

Apprenticeship and Industry Training

Sprinkler Systems Installer Curriculum Guide

037 (2022)

Alberta 



Apprenticeship
and Industry
Training

ALBERTA ADVANCED EDUCATION

Sprinkler Systems Installer : apprenticeship education program curriculum guide

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**Sprinkler Systems Installer
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CURRICULUM GUIDE

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Apprenticeship

Apprenticeship is post-secondary education with a difference. Apprenticeship begins with finding a sponsor. Sponsors guide apprentices, and support on-the-job learning through provision of mentorship. Approximately 80 per cent of an apprentice's time is spent on the job under the supervision of a certified journeyman or qualified tradesperson. The other 20 per cent involves technical training provided at, or through, a post-secondary institution (PSI) – usually a college or technical institute.

To receive their post-secondary credential, apprentices must learn theory and skills, and they must pass examinations. Criteria for the program—including the content and delivery of technical training—are developed and updated by the Registrar.

The graduate of the Sprinkler Systems Installer apprenticeship program is an individual who will be able to:

- be proficient in all phases of sprinkler systems installation and maintenance
- know the installation and operation requirements of fire protection equipment
- read and interpret plans and specifications
- calculate material quantities
- use and maintenance of hand tools, machines and equipment
- recognize the safety requirements of Occupational Health & Safety
- jobsite coordination
- installs, inspects, tests and maintains (ITM) fire protection systems
- competent with fire protection water supply systems including underground mains.
- Apply NFPA related codes to the industry
- perform assigned tasks in accordance with quality and production standards required by industry.

Apprenticeship and Industry Training System

Alberta's apprenticeship programs are supported by industry stakeholders that ensures a highly skilled, internationally competitive workforce in the province. The Registrar establishes the educational standards and provides direction to the system supported by industry and the PSI's. The Ministry of Advanced Education provides the legislative framework and administrative support for the apprenticeship and industry training system.

Special thanks are offered to the following industry members who contributed to the development of the standard:

Ms. M. Osetsky Edmonton
Mr. S. Huska Calgary
Mr. R. Russell..... Leduc
Mr. L. Zallas..... Edmonton
Mr. L. Bates Spruce Grove
Mr. M. Kastern..... Calgary
Mr. T. O'Brien Calgary

Alberta Government

Alberta Advanced Education works with industry, sponsor and employee organizations and technical training providers to:

- facilitate industry's development and maintenance of training and credential standards
- provide registration and counselling services to apprentices and sponsors
- coordinate technical training in collaboration with training providers
- certify apprentices and others who meet industry standards

Apprenticeship Safety

Safe working procedures and conditions, incident/injury prevention, and the preservation of health are of primary importance in apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of government, sponsors, employees, apprentices and the public. Therefore, it is imperative that all parties are aware of circumstances that may lead to injury or harm.

Safe learning experiences and healthy environments can be created by controlling the variables and behaviours that may contribute to or cause an incident or injury. By practicing a safe and healthy attitude, everyone can enjoy the benefit of an incident and injury free environment.

Occupational Health and Safety

Persons engaged in, or supporting an individual in an experiential learning environment are often exposed to more worksite hazards than in other forms of traditional post-secondary education and therefore should be familiar with and apply the Occupational Health and Safety Act, Regulations and Code when dealing with personal safety and the special safety rules that apply to all daily tasks.

Occupational Health and Safety-OHS (a division of Alberta Labour and Immigration) conducts periodic inspections of workplaces to ensure that safety regulations for industry are being observed.

Additional information is available at www.alberta.ca/occupational-health-safety.aspx

Technical Training

Apprenticeship technical training is delivered by the PSI's throughout Alberta. The PSI's are committed to delivering the technical training component of Alberta apprenticeship programs in a safe, efficient and effective manner. All PSI's place a strong emphasis on safety that complements safe workplace practices towards the development of a culture of safety for all professions.

The PSI's work with industry and Alberta Advanced Education to enhance access and responsiveness to industry needs through the delivery of the technical training component of apprenticeship programs across the province. They develop curriculum from the curriculum guides established by the Registrar in consultation with the PSI's and industry and provide the technical training to apprentices.

The following PSI's deliver Sprinkler Systems Installer trade apprenticeship technical training:

Red Deer College

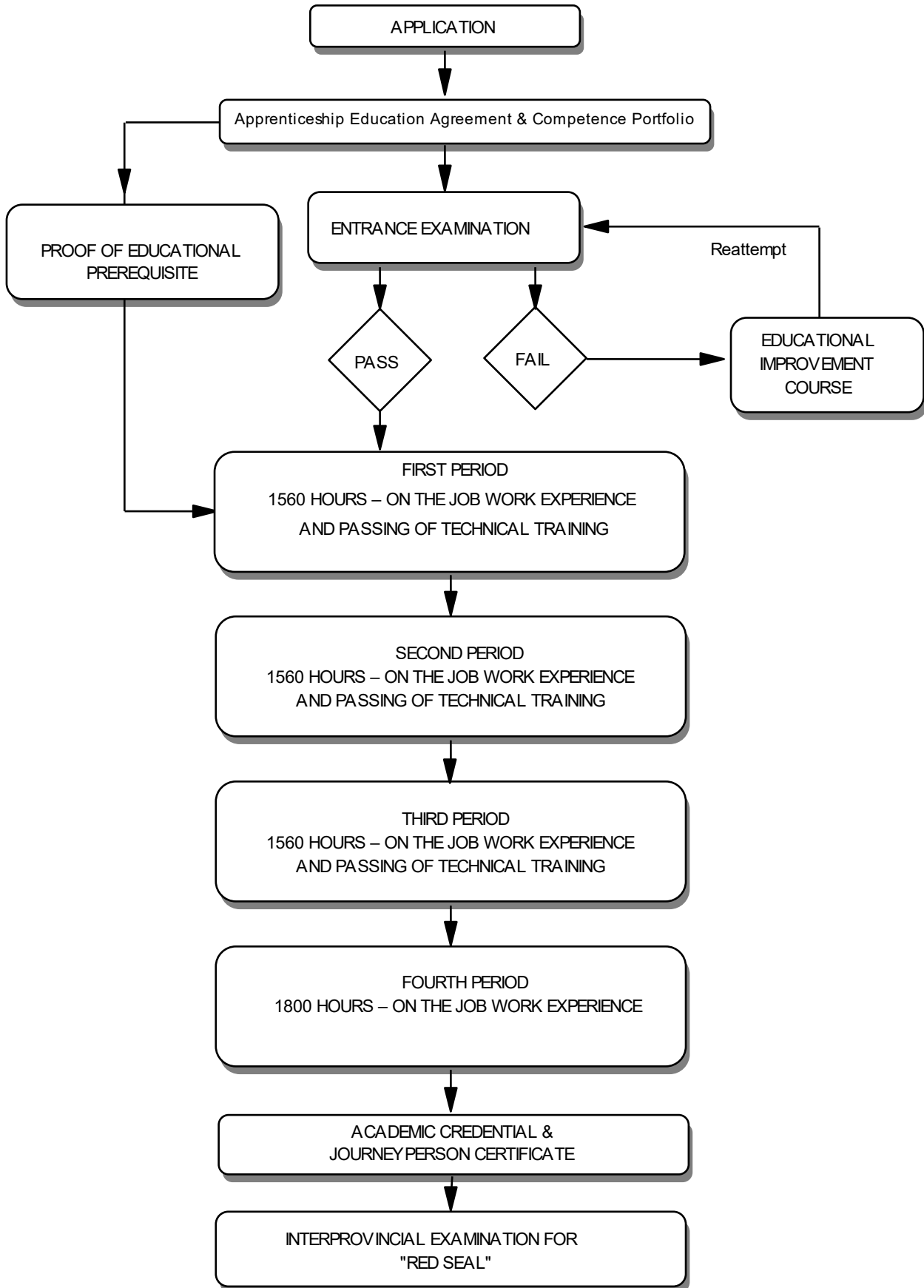
Procedures for Recommending Revisions to the Curriculum Guide

Any concerned individual or group in the province of Alberta may make recommendations for change by writing to:

Registrar of Apprenticeship Programs
c/o Apprenticeship Delivery and Industry Support Services
Apprenticeship Delivery and Industry Support
Advanced Education
19th floor, Commerce Place
10155 102 Street NW
Edmonton AB T5J 4L5

It is requested that recommendations for change refer to specific areas and state references used.

Apprenticeship Route toward Academic Credential



Sprinkler System Installer Training Profile
FIRST PERIOD
(8 Weeks 30 Hours per Week – Total of 240 Hours)

SECTION ONE

WORKPLACE SAFETY AND RIGGING
 10%



A

Safety Legislation, Regulations & Industry Policy in the Trades
 16%

B

Climbing, Lifting, Rigging and Hoisting
 25%

C

Hazardous Materials & Fire Protection
 16%

D

Apprenticeship Training Program
 13%

E

Pipe Trade Codes
 13%

F

Electrical Safety
 17%

SECTION TWO

TOOLS, EQUIPMENT AND MATERIALS
 38%



A

Hand Tools
 7%

B

Power Tools
 7%

C

Welded Pipe and Fittings
 13%

D

Plastic Pipe and Tube
 13%

E

Threaded and Grooved Pipe
 16%

F

Tube and Tubing
 13%

G

Valves
 13%

H

Hangers, Supports and Fasteners
 11%

I

Pressure Testing
 3%

J

Pumps
 4%

SECTION THREE

METAL FABRICATION
 19%



A

Welding Safety
 9%

B

Welding
 65%

C

Brazing and Soldering
 26%

SECTION FOUR

DRAWING AND SPECIFICATIONS
 13%



A

Sketching and Drawing
 20%

B

Single Line Drawing
 40%

C

Drawing Interpretations
 40%

SECTION FIVE

CALCULATIONS AND SCIENCE
 20%



A

Applied Calculations
 17%

B

Perimeters, Areas, Percentage and Grade
 23%

C

Volumes and Capacities
 8%

D

Piping Offsets
 12%

E

Matter, Density and Relative Density
 12%

F

Pressure and Atmosphere
 13%

G

Principles of Electricity
 15%

SECOND PERIOD
(8 Weeks 30 Hours per Week – Total of 240 Hours)

SECTION ONE

FIRE SPRINKLER SYSTEMS
 34%



| | | |
|-------------------------------|-------------------------------|---------------------------------|
| A | B | C |
| Hazard Classifications 10% | Piping Arrangements 27% | Sprinkler System Drainage 6% |
| D | E | F |
| Piping Support Systems 9% | Sprinkler Installation 27% | System Hydraulic Design 17% |
| G | | |
| Access Equipment 4% | | |

SECTION TWO

WATER-BASED SYSTEMS
 28%



| | | |
|----------------------------|------------------------------|------------------------------|
| A | B | C |
| Residential Systems 15% | Wet Sprinkler Systems 26% | Dry Sprinkler Systems 32% |
| D | E | |
| Freeze Protection 9% | Stand Pipe Systems 18% | |

SECTION THREE

WATER SUPPLY
 21%



| | | |
|-----------------------------------|-----------------------------|---------------------------------|
| A | B | C |
| Public Water Supply 12% | Private Water Supply 12% | Cross Connection Control 12% |
| D | E | F |
| Fire Department Connections 8% | Fire Hydrants 29% | Underground Piping 19% |
| G | | |
| Water Properties 8% | | |

SECTION FOUR

WORK ORGANIZATION
 17%



| | | |
|--------------------------------|-----------------------|--------------------------|
| A | B | C |
| Legislated Requirements 40% | Systems Layout 30% | Job Site Planning 30% |

THIRD PERIOD
(8 Weeks 30 Hours per Week – Total of 240 Hours)

SECTION ONE

| | | | | |
|-------------------------------|---|-------------------|----------------|--------------------|
| FIRE PUMP UNITS 18% | ⇒ | A | B | C |
| | | Fire Pumps 72% | Drivers 14% | Controllers 14% |

SECTION TWO

| | | | | |
|--|---|------------------------------------|------------------------------|----------------------------|
| SPECIALTY HAZARD SYSTEMS 42% | ⇒ | A | B | C |
| | | Dry and Wet Chemical Systems 6% | Extinguishers 6% | Foam Systems 15% |
| | | D | E | F |
| | | Clean Agent Systems 10% | Carbon Dioxide Systems 6% | Pre-Action Systems 21% |
| | | G | H | I |
| | | Deluge Systems 20% | Water Mist Systems 10% | Corrosion Inhibiting 6% |

SECTION THREE

| | | | | |
|---|---|--|--|---------------------|
| INSPECTION, TESTING AND MAINTENANCE 15% | ⇒ | A | B | C |
| | | Inspect Fire Protection Systems 28% | Fire Protection Systems Maintenance 28% | Deficiencies 44% |

SECTION FOUR

| | | | | |
|---|---|----------------------------------|-------------------------------|----------------------------------|
| DETECTION AND SIGNAL INITIATING DEVICES 16% | ⇒ | A | B | C |
| | | Actuating Devices 23% | Spark Detection Systems 8% | Air Sampling Systems 15% |
| | | D | E | F |
| | | Signal Initiating Devices 18% | Fire Alarm Panels 21% | Electrical Test Equipment 15% |

SECTION FIVE

| | | | | |
|--|---|---------------------------------|--|---------------------------------|
| EMERGING TECHNOLOGY, COMMUNICATION AND APPRENTICESHIP 9% | ⇒ | A | B | C |
| | | Estimation 45% | Building Information Modelling 27% | Communication Techniques 14% |
| | | D | E | |
| | | Workplace Coaching Skills 5% | Interprovincial Standards Red Seal Program 9% | |

**FIRST PERIOD TECHNICAL TRAINING
SPRINKLER SYSTEMS INSTALLER TRADE
CURRICULUM GUIDE**

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:WORKPLACE SAFETY AND RIGGING..... 10%

A. Safety Legislation, Regulations & Industry Policy in the Trades 16%

Outcome: ***Apply legislation, regulations and practices ensuring safe work in this trade.***

1. Demonstrate the application of the Occupational Health and Safety Act, Regulation and Code.
2. Describe the sponsor's and employee's role with Occupational Health and Safety (OH&S) regulations, Worksite Hazardous Materials Information Systems (WHMIS), fire regulations, Workers Compensation Board regulations and related advisory bodies and agencies.
3. Describe industry practices for hazard assessment and control procedures.
4. Describe the responsibilities of worker and sponsors to apply emergency procedures.
5. Describe tradesperson attitudes with respect to housekeeping, personal protective equipment and emergency procedures.
6. Describe the roles and responsibilities of sponsors and employees with the selection and use of personal protective equipment (PPE).
7. Maintain required PPE for tasks.
8. Use required PPE for tasks.

B. Climbing, Lifting, Rigging and Hoisting 25%

Outcome: ***Use industry standard practices for climbing, lifting, rigging and hoisting in this trade.***

1. Describe manual lifting procedures.
2. Describe rigging hardware and associated safety factors.
3. Select equipment for rigging loads.
4. Describe hoisting and load moving procedures.
5. Maintain personal protective equipment (PPE) for climbing, lifting and load moving equipment.
6. Use PPE for climbing, lifting and moving equipment.

C. Hazardous Materials & Fire Protection 16%

Outcome: ***Apply industry standard practices for hazardous materials and fire protection in this trade.***

1. Describe roles, responsibilities, features and practices related to the Workplace Hazardous Materials Information System (WHMIS) program.
2. Describe the three key elements of WHMIS.
3. Describe handling, storing and transporting procedures for hazardous material.
4. Describe venting procedures when working with hazardous materials.
5. Describe fire hazards, classes, procedures and equipment related to fire protection.

D. Apprenticeship Training Program..... 13%

Outcome: ***Manage an apprenticeship to earn journeyperson certification.***

1. Describe the contractual responsibilities of the apprentice, sponsor and Alberta Apprenticeship and Industry Training.
2. Describe the purpose of the competency portfolio.
3. Describe the procedure for changing sponsors during an active apprenticeship.
4. Describe the purpose of the curriculum guide.
5. Describe the procedure for progressing through an apprenticeship.
6. Describe advancement opportunities in this trade.

E. Pipe Trades Codes..... 13%

Outcome: ***Use code and standards that are applied in the pipe trades.***

1. Identify code documents relating to pipe trades including ASME/ ABSA, CSA, NRC, NFPA, ASHRAE.
2. Explain the purpose of codes and standards.
3. Describe where codes and standards are applicable and by what authority.
4. Describe the procedures for the acceptance of the codes by the provinces and the local authorities.

F. Electrical Safety 17%

Outcome: ***Apply arc flash safety and lockout and tagout on a jobsite.***

1. Identify safe work practices to protect from arc flash hazards.
2. Describe lockout/tagout procedures.
3. Identify safe work practices to prevent electrical shock.

SECTION TWO:..... TOOLS, EQUIPMENT AND MATERIALS 38%

A. Hand Tools.....7%

Outcome: ***Use hand tools common to the pipe trades.***

1. Identify the types of hand tools.
2. Describe use of hand tools.
3. Describe the maintenance of hand tools.

B. Power Tools.....7%

Outcome: ***Use power tools common to the pipe trades.***

1. Identify the types of power tools.
2. Describe use of power tools.
3. Describe the maintenance of power tools.

C. Welded Pipe and Fittings 13%**Outcome: Construct welded and flanged piping system components.**

1. Identify types, markings, designations and pressure rating for welded pipe fittings.
2. Identify stud tensioning systems.
3. State factors, methods and torque measurements for bolt ups.
4. Identify types, markings, designations, temperature and pressure ratings of flanged fittings and gaskets.
5. Describe the fabrication process for welded pipe and fittings to the tack-up stage.
6. Describe flange preparation and joining techniques for flanged joints.

D. Plastic Pipe and Tube 13%**Outcome: Construct plastic piping and tubing systems.**

1. Identify types, applications and designations of plastic pipe, tubing and fittings.
2. Describe fabrication processes for solvent welding plastic pipe.
3. Describe fabrication processes for plastic pipe and tubing using alternative joining methods.
4. Describe fabrication processes for bell end joints.
5. Describe fabrication processes for plastic pipe using thermal fusion and electric resistance welding.
6. Fabricate and test a solvent weld spool to manufacturer's specifications.
7. Fabricate and test a fusion weld spool to manufacturer's specifications.

E. Threaded and Grooved Pipe 16%**Outcome: Construct threaded and grooved piping system components.**

1. Identify types, markings, designations, temperature and pressure ratings of ferrous pipe and fittings.
2. Identify applications of codes, regulations and manufacturer's specifications.
3. Describe the composition of ferrous, alloyed and non-ferrous pipe.
4. Describe the fabrication steps for threading and grooving pipe.
5. Calculate cut length for threaded and grooved pipe.
6. Demonstrate use of hand tools to thread and groove pipe.
7. Demonstrate use of power tools to thread and groove pipe.
8. Assemble and pressure test an assigned project.

F. Tube and Tubing 13%**Outcome: Construct tube and tubing system components.**

1. Identify types, designations and pressure ratings.
2. Identify fitting types and joining techniques.
3. Identify applications and manufacturer's specifications pertaining to joining methods.
4. Identify health and safety issues pertaining to joining methods.
5. Describe the process for bending tubing.

6. Describe the fabrication processes for joining tubing systems.
7. Assemble and pressure test an assigned project including flared, compression joints and bending components.

G. Valves 13%

Outcome: *Install valves in piping systems.*

1. Identify types of valves.
2. Describe fundamental design variations and their applications.
3. Describe service and maintenance procedures.
4. Explain specifications and manufacturer's requirements for valves.

H. Hangers, Supports and Fasteners 11%

Outcome: *Install hangers, supports and fasteners for piping systems.*

1. Identify types of hangers, supports and fasteners.
2. Describe applications of hangers, supports and fasteners.
3. Describe installation techniques for hangers, supports and fasteners.
4. Explain specifications and manufacturer requirements for hangers, supports and fasteners.

I. Pressure Testing3%

Outcome: *Conduct a pressure test on a system.*

1. Identify equipment used for pressure testing piping installations.
2. Describe procedures and requirements for pneumatic and hydrostatic testing.
3. Describe hazards specific to pressure testing.

J. Pumps4%

Outcome: *Describe pumps for piping systems.*

1. Identify types of pumps.
2. Describe applications for pumps.
3. Describe factors affecting the operation of a pump.

SECTION THREE:.....METAL FABRICATION 19%

A. Welding Safety9%

Outcome: *Apply safe work practices according to Occupational Health and Safety Act (OHS) legislation.*

1. Identify hazards for welding and cutting operations.
2. Identify personal protective equipment for welding and cutting operations.
3. Explain hazards involved with welding fumes and gases.
4. Identify welding fume ventilation methods.
5. Explain the effects of electricity and precautions used to prevent injury.
6. Describe procedures for welding or cutting in confined spaces.
7. Interpret sections of the Occupational Health and Safety Act, general safety regulations.

B. Welding 65%**Outcome: *Use oxy-fuel and welding equipment.***

1. Identify five basic joint types.
2. Describe types of welds and their required dimensions.
3. Identify types of metals using practical tests.
4. Identify oxy-fuel cutting equipment.
5. Identify arc welding equipment.
6. Build a bracket project.
7. Build a spool project.

C. Brazing and Soldering 26%**Outcome: *Braze and solder metal alloys.***

1. Identify applications of brazed and solder joints.
2. Identify equipment and materials required to braze and solder.
3. Describe brazing and soldering procedures.
4. Assemble and test assigned project.

SECTION FOUR:..... DRAWINGS AND SPECIFICATIONS 13%**A. Sketching and Drawing20%****Outcome: *Apply sketching and drawing concepts.***

1. Identify the types of drafting equipment.
2. Explain the use of drafting equipment.
3. Identify the types of drafting lines found on a drawing.
4. Identify the three views of an orthographic projection.
5. Draw and label the three views of an orthographic drawing.

B. Single Line Drawing..... 40%**Outcome: *Develop single line pipe drawings.***

1. Identify piping symbols.
2. Draw and label orthographic single-line drawings.
3. Draw and label isometric single-line piping drawings.

C. Drawing Interpretation..... 40%**Outcome: *Interpret drawings.***

1. Identify the views of a drawing.
2. Explain usage of scales.
3. Calculate dimensions using imperial and metric scales.
4. Describe symbols found on a drawing.
5. Identify the five divisions of a drawing package.

6. Describe the purpose of drawing divisions.
7. Use architectural and mechanical drawings.

SECTION FIVE:.....CALCULATIONS AND SCIENCE..... 20%

A. Applied Calculations 17%

Outcome: *Apply calculations using both metric and imperial measurements.*

1. Perform calculations using whole numbers, fractions and decimals.
2. Describe the metric and imperial measurement systems.
3. Describe the operation of the AIT calculator.
4. Perform number conversions using whole numbers, fractions and decimals.
5. Perform measurement conversions using whole numbers, fractions and decimals.

B. Perimeters, Areas, Percentage and Grade 23%

Outcome: *Perform calculations involving perimeter, areas, percentage and grade.*

1. Identify concepts when working with formulas.
2. Apply formulas for calculating perimeters of a rectangle, triangle and a circle.
3. Apply formulas for calculating the surface area of regular-shaped solids, tanks and cylinders.
4. Apply the formula for calculating percentages.
5. Calculate grades in percentage, fractions and ratio.

C. Volumes and Capacities.....8%

Outcome: *Calculate volumetric capacities for tanks and cylinders.*

1. Apply formulas for calculating volumes of regular shaped solids, tanks and cylinders.
2. Calculate capacities of regular shaped tanks and cylinders using both metric and imperial values.

D. Piping Offsets..... 12%

Outcome: *Calculate 45° and 90° offsets for piping systems.*

1. Calculate offsets for right angle triangles.
2. Apply formulas for 45° and 90° offsets.
3. Calculate offset dimensions around an object.

E. Matter, Density and Relative Density..... 12%

Outcome: *Calculate mass, densities and relative densities.*

1. Describe three common states of matter.
2. Define the terms matter, element, compound and mixture.
3. Define the terms adhesion, cohesion, surface tension and capillarity.
4. Calculate density, mass and volume of substances.
5. Calculate mass and density using relative densities.

F. Pressure and Atmosphere 13%

Outcome: **Calculate pressures in metric and imperial values.**

1. Define pressure and force.
2. State the six principles of hydrostatics.
3. Define pressure constants used for calculating pressures.
4. Describe atmospheric pressure and the effect of altitude.
5. Perform pressure and force calculations in both imperial and metric units.
6. Perform calculations to convert absolute, gauge and mercury pressures.

G. Principles of Electricity 15%

Outcome: **Perform electrical calculations.**

1. Identify principles of electricity including direct and alternating current flow, electrolysis and electromagnetism.
2. Sketch series and parallel electrical circuits.
3. Apply Ohm's Law.

**SECOND PERIOD TECHNICAL TRAINING
SPRINKLER SYSTEMS INSTALLER TRADE
CURRICULUM GUIDE**

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE: FIRE SPRINKLER SYSTEMS 34%

A. Hazard Classifications 10%

Outcome: Perform a hazard assessment.

1. Describe fire science terms.
2. Describe sprinkler system design.
3. Describe hazard classifications.
4. Explain methods of fire containment.
5. Perform hazard assessments.

B. Piping Arrangements 27%

Outcome: Construct piping systems.

1. Identify formulas for multiple piping offsets.
2. Describe piping system types.
3. Describe piping system components.
4. Describe hand hose connections.
5. Describe application of equal and unequal spread offsets.
6. Explain pipe schedule systems.
7. Explain hydraulically calculated systems.
8. Explain special piping arrangements.
9. Explain flushing connections.
10. Explain pipe sleeve clearances.
11. Design pipe schedule systems.
12. Construct piping systems.

C. Sprinkler System Drainage 6%

Outcome: Install sprinkler system drains.

1. Describe drainage installation requirements.
2. Describe drainage components for sprinkler systems.
3. Explain grade requirements for piping systems.
4. Explain sprinkler system drainage maintenance procedures.
5. Install sprinkler system drains.

D. Piping Support Systems 9%

Outcome: *Install sprinkler systems supports.*

1. Describe hanger types.
2. Describe bracing types.
3. Describe hanger components.
4. Describe bracing components.
5. Explain seismic bracing requirements.
6. Explain installation of sprinkler system supports.
7. Perform trapeze hanger calculations.
8. Perform rod sizing calculations.

E. Sprinkler Installation 27%

Outcome: *Install sprinklers.*

1. Describe sprinkler types.
2. Describe nozzle types.
3. Describe sprinkler components.
4. Describe nozzle components.
5. Describe sprinkler installation.
6. Describe nozzle installation.
7. Explain sprinkler care.
8. Explain clearance requirements for sprinklers.
9. Explain sprinkler selection.
10. Explain sprinkler spray patterns.
11. Explain obstruction rules.
12. Calculate clearances for sprinkler installation.
13. Install sprinklers.

F. System Hydraulic Design 17%

Outcome: *Use hydraulic calculations for system layout.*

1. Describe hydraulic calculation terminology.
2. Describe hydraulic calculation procedures.
3. Describe pressure loss.
4. Explain water density requirements over a design area.
5. Perform pressure loss calculation.
6. Perform water demand calculation.
7. Use hydraulic calculations for system layout.

G. Access Equipment 4%

Outcome: Use access equipment.

1. Describe elevated work platform types.
2. Explain OH&S standards for elevated work platforms.

SECTION TWO:WATER-BASED SYSTEMS 28%

A. Residential Sprinkler Systems..... 15%

Outcome: Install residential sprinkler systems.

1. Describe residential sprinkler system types.
2. Describe water supply requirements.
3. Describe material requirements.
4. Explain maintenance procedures.
5. Perform residential piping installation.

B. Wet Sprinkler Systems 26%

Outcome: Install wet sprinkler systems.

1. Describe wet system types.
2. Describe wet system components.
3. Explain wet system testing procedures.
4. Explain wet system maintenance.
5. Sketch an isometric drawing of an alarm check valve.
6. Perform trim installation on an alarm valve.

C. Dry Sprinkler Systems 32%

Outcome: Install dry sprinkler systems.

1. Describe dry system types.
2. Describe dry system components.
3. Explain dry system testing procedures.
4. Explain dry system maintenance.
5. Explain air supply requirements for a dry system.
6. Sketch an isometric drawing of a dry pipe valve.
7. Perform trim installation on a dry pipe valve.

D. Freeze Protection 9%

Outcome: Service freeze protection systems.

1. Describe freeze protection systems.
2. Describe freeze protection components.
3. Describe freeze protection for piping.

- 4. Explain freeze protection system hazards.
- 5. Explain freeze protection testing procedures.
- 6. Service freeze protection systems.

E. Stand Pipe Systems 18%

Outcome: Install stand pipe systems.

- 1. Describe stand pipe system types.
- 2. Describe stand pipe system components.
- 3. Describe stand pipe system testing requirements.
- 4. Explain stand pipe system maintenance requirements.

SECTION THREE: WATER SUPPLY 21%

A. Public Water Supply 12%

Outcome: Install public water supply connections.

- 1. Describe public water supply.
- 2. Describe water supply terminology.
- 3. Explain flushing requirements.
- 4. Explain types of public water supply connections.

B. Private Water Supply 12%

Outcome: Install private water supply systems.

- 1. Describe private water supply systems.
- 2. Describe private water supply storage tanks.
- 3. Describe private water supply components.
- 4. Describe corrosive water supplies.
- 5. Explain flushing requirements.
- 6. Perform tank size calculation.

C. Cross Connection Control 12%

Outcome: Install cross connection control.

- 1. Identify cross connection control categories.
- 2. Describe cross connection control terminology.
- 3. Describe American Water Works Association (AWWA) certification.
- 4. Explain cross connection control installation procedures.
- 5. Explain cross connection control testing procedures.

D. Fire Department Connections 8%

Outcome: Install fire department connections.

- 1. Describe fire department connections.
- 2. Describe fire department connection components.

3. Describe fire department connection testing.
4. Explain fire department connection installation.

E. Fire Hydrants 29%

Outcome: *Install fire hydrants.*

1. Identify hydrant tools.
2. Describe hydrant types.
3. Describe hydrant components.
4. Describe hydrant operation.
5. Describe hydrant maintenance.
6. Perform hydrant flow test calculation.

F. Underground Piping 19%

Outcome: *Install underground piping systems.*

1. Describe underground piping systems.
2. Describe underground piping system components.
3. Explain flushing requirements.

G. Water Properties 8%

Outcome: *Interpret water properties.*

1. Describe chemical properties of water.
2. Describe water flow terminology.
3. Explain Venturi effect.
4. Explain head pressure.
5. Interpret water properties.

SECTION FOUR: WORK ORGANIZATION 17%

A. Legislated Requirements 40%

Outcome: *Interpret legislation, regulations, codes, and standards.*

1. Identify environmental regulations.
2. Describe fire protection legislation.
3. Explain National Fire Protection Association (NFPA) standards.
4. Explain Alberta Fire Code (AFC).
5. Explain Alberta Building Code (ABC).
6. Explain National Building Code (NBC).

B. System Layout 30%

Outcome: *Perform system layout.*

1. Interpret installation specifications.
2. Interpret blueprints.
3. Perform system layout.

C. Job Site Planning 30%

Outcome: *Perform job site planning.*

1. Identify project management requirements.
2. Identify jobsite requirements.
3. Identify factors that affect jobsite requirements.
4. Describe jobsite reports.
5. Explain work permits.
6. Coordinate tasks with other trades.

**THIRD PERIOD TECHNICAL TRAINING
SPRINKLER SYSTEMS INSTALLER TRADE
CURRICULUM GUIDE**

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:.....FIRE PUMP UNITS..... 18%

A. Fire Pumps 72%

Outcome: *Install fire pumps.*

1. Describe fire pumps.
2. Describe fire pump operation principles.
3. Describe fire pump components.
4. Describe jockey pumps.
5. Describe pipe sizing.
6. Explain fire pump commissioning.
7. Explain fire pump maintenance.
8. Explain fire pump room.
9. Sketch fire pump room.
10. Perform fire pump curve calculations.

B. Drivers..... 14%

Outcome: *Install drivers.*

1. Identify driver performance.
2. Identify power supplies.
3. Describe drivers.
4. Describe driver components.
5. Describe driver operation.
6. Explain driver-to-pump alignment.
7. Perform water horsepower calculation.

C. Controllers..... 14%

Outcome: *Install controllers.*

1. Describe controllers.
2. Describe controller operation.
3. Describe controller components.
4. Explain sensing line installations.

SECTION TWO: SPECIALTY HAZARD SYSTEMS 42%

A. Chemical Systems 6%

Outcome: *Install chemical systems.*

1. Describe chemical systems.
2. Describe dry chemical system components.
3. Describe wet chemical system components.
4. Describe operations of dry chemical systems.
5. Describe wet chemical systems.
6. Explain maintenance of chemical systems.

B. Extinguishers..... 6%

Outcome: *Install fire extinguishers.*

1. Describe fire extinguisher classes.
2. Describe fire extinguisher components.
3. Explain fire extinguisher inspection.
4. Explain fire extinguisher maintenance.

C. Foam Systems 15%

Outcome: *Install foam systems.*

1. Describe foam systems.
2. Describe foam concentrates.
3. Describe foam system discharge devices.
4. Explain foam system component installation.
5. Explain commissioning of foam systems.
6. Explain operation of a foam system.

D. Clean Agent Systems 10%

Outcome: *Install clean agent systems.*

1. Describe clean agent systems.
2. Describe clean agent system components.
3. Describe clean agent system operation.
4. Explain clean agent system testing requirements.

E. Carbon Dioxide Systems 6%

Outcome: *Install carbon dioxide systems.*

1. Describe carbon dioxide systems.
2. Describe carbon dioxide system components.
3. Describe carbon dioxide system operations.
4. Explain carbon dioxide system testing.

F. Pre-Action Systems 21%

Outcome: *Install pre-action systems.*

1. Describe pre-action systems.
2. Describe pre-action system components.
3. Describe pre-action system operations.
4. Explain pre-action systems testing requirements.
5. Perform trim installation on a pre-action valve.

G. Deluge Systems..... 20%

Outcome: *Install deluge systems.*

1. Describe deluge systems.
2. Describe deluge system components.
3. Describe deluge system operation.
4. Describe fixed water spray systems.
5. Describe outside exposure systems.
6. Perform trim installation on a deluge valve.

H. Water Mist Systems 10%

Outcome: *Install water mist systems.*

1. Describe water mist systems.
2. Describe water mist system components.
3. Describe water mist system operations.
4. Describe hybrid systems.
5. Describe hybrid system components.
6. Describe hybrid system operation.

I. Corrosion Inhibiting 6%

Outcome: *Install corrosion inhibiting devices.*

1. Describe piping corrosion.
2. Describe corrosion inhibiting system devices.
3. Explain corrosion inhibiting methods.

SECTION THREE: INSPECTION, TESTING AND MAINTENANCE 15%

A. Inspect Fire Protection Systems 28%

Outcome: *Perform fire protection system inspections.*

1. Identify owner’s responsibilities for disarming systems.
2. Identify sprinkler systems installer’s responsibilities for disabling systems.
3. Describe required testing procedures.
4. Describe tools used for testing.

5. Describe equipment used for testing.
6. Describe types of inspection report documents.
7. Describe inspection report terminology.
8. Describe report document preparation.
9. Perform a fire protection system inspection.

B. Fire Protection System Maintenance 28%

Outcome: Maintain fire protection systems.

1. Identify owner’s responsibilities for sprinkler systems.
2. Identify sprinkler systems installer’s legal responsibilities.
3. Describe tools required for system maintenance.
4. Describe equipment required for system maintenance.
5. Describe routine maintenance procedures.

C. Deficiencies 44%

Outcome: Repair deficiencies.

1. Describe system deficiencies.
2. Describe system impairments.
3. Describe sprinkler system failures.
4. Describe sprinkler system repair procedures.

SECTION FOUR.....DETECTION AND SIGNAL INITIATING DEVICES..... 16%

A. Actuating Devices 23%

Outcome: Install actuating devices.

1. Describe actuating devices.
2. Describe actuating device components.
3. Explain device actuation.

B. Spark Detection Systems 8%

Outcome: Install spark detection systems.

1. Describe spark detection systems.
2. Describe spark detection system components.
3. Describe spark detection system operation.

C. Air Sampling Systems 15%

Outcome: Install air sampling systems.

1. Describe air sampling systems.
2. Describe air sampling system components.
3. Explain operation of air sampling systems.

D. Signal Initiating Devices..... 18%

Outcome: *Install signal initiating devices.*

1. Describe signal initiating devices.
2. Describe signal initiating device components.
3. Explain operation of a signal initiating device.

E. Fire Alarm Panels 21%

Outcome: *Operate fire alarm panels.*

1. Describe fire alarm panels.
2. Describe fire alarm panel terminology.
3. Explain fire alarm devices.
4. Explain fire alarm panel bypassing procedures.
5. Explain fire alarm panel reset procedures.
6. Operate fire alarm panels.

F. Electrical Test Equipment 15%

Outcome: *Use electrical test equipment.*

1. Identify electrical test equipment.
2. Describe electrical test equipment functions.
3. Use electrical test equipment.

SECTION FIVE:....EMERGING TECHNOLOGY, COMMUNICATION AND APPRENTICESHIP 9%

A. Estimation 45%

Outcome: *Perform jobsite estimates.*

1. Define scope of work.
2. Describe contract purpose.
3. Explain estimating principles.
4. Explain contract change order process.
5. Perform a jobsite estimate.

B. Building Information Modelling 27%

Outcome: *Use building information modelling software.*

1. Describe building information modelling.
2. Explain building information modelling functions.
3. Use building information modelling software.

C. Communication Techniques 14%

Outcome: *Use communication techniques.*

1. Describe professional expectations.
2. Describe effective communications skills.
3. Describe conflict resolution processes.
4. Use communication techniques.

D. Workplace Coaching Skills 5%

Outcome: *Use coaching skills when training an apprentice.*

1. Describe the process for coaching an apprentice.

E. Interprovincial Standards Red Seal Program..... 9%

Outcome: *Use Red Seal products to challenge an Interprovincial examination.*

1. Identify Red Seal products used to develop Interprovincial examinations.
2. Use Red Seal products to prepare for an Interprovincial examination.



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