
Plan of Training

SPRINKLER SYSTEM INSTALLER



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

March 2010

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Approved by:

A handwritten signature in black ink, appearing to read "Paula Hood", written over a horizontal line.

Chairperson, Provincial Apprenticeship and Certification Board

Date: March 17, 2010

Preface

This Apprenticeship Standard is based on the 2009 edition of the National Occupational Analysis for the Sprinkler System Installer trade.

This document describes the curriculum content for the Cook 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.

Contact Information

Department of Advanced Education and Skills
Apprenticeship and Trades Certification Division
Tel: 709-729-2729 / 1-877-771-3737
Email: app@gov.nl.ca
Web: www.gov.nl.ca/app

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A. Profile Chart

Common Occupational Skills		
WHMIS TS1520	Standard First Aid TS1530	Fall Protection Awareness LA1110
Transportation of Dangerous Goods HE1630	Personal and Work Site Safety SK1100	Tools and Work Site Equipment SK1110
Rigging and Hoisting SK1220	Confined Space Awareness LA1100	Blueprint Reading and Sketching SK1290
Water Supply Installation		
Water Supply Installation SK1230	Fire Pump Installation SK2110	
Piping Installation		
Installation of Piping Offsets SK1270	Pipe Fabrication SK1200	Cross Connection Control Awareness SK2140
Detection, Protection & Control Systems		
Detection and Actuation Devices SK1260	Sprinkler Heads - Specific Application SK1250	Design Systems SK2100
Fire Protection Systems		
Fire Protection Systems I SK1210	Fire Hose and Standpipe Fire Protection Systems SK1250	Fire Protection Systems II SK1280
Fire Protection Systems III SK2130	Inspection, Testing, Maintenance and Documentation SK2130	

B. NOA Comparison Table

2009 NOA Tasks and Sub-tasks		2010 POT	
Task 1 – Uses and maintains tools and equipment.			
1.01	Maintains hand tools	SK1110	Tools and Work Site Equipment
1.02	Maintains portable and stationary power tools		
1.03	Maintains measuring and testing equipment		
1.04	Uses access equipment		
1.05	Uses rigging, hoisting and lifting equipment	SK1220	Rigging and Hoisting
1.06	Uses personal protective equipment (PPE) and safety equipment	SK1110	Personal and Work Site Safety
Task 2 – Organizes work.			
2.01	Interprets codes, regulations and procedures	SK1290	Blueprint Reading and Sketching
2.02	Interprets blueprints and specifications		
2.03	Uses documentation and reference material	SK2120	Inspection, Testing, Maintenance and Documentation
2.04	Communicates with others	CM2160	Communication Essentials
		SD1760	Workplace Essentials
		SK2120	Inspection, Testing, Maintenance and Documentation
2.05	Plans daily tasks and procedures	CM2160	Communication Essentials
2.06	Maintains safe work environment	SK1110	Personal and Work Site Safety
		LA1110	Fall Protection Awareness
		LA1100	Confined Space Awareness
		HE1630	Transportation of Dangerous Goods

2009 NOA Tasks and Sub-tasks		2010 POT	
Task 3 – Performs common trade activities.			
3.01	Prepares work site	SK1110	Tools & Worksite Equipment
		SK1100	Personal & Worksite Safety
		SK1200	Pipe Fabrication
3.02	Handles materials and supplies	SK1110	Tools & Worksite Equipment
		SK1200	Pipe Fabrication
3.03	Installs supports and hangers	SK1200	Pipe Fabrication
3.04	Performs layout of systems	SK1200	Pipe Fabrication
		SK2100	Design System
Task 4 – Commissions systems.			
4.01	Commissions water supply systems	SK1230	Water Supply Installation
		SK2120	Inspection, Testing, Maintenance & Documentation
4.02	Commissions piping installation	SK1210	Fire Protection Systems I
		SK1280	Fire Protection Systems II
		SK2130	Fire Protection Systems III
4.03	Commissions detection, protection and control systems	SK1260	Detection & Actuation Devices
Task 5 – Installs underground water supplies.			
5.01	Supervises trenching and backfilling	SK1230	Water Supply Installation
5.02	Installs underground piping and components		
5.03	Flushes underground systems		
Task 6 – Installs fire and booster pumps.			
6.01	Determines location of pumps, drives, controllers and components	SK2110	Fire Pump Installation
6.02	Installs pumps, controllers and components		
Task 7 – Installs private water supply systems.			
7.01	Installs water tanks	SK1230	Water Supply Installation
7.02	Installs related equipment		

2009 NOA Tasks and Sub-tasks		2010 POT		
Task 8 – Prepares piping and fittings for installation.				
8.01	Cuts pipe	SK1200	Pipe Fabrication	
		SK1210	Fire Protection Systems I	
8.02	Bends pipe	SK1200	Pipe Fabrication	
8.03	Threads pipe			
8.04	Grooves pipe			
8.05	Drills pipe			
8.06	Grinds pipe			
8.07	Prepares fittings			
Task 9 – Installs pipe and fittings.				
9.01	Installs steel pipe and fittings	SK1200	Pipe Fabrication	
9.02	Installs plastic pipe and fittings			
9.03	Installs copper pipe and fittings		SK1270	Installation of Piping Offsets
			9.04	
Task 10 – Installs piping components.				
10.01	Identifies sprinkler heads	SK1240	Fire Hose & Standpipe Fire Protection Systems	
		SK1250	Sprinkler Heads-Specific Application	
		SK1210	Fire Protection Systems I	
		SK1280	Fire Protection Systems II	
		SK2130	Fire Protection Systems III	
10.02	Installs sprinkler heads and nozzles	SK1250	Sprinkler Heads-Specific Application	
		SK1210	Fire Protection Systems I	
		SK1280	Fire Protection Systems II	
		SK2130	Fire Protection Systems III	
10.03	Installs sleeves	SK1210	Fire Protection Systems I	
		SK1280	Fire Protection Systems II	
		SK2130	Fire Protection Systems III	

2009 NOA Tasks and Sub-tasks		2010 POT	
10.04	Installs sway / seismic bracing	SK1200	Pipe Fabrication
10.05	Installs auxiliary devices	SK1210	Fire Protection Systems I
		SK1280	Fire Protection Systems II
		SK2130	Fire Protection Systems III
		SK1260	Detection & Actuation Devices
10.06	Installs cross connection control assemblies	SK2140	Cross Connection Control Awareness
Task 11 – Installs water-based systems.			
11.01	Installs wet systems	SK1210	Fire Protection Systems I
11.02	Installs dry systems		
11.03	Installs antifreeze systems	SK1280	Fire Protection Systems II
11.04	Installs preaction / deluge systems		
11.05	Installs foam systems	SK2130	Fire Protection Systems III
11.06	Installs standpipe systems	SK1240	Fire Hose & Standpipe Fire Protection Systems
11.07	Installs water mist systems	SK2130	Fire Protection Systems III
Task 12 – Installs specialty fire suppression systems.			
12.01	Installs dry chemical, clean agent and carbon dioxide systems	SK2130	Fire Protection Systems III
12.02	Installs portable extinguishers	SK2120	Inspection, Testing, Maintenance & Documentation
		SK2130	Fire Protection Systems III
Task 13 – Installs detection devices.			
13.01	Installs wet and dry pilot lines	SK1260	Detection & Actuation Devices
13.02	Installs heat-actuated detectors (HADs)		
13.03	Installs spark detection systems		
13.04	Installs air sampling systems		
13.05	Installs electrical detection systems		

2009 NOA Tasks and Sub-tasks		2010 POT	
Task 14 – Installs signal-initiating devices.			
14.01	Installs alarm-initiating devices	SK1210	Fire Protection Systems I
		SK2130	Fire Protection Systems III
		SK2120	Inspection, Testing, Maintenance & Documentation
		SK2110	Fire Pump Installation
14.02	Installs supervisory-initiating devices	SK1260	Detection & Actuation Devices
		SK2120	Inspection, Testing, Maintenance & Documentation
Task 15 – Maintains and repairs fire protection systems.			
15.01	Troubleshoots fire protection systems	SK2120	Inspection, Testing, Maintenance & Documentation
15.02	Repairs deficiencies		
15.03	Performs scheduled maintenance	SK1210	Fire Protection Systems I
		SK1280	Fire Protection Systems II
		SK2130	Fire Protection Systems III
Task 16 – Inspects and tests fire protection systems.			
16.01	Performs scheduled inspections	SK2120	Inspection, Testing, Maintenance & Documentation
16.02	Performs scheduled tests		
16.03	Inspects portable fire extinguishers		

C. Program Structure

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

The order of course delivery within each 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.

Program Structure

Block I			
Course No.	Course Name	Hours	Pre-requisite(s)
TS1520	WHMIS	6	None
TS1530	Standard First Aid	14	None
LA1110	Fall Protection Awareness	6	None
LA1100	Confined Space Awareness	6	None
HE1630	Transportation of Dangerous Goods	6	None
SK1100	Personal and Work Site Safety	18	None
SK1110	Tools and Work Site Equipment	12	None
SK1200	Pipe Fabrication	80	TS1520 TS1530 SK1100
SK1210	Fire Protection Systems I	59	None
SK1220	Rigging and Hoisting	18	None
AP1101	Introduction to Apprenticeship	15	None

Block I			
Course No.	Course Name	Hours	Pre-requisite(s)
AM1100	Math Essentials	30	None
AM1310	Sprinkler System Math Fundamentals	30	AM1100
CM2160	Communication Essentials	45	None
SD1760	Workplace Essentials	45	None
MC1060	Computer Essentials	15	None
Total Block I Hours		405	

Required Work Experience

Block II			
Course No.	Course Name	Hours	Pre-Requisite(s)
SK1230	Water Supply Installation	35	Entry Level (Block I)
SK1240	Fire Hose and Standpipe Fire Protection Systems	15	Entry Level (Block I)
SK1250	Sprinkler Heads – Specific Application	30	Entry Level (Block I)
SK1260	Detection and Actuation Devices	15	Entry Level (Block I)
SK1270	Installation of Piping Offsets	30	Entry Level (Block I)
SK1280	Fire Protection Systems II	85	Entry Level (Block I)
SK1290	Blueprint Reading and Sketching	30	Entry Level (Block I)
Total Block II Hours		240	

Required Work Experience

Block III			
Course No.	Course Name	Hours	Pre-Requisite(s)
SK2100	Design Systems	30	Block II
SK2110	Fire Pump Installation	50	Block II
SK2120	Inspection, Testing, Maintenance and Documentation	55	Block II
SK2130	Fire Protection Systems III	30	Block II
SK2140	Cross Connection Control Awareness	30	Block II
Total Block III Hours		195	
Total Course Credit Hours		840	

***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

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.

LA1110 Fall Protection Awareness

Learning Outcomes:

- Demonstrate knowledge of various types of fall protection and their components
- Demonstrate knowledge of the proper use of fall protection equipment and personal fall arrest systems
- Demonstrate knowledge of fall hazards in the workplace and how to take corrective measures to eliminate them through the selection of appropriate fall protection systems

Duration: 6 Hours

Pre-requisite(s): None

Objectives and Content:

1. Define the term fall protection.
2. Explain why fall protection is important in the workplace.
3. Determine when to use fall protection.
4. List the A, B, C, D=s of a complete fall protection system.
5. Describe the basic function of a travel restrict system.
 - i. permanent and temporary guard rails
 - ii. personal travel restrict systems
6. Describe the basic function of a fall arrest system.
 - i. identify the components of a personal fall arrest system
 - full body harness
 - shock absorbers
 - lanyards
 - lifelines
 - vertical
 - horizontal
 - rope grabs

- anchors
 - ii. explain how to put on a full body harness
7. Describe the basic function of a work positioning system.
- i. list the components of a personal work positioning system
8. Explain when inspections on equipment must be conducted and what action must be taken if defects or damage is discovered.
- i. list components of equipment that require inspection

Practical Requirements:

None.

LA1100 Confined Space Awareness

Learning Outcomes:

- Demonstrate knowledge of how to properly prepare a confined space for entry
- Demonstrate knowledge of how to enter a confined space safely
- Demonstrate knowledge of how to perform the duties of an attendant
- Demonstrate knowledge of how to deal with an emergency

Duration: 6 Hours

Pre-requisite(s): None

Objectives and Content:

1. Recognize confined space hazards.
 - i. define a confined space
 - ii. identify types of hazards in confined spaces

2. Identify proper controls for confined space entries.
 - i. list steps to protect yourself from confined space hazards
 - ii. define an entry permit
 - iii. list information included on a confined space entry permit
 - iv. explain what action must be taken if a permit expires before work is completed

3. Preparing for confined space entry.
 - i. state the first step in entry preparation
 - ii. list examples of proper entry preparation
 - iii. list types of personal protective equipment used in confined spaces

4. Determine testing techniques for confined spaces.
 - i. list the necessary steps of air testing
 - ii. state the correct order for testing gases

5. Identify confined space entry procedures.
 - i. identify the attendants responsibilities
 - ii. identify the area where the attendant should be stationed
 - iii. identify the entrants responsibilities

6. Explain confined space rescue techniques.
 - i. list three types of confined space rescues
 - ii. explain non-entry rescue
 - iii. list the requirements of an on-site rescue team

Practical Requirements:

None.

HE1630 Transportation of Dangerous Goods

Learning Outcomes:

- Demonstrate knowledge of an individual's role in handling, offering for transport or transporting dangerous goods and performance of those activities
- Demonstrate knowledge of an employer's role in directing or allowing an employee to handle, offer for transport or transport dangerous goods, as well as training, certification and supervision of employees

Duration: 6 Hours

Pre-requisite(s): None

Objectives and Content:

1. Identify the classification criteria and test methods in "Classification".
2. Explain the importance of shipping names.
3. Explain the use of Schedules 1, 2 and 3.
4. Explain the shipping document and train consist of requirements in "Documentation".
5. Explain the dangerous goods safety marks requirements in "Dangerous Goods Safety Marks".
6. Identify the certification safety marks requirements, safety requirements and safety standards in "Means of Containment".
7. Explain the emergency response assistance plan requirements in "Emergency Response Assistance Plan".
8. Explain the report requirements in "Accidental Release and Imminent Accidental Release Report Requirements".

10. Describe the safe handling and transportation practices for dangerous goods, including the characteristics of the dangerous goods.
11. Identify the proper use of any equipment used to handle or transport the dangerous goods.
12. Identify the reasonable emergency measures taken to reduce or eliminate any danger to public safety that results or may reasonably be expected to result from an accidental release of the dangerous goods.
13. Identify the aspects of training set out in “Training – General” for air transport by the ICAO Technical Instructions for the persons named in that Chapter and the requirements in “Air” of these Regulations; and SOR/2002-306 (*The ICAO Technical Instructions require the approval of training programs for air carriers. Information may be obtained from the Chief, Dangerous Goods Standards, Civil Aviation, and Transport Canada*).
14. Describe the requirements set out in the IMDG Code and the “Dangerous Goods Shipping Regulations” for marine transport, and the requirements in “Marine” of these Regulations.

Practical Requirements:

1. Complete the exercises and write an exam using the TDG Guide as a reference.
<http://www.tc.gc.ca/tdg/clear/part6.htm#sec61>

SK1100 Personal and Work Site Safety

Learning Outcomes:

- Demonstrate knowledge of safe working habits and procedures
- Demonstrate knowledge of how to protect self and others through the use of appropriate work dress and personal protective equipment
- Demonstrate knowledge of how to protect self and others by working within safe physical limits
- Demonstrate knowledge of how to maintain a clean and safe work area
- Demonstrate knowledge of lock out, tag out and de-energizing procedures to electrical, mechanical, hydraulic and pneumatic equipment according to all applicable acts, codes, policies, procedures, and standards

Duration: 18 Hours

Pre-requisite(s): None

Objectives and Content:

1. Identify applicable acts, codes and regulations.
 - i. Occupational Health and Safety Act (OHSA)
 - ii. Workplace Safety Insurance (WHSCC)
 - iii. National Building Code Canada (NBCC)
 - iv. National Fire Prevention Association (NFPA)
2. Explain the difference between the “Act” and the “Regulations.”
3. Identify and interpret sections of the Occupational Health and Safety Act and Newfoundland Construction Safety Association.
4. Describe the requirements for acceptable work dress and personal protective equipment including:
 - i. safety boots
 - ii. hard hats
 - iii. gloves
 - iv. glasses, goggles

- v. masks
 - vi. coveralls
 - vii. safety harness
 - viii. respirators
 - ix. ear protection
5. Describe the selection, adjustment and maintenance of protective equipment that provides the maximum protection suitable to a given task.
 - i. work clothing
 - ii. headwear
 - iii. foot wear
 - iv. eye wear
 6. Identify and comply with all applicable codes, and company/customer standards.
 7. Identify the location of first aid equipment and supplies.
 8. Identify the location of fire extinguishers and fire alarms.
 9. Identify job conditions that require heating, ventilation and lighting.
 10. Explain the purpose of storing material and equipment in designated areas.
 11. Identify when to erect protective barriers.
 12. Remove debris to designated locations at intervals that will keep the work area clean and safe.
 13. Explain why it is important to recycle materials whenever possible.
 14. Identify where fire hazardous areas are located.
 15. Describe a fire evacuation plan.
 16. Determine safe physical limits using correct body mechanics when bending lifting, transporting or climbing with heavy loads.
 17. Determine which condition(s) causes personal injury.

18. State the procedures to follow when the following worksite conditions are encountered.
 - i. problems with equipment that may endanger the worker or other workers
 - ii. any contravention of acts, codes, policies , procedures or standards
 - iii. work site hazards
19. Identify the types of inappropriate behaviour that could endanger yourself and/or co-workers on the worksite, or damage equipment.
20. Determine which conditions would cause mechanical and electrical equipment to be tagged and locked out.
21. Describe how to lock out electrical, mechanical, hydraulic and pneumatic equipment.
22. Describe how to remove locked out electrical, mechanical, hydraulic and pneumatic equipment.

Practical Requirements:

None.

SK1110 Tools and Work Site Equipment

Learning Outcomes:

- Demonstrate knowledge of how to identify, select, use and maintain hand tools
- Demonstrate knowledge of how to identify, select, use and maintain various power tools
- Demonstrate knowledge of how to identify, select, use and maintain various ladders
- Demonstrate knowledge of the procedures for selecting, erecting, dismantling and maintaining scaffolding

Duration: 12 Hours

Pre-requisite(s): None

Objectives and Content:

1. Explain how to use and maintain hand tools and measuring devices.
 - i. measuring tape
 - ii. torpedo level
 - iii. screwdrivers
 - iv. pliers
 - v. nut drivers
 - vi. wrenches
 - vii. vises and clamps
 - viii. hammers
 - ix. saws
 - x. files
 - xi. drills
 - xii. punches
 - xiii. chisels
 - xiv. cutters
 - xv. reamers
 - xvi. threaders

2. Explain how to use and maintain various power tools and accessories.
 - i. drills (impact, cordless)
 - ii. pipe cutters
 - iii. welding machine (portable)
 - iv. grooving machines
 - v. saws (chop, gas-powered, reciprocating, circular, cut-off, band)
 - vi. threading machines
 - vii. grinders
 - viii. drill press
3. Identify common safety hazards related to the use of power tools and accessories.
4. Identify the types and uses of ladders.
 - i. fiberglass
 - ii. step
 - iii. extension
5. Describe the safety hazards of ladder use.
6. Explain how to identify and tag defective ladders.
7. Explain how to install and dismantle scaffolding.
 - i. determine required system
 - ii. precautions
 - iii. erect and dismantle scaffolding
8. Explain how to identify the various types of aerial platforms.
 - i. scissors lift
 - ii. articulating boom
 - iii. straight boom
 - iv. battery, gas and propane platforms
9. Describe the operation, application and basic safety procedures for aerial platforms.
10. Interpret Occupational Health and Safety regulations for aerial platforms.

SK1200 Pipe Fabrication

Learning Outcomes:

- Demonstrate knowledge of how to establish a site fabrication area by referencing the site plan and coordinating site activities with other trades
- Demonstrate knowledge of how to gain knowledge of materials and their applications as well as procedures for preparation and joining of fittings to pipe (steel, plastic and copper)
- Demonstrate knowledge of how to select brackets and hanger supports to complete pipe installations

Duration: 80 Hours

Pre-requisite(s): SK1100, TS1530, TS1520

Objectives and Content:

1. Identify and establish a suitable fabrication area.
 - i. accessibility
 - ii. lighting
 - iii. traffic flow
 - iv. material, equipment handling, and storage
 - v. power supply
2. Identify types of hangers used in the installation of pipe and describe their characteristics and applications.
3. Identify sway bracing and describe its applications.
4. Identify types of protective materials applied to hangers and describe their purpose and applications.
5. Identify hanger requirements for various piping systems.
6. Describe procedures used to install fasteners and inserts.

7. Identify types and sizes of hanger rods and describe their applications.
8. Identify tools and procedures used for the installation of hangers and supports.
9. Describe and install hangers, supports and bracing.
 - i. angle irons
 - ii. pipe trapeze bars
 - iii. rings, rods, fastening devices
10. Identify seismic bracing and sleeving requirements.
11. Identify hanger requirements for installation of residential systems.
12. Identify piping components and describe their purpose and relationships.
 - i. system riser
 - ii. riser
 - iii. feed mains
 - iv. cross mains
 - v. branch lines
 - vi. header
13. Describe the criteria for selection of steel pipe.
 - i. schedule numbers and grades
 - ii. pressure ratings
 - iii. pipe sizes and lengths
 - iv. end finishes
 - v. protective coatings and linings
 - vi. codes
 - vii. manufacturers' specifications
 - viii. manufacturing techniques
14. Describe and demonstrate different types of joining methods for pipe and fittings.
 - i. threading tools
 - hand tools
 - powered threaders
 - nipple chucks

- ii. thread cutting lubricants
 - iii. thread standards
 - iv. groovers
 - v. brazing
 - vi. soldering
15. Identify the types of threaded pipe fittings and their applications.
- i. malleable
 - ii. cast iron
 - iii. steel
 - iv. galvanized
 - v. non-ferrous
 - vi. stainless
16. Identify and interpret code regulations pertaining to threaded pipe and fittings.
17. Identify the types of flanges and their associated fittings and gaskets.
- i. identify types of flanges / fittings
 - uni-flange
 - grooved
 - welded
 - companion
 - ii. describe their selection criteria:
 - materials
 - flange markings
 - gasket specifications
 - manufacturers' specifications
 - iii. install a grooved flange
 - iv. identify and interpret codes and regulations pertaining to flanged pipe fittings and gasket materials
18. Identify grooved and grip style pipe fittings and gaskets.
- i. identify types of fittings / gaskets
 - grooved flange
 - slip fitting
 - flexible coupling
 - ii. describe their selection criteria:
 - materials and types
 - markings

- pressure and temperature ratings
 - color coding of gaskets
 - joining techniques
 - iii. identify tools and equipment used for preparing and joining grooved pipe and describe joining techniques
 - hand tools
 - power tools (cut grooves, roll grooves)
 - machines
 - iv. join grooved and grip style fittings to pipe
 - v. interpret codes, regulations and manufacturers' specifications pertaining to gasket selection assembly of grooved and grip style fittings on pipe
19. Describe equipment and the techniques used to drill pipe.
20. Describe the procedures used to paint and label steel pipe.
21. Describe the procedures used to prepare and bend pipe.
22. Describe the criteria for selection of plastic pipe.
- i. types
 - ii. pressure and temperature ratings
 - iii. sizes
 - iv. manufacturers' specifications
23. Identify and interpret code regulations pertaining to plastic pipe and fittings.
24. Describe the types of fittings and solvents used with plastic pipe.
25. Describe the procedures used to join plastic pipe using the solvent welding process.
- i. safety requirements
 - ii. fabrication process and materials
 - iii. cleaning, beveling and de-burring
 - iv. assembly
 - v. tools
 - vi. ventilation
 - vii. solvent cure times
 - viii. testing

26. Describe the criteria for selection of tube and tubing.
 - i. types
 - ii. schedule numbers and grades
 - iii. pressure ratings
 - iv. sizes and lengths
 - v. end finishes
 - vi. codes
 - vii. manufacturers' specifications
 - viii. manufacturing techniques

27. Identify the types of tube and tubing fittings and their characteristics and applications.
 - i. ferrous
 - ii. non-ferrous

28. Identify and interpret code regulations pertaining to tube, tubing and fittings.

29. Describe the tools, equipment and techniques used to join tube and tubing.
 - i. brazing
 - ii. soldering
 - iii. compression
 - iv. flaring

30. Describe the selection criteria for solders and brazing alloys.
 - i. types
 - ii. pressure rating
 - iii. temperature rating
 - iv. application

31. Identify types of flux used in soldering or brazing and describe their purpose, applications and effects.

32. Describe procedures used to solder or braze joints.
 - i. types of torches
 - fuel
 - electric
 - ii. torch and tip selection
 - iii. code interpretation and application

SK1210 Fire Protection Systems I

Learning Outcomes:

- Demonstrate knowledge of how to select, identify, check, control and drain valves
- Demonstrate knowledge of how to identify and select a range of commonly used standard spray sprinkler heads
- Demonstrate knowledge of how to determine the requirements for the installation of wet-pipe fire protection systems
- Demonstrate knowledge of how to determine the requirements for the installation of dry-pipe fire protection systems

Duration: 59 Hours

Pre-requisite(s): None

Objectives and Content:

1. Identify types of valves and describe their operation and installations.
 - i. ball
 - ii. butterfly
 - iii. check
 - iv. gate
 - v. globe
 - vi. alarm
 - vii. dry
 - viii. pressure reducing
 - ix. pressure relief
 - x. test and drain
 - xi. indicating/non-indicating drain
 - xii. wall post indicators
 - xiii. quick opening devices
 - xiv. pre-action and deluge

2. Describe major design variations and construction features of valves.
3. Identify indicating valves and explain their operation.
4. Identify the various categories and listing information (manufacturers' specifications and NFPA 13) on standard spray sprinkler heads.
 - i. fusible link
 - ii. frangible bulb
 - iii. open orifice
5. Identify temperature ratings and color coding.
 - i. fusible link
 - ii. frangible bulb
 - iii. special application
6. Identify the performance characteristics that apply to standard spray sprinkler heads.
 - i. deflector design/spray patterns
 - ii. orifice sizes
 - iii. orientation
7. Describe methods for protection of standard spray sprinkler heads.
 - i. shipping
 - ii. unpacking
 - iii. storage
 - iv. installation
8. Explain the location requirements, procedures for installing and ceiling temperatures of standard spray sprinkler heads.
 - i. bays
 - ii. beams
 - iii. girders
 - iv. joists
 - v. open bar joists
 - vi. open ceilings
 - vii. trusses
 - viii. storage materials

9. Identify wet-pipe sprinkler systems and describe their operating principles and characteristics for commercial, industrial and residential structures.
10. Describe the advantages of a wet-pipe sprinkler system.
11. Describe how to install and remove components of a wet-pipe sprinkler system.
 - i. explain the procedures
 - ii. assemble the components of a wet pipe sprinkler system
 - iii. remove the components of a wet pipe sprinkler system
12. Describe methods for preventing false alarms on a wet-pipe sprinkler system.
13. Identify dry-pipe sprinkler system and describe its operating principles and characteristics.
14. Describe the special requirements for arranging and installing dry-pipe systems that protect unheated areas.
15. Identify the components of dry-pipe sprinkler systems and describe their location, purpose and operation.
16. Describe the methods for preventing false alarms on a dry-pipe sprinkler system.

SK1220 Rigging and Hoisting

Learning Outcomes:

- Demonstrate knowledge of rigging and hoisting equipment and the procedures for its use
- Demonstrate knowledge of loading and unloading equipment and materials according to all applicable acts, codes, policies, procedures, and standards

Duration: 18 Hours

Pre-requisite(s): None

Objectives and Content:

1. Identify rigging and hoisting equipment and describe their applications and safe working loads.
 - i. cable clamps
 - ii. chain block hoist (single and double)
 - iii. chains
 - iv. choker
 - v. come-alongs (cable or chain)
 - vi. jacks
 - vii. overhead hoist
 - viii. pipe buggy
 - ix. pipe stand
 - x. shackles
 - xi. slings
 - xii. spreader bar
 - xiii. tugger
 - xiv. ratchet lever hoist
 - xv. hand hoist

2. Describe types of ropes and slings, their characteristics and applications.
 - i. natural
 - ii. synthetic
 - iii. wire
3. Describe knots and hitches used on ropes, their applications and safety factors.
4. Explain the purpose and procedures for using the following equipment when hoisting loads.
 - i. chain falls
 - ii. come-along
 - iii. jacks
 - iv. trolleys
 - v. slings
 - vi. shackles
 - vii. power lifts
 - viii. leveling equipment
 - ix. fastening equipment
5. Explain how to disconnect, remove and secure lifting devices and equipment.
6. Describe how to secure and barricade the area(s) for rigging and hoisting operations.
7. Explain how to coordinate with other trades when preparing for rigging and hoisting operations.
8. Identify when special rigging or hoisting may be required for given materials for pieces of equipment.
9. Explain the inspection procedures for rigging and hoisting equipment and describe conditions that warrant inspections.

Practical Requirements:

1. Demonstrate the ability to tie approved knots, bends and hitches.
2. Demonstrate the use of international hand signals.

3. Demonstrate the use of standard weight tables to determine the weight of a given load.

4. Load, move and unload equipment and materials.
 - i. equipment selection
 - ii. equipment setup
 - iii. slinging
 - iv. load placement
 - v. securing load

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 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 2nd 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 percentages
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.

AM1310 Sprinkler 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

SK1230 Water Supply Installation

Learning Outcomes:

- Demonstrate knowledge of the procedures for excavating the installation site
- Demonstrate knowledge of the methods of installing underground piping
- Demonstrate knowledge of the procedures for the installation of thrust blocks and restraining devices
- Demonstrate knowledge of the procedures for the installation of hydrants and control valves including yard and wall hydrants
- Demonstrate knowledge of how to determine water supply from plans and water flow test data

Duration: 35 Hours

Pre-requisite(s): Entry Level (Block I)

Objectives and Content:

1. Describe the procedure for determining the location of existing utility lines.
 - i. hydro
 - ii. telephone
 - iii. cable
 - iv. water
 - v. site services
2. Describe various shoring systems and how soil type affects shoring of trenches.
 - i. trench box
 - ii. slope trench
3. Explain installation techniques for shoring.
 - i. guidelines for placement of shoring and excavation tools, equipment, materials, soil and barricades
 - ii. describe the situations that affect trench stability causing cave-ins

- iii. explain why trench shoring, ground surface and adjacent areas should be inspected regularly
4. Describe the various types of pipe and joining methods used when installing a private fire service main.
5. Verify factors to be considered in determining the class and type of pipe for a particular job.
 - i. working pressure
 - ii. laying conditions
 - iii. soil conditions
 - iv. corrosion
 - v. external loads
6. Describe testing and flushing procedures for new and existing underground piping.
7. Describe the approved methods and devices used to restrain fire service mains against movement.
8. Explain how the type of pipe, soil conditions and available space determine the restraining method to be used.
9. Explain the purpose of cleaning and coating restraining devices with corrosion-retarding materials.
10. Explain how concrete thrust blocks are utilized in combination with tie rods, structural anchoring, thrust collars, and restrained joints.
11. Describe the type of hydrant commonly used in private fire service mains.
12. Describe the functions of the various parts of the hydrants.
13. Determine the location of hydrants in private fire service mains.
14. Describe care and maintenance procedures for fire hydrants.
 - i. lubrication
 - ii. painting
 - iii. flushing

- iv. hydrant housing
 - v. freezing prevention
 - vi. checking for leaks
 - main valve
 - drip valve
 - water mains
15. Describe installation requirements for hydrant houses.
16. Describe types of water supply used for sprinkler and hose systems.
- i. municipal
 - ii. tanks
 - iii. reservoir
17. Describe installation procedures for alternative water supply.
18. Describe pump requirements for alternative water supply.
19. Explain the relationship of occupancy classification to water supply requirements.
20. Describe fire department connections and their installation requirements.
- i. sizing
 - ii. hose thread connections
 - iii. check valves
 - iv. additional components
21. Describe flow test procedure used to determine water flow data for fire protection systems.
22. Determine and calculate weights and volumes of cylinders and rectangular tanks or reservoirs.

SK1240 Fire Hose and Standpipe Fire Protection Systems

Learning Outcomes:

- Demonstrate knowledge of how to determine the installation requirements of a standpipe system and components
- Demonstrate knowledge of how to determine the testing and maintenance requirements of a standpipe system and components

Duration: 15 Hours

Pre-requisite(s): Entry Level (Block I)

Objectives and Content:

1. Determine the installation requirements of a combined sprinkler-standpipe system.
 - i. cross-zoning
 - ii. pipe sizing
2. Describe the characteristics and the installation requirements of standpipe classifications.
 - i. Class I
 - ii. Class II
 - iii. Class III
3. Explain the procedures for the routine inspection and testing of standpipe and hose systems.
 - i. acceptance
 - ii. inspection
 - iii. checkpoints and corrective actions
 - corrosion
 - foreign material
 - physical damage
 - water damage
 - tampering
 - other conditions that prevent operation

SK1250 Sprinkler Heads – Specific Application

Learning Outcomes:

- Demonstrate knowledge of how to select a variety of specific application sprinkler heads

Duration: 30 Hours

Pre-requisite(s): Entry Level (Block I)

Objectives and Content:

1. Identify specific application sprinkler heads and describe their characteristics and applications.
 - i. early suppression fast response (ESFR)
 - ii. quick response early suppression (QRES)
 - iii. old-style/conventional
 - iv. extended coverage
 - v. large drop
 - vi. in-rack
 - vii. attic
 - viii. nozzles
 - ix. open sprinkler
 - x. window
 - xi. dry sidewall
 - xii. dry upright
 - xiii. dry pendant
 - xiv. residential

2. Identify the performance characteristics that apply to specific application sprinkler heads.
 - i. deflector design/spray patterns
 - ii. orifice sizes
 - iii. temperature rating
 - iv. temperature sensitivity
 - v. orientation

3. Explain the procedures for installing specific application sprinkler heads.
4. Explain the location requirements of specific application sprinkler heads in relation to:
 - i. bays
 - ii. beams
 - iii. girders
 - iv. joists
 - v. open bar joists
 - vi. open ceilings
 - vii. trusses
 - viii. storage materials
5. Identify required distances between specific application sprinkler heads for specific hazards.
 - i. light hazard
 - ii. ordinary hazard
 - iii. extra hazard
6. Identify sprinkler deflector orientation and location.
 - i. low-pitched roofs
 - ii. partitions
 - iii. peaks
 - iv. roofs
 - v. stair and ramps
7. Identify clearances required between piled storage materials and sprinkler deflectors.
8. Identify the installation requirements for special situations.
 - i. concealed spaces
 - ii. attics
 - iii. vertical shafts
 - iv. stairways
 - v. vertical openings
 - vi. building service shafts
 - vii. elevator hoists ways and machine rooms
 - viii. spaces in underground floors

- ix. exterior docks and platforms
- x. exterior roofs or canopies
- xi. dwelling unit
- xii. library stockrooms
- xiii. electrical equipment
- xiv. ceiling types
- xv. fire curtains
- xvi. column protection

SK1260 Detection and Actuation Devices

Learning Outcomes:

- Demonstrate knowledge of how to install and determine the maintenance requirements for fixed temperature detection and actuation devices
- Demonstrate knowledge of how to install and determine the maintenance requirements for rate of rise and combination detection and actuation devices
- Demonstrate knowledge of how to install and determine the maintenance requirements for manual activation device

Duration: 15 Hours

Pre-requisite(s): Entry Level (Block I)

Objectives and Content:

1. Identify fixed temperature detection and actuation devices.
 - i. wet and dry pilot detector and actuators
 - ii. electric solenoids
 - iii. foam actuation devices
 - iv. protecto wire systems

2. Explain installation and maintenance procedures for fixed temperature detection and actuation devices.
 - i. wet and dry pilot detector and actuators
 - ii. electric solenoids
 - iii. foam actuation devices
 - iv. protecto wire systems

3. Identify rate of rise and combination detection and actuation devices and their installation.
 - i. pneumatic
 - ii. electric
 - iii. hydraulic

4. Identify manual activation devices.
 - i. manual pull stations
 - ii. dead man switch/abort switch
 - iii. emergency pull stations

5. Explain installation and maintenance procedures for manual activation devices.

Practical Requirements:

1. Assemble a simple dry pilot actuation line.

SK1270 Installation of Piping Offsets

Learning Outcomes:

- Demonstrate knowledge of how to perform the calculations of rolled and linear offsets according to all applicable acts, codes, policies, procedures, and standards

Duration: 30 Hours

Pre-requisite(s): Entry Level (Block I)

Objectives and Content:

1. Describe types of offsets and their applications.
 - i. rolled
 - ii. linear
 - iii. horizontal
 - iv. perpendicular
 - v. swing

Practical Requirements:

1. Calculate the required lengths for specific applications.
 - i. wall brackets
 - ii. swing joints
 - iii. ladder angles
 - iv. slings
2. Perform piping offset calculations for 90° and 45° fittings.
 - i. offset travel
 - ii. offset advancement
3. Construct a 90°, 45° and rolling offset.

SK1280 Fire Protection Systems II

Learning Outcomes:

- Demonstrate knowledge of how to determine the requirements for the installation of an anti-freeze fire protection system
- Demonstrate knowledge of how to determine the requirements for the installation of pre-action and deluge system
- Demonstrate knowledge of how to determine the installation requirements for combination dry-pipe and pre-action systems

Duration: 85 Hours

Pre-requisite(s): Entry Level (Block I)

Objectives and Content:

1. Describe the characteristics of anti-freeze fire protection systems.
2. Explain freezing protection of sprinkler controls and systems.
3. Describe how sprinkler systems using anti-freeze solutions operate.
4. Describe the procedures to follow for compliance with jurisdictional and local regulations concerning the use of anti-freeze solutions in a sprinkler system.
 - i. types of solutions
 - ii. potable water supply
 - iii. non-potable water supply
 - iv. cross-connections
5. Describe how to determine and prepare appropriate anti-freeze solutions for varying freezing temperatures.

6. Describe the procedures for installing an anti-freeze sprinkler system.
 - i. total capacity
 - ii. anti-freeze loop
 - iii. cross connection control
7. Explain how to fill systems that employ anti-freeze solutions.
8. Identify the components of pre-action and deluge systems and their applications.
9. Identify the activation methods for pre-action and deluge system detection lines.
 - i. pneumatic
 - ii. hydraulic
 - iii. electric
10. Describe the procedures for installing pre-action and deluge systems.
 - i. single interlock
 - ii. double interlock
 - iii. non-interlocking
11. Explain the requirements for drainage of pre-action and deluge systems.
12. Describe the circumstances that require combined dry-pipe and pre-action systems.
13. Describe the distinguishing characteristics of a combined dry-pipe and pre-action sprinkler system.
14. Explain the function of an air exhaust valve on a dry-pipe system.
15. Explain the function of an accelerator on a dry-pipe system.
16. Describe the requirements for dividing dry pipe systems using check valves.

Practical Requirements:

1. Demonstrate how to draw and test anti-freeze solutions from an anti-freeze sprinkler system.

2. Perform a trip test and reset of a pre-action and deluge system.
3. Construct and trim a combined dry-pipe and pre-action system with sprinklers and auxiliary drain.

SK1290 **Blueprint Reading and Sketching**

Learning Outcomes:

- Demonstrate knowledge of how to identify and extract relevant information from construction drawings and to produce basic sketches
- Demonstrate knowledge of how to extract information relevant to sprinkler system installation from construction drawings and documents

Duration: 30 Hours

Pre-requisite(s): Entry Level (Block I)

Objectives and Content:

1. Identify typical lines found on a blueprint of a sprinkler system.
 - i. visible line
 - ii. hidden line
 - iii. central line
 - iv. dimension line
 - v. extension line
 - vi. section cutting line
 - vii. material section line
2. Describe the fundamentals of orthographic projection.
3. Identify sketching and drawing equipment and explain how it is used.
4. Describe views of a building with the aid of an installation drawing.
 - i. plan
 - ii. elevation
5. Identify and interpret architectural dimension and scaling.
 - i. S.I. scale rule
 - ii. architect scale rule (Imperial)
 - iii. engineer scale rule

- iv. typical scales
 - v. floor plans
 - vi. elevations
 - vii. sections
 - viii. details
6. Interpret symbols found on typical sprinkler system blueprints.
 7. Interpret specifications.
 8. Interpret a site plan in both Metric and Imperial units.
 9. Identify divisions of blueprints and describe their purpose.
 - i. architectural
 - ii. structural
 - iii. mechanical
 - iv. electrical
 - v. plot
 - vi. specifications and schedules
 10. Identify views and drawings of a building and describe their purpose.
 - i. plans
 - ii. elevations
 - iii. sections
 - iv. details
 11. Identify and interpret sprinkler systems information.
 - i. grades
 - ii. dimensioning and scaling
 - iii. cutting plane lines
 - iv. extension lines
 - v. symbols and abbreviations
 - vi. single line pipe drawings

Practical Requirements:

1. Sketch a sprinkler system in plan view and drawn an isometric detail for a section of the plan.

2. Draw and label three basic views of an object.
3. Draw and label single line pipe drawings.
 - i. orthographic
 - 45° fittings
 - 90° fittings
 - ii. detail drawings (spool sheet) with north arrow indicators
 - Orthographic North to Isometric North
 - North orientation
 - cut sheets
4. Draw and label isometric single line piping drawings using 90° elbows and tees.

BLOCK III

SK2100 Design Systems

Learning Outcomes:

- Demonstrate knowledge of how to determine occupancy classification and design criteria
- Demonstrate knowledge of how to perform system hydraulic calculations to determine friction loss and pipe sizing needed to meet the water flow requirements of the design criteria

Duration: 30 Hours

Pre-requisite(s): Block II

Objectives and Content:

1. List and describe the classifications of occupancies.
2. Identify special occupancy conditions.
 - i. high piles of combustible stocks
 - ii. flammable and combustible liquids
 - iii. combustible dusts and fibers
 - iv. large quantities of light, loose combustible materials
 - v. chemical and explosives
3. Identify hazard categories and describe their characteristics.
 - i. light
 - ii. ordinary
 - iii. extra
 - iv. unique content
4. Explain how a building's occupancy classification affects the design criteria of the sprinkler system and water supply.

5. Describe the basic principles of physics as they are applied to the sprinkler trade.
 - i. specific weight
 - ii. specific gravity
 - iii. difference between pressure and total force
 - iv. total force applied in differential type valves

6. Explain the concept of pressure and the various ways it is used in the design of a sprinkler system.
 - i. gravity
 - ii. compression of air or inert gas
 - iii. centrifugal force
 - iv. pump impellers

7. Describe static and residual pressure, the concepts of flow rate and velocity, and the requirements for uncalculated systems.

8. Identify the causes of pressure losses in sprinkler systems due to friction and how the extent of those losses is determined.

9. Explain how to calculate requirements for coverage area and spray density for the various occupancy hazards.

10. Establish the volume of water that must be provided by the various automatic supplies in various occupancy classifications.
 - i. pipe schedule method
 - ii. area/density method
 - iii. room design method

Practical Requirements:

1. Calculate and size a basic sprinkler system by:
 - i. pipe schedule method
 - ii. hydraulic calculation method

SK2110 Fire Pump Installation

Learning Outcomes:

- Demonstrate knowledge of the procedures for installing and maintaining fire pumps and controllers
- Demonstrate knowledge of the procedures of installing, testing, and maintaining various types of secondary water supply sources
- Demonstrate knowledge of the procedures to select and install a fuel system

Duration: 50 Hours

Pre-requisite(s): Block II

Objectives and Content:

1. Identify types of pumps and describe their principles of operation and applications.
 - i. types of drivers
 - ii. pump and pipe sizing
 - iii. capacity of pumps
 - iv. pressure ratings
 - v. pump performance
 - vi. fire pump curve
 - vii. testing requirements
 - viii. start mechanisms
 - ix. pre-commissioning checks
2. Describe head pressure as it relates to pumps.
3. Describe installation procedures for fire, booster and jockey pumps.
4. Identify types of controllers and describe their application and installation.
5. Demonstrate the pressure ratios of fire, booster and jockey pumps on a sprinkler system.

6. Describe the effects of potential problems and their solutions.
 - i. air leaks
 - ii. cavitations
 - iii. rotation
 - drivers
 - rpm
 - pressure relief valves
 - iv. packing and seals

7. Identify limited water supply conditions.
 - i. reservoirs
 - ii. pressure tanks
 - iii. gravity tanks
 - iv. municipal

8. Describe pressure and gravity tanks and their applications.
 - i. locations
 - ii. tank sizes and pressure
 - iii. operation
 - iv. water supply requirements
 - v. piping, valves, trim and accessories installation
 - vi. electrical requirements
 - vii. discharge and drainable pipe requirements

9. Identify how to verify the flushing and testing of a water supply pipe.
 - i. contractor's test and material certificates
 - ii. chlorinating certificates

10. Describe the procedures to select, coordinate and install a fuel system and components.
 - i. fuel source
 - ii. emission exhaust
 - iii. ventilation
 - iv. storage tanks
 - v. exhaust piping

11. Describe the procedures for the installation of protection devices for fuel links to prevent impairment.

Practical Requirements:

1. Install batteries, battery supports and shields.
2. Perform required maintenance on batteries, supports, shields.

SK2120 Inspection, Testing, Maintenance and Documentation

Learning Outcomes:

- Demonstrate knowledge of how to select, install and maintain tamper, flow and pressure devices for fire protection systems
- Demonstrate knowledge of how to trim, test and reset alarm and dry pipe valves
- Demonstrate knowledge of shut down procedures prior to servicing, shutting down and restoring to service fire protection system
- Demonstrate knowledge of how to visually inspect the sprinkler heads and related piping to assess system condition and determine deficiencies prior to performing tests
- Demonstrate knowledge of how to visually inspect and test sprinkler system components
- Demonstrate knowledge of how to select portable extinguishers
- Demonstrate knowledge of how to restore the operation of the fire protection system and complete required test reports
- Demonstrate knowledge of how to troubleshoot the fire protection system
- Demonstrate knowledge of how to read trade documents and reports, record data and maintain documentation

Duration: 55 Hours

Pre-requisite(s): Block II

Objectives and Content:

1. Identify alarm valves and their relevant design characteristics.
2. Identify dry pipe valves to be trimmed and describe their relevant design characteristics.
 - i. location of dry pipe valves
 - ii. trim and accessories required
3. Describe how to select dry pipe valve trim components.

4. Describe procedures used to test and reset alarm and dry pipe valves.
5. Explain how authorities are notified prior to servicing or shutting down the fire protection system.
 - i. local fire department
 - ii. insurance organization
 - iii. client or client representative
 - iv. monitoring companies
6. Explain why authorities and alarm-receiving facilities are notified when the fire protection system, supply, or component is returned to service.
7. Determine the type of heads used throughout the site and the date of installation.
8. Determine if the supply of spare sprinkler heads is adequate and the proper wrenches available.
9. Determine the condition of system piping and fittings.
 - i. mechanical damage
 - ii. leakage
 - iii. misalignment
 - iv. corrosion
 - v. external loads
10. Determine the condition and spacing of hangers and braces.
 - i. load
 - ii. attachment requirements
 - iii. seismic
11. Describe the location and position of gauges in relationship to fire protection systems.
12. Describe the range capabilities of all gauges.
13. Describe testing procedures of gauges.

14. Identify the service/maintenance requirements in accordance with manufacturer's data sheets.
 - i. preventative maintenance
 - ii. corrective maintenance
 - iii. emergency maintenance

15. Identify portable fire extinguishers and describe their characteristics.
 - i. carbon dioxide
 - ii. water
 - iii. dry chemical
 - iv. clean agent

16. Describe the installation procedures applicable to given site locations.
 - i. determine applicable type
 - ii. number of units
 - iii. spacing

17. Describe testing procedures for portable extinguishers.
 - i. tagging the date of inspection
 - ii. evaluate condition of extinguishers
 - iii. recording inspection date

18. Describe the procedure to verify that the operation of a fire protection system has been restored.
 - i. document correction of identified problems
 - ii. report items repaired or replaced
 - iii. report work completed
 - iv. notify appropriate authorities

19. Describe how to listen and interpret client's concerns.

20. Read and interpret previous records, inspection forms, reports or logs pertaining to problems.

21. Describe the procedure to verify system problems and determine probable solutions.

22. Identify and complete documents and reports used in the trade and describe their purpose.
 - i. time sheets
 - ii. progress reports
 - iii. test reports and certificates
 - iv. inspection reports
 - v. property damage reports
 - vi. work orders to schedule site services

Practical Requirements:

1. Test alarm devices using standard or specialized tools and equipment.
 - i. tamper switches
 - ii. low air and water pressure switches
 - iii. low water level switches
 - iv. low and high temperature switches
 - v. loss of power switches
 - vi. paddle flow switches
 - vii. water motor gong
2. Perform installation of alarm valve and trim on single and multiple valves.
 - i. location of alarm valves
 - ii. trim and accessories required
3. Perform installation of dry pipe valve trim on single and multiple valve applications.
4. Visually inspect sprinkler heads and related piping for the following:
 - i. corrosion
 - ii. foreign materials
 - iii. paint
 - iv. orientation
 - v. spacing
 - vi. obstruction
 - vii. pipe grading
5. Conduct a visual inspection to verify the fire system components are operational and free from physical damage.

SK2130 Fire Protection Systems III

Learning Outcomes:

- Demonstrate knowledge of the installation and maintenance requirements for dry and wet chemical systems
- Demonstrate knowledge of the installation and maintenance requirements for fixed water spray systems
- Demonstrate knowledge of the installation and maintenance requirements for foam extinguishing systems
- Demonstrate knowledge of the installation and maintenance requirements for carbon dioxide systems
- Demonstrate knowledge of the installation and maintenance requirements for clean agent extinguishing systems
- Demonstrate knowledge of the installation and maintenance requirements for outside exposure systems

Duration: 30 Hours

Pre-requisite(s): Block II

Objectives and Content:

1. Identify types of dry and wet chemical systems and describe their operating principles and applications.
 - i. methods of dispensing dry and wet chemicals
 - ii. applications and action of expellant gas
 - iii. extinguishing properties
 - iv. handling and storage
2. Describe fixed pipe systems.
 - i. total flooding
 - ii. local application

3. Describe fixed water spray systems and their operating principles.
 - i. applications
 - ii. codes and regulations
 - iii. water supply required
 - iv. design of system
 - v. water spray nozzle characteristics and applications
 - vi. exposure protection

4. Describe installation requirements for fixed water spray systems.
 - i. materials
 - ii. supports
 - iii. system actuation
 - iv. manufacturers' specifications

5. Describe the system controls for the fixed water spray system and installation.

6. Explain the requirements for leak testing the system.

7. Explain the requirements for drainage of the system.

8. Describe foam extinguishing systems and their operating principles.
 - i. applications
 - ii. codes and regulations
 - iii. water supply required
 - iv. design of system
 - v. characteristics and selection of water spray nozzles
 - vi. exposure protection

9. Describe installation requirements for foam extinguishing systems.
 - i. materials
 - ii. supports
 - iii. system actuation
 - iv. manufacturers' specifications

10. Describe the typical installation of foam extinguishing systems.
 - i. foam liquid storage tank and trim
 - ii. reserve tank and trim
 - iii. foam liquid pump
 - iv. check valves, strainers and orifice plates

- v. deluge valves
 - vi. piping
 - vii. cross connection control valves
 - viii. discharge methods
11. Explain the operation of a balanced pressure proportioning system.
12. Explain the operation of a pressure proportioning tank with and without diaphragm.
13. Describe carbon dioxide systems and its operating principles.
- i. applications
 - ii. codes and regulations
 - iii. design of system
 - iv. exposure protection
 - v. local application or total flooding
 - vi. safety practices for handling and storing
14. Describe the methods of system operations.
- i. hand directed operation
 - ii. actuation of each system
 - iii. detection of fires
 - iv. low and high pressure systems
 - v. supervision of system
 - vi. working pressure
 - vii. alarms and indicators
15. Describe the requirements for carbon dioxide systems.
- i. amount of carbon dioxide
 - ii. storage requirements for carbon dioxide containers
 - iii. storage temperatures
16. Describe the requirements for the installation of the carbon dioxide system.
- i. piping and material requirements
 - ii. discharge nozzles
 - iii. manufacturers' specifications
17. Identify the requirements for leak testing the carbon dioxide system.

18. Describe removal procedures for carbon dioxide systems.
19. Describe clean agent extinguishing systems and their operating principles.
 - i. applications
 - ii. codes and regulations
 - iii. design of system
 - iv. exposure protection
 - v. local application or total flooding
 - vi. safety practices for handling, storing, testing and servicing
20. Identify the components used in clean agent systems.
 - i. quantity of agent
 - ii. storage container requirements
 - iii. distribution of extinguishing agents
 - iv. pipe and materials
 - v. discharge nozzles
 - vi. pressure relief venting
21. Describe detection, activation, alarm and control systems for the clean agent extinguishing system.
22. Identify inspection requirements for the clean agent extinguishing system.
23. Describe possible safety hazards of the clean agent extinguishing system.
24. Describe outside exposure systems and their operating principles and applications.
25. Describe the installation requirements for outside exposure systems.
 - i. codes and regulations
 - ii. water service requirements
 - iii. methods of actuation
 - iv. sprinkler heads
 - v. strainers and trim
26. Describe the requirements of hydrostatic testing of the outside exposure system.
27. Describe the requirements for drainage of the outside exposure system.

SK2140 Cross Connection Control Awareness

Learning Outcomes:

- Demonstrate knowledge of how to recognize cross connection points and proper backflow prevention applications for various situations

Duration: 30 Hours

Pre-requisite(s): Block II

Objectives and Content:

1. Identify and interpret sources of information pertaining to installation.
 - i. the National Plumbing Code
 - ii. manufacturers' literature
2. Describe the division of responsibilities for cross connection control.
 - i. installation
 - ii. troubleshooting
 - iii. repair
3. Describe the cross connection control program.
 - i. administration
 - ii. legal aspects
 - iii. health aspects
 - iv. minimum standards
 - v. inspection of devices
 - vi. certification of testers
 - vii. testing of devices
4. Identify methods and devices used for cross connection control and describe their location and operation in various systems.

5. Describe the procedures used for maintenance and repair of devices.
 - i. troubleshooting
 - ii. repair procedures
6. Describe the causes of backflow and their role in cross connection.
7. Explain backflow control.
 - i. classification of hazards
 - ii. assessment of hazards
 - iii. types of devices
 - iv. selection of proper devices
 - v. methods of backflow control
 - vi. typical occurrences and recommended protection
8. Describe the purpose and operation of:
 - i. back siphonage devices
 - ii. back pressure devices
9. Identify testable devices.
 - i. non-testable devices
 - ii. testable devices
10. Describe the procedures used to install devices.
 - i. location of devices
 - ii. National Plumbing Code applications
 - iii. manufacturer's recommendations
 - iv. warranty of devices
11. Determine the type of backflow prevention requirements for specific fire protection systems.
 - i. raw water source
 - ii. automatic source drawing raw
 - iii. systems containing additives

Practical Requirements:

1. Select, install, and test various cross connection control devices.
 - i. atmospheric vacuum breaker
 - ii. pressure vacuum breaker
 - iii. double check valve assembly
 - iv. reduced pressure zone assembly

2. Assemble and disassemble various cross connection control devices.
 - i. atmospheric vacuum breaker
 - ii. pressure vacuum breaker
 - iii. double check valve assembly
 - iv. reduced pressure zone assembly

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

Sprinkler System Installer			
7200 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 st	60 %	<ul style="list-style-type: none"> ▪ Completion of Block 1 training ▪ Pass Block 1 exam ▪ Minimum 1800 hours of combined relevant work experience and training 	2 nd Year
2 nd	70%	<ul style="list-style-type: none"> ▪ Completion of Block 1 training ▪ Pass Block 1 exam ▪ Minimum 3600 hours of combined relevant work experience and training 	3 rd Year
3 rd	80%	<ul style="list-style-type: none"> ▪ Completion of Block 2 training ▪ Pass Block 2 exam ▪ Minimum 5400 hours of combined relevant work experience and training 	4 th Year
4 th	90%	<ul style="list-style-type: none"> ▪ Completion of Block 3 training ▪ Minimum 7200 hours of combined relevant work experience and training ▪ Sign-off of all workplace skills in apprentice logbook ▪ Pass certification exam 	Journeyman Certification
<p>Wage Rates</p> <ul style="list-style-type: none"> ▪ Rates are percentages of the prevailing journeyman’s wage rate in the place of employment of the apprentice. ▪ Rates must not be less than the wage rate established by the Labour standards Act (1990), as now in force or as hereafter amended, or by other order, as amended from time to time replacing the first mentioned order. ▪ Rates must not be less than the wage rate established by any collective agreement which may be in force at the apprentice’s workplace. ▪ Employers are free to pay wage rates above the minimums specified. <p>Block Exams</p> <ul style="list-style-type: none"> ▪ This program may not currently contain block exams, in which case this requirement will be waived until such time as block exams are available. 			

Sprinkler System Installer		
7200 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"> ▪ Minimum of 1000 hours of relevant work experience ▪ Prior Learning Assessment (PLA) at designated college (if applicable) 	To be determined by the number of courses completed after each class call
Block 2	<ul style="list-style-type: none"> ▪ Minimum of 5000 hours of relevant work experience and training 	240
Block 3	<ul style="list-style-type: none"> ▪ Minimum of 7000 hours of relevant work experience and training 	195
<p>Direct Entry Apprentice:</p> <ul style="list-style-type: none"> ▪ 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. <p>Class calls at Minimum Hours:</p> <ul style="list-style-type: none"> ▪ 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 journey person 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 journey person supervisor who is located at the same worksite as the apprentice, and that the apprentice is able to communicate with the journey person 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 7200 hours.

Or

A total of 9000 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 journey person.
- 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 journeyman 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.