NL Curriculum Standard

Plan of Training

Oil Heat System Technician

Government of Newfoundland and Labrador
Department of Immigration, Population Growth and Skills
Apprenticeship and Trades Certification Division

September 2016

PLAN OF TRAINING

Oil Heat System Technician

SEPTEMBER 2016

Newfoundland Labrador

Government of Newfoundland and Labrador
Department of Advanced Education and Skills
Apprenticeship and Trades Certification Division

Approved by:

Chairperson, Provincial Apprenticeship and Certification Board

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Preface

This Newfoundland and Labrador Curriculum Standard (NLCS) is aligned with the 2015 National Occupational Analysis (NOA) for the Oil Heat System Technician trade. It describes the curriculum content for the Oil Heat System Technician training program.

Acknowledgements

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We offer you a sincere thank you.

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A. NOA Comparison Chart

2015 NOA Task		2016 POT	
Task 1 – Uses Tools and Equipment			
1.01	Uses hand tools.	In Context throughout program	
1.02	Uses power tools.		
1.03	Uses powder-actuated tools. (NOT COMMON CORE)	Not Applicable	
1.04	Uses measuring and testing equipment.	OM1321	Combustion and Burner Air Handling Devices
1.05	Uses hoisting, lifting and rigging equipment.	OM1010	Workplace Safety
1.06	Uses ladders and platforms.	OM1010	Workplace Safety
1.07	Uses soldering, flaring and threading tools.	OM1231	Soldering, Flaring and Threading Pipe
1.08	Uses personal protective equipment (PPE) and safety equipment.	OM1010	Workplace Safety
Task 2 – Organizes Work			
2.01	Communicates with others.	OM1010 OM1152	Workplace Safety Trade Practice
2.02	Maintains clean and safe work environment.	OM1010 OM1152	Workplace Safety Trade Practice
2.03	Interprets codes and documentation.	OM1152	Trade Practice
2.04	Completes documentation.	OM1152	Trade Practice
2.05	Interprets drawings.	OM1121	Print Reading and Sketching
2.06	Performs basic distribution layout.	OM1622	Warm Air Furnaces
2.07	Organizes material and components.	In Context throughout program	
2.08	Commissions appliances and components.	In Context throughout program	
Task 3 – Installs Fuel Storage Tanks			
3.01	Selects fuel storage tanks.	OM1242	Fuel Storage Tanks
3.02	Determines fuel storage tank location.		
3.03	Prepares location for fuel storage tanks.		
3.04	Positions fuel storage tanks		
3.05	Installs fuel storage tank components.		

2015 NOA Task		2016 POT	
3.06	Installs fill and vent pipes.		
Task 4 – Installs Fuel Supply System			
4.01	Selects fuel supply components.	OM1242 OM1252	Fuel Storage Tanks Fuel Delivery Systems
4.03	Installs fuel supply components.		
Task 5 – Installs and Retrofits Oil-Fired and Wood/Oil Appliances and Components.			
5.01	Selects appliances.	OM1141 OM1321 OM1622 OM1603	House as a System Combustion and Burner Air Handling Devices Warm Air Furnaces Hydronic Heating systems 1
5.02	Positions appliances.		
5.03	Installs components on appliance.		
5.04	Connects fuel supply to appliance.		
5.05	Connects electrical supply to appliance.		
5.06	Connects vent/exhaust piping to appliance.		
5.07	Installs dump zones for wood/oil systems.		
5.08	Connects drain to appliance.		
Task 6 – Installs Forced-Air Heating Systems			
6.01	Assembles ductwork.	OM1622	Warm Air Furnaces
6.02	Installs ductwork.		
Task 7 – Installs Hydronic Heating Systems			
7.01	Assembles boilers.	OM1603 OM1780	Hydronic Heating systems 1 Hydronic Heating systems 2
7.02	Installs hydronic distribution system		
7.03	Installs indirect water.		
7.04	Installs oil-fired water heater.		
7.05	Installs hydronic heating system components		
Task 8 – Selects Venting System			
8.01	Selects venting system.	OM1141 OM1471	House as a System Chimneys, Venting and Draft Control
8.02	Prepares locations for termination.		
8.03	Installs venting components.		
8.04	Secures venting system to structure.		
Task 9 – Installs Equipment and Components for combustion Air and Make Up Air			
9.01	Selects equipment and components.	OM1141 OM1471	House as a System Chimneys, Venting and Draft

2015 NOA Task		2016 POT	
9.02	Prepares location for equipment and components for combustion air and make-up air.		Control
9.03	Assembles equipment and components.		
9.04	Secures equipment and components to structure		
Task 10 – Installs Electrical and Electronic Systems			
10.01	Selects controls and components.	OM1330 OM1341 OM1352	Electricity 1 Electricity 2 Electricity 3
10.02	Selects location of controls and components.		
10.03	Installs controls and components		
Task 11 – Tests Electrical and Electronic Systems			
11.01	Cycles appliance controls.	OM1330 OM1341 OM1352	Electricity 1 Electricity 2 Electricity 3
11.02	Checks operating and safety controls.		
11.03	Checks accessories and components.		
11.04	Sets up operating parameters		
Task 12 – Maintains Oil-Fired Heading Systems and Components			
12.01	Checks oil-fired heating system and components.	OM1321 OM1671 OM1681	Combustion and Burner Air Handling Devices Service and Troubleshooting Planned Maintenance
12.02	Cleans components.		
12.03	Changes preventative maintenance components.		
12.04	Lubricates moving components.		
Task 13 – Diagnoses Oil-Fired Heading Systems and Components			
13.01	Checks for electrical problems.	OM1321 OM1671 OM1681	Combustion and Burner Air Handling Devices Service and Troubleshooting Planned Maintenance
13.02	Checks for burner problems.		
13.03	Checks for distribution problems.		
13.04	Checks for problems with combustion air and make-up air.		
Task 14 – Repairs Oil-Fired Heading Systems and Components			
14.01	Corrects electrical problems.	OM1321 OM1671 OM1681	Combustion and Burner Air Handling Devices Service and Troubleshooting Planned Maintenance
14.02	Corrects burner problems.		
14.03	Corrects distribution problems.		

2015 NOA Task		2016 POT
Task 15 – Removes Appliances and Components		
15.01	Decommissions appliances and components.	In Context throughout program
15.02	Disposes of waste products.	

B. Program Structure

For each and every course, a formal assessment is required for which 70% is the pass mark. A mark of 70% must be attained in both the theory examination and the practical project assignment, where applicable as documented on an official transcript.

The order of course delivery within each level can be determined by the training institution, as long as pre-requisite conditions are satisfied.

Upon completion of this training program, individuals may be required to complete other certifications (employer or job site specific) in order to gain employment.

Level 1			
Course No.	**Course Name**	**Hours**	**Pre-Requisites**
OM1010	Workplace Safety	6	None
OM1121	Print Reading and Sketching	12	None
OM1141	House as a System	30	None
OM1152	Trade Practice	18	None
OM1231	Soldering , Flaring and Threading Pipe	18	None
OM1242	Fuel Storage Tanks	12	None
OM1321	Combustion and Burner Air Handling Devices	30	None
OM1330	Electricity 1 (Principles of Electricity)	30	None
OM1603	Hydronic Heating Systems 1	30	OM1121 OM1231 OM1152
OM1622	Warm Air Furnaces	24	
	Total Level 1 Hours	**210**	

Required Work Experience

Level 2			
Course No.	**Course Name**	**Hours**	**Pre-Requisites**
OM1252	Fuel Delivery Systems	24	Level 1
OM1341	Electricity 2 (Electrical Devices and Ignition Systems)	42	Level 1
OM1441	Controls and Wiring	54	Level 1
OM1471	Chimneys, Venting & Draft Control	18	Level 1
OM1780	Hydronic Heating Systems 2	30	Level 1
OM1790	Low Pressure Steam Systems	12	Level 1
OM1632	Domestic Hot Water Heaters	12	Level 1
OM1451	Motors	18	Level 1
	Total Level 2 Hours	**210**	

REQUIRED WORK EXPERIENCE

Level 3			
Course No.	**Course Name**	**Hours**	**Pre-Requisites**
OM1353	Electricity 3 (Solid State & Programmable Controls)	36	Level 2
OM1462	Combustion Chambers	12	Level 2
OM1641	Specialized Systems	36	Level 2
OM1652	Zoning 1 (Hot Water System)	30	Level 2
OM1661	Retrofit Systems	24	Level 2
OM1671	Service and Troubleshooting	36	Level 2
OM1681	Planned Maintenance	24	Level 2
OM1692	Zoning 2 (Warm Air Systems)	12	Level 2
	Total Level 3 Hours	**210**	
	Total Training Credit Hours	**630**	

Level 1

OM1010 Workplace Safety

Learning Outcomes:

- Demonstrate knowledge of Transportation of Dangerous Goods (TDG) Regulations.
- Demonstrate knowledge of PPE.
- Demonstrate knowledge of working safely in hazardous situations and locations.

Duration: 6 Hours

Pre-requisite(s): None

1. Interpret the Transportation of Dangerous Goods Regulations.
   i. transportation of materials and chemicals
      - placards and markings
      - containers and storage
      - handling and transporting
      - accidents and spills
      - notification of TDG
      - training requirements

2. Identify hazardous work situations.
   i. hazardous materials
      - asbestos
      - silica
      - flammable materials
      - chemicals
   ii. hazardous locations and situations
      - TDG
      - WHMIS
      - confined spaces
      - overhead locations
        - ladders
        - scaffolding and platforms
        - rigging
   iii. genie (sleight lift) and other motorized equipment
      - training
        - signals
        - loads requirements

3. Identify various types of personal protective equipment.

i. clothing
   - safety reflection
   - appropriate materials

ii. footwear

iii. eye protection
   - safety glasses
   - safety goggles
   - safety shield
   - machine guards

iv. hearing protection

v. breathing protection and apparatus
   - face mask (dust mask)
   - respirator

vi. safety harness

4. Describe correct procedures for working in hazardous or potentially dangerous work situations.

i. confined spaces
   - OH&S regulations
   - proper procedures for working within confined space
     - documentation
     - planning and evaluating
     - proper safety equipment
     - ventilation and air supply
     - flammable locations
     - emergency procedures

ii. overhead locations
   - OH&S regulations
   - types of ladders
     - fibreglass
     - aluminums
     - step ladders
     - ladder safety
     - ladder maintenance
   - rigging
     - evaluate type of rope, line or cable required
     - knots
     - fastening and securing loads
     - safety limits for lifting procedures
   - safety harness
     - OH&S regulations
     - inspecting harness
     - proper procedures for using harness and lanyards
     - harness safety

iii. fumes and vapours

- OH&S regulations
- face masks
- respirators
- exhaust fans and systems

iv. flammable or explosive materials and liquids
- classification of fires
- types of fire extinguishers and fire suppression systems
- proper procedures to prevent fires
  - flammable liquids
  - flammable materials

Practical Requirements:

1. Demonstrate understanding of TDG regulations and proper procedures for identifying and using placards and signage.

2. Correctly use appropriate rigging for various loads and lifts.

3. Demonstrate proper use of safety harness.

OM1121 Print Reading and Sketching

Learning Outcomes:

- Demonstrate knowledge of blueprints and drawings.
- Demonstrate knowledge of single line sketches.

Duration: 12 Hours

Pre-requisite(s): None

Objectives and Content:

1. Identify drawing instruments, describe their purpose and use.
   i. traditional
   ii. CAD

2. Describe types of drawings and prints and their use.

3. Describe scales, their purpose and use.

4. Identify types of lines and describe their use.
   i. object
   ii. broken
   iii. extension
   iv. dimension
   v. centre
   vi. leader
   vii. break line
   viii. cutting plane

5. Identify drawing symbols and abbreviations and describe their use.

6. Identify views and describe their use.

7. Identify standard elevations and describe their use.

8. Identify specifications and describe their use.

Practical Requirements:

1. Identify relevant symbols and lines.

2. Sketch projects to scale.

OM1141 House as a System

Learning Outcomes:

- Demonstrate knowledge of building science as it relates to climate control systems.
- Demonstrate knowledge of climate control systems.

Duration: 30 Hours

Pre-requisite(s): None

Objectives and Content:

Combustion Air / Ventilation Air

1. Define combustion/ventilation and describe its relationship to oil heating systems.
2. Define make up air and describe its relationship to oil heating systems
3. Calculate the amount of combustion air required for a particular system.
4. Interpret the CSA codes regarding air supply.

Humidity Control

5. Describe the factors affecting humidity.
6. Describe relative humidity and the importance of correct relative humidity.
7. Describe the different types of humidifiers and how they operate.
8. Describe the procedures used to install and service humidifiers.
9. Explain the importance of air change and its effects on humidity.
10. Explain the causes and effects of depressurization by exhaust appliances.

Building Science and Vapour Barriers

11. Describe exterior wind barriers, their purpose and operation.
12. Describe vapour barriers, their purpose and operation.

13. Describe the various types of housing insulation, its characteristics and effect on heating requirements.

14. Identify and interpret problems related to oil heating equipment created by changes to a building structure.

15. Demonstrate how to perform heat loss calculations.

Practical Requirements:

1. Install combustion air vents.

2. Install make up air venting system.

3. Measure humidity.

4. Perform heat loss calculations.

OM1152 Trade Practice

Learning Outcomes:

- Demonstrate knowledge of the scope and limitations of the trade.
- Demonstrate knowledge of professional standards of customer service.
- Demonstrate understanding of appropriate codes and regulations.

Duration: 18 Hours

Pre-requisite(s): None

Objectives and Content:

Responsibilities and Trade Practice

1. Describe the responsibilities of the Oil Heat System Technician under the various applicable codes and regulations.
   i. workers compensation
   ii. Occupational Health and Safety Act
   iii. WHIMS
   iv. environmental regulations
   v. environmental considerations
   vi. regulations governing fuel tanks
   vii. fire regulations
   viii. company regulations
   ix. plumbing codes
   x. electrical codes
   xi. pressure vessels act
   xii. installation code for oil burning equipment
   xiii. Newfoundland & Labrador Heating Oil Storage Tank System Regulations,2003

2. Describe the responsibilities of the Oil Heat System Technician and workmanship required in the installation code for oil burning Equipment.
   i. compare national codes and provincial regulations

3. Describe the limitations of work carried out in the Oil Heat System Technician trade and good practices when dealing with other related trade groups.

Customer Service

4. Describe the relationship between sales and service.

5. Describe good practices for projecting a professional attitude.
   i. respect the customer
   ii. appearance
   iii. workplace behaviour

6. Describe effective communication.
   i. first contact
   ii. sharing information

7. Describe methods of preventing property damage.
   i. vehicles
   ii. cleanliness
   iii. use of tools and equipment
   iv. handling and installation of appliances
   v. clean up

8. Describe good practices for dealing with customers.
   i. calming customers
   ii. preventing problems
   iii. dealing with complaints
   iv. resolving problems

9. Describe effective strategies for dealing with difficult customers and high risk situations.

10. Describe cultural differences affecting work issues and communication and strategies for overcoming them.

11. Describe legal requirements for becoming a certified inspector.

12. Describe insurance requirements of homeowner, installer and inspector.

Practical Requirements:

1. Classroom exercises as determined by the instructor.

OM1231 Soldering, Flaring and Threading Pipe

Learning Outcomes:

- Demonstrate knowledge of the equipment and procedures used to flare and join copper tubing.
- Demonstrate knowledge of the equipment and procedures used to solder fittings.
- Demonstrate knowledge of the applications, tools and procedures used for threading pipe.

Duration: 18 Hours

Pre-requisite(s): None

Objectives and Content:

1. Describe the uses and applications of brazing and soldering processes.

2. Describe the tools used in brazing and soldering processes, their applications and care.

3. Describe the types of flux, their characteristics and applications.

4. Describe the safety precautions to be observed during brazing and soldering operations.

5. Describe the procedures used to perform brazing and soldering operations on copper tubing.

6. Describe types of pipe threading compounds, and cutting fluids.

7. Describe pipe threading devices, their purpose, applications and procedures for use.

Practical Requirements:

1. Flare and join copper tubing.

2. Solder fittings.

3. Thread pipe.

OM1242 Fuel Storage Tanks

Learning Outcomes:

- Demonstrate knowledge of fuel storage and supply systems to oil burning equipment.
- Demonstrate knowledge of oil tank installation.
- Demonstrate understanding of codes and regulations.

Duration: 12 Hours

Pre-requisite(s): None

Objectives and Content:

Selection and Location

1. Describe the characteristics and specifications of tanks.
   i. inside
   ii. above ground
   iii. underground

2. Describe conditions for locating and placing an oil tank, both steel and non-metallic.
   i. inside
   ii. above ground
   iii. underground

3. Describe the effects of condensation and methods for remedy and prevention.

4. Describe and interpret the system for pipe sizing.

5. Describe the type and sizing of pipe used in tank installation and the applications of each.

6. Identify and interpret codes and regulations that apply to piping in the trade.
   i. Newfoundland and Labrador System Installation and Inspection Manual regarding piping

7. Identify and interpret the Regulations for Underground Tanks.
   i. Newfoundland and Labrador System Installation and Inspection Manual regarding tanks

8. Identify and interpret installation codes that apply to metallic and non-metallic storage tanks.
   i. CSA
   ii. U.C.
   iii. ORD requirements
   iv. Newfoundland and Labrador Heating Oil Storage Tank System Regulations, 2003

Installation

9. Describe safe practices for handling fuels.

10. Describe methods for installing fill and venting pipes.

11. Describe the procedures used to thread pipe.

12. Describe the procedures used to anneal pipe.

13. Describe the procedures used to flare pipe.

14. Describe the methods for installing tubing.
   i. cutting and joining
   ii. fittings
   iii. clamping and supporting
   iv. methods of channeling in floors

15. Describe the type, location and placement of tank ancillaries and procedures for installation.
   i. gauging devices
   ii. vent alarm

16. Describe the purpose, types and location of shut-off valves.

17. Describe the procedure for flushing fuel delivery systems.

18. Describe the oil filter assembly and procedures used for installation of oil filter assembly.

19. Describe the procedure for performing visual inspection of fuel storage tanks and installations.

20. Describe the procedures used to cut, thread and install black iron pipe.

21. Demonstrate how to perform calculations of piping material requirements for a given installation.

22. Demonstrate how to perform calculations of tank size.

23. Describe procedure to compile materials list.

24. Describe the procedures used to test oil tanks.
    i. pre-installation
    ii. post installation

25. Describe regulations and procedures for dealing with fuel oil spillages and containment.
    i. secondary containment
    ii. double wall requirements

26. Describe procedures for removal and disposal of oil tanks.
    i. regulations
    ii. safety

Practical Requirements:

1. Cut, thread and install black iron pipe.

2. Perform calculations of piping material requirements for a given installation.

3. Perform calculations of tank size

4. Compile materials list.

5. Install and remove various types of tanks.

OM1321 Combustion and Burner Air Handling Devices

Learning Outcomes:

- Demonstrate understanding of oil as a fuel.
- Demonstrate knowledge of the combustion process.
- Demonstrate knowledge of selection, maintenance, and use of appropriate test equipment.
- Demonstrate understanding of appropriate codes and regulations.

Duration: 30 Hours

Pre-requisite(s): None

Objectives and Content:

Fuel Oil Properties

1. Describe the composition and origin of heating oil.

2. Describe the refining processes and their products.

3. Describe the types of fuel oils and their applications.

4. Describe the characteristics of fuel oil and their relevance to burning characteristics.
   i. flash point
   ii. pour point
   iii. water and sediment
   iv. volatility
   v. viscosity
   vi. gravity
   vii. sulfur content
   viii. color

5. Describe the safe handling and storage of fuel oil.
   i. storage temperature
   ii. cross-contamination with other fuels

6. Describe the effects of water and sediment in fuel tanks.

7. Describe the significance of regional variations of fuel properties.

Combustion

8. Describe the relevance of combustion theory to the trade.

9. Define combustion; explain the process and its products.

10. Describe the composition of air and its role in the combustion process.

11. Describe the physical requirements for oil burning.

12. Describe fuel/air ratios and their importance.

13. Describe the process of atomization and its role in the burning of fuel oil.

14. Describe incomplete combustion, its causes and dangers.

15. Describe the relationship between excess combustion air, smoke, and efficiency.

Air Handling Parts

16. Describe burner fans, their purpose, parts, and operation.

17. Describe turbulators, their purpose, parts, and operation.

18. Describe the types of blowers, their characteristics and applications

19. Describe spinners, their purpose, parts, and operation.

20. Describe end cones, their purpose, parts, and operation.

21. Describe the types of combustion heads, their purpose, parts, and operation:
    i. retention head
    ii. non-retention head

22. Explain the relationship of adjustment of the various air handling parts to the combustion of the fuel oil.

23. Explain the effects of draft on air delivery.

Combustion Efficiency Testing

24. Describe the purpose of combustion testing and the main measurements included in combustion testing.
    i. combustion air
    ii. smoke measurement and reduction
    iii. flue gas/net stack temperature

iv. draft measurement

25. Describe the benefits of performing accurate testing interpretation and documentation.
    i. to efficiency
    ii. to the customer
    iii. to the mechanic

26. Describe the draft gauge, its purpose and operation, adjustment and use.

27. Describe the common causes of poor draft.

28. Describe the smoke tester, its purpose, operating principles and procedures for adjustment and use.

29. Describe the test indications and their significance.

30. Describe the CO. analyzer, its purpose, parts, operating principles and procedures for adjustment and use.

31. Describe the dial type stack thermometer and procedures for its use.
    i. drilling holes
    ii. stable stack temperature

32. Describe various types of diagnostic combustion test equipment, its design and advantages.

Practical Requirements:

1. Perform complete combustion efficiency testing on various heating units.

OM1330 Electricity 1 (Principles of Electricity)

Learning Outcomes:

- Demonstrate knowledge of basic electrical theory, systems and components.
- Demonstrate knowledge of selection and use of appropriate electrical test equipment.

Duration: 30 Hours

Pre-requisite(s): None

Objectives and Content:

Introduction to Electricity

1. Explain the electron theory.

2. Explain electrical terminology and units of measurement.

3. Describe what is meant by resistance and the factors affecting it.

4. Describe the characteristics of conductors and insulators and their applications.

5. Explain Ohm's Law and use of associated formulae.

Direct and Alternating Current

6. Describe electromagnetism and how it can be used to produce voltage.

7. Describe direct current and how it is created.

8. Describe the trade related applications of direct current.

9. Describe alternating current and how it is created.

10. Describe terms associated with alternating current.
    i. cycle
    ii. hertz
    iii. effective value
    iv. electrical characteristics

11. Describe the characteristics of sine waves and their interpretation.

12. Describe the applications within the trade of alternating current.

13. Describe the method of distribution of electric power.

14. Describe the layout of a typical home distribution panel and its relationship to the heating system.

Electrical Circuits

15. Describe electrical circuits, their components and operation.

16. Describe the procedure used to construct series circuits.

17. Describe the procedure used to construct parallel circuits.

18. Describe the procedures used to construct series/parallel circuits.

19. Describe the causes of excessive current.

20. Describe overload protection circuits.

21. Interpret the abbreviations, formula symbols and circuit symbols found in circuit diagrams.

22. Identify the sections of the Canadian Electrical Code that apply to oil burner installation and service.

23. Describe the procedures used to perform the procedures used to wire a heating system.

Electrical Test Meters

24. Describe the Ohmmeter, its purpose and procedures for use.

25. Describe the ammeter/amperage meter, its purpose and procedures for use.

26. Describe the procedure used to test basic wiring components and circuits.
    i. fuses
    ii. terminals
    iii. circuit breakers
    iv. resistors
    v. switches

27. Describe equipment used to measure.
    i. voltage
    ii. current

iii. resistance

Practical Requirements:

1. Perform calculations using Ohm’s law and associated formulae.
2. Select and use test meters to identify problems in electrical circuits.
3. Construct parallel series circuit.

OM1603 Hydronic Heating Systems I

Learning Outcomes:

- Demonstrate knowledge of hydronic heating systems and their characteristics.
- Demonstrate knowledge of installation and maintenance procedures related to hot water boilers.

Duration: 30 Hours

Pre-requisite(s): OM1121; OM1231; OM1152

Objectives and Content:

Hydronic Heating Systems

1. Describe the typical components of hot water boilers, their purpose and operation.
   i. combustion chamber
   ii. heating surfaces
   iii. baffles or turbulators
   iv. insulation

2. Describe the system for rating boilers.
   i. net ratings
   ii. gross ratings

3. Describe the operation of a gravity type open system.

4. Describe the operation of a forced circulation closed system.
   i. two-pipe system
   ii. reverse return system

5. Explain the purpose and function and applications of the controls and other devices used in the operation of a hot water boiler.
   i. circulator
   ii. pressure reducing valve
   iii. flow control valve
   iv. air elimination valves
   v. expansion tanks
   vi. zone control
   vii. tempering valves
   viii. coils
      - tankless

- indirect water heater

ix. couplings
x. pressure relief valves
xi. tridicator valve
xii. wood/oil combination

6. Describe the different piping systems used for heat delivery and their applications.

7. Describe the different types of radiation.

8. Describe routine maintenance procedures for hot water heating systems.

9. Describe methods of backflow prevention.

10. Describe the benefits of pipe insulation.

Practical Requirements:

1. Plumb and hook up a hydronic heating system.

OM1622 Warm Air Furnaces

Learning Outcomes:

- Demonstrate knowledge of warm air heating systems, their installation codes and regulations.
- Demonstrate knowledge of troubleshooting and servicing procedures for warm air heating systems.
- Demonstrate knowledge of the installation and servicing of humidifiers and electrostatic air cleaners.

Duration: 24 Hours

Pre-requisite(s): OM1121; OM1231; OM1152

Objectives and Content:

System Components and Operation

1. Describe the components and operation of a warm air system.
   i. gravity
   ii. forced

2. Explain the purpose and function of controls and other devices used in the operation of a warm air system.
   i. oil
   ii. wood/oil combination
   iii. wood add-on

3. Describe the parts of warm air distribution systems and their applications.
   i. oil
   ii. wood/oil combination
   iii. wood add-on

4. Describe the procedures used to test, adjust and balance air flow systems.
   i. static pressure
   ii. temperature rise

Installation

5. Explain the basic procedures for design and installation of a warm air system.
   i. duct sizing
   ii. heat loss
   iii. size and type of furnace

iv. CFM (cubic feet per minute) air flow
v. system requirements
vi. code requirements
vii. manufacturer specifications
viii. diffusers and registers

6. Describe humidifiers, their parts, operation and procedures for installation.

7. Describe electrostatic air cleaners, their parts, operation and procedures for installation.

Service and Maintenance

8. Describe routine maintenance procedures for warm air heating systems.

9. Describe the potential problems in warm air systems, diagnostic procedures and remedies.

10. Describe procedures used to test heat exchangers for leakage.

Practical Requirements:

1. Install plenums and sheet metal ductwork.

2. Design a warm air system.

3. Compile a materials list.

4. Measure and adjust air flow.

Level 2

OM1252 Fuel Delivery Systems

Learning Outcomes:

- Demonstrate knowledge of fuel units, their installation and adjustment.
- Demonstrate knowledge of fuel pumps, auxiliary fuel pumps and their installation.
- Demonstrate knowledge of nozzles and fuel filters, their applications and installation.

Duration: 24 Hours

Pre-requisite(s): Level 1

Objectives and Content:

Fuel Units

1. Identify and describe the types of fuel units and their purpose.

2. Identify and describe the component parts of the fuel unit.

3. Describe the characteristics and applications of fuel systems.
   i. one pipe
   ii. two pipe single stage
   iii. two-stage fuel units
   iv. auxiliary pumping systems

4. Describe installation procedures for fuel units.
   i. pump selection
   ii. proper rotation
   iii. alignment
   iv. sizing of fuel lines
   v. pump couplings

5. Describe installation procedures for auxiliary pumps.
   i. pump selection
   ii. proper rotation
   iii. alignment
   iv. sizing of fuel lines
   v. pump couplings

6. Describe servicing procedures for fuel units.
   i. primary venting and bleeding
   ii. cleaning and replacement of pump screen
   iii. pressure regulation
   iv. pressure and vacuum
   v. gasket replacement
   vi. gear replacement
   vii. regulator replacement
   viii. seal replacement

7. Describe servicing procedures for auxiliary pumps.
   i. primary venting and bleeding
   ii. cleaning and replacement of pump screen
   iii. pressure regulation
   iv. pressure and vacuum
   v. gasket replacement
   vi. gear replacement
   vii. regulator replacement
   viii. seal replacement

8. Describe the types of couplings and their applications.

9. Describe procedures used in testing and inspecting fuel units.

10. Describe procedures used in testing and inspecting auxiliary pumps.

11. Describe possible fuel unit problems, their indicators and remedial action to be taken.

12. Describe possible auxiliary pump problems, their indicators and remedial action to be taken.

13. Identify and interpret the appropriate installation codes.

Nozzles and Fuel Filters

14. Describe the purpose and function of nozzles.

15. Describe the different types of nozzles and nozzle adaptors and their applications.

16. Describe the effect on nozzles of:
   i. pressures
   ii. gravity
   iii. viscosity

17. Describe the procedures for installation and servicing of nozzles.

18. Describe the procedures for testing nozzles.

19. Describe the purpose and application of oil filters and the procedures for installation and replacement of oil filters.

20. Describe possible problems encountered in working with nozzles and oil filters and their likely causes and appropriate remedies.

21. Describe the care and maintenance of the test equipment and instruments.

22. Describe the diagnostic procedures to be used with test readings.
    i. check burner shutdown
    ii. observe flame
    iii. look for air leaks
    iv. check burner operating period

23. Describe the common problems indicated by test readings.

24. Describe the procedure for estimating fuel savings.

Practical Requirements:

1. Install various types of fuel units.

2. Perform testing procedures on fuel units.

3. Install auxiliary units.

4. Perform testing on auxiliary units.

5. Dismantle and reassemble fuel units.

6. Dismantle and reassemble auxiliary units.

OM1341 Electricity 2 (Electrical Devices and Ignition Systems)

Learning Outcomes:

- Demonstrate knowledge of the installation, diagnosis, repair and replacement of ignition systems.

Duration: 42 Hours

Pre-requisite(s): Level 1

Objectives and Content:

Electrical Devices

1. Describe electromagnetic (solenoid) valves and their function.
2. Describe the purpose, layout and operation of relays.
3. Describe the procedures for installation of relays.
4. Describe the purpose, operation and location of transformers.
5. Describe the potential problems, diagnostic procedures and servicing of relays.
6. Describe resistors and circuit breakers, their layout, purpose and operation.
7. Describe timing devices, their purpose and two most common methods of operation.
8. Describe the operating principles of electric motors.

Switches

9. Describe electrical switches, their operating principles and their purpose.
10. Describe the types of switches, their operation and applications.
    i. micro (snap-acting)
    ii. mercury switches
11. Explain switch terminology.
    i. SPST
    ii. SPDT
    iii. DPST

iv. DPDT
v. direct
vi. reverse acting

12. Describe the trade applications of the various types of switches.
    i. main switch
    ii. burner control
    iii. limit control
    iv. timers
    v. thermostats
    vi. relays

13. Describe the location of switches.

14. Describe potential problems with switches, their causes and corrective action.

Transformers and Solid State Ignitions

15. Describe the purpose and operation of the ignition system.

16. Describe the purpose and parts of the A-C transformer.

17. Describe primary and secondary voltage and their relationship.

18. Describe the relationship between voltage and amperage and the dangers presented through handling transformers as a result.

19. Describe the factors to be taken into account when selecting transformers and the significance of each.

20. Describe the procedures used to wire an ignition transformer into the circuit:
    i. interrupted ignition
    ii. intermittent ignition

21. Describe the characteristics of the solid-state electronic ignition.

Electrodes and Insulators

22. Describe insulators, their characteristics and function.

23. Describe the methods of providing an efficient path to the ignition electrodes.
    i. ignition cable
    ii. buss bars
    iii. spring clips

24. Describe ignition electrodes, their purpose, components and function.
    i. rods
    ii. holders

25. Describe set up procedures for electrode adjustment.

Ignition Problems and Causes

26. Describe the procedures and equipment used to test transformers.

27. Describe problems caused by improper electrode adjustment.

28. Describe the equipment and procedures used to test and set electrodes.

29. Describe common procedures used to service ignition equipment.

30. Describe common ignition failure problems, their cause and solutions.

31. Describe the types and purpose of ignition control systems.
    i. intermittent ignition
    ii. interrupted ignition

32. Describe the symptoms of defective ignition and their causes.

33. Describe the procedures used to perform inspection and testing of ignition systems.

Practical Requirements:

1. Construct a variety of electrical system circuits using electrical devices as specified by the instructor.

2. Perform the procedures used to test a transformer.

3. Adjust and set electrodes according to manufacturer's specifications.

4. Inspect and test ignition systems.

OM1441 Controls and Wiring

Learning Outcomes:

- Demonstrate knowledge of the procedures used to install, service and maintain limit controls and thermostats.
- Demonstrate knowledge of the procedures used to install, service and maintain limit primary controls.

Duration: 54 Hours

Pre-requisite(s): Level 1

Objectives and Content:

Limit Controls and Thermostats

1. Describe the different types of limit controls, their purpose and operation.
   i. hot water
   ii. steam
   iii. warm air

2. Describe the location and installation procedures for limit controls.

3. Describe the setting and adjustment of limit controls for various requirements.

4. Describe the potential problems, checks, diagnostic procedures and servicing for limit controls.

5. Identify sources of information for installation of limit controls and describe their importance and use.
   i. code
   ii. manufacturers' instructions

6. Describe the types of thermostats, their function and applications.

7. Describe factors affecting location of limit controls.
   i. thermostat
   ii. humidity control
   iii. air stat
   iv. aquastat
   v. pressure control

8. Describe the procedures for installation of limit controls.
   i. thermostat
   ii. humidity control
   iii. air stat
   iv. aquastat
   v. pressure control

9. Describe the potential problems, diagnostic procedures and servicing of thermostats.

Primary Controls

10. Describe the different types of primary controls used in the oil heat industry and their purpose.

11. Describe stack mounted primary controls, their layout, function and applications.

12. Describe Cad Cell primary controls, their layout, operation and applications.

13. Describe how to locate and wire controls to perform a specific function.

14. Explain procedures for testing controls for proper operation.

15. Describe troubleshooting procedures used to locate problems with controls.

16. Describe possible control problems, their cause and procedures for correction.

17. Read and interpret schematic and pictorial diagrams.

Practical Requirements:

1. Install heating system controls for various types of systems.

2. Wire a heating system.

OM1471 Chimneys, Venting & Draft Control

Learning Outcomes:

- Demonstrate knowledge of evaluating and planning the draft and venting requirements of systems.
- Demonstrate knowledge of venting systems and their installation.

Duration: 18 Hours

Pre-requisite(s): Level 1

Objectives and Content:

Chimneys

1. Describe the purpose of draft and how draft is created.
   i. natural
   ii. mechanical
   iii. induced

2. Describe the conditions needed to maintain adequate chimney draft.
   i. location
   ii. chimney size
   iii. temperature

3. Describe potential chimney problems affecting draft, their symptoms and their solutions.

4. Describe how chimney draft is measured.

Venting and Draft Control

5. Describe the effects of improper draft.
   i. air leakage
   ii. standby losses
   iii. burner air delivery
   iv. spillage

6. Describe the purpose and function of draft regulators.

7. Describe direct venting, draft inducers and power venting, and explain operation and applications.

8. Describe the operation of a sealed combustion direct vent system.

9. Identify and interpret the CSA codes relating to venting.

10. Describe the necessity of stainless steel chimney liners and sizing procedures.

Practical Requirements:

1. Install smoke pipes.

2. Install a prefabricated chimney.

3. Inspect chimneys and perform draft adjustment.

4. Install mechanical venting systems.
   i. sidewall
   ii. direct

OM1780 Hydronic Heating Systems II

Learning Outcomes:

- Demonstrate knowledge of alternate and advanced hydronic heating systems and their characteristics.

Duration: 30 Hours

Pre-requisite(s): Level 1

Objectives and Content:

Hydronic Heating Systems

1. Describe the operation of in-floor radiant forced circulation closed system.

2. Explain the operation and application of alternate fuel boilers.
   i. wood/oil add-on
   ii. electric
   iii. solar
   iv. heat pumps
   v. gas

3. Explain the operation and application of a wood/oil add-on hot water boiler.

4. Describe potential boiler problems, diagnostic procedures and solutions.

5. Describe how to lay out a hydronic heating system.

Practical Requirements:

1. Lay out a hydronic heating system.

2. Compile a materials take off list.

3. Sketch a hydronic heating system.

OM1790 Low Pressure Steam Systems

Learning Outcomes:

- Demonstrate knowledge of steam heating systems and their components.
- Demonstrate knowledge of installation, servicing and maintenance of steam heating systems.

Duration: 12 Hours

Pre-requisite(s): Level 1

Objectives and Content:

System Components and Operation

1. Describe methods of heat transfer.
   i. latent
   ii. radiant
   iii. conductive
   iv. convective

2. Describe the principles of steam heating.

3. Describe one pipe systems, their layout and operation.

4. Describe two pipe systems, their layout and operation.

5. Describe the operation, function and proper location of the controls required.

6. Describe the function of steam traps.

7. Describe pumps, receivers and Hartford loop.

Installation

8. Describe procedures used to remove and replace system components.

9. Describe the importance of piping specifications and the general instructions given by manufacturers.

10. Explain how to skim a new boiler to remove contaminants.

11. Explain how to balance system radiation.

i. one pipe systems
ii. two pipe systems

Service and Maintenance

12. Describe routine inspection and maintenance procedures for steam heating systems.

13. Describe troubleshooting procedures used to identify problems in steam heating systems and corrective action to be taken.

Practical Requirements:

1. Wire controls for steam heating systems.

2. Set up and adjust the burner.

3. Perform efficiency testing of the burner.

OM1632 Domestic Hot Water Heaters

Learning Outcomes:

- Demonstrate knowledge of domestic hot water heaters their components and operation.
- Demonstrate knowledge of the installation procedures for domestic hot water heaters.

Duration: 12 Hours

Pre-requisite(s): Level 1

Objectives and Content:

System Types and Components

1. Describe the components and operation of indirect fired hot water heaters.

2. Describe the components and operation of direct fired hot water heaters.

3. Explain the purpose and function of controls and other devices used on domestic hot water heaters.
   i. relief valves
   ii. backflow preventers
   iii. tempering valves
   iv. dielectric fittings
   v. pressure reducing valves
   vi. anode rod

Installation

4. Describe the procedures for installation of indirect fired hot water heaters (tankless coil).

5. Describe the procedures for the installation of direct fired hot water heaters.

Service and Maintenance

6. Describe the procedures for performing routine maintenance of domestic hot water heaters.

7. Describe procedures for identifying problems in hot water heaters and corrective action to be taken.

Practical Requirements:

1. Install an oil fired water heater.

2. Install an indirect water storage heater.

OM1451 Motors

Learning Outcomes:

- Demonstrate knowledge of the operation, installation and repair of motors, fans and couplings.

Duration: 18 Hours

Pre-requisite(s): Level 1

Objectives and Content:

1. Describe the types of motors found on heating systems and their characteristics.

2. Describe motor terminology.

3. List the major characteristics of a split phase centrifugal switch motor.

4. Describe the components and operation of a split phase centrifugal switch motor.
   i. start switch
   ii. overload switch
   iii. internal wiring
   iv. connections
   v. capacitors

5. Describe the purpose of bearings, the various types of bearings and their applications.

6. Describe diagnostic and inspection procedures for motors and remedial action to be taken.
   i. malfunction
   ii. motor replacement
   iii. inspection

Practical Requirements:

1. Disassemble an electric motor, carry out minor repairs and reassemble motor.

2. Perform various tests on motors.

Level 3

OM1353 Electricity 3 (Solid State and Programmable Controls)

Learning Outcomes:

- Demonstrate knowledge of basic electronic theory, systems and components.
- Demonstrate knowledge of programming controls.
- Demonstrate knowledge of troubleshooting problems with electronic and solid state components.

Duration: 36 Hours

Pre-requisite(s): Level 2

Objectives and Content:

1. Describe the theory of operation of electronics solid state and programmable controls specific to radiant and in-floor heating.

2. Describe components of an electronic system.
   i. capacitor
   ii. resistance
   iii. diode
   iv. symbol
   v. xener
   vi. transistor
   vii. triac
   viii. laser

3. Describe the principles of operation of relay circuits.

4. Describe procedures used to program controls.
   i. outdoor reset controls
   ii. prioritizing functions

5. Identify oil burning equipment components where electronic controls are used.

6. Troubleshoot problems with electronic devices, and solid state components.

7. Describe procedures used to troubleshoot electronic circuits.
   i. locate the defective components
   ii. test methods
   iii. interpretation of test results
   iv. corrective action

Practical Requirements:

1. Program various types of controls.

2. Construct electronic circuits using electronics and solid state components.

OM1462 Combustion Chambers

Learning Outcomes:

- Demonstrate knowledge of the construction and operation of a combustion chamber.

Duration: 12 Hours

Pre-requisite(s): Level 2

Objectives and Content:

1. Identify hazardous materials and practices for safe handling.

2. Describe the types of materials used in the manufacture of combustion chambers and their characteristics.
   i. common fire brick
   ii. insulating fire brick
   iii. metal
   iv. ceramic
   v. soft fibre materials-wet and dry

3. Describe the types of insulation used and their applications.

4. Describe the characteristics of size and shape of the combustion chamber and their relationship to efficient combustion.

5. Describe the procedure for installation of combustion chambers.

6. Describe the procedures used to clean and repair combustion chambers.

7. Describe the procedures used for replacement of combustion chambers.

8. Describe chamberless firing.

Practical Requirements:

1. Install pre-fabricated combustion chamber.

OM1641 Specialized Systems

Learning Outcomes:

- Demonstrate knowledge of vaporizing oil burners, their components, operation and installation.
- Demonstrate knowledge of waste oil burners, their components and operation.
- Demonstrate knowledge of combo systems, their components and operation.

Duration: 36 Hours

Pre-requisite(s): Level 2

Objectives and Content:

Vaporizing Oil Burners

1. Identify the types of vaporizing oil burners, and their characteristics and applications.
   i. natural draft pot-type
   ii. forced draft

2. Describe the oil supply system for vaporizing burners.
   i. wall lift pump
   ii. day tank
   iii. installation

3. Explain how to service, adjust and calibrate a constant level valve.

4. Explain installation and service procedures for both natural and forced draft vaporizing burners.
   i. code requirements
   ii. oil flow control valve
   iii. level seating of the burner

5. Describe the trouble shooting, maintenance and procedures related to vaporizing oil burners.
   i. position of flame rings
   ii. oil flow control valve

Waste Oil Heating

6. Describe the types of waste oil heating systems, their principles of operation, characteristics and applications.
   i. furnace
   ii. boiler

7. Describe the various regulations affecting the installation and use of waste oil systems.
   i. laws
   ii. code requirements
      - fire
      - environmental

8. Describe the types of secondary pumps, their functions, components and applications.

9. Describe the procedures used to install waste oil heating systems.
   i. manufacturer's instructions
   ii. assembly
   iii. venting
   iv. fuel pipes
   v. wiring

10. Describe the procedures used to set up and test the burner.
    i. safety set-up
    ii. operation of burner in relation to system
    iii. testing

Combo Systems

11. Describe combo systems, their components and principles of operation.

12. Describe the procedures used to install a combo-system.

13. Describe the procedures used to perform routine maintenance of a combo-system.

Practical Requirements:

1. Remove, disassemble, clean, reassemble, calibrate and reinstall the oil flow control valve.

2. Install a natural draft burner.

OM1652 Zoning 1 (Hot Water System)

Learning Outcomes:

- Demonstrate knowledge of the purpose, design and operation of zoned systems.
- Demonstrate knowledge of the installation of zoned systems.

Duration: 30 Hours

Pre-requisite(s): Level 2

Objectives and Content:

1. Explain the benefits of zoning and its applications.

2. Describe different types of zone valves and their applications.

3. Interpret the wiring schematics for zoning installations.

4. Describe the procedures used to install a 3-zone hot water radiation system.

5. Describe the use of circulators for hot water zoning.

6. Describe the procedures to install a multi-zone in-floor heating system.
   i. injection
   ii. balancing

Practical Requirements:

1. Plan and install a zoned hot water system to specifications.

2. Plan and install a zoned in-floor heating system.

OM1661 Retrofit Systems

Learning Outcomes:

- Demonstrate knowledge to plan appropriate climate control systems.
- Demonstrate knowledge of the removal and installation of retrofit systems and components.
- Demonstrate knowledge of installation procedures of humidifiers.
- Demonstrate knowledge of code requirements for air exchangers and humidifiers.

Duration: 24 Hours

Pre-requisite(s): Level 2

Objectives and Content:

System Evaluation and Planning

1. Describe the sources of heat loss and their effects on efficiency.
   i. off-cycle
   ii. on-cycle
   iii. jacket loss
   iv. pipe and duct loss

2. Describe the characteristics of flame retention burners and their effect on efficiency.

3. Describe the design characteristics of heating systems that will most benefit by boiler or furnace replacement.

4. Describe draft regulators, the factors that affect their efficient operation, and their contribution to the reduction of heat loss.

5. Describe the logic behind reducing fuel nozzle size and the effect on efficient heating.

6. Describe the possibilities and methods for reducing temperature settings of boilers and furnaces for maximum efficiency.

7. Describe methods of heat loss reduction, their applications and effects on efficiency.
   i. insulation and air sealing
   ii. turbulator (baffle) replacement

8. Describe the advantages of regular system tune ups and the basic steps involved in efficiency tune up.

9. Describe the procedures used to calculate the heating requirements of the customer.

10. Describe the process for obtaining approval for retrofit from the necessary agencies.

System Removal and Installation

11. Describe the precautions to be taken before removal of an existing appliance or system.

12. Describe the sequence of procedures to be followed when removing an existing oil fired appliance.

13. Describe codes and regulations that apply to the disposal of system components and materials.

14. Describe the sequence of procedures involved in the installation of a retrofit system.

Practical Requirements:

1. Evaluate an existing heating system and prepare a proposal with recommendations for retrofit and upgrading.

2. Compile a work schedule.

3. Compile a materials list.

4. Perform modernization and upgrade on an existing system.

OM1671 Service and Troubleshooting

Learning Outcomes:

- Demonstrate knowledge of troubleshooting techniques and diagnostic procedures.
- Demonstrates knowledge of servicing procedures.
- Demonstrate knowledge of selecting appropriate test equipment.

Duration: 36 Hours

Pre-requisite(s): Level 2

Objectives and Content:

No Heat

1. Describe the procedure used to identify the point of failure.

2. Describe the system parts associated with each step of the sequence.

3. Describe the possible causes and corrective action for each indication.

Underheating/Overheating

4. Describe the possible problems associated with the following and the corrective action taken with each.
   i. oil delivery
   ii. electrical circuit
   iii. flame adjustment
   iv. heating systems

Operational Problems

5. Describe the possible problems associated with the following and determine the corrective action taken for each.
   i. oil delivery
   ii. electrical circuit
   iii. flame adjustment
   iv. venting system
   v. heating system
   vi. mechanical components

Practical Requirements:

1. Select and use appropriate test equipment to troubleshoot systems.

OM1681 Planned Maintenance

Learning Outcomes:

- Demonstrate knowledge of regular maintenance requirements and practices.
- Demonstrate knowledge of professionalism and customer service.
- Demonstrate knowledge of appropriate codes and regulations.

Duration: 24 Hours

Pre-requisite(s): Level 2

Objectives and Content:

1. Describe the objectives of regular service and maintenance.
   i. reduction of service calls
   ii. efficiency
   iii. life of equipment
   iv. customer comfort and satisfaction

2. Describe the advantages of adopting a systematic approach and sequence to service calls.

3. Describe the components serviced during annual maintenance.

4. Describe the inspection and servicing procedures involved in annual maintenance of the various types of heating systems.

5. Describe the steps of annual maintenance checks and their associated procedures.

6. Describe the procedures used to disassemble and clean components of various types of heating systems.

7. Describe the procedures used to reassemble and set up various types of heating systems.

8. Describe the factors evaluated to determine system efficiency and the adjustments made to ensure safe and efficient operation of the system.

Practical Requirements:

1. Disassemble and clean components of various types of heating system.

2. Reassemble and set up various types of heating system.

3. Perform efficiency test and make appropriate adjustments.

OM1692 Zoning 2 (Warm Air Systems)

Learning Outcomes:

- Demonstrate knowledge of the purpose, design and operation of zoned systems.
- Demonstrate knowledge of the installation of zoned systems.

Duration: 12 Hours

Pre-requisite(s): Level 2

Objectives and Content:

1. Explain the benefits of zoning and its applications.

2. Describe warm air zone dampers and how they operate.

3. Interpret the wiring schematics for zoning installations.

Practical Requirements:

1. Plan and install a zoned warm air system to specifications.

C. Conditions Governing Apprenticeship Training

1.0 General

The following general conditions apply to all apprenticeship training programs approved by the Provincial Apprenticeship and Certification Board (PACB) in accordance with the **Apprenticeship Training and Certification Act (1999)**. If an occupation requires additional conditions, these will be noted in the specific Plan of Training for the occupation. In no case should there be a conflict between these conditions and the additional requirements specified in a certain Plan of Training. All references to Memorandum of Understanding will also apply to Letter of Understanding (LOU) agreements.

2.0 Entrance Requirements

2.1 Entry into the occupation as an apprentice requires:

Indenturing into the occupation by an employer who agrees to provide the appropriate training and work experiences as outlined in the Plan of Training.

2.2 Notwithstanding the above, each candidate must have successfully completed a high school program or equivalent, and in addition may be required to have completed certain academic subjects as specified in a particular Plan of Training. Mature students, at the discretion of the Director of Apprenticeship and Trades Certification, may be registered. A mature student is defined as one who has reached the age of 19 and who can demonstrate the ability and the interest to complete the requirements for certification.

2.3 At the discretion of the Director of Apprenticeship and Trades Certification, credit toward the apprenticeship program may be awarded to an apprentice for previous work experience and/or training as validated through prior learning assessment.

2.4 An Application for Apprenticeship form must be duly completed along with a Memorandum of Understanding as applicable to be indentured into an Apprenticeship. The Memorandum of Understanding must contain signatures of an authorized employer representative, the apprentice and an official representing the Provincial Apprenticeship and Certification Board to be valid.

2.5 A new Memorandum of Understanding must be completed for each change in an employer during the apprenticeship term.

3.0 Probationary Period

The probationary period for each Memorandum of Understanding will be six months or 900 employment credit hours. Within that period the memorandum may be terminated by either party upon giving the other party and the PACB one week notice in writing.

4.0 Termination of a Memorandum of Understanding

After the probationary period referred to in Section 3.0, the Memorandum of Understanding may be terminated by the PACB by mutual consent of the parties involved, or cancelled by the PACB for proper and sufficient cause in the opinion of the PACB, such as that stated in Section14.

5.0 Apprenticeship Progression Schedule, Wage Rates and Advanced Training Criteria

Progression Schedule

Oil Heat System Technician - 5400 Hours			
Apprenticeship Level and Wages			
Level	Wage Rate	Requirements for Progression to Next Level	Next Level
1	60%	▪ Completion of Level 1 training ▪ Registration as an apprentice ▪ Pass Level 1 exam* ▪ Minimum 1800 hours of combined relevant work experience and training	2nd Year
2	75%	▪ Completion of Level 2 training ▪ Pass Level 2 exam* ▪ Minimum 3600 hours of combined relevant work experience and training	3rd Year
3	90%	▪ Completion of Level 3 training ▪ Pass Level 3 exam* ▪ Minimum 5400 hours of combined relevant work experience and training ▪ Sign-off of all workplace skills in apprentice logbook ▪ Pass certification exam	Journeyperson Certification

Wage Rates

- Rates are percentages of the prevailing journeyperson's wage rate in the place of employment of the apprentice.
- Rates must not be less than the wage rate established by the Labour Standards Act (1990), as now in force or as hereafter amended, or by other order, as amended from time to time replacing the first mentioned order.
- Rates must not be less than the wage rate established by any collective agreement which may be in force at the apprentice's workplace.
- Employers are free to pay wage rates above the minimums specified.

Level Exams*

- This program may **not** currently contain level exams, in which case this requirement will be waived until such time as level exams are available.

Oil Heat System Technician - 5400 Hours		
Class Calls (After Apprenticeship Registration)		
Call Level	Requirements for Class Call	Hours awarded for In-School Training
Direct Entry Level 1	▪ Minimum of 1800 hours of relevant work experience ▪ Prior Learning Assessment (PLA) at designated college (if applicable)	210
Level 2	▪ Minimum of 3000 hours of relevant work experience and training	210
Level 3	▪ Minimum of 5200 hours of relevant work experience and training	210
Class Calls at Minimum Hours ▪ Class calls may not always occur at the minimum hours indicated. Some variation is permitted to allow for the availability of training resources and apprentices.		

6.0 Tools

Apprentices shall be required to obtain their own hand tools applicable for the designated occupation of registration or tools as specified by the PACB.

7.0 Periodic Examinations and Evaluation

7.1 Every apprentice shall submit to such occupational tests and examinations as the PACB shall direct. If after such occupational tests and examinations the apprentice is found to be making unsatisfactory progress, his/her apprenticeship level and rate of wage shall not be advanced as provided in Section 5 until his/her progress is satisfactory to the Director of Apprenticeship and Trades Certification and his/her date of completion shall be deferred accordingly. Persistent failure to pass required tests shall be a cause for revocation of his/her Memorandum of Understanding.

7.2 Upon receipt of reports of accelerated progress of the apprentice, the PACB may shorten the term of apprenticeship and advance the date of completion accordingly.

7.3 For each and every course, a formal assessment is required for which 70% is the pass mark. A mark of 70% must be attained in both the theory examination and the practical project assignment, where applicable as documented on an official transcript.

7.4 Course credits may be granted through the use of a PACB approved matrix which identifies course equivalencies between designated trades and between current and historical Plans of Training for the same trade.

8.0 Granting of Certificates of Apprenticeship

Upon the successful completion of apprenticeship, the PACB shall issue a Certificate of Apprenticeship.

9.0 Hours of Work

Any hours employed in the performance of duties related to the designated occupation will be credited towards the completion of the term of apprenticeship. Appropriate documentation of these hours must be provided.

10.0 Copies of the Registration for Apprenticeship

The Director of Apprenticeship and Trades Certification shall provide copies of the Registration for Apprenticeship form to all signatories to the document.

11.0 Ratio of Apprentices to Journeypersons

Under normal practice, the ratio of apprentices to journeypersons shall not exceed two apprentices to every one journeyperson employed. Other ratio arrangements would be determined and approved by the PACB.

12.0 Relationship to a Collective Bargaining Agreement

Where applicable in Section 5 of these conditions, Collective Agreements take precedence.

13.0 Amendments to a Plan of Apprenticeship Training

A Plan of Training may be amended at any time by the PACB.

14.0 Employment, Re-Employment and Training Requirements

14.1 The Plan of Training requires apprentices to regularly attend their place of employment.

14.2 The Plan of Training requires apprentices to attend training for that occupation as prescribed by the PACB.

14.3 Failure to comply with Sections 14.1 and/or 14.2 will result in cancellation of the Memorandum of Understanding. Apprentices may have their MOUs reinstated by the PACB but would be subject to a commitment to complete the entire program as outlined in the General Conditions of Apprenticeship. Permanent cancellation in the said occupation is the result of non-compliance.

14.4 Cancellation of the Memorandum of Understanding to challenge journeyperson examinations, if unsuccessful, would require an apprentice to serve a time penalty of two (2) years before reinstatement as an apprentice or qualifying to receive a class call to training as a registered Trade Qualifier. Cancellation must be mutually agreed upon by the employer and the apprentice.

14.5 An employer shall ensure that each apprentice is under the direct supervision of an approved journeyperson supervisor who is located at the same worksite as the apprentice, and that the apprentice is able to communicate with the journeyperson with respect to the task, activity or function that is being supervised.

14.6 Under the Plan of Training the employer is required to keep each apprentice employed as long as work is available, and if the apprentice is laid off due to lack of work, to give first opportunity to be hired before another is hired.

14.7 The employer will permit each apprentice to attend training programs as prescribed by the PACB.

14.8 Apprentices who cannot acquire all the workplace skills at their place of employment will have to be evaluated in a simulated work environment at a PACB authorized training institution and have sign-off done by instructors to meet the requirements for certification.

15.0 Appeals to Decisions Based on Conditions Governing Apprenticeship Training

Persons wishing to appeal any decisions based on the above conditions must do so in writing to the Minister of Immigration, Population Growth and Skills within 30 days of the decision.

D. Requirements for Red Seal Endorsement

1. Evidence the required work experiences outlined in this Plan of Training have been obtained. This evidence must be in a format clearly outlining the experiences and must be signed by an appropriate person or persons attesting that these experiences have been obtained to the level required.

2. Successful completion of all required courses in the program.

3. A combination of training from an approved training program and suitable work experience totaling 5400 hours.

   Or

   A total of 8100 hours of suitable work experience.

4. Completion of a National Red Seal examination, to be set at a place and time determined by the Apprenticeship and Trades Certification Division.

E. Roles and Responsibilities of Stakeholders in the Apprenticeship Process

The apprenticeship process involves a number of stakeholders playing significant roles in the training of apprentices. This section outlines these roles and the responsibilities resulting from them.

The Apprentice:

- completes all required technical training courses as approved by the PACB.
- finds appropriate employment.
- completes all required work experiences in combination with the required hours.
- ensures work experiences are well documented.
- approaches apprenticeship training with an attitude and commitment that fosters the qualities necessary for a successful career as a qualified journeyperson.
- obtains the required hand tools as specified by the PACB for each period of training of the apprenticeship program.

The Employer:

- provides high quality work experiences in an environment conducive to learning.
- remunerates apprentices as set out in the Plan of Training or Collective Agreements.
- provides feedback to training institutions, Apprenticeship and Trades Certification Division and apprentices in an effort to establish a process of continuous quality improvement.
- where appropriate, releases apprentices for the purpose of returning to a training institution to complete the necessary technical courses.
- ensures work experiences of the apprentice are documented.
- ensures a certified journeyperson is currently on staff in the same trade area as the apprentice and whose certification is recognized by the NL Department of Immigration, Skills and Labour.

The Training Institution:

- provides a high quality learning environment.
- provides the necessary student support services that will enhance an apprentice's ability to be successful.
- participates with other stakeholders in the continual updating of programs.

The Apprenticeship and Trades Certification Division:

- establishes and maintains program advisory committees under the direction of the PACB.
- promotes apprenticeship training as a viable career option to prospective apprentices and other appropriate persons involved, such as career guidance counsellors, teachers, parents, etc.
- establishes and maintains a protocol with training institutions, employers and other appropriate stakeholders to ensure the quality of apprenticeship training programs.
- ensures all apprentices are appropriately registered and records are maintained as required.
- schedules all necessary technical training periods for apprentices to complete requirements for certification.
- administers level, provincial and interprovincial examinations.

The Provincial Apprenticeship and Certification Board:

- sets policies to ensure the provisions of the **Apprenticeship and Certification Act (1999)** are implemented.
- ensures advisory and examination committees are established and maintained.
- accredits institutions to deliver apprenticeship training programs.
- designates occupations for apprenticeship training and/or certification.