifications and industry best practices

Range of Variables (include, but not limited to)

materials: alloys, fluxes

Knowledge

Reference Code	Learning Outcomes and Objectives
A-2.07.01L	demonstrate knowledge of soldering, flaring and threading equipment, their characteristics, applications, maintenance and procedures for use
a.	identify types of soldering, flaring and threading equipment and describe their characteristics and applications
b.	identify types of **materials** used to solder, and describe their applications and procedures for use
c.	describe ventilation requirements when using soldering, flaring and threading equipment
d.	identify hazards and describe safe work practices pertaining to use of soldering, flaring and threading equipment
e.	describe operating principles of soldering, flaring and threading equipment
f.	interpret information pertaining to soldering, flaring and threading equipment found in manufacturers' specifications
g.	describe procedures to inspect, use, maintain and store soldering, flaring and threading equipment
h.	describe procedures to set up, adjust and shut down soldering, flaring and threading equipment

Range of Variables (include, but not limited to)

materials: alloys, fluxes

Task A-3 Organizes work

Task Descriptor
Oil heat system technicians organize their work to complete their tasks safely, efficiently and productively.

A-3.01 Interprets drawings, codes and documentation

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-3.01.01P	select and use drawing instruments	drawing instruments are selected and used according to task
A-3.01.02P	determine **equipment specifications**	**equipment specifications** are determined according to **specifications** and **drawings**
A-3.01.03P	determine equipment required	equipment required is determined according to design specifications and **drawings**
A-3.01.04P	scale **drawings**	**drawings** are scaled for placement of equipment and accessories, coring of holes and location of utilities
A-3.01.05P	scale imperial and metric measurements	imperial and metric measurements are scaled
A-3.01.06P	locate and interpret information in **drawings, codes, standards, regulations** and **documentation**	information in **drawings, codes, standards, regulations** and **documentation** are located and interpreted

Range of Variables (include, but not limited to)

equipment specifications: weight, size, service access locations, materials

specifications: site, manufacturers', engineers', contractors', clients'

drawings: blueprints, shop drawings, sketches, schematics

codes, standards and regulations: Canadian Standards Association (CSA) codes (Boiler, Pressure Vessel, and Pressure Piping Code [CSA B51], Installation Code for Oil-Burning Equipment [CSA B139 Series], Oil-Burning Equipment: General Requirements [CSA B140], Propane Storage and Handling Code [CSA B149], Installation Code for Hydronic Heating Systems [CSA B214], Installation Code for Solid Fuel Burning Appliances and Equipment [CSA B365], Manufactured Homes [CSA Z240 MH Series]); National Building Code of Canada (NBC); Canadian Electrical Code (CEC); National Plumbing Code of Canada (NPC); jurisdictional codes and regulations; National Fire Protection Association (NFPA); American National Standards Institute (ANSI); Underwriters Laboratory of Canada (ULC); Transportation of Dangerous Goods (TDG); Occupational Health and Safety (OHS); Workplace Hazardous Materials Information System (WHMIS); environmental regulations

documentation: permits, warranties, invoices, acts

Knowledge

Reference Code	Learning Outcomes and Objectives
A-3.01.01L	demonstrate knowledge of **drawings, codes, standards, regulations** and **documentation**, their characteristics and applications
a.	identify types of **drawings, codes, standards, regulations** and **documentation**, and describe their characteristics and applications
b.	identify **views used on drawings**
A-3.01.02L	demonstrate knowledge of procedures to interpret **drawings, codes, standards, regulations** and **documentation**
a.	describe procedures to locate and interpret **information found on drawings**, and in **codes, standards, regulations** and **documentation**
b.	identify and interpret **common symbols and abbreviations found on drawings**
c.	identify types of scales and describe their applications and procedures for use
d.	explain use of **drawings** and measurement scales
e.	describe procedures to convert between metric and imperial units of measurement
A-3.01.03L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify **codes, standards and regulations** that contribute to environmental protection

Range of Variables (include, but not limited to)

drawings: blueprints, shop drawings, sketches, schematics

codes, standards and regulations: Canadian Standards Association (CSA) codes (Boiler, Pressure Vessel, and Pressure Piping Code [CSA B51], Installation Code for Oil-Burning Equipment [CSA B139 Series], Oil-Burning Equipment: General Requirements [CSA B140], Propane Storage and Handling Code [CSA B149], Installation Code for Hydronic Heating Systems [CSA B214], Installation Code for Solid Fuel Burning Appliances and Equipment [CSA B365], Manufactured Homes [CSA Z240 MH Series]); National Building Code of Canada (NBC); Canadian Electrical Code (CEC); National Plumbing Code of Canada (NPC); jurisdictional codes and regulations; National Fire Protection Association (NFPA); American National Standards Institute (ANSI); Underwriters Laboratory of Canada (ULC); Transportation of Dangerous Goods (TDG); Occupational Health and Safety (OHS); Workplace Hazardous Materials Information System (WHMIS); environmental regulations

documentation: permits, warranties, invoices, acts

views used on drawings: elevation, plan, section, detail, isometric

information found on drawings: lines, legend, symbols and abbreviations, notes and specifications, schedules, scales

common symbols and abbreviations found on drawings: duct, welding, electrical, piping, architectural

A-3.02 Completes documentation

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-3.02.01P	complete **written and electronic documents**	**written and electronic documents** are completed according to jurisdictional regulations, and client and company policies and procedures
A-3.02.02P	use **documentation equipment** to complete electronic documents	**documentation equipment** is used to complete electronic documents

Range of Variables (include, but not limited to)

written and electronic documents: work orders, purchase orders, service invoices, warranties, inspection reports, environmental forms, permits, quotes, estimates
documentation equipment: computers, digital cameras, video cameras, smartphones, tablets, laptops

Knowledge

Reference Code	Learning Outcomes and Objectives
A-3.02.01L	demonstrate knowledge of **written and electronic documents**, their purpose, applications and use
a.	identify types and sources of **written and electronic documents**, and describe their applications
A-3.02.02L	demonstrate knowledge of procedures to complete documentation
a.	describe procedures to complete **written and electronic documents**
A-3.02.03L	demonstrate knowledge of regulatory requirements to complete documentation
a.	identify codes, standards and regulations pertaining to documentation
A-3.02.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify **written and electronic documents** that contribute to environmental protection

Range of Variables (include, but not limited to)

written and electronic documents: work orders, purchase orders, service invoices, warranties, inspection reports, environmental forms, permits, quotes, estimates

A-3.03 Performs basic distribution layout

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-3.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task
A-3.03.02P	identify **factors** to determine basic distribution layout	**factors** to determine basic distribution layout are identified according to calculations, drawings, and job requirements and specifications
A-3.03.03P	take worksite measurements	worksite measurements are taken for equipment and components, and their location/orientation is verified according to jurisdictional regulations and for serviceability and overall function
A-3.03.04P	calculate heat loss and heat gain	heat loss and heat gain are calculated according to task
A-3.03.05P	determine location of piping and ducting	location of piping and ducting are determined according to drawings, calculations and task

Range of Variables (include, but not limited to)

factors: building size and construction, application, type of appliance and components, heat loss, occupants, geographical location, wind factor

Knowledge

Reference Code	Learning Outcomes and Objectives
A-3.03.01L	demonstrate knowledge of procedures to perform basic distribution layout
a.	identify tools and equipment used to perform basic distribution layout, and describe their procedures for use

Reference Code	Learning Outcomes and Objectives
b.	identify hazards, and describe safe work practices to perform basic distribution layout
c.	describe procedures to perform basic distribution layout
d.	determine **factors** and interpret information pertaining to layouts found on drawings and specifications
e.	describe procedures to take worksite measurements
f.	describe procedures to calculate heat loss and heat gain
g.	describe procedures to determine location of piping and ducting
A-3.03.02L	demonstrate knowledge of regulatory requirements pertaining to basic distribution layout
a.	identify codes, standards and regulations pertaining to basic distribution layout

Range of Variables (include, but not limited to)

factors: building size and construction, application, type of appliance and components, heat loss, occupants, geographical location, wind factor

A-3.04 Organizes material and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-3.04.01P	select and use tools and equipment	tools and equipment are selected and used according to task
A-3.04.02P	select material and components	material and components are selected according to job specifications
A-3.04.03P	prepare material and components	material and components are prepared according to task
A-3.04.04P	order material and components	material and components are ordered according to job specifications

Reference Code	Performance Criteria	Evidence of Attainment
A-3.04.05P	take worksite measurements	worksite measurements are taken according to task
A-3.04.06P	clean pipes and fittings	pipes and fittings are cleaned according to industry best practices

Knowledge

Reference Code	Learning Outcomes and Objectives
A-3.04.01L	demonstrate knowledge of materials and components, their characteristics, applications and operation
a.	identify types of materials and components, and describe their characteristics and applications
b.	describe operating principles of materials and components
c.	interpret information pertaining to materials and components found on drawings and specifications
A-3.04.02L	demonstrate knowledge of procedures to organize materials and components
a.	identify tools and equipment used to organize materials and components, and describe their procedures for use
b.	describe procedures to select and prepare materials and components
c.	describe procedures to order materials and components
d.	describe procedures to take worksite measurements
e.	describe procedures to clean pipes and fittings

A-3.05 Commissions appliances and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-3.05.01P	select and use tools and equipment	tools and equipment are selected and used according to task
A-3.05.02P	verify appliance and component operation	appliance and component operation is verified according to testing and measurements, and manufacturers' specifications
A-3.05.03P	verify system operation	system operation is verified by measuring system conditions according to site conditions and manufacturers' specifications
A-3.05.04P	perform system analysis	system analysis is performed according to industry best practices and codes, standards and regulations
A-3.05.05P	perform visual inspection	visual inspection is performed to identify defects in system

Knowledge

Reference Code	Learning Outcomes and Objectives
A-3.05.01L	demonstrate knowledge of appliances and components, their characteristics, applications and operation
a.	identify types of appliances and components, and describe their characteristics and applications
b.	describe operating principles of appliances and components
c.	interpret information pertaining to appliances and their components found on drawings and specifications

Reference Code	Learning Outcomes and Objectives
A-3.05.02L	demonstrate knowledge of procedures to commission appliances and components
a.	identify tools and equipment used to commission appliances and components, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to commissioning appliances and components
c.	describe procedures to commission appliances and components
d.	describe procedures to inspect appliances and components
A-3.05.03L	demonstrate knowledge of regulatory requirements pertaining to commissioning of appliances and components
a.	identify codes, standards and regulations pertaining to commissioning of appliances and components
A-3.05.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Task A-4 Maintains continuous learning

Task Descriptor

Oil heat system technicians must stay current on building science principles, sustainable and industry best practices, and learn about emerging technologies being introduced in the trade. They need to keep informed about new and changing codes and regulations, types of equipment, energy sources and materials.

A-4.01 Upskills in new trade practices and procedures

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-4.01.01P	apply **continuous learning methods**	**continuous learning methods** are applied
A-4.01.02P	develop and maintain personal and professional development plan	personal and professional development plan is developed and maintained with established learning goals (short and long term) and time frames
A-4.01.03P	identify available **supports and resources** for learning	available **supports and resources** for learning are identified

Range of Variables (include, but not limited to)

continuous learning methods: actively engaging in performance review processes and taking action to address feedback; seeking out and actively participating in and embracing learning opportunities (seminars, webinars, trainings, podcasts, independent research); maintaining all required certifications and training; upgrading and maintaining computer and technology skills; sharing learning outcomes and concepts with others; transferring knowledge into practice

supports and resources: professional networks and associations, manufacturers' seminars, collaboration with colleagues and community members, counselling, mentoring, peer support groups, online resources, trade shows

Knowledge

Reference Code	Learning Outcomes and Objectives
A-4.01.01L	demonstrate knowledge of upskilling in new trade practices and procedures
a.	identify **continuous learning methods**
b.	explain importance of staying current on new trade practices and procedures
c.	identify **supports and resources** for learning
A-4.01.02L	demonstrate knowledge of personal and professional development plan
a.	identify **elements of a professional portfolio**
b.	identify link between professionalism and continuous learning
c.	describe how to assess personal learning needs
d.	identify **factors** that may impact learning needs and goals

Range of Variables (include, but not limited to)

continuous learning methods: actively engaging in performance review processes and taking action to address feedback; seeking out and actively participating in and embracing learning opportunities (seminars, webinars, trainings, podcasts, independent research); maintaining all required certifications and training; upgrading and maintaining computer and technology skills; sharing learning outcomes and concepts with others; transferring knowledge into practice

supports and resources: professional networks and associations, manufacturers' seminars, collaboration with colleagues and community members, counselling, mentoring, peer support groups, online resources, trade shows

elements of a professional portfolio: résumé, certificates, licenses, diplomas, degrees, transcripts, marketable skills, professional accomplishments, work samples, awards, references

factors: new technology, sector trends and practices, skills updating, legislative and regulatory changes

A-4.02 Upskills in emerging technologies

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-4.02.01P	read **information** about latest advancements and emerging technologies	**information** about latest advancements and emerging technologies is read to stay informed
A-4.02.02P	attend seminars, webinars and information sessions	seminars, webinars and information sessions organized by equipment manufacturers, suppliers, unions and employers are attended
A-4.02.03P	share **information** with colleagues and management on new equipment	**information** on new equipment is shared with colleagues and management, and advantages are explained

Range of Variables (include, but not limited to)

information: manufacturers' literature, online resources, trade journals and magazines

Knowledge

Reference Code	Learning Outcomes and Objectives
A-4.02.01L	demonstrate knowledge of upskilling in emerging technologies
a.	identify types of **information** on emerging technologies
b.	explain importance of staying current on emerging technologies

Range of Variables (include, but not limited to)

information: manufacturers' literature, online resources, trade journals and magazines

Task A-5 Uses communication and mentoring techniques

Task Descriptor

Learning in the trades is done primarily in the workplace with tradespeople passing on their skills and knowledge to apprentices, as well as sharing knowledge among themselves. Apprenticeship is, and always has been about mentoring – learning workplace skills and passing them on. Because of the importance of this to the trade, this task covers the activities related to communication in the workplace and mentoring skills.

A-5.01 Uses communication techniques

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-5.01.01P	demonstrate communication practices with individuals or in a group	instructions and messages are interpreted by all parties involved in communication
A-5.01.02P	listen using **active listening** practices	**active listening** practices are utilized
A-5.01.03P	speak clearly using correct industry terminology to ensure understanding	understanding of message is confirmed by both parties
A-5.01.04P	receive and respond to instructions	response to instructions indicates understanding
A-5.01.05P	receive and respond to feedback on work completed or performed	response to feedback indicates understanding and corrective measures are taken
A-5.01.06P	explain and provide feedback	explanation and feedback are provided, and task is carried out as directed
A-5.01.07P	communicate understanding and comfort level in performing trade tasks	opportunities for practice and gradual exposure to new tasks is offered and understanding is confirmed
A-5.01.08P	use questions to improve communication	questions are used to enhance understanding, on-the-job training and goal setting

Reference Code	Performance Criteria	Evidence of Attainment
A-5.01.09P	participate in safety and information meetings	meetings are attended, information is relayed to employees, and is applied
A-5.01.10P	send and receive **electronic messages**	**electronic messages** are sent and received using professionalism, plain language and clear expressions according to company policies and procedures
A-5.01.11P	use **online tools**	**online tools** are used to communicate

Range of Variables (include, but not limited to)

active listening: hearing, interpreting, reflecting, responding, paraphrasing
electronic messages: email, text messages
online tools: video conferencing, teleconferencing, apps

Knowledge

Reference Code	Learning Outcomes and Objectives
A-5.01.01L	demonstrate knowledge of trade terminology
a.	define terminology used in trade
A-5.01.02L	demonstrate knowledge of effective communication practices
a.	describe importance of using effective verbal and non-verbal communication with **people in the workplace**
b.	describe importance of teamwork
c.	identify **sources of information** to effectively communicate
d.	identify communication and **learning styles**
e.	describe effective listening and speaking skills
f.	describe how to receive and give instructions effectively
g.	identify **personal responsibilities and attitudes** that contribute to on-the-job success
h.	identify value of equity, diversity and inclusion in workplace

Reference Code	Learning Outcomes and Objectives
	i. identify communication that constitutes bullying, **harassment** and **discrimination**
	j. identify communication styles appropriate to different systems and applications of **electronic messages** and **online tools**

Range of Variables (include, but not limited to)

people in the workplace: other tradespeople, colleagues, apprentices, supervisors, clients, jurisdictional representatives, manufacturers, office administrators

sources of information: regulations, codes, occupational health and safety requirements, jurisdictional requirements, prints, drawings, specifications, company and client documentation

learning styles: visual, auditory, kinesthetic

personal responsibilities and attitudes: asking questions; working safely; accepting constructive feedback; time management and punctuality; respect for authority; good stewardship of materials, tools and property; efficient work practice

harassment: as defined by the Canadian and jurisdictional Human Rights Commissions

discrimination: as defined by the Canadian Human Rights Act and jurisdictional human rights laws

electronic messages: email, text messages

online tools: video conferencing, teleconferencing, apps

A-5.02 Uses mentoring techniques

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
A-5.02.01P	identify and communicate learning objective and point of lesson	apprentice or learner can explain objective and point of lesson
A-5.02.02P	link lesson to other lessons and project	lesson order and unplanned learning opportunities are defined
A-5.02.03P	demonstrate performance of a skill to an apprentice or learner	**steps required to demonstrate a skill** are performed

Reference Code	Performance Criteria	Evidence of Attainment
A-5.02.04P	set up conditions required for apprentice or learner to practice a skill	**practice conditions** are set up so that skill can be practiced safely by apprentice or learner
A-5.02.05P	set up conditions where apprentice or learner feels comfortable communicating and asking questions	conditions are such that apprentice or learner feels comfortable communicating and asking questions
A-5.02.06P	recognize and discuss multiple possible techniques for performing trade tasks and options that may be best for apprentice or learner	multiple possible techniques for performing trade tasks and options that may be best for apprentice or learner are recognized and discussed
A-5.02.07P	assess apprentice or learner's ability to perform tasks with increasing independence	performance of apprentice or learner improves with practice to a point where task can be done with little supervision
A-5.02.08P	give supportive and constructive feedback	apprentice or learner adopts best practice after having been given supportive or constructive feedback
A-5.02.09P	support apprentices or learners in pursuing technical training opportunities	technical training is completed within timeframe prescribed by apprenticeship authority
A-5.02.10P	support anti-**harassment** and anti-**discrimination** practices in workplace	workplace is **harassment** and **discrimination**-free
A-5.02.11P	support accommodations and alternate work practices that are appropriate for apprentice or learner	accommodations and alternate work practices that are appropriate for apprentice or learner are supported
A-5.02.12P	assess apprentice or learner suitability to trade during probationary period	apprentice or learner is given constructive feedback that helps them identify their own strengths and weaknesses and suitability for trade

Range of Variables (include, but not limited to)

steps required to demonstrate a skill: understanding who, what, where, when, why, and how; explaining; showing; giving encouragement; following up to ensure skill is performed correctly

practice conditions: guided, limited independence, full independence

harassment: as defined by the Canadian and jurisdictional Human Rights Commissions

discrimination: as defined by the Canadian Human Rights Act and jurisdictional human rights laws

Knowledge

Reference Code	Learning Outcomes and Objectives
A-5.02.01L	demonstrate knowledge of strategies for learning skills in workplace
a.	describe importance of individual experience
b.	describe shared responsibilities for workplace learning
c.	determine one's own learning preferences and explain how these relate to learning new skills
d.	describe importance of different types of skills in workplace
e.	describe importance of **Skills for success (essential skills)** in workplace
f.	identify different **learning styles**
g.	identify different **learning needs** and strategies to meet them
h.	identify **strategies to assist in learning a skill**
A-5.02.02L	demonstrate knowledge of strategies for teaching workplace skills
a.	identify different roles played by workplace mentor
b.	explain importance of identifying point of lesson
c.	identify how to choose a good time to present lesson
d.	explain importance of linking lessons
e.	identify context for learning skills
f.	describe considerations in setting up opportunities for skill practice
g.	explain importance of providing feedback
h.	identify techniques for giving effective feedback
i.	describe a skills assessment
j.	identify methods of assessing progress
k.	explain how to adjust lesson to different situations

Range of Variables (include, but not limited to)

Skills for success (essential skills): adaptability, collaboration, communication, creativity and innovation, digital, numeracy, problem-solving, reading, writing

learning styles: visual, auditory, kinesthetic

learning needs: learning disabilities, learning preferences, language proficiency

strategies to assist in learning a skill: understanding basic principles of instruction, developing coaching skills, being mature and patient, providing feedback

Major Work Activity B – Installs fuel supply and storage systems

Task B-6 Installs fuel storage tanks

Task Descriptor

Stringent new jurisdictional regulations have mandated that oil heat system technicians install fuel storage tanks in strict adherence to standards to prevent environmental mishaps. New guards and improved connections ensure that leaks are minimized, and the storage of fuel oil is more secure and less subjected to accidents and system defects.

B-6.01 Selects fuel storage tanks

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
B-6.01.01P	determine **type of fuel storage tank** to be used	**type of fuel storage tank** to be used is determined according to **location, characteristics and specifications**
B-6.01.02P	select stand	stand is selected according to codes, standards and regulations

Range of Variables (include, but not limited to)

types of fuel storage tanks: metallic, non-metallic

locations: inside, outside

characteristics and specifications: single wall, double wall, double bottom, self-contained, vertical, horizontal

Knowledge

Reference Code	Learning Outcomes and Objectives
B-6.01.01L	demonstrate knowledge of fuel storage tanks, their components, characteristics, **composition**, applications and operation
a.	identify **types of fuel storage tanks**, and describe their characteristics, **composition** and applications
b.	describe operating principles of fuel storage tanks
c.	interpret information pertaining to fuel storage tanks found on drawings and specifications
d.	describe types of tank design
e.	describe considerations related to building size and geographic location
f.	identify accessibility of tank location
B-6.01.02L	demonstrate knowledge of procedures to select fuel storage tanks
a.	identify hazards, and describe safe work practices pertaining to fuel storage tanks
b.	describe procedures to select fuel storage tanks and stands
B-6.01.03L	demonstrate knowledge of fuel oil and their properties, characteristics and applications
a.	identify **types of fuel oil** and describe their applications
b.	identify **characteristics of fuel oil** and their relevance to burning
c.	identify hazards, and describe safe work practices to work with fuel oil
d.	interpret information pertaining to composition and origin of heating oil
e.	describe procedures and considerations for handling and storage of fuel oil
B-6.01.04L	demonstrate knowledge of regulatory requirements pertaining to fuel storage tanks
a.	identify codes, standards and regulations pertaining to fuel storage tanks
B-6.01.05L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

composition: fibreglass, plastic, steel

types of fuel storage tanks: metallic, non-metallic

types of fuel oil: #1 (kerosene), #2 (diesel), #4, #6

characteristics of fuel oil: flash point, pour point, water and sediment, volatility, viscosity, calorific value, gravity, sulfur content, colour, British Thermal Unit (BTU)

B-6.02 Determines fuel storage tank location

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
B-6.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
B-6.02.02P	identify locations of **utilities and other fuel storage units**	locations of **utilities and other fuel storage units** are identified according to codes, standards and regulations
B-6.02.03P	identify building orientation and property lines	building orientation and property lines are identified
B-6.02.04P	identify locations of **building openings**	locations of **building openings** are identified
B-6.02.05P	identify fuel storage tank capacity and design	fuel storage tank capacity and design are identified
B-6.02.06P	identify **location** for tank	tank **location** is identified according to customer preferences, building insurance requirements, and codes, standards and regulations
B-6.02.07P	take worksite measurements	worksite measurements are taken according to codes, standards and regulations

Range of Variables (include, but not limited to)

utilities and other fuel storage units: water, electrical, drainage, natural gas, propane tanks

building openings: air supply, ventilation, windows, doors

locations: inside, outside

Knowledge

Reference Code	Learning Outcomes and Objectives
B-6.02.01L	demonstrate knowledge of procedures to determine fuel storage tank **location**
a.	identify tools and equipment used to determine fuel storage tank location, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to fuel storage tank **location**
c.	describe procedures to determine fuel storage tank **location**
B-6.02.02L	demonstrate knowledge of regulatory requirements pertaining to fuel storage tank **location**
a.	identify codes, standards and regulations pertaining to fuel storage tank **location**
B-6.02.03L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

locations: inside, outside

B-6.03 Positions fuel storage tanks

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
B-6.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task
B-6.03.02P	determine fuel storage tank incline required	fuel storage tank incline required is determined according to **tank design** and manufacturers' specifications

Reference Code	Performance Criteria	Evidence of Attainment
B-6.03.03P	secure fuel storage tank legs	fuel storage tank legs are secured according to codes, standards and regulations, and manufacturers' specifications
B-6.03.04P	install tank drip trays (containment trays)	tank drip trays (containment trays) are installed according to codes, standards and regulations, and manufacturers' specifications
B-6.03.05P	secure fuel storage tank to base	fuel storage tank is secured to base according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

tank designs: end and bottom outlet, vertical, horizontal

Knowledge

Reference Code	Learning Outcomes and Objectives
B-6.03.01L	demonstrate knowledge of procedures to position fuel storage tanks
a.	identify tools and equipment used to position fuel storage tanks, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to positioning of fuel storage tanks
c.	describe procedures to position fuel storage tanks
d.	describe environmental conditions pertaining to positioning of fuel storage tanks
B-6.03.02L	demonstrate knowledge of training and certification requirements to position fuel storage tanks
a.	identify training and certification requirements to position fuel storage tanks
B-6.03.03L	demonstrate knowledge of regulatory requirements pertaining to fuel storage tanks
a.	identify codes, standards and regulations pertaining to fuel storage tanks
B-6.03.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

B-6.04 Installs fuel storage tank components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
B-6.04.01P	select and use tools and equipment	tools and equipment are selected and used according to task
B-6.04.02P	seal **fuel storage tank components**	**fuel storage tank components** are sealed using approved compounds according to codes, standards and regulations
B-6.04.03P	tighten **fuel storage tank components**	**fuel storage tank components** are tightened according to piping standards
B-6.04.04P	replace **fuel storage tank components**	**fuel storage tank components** are replaced according to codes, standards and regulations, and manufacturers' specifications
B-6.04.05P	test and inspect **fuel storage tank components** for fuel leaks	**fuel storage tank components** are tested and inspected for fuel leaks according to codes, standards and regulations

Range of Variables (include, but not limited to)

fuel storage tank components: gauges, valves, vent alarms, leak detectors, tank drip trays (containment trays), gauge and tank covers

Knowledge

Reference Code	Learning Outcomes and Objectives
B-6.04.01L	demonstrate knowledge of **fuel storage tank components**, their characteristics, applications and operation
a.	identify types of **fuel storage tank components**, and describe their characteristics and applications
b.	describe operating principles of **fuel storage tank components**

Reference Code	Learning Outcomes and Objectives
c.	interpret information pertaining to **fuel storage tank components** found on drawings and specifications
d.	identify protection used for **fuel storage tank components**
B-6.04.02L	demonstrate knowledge of procedures to install **fuel storage tank components**
a.	identify tools and equipment used to install **fuel storage tank components**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of **fuel storage tank components**
c.	describe procedures to install **fuel storage tank components**
d.	describe procedures to test and inspect **fuel storage tank components** for fuel leaks
B-6.04.03L	demonstrate knowledge of training and certification requirements to install **fuel storage tank components**
a.	identify training and certification requirements to install **fuel storage tank components**
B-6.04.04L	demonstrate knowledge of regulatory requirements pertaining to **fuel storage tank components**
a.	identify codes, standards and regulations pertaining to **fuel storage tank components**
B-6.04.05L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

fuel storage tank components: gauges, valves, vent alarms, leak detectors, tank drip trays (containment trays), gauge and tank covers

B-6.05 Installs fill and vent pipes

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
B-6.05.01P	select and use tools and equipment	tools and equipment are selected and used according to task
B-6.05.02P	cut and seal holes in building envelope	holes are cut and sealed in building envelope
B-6.05.03P	prepare pipe	pipe is prepared by threading and applying sealing compound
B-6.05.04P	size vents	vents are sized according to codes, standards and regulations, and manufacturers' specifications
B-6.05.05P	seal components	components are sealed using approved sealants
B-6.05.06P	torque pipe and **fittings**	pipe and **fittings** are torqued
B-6.05.07P	test and inspect system for fuel leaks	system is tested and inspected for fuel leaks according to codes, standards and regulations
B-6.05.08P	place and secure fill and vent pipe using fasteners and supports	fill and vent pipe is placed and secured using fasteners and supports

Range of Variables (include, but not limited to)

fittings: caps, elbows, unions

Knowledge

Reference Code	Learning Outcomes and Objectives
B-6.05.01L	demonstrate knowledge of fill and vent pipes, their components, characteristics, applications and operation
a.	identify types and sizes of fill and vent pipes, and describe their characteristics and applications
b.	describe operating principles of fill and vent pipes
c.	interpret information pertaining to fill and vent pipes found on drawings and specifications
B-6.05.02L	demonstrate knowledge of procedures to install fill and vent pipes
a.	identify tools and equipment used to install fill and vent pipes, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of fill and vent pipes
c.	describe procedures to install fill and vent pipes
d.	describe procedures to inspect and test system for fuel leaks
B-6.05.03L	demonstrate knowledge of regulatory requirements pertaining to installation of fill and vent pipes
a.	identify codes, standards and regulations pertaining to installation of fill and vent pipes
B-6.05.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Task B-7 Installs fuel supply systems

Task Descriptor

Environmental impact regulations throughout Canada have required that oil heat system technicians improve skills in the installation of relevant fuel supply components. Improved and more durable components allow for movement of integral parts without breakage or oxidation.

B-7.01 Selects fuel supply components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
B-7.01.01P	determine size of fuel lines and oil filters	size of fuel lines and oil filters are determined according to codes, standards and regulations
B-7.01.02P	determine required **fuel supply components**	**fuel supply components** required for installation are determined according to codes, standards and regulations, and manufacturers' specifications
B-7.01.03P	determine when to use **systems for specific applications**	**systems for specific applications** are used according to codes, standards and regulations
B-7.01.04P	inspect **fuel supply components** for leaks and operation	**fuel supply components** are inspected for leaks and operation according to codes, standards and regulations

Range of Variables (include, but not limited to)

fuel supply components: filters, valves (oil-safety, in-line, anti-siphon, check fusible link), flame safeguard and combustion controls, pumps, oil lines, de-aerators, auxiliary pump, pressure gauges, solenoid valves, float switches

systems for specific applications: booster pump, two-line, de-aerator, day tank

Knowledge

Reference Code	Learning Outcomes and Objectives
B-7.01.01L	demonstrate knowledge of **fuel supply components**, their characteristics, applications and operation
a.	identify types of **fuel supply components**, and describe their characteristics and applications
b.	describe operating principles of **fuel supply components**
c.	interpret information pertaining to **fuel supply components** found on drawings and specifications
B-7.01.02L	demonstrate knowledge of **systems for specific applications**, their characteristics, applications and operation
a.	identify types of **systems for specific applications**, and describe their characteristics and applications
b.	describe operating principles of **systems for specific applications**
c.	interpret information pertaining to **systems for specific applications** found on drawings and specifications
B-7.01.03L	demonstrate knowledge of procedures to select **fuel supply components**
a.	describe procedures to select **fuel supply components** and **systems for specific applications**
B-7.01.04L	demonstrate knowledge of training and certification requirements to select **fuel supply components**
a.	identify manufacturers' training and certification requirements to select **fuel supply components**
B-7.01.05L	demonstrate knowledge of regulatory requirements pertaining to **fuel supply components**
a.	identify codes, standards and regulations pertaining to **fuel supply components**
B-7.01.06L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

fuel supply components: filters, valves (oil-safety, in-line, anti-siphon, check fusible link), flame safeguard and combustion controls, pumps, oil lines, de-aerators, auxiliary pump, pressure gauges, solenoid valves, float switches

systems for specific applications: booster pump, two-line, de-aerator, day tank

B-7.02 Installs fuel supply components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
B-7.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
B-7.02.02P	determine location of **fuel supply components**	location of **fuel supply components** is determined according to codes, standards and regulations, and manufacturers' specifications
B-7.02.03P	determine travel path of fuel line	travel path of fuel line is determined according to codes, standards and regulations
B-7.02.04P	fasten, support and protect pipe	pipe is fastened, supported and protected according to codes, standards and regulations
B-7.02.05P	seal **fuel supply components**	**fuel supply components** are sealed using approved sealants according to codes, standards and regulations
B-7.02.06P	test and inspect system for fuel leaks	system is tested and inspected for fuel leaks

Range of Variables (include, but not limited to)

fuel supply components: filters, valves (oil-safety, in-line, anti-siphon, check fusible link), flame safeguard and combustion controls, pumps, oil lines, de-aerators, auxiliary pump, pressure gauges, solenoid valves, float switches

Knowledge

Reference Code	Learning Outcomes and Objectives
B-7.02.01L	demonstrate knowledge of **fuel supply components**, their characteristics, applications and operation
a.	identify types of **fuel supply components**, and describe their characteristics and applications
b.	describe operating principles of **fuel supply components**
c.	interpret information pertaining to **fuel supply components** found on drawings and specifications
B-7.02.02L	demonstrate knowledge of procedures to install **fuel supply components**
a.	identify tools and equipment used to install **fuel supply components**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of **fuel supply components**
c.	describe procedures to install **fuel supply components**
d.	describe procedures to inspect and test system for leaks
B-7.02.03L	demonstrate knowledge of regulatory requirements pertaining to installation of **fuel supply components**
a.	identify codes, standards and regulations pertaining to installation of **fuel supply components**
B-7.02.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

fuel supply components: filters, valves (oil-safety, in-line, anti-siphon, check fusible link), flame safeguard and combustion controls, pumps, oil lines, de-aerators, auxiliary pump, pressure gauges, solenoid valves, float switches

Major Work Activity C – Installs oil-fired heating systems

Task C-8 Installs and retrofits oil-fired and wood/oil appliances and components

Task Descriptor

The appliance provides the heat for all heating systems. Oil heat system technicians must assemble and position the appliance and complete all connections to fuel and electrical supply and to venting and distribution systems.

C-8.01 Selects appliances

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-8.01.01P	verify site measurements and clearance for **appliances** and their location/orientation	site measurements and clearance for **appliances** and their location/orientation are verified for serviceability and overall function
C-8.01.02P	verify utilities	required utilities are available
C-8.01.03P	determine location of other **appliances**	location of other **appliances** is determined
C-8.01.04P	select **appliance**	**appliance** is selected according to **factors**
C-8.01.05P	verify **appliance** specifications	**appliance** specifications are verified according to engineering and system design specifications

Reference Code	Performance Criteria	Evidence of Attainment
C-8.01.06P	select **appliance components**	**appliance components** are selected according to design specifications, code and operational requirements
C-8.01.07P	verify **component specifications**	**component specifications** are verified according to engineering, system design and manufacturers' specifications

Range of Variables (include, but not limited to)

appliances: boilers, water heaters, wood/oil combination appliances, forced-air furnaces, condensing furnaces, incinerators, oil stoves, space heaters, combo systems (water/air heating)

factors: code requirements, manufacturers' and engineering specifications, system and client requirements, regulations, drawings, site conditions, environmental conditions

components: indirect water heaters, condensate pumps, circulating pumps, manifolds, valves (zone, pressure reducing, check, flow, pressure relief, backflow preventing, low water cut-off), relays, expansion tanks (diaphragm tanks), auto vents, air scoops, limit controls, smoke pipe, ducting, plenums, dampers, thermostats, draft controls, draft inducers, registers, grilles, piping, tubing, humidifiers, dehumidifiers, air cleaning devices, heat recovery ventilators, operating controls, block vent switch safeties, burners, appliance jackets

component specifications: blower capacity, pressure drops, size, fluid flow, heating/cooling capacity, sensible heating ratio, temperature heat curve, temperature and pressure operating ratings (domestic hot water heating), pressure expansion (domestic hot water heating)

Knowledge

Reference Code	Learning Outcomes and Objectives
C-8.01.01L	demonstrate knowledge of **appliances**, their **components**, characteristics, applications and operation
a.	identify types of **appliances** and their **components**, and describe their characteristics and applications
b.	describe operating principles of **appliances** and their **components**
c.	interpret information pertaining to **appliances** and their **components** found on drawings and specifications

Reference Code	Learning Outcomes and Objectives
C-8.01.02L	demonstrate knowledge of procedures to select **appliances** and their **components**
a.	describe procedures to select **appliances** and their **components**
b.	describe procedures to perform measurements and calculations
C-8.01.03L	demonstrate knowledge of training and certification requirements to select **appliances** and their **components**
a.	identify manufacturers' training and certification requirements to select **appliances** and their **components**
C-8.01.04L	demonstrate knowledge of regulatory requirements pertaining to **appliances** and their **components**
a.	identify codes, standards and regulations pertaining to **appliances** and their **components**
C-8.01.05L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection
b.	identify practices that reduce carbon footprint

Range of Variables (include, but not limited to)

appliances: boilers, water heaters, wood/oil combination appliances, forced-air furnaces, condensing furnaces, incinerators, oil stoves, space heaters, combo systems (water/air heating)

components: indirect water heaters, condensate pumps, circulating pumps, manifolds, valves (zone, pressure reducing, check, flow, pressure relief, backflow preventing, low water cut-off), relays, expansion tanks (diaphragm tanks), auto vents, air scoops, limit controls, smoke pipe, ducting, plenums, dampers, thermostats, draft controls, draft inducers, registers, grilles, piping, tubing, humidifiers, dehumidifiers, air cleaning devices, heat recovery ventilators, operating controls, block vent switch safeties, burners, appliance jackets

C-8.02 Positions appliances

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-8.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-8.02.02P	install **appliances** in place	**appliances** are installed in place according to design specifications, code and operational requirements
C-8.02.03P	mount and level **appliances**	**appliances** are mounted and leveled according to manufacturers' specifications

Range of Variables (include, but not limited to)

appliances: boilers, water heaters, wood/oil combination appliances, forced-air furnaces, condensing furnaces, incinerators, oil stoves, space heaters, combo systems (water/air heating)

Knowledge

Reference Code	Learning Outcomes and Objectives
C-8.02.01L	demonstrate knowledge of **appliances**, their characteristics, applications and operation
a.	identify types of **appliances**, and describe their characteristics and applications
b.	describe operating principles of **appliances**
c.	interpret information pertaining to **appliances** found on drawings and specifications
C-8.02.02L	demonstrate knowledge of procedures to position **appliances**
a.	identify tools and equipment used to position **appliances**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to positioning **appliances**

Reference Code	Learning Outcomes and Objectives
c.	describe procedures to position **appliances**
d.	identify positioning considerations related to **other appliances**
C-8.02.03L	demonstrate knowledge of regulatory requirements pertaining to positioning of **appliances**
a.	identify codes, standards and regulations pertaining to positioning of **appliances**

Range of Variables (include, but not limited to)

appliances: boilers, water heaters, wood/oil combination appliances, forced-air furnaces, condensing furnaces, incinerators, oil stoves, space heaters, combo systems (water/air heating)

other appliances: clothes dryers, heat recovery ventilators, water heaters

C-8.03 Installs components on appliance

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-8.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-8.03.02P	follow sequence of installation of **components**	sequence of installation of **components** is followed according to manufacturers' specifications
C-8.03.03P	apply sealing compounds and gaskets	sealing compounds and gaskets are applied according to manufacturers' specifications
C-8.03.04P	attach fittings and adapters	fittings and adapters are attached according to manufacturers' specifications

Reference Code	Performance Criteria	Evidence of Attainment
C-8.03.05P	connect water supply to **appliance**	water supply is connected to **appliance** according to codes, standards and regulations, and manufacturers' specifications
C-8.03.06P	assemble and mount burners	burners are assembled and mounted according to manufacturers' specifications
C-8.03.07P	confirm **component specifications**	**component specifications** are confirmed according to engineering, system design and manufacturers' specifications
C-8.03.08P	verify **appliance** operation	**appliance** operation is verified according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

components: indirect water heaters, condensate pumps, circulating pumps, manifolds, valves (zone, pressure reducing, check, flow, pressure relief, backflow preventing, low water cut-off), relays, expansion tanks (diaphragm tanks), auto vents, air scoops, limit controls, smoke pipe, ducting, plenums, dampers, thermostats, draft controls, draft inducers, registers, grilles, piping, tubing, humidifiers, dehumidifiers, air cleaning devices, heat recovery ventilators, operating controls, block vent switch safeties, burners, appliance jackets

appliances: boilers, water heaters, wood/oil combination appliances, forced-air furnaces, condensing furnaces, incinerators, oil stoves, space heaters, combo systems (water/air heating)

component specifications: blower capacity, pressure drops, size, fluid flow, heating/cooling capacity, sensible heating ratio, temperature heat curve, temperature and pressure operating ratings (domestic hot water heating), pressure expansion (domestic hot water heating)

Knowledge

Reference Code	Learning Outcomes and Objectives
C-8.03.01L	demonstrate knowledge of **appliances**, their **components**, characteristics, applications and operation
a.	identify types of **appliances** and their **components**, and describe their characteristics and applications
b.	describe operating principles of **appliances** and their **components**
c.	interpret information pertaining to **appliances** and their **components** found on drawings and specifications
C-8.03.02L	demonstrate knowledge of procedures to install **components** on **appliances**
a.	identify tools and equipment used to install **components** on **appliances**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of **components** on **appliances**
c.	describe procedures to install **components** on **appliances**
C-8.03.03L	demonstrate knowledge of regulatory requirements pertaining to installation of **components** on **appliances**
a.	identify codes, standards and regulations pertaining to installation of **components** on **appliances**

Range of Variables (include, but not limited to)

appliances: boilers, water heaters, wood/oil combination appliances, forced-air furnaces, condensing furnaces, incinerators, oil stoves, space heaters, combo systems (water/air heating)

components: indirect water heaters, condensate pumps, circulating pumps, manifolds, valves (zone, pressure reducing, check, flow, pressure relief, backflow preventing, low water cut-off), relays, expansion tanks (diaphragm tanks), auto vents, air scoops, limit controls, smoke pipe, ducting, plenums, dampers, thermostats, draft controls, draft inducers, registers, grilles, piping, tubing, humidifiers, dehumidifiers, air cleaning devices, heat recovery ventilators, operating controls, block vent switch safeties, burners, appliance jackets

C-8.04 Connects fuel supply to appliance

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-8.04.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-8.04.02P	apply sealing compounds	sealing compounds are applied according to codes, standards and regulations, and manufacturers' specifications
C-8.04.03P	connect fuel lines	fuel lines are **connected** according to codes, standards and regulations
C-8.04.04P	support fuel lines	fuel lines are supported according to codes, standards and regulations, and manufacturers' specifications
C-8.04.05P	protect fuel lines	fuel lines are protected according to codes, standards and regulations, and manufacturers' specifications
C-8.04.06P	install **adapters and fittings**	**adapters and fittings** are installed according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

connections: flared, threaded

adapters and fittings: fusible valves, oil safety valves (OSV), solenoid valves, anti-syphon valves, flared inline valves, oil filters (felt refills, canisters), check valves, pressure-reducing

Knowledge

Reference Code	Learning Outcomes and Objectives
C-8.04.01L	demonstrate knowledge of fuel lines, their components, characteristics, applications and operation
a.	identify **types of fuel lines**, and describe their characteristics and applications
b.	identify **adapters and fittings**, and describe their characteristics and applications
c.	describe operating principles of fuel lines
d.	interpret information pertaining to fuel lines found on drawings and specifications
C-8.04.02L	demonstrate knowledge of procedures to connect fuel lines to appliances
a.	identify tools and equipment used to connect fuel lines to appliances, and describe their procedures for use
b.	identify hazards, and describe safe work practices to connect fuel lines to appliances
c.	describe procedures to **connect** fuel lines to appliances
C-8.04.03L	demonstrate knowledge of training and certification requirements to connect fuel lines to appliances
a.	identify jurisdictional training and certification requirements to connect fuel lines to appliances
C-8.04.04L	demonstrate knowledge of regulatory requirements pertaining to fuel lines
a.	identify codes, standards and regulations pertaining to fuel lines
C-8.04.05L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

types of fuel lines: steel, flexible, coated copper, braided
adapters and fittings: fusible valves, oil safety valves (OSV), solenoid valves, anti-syphon valves, flared inline valves, oil filters (felt refills, canisters), check valves, pressure-reducing
connections: flared, threaded

C-8.05 Connects electrical supply to appliance

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-8.05.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-8.05.02P	verify circuit is de-energized	circuit is de-energized to avoid personal injury or damage to appliance by following lock-out and tag-out procedures
C-8.05.03P	interpret electrical schematics and termination points	electrical schematics and termination points are interpreted according to manufacturers' and design specifications, and codes, standards and regulations
C-8.05.04P	select wire size and type	wire size and type are selected according to amperage, insulation rating, compatibility with other components, and codes, standards and regulations
C-8.05.05P	route and secure wire	wire is routed and secured according to codes, standards and regulations and site requirements
C-8.05.06P	strip and fasten wire	wire is stripped and fastened according to industry best practices
C-8.05.07P	secure wire to building structure	wire is secured to building structure according to codes, standards and regulations
C-8.05.08P	seal electrical connectors	electrical connectors are sealed according to codes, standards and regulations

Reference Code	Performance Criteria	Evidence of Attainment
C-8.05.09P	terminate wiring to appliance	wiring to appliance is terminated according to codes, standards and regulations, and manufacturers' specifications
C-8.05.10P	label or tag wire with wire markers	wire is labelled or tagged with wire markers for identification and service purposes according to codes, standards and regulations, and design specifications

Knowledge

Reference Code	Learning Outcomes and Objectives
C-8.05.01L	demonstrate knowledge of fundamental concepts of electricity
a.	define terminology associated with electrical fundamentals
b.	identify hazards and describe safe work practices pertaining to electricity
c.	interpret electrical-related information found on drawings and specifications
d.	explain Ohm's law and describe its applications and associated calculations
C-8.05.02L	demonstrate knowledge of procedures to connect electrical supply to appliances
a.	identify tools and equipment used to connect electrical supply to appliances, and describe their procedures for use
b.	describe procedures to connect electrical supply to appliances
C-8.05.03L	demonstrate knowledge of regulatory requirements pertaining to wiring of appliances
a.	identify codes, standards and regulations pertaining to wiring of appliances
C-8.05.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

C-8.06 Connects vent/exhaust piping to appliance

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-8.06.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-8.06.02P	cut and crimp piping	piping is cut and crimped according to industry best practices
C-8.06.03P	fasten piping to appliance and venting system	piping is fastened to appliance and venting system according to codes, standards and regulations, and manufacturers' specifications
C-8.06.04P	apply sealants on balanced flue and direct vent applications	sealants are applied on balanced flue and direct vent applications according to manufacturers' specifications
C-8.06.05P	perform tests on system to ensure integrity of joints	tests are performed on system to determine if it is tight and leak-free

Knowledge

Reference Code	Learning Outcomes and Objectives
C-8.06.01L	demonstrate knowledge of vent/exhaust piping, their components, characteristics, applications and operation
a.	identify **types of vent/exhaust piping**, and describe their characteristics and applications
b.	describe operating principles of vent/exhaust piping
c.	interpret information pertaining to vent/exhaust piping found on drawings and specifications

Reference Code	Learning Outcomes and Objectives
C-8.06.02L	demonstrate knowledge of procedures to connect vent/exhaust piping to appliances
a.	identify tools and equipment used to connect vent/exhaust piping to appliances, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to connecting vent/exhaust piping to appliances
c.	describe procedures to connect vent/exhaust piping to appliances
C-8.06.03L	demonstrate knowledge of regulatory requirements pertaining to vent/exhaust piping for appliances
a.	identify codes, standards and regulations pertaining to vent/exhaust piping for appliances
C-8.06.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

types of vent/exhaust piping: galvanized, black pipe, flexible liners, stainless steel liners, clay liners, concrete liners, pre-fab chimney liners for solid fuel-burning applications, plastic pipes (in condensing systems), masonry chimneys and liners, class A factory-built chimneys (type L, type B, type C [vent connectors/galvanized pipe]), 650 ºC factory-built chimneys, black single-walled (solid, gas or oil), double-walled stove pipes, forced draft, induced draft

C-8.07 Installs dump zones

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-8.07.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-8.07.02P	determine location for dump zone	location for dump zone is determined according to codes, standards and regulations, and system design
C-8.07.03P	assemble **dump zone components**	**dump zone components** are assembled
C-8.07.04P	connect pipes, valves and fittings on hydronic systems	pipes, valves and fittings on hydronic systems are connected according to industry best practices
C-8.07.05P	connect ductwork and fittings on forced-air heating systems	ductwork and fittings on forced-air heating systems are connected according to codes, standards and regulations, and system design
C-8.07.06P	fabricate emergency access panel on forced-air heating system	emergency access panel is fabricated on forced-air heating system according to industry best practices
C-8.07.07P	connect wiring to dump zones	wiring is connected to dump zones according to manufacturers' specifications

Range of Variables (include, but not limited to)

dump zone components: isolating relays, interlocking relays, step-down transformers, damper motors, dampers, normally open zone controls

Knowledge

Reference Code	Learning Outcomes and Objectives
C-8.07.01L	demonstrate knowledge of dump zones, their components, characteristics, **applications** and operation
a.	identify dump zones, and describe their characteristics and **applications**
b.	describe operating principles of dump zones
c.	interpret information pertaining to dump zones found on drawings, wiring schematics and specifications
C-8.07.02L	demonstrate knowledge of procedures to install dump zones
a.	identify tools and equipment used to install dump zones, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of dump zones
c.	describe procedures to install dump zones
C-8.07.03L	demonstrate knowledge of training and certification requirements to install dump zones
a.	identify jurisdictional training and certification requirements to install dump zones (e.g. Wood Energy Technology Transfer [WETT])
C-8.07.04L	demonstrate knowledge of regulatory requirements pertaining to installation of dump zones
a.	identify codes, standards and regulations pertaining to installation of dump zones

Range of Variables (include, but not limited to)

applications: wood systems, wood/oil combination systems

C-8.08 Connects drain to appliance

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-8.08.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-8.08.02P	fasten drainpipe to appliance	drainpipe is fastened to appliance according to codes, standards and regulations, and manufacturers' specifications
C-8.08.03P	apply sealant	sealant is applied according to industry best practices

Knowledge

Reference Code	Learning Outcomes and Objectives
C-8.08.01L	demonstrate knowledge of **types of drains**, their components, characteristics, applications and operation
a.	identify **types of drains**, and describe their characteristics and applications
b.	identify types of liquids to be drained
c.	identify **drain materials**
d.	describe operating principles of drains
e.	interpret information pertaining to drains found on drawings and specifications
C-8.08.02L	demonstrate knowledge of procedures to connect drainpipe to appliance
a.	identify tools and equipment used to connect drainpipe to appliance, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to connecting drainpipe to appliance
c.	describe procedures to connect drainpipe to appliance

Reference Code	Learning Outcomes and Objectives
C-8.08.03L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection
b.	identify practices that reduce the carbon footprint

Range of Variables (include, but not limited to)

types of drains: condensate drains, condensing system drains, pressure relief drains, boiler drains

drain materials: piping, tubing, fittings

Task C-9 Installs and retrofits forced-air heating systems

Task Descriptor

Warm air is delivered to all points of the building through the ducts. Oil heat system technicians install the furnace, the distribution system and related components.

C-9.01 Assembles ductwork

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-9.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-9.01.02P	join ducting	ducting is joined according to industry best practices
C-9.01.03P	modify ductwork	ductwork is modified by using **methods**
C-9.01.04P	size supply and return ducts	supply and return ducts are sized according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

methods: cutting, forming, flanging

Knowledge

Reference Code	Learning Outcomes and Objectives
C-9.01.01L	demonstrate knowledge of ductwork, their components, characteristics, applications and operation
a.	identify ductwork, and describe their characteristics and applications
b.	describe operating principles of ductwork
c.	interpret information pertaining to ductwork found on drawings and specifications
C-9.01.02L	demonstrate knowledge of procedures to assemble ductwork
a.	identify tools and equipment used to assemble ductwork, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to assembling ductwork
c.	describe procedures to assemble ductwork
d.	describe procedures and **methods** used to modify ductwork
C-9.01.03L	demonstrate knowledge of regulatory requirements pertaining to assembly of ductwork
a.	identify codes, standards and regulations pertaining to assembly of ductwork

Range of Variables (include, but not limited to)

methods: cutting, forming, flanging

C-9.02 Installs ductwork

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-9.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-9.02.02P	connect plenums to appliance	plenums are connected to appliance according to codes, standards and regulations, and manufacturers' specifications
C-9.02.03P	connect starting collars and takeoffs	starting collars and takeoffs are connected according to industry best practices
C-9.02.04P	install hangers and supports	hangers and supports are installed according to industry best practices
C-9.02.05P	seal joints	joints are sealed using **sealants** according to manufacturers' specifications
C-9.02.06P	connect trunk lines and branch lines	trunk lines and branch lines are connected according to system design
C-9.02.07P	install **dampers**	**dampers** are installed according to codes, standards and regulations, and design and manufacturers' specifications
C-9.02.08P	install **finish components**	**finish components** are installed according to industry best practices and system design
C-9.02.09P	install **auxiliary ductwork components**	**auxiliary ductwork components** are installed according to design and manufacturers' specifications

Range of Variables (include, but not limited to)

sealants: duct sealer, foil tape, vinyl duct tape

dampers: manual, motorized, zone, fire

finish components: registers, return air grilles

auxiliary ductwork components: humidifiers, electronic air cleaners, filters, ultraviolet (UV) lighting

Knowledge

Reference Code	Learning Outcomes and Objectives
C-9.02.01L	demonstrate knowledge of ductwork, their components, characteristics, applications and operation
a.	identify ductwork, and describe their characteristics and applications
b.	identify **finish components** and **auxiliary ductwork components**, and describe their characteristics and applications
c.	describe operating principles of ductwork
d.	interpret information pertaining to ductwork found on drawings and specifications
C-9.02.02L	demonstrate knowledge of procedures to install ductwork
a.	identify tools and equipment used to install ductwork, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of ductwork
c.	describe procedures to install ductwork
d.	describe sequence of assembly
C-9.02.03L	demonstrate knowledge of regulatory requirements pertaining to installation of ductwork
a.	identify codes, standards and regulations pertaining to installation of ductwork

Range of Variables (include, but not limited to)

finish components: registers, return air grilles

auxiliary ductwork components: humidifiers, electronic air cleaners, filters, ultraviolet (UV) lighting

Task C-10 Installs and retrofits hydronic heating systems

Task Descriptor

Hydronic heating systems heat buildings through the circulation of liquids. Oil heat system technicians install the boilers, the distribution systems and related components.

C-10.01 Assembles boilers

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-10.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-10.01.02P	join sections of boilers	sections of boilers are joined according to codes, standards and regulations, and manufacturers' specifications
C-10.01.03P	fasten jacket	jacket is fastened according to manufacturers' specifications
C-10.01.04P	apply sealants	sealants are applied according to manufacturers' specifications
C-10.01.05P	install **boiler components**	**boiler components** are installed according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

boiler components: aquastat, aquastat well, controls, boiler drain, tridicator, low water cutoff, pressure relief valves

Knowledge

Reference Code	Learning Outcomes and Objectives
C-10.01.01L	demonstrate knowledge of boilers, their **components**, characteristics, **applications** and operation
a.	identify **types of boilers**, and describe their characteristics and **applications**
b.	describe operating principles of boilers
c.	interpret information pertaining to boilers found on drawings and specifications
d.	explain **boiler rating systems**
C-10.01.02L	demonstrate knowledge of procedures to assemble boilers
a.	identify tools and equipment used to assemble boilers, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to assembly of boilers
c.	describe procedures to assemble boilers
C-10.01.03L	demonstrate knowledge of regulatory requirements pertaining to assembly of boilers
a.	identify codes, standards and regulations pertaining to assembly of boilers
C-10.01.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection
b.	identify practices that reduce the carbon footprint

Range of Variables (include, but not limited to)

boiler components: aquastat, aquastat well, controls, boiler drain, tridicator, low water cutoff, pressure relief valves

applications: residential, commercial

types of boilers: horizontal and vertical tube, cast iron, sectional, steel, cold-start (high efficiency three-pass), dry base, wet base, wet leg

boiler rating systems: net ratings, gross ratings, operating pressure, operating temperature, combustion efficiency

C-10.02 Installs hydronic distribution system and heating system components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-10.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-10.02.02P	prepare rough-in	rough-in is prepared according to system design to accept **hydronic distribution system**
C-10.02.03P	install fasteners and supports	fasteners and supports are installed according to codes, standards and regulations, and manufacturers' specifications
C-10.02.04P	join and fit piping and fittings	piping and fittings are joined using **methods**
C-10.02.05P	locate and install **heating system components**	**heating system components** are located and installed according to system design, codes, standards and regulations, and manufacturers' specifications
C-10.02.06P	join **heating system components**	**heating system components** are joined using **methods**
C-10.02.07P	seal **heating system components**	**heating system components** are sealed according to manufacturers' specifications
C-10.02.08P	connect **heating system components** to electrical supply	**heating system components** are connected to electrical supply according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

hydronic distribution systems: radiant floor, cast iron, fin tube convector, water-to-air, heat exchangers, domestic direct water heaters, reverse return, direct return, series loop, one-pipe, two-pipe, manifold system, radiant panel

methods (for joining piping and fittings): crimping, soldering, threading, using compression fittings

heating system components: expansion tanks, air scoops, backflow preventers, check valves, deaerators, air eliminators, circulators, baseboards (aluminum fin), zone valves, radiant panels, manifolds, gauges, mixing valves, anti-scald valves, hot water feed reducing valves, pressure reducing valves, flow control valves, indirect water heaters, pressure differential bypass valves

methods (for joining heating system components): crimping, expanding, soldering, threading, press fitting

Knowledge

Reference Code	Learning Outcomes and Objectives
C-10.02.01L	demonstrate knowledge of **hydronic distribution systems**, and **heating system components**, their characteristics, applications and operation
a.	identify types of **hydronic distribution systems**, and describe their characteristics and applications
b.	identify types of **heating system components**, and describe their characteristics and applications
c.	describe operating principles of **hydronic distribution systems**
d.	interpret information pertaining to **hydronic distribution systems** found on drawings and specifications
e.	identify types and sizes of piping and tubing, and describe their characteristics and applications
f.	identify **types of piping and tubing materials**, and describe their characteristics and applications
C-10.02.02L	demonstrate knowledge of procedures to install **hydronic distribution systems** and **heating system components**
a.	identify tools and equipment used to install **hydronic distribution systems** and **heating system components**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of **hydronic distribution systems** and **heating system components**
c.	describe procedures to install **hydronic distribution systems** and **heating system components**

Reference Code	Learning Outcomes and Objectives
C-10.02.03L	demonstrate knowledge of regulatory requirements pertaining to installation of **hydronic distribution systems** and **heating system components**
a.	identify codes, standards and regulations pertaining to installation of **hydronic distribution systems** and **heating system components**
C-10.02.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection
b.	identify practices that reduce the carbon footprint

Range of Variables (include, but not limited to)

hydronic distribution systems: radiant floor, cast iron, fin tube convector, water-to-air, heat exchangers, domestic direct water heaters, reverse return, direct return, series loop, one-pipe, two-pipe, manifold system, radiant panel

heating system components: expansion tanks, air scoops, backflow preventers, check valves, deaerators, air eliminators, circulators, baseboards (aluminum fin), zone valves, radiant panels, manifolds, gauges, mixing valves, anti-scald valves, hot water feed reducing valves, pressure reducing valves, flow control valves, indirect water heaters, pressure differential bypass valves

types of piping and tubing materials: cross-linked polyethylene (PEX) pipe (for heating applications), copper, steel

C-10.03 Installs indirect water heater

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-10.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-10.03.02P	level heater	heater is leveled according to industry best practices
C-10.03.03P	wire heater	heater is wired according to manufacturers' specifications

Reference Code	Performance Criteria	Evidence of Attainment
C-10.03.04P	connect heater to appliance	heater is connected to appliance according to codes, standards and regulations, and manufacturers' specifications
C-10.03.05P	install heater **components**	heater **components** are installed according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

components: circulating pumps, check valves, temperature controls, vacuum relief/breaker valves, temperature and pressure relief valves, backflow preventers, tempering/mixing valves, dielectric fittings, pressure reducing valves, anode rods, potable water expansion tanks

Knowledge

Reference Code	Learning Outcomes and Objectives
C-10.03.01L	demonstrate knowledge of indirect water heaters, their **components**, characteristics, applications and operation
a.	identify **types of indirect water heaters**, and describe their characteristics and applications
b.	describe operating principles of indirect water heaters
c.	interpret information pertaining to indirect water heaters found on drawings and specifications
d.	identify water requirements of building occupants
C-10.03.02L	demonstrate knowledge of procedures to install indirect water heaters
a.	identify tools and equipment used to install indirect water heaters, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of indirect water heaters
c.	describe procedures to install indirect water heaters
C-10.03.03L	demonstrate knowledge of regulatory requirements pertaining to installation of indirect water heaters
a.	identify codes, standards and regulations pertaining to installation of indirect water heaters

Reference Code	Learning Outcomes and Objectives
C-10.03.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection
b.	identify practices that reduce the carbon footprint

Range of Variables (include, but not limited to)

components: circulating pumps, check valves, temperature controls, vacuum relief/breaker valves, temperature and pressure relief valves, backflow preventers, tempering/mixing valves, dielectric fittings, pressure reducing valves, anode rods, potable water expansion tanks

types of indirect water heaters: stainless steel, glass-lined, plastic-lined

C-10.04 Installs oil-fired water heater

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
C-10.04.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-10.04.02P	size burner	burner is sized according to design and manufacturers' specifications
C-10.04.03P	install **components**	**components** are installed according to manufacturers' specifications
C-10.04.04P	level heater	heater is leveled according to industry best practices

Reference Code	Performance Criteria	Evidence of Attainment
C-10.04.05P	connect appliance to fuel, electrical, water supply and venting	appliance is connected to fuel, electrical, water supply and venting according to codes, standards and regulations, and manufacturers' specifications
C-10.04.06P	connect appliance to distribution system	appliance is connected to distribution system according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

components: burners, venting, drains, vacuum relief valves, pressure reducing valves, pressure relief valves, anti-scald valves, backflow preventers, tempering valves, domestic water bladder expansion tanks, dielectric fittings, aquastats (heating controls)

Knowledge

Reference Code	Learning Outcomes and Objectives
C-10.04.01L	demonstrate knowledge of oil-fired water heaters, their **components**, characteristics, **applications** and operation
a.	identify oil-fired water heaters and their **components**, and describe their characteristics and **applications**
b.	describe operating principles of oil-fired water heaters and their **components**
c.	interpret information pertaining to oil-fired water heaters found on drawings and specifications
d.	identify water heater sizes for specific applications
e.	identify types of burners
f.	identify flooring materials and related code requirements for oil-fired water heaters
C-10.04.02L	demonstrate knowledge of procedures to install oil-fired water heaters
a.	identify tools and equipment used to install oil-fired water heaters, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of oil-fired water heaters
c.	describe procedures to install oil-fired water heaters

Reference Code	Learning Outcomes and Objectives
C-10.04.03L	demonstrate knowledge of regulatory requirements pertaining to installation of oil-fired water heaters
a.	identify codes, standards and regulations pertaining to installation of oil-fired water heaters
C-10.04.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection
b.	identify practices that reduce the carbon footprint

Range of Variables (include, but not limited to)

components: burners, venting, drains, vacuum relief valves, pressure reducing valves, pressure relief valves, anti-scald valves, backflow preventers, tempering valves, domestic water bladder expansion tanks, dielectric fittings, aquastats (heating controls)
applications: domestic hot water, combination hot water and heating

Major Work Activity D – Installs venting systems, and combustion air and make-up air equipment and components

Task D-11 Installs venting systems

Task Descriptor

Oil heat system technicians install venting systems, and combustion air and make-up air equipment and components. Venting systems convey products of combustion safely outside.

D-11.01 Selects venting system

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
D-11.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
D-11.01.02P	identify type of **venting system** and **components** required	type of **venting system** and **components** required are identified
D-11.01.03P	measure clearances for **venting systems**	clearances for **venting systems** are measured according to codes, standards and regulations, and manufacturers' specifications
D-11.01.04P	calculate capacities for **venting systems**	capacities for **venting systems** are calculated according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

venting systems: chimney, balanced flue, mechanical

components: sealants, ductwork and piping, insulation, fasteners, liners, chimney (pre-fab), direct vents, bricks, grilles, hoods, caps, dampers, fans, controls, wiring, construction material, heater (pre-heat)

Knowledge

Reference Code	Learning Outcomes and Objectives
D-11.01.01L	demonstrate knowledge of **venting systems**, their **components**, characteristics, applications and operation
a.	identify types of **venting systems** and their **components**, and describe their characteristics and applications
b.	describe operating principles of **venting systems**
c.	interpret information pertaining to **venting systems** found on drawings and specifications
d.	explain effect of draft and describe its purpose
e.	explain how chimney draft is measured
f.	explain effects of **improper draft**
D-11.01.02L	demonstrate knowledge of procedures to select **venting systems** and their **components**
a.	identify tools and equipment used to select **venting systems**, and describe their procedures for use
b.	describe procedures to select **venting systems** and their **components**
c.	describe procedures to take measurements and perform calculations for **venting systems**
D-11.01.03L	demonstrate knowledge of regulatory requirements pertaining to selection of **venting systems**
a.	identify codes, standards and regulations pertaining to selection of **venting systems**

Range of Variables (include, but not limited to)

venting systems: chimney, balanced flue, mechanical

components: sealants, ductwork and piping, insulation, fasteners, liners, chimney (pre-fab), direct vents, bricks, grilles, hoods, caps, dampers, fans, controls, wiring, construction material, heater (pre-heat)

improper drafts: air leakage, standby losses, burner air delivery, spillage

D-11.02 Prepares locations for termination

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
D-11.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
D-11.02.02P	measure clearances	clearances are measured according to codes, standards and regulations, and manufacturers' specifications
D-11.02.03P	perform basic carpentry	basic carpentry is performed according to codes, standards and regulations, and manufacturers' specifications
D-11.02.04P	visualize layout of system	layout of system is visualized
D-11.02.05P	perform basic masonry	basic masonry is performed

Knowledge

Reference Code	Learning Outcomes and Objectives
D-11.02.01L	demonstrate knowledge of procedures to prepare locations for termination
a.	identify tools and equipment used to prepare locations for termination, and describe their procedures for use
b.	identify hazards, and describe safe work practices to prepare locations for termination
c.	describe procedures to prepare locations for termination
d.	describe procedures to measure clearances
e.	describe procedures to perform basic carpentry and masonry
D-11.02.02L	demonstrate knowledge of regulatory requirements pertaining to preparation of locations for termination
a.	identify codes, standards and regulations pertaining to preparation of locations for termination

D-11.03 Installs venting components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
D-11.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task
D-11.03.02P	assemble **venting components**	**venting components** are assembled according to codes, standards and regulations, and manufacturers' specifications
D-11.03.03P	apply sealants	sealants are applied according to manufacturers' specifications
D-11.03.04P	fasten and secure **venting components**	**venting components** are fastened and secured according to codes, standards and regulations, and manufacturers' specifications
D-11.03.05P	install liners	liners are installed according to codes, standards and regulations, and manufacturers' specifications
D-11.03.06P	perform basic carpentry	basic carpentry is performed according to codes, standards and regulations, and manufacturers' specifications
D-11.03.07P	perform basic masonry	basic masonry is performed

Range of Variables (include, but not limited to)

venting components: sealants, ductwork and piping, insulation, fasteners, liners, chimney (pre-fab), direct vents, bricks, grilles, hoods, caps, dampers, fans, controls, wiring, construction material, heater (pre-heat)

Knowledge

Reference Code	Learning Outcomes and Objectives
D-11.03.01L	demonstrate knowledge of **venting components**, their characteristics, applications and operation
a.	identify types of **venting components**, and describe their characteristics and applications
b.	identify types of liners, and describe their characteristics and applications
c.	identify types of sealants used for venting, and describe their characteristics and applications
d.	identify types of fasteners and supports used to secure venting, and describe their characteristics and applications
e.	describe operating principles of **venting components**
f.	interpret information pertaining to **venting components** found on drawings and specifications
D-11.03.02L	demonstrate knowledge of procedures to install **venting components**
a.	identify tools and equipment used to install **venting components**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of **venting components**
c.	describe procedures to install **venting components**
d.	describe sequence of installation
e.	describe procedures to perform basic carpentry and masonry
D-11.03.03L	demonstrate knowledge of regulatory requirements pertaining to installation of **venting components**
a.	identify codes, standards and regulations pertaining to installation of **venting components**

Range of Variables (include, but not limited to)

venting components: sealants, ductwork and piping, insulation, fasteners, liners, chimney (pre-fab), direct vents, bricks, grilles, hoods, caps, dampers, fans, controls, wiring, construction material, heater (pre-heat)

D-11.04 Secures venting system to structure

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
D-11.04.01P	select and use tools and equipment	tools and equipment are selected and used according to task
D-11.04.02P	measure support points	support points are measured according to codes, standards and regulations, and manufacturers' specifications
D-11.04.03P	fasten **venting system** to structure	**venting system** is fastened to structure according to codes, standards and regulations, and manufacturers' specifications
D-11.04.04P	apply sealants	sealants are applied according to manufacturers' specifications
D-11.04.05P	perform basic masonry	basic masonry is performed

Range of Variables (include, but not limited to)

venting systems: chimneys, balanced flues, mechanical

Knowledge

Reference Code	Learning Outcomes and Objectives
D-11.04.01L	demonstrate knowledge of **venting systems**, their **components**, characteristics, applications and operation
a.	identify types of **venting systems** and their **components**, and describe their characteristics and applications
b.	describe operating principles of **venting systems**
c.	interpret information pertaining to **venting systems** found on drawings and specifications
d.	identify types of fasteners and supports used to secure **venting system** to structure, and describe their characteristics and applications

Reference Code	Learning Outcomes and Objectives
D-11.04.02L	demonstrate knowledge of procedures to secure **venting system** to structure
a.	identify tools and equipment used to secure **venting system** to structure, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to securing of **venting system** to structure
c.	describe procedures to secure **venting system** to structure
d.	describe sequence of assembly
D-11.04.03L	demonstrate knowledge of regulatory requirements pertaining to securing of **venting system** to structure
a.	identify codes, standards and regulations pertaining to securing of **venting system** to structure

Range of Variables (include, but not limited to)

venting systems: chimneys, balanced flues, mechanical

components: sealants, ductwork and piping, insulation, fasteners, liners, chimney (pre-fab), direct vents, bricks, grilles, hoods, caps, dampers, fans, controls, wiring, construction material, heater (pre-heat)

Task D-12 Installs equipment and components for combustion air and make-up air

Task Descriptor

Oil heat system technicians install equipment and components for combustion air and make-up air. Equipment supplies adequate air for combustion and make-up air and to maintain balanced pressure in the mechanical room.

D-12.01 Selects equipment and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
D-12.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
D-12.01.02P	verify site measurements and clearance for **equipment** and its location/orientation	site measurements and clearance for **equipment** and its location/orientation is verified for serviceability and overall function
D-12.01.03P	verify utilities	required utilities are available
D-12.01.04P	determine location of other equipment	location of other equipment is determined
D-12.01.05P	determine **equipment** and **components**	**equipment** and **components** are determined according to **factors**
D-12.01.06P	verify **equipment** and **component specifications**	**equipment** and **component specifications** are verified according to design specifications, code and operational requirements
D-12.01.07P	calculate size	size is calculated according to codes, standards and regulations, and manufacturers' specifications

Reference Code	Performance Criteria	Evidence of Attainment
D-12.01.08P	determine location of intakes for combustion air and make-up air	location of intakes for combustion air and make-up air is determined according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

equipment: water heaters, forced-air furnaces, hot water boilers

components: fans, ducting, grilles, coil heat exchangers

factors: code requirements, manufacturers' and engineering specifications, system and client requirements, regulations, drawings, site conditions, environmental conditions

component specifications: blower capacity, pressure drops, size, fluid flow, heating/cooling capacity, sensible heating ratio

Knowledge

Reference Code	Learning Outcomes and Objectives
D-12.01.01L	demonstrate knowledge of **equipment** and their **components**, their characteristics, applications, capacities and operation
a.	identify types of **equipment** and their **components**, and describe their characteristics, applications and capacities
b.	describe operating principles of **equipment** and their **components**
c.	interpret information pertaining to **equipment** and their **components** found on drawings and **specifications**
D-12.01.02L	demonstrate knowledge of procedures to select **equipment** and their **components**
a.	identify tools and equipment used to select **equipment** and their **components**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to selection of **equipment** and their **components**
c.	describe procedures to select **equipment** and their **components**
d.	describe procedures to perform measurements and calculations
D-12.01.03L	demonstrate knowledge of regulatory requirements pertaining to selection of **equipment** and their **components**
a.	identify codes, standards and regulations pertaining to selection of **equipment** and their **components**

Range of Variables (include, but not limited to)

equipment: water heaters, forced-air furnaces, hot water boilers

components: fans, ducting, grilles, coil heat exchangers

component specifications: blower capacity, pressure drops, size, fluid flow, heating/cooling capacity, sensible heating ratio

D-12.02 Prepares location for equipment and components for combustion air and make-up air

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
D-12.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
D-12.02.02P	perform basic carpentry	basic carpentry is performed
D-12.02.03P	measure clearances	clearances are measured according to codes, standards and regulations, and manufacturers' specifications to ensure that equipment will fit in location
D-12.02.04P	visualize layout of system	layout of system is visualized

Knowledge

Reference Code	Learning Outcomes and Objectives
D-12.02.01L	demonstrate knowledge of **equipment** and their **components**, their characteristics, applications, capacities and operation
a.	identify types of **equipment** and their **components**, and describe their characteristics, applications and capacities
b.	describe operating principles of **equipment** and their **components**
c.	interpret information pertaining to **equipment** and their **components** found on drawings and specifications

Reference Code	Learning Outcomes and Objectives
D-12.02.02L	demonstrate knowledge of procedures to prepare location for **equipment** and their **components** for combustion air and make-up air
a.	identify tools and equipment used to prepare location for **equipment** and their **components**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to preparation of location for **equipment** and their **components**
c.	describe procedures to prepare location for **equipment** and their **components**
d.	describe procedures to perform basic carpentry
e.	describe procedures to perform measurements and calculations
f.	describe **outside influences** that impact **equipment** and their **components**
g.	describe regional conditions that influence operation of **equipment** and their **components**
D-12.02.03L	demonstrate knowledge of regulatory requirements pertaining to preparation of location for **equipment** and their **components**
a.	identify codes, standards and regulations pertaining to preparation of location for **equipment** and their **components**

Range of Variables (include, but not limited to)

equipment: water heaters, forced-air furnaces, hot water boilers
components: fans, ducting, grilles, coil heat exchangers
outside influences: trees, dust, snow, grass

D-12.03 Assembles equipment and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
D-12.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task

Reference Code	Performance Criteria	Evidence of Attainment
D-12.03.02P	unpack and perform pre-assembly check of **equipment** and their **components**	**equipment** and their **components** are unpacked to ensure quantity and type are correct, in good condition and are compatible with utilities/energy sources, and installation and job specifications
D-12.03.03P	connect **components**	**components** are connected
D-12.03.04P	modify or adjust **equipment** and their **components** including orientation, flow direction, add-on kits and rotations	**equipment** and their **components** including orientation, flow direction, add-on kits and rotations are modified or adjusted to match system orientation and design
D-12.03.05P	apply sealants	sealants are applied according to manufacturers' specifications
D-12.03.06P	confirm final assembly of **equipment** and their **components**	final assembly of **equipment** and their **components** is confirmed according to jurisdictional regulations and manufacturers' specifications

Range of Variables (include, but not limited to)

equipment: water heaters, forced-air furnaces, hot water boilers
components: fans, ducting, grilles, coil heat exchangers

Knowledge

Reference Code	Learning Outcomes and Objectives
D-12.03.01L	demonstrate knowledge of **equipment** and their **components**, their characteristics, applications, capacities and operation
a.	identify types of **equipment** and their **components**, and describe their characteristics, applications and capacities
b.	identify types of sealants, and describe their characteristics, applications and capacities
c.	describe operating principles of **equipment** and their **components**
d.	interpret information pertaining to **equipment** and their **components** found on drawings and specifications

Reference Code	Learning Outcomes and Objectives
D-12.03.02L	demonstrate knowledge of procedures to assemble **equipment** and their **components**
a.	identify tools and equipment used to assemble **equipment** and their **components**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to assembly of **equipment** and their **components**
c.	describe procedures to assemble **equipment** and their **components**
d.	describe sequence of assembly
D-12.03.03L	demonstrate knowledge of regulatory requirements pertaining to assembly of **equipment** and their **components**
a.	identify codes, standards and regulations pertaining to assembly of **equipment** and their **components**

Range of Variables (include, but not limited to)

equipment: water heaters, forced-air furnaces, hot water boilers
components: fans, ducting, grilles, coil heat exchangers

D-12.04 Secures equipment and components to structure

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
D-12.04.01P	select and use tools and equipment	tools and equipment are selected and used according to task
D-12.04.02P	measure spacing for fasteners and supports	spacing for fasteners and supports are measured according to codes, standards and regulations, and manufacturers' specifications
D-12.04.03P	install fasteners and supports	fasteners and supports are installed according to codes, standards and regulations, and manufacturers' specifications

Reference Code	Performance Criteria	Evidence of Attainment
D-12.04.04P	fasten **equipment** and **components** to structure	**equipment** and **components** are fastened to structure according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

equipment: water heaters, forced-air furnaces, hot water boilers

components: fans, ducting, grilles, coil heat exchangers

Knowledge

Reference Code	Learning Outcomes and Objectives
D-12.04.01L	demonstrate knowledge of **equipment** and their **components**, their characteristics, applications, capacities and operation
a.	identify types of **equipment** and their **components**, and describe their characteristics, applications and capacities
b.	identify types of fasteners and supports, and describe their characteristics, applications and capacities
c.	describe operating principles of **equipment** and their **components**
d.	interpret information pertaining to **equipment** and their **components** found on drawings and specifications
D-12.04.02L	demonstrate knowledge of procedures to secure **equipment** and their **components** to structure
a.	identify tools and equipment used to secure **equipment** and their **components** to structure, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to securing of **equipment** and their **components** to structure
c.	describe procedures to secure **equipment** and their **components** to structure
D-12.04.03L	demonstrate knowledge of regulatory requirements pertaining to securing of **equipment** and their **components** to structure
a.	identify codes, standards and regulations pertaining to securing of **equipment** and their **components** to structure
D-12.04.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

equipment: water heaters, forced-air furnaces, hot water boilers
components: fans, ducting, grilles, coil heat exchangers

Major Work Activity E – Installs and tests electrical and electronic systems

Task E-13 Installs electrical and electronic systems

Task Descriptor

Oil heat system technicians install electrical and electronic systems.

Electrical and electronic systems save fuel, work more efficiently and quietly, require less maintenance and provide increased comfort.

E-13.01 Selects controls and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
E-13.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
E-13.01.02P	determine **controls** and **components** to install	**controls** and **components** to install are determined according to codes, standards and regulations, and manufacturers' and engineering specifications
E-13.01.03P	determine **control component** specifications	**control component** specifications are determined according to system design and application, and manufacturers' specifications

Range of Variables (include, but not limited to)

controls: thermostat, aquastat, mixing, pressure, solid state, programmable, electronically commutated motors (ECM), hydronic mixing controls, outdoor reset, system reset

components: fasteners, fans, wiring, interlocks, switches

Knowledge

Reference Code	Learning Outcomes and Objectives
E-13.01.01L	demonstrate knowledge of **controls** and **components**, their characteristics, applications and operation
a.	identify types of **controls** and **components**, and describe their characteristics and applications
b.	describe operating principles of **controls** and **components**
c.	describe sequence of operation of **controls**
d.	interpret information pertaining to **controls** and **components** found on drawings and specifications
E-13.01.02L	demonstrate knowledge of basic electrical principles as they relate to system operation
a.	describe basic electrical theory as it relates to **controls** and **components**
b.	identify units of electrical measurement and symbols
c.	identify hazards and describe safe work practices pertaining to electricity
d.	identify types of **loads**
E-13.01.03L	demonstrate knowledge of procedures to select **controls** and **components**
a.	describe procedures to select **controls** and **components**
E-13.01.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

controls: thermostat, aquastat, mixing, pressure, solid state, programmable, ECM, hydronic mixing controls, outdoor reset, system reset

components: fasteners, fans, wiring, interlocks, switches

loads: motors, transformers, damper motors

E-13.02 Selects location of controls and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
E-13.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
E-13.02.02P	assess placement of **controls**, **loads** and wiring	placement of **controls**, **loads** and wiring are assessed according to serviceability and jurisdictional regulations
E-13.02.03P	measure clearances	clearances are measured according to task and jurisdictional regulations
E-13.02.04P	determine connection routing for **controls** and **components**	connection routing for **controls** and **components** is determined according to drawings, clearances and site visits
E-13.02.05P	determine physical and environmental limitations of **controls** and **loads**	physical and environmental limitations of **controls** and **loads** are determined according to manufacturers' specifications, industry best practices and task

Range of Variables (include, but not limited to)

controls: thermostat, aquastat, mixing, pressure, solid state, programmable, ECM, hydronic mixing controls, outdoor reset, system reset

loads: motors, transformers, damper motors

components: fasteners, fans, wiring, interlocks, switches

Knowledge

Reference Code	Learning Outcomes and Objectives
E-13.02.01L	demonstrate knowledge of **controls** and **components**, their characteristics, applications and operation
a.	identify types of **controls** and **components**, and describe their characteristics and applications
b.	describe operating principles of **controls** and **components**
c.	describe sequence of operation of **controls**
d.	interpret information pertaining to **controls** and **components** found on drawings and specifications
E-13.02.02L	demonstrate knowledge of procedures to select location of **controls** and **components**
a.	identify tools and equipment used to select location of **controls** and **components**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to selecting location of **controls** and **components**
c.	describe procedures to select location of **controls** and **components**
d.	describe sequence of assembly
E-13.02.03L	demonstrate knowledge of regulatory requirements pertaining to selecting location of controls and components
a.	identify codes, standards and regulations pertaining to selecting location of controls and components

Range of Variables (include, but not limited to)

controls: thermostat, aquastat, mixing, pressure, solid state, programmable, ECM, hydronic mixing controls, outdoor reset, system reset

components: fasteners, fans, wiring, interlocks, switches

E-13.03 Installs controls and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
E-13.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task
E-13.03.02P	install wire	wire is installed according to clearances, task, codes, standards and regulations
E-13.03.03P	install fasteners and supports	fasteners and supports are installed according to clearances, task, codes, standards and regulations
E-13.03.04P	fasten **controls** and **components**	**controls** and **components** are fastened according to manufacturers' specifications and task

Range of Variables (include, but not limited to)

controls: thermostat, aquastat, mixing, pressure, solid state, programmable, ECM, hydronic mixing controls, outdoor reset, system reset

components: fasteners, fans, wiring, interlocks, switches

Knowledge

Reference Code	Learning Outcomes and Objectives
E-13.03.01L	demonstrate knowledge of **controls** and **components**, their characteristics, applications and operation
a.	identify types of **controls** and **components**, and describe their characteristics and applications
b.	describe operating principles of **controls** and **components**
c.	describe sequence of operation of **controls**

Reference Code	Learning Outcomes and Objectives
d.	interpret information pertaining to **controls** and **components** found on drawings and specifications
e.	identify types of fasteners and supports used to install **controls** and **components**
E-13.03.02L	demonstrate knowledge of procedures to install **controls** and **components**
a.	identify tools and equipment used to install **controls** and **components**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to installation of **controls** and **components**
c.	describe procedures to install **controls** and **components**
E-13.03.03L	demonstrate knowledge of regulatory requirements pertaining to installation of **controls** and **components**
a.	identify codes, standards and regulations pertaining to installation of **controls** and **components**

Range of Variables (include, but not limited to)

controls: thermostat, aquastat, mixing, pressure, solid state, programmable, ECM, hydronic mixing controls, outdoor reset, system reset
components: fasteners, fans, wiring, interlocks, switches

Task E-14 Tests electrical and electronic systems

Task Descriptor
Oil heat system technicians are responsible for testing related electrical and electronic systems for safety and functionality.

E-14.01 Cycles appliance controls

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
E-14.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
E-14.01.02P	operate appliance controls	appliance controls are operated according to manufacturers' specifications and task
E-14.01.03P	monitor sequence of operation of system	sequence of operation of system is monitored according to manufacturers' specifications

Knowledge

Reference Code	Learning Outcomes and Objectives
E-14.01.01L	demonstrate knowledge of appliance controls, their characteristics, applications and operation
a.	identify appliance controls, and describe their characteristics and applications
b.	describe operating principles of appliance controls
c.	interpret information pertaining to appliance controls found on drawings and specifications

Reference Code	Learning Outcomes and Objectives
E-14.01.02L	demonstrate knowledge of procedures to cycle appliance controls
a.	identify tools and equipment used to cycle appliance controls, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to cycling of appliance controls
c.	describe procedures to cycle appliance controls
d.	describe sequence of operation of system

E-14.02 Checks operating and safety controls

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
E-14.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
E-14.02.02P	verify safety controls	safety controls are verified by overriding operating components according to industry best practices and task
E-14.02.03P	trace circuits	circuits are traced to troubleshoot safety controls according to manufacturers' specifications
E-14.02.04P	verify that controls are operational through full cycle	controls are operational through full cycle according to manufacturers' specifications

Knowledge

Reference Code	Learning Outcomes and Objectives
E-14.02.01L	demonstrate knowledge of operating and safety controls, their components, characteristics, applications and operation
a.	identify types of operating and safety controls, and describe their characteristics and applications
b.	describe operating principles of operating and safety controls
c.	interpret information pertaining to operating and safety controls found on drawings and specifications
d.	describe sequence of operation for system
e.	identify types of circuits, and describe their characteristics and applications
f.	identify set points, and describe their characteristics and applications
E-14.02.02L	demonstrate knowledge of procedures to check operating and safety controls
a.	identify tools and equipment used to check operating and safety controls, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to checking of operating and safety controls
c.	describe procedures to verify and troubleshoot operating and safety controls

E-14.03 Checks accessories and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
E-14.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task
E-14.03.02P	test circuits, **accessories** and **components**	circuits, **accessories** and **components** are tested according to manufacturers' specifications

Reference Code	Performance Criteria	Evidence of Attainment
E-14.03.03P	interpret readings	readings are interpreted according to system
E-14.03.04P	verify that circuits, **accessories** and **components** are operational through full cycle	circuits, **accessories** and **components** are operational through full cycle according to manufacturers' specifications

Range of Variables (include, but not limited to)

accessories: zone valves, booster pumps, air cleaning devices, switching relays, transformers, zone panels

components: circulators, blower motors, burners

Knowledge

Reference Code	Learning Outcomes and Objectives
E-14.03.01L	demonstrate knowledge of circuits, **accessories** and **components**, their characteristics, applications and operation
a.	identify types of circuits, **accessories** and **components**, and describe their characteristics and applications
b.	describe operating principles of circuits, **accessories** and **components**
c.	interpret information pertaining to circuits, **accessories** and **components** found on drawings and specifications
d.	describe sequence of operation for system
e.	identify types of circuits, and describe their characteristics and applications
f.	identify set points, and describe their characteristics and applications
E-14.03.02L	demonstrate knowledge of procedures to check circuits, **accessories** and **components**
a.	identify tools and equipment used to check circuits, **accessories** and **components**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to circuits, **accessories** and **components**
c.	describe procedures to check circuits, **accessories** and **components**

Range of Variables (include, but not limited to)

accessories: zone valves, booster pumps, air cleaning devices, switching relays, transformers, zone panels

components: circulators, blower motors, burners

E-14.04 Sets up operating parameters

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
E-14.04.01P	select and use tools and equipment	tools and equipment are selected and used according to task
E-14.04.02P	verify **operating parameters**	**operating parameters** are verified according to manufacturers' specifications, site conditions and client requirements
E-14.04.03P	adjust **operating controls**	**operating controls** are adjusted according to manufacturers' specifications, site conditions and client requirements
E-14.04.04P	adjust equipment and components	equipment and components are adjusted according to system design

Range of Variables (include, but not limited to)

operating parameters: alarm, humidity, temperature, pressures, flow, levels
operating controls: thermostat, limit controls (aquastat, fan and limit control, fan center board), pressure, mixing, solid state, programmable, ECM, hydronic mixing controls, low water cut-off

Knowledge

Reference Code	Learning Outcomes and Objectives
E-14.04.01L	demonstrate knowledge of **operating parameters**, their characteristics, applications and operation
a.	identify **operating parameters**, and describe their characteristics and applications
b.	describe operating principles of **operating parameters**
c.	interpret information pertaining to **operating parameters** found on drawings and specifications

Reference Code	Learning Outcomes and Objectives
E-14.04.02L	demonstrate knowledge of procedures to check **operating parameters**
a.	identify tools and equipment used to check **operating parameters**, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to checking of **operating parameters**
c.	describe procedures to check **operating parameters**

Range of Variables (include, but not limited to)

operating parameters: alarm, humidity, temperature, pressures, flow, levels

Major Work Activity F – Performs maintenance, diagnosis, repair and removal

Task F-15 Maintains oil-fired heating systems and components

Task Descriptor

Oil heat system technicians maintain oil-fired heating systems and components which helps to ensure that the system operates safely, efficiently and economically. These systems include all oil-fired appliances as well as portable heating equipment.

F-15.01 Checks oil-fired heating system and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-15.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-15.01.02P	review service history	service history is reviewed
F-15.01.03P	inspect equipment	equipment is inspected to determine its condition
F-15.01.04P	identify potential problem areas	potential problem areas are identified

Knowledge

Reference Code	Learning Outcomes and Objectives
F-15.01.01L	demonstrate knowledge of oil-fired heating systems, their components, characteristics, applications and operation
a.	identify types of oil-fired heating systems and their components, and describe their characteristics and applications

Reference Code	Learning Outcomes and Objectives
b.	describe operating principles of oil-fired heating systems and their components
c.	interpret information pertaining to oil-fired heating systems and their components found on drawings and specifications
F-15.01.02L	demonstrate knowledge of procedures to check oil-fired heating systems and their components
a.	identify tools and equipment used to check oil-fired heating systems and their components, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to checking of oil-fired heating systems and their components
c.	describe procedures to check oil-fired heating systems and their components
d.	identify potential problems of oil-fired heating systems and their components
F-15.01.03L	demonstrate knowledge of regulatory requirements pertaining to checking of oil-fired heating systems and their components
a.	identify codes, standards and regulations pertaining to checking of oil-fired heating systems and their components
F-15.01.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

F-15.02 Cleans oil-fired heating appliances and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-15.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-15.02.02P	drain and recharge expansion tanks	expansion tanks are drained and recharged according to manufacturers' specifications
F-15.02.03P	clean distribution fan	distribution fan is cleaned according to manufacturers' specifications
F-15.02.04P	clean burner components	burner components are cleaned according to manufacturers' specifications
F-15.02.05P	clean **exhaust components**	**exhaust components** are cleaned according to manufacturers' specifications
F-15.02.06P	clean oil-fired heating appliance	oil-fired heating appliance is cleaned according to manufacturers' specifications
F-15.02.07P	set or adjust temperature and pressure controls	temperature and pressure controls are set and adjusted according to manufacturers' specifications

Range of Variables (include, but not limited to)

exhaust components: sidewall vents, direct vents, smoke pipe, chimneys (certification may be required in some jurisdictions)

Knowledge

Reference Code	Learning Outcomes and Objectives
F-15.02.01L	demonstrate knowledge of cleaning materials, their characteristics and applications
a.	identify types of cleaning materials, and describe their characteristics and applications
b.	interpret information pertaining to cleaning materials found in specifications
F-15.02.02L	demonstrate knowledge of procedures and **methods** used to clean oil-fired heating appliances and components
a.	identify tools and equipment used to clean oil-fired heating appliances and components, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to cleaning of oil-fired heating appliances and components
c.	describe procedures and **methods** used to clean oil-fired heating appliances and components
F-15.02.03L	demonstrate knowledge of regulatory requirements pertaining to cleaning of oil-fired heating appliances and components
a.	identify codes, standards and regulations pertaining to cleaning of oil-fired heating appliances and components
F-15.02.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

methods: vacuuming, flushing, washing

F-15.03 Changes preventative maintenance components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-15.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-15.03.02P	access **preventative maintenance components**	**preventative maintenance components** are accessed
F-15.03.03P	install new **preventative maintenance components**	new **preventative maintenance components** are installed according to manufacturers' specifications
F-15.03.04P	perform efficiency test on flue gases	efficiency test on flue gases is performed according to codes, standards and regulations, and manufacturers' specifications

Range of Variables (include, but not limited to)

preventative maintenance components: nozzles, oil filters, air filters, fan belts, gaskets

Knowledge

Reference Code	Learning Outcomes and Objectives
F-15.03.01L	demonstrate knowledge of **preventative maintenance components**, their characteristics, applications and operation
a.	identify types of **preventative maintenance components**, and describe their characteristics and applications
b.	describe operating principles of **preventative maintenance components**
c.	interpret information pertaining to **preventative maintenance components** found in specifications
F-15.03.02L	demonstrate knowledge of procedures to change **preventative maintenance components**
a.	identify tools and equipment used to change **preventative maintenance components**, and describe their procedures for use

Reference Code	Learning Outcomes and Objectives
b.	identify hazards, and describe safe work practices pertaining to changing of **preventative maintenance components**
c.	describe procedures to change **preventative maintenance components**
d.	describe sequence of changing **preventative maintenance components**
F-15.03.03L	demonstrate knowledge of regulatory requirements pertaining to changing of **preventative maintenance components**
a.	identify codes, standards and regulations pertaining to changing of **preventative maintenance components**
F-15.03.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

preventative maintenance components: nozzles, oil filters, air filters, fan belts, gaskets

F-15.04 Lubricates moving components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-15.04.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-15.04.02P	choose type of lubricant	type of lubricant is chosen according to manufacturers' specifications
F-15.04.03P	apply lubricant to components	lubricant is applied to components according to **manufacturers' requirements** and specifications

Range of Variables (include, but not limited to)

manufacturers' requirements: frequency, locations, amount of lubricant

Knowledge

Reference Code	Learning Outcomes and Objectives
F-15.04.01L	demonstrate knowledge of lubricants, their characteristics and applications
a.	identify types of lubricants, and describe their characteristics and applications
b.	interpret information pertaining to lubricants found in specifications
F-15.04.02L	demonstrate knowledge of procedures to apply lubricants
a.	identify tools and equipment used to apply lubricants, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to application of lubricants
c.	describe procedures to apply lubricants
F-15.04.03L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Task F-16 Diagnoses oil-fired heating systems and components

Task Descriptor

Oil heat system technicians must be familiar with diagnostic techniques to enable safe, economical and efficient repairs.

F-16.01 Checks for electrical problems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-16.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-16.01.02P	interpret component schematics	component schematics are interpreted

Reference Code	Performance Criteria	Evidence of Attainment
F-16.01.03P	perform **checks** on electrical components	**checks** on electrical components are performed according to manufacturers' specifications to identify problems

Range of Variables (include, but not limited to)

checks: polarity, continuity, voltage, amperage, resistance

Knowledge

Reference Code	Learning Outcomes and Objectives
F-16.01.01L	demonstrate knowledge of basic electronic and electrical principles as they relate to system operation
a.	describe basic electronic theory as it relates to controls and components
b.	identify units of electrical measurement and symbols
c.	identify hazards, and describe safe work practices pertaining to electricity
d.	interpret electrical component schematics
F-16.01.02L	demonstrate knowledge of procedures to check components for electrical problems
a.	identify tools and equipment used to check components for electrical problems, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to checking components for electrical problems
c.	describe procedures to check components for electrical problems
d.	identify types of **checks** performed on electrical components
e.	identify potential problems with electrical components
F-16.01.03L	demonstrate knowledge of regulatory requirements pertaining to checking components for electrical problems
a.	identify codes, standards and regulations pertaining to checking components for electrical problems

Range of Variables (include, but not limited to)

checks: polarity, continuity, voltage, amperage, resistance

F-16.02 Checks for burner problems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-16.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-16.02.02P	perform **checks** on burners and their components	**checks** on burners and their components are performed according to manufacturers' specifications to identify problems

Range of Variables (include, but not limited to)

checks: fuel supply, ignition, flame, safety features (e.g., primary controls, flame sensors)

Knowledge

Reference Code	Learning Outcomes and Objectives
F-16.02.01L	demonstrate knowledge of burners and their components, their characteristics, applications and operation
a.	identify types of burners and their components, and describe their characteristics and applications
b.	describe operating principles of burners and their components
c.	interpret information pertaining to burners and their components found in specifications
F-16.02.02L	demonstrate knowledge of procedures to check burners and their components
a.	identify tools and equipment used to check burners and their components, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to checking of burners and their components
c.	describe procedures to check burners and their components
d.	identify types of **checks** performed on burners and their components
e.	identify potential problems with burners and their components

Reference Code	Learning Outcomes and Objectives
F-16.02.03L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

checks: fuel supply, ignition, flame, safety features (e.g., primary controls, flame sensors)

F-16.03 Checks for distribution problems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-16.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-16.03.02P	perform **checks** on distribution system	**checks** on distribution system are performed according to manufacturers' specifications to identify source of **problem**
F-16.03.03P	isolate source of **problem**	source of **problem** is isolated

Range of Variables (include, but not limited to)

checks: airflow (filters, fan belts), thermostats, fuel lines, pumps, zone valves, controls (limit, safety)

problems: no heat, insufficient heat, excessive heat

Knowledge

Reference Code	Learning Outcomes and Objectives
F-16.03.01L	demonstrate knowledge of distribution systems, their components, characteristics, applications and operation
a.	identify distribution systems and their components, and describe their characteristics and applications
b.	describe operating principles of distribution systems and their components
c.	interpret information pertaining to distribution systems found on drawings and specifications
F-16.03.02L	demonstrate knowledge of procedures to check distribution systems
a.	identify tools and equipment used to check distribution systems, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to checking of distribution systems
c.	describe procedures to check distribution systems
d.	identify types of **checks** performed on distribution systems
e.	identify potential **problems** with distribution systems and their components
F-16.03.03L	demonstrate knowledge of regulatory requirements pertaining to checking of distribution systems
a.	identify codes, standards and regulations pertaining to checking of distribution systems
F-16.03.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

checks: airflow (filters, fan belts), thermostats, fuel lines, pumps, zone valves, controls (limit, safety)

problems: no heat, insufficient heat, excessive heat

F-16.04 Checks for problems with distribution system for combustion air and make-up air

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-16.04.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-16.04.02P	perform **checks** on distribution system for combustion air and make-up air	**checks** on distribution system for combustion air and make-up air are performed according to codes, standards and regulations, and manufacturers' specifications to identify source of **problems**

Range of Variables (include, but not limited to)

checks: blockages, pressure differential

problems: building alterations and additions, new exhaust system

Knowledge

Reference Code	Learning Outcomes and Objectives
F-16.04.01L	demonstrate knowledge of distribution systems for combustion air and make-up air, their characteristics, applications and operation
a.	identify distribution systems for combustion air and make-up air, and describe their characteristics and applications
b.	describe operating principles of distribution systems for combustion air and make-up air
c.	interpret information pertaining to distribution systems for combustion air and make-up air found in specifications
F-16.04.02L	demonstrate knowledge of procedures to check for **problems** with distribution systems for combustion air and make-up air
a.	identify tools and equipment used to check for **problems** with distribution systems for combustion air and make-up air, and describe their procedures for use

Reference Code	Learning Outcomes and Objectives
	b. identify hazards, and describe safe work practices pertaining to checking for **problems** with distribution systems for combustion air and make-up air
	c. describe procedures to check for **problems** with distribution systems for combustion air and make-up air
	d. identify types of **checks** performed on distribution systems for combustion air and make-up air
	e. identify potential **problems** with distribution systems for combustion air and make-up air

Range of Variables (include, but not limited to)

problems: building alterations and additions, new exhaust system

checks: blockages, pressure differential

Task F-17 Repairs oil-fired heating systems and components

Task Descriptor

Oil heat system technicians repair oil-fired heating systems and components to return the system to its correct and safe operation.

F-17.01 Corrects electrical problems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-17.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-17.01.02P	interpret component schematics	component schematics are interpreted
F-17.01.03P	lock out equipment	equipment is locked out according to jurisdictional regulations
F-17.01.04P	reset switches and breakers	switches and breakers are reset

Reference Code	Performance Criteria	Evidence of Attainment
F-17.01.05P	replace defective electrical components	defective electrical components are replaced according to manufacturers' specifications
F-17.01.06P	repair damaged wires and terminals	damaged wires and terminals are repaired according to codes, standards and regulations, and manufacturers' specifications

Knowledge

Reference Code	Learning Outcomes and Objectives
F-17.01.01L	demonstrate knowledge of electrical components, their characteristics, applications and operation
a.	identify types of electrical components, and describe their characteristics and applications
b.	describe operating principles of electrical components
c.	interpret information pertaining to electrical components found on drawings and specifications
F-17.01.02L	demonstrate knowledge of basic electrical principles as they relate to system operation
a.	describe basic electronic theory as it relates to electrical components
b.	identify units of electrical measurement and symbols
F-17.01.03L	demonstrate knowledge of procedures to correct electrical components
a.	identify tools and equipment used to correct electrical components, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to correction of electrical components
c.	describe procedures to correct electrical components
F-17.01.04L	demonstrate knowledge of regulatory requirements pertaining to correction of electrical components
a.	identify codes, standards and regulations pertaining to correction of electrical components

F-17.02 Corrects burner problems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-17.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-17.02.02P	interpret burner component schematics	burner component schematics are interpreted
F-17.02.03P	repair and replace defective burner components	defective burner components are repaired and replaced according to manufacturers' specifications
F-17.02.04P	set operating parameters	operating parameters are set according to manufacturers' specifications
F-17.02.05P	reset burner components	burner components are reset according to manufacturers' specifications

Knowledge

Reference Code	Learning Outcomes and Objectives
F-17.02.01L	demonstrate knowledge of burner components, their characteristics, safety features, applications and operation
a.	identify types of burner components, and describe their characteristics, safety features and applications
b.	describe operating principles of burner components
c.	interpret information pertaining to burner components found on drawings and specifications
F-17.02.02L	demonstrate knowledge of procedures to correct burner components
a.	identify tools and equipment used to correct burner components, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to correction of burner components

Reference Code	Learning Outcomes and Objectives
c.	describe procedures to correct burner components
F-17.02.03L	demonstrate knowledge of regulatory requirements pertaining to correction of burner components
a.	identify codes, standards and regulations pertaining to correction of burner components
F-17.02.04L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

F-17.03 Corrects distribution problems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-17.03.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-17.03.02P	interpret distribution component schematics	distribution component schematics are interpreted
F-17.03.03P	repair and replace defective distribution components	defective distribution components are repaired and replaced according to manufacturers' specifications
F-17.03.04P	purge hydronic distribution system	hydronic distribution system is purged
F-17.03.05P	realign and adjust drive belts and pulleys	drive belts and pulleys are realigned and adjusted according to manufacturers' specifications
F-17.03.06P	set operating parameters	operating parameters are set according to manufacturers' specifications

Knowledge

Reference Code	Learning Outcomes and Objectives
F-17.03.01L	demonstrate knowledge of distribution systems and their components, their characteristics, applications and operation
a.	identify types of distribution systems and their components, and describe their characteristics and applications
b.	describe operating principles of distribution systems and their components
c.	interpret information pertaining to distribution systems and their components found in specifications
F-17.03.02L	demonstrate knowledge of procedures to correct distribution system components
a.	identify tools and equipment used to correct distribution system components, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to correction of distribution system components
c.	describe procedures to correct distribution system components
F-17.03.03L	demonstrate knowledge of regulatory requirements pertaining to correction of distribution system components
a.	identify codes, standards and regulations pertaining to correction of distribution system components

Task F-18 Removes appliances and components

Task Descriptor

Oil heat system technicians remove unsafe, inefficient and defective appliances and components. Proper storage and disposal of waste products and components is imperative.

F-18.01 Decommissions appliances and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-18.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-18.01.02P	identify **waste products**	**waste products** are identified
F-18.01.03P	identify **waste products** that can be recycled	**waste products** that can be recycled are identified
F-18.01.04P	disconnect utilities	utilities are disconnected
F-18.01.05P	drain system	system is drained
F-18.01.06P	seal breeches	breeches are sealed
F-18.01.07P	strap ductwork and piping	ductwork and piping are strapped according to code
F-18.01.08P	disassemble appliance and components	appliance and components are disassembled

Range of Variables (include, but not limited to)

waste products: fuel tanks, oil, glycol, mercury, heavy metals, asbestos, contaminated soil

Knowledge

Reference Code	Learning Outcomes and Objectives
F-18.01.01L	demonstrate knowledge of appliances and their components, their characteristics, applications and operation
a.	identify types of appliances and their components, and describe their characteristics and applications
b.	describe operating principles of appliances and their components
c.	interpret information pertaining to appliances and their components found in specifications
F-18.01.02L	demonstrate knowledge of procedures to decommission appliances and their components
a.	identify tools and equipment used to decommission appliances and their components, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to decommissioning of appliances and their components
c.	identify hazards, and describe safe work practices pertaining to handling of **waste products**
d.	describe procedures to decommission appliances and their components
F-18.01.03L	demonstrate knowledge of training and certification requirements for handling of **waste products**
a.	identify training and certification requirements to handle **waste products**
F-18.01.04L	demonstrate knowledge of regulatory requirements pertaining to decommissioning of appliances and their components
a.	identify codes, standards and regulations pertaining to decommissioning of appliances and their components
b.	identify codes, standards and regulations pertaining to handling of **waste products**
F-18.01.05L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

waste products: fuel tanks, oil, glycol, mercury, heavy metals, asbestos, contaminated soil

F-18.02 Disposes of waste products

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	NV	NV	NV	NV	NV	yes	yes	yes

Skills

Reference Code	Performance Criteria	Evidence of Attainment
F-18.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
F-18.02.02P	interpret **information** on disposal of **waste products**	**information** on disposal of **waste products** is interpreted
F-18.02.03P	select containment systems	containment systems are selected according to type of **waste product**
F-18.02.04P	handle and dispose of **waste products** and containment systems	**waste products** and containment systems are handled and disposed of according to jurisdictional regulations and site conditions

Range of Variables (include, but not limited to)

information: jurisdictional guidelines, requirements and regulations; WHMIS; TDG regulations; signage requirements; local resources for disposal of waste products (e.g., environmental agencies, coast guard and certified disposal companies)

waste products: fuel tanks, oil, glycol, mercury, heavy metals, asbestos, contaminated soil

Knowledge

Reference Code	Learning Outcomes and Objectives
F-18.02.01L	demonstrate knowledge of **waste products**, their characteristics and applications
a.	identify types of **waste products**, and describe their characteristics and applications
b.	interpret **information** pertaining to **waste products**
c.	identify types of containment systems used for **waste products**, and describe their characteristics and applications
F-18.02.02L	demonstrate knowledge of procedures to dispose of **waste products** and containment systems

Reference Code	Learning Outcomes and Objectives
a.	identify tools and equipment used to dispose of **waste products** and containment systems, and describe their procedures for use
b.	identify hazards, and describe safe work practices pertaining to disposal of **waste products** and containment systems
c.	describe procedures to dispose of **waste products** and containment systems
F-18.02.03L	demonstrate knowledge of training and certification requirements to dispose of **waste products** and containment systems
a.	identify training and certification requirements to dispose of **waste products** and containment systems
F-18.02.04L	demonstrate knowledge of regulatory requirements pertaining to disposal of **waste products** and containment systems
a.	identify codes, standards and regulations pertaining to disposal of **waste products** and containment systems
F-18.02.05L	demonstrate knowledge of sustainability and environmental stewardship practices
a.	identify practices that contribute to environmental protection

Range of Variables (include, but not limited to)

waste products: fuel tanks, oil, glycol, mercury, heavy metals, asbestos, contaminated soil

information: jurisdictional guidelines, requirements and regulations; WHMIS; TDG regulations; signage requirements; local resources for disposal of waste products (e.g., environmental agencies, coast guard and certified disposal companies)

Appendix A - Acronyms

AI	artificial intelligence
ANSI	American National Standards Institute
BTU	British Thermal Unit
CCUS	carbon capture, utilization and storage
CEC	Canadian Electrical Code
CNZEAA	Canadian Net-Zero Emissions Accountability Act
CSA	Canadian Standards Association
ECM	electronically commutated motors
EMS	energy management system
HVAC	heating, ventilation and air conditioning
ID	inside diameter
IoT	Internet of Things
IPS	Iron Pipe Size
LEED	Leadership in Energy and Environmental Design
MEWP	mobile elevated work platform
NBC	National Building Code of Canada
NECB	National Energy Code of Canada for Buildings
NFPA	National Fire Protection Association
NPC	National Plumbing Code of Canada
OD	outside diameter
OEM	original equipment manufacturer
OHS	Occupational Health and Safety
OSV	oil safety valves
PPE	personal protective equipment
PEX	cross-linked polyethylene
TDG	Transportation of Dangerous Goods
ULC	Underwriters Laboratory of Canada
UV	ultraviolet
WETT	Wood Energy Technology Transfer
WHMIS	Workplace Hazardous Materials Information System
ZCB	Zero Carbon Building
ZEV	zero-emission vehicles

Appendix B - Tools and Equipment / Outils et équipement

Personal Protective Equipment (PPE) and Safety Equipment / Équipement de protection individuelle et équipement de sécurité

dust masks	masques antipoussières
ear plugs	protège tympans
face shields	écrans facial
fall arrest equipment	protection antichute
fire extinguishers	extincteur
first aid kits	trousses de premiers soins
gas detection devices	détecteurs de gaz
gloves	gants
hard hats	casques de protection
portable eye wash	douche oculaire portative
pylons	pylônes
respirators	respirateurs
safety boots	bottes de sécurité
safety glasses	lunettes de sécurité
safety tape	ruban de sécurité

Hand Tools / Outils à main

adjustable pliers	pinces réglable
alignment bars	barres d'alignement
aviation snips	cisailles de type aviation
burner brushes	brosses à brûleur
caulking guns	pistolets à calfeutrer
copper tube cutters	coupe-tubes en cuivre
duct folders	plieuses à conduit
duct stretchers	machines à étirer les conduits
easy outs	extracteurs
expansion tools	outils d'expansion
flame mirrors (chimney mirrors)	miroirs d'examen de la flamme
flaring tools	outils d'évasion
flashlights	lampes de poche
folding pliers	plieuse manuelle
grease guns	pistolets graisseur

hacksaws	scies à métaux
hammers (ball-peen, chipping, claw, sheet metal)	marteaux (à panne ronde, à piquer, fendu, de ferblantier)
hand hole saws	scies-cloche manuelle
levels	niveaux
linesman pliers	pinces d'électricien
locking pliers	pinces-étau
lock-out devices	dispositifs de verrouillage
needle nose pliers	pinces à long bec ou à bec effilé
nut drivers	tourne écrous
plastic pipe crimpers	appareils à sertir les tuyaux de plastique
plastic pipe cutters	coupe-tubes de plastique
plumb bobs	fils à plomb
porcelain cutters	couteaux à porcelaine
pry bars	leviers
pullers	extracteurs
reamers	alésoirs
scrapers	grattoirs
screwdrivers	tournevis
sheet metal crimpers	sertisseurs de tôle
side cutters	pince coupantes diagonale
steel pipe cutters	coupe tuyaux en acier
steel pipe reamers	alésoirs à tuyau en acier
squares	équerres
tap and die sets	jeu de tarauds et filières
wrenches (adjustable, socket, torque, hex, box-end, combination, nozzle, oil filter, open end, pipe)	clés (à molette, à douille, dynamométrique, hexagonales, polygonales, mixte, pour l'ajutage, pour filtre à huile, à fourche, serre-tube)
trouble lights	lampes de service
trowels	truelles
tube benders	cintreuse à tubes
tube reamers	alésoir à tubes
utility knives	couteaux
wire crimpers	sertisseurs de fil
wire strippers	pinces à dénuder

Power Tools / Outils mécaniques

circular saws	scies circulaire
compaction equipment	matériel de compactage
compressed air equipment	équipement à air comprimé
cut-off saws	scies à tronçonner
electrical or battery-operated drills	perceuses électrique ou rechargeable
hammer drills	marteaux perforateur
jigsaws	scies sauteuse
masonry cutting tools	couteaux à maçonnerie
pipe crimping tools (copper and black iron)	pinces à sertir
powder actuated tools	fixateurs à cartouches
power grinders	meuleuses électrique
power nibblers	grignoteuses électrique
power pipe threaders	fileteuses à tuyaux
pressure washers	nettoyeurs à haute pression
reciprocating saws	scies alternative
vacuum cleaners	aspirateurs

Measuring and Testing Equipment / Équipement de mesure et d'essai

ammeters	ampèremètres
anemometers	anémomètres
calculators	calculatrices
calliper gauges	jauges à coulisse
callipers	pieds à coulisse
CO analyzers	analyseurs de CO
CO_2 testing equipment	matériels de mesure du CO_2
combustion analyzers (multiple gases)	analyseurs de combustion (plusieurs gaz)
control component testers	vérificateurs des dispositifs de commande
draft testing equipment	matériel de mesure du tirage
flame signal meters	appareils de mesure du signal d'intensité de la flamme
heat guns	pistolets thermique
hygrometers	hygromètres
magnehelic gauges	débitmètres à hélice
manometers	manomètres
measuring tapes	rubans à mesurer
megohmmeters	mégohmmètres

multimeters (voltage sticks)	multimètres (détecteurs de tension)
O_2 testing equipment	matériels de mesure du O_2
potentiometers	potentiomètres
pressure gauges	manomètres
pyrometers	pyromètres
sling psychrometers	psychromètres fronde
smoke testing equipment	appareils de mesure de fumée
stud sensors	localisateurs de montants
temperature testing equipment	vérificateurs d'endurance thermique
test lamps	lampes témoin au néon
T-gauges	jauges en T
vacuum gauges	jauges à vide
velocity meters	indicateurs de vitesse

Hoisting, Lifting and Rigging Equipment / Équipement de levage et de gréage

chain falls	palans à chaîne
come-alongs	treuils manuel
hand carts	chariots à plateforme
hydraulic jacks	crics hydraulique
ladders	échelles
mobile elevated work platform (MEWP) (scissor lifts, telescoping and articulating boom lifts)	plateformes élévatrice mobile de travail - PEMP – (plateformes élévatrices à ciseaux électrique, flèches télescopiques et nacelles élévatrices à flèche articulée)
power lift carts	tables élévatrice électrique
rigging equipment	matériels de montage
scaffolding	échafaudages

Soldering, Flaring and Threading Equipment / Équipement de soudage, d'évasement et de filetage

cutting torches	chalumeaux
magnetic patches	patch d'usure magnétique
manual pipe threader	filières à tuyaux manuelle
soldering torches	chalumeaux braseur

Business and Communication Equipment / Équipement commercial et de communication

computers and tablets	ordinateurs et tablettes
smartphones	téléphones intelligent
digital cameras	appareils photo numérique
fax machines	télécopieurs
photocopiers	photocopieurs
printers	imprimantes
two-way radios	radios émetteur-récepteur

Appendix C - Glossary / Glossaire

appliance	a device to convert fuel into energy, and including all components, controls, wiring, and piping required as part of the device by the applicable standard	**appareil de chauffage**	dispositif servant à transformer le combustible en énergie et comprenant les composantes, les organes de commande, le câblage et les canalisations prescrites par les normes en vigueur
boiler	an appliance intended to supply hot water or steam for space heating, processing or power purposes	**chaudière**	appareil destiné à fournir de l'eau ou de la vapeur aux fins du chauffage des locaux, d'un procédé ou de la production d'électricité
burner	a device or group of devices forming an integral unit for the introduction of fuel, with or without air or oxygen, into the combustion zone for ignition	**brûleur**	dispositif ou ensemble intégré de dispositifs assurant la distribution du combustible, avec ou sans la présence d'air ou d'oxygène, dans la zone de combustion pour permettre l'allumage
chimney	a primarily vertical shaft enclosing at least one vent for conducting flue gases to the outside atmosphere	**cheminée**	colonne généralement verticale comprenant au moins un conduit d'évacuation pour acheminer les gaz de carneau à l'extérieur
combustion air	the air required for satisfactory combustion of fuel, including excess air	**air de combustion**	air requis pour assurer une combustion satisfaisante du combustible, y compris de l'excès d'air
component	an essential part of an appliance that may be certified separately from the appliance	**composant**	partie essentielle d'un appareil pouvant faire l'objet d'une homologation distincte

damper	a movable plate or valve for regulating the flow of air or flue gas	**registre**	plaque ou volet mobile servant à régler le débit de l'air ou des gaz de carneau
de-aerators	devices used for the removal of oxygen and other dissolved gases from the boiler feed water or fuel oil supply line	**dégazeur**	dispositifs utilisés pour retirer l'oxygène et tout autre gaz dissout de l'eau d'alimentation d'une chaudière ou d'une canalisation d'alimentation en mazout
decommission	take out of service, dismantle and make safe	**mettre hors service**	arrêter un appareil, le démonter et le rendre sûr
dump zone	safety bypass that diverts the excess temperature and pressure in the heating system	**zone de surplus**	élément de sécurité permettant à l'excédent de température et de pression d'être envoyés dans le système de chauffage
forced-air furnace	a furnace equipped with a blower which provides the primary means for circulation of air (refer to furnace)	**fournaise à air pulsé**	appareil de chauffage équipé d'une soufflante servant de principal moyen de circulation de l'air (se reporter à fournaise)
fuel oil	kerosene or any hydrocarbon oil as classified in CSA Standards B140	**mazout**	kérosène ou tout hydrocarbure classé selon la norme B140 de l'Association canadienne de normalisation (CSA)
furnace	a space-heating appliance, using warm air as the heating medium, and usually having provision for the attachment of ducts	**fournaise**	appareil de chauffage des locaux utilisant l'air chaud comme fluide caloporteur et pouvant, généralement, être raccordé à des conduits
heat exchanger	the firebox and any auxiliary heat transfer surfaces within the casing of an appliance	**échangeur de chaleur**	foyer et toute autre surface de transfert thermique à l'intérieur du bâti d'un appareil
ignition	establishment of a flame	**allumage**	établissement d'une flamme

incinerator	an appliance in which combustible wastes are ignited and burned	**incinérateur**	appareil servant à allumer et à brûler les combustibles usés
indirect water heater	a water heater which derives its heat from a heating medium such as warm air, steam or hot water	**chauffe-eau indirect**	chauffe-eau qui tire son énergie thermique d'un fluide caloporteur comme l'air chaud, la vapeur ou l'eau chaude
limit control	a safety control intended to prevent unsafe conditions of temperature, pressure or liquid level	**limiteur**	organe de sécurité primaire servant à prévenir des conditions de température, de pression ou de niveau jugées dangereuses
make-up air	fresh air that is introduced to the furnace room to replace air that has been exhausted	**entrée d'air**	nouvel air qui entre dans le système pour remplacer l'air poussé dans les conduits
manual damper	an adjustable damper manually set and locked in the desired position	**registre manuel**	registre réglable à la main et verrouillé à la position désirée
piping	the fuel conduits of circular cross section that are of sufficient wall thickness and or suitable outside diameter (OD) for threading to Iron Pipe Size (IPS) Standards, and that are specified by nominal inside diameter (ID)	**tuyau**	conduit à section circulaire qui convient au filetage en raison de l'épaisseur de ses parois ou de son diamètre extérieur; il est défini par son calibre (diamètre intérieur) selon les normes internationales de tuyauterie (IPS)
plenum	a chamber for distributing warm air from a furnace to the supply ducts (supply plenum), or for receiving air to be heated by the furnace (return plenum)	**chambre de répartition d'air**	chambre d'où est acheminé l'air chaud en provenance de la fournaise jusqu'aux conduits de répartition d'air; elle peut également servir à recevoir l'air destiné à être chauffé dans la fournaise (conduits de reprise d'air)
retrofit	to replace an obsolete or defective component for the purpose of updating the heating system	**adapter**	remplacer un composant désuet ou défectueux dans le but d'améliorer le système de chauffage

safety control	an automatic control of a safety control system that is intended to automatically prevent unsafe operation of the controlled equipment, and may include relays, switches and other auxiliary equipment and interconnecting circuitry	**commande de sécurité**	commande automatique faisant partie d'un dispositif de sécurité conçu pour prévenir automatiquement un fonctionnement jugé dangereux; il peut se composer de relais, de commutateurs, de dispositifs secondaires et de circuits interconnectés
storage tank	a tank for the storage of fuel and from which the fuel-burning equipment is not intended to be fed automatically	**réservoir de stockage**	réservoir utilisé pour le stockage du combustible, mais qui n'alimente pas directement l'équipement de chauffage
tubing	fuel conduits of circular cross section that are not of sufficient wall thickness or of suitable OD permit threading to Iron Pipe Size (IPS) Standards, and are specified by OD	**tubulure**	conduit à section circulaire qui ne convient pas au filetage en raison de l'épaisseur de ses parois ou de son diamètre extérieur; il est défini par son diamètre extérieur selon les normes internationales de tuyauterie (IPS)
valve	a device by which the flow of a fluid may be started, stopped or regulated by a movable part which opens or obstructs passage	**vanne**	dispositif grâce auquel on peut déclencher, interrompre ou régler le débit d'un fluide; il comporte une pièce mobile qui s'ouvre ou se ferme
vent	an enclosed passageway for conveying flue gases	**conduit de fumée**	conduit destiné à l'échappement des gaz de carneau
venting	the removal of flue gases or vent gases to the outside air by means of building openings or venting systems	**évacuation**	évacuation des gaz de carneau ou des gaz d'évacuation dans l'air extérieur par des ouvertures ou des conduits d'évacuation

venting system	a system for the removal of flue gases or vent gases to the outside air by means of vent connectors, chimneys, gas vents or exhaust systems, natural or mechanical	**conduits d'évacuation**	conduits destinés à l'évacuation des gaz de carneau ou des gaz d'évacuation dans l'air extérieur par des dispositifs de raccordement, des cheminées, des conduits d'évacuation des gaz brûlés ou des dispositifs d'échappement naturel ou mécanique
water heater	an appliance intended for the heating of water for plumbing services	**chauffe-eau de service**	appareil servant au chauffage de l'eau destinée aux installations sanitaires