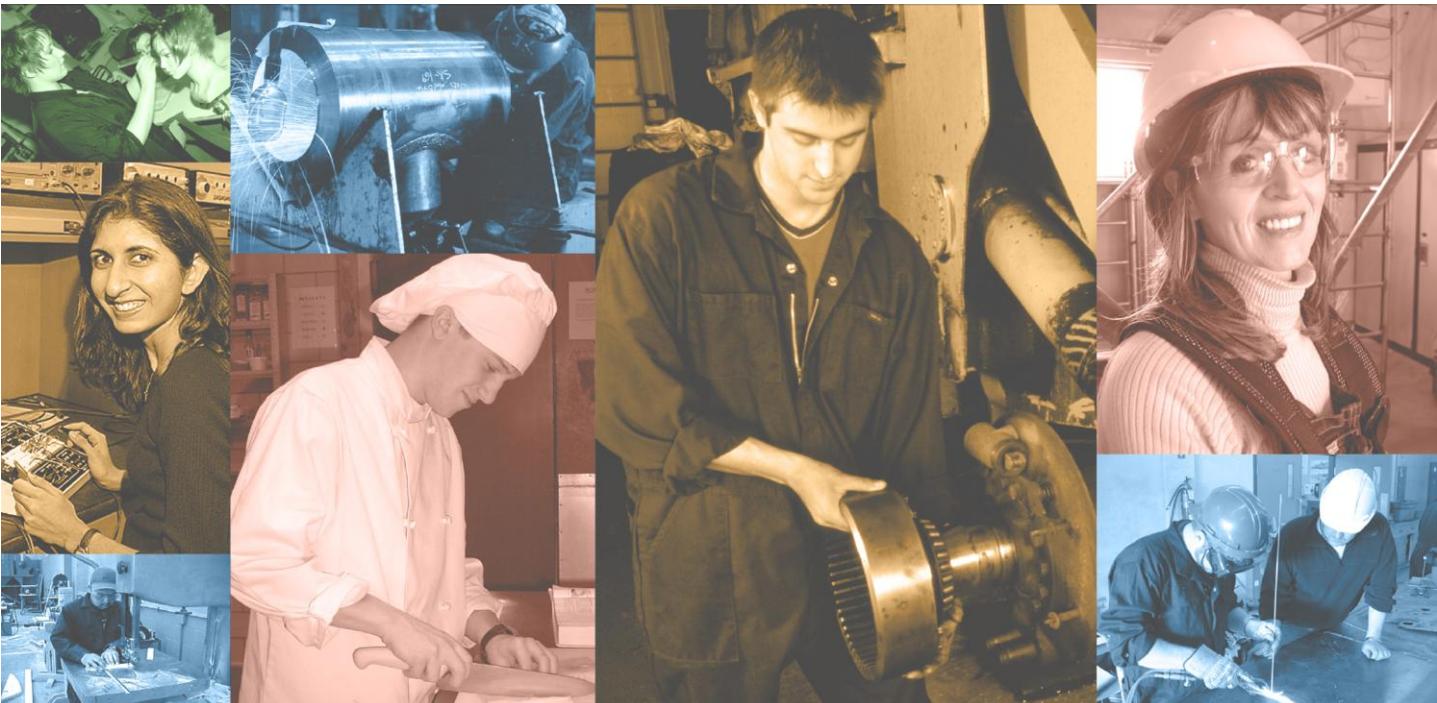


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# Plan of Training

## OIL HEAT SYSTEM TECHNICIAN



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

**SEPTEMBER 2009**

**PLAN OF TRAINING**

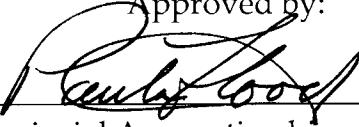
**OIL HEAT SYSTEMS TECHNICIAN**

SEPTEMBER 2009



**Government of Newfoundland and Labrador**  
**Department of Education**  
**Institutional and Industrial Education Division**

Approved by:

  
\_\_\_\_\_  
Chairperson, Provincial Apprenticeship and Certification Board

Date: Sept 23/09

### Preface

This Apprenticeship Standard is based on the 2006 edition of the National Occupational Analysis for the Trade Name trade.

This document describes the curriculum content for the Oil Heat System Technician apprenticeship training program and outlines each of the technical training units necessary for the completion of apprenticeship.

### Acknowledgements

Advisory committees, industry representatives, instructors and apprenticeship staff provided valuable input to the development of this Apprenticeship Curriculum Standard. Without their dedication to quality apprenticeship training, this document could not have been produced.

We offer you a sincere thank you.

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## A. 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 Requirements project assignment, where applicable as documented on an official transcript.

The order of course delivery within each block can be determined by the educational agency, as long as pre-requisite conditions are satisfied.

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

Block I			
NL Course No.	Course Name	Hours	Prerequisites
TS1510	Occupational Health & Safety	6	None
TS1520	WHMIS	6	None
TS1530	Standard First Aid	14	None
OM1000	Workplace Safety	40	None
OM1120	Print Reading and Sketching	30	Co-Requisite AM1100; AM1250
OM1130	Tools & Equipment	45	None
OM1141	House as a System	30	None
OM1151	Trade Practice	42	None
OM1230	Soldering , Flaring and Threading Pipe	30	OM1130
OM1241	Fuel Storage Tanks	42	OM1130
OM1251	Fuel Delivery Systems	40	OM1130
OM1320	Combustion and Burner Air Handling	35	OM1251

## Plan of Training – Oil Heat System Technician

Block I			
NL Course No.	Course Name	Hours	Prerequisites
	Devices		
OM1330	Electricity 1 (Principles of Electricity)	30	OM1130
OM1340	Electricity 2 (Electrical Devices and Ignition Systems)	30	OM1330
OM1440	Controls and Wiring	75	OM1340
OM1470	Chimneys, Venting & Draft Control	30	OM1320; OM1450
OM1602	Hydronic Heating Systems	60	OM1120; OM1230; OM1251; OM1151; OM1340
OM1621	Warm Air Furnaces	60	OM1120; OM1230; OM1251; OM1151; OM1340
OM1620	Low Pressure Steam Systems	15	OM1602
OM1631	Domestic Hot Water Heaters	20	OM1601
OT1240	Workplace Exposure	90	None
AP1101	Introduction to Apprenticeship	15	None
AM1100	Math Essentials	30	None
AM1250	Oil Heat System Math Fundamentals	30	AM1100
CM2160	Communication Essentials	45	None
SD1760	Workplace Essentials	45	None

## Plan of Training – Oil Heat System Technician

<b>Block I</b>			
<b>NL Course No.</b>	<b>Course Name</b>	<b>Hours</b>	<b>Prerequisites</b>
MC1060	Computer Essentials	15	None
	<b>Total Hours</b>	<b>950</b>	

### Required Work Experience

<b>Block II</b>			
<b>NL Course No.</b>	<b>Course Name</b>	<b>Hours</b>	<b>Prerequisites</b>
OM1352	Electricity 3 (Solid State & Programmable Controls)	42	Block I
OM1450	Motors	30	Block I
OM1461	Combustion Chambers	15	Block I
OM1640	Specialized Systems	30	Block I
OM1651	Zoning 1 (Hot Water System)	60	Block I
OM1660	Retrofit Systems	20	Block I
OM1670	Service and Troubleshooting	30	Block I
OM1680	Planned Maintenance	30	Block I
OM1691	Zoning 2 (Warm Air Systems)	15	Block I
	<b>Total Hours</b>	<b>272</b>	

**Total Course Credit Hours** **1222**

**\*A student who can meet the mathematics requirement through an ACUPLACER® test may be exempted from AM1100 - Math Essentials. Please check with your training institution.**

## **BLOCK I**

### **TS1510      Occupational Health and Safety**

#### **Learning Outcomes:**

- Demonstrate knowledge of interpreting the Occupational Health and Safety Act, laws and regulations.
- Demonstrate knowledge of understanding the designated responsibilities within the laws and regulations such as the right to refuse dangerous work; and the importance of reporting accidents.
- Demonstrate knowledge of how to prevent accidents and illnesses.
- Demonstrate knowledge of how to improve health and safety conditions in the workplace.

**Duration:**            6 Hours

**Pre-requisite(s):**    None

#### **Objectives and Content:**

1. Interpret the Occupational Health and Safety Act laws and regulations.
  - i. explain the scope of the act
    - application of the Act
    - Federal/Provincial jurisdictions
    - Canada Labour Code
    - rules and regulations
    - private home application
    - conformity of the Crown by the Act
2. Explain responsibilities under the Act and Regulations.
  - i. duties of employer, owner, contractors, sub-contractors, employees, and suppliers
3. Explain the purpose of joint health and safety committees.
  - i. formation of committee
  - ii. functions of committee

- iii. legislated rights
- iv. health and safety representation
- v. reporting endangerment to health
- vi. appropriate remedial action
- vii. investigation of endangerment
- viii. committee recommendation
- ix. employer's responsibility in taking remedial action

4. Examine right to refuse dangerous work.

- i. reasonable grounds for refusal
- ii. reporting endangerment to health
- iii. appropriate remedial action
- iv. investigation of endangerment
- v. committee recommendation
- vi. employer's responsibility to take appropriate remedial action
- vii. action taken when employee does not have reasonable grounds for refusing dangerous work
- viii. employee's rights
- ix. assigning another employee to perform duties
- x. temporary reassignment of employee to perform other duties
- xi. collective agreement influences
- xii. wages and benefits

5. State examples of work situations where one might refuse work.

6. Describe discriminatory action.

- i. Definition
- ii. filing a complaint procedure
- iii. allocated period of time a complaint can be filed with the Commission
- iv. duties of an arbitrator under the Labour Relations Act
- v. order in writing inclusion
- vi. report to commission allocated period of time to request arbitrator to deal with the matter of the request
- vii. notice of application
- viii. failure to comply with the terms of an order
- ix. order filed in the court

7. Explain duties of commission officers.

- i. powers and duties of officers
- ii. procedure for examinations and inspections

- iii. orders given by officers orally or in writing
- iv. specifications of an order given by an officer to owner of the place of employment, employer, contractor, sub-contractor, employee, or supplier
- v. service of an order
- vi. prohibition of persons towards an officer in the exercise of his/her power or duties
- vii. rescinding of an order
- viii. posting a copy of the order
- ix. illegal removal of an order

8. Interpret appeals of others.

- i. allocated period of time for appeal of an order
- ii. person who may appeal order
- iii. action taken by commission when person involved does not comply with the order
- iv. enforcement of the order
- v. notice of application
- vi. rules of court

9. Explain the process for reporting of accidents.

- i. application of act
- ii. report procedure
- iii. reporting notification of injury
- iv. reporting accidental explosion or exposure
- v. posting of act and regulations

**Practical Requirements Requirements:**

1. Conduct an interview with someone in your occupation on two or more aspects of the act and report results.
2. Conduct a safety inspection of shop area.

TS1520      Workplace Hazardous Materials Information System (WHMIS)

**Learning Outcomes:**

- Demonstrate knowledge of interpreting and applying the Workplace Hazardous Materials Information System (WHMIS) regulation under the Occupational Health and Safety Act.

**Duration:**            6 Hours

**Pre-requisite(s):**    None

**Objectives and Content:**

1. Define WHMIS safety.
  - i. rational and key elements
  - ii. history and development of WHMIS
  - iii. WHMIS legislation
  - iv. WHMIS implementation program
  - v. definitions of legal and technical terms
2. Examine hazard identification and ingredient disclosure.
  - i. prohibited, restricted and controlled products
  - ii. classification and the application of WHMIS information requirements
  - iii. responsibilities for classification
    - the supplier
    - the employer
    - the worker - Classification: rules and criteria
    - information on classification
    - classes, divisions and subdivision in WHMIS
    - general rules for classification
    - class A - compressed gases
    - class B - flammable and combustible materials
    - class C - oxidizing material
    - class D - poisonous and infectious material
    - class E - corrosive material
    - class F - dangerously reactive material

- iv. products excluded from the application of WHMIS legislation
  - consumer products
  - explosives
  - cosmetics, drugs, foods and devices
  - pest control products
  - radioactive prescribed substances
  - wood or products made of wood
  - manufactured articles
  - tobacco or products of tobacco
  - hazardous wastes
  - products handled or transported pursuant to the Transportation of Dangerous Goods (TDG) Act
- v. comparison of classification systems – WHMIS and TDG
- vi. general comparison of classification categories
- vii. detailed comparison of classified criteria

3. Explain labeling and other forms of warning.

- i. definition of a WHMIS label
  - supplier label
  - workplace label
  - other means of identification
- ii. responsibility for labels
  - supplier responsibility
  - employer responsibility
  - worker responsibility
- iii. introduce label content, design and location
  - supplier labels
  - workplace labels
  - other means of identification

4. Introduce material safety data sheets (MSDS).
  - i. definition of a material safety data sheet
  - ii. purpose of the data sheet
  - iii. responsibility for the production and availability of data sheets
    - supplier responsibility
    - employer responsibility
    - workers responsibility

**Practical Requirements:**

1. Locate WHMIS label and interpret the information displayed.
2. Locate a MSDS sheet for a product used in the workplace and determine what personal protective equipment and other precautions are required when handling this product.

TS1530      Standard First Aid

**Learning Outcomes:**

- Demonstrate knowledge of recognizing situations requiring emergency action
- Demonstrate knowledge of making appropriate decisions concerning first aid

**Duration:**      14 Hours

**Pre-requisite(s):**      None

**Objectives and Content:**

1.      Complete a St. John Ambulance or Canadian Red Cross Standard First Aid Certificate course.

## OM1000 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:** 40 Hours

**Pre-requisites:** None

### **Objectives and Content:**

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. Determine correct fire extinguisher for specific types of fires.
3. Correctly use appropriate rigging for various loads and lifts.
4. Demonstrate proper use of safety harness.

## OM1120 Print Reading and Sketching

### **Learning Outcomes:**

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

**Duration:** 30 Hours

**Co-Requisites:** MC1050

### **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.

## OM1130 Tools and Equipment

### **Learning Outcomes:**

- Demonstrate knowledge of safety practices in the use and care of tools and equipment.
- Demonstrate knowledge in the selection, operation and maintenance of hand and power tools, equipment and facilities, without damage to equipment, operator or to others.
- Demonstrate understanding of the responsibilities of the Oil Heat System Technician toward the employer for the care and proper use of tools.

**Duration:** 45 Hours

**Pre-requisites:** None

### **Objectives and Content:**

#### **Hand and Power Tools**

1. Describe the purpose, applications, and procedures for use and care of hand tools.
  - i. hammers
  - ii. screwdrivers
  - iii. wrenches
  - iv. pliers and wire cutters
  - v. rulers and measuring tools
  - vi. cutting tools
  - vii. files
  - viii. torque wrenches
2. Describe the purpose, applications, and procedures for use and care of power tools.
  - i. drills and drill bits
  - ii. saws
  - iii. sanders and grinders
  - iv. powder actuated tools
3. Describe the components, applications and procedure for using compressed air

systems.

4. Describe powder actuated tools, their applications and procedures for safe use.

### Specialty Tools

5. Describe the various special tools used in the Oil Heat System Technician trade, their purpose, applications and procedures for use.
  - i. pressure and vacuum gauges
  - ii. multimeter
  - iii. nozzle wrench
  - iv. flame mirror
  - v. electrode gauges
  - vi. fan-wheel puller
6. Describe scribes and markers, their purpose, applications and procedure for use.
7. Describe flaring tools, their purpose, applications and procedures for use.
8. Describe grinding tools, their purpose, applications and procedures for use.
9. Describe taps and dies, their purpose, applications and procedures for use.
10. Describe the types of fasteners, their applications and procedures for use.
11. Describe soldering tools, their applications, care and procedures for use.
12. Describe measuring tools, their applications, care and procedures for use.
13. Describe the various special tools for working with non-metallic pipe.
  - i. cutters
  - ii. champering tools
  - iii. crimpers

**Practical Requirements:**

1. Complete projects as assigned by instructor.
  - i. measuring
  - ii. cutting
  - iii. threading
  - iv. filing

## 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-requisites:** 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.

## OM1151 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:** 42 Hours

**Pre-requisites:** 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.

## OM1230 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:** 30 Hours

**Pre-requisites:** OM1130

### **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.

## OM1241 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:** 42 Hours

**Pre-requisites:** OM1130

### **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.

## OM1251 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:** 40 Hours

**Pre-requisites:** OM1130

### **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.

## OM1320 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:** 35 Hours

**Pre-requisites:** OM1251

### **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-requisites:** OM1130

### **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.

## OM1340 Electricity 2 (Electrical Devices and Ignition Systems)

### **Learning Outcomes:**

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

**Duration:** 30 Hours

**Pre-requisites:** OM1330

### **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.
  - iv. rods
  - v. 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.

## OM1440 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:** 75 Hours

**Pre-requisites:** OM1340

### **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.

## OM1470 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:** 30 Hours

**Pre-requisites:** OM1320; OM1450

### **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

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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

## OM1602 Hydronic Heating Systems

### **Learning Outcomes:**

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

**Duration:** 60 Hours

**Pre-requisites:** OM1120; OM1230; OM1251; OM1151; OM1340

### **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
  - iii. in-floor radiant systems
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. Explain the operation and application of alternate fuel boilers.
  - i. wood/oil add-on
  - ii. electric
  - iii. solar
  - iv. heat pumps
  - v. gas
7. Explain the operation and application of a wood/oil add-on hot water boiler.
8. Describe the different piping systems used for heat delivery and their applications.
9. Describe the different types of radiation.
10. Describe routine maintenance procedures for hot water heating systems.
11. Describe methods of backflow prevention.
12. Describe potential boiler problems, diagnostic procedures and solutions.
13. Describe how to layout a hydronic heating system.
14. Describe the benefits of pipe insulation.

**Practical Requirements:**

1. Plumb and hook up a hydronic heating system.
2. Layout a hydronic heating system.

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3. Compile a materials take off list.
4. Sketch a hydronic heating system.

## OM1621 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:** 60 Hours

**Pre-requisites:** OM1120; OM1230; OM1251; OM1151; OM1340

### **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.

## OM1620 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:** 15 Hours

**Pre-requisites:** OM1602

### **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.

## OM1631 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:** 20 Hours

**Pre-requisites:** OM1602

### **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.

**OT1240      Workplace Exposure**

**Learning Outcomes:**

- Demonstrate knowledge of theory and practical applications of trade skills, safe work practices, appropriate workplace behaviour, and time management through exposure to the trade in an authentic work environment

NOTE: The pre-apprentice must be supervised at the workplace. Supervision staff must be appropriately qualified to undertake that role – preferably a certified Journeyperson for the trade.

**Duration:**            90 Hours

**Pre-Requisite(s):**    None

**AP1101      Introduction to Apprenticeship**

**Learning Outcomes:**

- Demonstrate knowledge of how to become a registered apprentice.
- Demonstrate knowledge of the steps to complete an apprenticeship program.
- Demonstrate knowledge of various stakeholders in the apprenticeship process.
- Demonstrate knowledge of the Red Seal Program.

**Duration:**            15 Hours

**Pre-Requisite(s):**    None

**Objectives and Content:**

1. Define the following terms:
  - i. apprenticeship
  - ii. apprentice vs. registered apprentice
  - iii. Journeyperson vs. Certified Journeyperson
  - iv. Certificate of Apprenticeship
  - v. Certificate of Qualification
  - vi. Recognition of Prior Learning
  - vii. dual certification
2. Explain the apprenticeship system in Newfoundland and Labrador and the roles and responsibilities of those involved.
  - i. registered apprentice
  - ii. training institution
  - iii. employer
  - iv. Journeyperson
  - v. Department of Advanced Education and Skills
    - Industrial Training Section
    - Standards and Curriculum Section
  - vi. Provincial Trade Advisory Committees
  - vii. Provincial Apprenticeship and Certification Board

3. Identify the Conditions Governing Apprenticeship.
4. Describe the training and educational requirements.
  - i. pre-employment (entry level) training
  - ii. block release
  - iii. on-the-job
5. Explain the steps in the registered apprenticeship process.
  - i. criteria for eligibility
    - entrance requirements as per Conditions of Apprenticeship
    - employment
  - ii. registration process
    - application requirements
  - iii. Memorandum of Understanding
    - probation period
    - cancellation
  - iv. Record of Occupational Progress (Logbook)
    - signing off skills
    - recording hours
    - updating PDO on progress
  - v. class calls
    - schedule
    - EI Eligibility
    - Direct Entry
    - advanced level
  - vi. Block Exams
  - vii. progression
    - schedule
    - wage rates
  - viii. cancellation of apprenticeship
  - ix. Practical Examinations
  - x. Provincial and Interprovincial examinations
  - xi. certification
    - Certification of Apprenticeship
    - Certification of Qualification
    - Provincial certification
    - Interprovincial Red Seal endorsement

6. Explain the Interprovincial Standards Red Seal Program.
  - i. designated Red Seal trade
  - ii. the National Occupational Analysis (NOA)
  - iii. Interprovincial (IP) Red Seal Endorsement Examination
  - iv. relationship of NOA to IP Examination
  - v. qualification recognition and mobility
7. Identify the current financial incentives available to apprentices.
8. Explain the NL apprenticeship and trades certification division's out-of- province apprenticeship policy.

**Practical Requirements:**

1. Use the Provincial Apprenticeship and Trades Certification web site at [www.gov.nl.ca/app](http://www.gov.nl.ca/app) to:
  - i. locate, download, and complete the Application for Apprenticeship and Memorandum of Understanding (MOU)
  - ii. locate, download, and complete the Out of Province registration forms
    - Application for Apprenticeship (out of province)
    - Letter of Understanding (LOU)
    - Acceptance of Conditions Letter
  - iii. locate, download, and complete the Work Experience Credits form
  - iv. identify the locations of all Industrial Training offices
  - v. locate and review the following learning resources relevant to the trade:
    - Study Guide
    - Exam Preparation Guide
    - Plan of Training
2. Use a logbook for this trade to:
  - i. identify the hours for the trade (in-school and on-the-job)
  - ii. identify the number of blocks
  - iii. identify the courses in each block
  - iv. identify the workplace skills to be completed and verified

3. Use the Red Seal Web site, <http://www.red-seal.ca> to retrieve the National Occupational Analyses (NOA) for this trade.
  - i. identify the following components of the NOA:
    - Trends
    - Scope
    - Key Competencies
    - Blocks
    - Tasks
    - Subtasks
    - Pie Charts
    - Table of Specifications

## AM1100 Math Essentials

**Note:** It is recommended that AM1100 be delivered in the first semester of the Entry Level training program.

### **Learning Outcomes:**

- Demonstrate knowledge of the numeracy skills required to begin the 2<sup>nd</sup> level math course.
- Demonstrate knowledge of mathematics as a critical element of the trade environment.
- Demonstrate knowledge of mathematical principles in trade problem solving situations.
- Demonstrate the ability to solve simple mathematical word problems.

**Duration:** 30 Hours

**Pre-Requisite(s):** None

### **Objectives and Content:**

*Wherever possible, the instructor should use trade specific examples to reinforce the course objectives*

1. Use multiplication tables from memory.
2. Perform whole number operations.
  - i. read, write, count, round off, add, subtract, multiply and divide whole numbers
3. Apply the order of operations in math problems.
4. Perform fraction and mixed number operations.
  - i. read, write, add, subtract, multiply and divide fractions

5. Perform decimal operations.
  - i. read, write, round off, add, subtract, multiply and divide decimals
6. Perform percent/decimal/fraction conversion and comparison.
  - i. convert between fractions, decimals and percents
7. Perform percentage operations.
  - i. read and write percentages
  - ii. calculate base, rates and percentages
8. Perform ratio and proportion operations.
  - i. use a ratio comparing two quantities with the same units
  - ii. use a proportion comparing two ratios
9. Use the imperial measurement system in math problems.
  - i. identify units of measurement for:
    - length
    - mass
    - area
    - volume
    - capacity
10. Use the metric measurement system in math problems.
  - i. identify units of measurement for:
    - length
    - mass
    - area
    - volume
    - capacity

**Practical Requirements:**

1. To emphasize or further develop specific knowledge objectives, students will be asked to complete practical demonstrations which confirm proper application of mathematical theory to job skills.

## AM1250 Oil Heat System Math Fundamentals

### **Learning Outcomes:**

- Demonstrate knowledge of mathematical concepts in the performance of trade practices.
- Demonstrate knowledge of mathematics as a critical element of the trade environment.
- Demonstrate knowledge of solving mathematical word problems.
- Demonstrate knowledge of mathematical principles for the purposes of problem solving, job and materials estimation, measurement, calculation, system conversion, diagram interpretation and scale conversions, formulae calculations, and geometric applications.

**Duration:** 30 Hours

**Pre-Requisite(s):** AM1100

### **Objectives and Content:**

*The instructor is required to use trade specific examples to reinforce the course objectives.*

1. Employ percent/decimal/fraction conversion and comparison in trade specific situations.
2. Apply ratios and proportions to trade specific problems.
3. Use the Imperial Measurement system in trade specific applications.
4. Use the Metric Measurement system in trade specific applications.
5. Complete Imperial/Metric conversions in trade specific situations.
  - i. convert between imperial and metric measurements
  - ii. convert to another unit within the same measurement system

6. Manipulate formulas using cross multiplication, dividing throughout, elimination, and substitution to solve trade specific problems, such as:
  - i. right angle triangles
  - ii. area
  - iii. volume
  - iv. perimeter
7. Perform calculations involving geometry that are relevant to the trade, such as:
  - i. angle calculations
  - ii. circle calculations
8. Use practical math skills to complete administrative trade tasks.
  - i. material estimation
  - ii. material costing
  - iii. time & labour estimates
  - iv. taxes & surcharges
  - v. markup & projecting revenue

**Practical Requirements:**

1. To emphasize or further develop specific knowledge objectives, students will be asked to complete practical demonstrations which confirm proper application of mathematical theory to job skills.

**Note:**

This course has been designated as NON-TRANSFERABLE to other trades programs, and NOT ELIGIBLE FOR PRIOR LEARNING ASSESSMENT. Students completing training in this trade program are required to complete this math course.

## CM2160 Communication Essentials

### **Learning Outcomes:**

- Demonstrate knowledge of the importance of well-developed writing skills in the workplace and in career development.
- Demonstrate knowledge of the purpose of various types of workplace correspondence.
- Demonstrate knowledge of the principles of effective workplace writing.
- Demonstrate knowledge of standard formats for letters and memos.
- Demonstrate knowledge of principles related to writing effective letters and memos.
- Demonstrate the ability to prepare and deliver an oral presentation.
- Demonstrate knowledge of the importance of effective interpersonal skills in the workplace.

**Duration:** 45 Hours

**Pre-Requisite(s):** None

### **Objectives and Content:**

*Wherever possible, the instructor is expected to use trade specific examples to reinforce the course objectives.*

1. Identify the principles for writing clear, concise, complete sentences and paragraphs which adhere to the conventions of grammar, punctuation, and mechanics.
2. Identify the principles of effective workplace writing.
  - i. describe the value of well-developed writing skills to career success
  - ii. discuss the importance of tone, and language or word choice in workplace communication, regardless of the circumstances
  - iii. demonstrate an awareness of cultural differences when preparing workplace correspondence
  - iv. describe the writing process as it applies to workplace communication
    - planning
    - writing
    - editing/revising

- v. identify the parts of a business letter and memo, and when each should be used in the workplace
- vi. identify the standard formats for business letters and memos
- vii. identify guidelines for writing sample letters and memos which convey:
  - acknowledgment
  - routine request
  - routine response
  - complaint
  - refusal
  - persuasive request
  - letters of appeal

3. Identify types of informal workplace documents.

- i. identify types & purposes of reports
  - incident
  - process
  - progress
- ii. identify common trade specific forms
- iii. describe primary and secondary methods used to gather information
- iv. discuss the importance of accuracy and completeness in reports and forms

4. Identify the elements of presentations used in the workplace.

- i. identify presentation types
  - impromptu
  - informative
  - demonstration
  - persuasive
- ii. identify the components of an effective presentation
  - eye contact
  - body language
  - vocal qualities
  - audience analysis
  - multimedia tools
  - keeping on topic

5. Demonstrate an understanding of interpersonal communications in the workplace.
  - i. identify listening techniques
  - ii. demonstrate an understanding of group dynamics
  - iii. describe the importance of contributing information and expertise in the workplace
  - iv. describe the importance of respectful and open communication in the workplace
  - v. identify methods to accept and provide feedback in a constructive and considerate manner
  - vi. explain the role of conflict in a group to reach solutions
6. Identify acceptable workplace uses of communication technologies.
  - i. cell / Smart Phone etiquette
  - ii. voice mail
  - iii. e-mail
  - iv. teleconferencing / videoconferencing for meetings and interviews
  - v. social networking
  - vi. other emerging technologies

**Practical Requirements:**

1. Write well-developed, coherent, unified paragraphs.
2. Write sample letters and memos.
3. Write one short informal report.
4. Complete a selection of at least 3 trade-related forms.
5. Deliver an effective oral presentation.

## SD1760      Workplace Essentials

**Note:** It is recommended that SD1760 be delivered in the second half of the Entry Level training program.

### **Learning Outcomes:**

- Demonstrate knowledge of workplace essentials in the areas of meetings, unions, workers compensation, workers' rights, and human rights.
- Demonstrate knowledge of good customer service practices.
- Demonstrate knowledge of effective job search techniques.

**Duration:**            45 Hours

**Pre-Requisite(s):**    None

### **Objectives and Content:**

*Wherever possible, the instructor is expected to use trade specific examples to reinforce the course objectives.*

1.      Identify common practices related to workplace meetings.
  - i.      identify and discuss meeting format and preparation required for a meeting
  - ii.     explain the purpose of an agenda
  - iii.    explain the expected roles, responsibilities, and etiquette of meeting participants
2.      Define unions and identify their role in the workplace.
  - i.      identify the purpose of unions
  - ii.     identify a common union structure
  - iii.    identify the function of unions in this trade

3. Demonstrate an understanding of the Worker's Compensation process.
  - i. describe the aims, objectives, regulations and benefits of the Workplace Health, Safety and Compensation Commission
  - ii. explain the role of the Workers Advisor
  - iii. explain the internal review process
4. Demonstrate an understanding of workers' rights.
  - i. define labour standards
  - ii. identify regulations, including:
    - hours of work & overtime
    - termination of employment
    - minimum wages & allowable deductions
    - statutory holidays, vacation time, and vacation pay
5. Demonstrate an understanding of Human Rights issues.
  - i. examine the Human Rights Code and explain the role of the Human Rights Commission
  - ii. define harassment in various forms and identify strategies for prevention
    - direct
    - systemic
    - adverse effect
  - iii. identify gender and stereotyping issues in the workplace
  - iv. define basic concepts and terms related to workplace diversity including age, race, culture, religion, socio-economic status, and sexual orientation
6. Demonstrate an understanding of quality customer service.
  - i. explain why quality service is important
  - ii. identify barriers to quality customer service
  - iii. identify customer needs & common methods for meeting them
  - iv. identify and discuss the characteristics & importance of a positive attitude
  - v. identify the importance of demonstrating good communication skills including body language, listening, questioning, and when using electronic communication devices
  - vi. identify techniques for interacting with challenging customers to address complaints and resolve conflict

7. Demonstrate an understanding of effective job search techniques.
  - i. identify and explain employment trends, opportunities, and sources of employment
  - ii. identify and discuss essential skills for the trades as outlined by Human Resources and Skills Development Canada
  - iii. review job ads and identify the importance of fitting qualifications to job requirements
  - iv. identify the characteristics of effective resumes, the types of resumes, and principles of resume formatting
  - v. identify the characteristics of an effective cover letter
  - vi. identify the components of a portfolio, and discuss the value of establishing and maintaining a personal portfolio
  - vii. identify the common characteristics of the job interview process:
    - pre-interview preparation
    - interview conduct
    - post-interview follow up

**Practical Requirements:**

1. Create a resume.
2. Create a cover letter.
3. Participate in a mock job interview.

## MC1060 Computer Essentials

### **Learning Outcomes:**

- Demonstrate knowledge of computer systems and their operation.
- Demonstrate knowledge of popular software packages and their applications.
- Demonstrate knowledge of security issues related to computers.

**Duration:** 15 Hours

**Pre-Requisite(s):** None

### **Objectives and Content:**

*Wherever possible, the instructor is expected to use trade specific examples to reinforce the course objectives.*

1. Identify the major external components of a microcomputer system.
  - i. input devices
  - ii. output devices
  - iii. central control unit
2. Use operating system software.
  - i. start and quit a program
  - ii. use the help function
  - iii. use the find function
  - iv. maximize and minimize a window
  - v. use the task bar
  - vi. adjust desktop settings such as screen savers, screen resolution, and backgrounds
  - vii. shut down a computer

3. Perform file management commands.
  - i. create folders
  - ii. copy files and folders
  - iii. move files and folders
  - iv. rename files and folders
  - v. delete files and folders
4. Use word processing software to create documents.
  - i. enter text
  - ii. indent and tab text
  - iii. change text attributes (bold, underline, font, etc.)
  - iv. change layout format (margins, alignment, line spacing)
  - v. spell check and proofread
  - vi. edit text
  - vii. save document
  - viii. print document
  - ix. close document
  - x. retrieve documents
5. Use spreadsheet software to create spreadsheets.
  - i. enter data in cells
  - ii. create formulas to add, subtract, multiply and divide
  - iii. save spreadsheet
  - iv. print spreadsheet
  - v. close spreadsheet
  - vi. retrieve spreadsheet
6. Access the Internet.
  - i. access websites using the world wide web(www)
  - ii. identify examples of web browsers
  - iii. use search engines with common searching techniques
  - iv. describe security issues

7. Use electronic mail.

- i. describe e-mail etiquette
  - grammar and punctuation
  - privacy and legal issues when sharing and forwarding e-mail
  - work appropriate content
  - awareness of employer policies
- ii. manage e-mail using the inbox, sent, and deleted folders
- iii. send an e-mail message with attachment(s)
- iv. print e-mail

**Practical Requirements:**

None

## **BLOCK II**

### **OM1352 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:** 42 Hours

**Pre-requisites:** Block I

#### **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.

## OM1450    Motors

### **Learning Outcomes:**

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

**Duration:**            30 Hours

**Pre-requisites:**      Block I

### **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.

## OM1461 Combustion Chambers

### **Learning Outcomes:**

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

**Duration:** 15 Hours

**Pre-requisites:** Block I

### **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.

## OM1640 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:** 30 Hours

**Pre-requisites:** Block I

### **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 and 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.

## OM1651 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:** 60 Hours

**Pre-requisites:** Block I

### **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.

## OM1660    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:**            20 Hours

**Pre-requisites:**        Block I

### **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.

## OM1670 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:** 30 Hours

**Pre-requisites:** Block I

### **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 to be 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 to be 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.

## OM1680 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:** 30 Hours

**Pre-requisites:** Block I

### **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.

**OM1691 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:** 15 Hours

**Pre-requisites:** Block I

**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.

## **D. 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 Section 14.

### **5.0 Apprenticeship Progression Schedule, Wage Rates and Advanced Training Criteria**

Progression Schedule, Wage Rate and Advanced Training Criteria are stated in the specific occupational Plan of Training for each designated apprenticeship occupation.

## Progression Schedule

Oil Heat System Technician - 5400 Hours			
APPRENTICESHIP LEVEL AND WAGES			
Year	Wage Rate At This Level	Requirements for progression to next level of apprenticeship	When requirements are met, the apprentice will progress to...
1 <sup>st</sup>	60 %	<ul style="list-style-type: none"> <li>▪ Completion of Block 1 training</li> <li>▪ Pass Block 1 exam</li> <li>▪ Minimum 1800 hours of combined relevant work experience and training</li> </ul>	2 <sup>nd</sup> Year
2 <sup>nd</sup>	75%	<ul style="list-style-type: none"> <li>▪ Completion of Block 1 training</li> <li>▪ Pass Block 1 exam</li> <li>▪ Minimum 3600 hours of combined relevant work experience and training</li> </ul>	3 <sup>rd</sup> Year
3 <sup>rd</sup>	90%	<ul style="list-style-type: none"> <li>▪ Completion of Block 2 training</li> <li>▪ Pass Block 2 exam</li> <li>▪ Minimum 5400 hours of combined relevant work experience and training</li> <li>▪ Sign-off of all workplace skills in apprentice logbook</li> <li>▪ Pass certification exam</li> </ul>	Journeyperson Certification
<p><b>Wage Rates</b></p> <ul style="list-style-type: none"> <li>▪ Rates are percentages of the prevailing journeyperson's wage rate in the place of employment of the apprentice.</li> <li>▪ 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.</li> <li>▪ Rates must not be less than the wage rate established by any collective agreement which may be in force at the apprentice's workplace.</li> <li>▪ Employers are free to pay wage rates above the minimums specified.</li> </ul> <p><b>Block Exams</b></p> <ul style="list-style-type: none"> <li>▪ This program may <b>not</b> currently contain Block Exams, in which case this requirement will be waived until such time as Block Exams are available.</li> </ul>			

## Plan of Training – Oil Heat System Technician

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Oil Heat System Technician - 5400 Hours		
CLASS CALLS		
Call Level	Requirements for Class Call	Hours awarded for In-School Training
Direct Entry Apprentice: PLA & / or Block 1	<ul style="list-style-type: none"><li>▪ Minimum of 1000 hours of relevant work experience</li><li>▪ Prior Learning Assessment (PLA) at designated college (if applicable)</li></ul>	To be determined by the number of courses completed after each class call
Block 2	<ul style="list-style-type: none"><li>▪ Minimum of 5200 hours of relevant work experience and training</li></ul>	272

Direct Entry Apprentice

- Must complete Block 1 courses through PLA and / or in-school training.
- Block 1 training is to be completed via class calls; up to 16 weeks of training per calendar year.
- Must attend in-school training until Block 1 is complete before attending Blocks 2 or higher

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 Advanced Education and Skills within 30 days of the decision.

**E. 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 7200 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.

## **F. 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 Advanced Education and Skills.

## **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 block, 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.