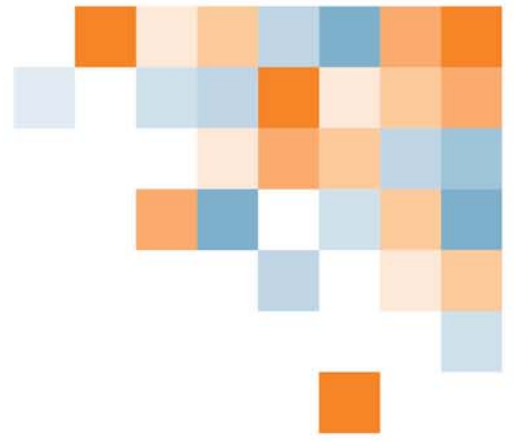


ita
YOUR TICKET.



PROGRAM OUTLINE

Residential Steep Roofer



The latest version of this document is available in PDF format on the ITA website
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RESIDENTIAL STEEP ROOFER PROGRAM OUTLINE

**APPROVED BY INDUSTRY
MARCH 2012**

**Developed by
Industry Training Authority
Province of British Columbia**



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Section 1

INTRODUCTION

Residential Steep Roofer



Foreword

This Residential Steep Roofer Program Outline is intended as a guide for instructors, apprentices, and employers of apprentices as well as for the use of industry organizations, regulatory bodies, and the provincial government. The Program Outline reflects updated standards based on the new Residential Steep Roofer Occupational Analysis (2012) and British Columbia industry and instructor subject matter experts.

Practical instruction by demonstration and student participation should be integrated with classroom sessions. Safe working practices, even though not always specified in each operation or topic, are an implied part of the program and should be stressed throughout the apprenticeship.

This Program Outline includes a list of recommended reference textbooks that are available to support the learning objectives and the minimum shop requirements needed to support instruction.

This Program Outline was prepared with the advice and assistance of Roofer Review Committee and will form the basis for further updating of the British Columbia Steep Roofing Program and learning resources by the Construction Industry Training Organization on behalf of the Industry Training Authority.

Each competency is to be evaluated through the use of written examination in which the learner must achieve a minimum of 70% in order to receive a passing grade. The types of questions used on these exams must reflect the cognitive level indicated by the learning objectives and the learning tasks listed in the related competencies.

Achievement Criteria are included for those competencies that require a practical component. The intent of including Achievement Criteria in the Program Outline is to ensure consistency in training across the many training institutions in British Columbia. Their purpose is to reinforce the theory and to provide a mechanism for evaluation of the learner's ability to apply the theory to practice. It is important that these performances be observable and measureable and that they reflect the skills spelled out in the competency as those required of a competent journeyman. The conditions under which these performances will be observed and measured must be clear to the learner as well as the criteria by which the learner will be evaluated. The learner must also be given the level of expectation of success.

The performance spelled out in the Achievement Criteria is a suggested performance and is not meant to stifle flexibility of delivery. Training providers are welcome to substitute other practical performances that measure similar skills and attainment of the competency. Multiple performances may also be used to replace individual performances where appropriate.

SAFETY ADVISORY

Be advised that references to the WorkSafeBC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation (the current Standards and Regulation in BC can be obtained on the following website: <http://www.worksafebc.com>). Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.



Acknowledgements

The Program Outline was prepared with the advice and direction of an industry steering committee convened initially by the [insert ITO name]. Members include:

- Shirley Caldwell – RCABC – Education Manager
- Darran Light – Laing Roofing Ltd. – Vice President
- Rod Parker – Parker Johnston Industries Ltd. – General Manager
- Sean Pepin – Roofix Services Inc. – Operations Manager
- Jeff Reddeman – Totem Roofing and Insulation – Owner and President
- Ivan van Spronsen – RCABC – Executive Director
- Ian Woodason – Nelson Roofing and Sheet Metal Ltd. – Superintendant (Residential Projects)

Industry subject matter experts retained to assist in the development of Program Outline content:

- John Schramm – Laing Roofing Ltd. – Roofing Installer
- Blaine Bruce – Crown Roofing Group of Companies Ltd. – Foreman
- Greg Perry – Parker Johnston Industries Ltd. – Foreman
- Joshua Towns – Roofix Services Inc. – Froeman
- Roger Sove – RCABC – Instructor

The Industry Training Authority would like to acknowledge the dedication and hard work of all the industry representatives appointed to identify the training requirements of the Steep Roofer Trade



How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Program Credentialing Model	Communicate program length and structure, and all pathways to completion	Understand the length and structure of the program	Understand the length and structure of the program, and pathway to completion	Understand challenger pathway to Certificate of Qualification
Program Assessment	Communicate program completion requirements and assessment methods	Understand the various assessment requirements for the program	Understand the various assessment requirements for the program	Understand the assessment requirements they would have to fulfill in order to challenge the program
OAC	Communicate the competencies that industry has defined as representing the scope of the occupation	Understand the competencies that an apprentice is expected to demonstrate in order to achieve certification	View the competencies they will achieve as a result of program completion	Understand the competencies they must demonstrate in order to challenge the program
Training Topics and Suggested Time Allocation	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the relative weightings of various competencies of the occupation on which assessment is based
Program Content	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measureable achievement criteria for objectives with a practical component	Identifies detailed program content and performance expectations for competencies with a practical component; may be used as a checklist prior to signing a recommendation for certification (RFC) for an apprentice	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels



Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Training Provider Standards	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Identifies the tools and equipment an apprentice is expected to have access to; which are supplied by the training provider and which the student is expected to own	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors	Identifies the tools and equipment a tradesperson is expected to be competent in using or operating; which may be used or provided in a practical assessment



Section 2

PROGRAM OVERVIEW

Residential Steep Roofer



Program Credentialing Model

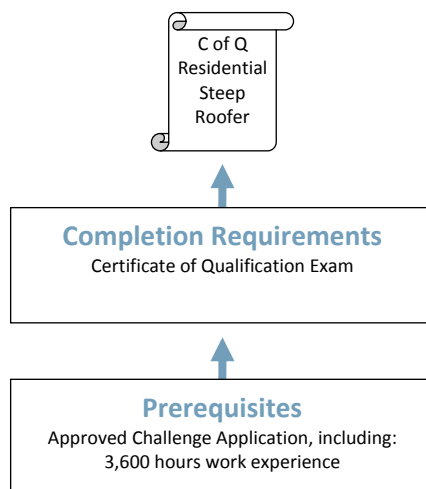
Apprenticeship Pathway



**Suggested duration based on 30-hour week*

*Certificate of Qualification (C of Q)
 Certificate of Apprenticeship (C of A)
 Certificate of Completion (C of C)
 Work-Based Training (WBT)*

Challenge Pathway





Occupational Analysis Chart

RESIDENTIAL STEEP ROOFER

Occupation Description: “Residential Steep Roofer” means a person who covers 1:3 ratio (4 in 12 pitch) roof frames and other steep roofs weatherproofing materials, including unitized materials such as asphalt shingles, cedar shingles and shakes, slate, various types of vinyl roofing products and coatings, various types of clay, metal and concrete tiles.

USE SAFE WORK PRACTICES AND PROCEDURES A	Interpret the WorkSafeBC Regulation A1 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Describe safety hazards in the roofing trade A2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use Workplace Hazardous Materials Information System (WHMIS) A3 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Apply personal safety practices A4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use fall protection A5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use fire safety procedures A6 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	Complete Level 1 First Aid A7 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
USE TOOLS AND EQUIPMENT B	Use hand tools B1 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use portable power tools B2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use hoisting, lifting and rigging equipment B3 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use ladders and work platforms B4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
	USE DOCUMENTATION C	Read drawings and specifications C1 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use Building Codes and RCABC Standards C2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Read manufacturers' information C3 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
ORGANIZE WORK D		Communicate with others D1 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Prepare the worksite D2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use trade related math D3 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Estimate materials D4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
	PREPARE ROOFS E	Prepare roofs for replacement E1 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Prepare roofs for new installation E2 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Prepare built-in gutters E3 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		

Program Overview



INSTALL STEEP ROOFING F	Describe roof types	Install built-in gutter membranes	Install asphalt shingles	Install wood shingles and shakes	Install concrete and composite materials	Install metallic materials				
	F1	F2	F3	F4	F5	F6				
ASSESS AND MAINTAIN ROOFS G	Assess roof conditions	Maintain and repair roofs								
	G1	G2								



Training Topics and Suggested Time Allocation

Residential Steep Roofer

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
Line A	USE SAFE WORK PRACTICES AND PROCEDURES	24%	100%	0%	100%
A1	Interpret the WorkSafeBC Regulation	15	✓		
A2	Describe safety hazards in the roofing trade	5	✓		
A3	Use Workplace Hazardous Materials Information System (WHMIS)	5	✓		
A4	Apply personal safety practices	5	✓		
A5	Use fall protection	50	✓		
A6	Use fire safety procedures	5	✓		
A7	Complete Level 1 First Aid	15	✓		
Line B	USE TOOLS AND EQUIPMENT	7%	75%	25%	100%
B1	Use hand tools	25	✓		
B2	Use portable power tools	25	✓		
B3	Use hoisting, lifting and rigging equipment	25	✓	✓	
B4	Use ladders and work platforms	25	✓	✓	
Line C	USE DOCUMENTATION	7%	100%	0%	100%
C1	Read drawings and specifications	34	✓		
C2	Use Building Codes and RCABC Standards	33	✓		
C3	Read manufacturers' information	33	✓		
Line D	ORGANIZE WORK	14%	100%	0%	100%
D1	Communicate with others	5	✓		
D2	Prepare the worksite	25	✓		
D3	Use trade related math	35	✓		
D4	Estimate materials	35	✓	✓	
Line E	PREPARE ROOFS	3%	100%	0%	100%
E1	Prepare roofs for replacement	34	✓		
E2	Prepare roofs for new installation	33	✓		
E3	Prepare built-in gutters	33	✓		
Line F	INSTALL STEEP ROOFING	42%	30%	70%	100%
F1	Describe roof types	5	✓		
F2	Install built-in gutter membranes	15	✓	✓	
F3	Install asphalt shingles	25	✓	✓	
F4	Install wood shingles and shakes	25	✓	✓	
F5	Install concrete and composite materials	15	✓	✓	
F6	Install metallic materials	15	✓	✓	



% of Time Allocated to:

		% of Time	Theory	Practical	Total
Line G	ASSESS AND MAINTAIN ROOFS	3%	100%	0%	100%
G1	Assess roof conditions	50	✓		
G2	Maintain and repair roofs	50	✓		
Total Percentage for Residential Steep Roofer		100%			



Section 3

PROGRAM CONTENT

Residential Steep Roofer



Line (GAC): **A USE SAFE WORK PRACTICES AND PROCEDURES**
Competency: **A1 Interpret the WorkSafeBC Regulation**

Objectives

To be competent in this area, the individual must be able to:

- Locate and apply WorkSafeBC Act and Regulations related to work performed by roofers.
- Complete Construction Safety Training System (Computer Based).

LEARNING TASKS

1. Describe the parts of the Workers Compensation Act

2. Describe “Core Requirements” of the Occupational Health and Safety Regulation and Guidelines related to the roofing trade

CONTENT

- Compensation to Workers and Dependents
- Occupational Health and Safety
- Appeals

- Definitions
- Application of OHS Regulation
- Responsibilities of employers
 - Provide a safe worksite
 - Provide training
 - Provide safety equipment
 - Perform job hazard analysis
 - Occupation Health and Safety Program
 - Health and safety programs
 - Workplace inspections
 - Correction of unsafe conditions
 - Occupational first aid requirements
 - Young and new worker orientation and training
- Responsibilities of supervisors
 - Ensure the health and safety of all workers under their direct supervision
- Rights and responsibilities of workers
 - Right to receive safety training
 - Right to refuse unsafe work
 - Must follow WorkSafeBC regulations
- General conditions
 - Building, equipment and site conditions
 - Emergency preparedness and response
 - Impairment
 - Working alone or in isolation
 - Workplace conduct



LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>3. Describe and apply the “General Hazard” requirements of the Occupational Health and Safety Regulation and Guidelines related to the roofing trade</p> | <ul style="list-style-type: none"> ○ Preventing violence ○ Work area requirements ○ Storage and handling of materials ○ Ergonomics ○ Work area guards and handrails ○ Illumination ○ Indoor air quality ○ Smoking ○ Lunchrooms, washrooms and clean water |
| <p>4. Complete Computer Based Construction Safety Training System</p> | <ul style="list-style-type: none"> ● Chemical and biological substances ● Substance specific requirements ● Noise, vibration, radiation and temperature ● Personal protective clothing and equipment ● Confined spaces ● De-energization and lockout ● Fall protection ● Tools, machinery and equipment ● Ladders, scaffolds and temporary work platforms ● Cranes and hoists ● Rigging ● Mobile equipment ● Transportation of workers ● Traffic control ● Electrical safety |



Line (GAC): A USE SAFE WORK PRACTICES AND PROCEDURES
Competency: A2 Describe safety hazards in the roofing trade

Objectives

To be competent in this area, the individual must be able to:

- Describe workplace hazards in the roofing trade.
- Locate and use emergency equipment.

LEARNING TASKS

CONTENT

1. Describe hazards in the roofing industry

- Slips, trips and falls
 - Rope organization
 - Airlines
 - Removed vents
 - Loose materials
- Falling objects
- Hazards to the public
- Decks/floor openings
- Fire
- Electrical
- Compressed gas
- Fuels
- Poor Housekeeping
- Tools and equipment
- High winds
- Heat stress and heat exhaustion
- Cold stress
- Power lines

2. Explain personal responsibilities

- Using safe work practices
- Following safe work procedures
- Looking out for unsafe conditions and/or practices
- Reporting unsafe conditions
- Field level hazard assessment
- Daily equipment inspection

3. Describe personal hazards

- Personal apparel
- Hair and beards
- Jewellery
- Horseplay



LEARNING TASKS

4. Describe long-term hazards
5. Understand emergency procedures

CONTENT

- Respiratory disease
- Skin disease
- Asbestosis
- Hearing loss

- Fire control systems
- Emergency exits
- First aid facilities
- Emergency contacts and phone numbers
- Muster stations
- Nearest medical facility



Line (GAC): **A** **USE SAFE WORK PRACTICES AND PROCEDURES**
Competency: **A3** **Use Workplace Hazardous Materials Information System (WHMIS)**

Objectives

To be competent in this area, the individual must be able to:

- Describe the purpose of the WHMIS regulation.
- Explain the contents of Material Safety Data Sheets (MSDSs).
- Explain the contents of WHMIS labels.
- Identify hazard symbols.
- Apply WHMIS regulations.

LEARNING TASKS

CONTENT

<ol style="list-style-type: none"> 1. Describe Federal WHMIS legislation 2. Describe Provincial WHMIS legislation 3. Describe the purpose of the Workplace Hazardous Materials Information System (WHMIS) 4. Describe the key elements of WHMIS 5. Describe the responsibilities of suppliers under WHMIS 6. Describe the responsibilities of employers under WHMIS 	<ul style="list-style-type: none"> • Hazardous Product Act <ul style="list-style-type: none"> ○ Controlled Products Regulations ○ Ingredient Disclosure List • Hazardous Materials Information Review Act • Use of hazardous materials in the workplace • Protection of Canadian workers from the adverse effects of hazardous materials through the provision of relevant information while minimizing the economic impact on industry and the disruption of trade • Recognition of rights <ul style="list-style-type: none"> ○ Workers ○ Employers ○ Suppliers ○ Regulators • Material Safety Data Sheets (MSDSs) • Labelling of containers of hazardous materials • Worker education programs • Provide MSDSs • Provide supplier labels • Provide worker access to MSDSs • Work education programs • Ensure proper storage and handling of materials
---	--



LEARNING TASKS

CONTENT

- | | |
|--|--|
| <p>7. Describe the responsibilities of workers</p> | <ul style="list-style-type: none"> • Understand information of MSDSs and labels • Inform employers of missing or illegible labels |
| <p>8. Describe information to be disclosed on a MSDS</p> | <ul style="list-style-type: none"> • Hazardous ingredients • Preparation information • Product information • Physical data • Fire or explosion • Reactivity data • Toxicological properties • Preventive measures • First-aid measures |
| <p>9. Identify symbols found on WHMIS labels and their meaning</p> | <ul style="list-style-type: none"> • Compressed gases • Flammable and combustible materials • Oxidizing materials • Poisonous and infectious materials <ul style="list-style-type: none"> ○ Materials causing immediate and serious toxic effects ○ Materials causing other toxic effects ○ Biohazardous infectious materials • Corrosive materials • Dangerously reactive materials |
| <p>10. Apply WHMIS regulations as they apply to hazardous materials used on site</p> | <ul style="list-style-type: none"> • Follow WHMIS regulations for use, storage and disposal of materials • Accidental release |



Line (GAC): A USE SAFE WORK PRACTICES AND PROCEDURES

Competency: A4 Apply personal safety practices

Objectives

To be competent in this area, the individual must be able to select and use personal protective equipment (PPE).

LEARNING TASKS

1. Describe personal protective equipment requirements

CONTENT

- WorkSafeBC Regulation
- Fall protection
 - Fall restraint
 - Fall arrest
 - Harnesses, lanyards, lifelines
- Safety footwear
 - CSA Standards
- Eye protection
 - Glasses
 - Goggles
 - Face shields
- Hearing protection
 - Hearing testing
 - Earplugs and canal caps
 - Earmuffs
 - Class/grade selection based on exposure level
- Head protection
 - CSA and ANSI types
- Respiratory protection
 - Respirator types
 - Positive and negative seal check
 - Fit testing
 - Types of breathing hazards
 - Cedar dust
 - Concrete dust
 - Asbestos
 - Silica
 - Animal droppings
 - Filters and cartridges
 - Protection factors
 - Warning signs of respirator failure
 - Hazard/product specific



LEARNING TASKS

CONTENT

2. Use personal protective equipment

- Clothing
 - High visibility
 - Hazard/product specific
- Hand protection
 - Gloves
 - Barrier creams
- Knee protection

3. Use safety precautions for various weather conditions

- Selection
- Purpose
- Training requirements
- Inspection
- Maintenance
- Storage
- Hypothermia
- Dehydration
- Heat stress and heat exhaustion
- Slippery surfaces
- High winds

4. Lift and move objects safely

- Rules for lifting and moving objects
- Procedures for lifting objects
- Plywood
- Planks and beams
- Ladders
- Wheelbarrows
- Shoveling
- Barrels and drums
- Boxes



Line (GAC): **A USE SAFE WORK PRACTICES AND PROCEDURES**
Competency: **A5 Use fall protection**

Objectives

To be competent in this area, the individual must be able to:

- Understand fall protection requirements.
- Develop a fall protection plan.
- Inspect and use fall protection.

LEARNING TASKS

1. Understand the types of fall protection and how they are used

CONTENT

- WorkSafeBC Regulation and guidelines
- Responsibilities of employers, supervisors and workers
- Terminology
- Fall hazards
- Dynamics of falling
- Equipment standards
 - ANSI
 - CSA
- Equipment inspection and maintenance
- Guard rail systems
 - Height of rails and toe boards
 - Spacing of uprights
 - Strength
- Fall restraint/work positioning systems
- Fall arrest systems
 - Personal fall arrest equipment
 - Safety nets
- Work procedures
 - Controls zone
 - Other work procedures acceptable to the Board
- Safe use and limitations of fall protection systems
- Calculation of fall distance when on a sloped roof
- Proper use of worksite access such as ladders and scaffolds
- Protective covers over floor and roof openings and skylights



LEARNING TASKS

CONTENT

- | | | |
|----|--|--|
| 2. | Describe the responsibilities of employers | <ul style="list-style-type: none"> • Requirements when using aerial work platforms <ul style="list-style-type: none"> ○ Maintenance logs ○ Pre-use inspection ○ Training/certification requirements ○ Manufacture’s manual |
| 3. | Responsibilities of supervisors | <ul style="list-style-type: none"> • Providing a safe worksite • First aid • Training • Supervision • Providing safe equipment • Young and new worker training |
| 4. | Responsibilities of workers | <ul style="list-style-type: none"> • Site specific orientation • Supervision of workers • Inspection of equipment • Site specific safe work plan • Hazard assessment |
| 5. | Describe requirements for vertical and horizontal life lines | <ul style="list-style-type: none"> • Following safe work practices • Following safe work procedures • Inspection of equipment • Reporting unsafe conditions to supervisors |
| 6. | Install anchorage for life lines | <ul style="list-style-type: none"> • Equipment specifications • Breaking strength • Inspection and storage • Anchorage |
| 7. | Use fall protection | <ul style="list-style-type: none"> • Compatibility • Connections • Load capacity • Permanent or temporary • Placement • Fall restraint or fall arrest • Manufacturer’s instructions |
| 7. | Use fall protection | <ul style="list-style-type: none"> • Safety procedures during installation • Personal fall restraint and fall arrest equipment |



LEARNING TASKS

- 8. Describe personal fall restraint and fall arrest equipment

- 9. Complete a fall protection plan

CONTENT

- Rope grabs and shock limiting devices
- Safety harness, lanyard, and lifeline
- Chicken ladders/crawl boards
- Roofing brackets/roof jacks/side guards
- Ridge hooks
- Ladder-jack scaffolds
- Guardrails
- Safety nets

- Equipment specifications
- Ladder systems
- Harnesses
 - Classifications
- Lanyards
 - Retractable
 - Shock absorbing
 - Rope grabs
 - Proper tie-off slings/cable
- Connecting devices

- Identifying work area and hazards
- Methods of reducing or eliminating fall hazards
- Eliminating swing hazards
- Selecting appropriate fall protection system and set up
- Fall clearance requirements
- Swing fall
- Free fall distance
- Total fall distance
- Procedures to assemble, maintain, inspect, use and disassemble the fall protection system or systems
- Rescue planning and preparedness
- Tool box meeting



Line (GAC): **A USE SAFE WORK PRACTICES AND PROCEDURES**
Competency: **A6 Use fire safety procedures**

Objectives

To be competent in this area, the individual must be able to:

- Describe the conditions necessary to support a fire.
- Describe classes of fires and methods used to extinguish them.
- Describe the consideration and steps taken prior to deciding to fight a fire.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <p>1. Describe the conditions necessary to support a fire</p> | <ul style="list-style-type: none"> • Oxygen • Fuel • Heat <ul style="list-style-type: none"> ○ Open flame ○ Sparks ○ Cutting processes ○ Electrical equipment ○ Static discharge |
| <p>2. Describe the classes of fires and extinguisher selection according to the materials being burned</p> | <ul style="list-style-type: none"> • Class A • Class B • Class C • Class D |
| <p>3. Describe types of fire extinguishers</p> | <ul style="list-style-type: none"> • Water • Foam • Soda acid • CO2 • Dry chemical • Halons |
| <p>4. Describe the procedure for using fire extinguishers</p> | <ul style="list-style-type: none"> • P.A.S.S. <ul style="list-style-type: none"> ○ Pull ○ Aim ○ Squeeze ○ Sweep |
| <p>5. Describe the considerations and steps to be taken prior to fighting a fire</p> | <ul style="list-style-type: none"> • Warning others • Personal method of egress • Phoning fire department • Fire contained and not spreading |



LEARNING TASKS

CONTENT

6. Identify combustible and flammable materials

- Fuels
- Solvents
- Flash point
- Ignition temperature
- Lubricants
- Oily rags
- Aerosols

7. Describe fire prevention techniques

- Training requirements
- Responsibilities
- Pre-planning
- Evacuation procedures
- Hot work permits
- Controlling spills
- Storage and handling of materials
- Application techniques



Line (GAC): **A USE SAFE WORK PRACTICES AND PROCEDURES**
Competency: **A7 Complete Level 1 First Aid**

Objectives

To be competent in this area, the individual must be able to demonstrate the basic skills needed to reduce shock and contain injuries.

LEARNING TASKS

1. Complete Level 1 First Aid Training

CONTENT

- Emergency Management
- C-Spine Control
- Obstructed airways
- Artificial respiration and CPR for adults
- Major bleeding control
- Records and Reporting



Line (GAC): **B USE TOOLS AND EQUIPMENT**
Competency: **B1 Use hand tools**

Objectives

To be competent in this area, the individual must be able to:

- Use layout and marking tools.
- Use roofing hand tools.

LEARNING TASKS

CONTENT

1. Describe and use layout and marking tools

- Chalk line
- Squares
- Metric and Imperial tape measures
- Levels
- Builder’s levels
- Marking tools
- Care maintenance and storage
- Pencils and graph paper
- Calculators

2. Describe roofing hand tools

- Knives
- Snips
- Hatchet
- Staple hammer
- Saws
- Chisels
- Files
- Punches
- Pliers
- Screwdrivers
- Hammers
- Pry bars
- Cat’s claw
- Wrenches
- Scrapers
- Shovels
- Trowels
- Caulking guns
- Wheelbarrow



LEARNING TASKS

3. Use roofing hand tools

CONTENT

- Types
- Parts
- Purpose/Uses
- Selection
- Procedures/Operations
- Safety
- Adjustment
- Inspection
- Maintenance
- Storage



Line (GAC): B USE TOOLS AND EQUIPMENT

Competency: B2 Use portable power tools

Objectives

To be competent in this area, the individual must be able to:

- Select portable power tools appropriate to roofing applications.
- Use and maintain portable power tools.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <p>1. Describe power tools used in the roofing trade</p> | <ul style="list-style-type: none"> • GFCI Protection • Grounding of tools • Circular saws • Drills • Angle grinders • Screw guns • Nail guns • Masonry saws • Blower • Power supply <ul style="list-style-type: none"> ○ Electric ○ Powder-actuated ○ Pneumatic ○ Battery |
| <p>2. Use roofing power tools</p> | <ul style="list-style-type: none"> • Safety hazards and precautions • Types • Parts • Purpose/Uses • Procedures/Operations • Training requirements • Adjustments • Inspection • Maintenance <ul style="list-style-type: none"> ○ Lubrication ○ Tensioning ○ Refuelling ○ Filter replacement • Storage • Manufacturer’s recommendations |



Line (GAC): **B** **USE TOOLS AND EQUIPMENT**
Competency: **B3** **Use hoisting, lifting and rigging equipment**

Objectives

To be competent in this area, the individual must be able to:

- Describe motorized equipment and its purposes.
- Use and maintain motorized equipment.

LEARNING TASKS

1. Describe rigging equipment
2. Describe roofing hoisting equipment

CONTENT

- Types
 - Ropes
 - Cables
 - Chains
 - Slings
 - Hooks
 - Shackles
 - Spreader bars
- Knots, bends and hitches
- Uses
- Limitations/ratings/specifications
 - Load
 - Height
- Inspection
- Maintenance
- Storage
- Types
 - Roofmaster™ hoists
 - Ladder hoists (wheel and platform)
 - Pulley systems
 - Manual hoists
 - Hand Beam Hoist
 - Overhead monorail hoist
 - Conveyor systems
 - Swing beam hoist
 - Hydraulic hoist
- Safety
- Uses
- Limitations/ratings/specifications
- Parts
- Counterweights



LEARNING TASKS

- 3. Describe rooftop delivery systems

- 4. Describe roof top storage practices

- 5. Use rigging and hoisting equipment

CONTENT

- Erection
- Dismantling
- Inspection
- Maintenance
- Storage

- Types
 - Cranes
 - Hyabs
 - Conveyors
- Uses
- Limitations/ratings/specifications
- Parts
- Inspection
- Maintenance
- Storage

- Load distribution
- Load location
- Storage
- Securing material
- Material handling
- Protection from the elements

- Barricade hoisting areas
- Signage
- Protection of workers and public
- Regulations
- Manufacturers' specifications
- Training and certification requirements
- Operating procedures
- Roof protection from equipment
- Estimating loads and heights
- Load distribution
- Load limits
 - Ropes
 - Cables
 - Chains
 - Slings
 - Hooks
 - Shackles



LEARNING TASKS

CONTENT

- Spreader bars
- Knots
 - Selection
 - Tying
- Hand signals
 - Stop
 - Lower and raise
 - Boom in and out
 - Travel/swing
 - Dog everything
- Radio communications
- Precautions
 - Slings
 - Tag lines
 - Power lines
 - Knots
 - Equipment specifications
- Erection/set-up
- Dismantling
- Loading
- Unloading
- Weight distribution
- Securing loads
- Inspection
 - Bird caging
 - Fittings
 - Hooks and eyes
 - Broken strands
 - Crushing
 - Load ratings
- Maintenance
- Storage



Achievement Criteria

Performance The learner will set-up and operate a ladder hoist.

Conditions The learner will be given:

- A ladder hoist
- Material to be lifted
- Operating instructions

Criteria The learner will score 70% or better on a rating sheet that reflects the following criteria:

- Inspection of equipment
- Safety
- Operating procedures
- Assembly and disassembly
- Barricading
- Signage



Line (GAC): **B USE TOOLS AND EQUIPMENT**
Competency: **B4 Use ladders and work platforms**

Objectives

To be competent in this area, the individual must be able to:

- Describe types of ladders and work platforms.
- Erect and use ladders and scaffolds.

LEARNING TASKS

1. Use ladders

2. Describe aerial work platforms

3. Describe ground-based scaffolds

CONTENT

- Ladder types
 - Extension
 - Straight
 - Step
- Grade
- Safety
 - Level firm base
 - Securing
 - Stand-offs/stabilizers
 - Feet
- Carrying, and using

- Safety
- Scissor
- Boomlifts
- Operating instructions
- Certification requirements
- Training requirements

- Safety
- Types
 - Tube and coupler
 - Steel Frame
 - Wood
 - Ladder jack
- Components
- Fall protection



LEARNING TASKS

- 4. Describe scaffold erection procedures

- 5. Use ladders and elevated platforms

CONTENT

- Mud sills
- Members plumb and level
- Stability
- Guardrails and toe-boards
- Scaffold planks
- Work platforms
- Plank support
- Scaffold loads
- Ladder access to scaffolds

- Selection
- Fall protection plan
- Fall arrest and restraint requirements
- Assembly/disassembly
- Limitations
- Securing
- Inspection
- Maintenance
- Storage

Achievement Criteria

Performance	The learner will assemble, use and disassemble steel scaffolding.
Conditions	The learner will be given: <ul style="list-style-type: none"> • Scaffolding • Level • Fall protection equipment
Criteria	The learner will score 70% or better on a rating sheet that reflects the following criteria: <ul style="list-style-type: none"> • Equipment inspection • Level • Plumb • Assembled to specification • Accessing • Use of fall protection



Line (GAC): C **USE DOCUMENTATION**
Competency: C1 **Read drawings and specifications**

Objectives

To be competent in this area, the individual must be able to read and interpret drawings and specifications.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Describe major divisions of working drawings and blueprints
 2. Describe important elements of drawings and blueprints
 3. Describe and identify lines used on blueprints
 4. Describe types of roofing specifications and codes | <ul style="list-style-type: none"> • Architectural drawings • Structural drawings • Mechanical drawings • Electrical drawings • Site plans
 • Floor plans • Elevations • Cross-sections • Details • Title block • Scale of drawing • Symbols and notations
 • Object/visible • Hidden • Extension • Dimension • Centre • Leader • Section/cutting plane • Long and short break
 • Architectural specifications • Manufacturer's specifications • Regional specifications (e.g., RCABC) • National Building Code • BC Building Code |
|---|--|



Line (GAC): **C USE DOCUMENTATION**
Competency: **C2 Use Building Codes and RCABC Standards**

Objectives

To be competent in this area, the individual must be able to:

- Locate and interpret sections of the provincial and national Building Codes that apply to the roofing trade.
- Describe guarantee program recommendations that exceed the requirements of other codes.
- Describe municipal requirements that supersede or amend the provincial Building Codes.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Locate and interpret sections of the provincial and national Building Codes that apply to the roofing trade</p> | <ul style="list-style-type: none"> • Sections • Materials • Flashing • Eaves • Bearing walls • Trusses and rafters • Decking • Insulation and weatherproofing • Installation • Loads (especially snow) • Differences between the codes |
| <p>2. Describe municipal requirements that supersede or amend the provincial Building Codes</p> | <ul style="list-style-type: none"> • Materials • Permits • Inspections |
| <p>3. Describe guarantee program recommendations that exceed the requirements of other codes</p> | <ul style="list-style-type: none"> • CSA/ISO • RCABC (RGC) • Manufacturers |



Line (GAC): C **USE DOCUMENTATION**
Competency: C3 **Read manufacturers' information**

Objectives

To be competent in this area, the individual must be able to interpret manufacturers' instructions and specifications.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Interpret roofing system manufacturers' specifications
 2. Use roofing system manufacturers' application procedures | <ul style="list-style-type: none"> • Manufacturers' specifications • Manufacturers' installation instructions • Manufacturers' inspection and maintenance information • Manufacturers' troubleshooting documentation
 • Installation • Fastening methods • Handling • Storage • Overlaps • Minimums/maximums |
|--|---|



Line (GAC): D ORGANIZE WORK
Competency: D1 Communicate with others

Objectives

To be competent in this area, the individual must be able to use effective communication.

LEARNING TASKS

1. Describe types of communication
2. Describe reasons for communication
3. Communicate with others

CONTENT

- Written
 - Work Orders
 - Inspection reports
 - Manufacturers' documentation
 - Permits
- Drawings and specifications
- Safety
- Project coordination
- Giving instructions
- Receiving and understanding instructions
- Clarification
- Customer relations
- Project notifications
 - Shutdowns
 - Precautions
 - Noise
 - Fumes/dust
 - Customer safety
- Training
- Respect
- Supervisors
- Other workers
- Apprentices
- Architects
- Engineers
- Inspectors
- Safety officers
- Other trades
- Customers
- Building occupants
- General public



LEARNING TASKS

3. Position equipment and material on the ground

4. Position equipment and material on the roof

CONTENT

- Erect and disassemble chutes and counterweights
- Equipment
 - Compressors
 - Disposal bins
- Placement
 - Regulations
 - Access
 - Customer convenience
- Safety equipment
 - Hoses
 - Fire extinguishers
 - Safety cones
 - Caution tape
 - Safety fence
- Communication with owner, contractor and other trades people
- Hoists
- Sequence of removal and installation
- Weight distribution
- Safety
- Securement
- Windows
- Ventilation openings
- Ease of access
- Safety equipment
 - Water hoses
 - Fire extinguishers
- Communication with owner, contractor and other trades people



LEARNING TASKS

5. Protect building finishes and landscaping

CONTENT

- Protection materials
 - Tarps
 - Plywood
 - Blankets
 - Fabric
- Types of damage
 - Broken glass
 - Fume infiltration
 - Staining
 - Fire
- Identification of areas of potential damage
 - Windows
 - Walls
 - Skylights
 - Mechanical equipment
 - Vehicles
 - Landscaping
- Identification of areas of previous damage
- Barrier erection
- Placement of materials



Line (GAC): **D ORGANIZE WORK**
Competency: **D3 Use trade related math**

Objectives

To be competent in this area, the individual must be able to:

- Perform mathematical calculations using whole numbers, fractions, decimals and ratios.
- Convert between metric and imperial units of measure.
- Solve problems involving area and volume.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <p>1. Add, subtract, multiply and divide whole numbers</p> | <ul style="list-style-type: none"> • Operations |
| <p>2. Solve problems with fractions, ratios and decimals</p> | <ul style="list-style-type: none"> • Operations <ul style="list-style-type: none"> ○ Fractions ○ Ratios ○ Decimals • Decimal to fraction conversions • Fraction to decimal conversions • Convert measurements to ratios |
| <p>3. Add, subtract, multiply and divide using units of linear measure</p> | <ul style="list-style-type: none"> • Feet and inches • Metric units |
| <p>4. Convert within the imperial system</p> | <ul style="list-style-type: none"> • Feet to inches • Inches to feet • Square feet to square inches • Square inches to square feet |
| <p>5. Convert metric and imperial measurements</p> | <ul style="list-style-type: none"> • Metric to imperial • Imperial to metric • Weights • Lengths • Volumes • Temperature • Prefixes |

**LEARNING TASKS**

6. Solve plane geometry problems

CONTENT

- Perimeters of shapes
 - Squares
 - Rectangles
 - Rhombus
 - Triangles
 - Law of right triangles/ Pythagoras theorem
 - Pentagons and higher order polygons
 - Circles
- Areas of shapes
 - Squares
 - Rectangles
 - Triangles
 - Pentagons and higher order polygons
 - Circles
- Angular measurements
- Practical word problems



Line (GAC): **D ORGANIZE WORK**
Competency: **D4 Estimate materials**

Objectives

To be competent in this area, the individual must be able to estimate materials for a steep roof.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Create roof sketch for estimating area
 2. Describe venting requirements
 3. Estimate materials required for a steep roof | <ul style="list-style-type: none"> • Taking measurements • Slope calculations • Roof heights
 • Building Code • Types of vents • Net free area • Sizing
 • Eave protection • Underlay • Starter course • Shingles • Wastage • Flashing • Built-in gutter material • Valley material • Capping • Fasteners |
|--|--|

Achievement Criteria

- Performance** The individual will create a roof sketch for a steep roof and determine material requirements.
- Conditions** The learner will be given:
- A roof area to measure
 - Specifications
 - Calculator
- Criteria** The learner will score 70% or better on a rating sheet that reflects the following criteria:
- Correct calculations



Line (GAC): E PREPARE ROOFS

Competency: E1 Prepare roofs for replacement

Objectives

To be competent in this area, the individual must be able to prepare a roof for replacement.

LEARNING TASKS

1. Protect windows, walls, skylights and mechanical equipment

CONTENT

- Types of protection material
 - Tarps
 - Plywood
 - Blankets
 - Fabric
 - Chute
- Types of damage
 - Broken glass
 - Staining
 - Fire
 - Scratches and dents
 - Punctures
- Areas of potential damage
 - Decks
 - Landscaping
 - Windows
 - Walls
 - Building finishes
 - Eavestroughs
 - Drainage
 - Skylights
 - Mechanical equipment
 - Vehicles
- Areas of previous damage
 - Pre-start walk through
 - Documentation (photos)
- Erection of protection barriers
- Placement of equipment and materials

**LEARNING TASKS**

2. Describe the removal of loose debris

3. Describe the removal of roofing and metal flashings

CONTENT

- Types of debris
 - Vegetation
 - Gravel
 - Dust
 - Construction materials
 - Environmental concerns
- Hazards
 - Cedar dust
 - Asbestos
 - Mould
 - Animal droppings
 - Coal tar pitch
 - Used needles
 - Flying debris
- Safety precautions
- Gathering
- Storing
- Disposing
- Notification to authorities of hazardous materials

- System types
 - Components
- Effect of weather conditions
- Removal sequence
- Materials to be removed
- Extra care when removing metal
- Hazards
 - Rotten deck
 - Nails
 - Electric wiring
 - Cuts on sharp metal
 - Slipping
 - Wildlife
- Recyclable materials
- Regulated and hazardous materials
- Removal equipment selection
- Removal techniques
- Amount of tear-off in a work period
- Removal and disposal of materials

**LEARNING TASKS**

4. Describe the preparation of the roof substrate

5. Describe the adjustment of heights of penetrations and parapets

CONTENT

- Types of deck substrates
 - Steel
 - Wood
- Substrate defects
 - Dents
 - Rotten wood
 - Corrosion
 - Knot holes
 - Deflection of plywood
 - Warping
 - Checking
 - Broken boards
- Structural defects
 - Cornices
 - Weak supporting structure and/or overhangs
- Cleaning substrate
- Vapour barriers
 - Repair
 - Replacement
- Insulation
 - Repair
 - Replacement
- Securing loose substrate components

- New roof composition
- Changes to roof mounted equipment
- Adjustments
 - Adding slope to coping
 - Extending methods for various materials
 - Pipes
 - Drains
- Height calculations
 - Penetrations
 - Parapets
- Building extensions
- Material selection to suit new construction
- Dismantling existing construction
- Adding material to existing construction



LEARNING TASKS

6. Describe the installation temporary waterproofing

CONTENT

- Materials
 - Shingles
 - Underlay
 - Tarps
- Material compatibility
- Determining integrity
- Removal



Line (GAC): E PREPARE ROOFS
Competency: E2 Prepare new roofs for installation

Objectives

To be competent in this area, the individual must be able to prepare new roofs for installations.

LEARNING TASKS

1. Describe requirements/procedures for inspecting decks

2. Verify the placement of roof penetrations and parapets and prepare roof deck

CONTENT

- Deck types
 - Wood
 - Steel
- When to inspect
- Defects
 - Height
 - Irregularities
 - Unfinished substrate
 - Plywood not staggered
 - Unfastened substrate
 - Trusses not trimmed
 - Orientation of substrate
 - Deck deflection
 - Corrosion
- Notification of responsible parties
 - Severity
 - Timeline
- Required penetrations and parapets
- Covering roof openings
- Height and fastening requirements
- Required components
 - Drains
 - Flashing and counter flashing
 - Skylights
 - Chimneys
 - Plumbing stacks
 - Vents
 - Anti-ponding boards
 - Hip and ridge trees
 - Open lath sheathing
- Clearances and placement
- Deck types
- Compatibility of components with roofing system



Line (GAC): E **PREPARE ROOFS**
Competency: E3 **Prepare built-in gutters**

Objectives

To be competent in this area, the individual must be able to prepare built-in gutters.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Describe preparation of an existing built-in gutter for new installation</p> <p>2. Inspect existing or new built-in gutters</p> <p>3. Describe installation of water cut-offs and temporary seals</p> | <ul style="list-style-type: none">• Safe access• Determining existing waterproofing membrane• Removing cap• Removing drains• Removing waterproofing membrane• Re-securing the substrate• Ensuring clean and dry substrate
• Slope to drain• Drain locations• Proper substrate• Cant strips• Suitable substrate• Vertical terminations
• Water cut-offs for built-in gutters• Requirements<ul style="list-style-type: none">○ Temporary seals○ Temporary drains |
|---|---|



Line (GAC): F **INSTALL STEEP ROOFING**
Competency: F1 **Describe roof types**

Objectives

To be competent in this area, the individual must be able to:

- Describe types of roof structures and designs.
- Describe roof structural components.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>1. Identify types of roof structures and designs</p> | <ul style="list-style-type: none"> • Hip • Gable • Gambrel • A-frame • Mansard • Shed • Dormer • Flat • Vaulted • Saw-toothed • Domed • Serpentine • Barrel • Conical |
| <p>2. Describe roof construction features</p> | <ul style="list-style-type: none"> • Trusses and rafters • Beams • Ridges • Valleys • Eaves • Hips • Guttering • Gables/Rakes/Barge • Cornice • Decking/substrate • Open lath/strapping • Insulation |
| <p>3. Describe roof slopes</p> | <ul style="list-style-type: none"> • Rise • Run • Slope/pitch |



Line (GAC): F **INSTALL STEEP ROOFING**
Competency: F2 **Install built-in gutter membranes**

Objectives

To be competent in this area, the individual must be able to install built-in gutter membranes.

LEARNING TASKS

1. Describe membrane types
2. Install EPDM gutter membrane

CONTENT

- Modified bituminous membrane (Mod Bit)
- Single ply
- Safety hazards and precautions
- Inspection of substrate
- Installation methods
 - Drains
 - Seaming
 - Fully adhered
- Manufacturer’s documentation
- Building Codes
- Tools and equipment
- Terminations
 - Corners
 - Slope side
 - Fascia side
 - Under cap flashing
 - Fasteners

Achievement Criteria

Performance The learner will install EPDM in a built-in gutter.

Conditions The learner will be given:

- Materials
- Tools
- Specifications
- Personal protective equipment

Criteria The learner will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Application
- Removal



Line (GAC): F **INSTALL STEEP ROOFING**
Competency: F3 **Install asphalt shingles**

Objectives

To be competent in this area, the individual must be able to:

- Describe asphalt shingles and their purpose.
- Install asphalt shingles.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| 1. Describe components and considerations | <ul style="list-style-type: none">• Decks<ul style="list-style-type: none">o Woodo Steel• Roof slope• Types of eave protection• Types of underlayment• Insulation• Ventilation<ul style="list-style-type: none">o Typeso Application• Shingles<ul style="list-style-type: none">o Styleso Compositiono Purposeo Advantages of asphalt productso Storage requirements• Fasteners• Details• Flashings• Effect of weather on installation |
| 2. Inspect and repair deck | <ul style="list-style-type: none">• Building Code requirements• RCABC, architectural and manufacturers' specifications• Fastening• Clean• Defects• Details |
| 3. Install insulation and venting | <ul style="list-style-type: none">• Cathedral/vaulted• Cold systems• Insulated roof assemblies• Baffles/stops |

**LEARNING TASKS**

4. Install eave protection and underlayments

5. Install flashing details

CONTENT

- Types/composition
 - Felt
 - Self adhered
 - Mineral surfaced
 - Synthetic
- Purpose
- Building Code requirements
- RCABC, architectural and manufacturers' specifications
- Fastening methods
- Overlaps

- Types
 - Drip edge
 - Rake edge
 - Step
 - Base
 - Counter
 - Through-wall
 - Back pan
 - Apron
 - Saddles or crickets
 - Valley
 - Plumbing stacks
 - Air vents
- Compatibility between materials
- Materials
 - Metal
 - Neoprene
 - Plastic
- Gauge
- Selection
- Forming
- Fasteners
 - Types
 - Location
- Methods
 - Flashing at valley
 - Flashing at vertical walls
 - Flashing at chimneys and vent pipes
 - Flashing at skylights



LEARNING TASKS

- 6. Install shingles

CONTENT

- Caulking and sealants
- Building Code requirements
- RCABC, architectural and manufacturers' specifications
- Mastic sealing of cut shingles
- Styles
- Applications
- Details
- Hips
- Valleys
- Starting point
- Overhangs
- Layout
 - Chalk line
 - Starter course
 - Exposure and overlap
 - Patterns
 - Alignment
- Fasteners
 - Type
 - Length
 - Number
 - Location
- Cap shingles
 - Hips
 - Ridges
- Wind considerations
 - Adhesives/sealants
 - Nailing patterns



Achievement Criteria

Performance The learner will install an asphalt shingle roof with flashing details.

Conditions The learner will be given:

- Roof deck
- Materials
- Tools
- Specifications
- Personal protective equipment

Criteria The learner will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Application
- Removal



Line (GAC): F **INSTALL STEEP ROOFING**
Competency: F4 **Install wood shingles and shakes**

Objectives

To be competent in this area, the individual must be able to:

- Describe wood shingles and shakes and their application.
- Install wood shingles and shakes and their application.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>1. Describe components of wood shingle and shake roofs</p> | <ul style="list-style-type: none"> • Decks <ul style="list-style-type: none"> ○ Wood • Slope • Eave protection • Underlayment • Insulation • Ventilation <ul style="list-style-type: none"> ○ Types ○ Application • Shingles and shakes <ul style="list-style-type: none"> ○ Grades ○ Purpose ○ Treatments • Fasteners • Details • Metal flashing |
| <p>2. Install insulation</p> | <ul style="list-style-type: none"> • Cathedral • Insulated roof assemblies • Cold system |
| <p>3. Install eave protection and underlayments</p> | <ul style="list-style-type: none"> • Types <ul style="list-style-type: none"> ○ Felt ○ Self adhered ○ Synthetics • Purpose • Building Code requirements • RCABC, architectural and manufacturers' specifications • Materials • Fastening methods • Overlaps |



LEARNING TASKS

4. Install flashing details

5. Install shingles/shakes

CONTENT

- Types
 - Drip edge
 - Rake edge
 - Step
 - Base
 - Counter
 - Through-wall
 - Back pan
 - Apron
 - Saddles or crickets
 - Valley
 - Plumbing stacks
 - Air vents
- Materials
 - Metal
 - Neoprene
 - Plastic
- Selection
- Forming
- Fasteners
 - Types
 - Location
- Methods
- Caulking and sealants
- Building Code requirements
- RCABC, architectural and manufacturers' specifications
- Inspection of material
- Grades
- Applications
- Details
- Starting point
- Layout
 - Chalk line
 - Starter courses
 - Exposure and overlap
 - Patterns
 - Spacing
 - Open lath
 - Interwoven/inter-coursing for shakes



LEARNING TASKS

CONTENT

- Alignment
- Fasteners
 - Type
 - Length
 - Number
 - Location
- Capping
 - Hips
 - Ridges
 - Underlayment
- Environmental considerations

Achievement Criteria

Performance The learner will install a wood shingle/shake roof with flashing details.

Conditions The learner will be given:

- Roof deck
- Materials
- Tools
- Specifications
- Personal protective equipment

Criteria The learner will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Application
- Removal



Line (GAC): F **INSTALL STEEP ROOFING**
Competency: F5 **Install concrete and composite materials**

Objectives

To be competent in this area, the individual must be able to:

- Describe concrete and composite materials and their application.
- Install concrete and composite materials.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Describe components of concrete and composite roofs</p> | <ul style="list-style-type: none"> • Decks <ul style="list-style-type: none"> ○ Wood ○ Slope • Eave protection • Underlayment • Insulation • Ventilation <ul style="list-style-type: none"> ○ Types ○ Application • Tiles <ul style="list-style-type: none"> ○ Styles ○ Purpose • Strapping/lath • Anti-ponding boards • Fasteners • Details • Flashings • Effect of weather in installation |
| <p>2. Inspect and repair deck</p> | <ul style="list-style-type: none"> • Building Code requirements • RCABC, architectural and manufacturers' specifications • Fastening • Clean • Defects • Details |
| <p>3. Install insulation and ventilation</p> | <ul style="list-style-type: none"> • Cold systems • Vaulted/cathedral • Insulated roof assemblies |



LEARNING TASKS

6. Install tiles

CONTENT

- Building Code requirements
- RCABC, architectural and manufacturers' specifications
- Styles
- Applications
- Details
- Starting point
- Layout
 - Lath/strapping
 - Spacing
 - Chalk line
 - Starter course (for composites)
 - Exposure and overlap
 - Patterns
 - Alignment
- Fasteners
 - Type
 - Length
 - Number
 - Location
- Cap tiles
 - Hips
 - Ridges
 - Mastic
 - Dentils and frogs
- Environmental considerations

Achievement Criteria

Performance The learner will install a concrete or composite roof with flashing details.

- Conditions** The learner will be given:
- Roof deck
 - Materials
 - Tools
 - Specifications
 - Personal protective equipment

- Criteria** The learner will score 70% or better on a rating sheet that reflects the following criteria:
- Safety
 - Application
 - Removal



Line (GAC): F INSTALL STEEP ROOFING

Competency: F6 Install metallic materials

Objectives

To be competent in this area, the individual must be able to:

- Describe components of metallic roofing and their application.
- Describe metal flashing and seams.
- Install preformed metal tiles.

LEARNING TASKS

1. Describe components of metallic roofing and considerations

CONTENT

- Decks
 - Wood
 - Steel
- Slope
- On-site storage
- Eave protection
- Underlayment
 - Proprietary
- Insulation
- Ventilation
 - Types
 - Application
- Metal roof systems
 - Metallic coated steel
 - Natural weathering metals
 - Painted and laminated metals
 - Galvanic series
 - Expansion and contraction
 - Potential problems
- Compatibility of components
- Metal panel systems
 - Panel configurations
 - Profiles
 - Hook strips
 - Fasteners clips and closures
- Preformed metal tiles
 - Styles
 - Purpose
- Strapping
- Battens
- Fasteners and clips
- Details
- Metal flashing
 - Cap flashing



LEARNING TASKS

- 2. Inspect and repair deck

- 3. Install insulation

- 4. Install eave protection and underlayments

- 5. Install flashing details

CONTENT

- Wall flashings
- Seaming methods
- Tools and equipment
- Proprietary equipment
- Effect of weather during installation

- Building Code requirements
- RCABC, architectural and manufacturers' specifications
- Fastening
- Cleaning
- Defects
- Details

- Requirements
 - Insulated roof assemblies

- Types
 - Felt
 - Self adhered
 - Synthetic
 - Proprietary
- Purpose
- Building Code requirements
- RCABC, architectural and manufacturers' specifications
- Materials
- Fastening methods
- Overlaps

- Types
 - Closures
 - Channels
 - Drip edge
 - Rake edge
 - Step
 - Base
 - Counter
 - Through-wall
 - Back pan
 - Apron
 - Saddles or crickets
 - Valley



LEARNING TASKS

6. Install preformed a metal roof system

CONTENT

- Plumbing stacks
- Air vents
- Materials
 - Metal
 - Lead
 - Neoprene
 - Plastic
- Selection
- Forming
 - Cutting and marking
 - Bending
- Fasteners
 - Types
 - Location
- Methods
- Caulking and sealants
- Building Code requirements
- RCABC, architectural and manufacturers' specifications
- Styles
- Applications
- Details
- Starting point
- Layout
 - Chalk line
 - Starter course
 - Exposure and overlap
 - Patterns
 - Alignment
 - Calculating angles
- Fasteners
 - Type
 - Length
 - Number
 - Location
 - Drag screws
- Metal cap
 - Hips
 - Ridges
- Environmental considerations



Achievement Criteria

Performance The learner will install a metal roof system with flashing details.

Conditions The learner will be given:

- Materials
- Tools and equipment
- Plans and specifications

Criteria The learner will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Layout
- Installation



Line (GAC): **G ASSESS AND MAINTAIN ROOFS**
Competency: **G1 Assess roof conditions**

Objectives

To be competent in this area, the individual must be able to:

- Describe the importance of inspection and maintenance.
- Perform a maintenance inspection.
- Write inspection and maintenance reports.

LEARNING TASKS

1. Describe assessment of roof conditions

2. Write a maintenance report

CONTENT

- Safety hazards and precautions
- Inspection
 - Historical records
 - Installation deficiencies
 - Types of defects
 - Causes of defects
 - Signs of deterioration
 - Maintenance items
 - Life expectancy
 - Checklist
 - Environmental occurrences
- Other occurrences
- Roof types
- Detailed roof plan
- Guarantee programs
- Testing
 - Destructive/non-destructive
 - Thermographic imaging/infrared scanning
 - Radioisotopic detection/nuclear surveying
- Purpose
- Tools
- Detailed plan
- Checklist
- Observations
- Recommendations



Line (GAC): G ASSESS AND MAINTAIN ROOFS

Competency: G2 Maintain and repair roofs

Objectives

To be competent in this area, the individual must be able to:

- Describe the maintenance and repair of roofs.
- Maintain and repair roofs.

LEARNING TASKS

1. Describe the maintenance and repair of steep roofs

2. Maintain and repair steep roofs

CONTENT

- Inspections
- Maintenance
- Causes of failure
 - Moisture
 - Ultra violet
 - Thermal cycling
 - Vegetation
 - Ventilation
 - Underlayment
 - Ice damming
 - Insects
 - Wildlife
 - Traffic
 - Aging
 - Wind
 - Impacts
 - Improper design
 - Improper installation
 - Structural movement
 - Contamination
 - Mechanical damage
 - Drainage failure
- Solutions to failures
- Materials
- Repair methods
 - Valleys
 - Nails backing out of deck
 - Broken shingles
 - Details
 - Defective flashing
 - Vents



Section 4

TRAINING PROVIDER STANDARDS



Facility Requirements

Classroom Area

- Comfortable seating and tables suitable for learning
- Compliance with the local and national fire code and occupational safety requirements
- Overhead and multimedia projectors with a projection screen
- Whiteboard with marking pens and erasers
- Lighting controls to allow easy visibility of the projection screen while allowing students to take notes
- Windows must have shades or blinds to adjust sunlight
- Heating/air conditioning for comfort all year round
- In-room temperature control to ensure comfortable room temperature
- Acoustics in the room must allow the instructor to be heard
- Library complete with reference material for student and instructor use

Shop Area

- 1,100 square foot sheet metal workshop with ceiling height sufficient to allow safe movement of materials
- 13,600 square foot mock-up/storage area which includes:
 - 5,000 square foot steep roofing area
 - 1,300 square foot flat roofing area
 - 120 square foot sheet metal roofing area
 - Tool crib
 - Lockers
- Adequate lighting and lighting control
- Ventilation as per WorkSafeBC standards
- Refuse and recycling bins for used shop materials
- First-aid facilities

Lab Requirements

- Computer lab complete with 16 computers and internet access

Student Facilities

- Adequate lunch room as per WorkSafeBC requirements
- Adequate washroom facilities as per WorkSafeBC requirements
- Personal storage lockers

Instructor's Office Space

- Desk and filing space
- Computer

Other

- N/A



Tools and Equipment

Shop Equipment

Required

- Forklift
- Hydraulic Swing hoist
- Ladder hoist
- Roof cutter
- Rotary spudder
- Ladders
- Fall protection

Recommended

- N/A

Shop (Facility) Tools

Standard Tools

- 12 Electrical cord
- 12 Field and detail torches
- 4 Hand drills
- 1 Industrial vacuum
- Adhesive spreader
- Adjustable spanner
- Axe
- Broom
- Caulking guns
- Chalk line
- Chisels
- Flashlight
- 1 Pallet jack
- 2 Power saws (circular)
- Hacksaw
- Hammer
- Hammer stapler
- Hand saw
- Hand spudder
- Hand roller
- Hatchet
- Infrared heat gun
- 1 Pressure washer
- 1 Roll carrier
- 6 Screw guns
- 2 Strikers
- 2 Pipe wrenches
- 1 Pop riveter
- 6 Pry bars
- 1 rake
- 12 Roof jack
- 12 Roofer knives
- 6 Saw horses
- 16 Scissors
- 2 Scoop shovel
- 1 Scraper
- 3 Screwdrivers
- 1 Seam folder
- 2 Seam rollers
- Shovel
- 1 Slater punch
- 1 Sliding T-bevel
- 1 Squeegee
- 12 Trowel



- Measuring tape
- Metal shear
- Pan and box brake
- 4 T-squares
- 1 Wheelbarrow
- 1 Water extractor
- 2 Sheet metal brakes (8 ft)
- 1 Slitter machine

Specialty Tools

- N/A

Student Equipment (supplied by school)

Required

16 Hand Tool Kits

- Aviation snips set
- Claw hammer
- Felt markers
- Scratch awl
- Tape measure
- Tinnerns hammer
- Tool box
- Vice grips (Bull nose)
- Vice grips (Regular)

Safety Equipment

- Ear muffs
- 1 Eye wash bottle
- 4 Face shields
- 2 First aid kits
- First aid room
- Box of masks
- 6 Portable fire extinguishers
- 32 Safety glasses
- 6 Safety harnesses
- Eye wash station

Recommended

- N/A

Student Tools (supplied by student)

Required

- Pouch
- Hammer
- Hatchet
- Tape measure
- Chalk line
- Nail puller
- Snips
- Coveralls
- Safety foot wear
- Hard hats
- Light duty work gloves

Recommended

- N/A



Reference Materials

Required Reference Materials

The following two textbooks are supplied to the students for use during technical training:

- RCABC Roofing Practices Manual
- A Guide to Roofing (RCABC)

Recommended Resources

The following resources are available for student use at the Roofing Contractor's Association of BC.

- Canadian Roofing Reference Manual (Canadian Roofing Contractors Association)
- Occupational Health and Safety Regulation and WCB Standards
- Residential Blueprint Reading
- Soprema Specification Manual (Soprema Inc.)
- Firestone Specifications Manual (Firestone Building Products Canada)
- Carlisle Specification Manual (Carlisle SynTec Systems Canada)
- IKO Specification Manual (IKO Industries Limited)
- Decra Systems Specifications Manual (DECRA Roofing Systems)
- BC and National Building Codes
- National Standards of Canada for Concrete Roof Tile (CSA A220 M91)
- NRCA Roofing and Waterproofing Manual (National Roofing Contractors Association)
- NRCA Repair Manual for Low-slope Membrane Roof Systems (National Roofing Contractors Association)
- WHMIS Publications (WorkSafeBC)
- The Science and Technology of Traditional and Modern Roofing Systems (Dr. H. O. Laaly)
- Cedar Shake and Shingle Specifications Manual (Cedar Shake and Shingle Bureau)
- WorkSafeBC Safety Video Clips
- Manufacturer's Application Videos



Instructor Requirements

Occupation Qualification

The instructor must possess:

1. A BC Certificate of Qualification as a Residential Steep Roofer or a Roofing Damp and Waterproofing Red Seal Certificate.
2. Equivalent Certificate of Qualification from another Canadian jurisdiction.

Work Experience

A minimum of 5 years experience, working in the industry as a journeyperson.

Instructional Experience and Education

The instructor must possess one of the following:

1. The B.C. Instructors Diploma or equivalent (individuals that are actively working towards the Instructors Diploma with a clearly defined completion goal may instruct this program)
2. A Bachelors Degree in Education
3. A Masters Degree in Education