Apprenticeship and Industry Training

Apprenticeship Curriculum Guide Companion Document

Roofer

Apprenticeship and Industry Training

Alberta

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Introduction

Apprenticeship and Industry Training (AIT) uses the curriculum guide to direct the developers of training plans. The curriculum guide is written to reflect and identify competence-based learning through competence and supporting competence statements. Although this model does provide more flexibility and responsiveness for the stakeholders, it also creates challenges to developers of lesson plans and assessment.

Purpose

The primary purpose of this document is to expand on competence and supporting compentence statements by identifying and providing outcome and objective statements that are associated with the supporting competence statement.

Outcome Statements

Outcome statements are an observable major task or work activity that an entry-level journeyperson performs for compensation.

Objective Statements

Objective statements are the knowledge or skill an apprentice learns or demonstrates while attending in-classroom instruction. They support achievement of the outcome statement by the apprentice.

Course Content Overview

The term **In Context** indicates that the supporting competence will become integrated learning and/or utilized as a component of the competence statement. It will **not** have an assigned weighting and will **not** be assessed as an examination item.

PERIOD ONE COURSE CONTENT

CORE COMPETENCE ONE: *Foundational Skills, Job Responsibilities, and Procedures*

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Apply foundational skills essential to convey and receive critical training and workplace information.	Apply legislation, regulations and practices ensuring safe work in the Roofer trade.	Manage an apprenticeship to earn journeyperson certification and Red Seal endorsement.	Select, use, and maintain hand and power tools.
	D	***E***	***F***
	Utilize roofing equipment.	Identify roof deck materials.	Describe roof deck loading procedures.

CORE COMPETENCE TWO: *Blueprints, Drawings and Calculations*

Competence Statement:	Supporting Competences:	
	A	***B***
Demonstrate knowledge, understanding and proficiency when interpreting blueprints, drawings and calculating mathematical problems.	Demonstrate numeracy.	Utilize and interpret blueprints and drawings.

CORE COMPETENCE THREE: *Steep Slope Roof Systems*

Competence Statement:	Supporting Competences:	
	A	***B***
Demonstrate knowledge, understanding and proficiency when installing steep slope roof systems.	Identify steep slope roof structures.	Install asphalt shingles.

CORE COMPETENCE FOUR: ***Low Slope Roof Systems***

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Demonstrate knowledge, understanding and proficiency when installing low slope roof systems.	Demonstrate torch safety.	Install modified bitumen roof systems.	Describe bur roof systems (Built Up Roofing).
	D	***E***	
	Identify low slope roofing structures.	Apply liquid membrane flashing.	

PERIOD TWO COURSE CONTENT

CORE COMPETENCE ONE: ***Foundational Skills, Job Responsibilities, and Procedures***

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Apply foundational skills essential to convey and receive critical training and workplace information.	Apply legislation, regulations and practices ensuring safe work in the Roofer trade.	Select, use, and maintain hand and power tools.	Utilize roofing equipment.
	In Context	***In Context***	***In Context***
	D	***E***	
	Identify roof deck materials.	Describe roof deck loading procedures.	
	In Context	***In Context***	

CORE COMPETENCE TWO: ***Blueprints, Drawings and Calculations***

Competence Statement:	Supporting Competences:	
	A	***B***
Demonstrate knowledge, understanding and proficiency when interpreting blueprints, drawings and calculating mathematical problems.	Demonstrate numeracy.	Interpret drawings and specifications.

CORE COMPETENCE THREE: ***Steep Slope Roof Systems***

Competence Statement:	Supporting Competences:	
	A	***B***
Demonstrate knowledge, understanding and proficiency when installing steep slope roof systems.	Install softwood shakes and shingles.	Install composite roofing.

CORE COMPETENCE FOUR: ***Low Slope Roof Systems***

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Demonstrate knowledge, understanding and proficiency when installing low slope roof systems.	Describe single ply tools and equipment. **In Context**	Install thermoset materials.	Install thermoplastic materials.

CORE COMPETENCE FIVE: ***Roof Assessment, Maintenance, and Repair***

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Demonstrate knowledge, understanding and proficiency when assessing, maintaining and repairing roofing systems.	Describe cause of steep slope roof failure.	Describe cause of low slope roof failure.	Perform re-roofing procedures.

PERIOD THREE COURSE CONTENT

CORE COMPETENCE ONE: ***Foundational Skills, Job Responsibilities, and Procedures***

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Apply foundational skills essential to convey and receive critical training and workplace information.	Apply legislation, regulations and practices ensuring safe work in the Roofer trade.	Manage an apprenticeship to earn journeyperson certification and Red Seal endorsement.	Select, use, and maintain hand and power tools. ***In Context***
	D	***E***	***F***
	Utilize roofing equipment.	Identify roof deck materials. ***In Context***	Describe roof deck loading procedures. ***In Context***
	G		
	Identify roofing crew dynamics.		

CORE COMPETENCE TWO: ***Blueprints, Drawings and Calculations***

Competence Statement:	Supporting Competences:	
	A	***B***
Demonstrate knowledge, understanding and proficiency when interpreting blueprints, drawings and calculating mathematical problems.	Perform steep slope material calculations.	Perform low slope material calculations.

CORE COMPETENCE THREE: *Steep Slope Roof Systems*

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency when installing steep slope roof systems.	**A** Describe concrete tile installation.	**B** Describe metal tile installation.	**C** Apply metal roofing.
	D Describe steep slope roof insulation requirements. ***In Context***	**E** Describe steep slope roof ventilation requirements.	**F** Identify steep slope roof drainage requirements. ***In context***
	G Describe photovoltaic roof materials. ***In Context***		

CORE COMPETENCE FOUR: *Low Slope Roof Systems*

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency when installing low slope roof systems.	**A** Describe low slope roof insulation requirements.	**B** Identify low slope roof ventilation requirements. ***In Context***	**C** Describe low slope roof drainage requirements.
	D Identify vapour retarders.	**E** Interpret wind uplift tables. ***In Context***	**F** Fabricate and install metal flashing and flanged accessories.

CORE COMPETENCE FIVE: *Waterproofing and Environmentally Sustainable Roof Systems*

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency when installing waterproofing and environmentally sustainable roof systems.	**A** Describe waterproofing/damp proofing materials.	**B** Describe sustainable roof systems.	Describe photovoltaic roof materials. ***In Context***

Period One
Course Content

(6 weeks – 180 hours)

Period One Core Competences	Weighting
Foundational Skills, Job Responsibilities, and Procedures	**22%**
Blueprints, Drawings and Calculations	**18%**
Steep Slope Roof Systems	**25%**
Low Slope Roof Systems	**35%**

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Weighting - 22%

A Roofer uses a comprehensive set of foundational skills and abilities that are crucial for understanding and executing their job responsibilities, as well as applying procedures to everyday activities. These skills are developed, practiced, and refined through a combination of personal and professional learning environments, making them essential tools in the learner's working portfolio.

These skills encompass technical knowledge, problem-solving abilities, and the capacity to make informed decisions, all of which contribute to job readiness. The development of these competencies ensures that learners can perform tasks efficiently and safely, adapt to new situations, and maintain high standards of work. The apprentice will also learn techniques used in the handling, loading and securing of materials.

These skills support the learner in exhibiting positive behaviors and effective communication, which are vital for teamwork and customer interactions. They also help in managing the demands and challenges of everyday life, fostering resilience and adaptability.

Throughout the apprenticeship education program, these supporting competencies are not only observed and studied but are also practiced in real-world settings. This hands-on experience is integral to reinforcing theoretical knowledge and ensuring that learners are fully prepared to enter the workforce as competent, job-ready professionals.

CS

Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Supporting Competence		Taxonomy	Weighting
1A.	Apply legislation, regulations and practices ensuring safe work in the roofer trade.	**I, II, III**	**56%**

Outcomes for this supporting competence include:

1A1. Apply legislation, regulations and practices ensuring safe work in this trade.

1. Demonstrate the application of the Occupational Health and Safety (OH&S) Act, Regulation and Code.
2. Describe the sponsor's and employee's role with 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 workers and sponsors to apply emergency procedures.
5. Describe tradesperson attitudes with respect to housekeeping, personal protective equipment (PPE) and emergency procedures.
6. Describe the roles and responsibilities of sponsors and employees with the selection and use of PPE.
7. Maintain required PPE for tasks.
8. Use required PPE for tasks.

1A2. Use industry standard practices for climbing, lifting, rigging and hoisting in Roofer trade.

1. Describe manual lifting procedures.
2. Maintain PPE for climbing, lifting and load moving equipment.
3. Use PPE for climbing, lifting and load moving equipment.

1A3. Apply industry standard practices for hazardous materials and fire protection in this trade

1. Describe roles, responsibilities, features and practices related to the WHMIS program.
2. Describe 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 hazards, classes, procedures, and equipment related to fire protection.

1B.	Manage an apprenticeship to earn journeyperson certification and Red Seal endorsement.	**I**	**2%**
1C.	Select, use, and maintain hand and power tools.	**I, II, III**	**16%**

Outcomes for this supporting competence include:

1C1. Demonstrate the ability to use and maintain roofing hand tools.

1. Demonstrate the ability to select and use various roofing hand tools for specific jobs.
2. Demonstrate the maintenance and storage of various roofing hand tools.

1C2. Demonstrate the ability to use and maintain roofing power tools.

1. Demonstrate the ability to select and use various roofing power tools for specific jobs.
2. Demonstrate the maintenance and storage of various roofing power tools.

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Supporting Competence	Taxonomy	Weighting
1D. Utilize roofing equipment.	**I, II, III**	**16%**

Outcomes for this supporting competence include:

1D1. Outline the use of on-deck roofing equipment.

1. Identify the types of on-deck roofing equipment and the safety requirements of each.
2. Describe the procedures used to operate various types of on-deck roofing equipment.
3. Explain the storage of on-deck roofing equipment.

1D2. Identify and demonstrate the use of hoisting equipment pertinent to the roofing industry.

1. Define the regulations required for hoisting and hoisting equipment as dictated by Alberta Workplace Health and Safety.
2. Describe rigging hardware and associated safety factors.
3. Select equipment for rigging loads.
4. Describe hoisting and load moving procedures.
5. Describe the various types of hoisting equipment used in roofing.
6. Demonstrate hand signals used for hoisting.
7. Describe the assembly and disassembly of roof hoists.

1D3. Describe the start up, use, and shut down of asphalt melting equipment.

1. Describe the use of asphalt melting equipment and asphalt pumps.
2. Describe the process used for the start-up of kettle operations.
3. List the procedures for handling and using hot products.
4. Describe the process used to shutdown asphalt melting equipment.

1E. Identify roof deck materials.	**I**	**7%**

Outcomes for this supporting competence include:

1E1. Identify the types of materials used for roof decks.

1. Describe the types of roof deck materials, such as:
   a) wood
   b) concrete
   c) steel
   d) stramit.
2. Identify procedures used to conduct a visual deck assessment prior to a new roof application for:
   a) wood decks
   b) steel decks
   c) concrete decks.
3. Describe deck preparation techniques prior to a roof replacement application for:
   a) wood decks
   b) steel decks
   c) concrete decks
   d) structural stramit.

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures			
Supporting Competence		**Taxonomy**	**Weighting**
1F.	Describe roof deck loading procedures.	**I**	**3%**
	Outcomes for this supporting competence include: ***1F1. Describe the various preparation and loading techniques used for roof decks.*** 1. Explain the procedures for loading materials and equipment onto a roof deck. 2. Identify the strong and weak areas of a roof deck in relation to roof loading. 3. Demonstrate the securing and protection of materials loaded onto a roof deck.		

Core Competence 2: Blueprints, Drawings and Calculations

Weighting – 18%

A Roofer frequently relies on drawings and specifications to complete projects. These documents provide a wealth of details, including clear instructions for the construction, maintenance, or repair of a project or its components, dimensions of individual or collective components, and lists of materials required for the project. These documents are crafted using a universal language understood by skilled trades professionals.

This section will focus on the fundamental principles required to comprehend drawings and specifications. Basic mathematical principles are instructed to prepare apprentices to calculate quantities of materials and labour.

CS

Demonstrate knowledge, understanding and proficiency when interpreting blueprints, drawings and calculating mathematical problems.

Core Competence 2: Blueprints, Drawings and Calculations

Supporting Competence		Taxonomy	Weighting
2A.	Demonstrate numeracy.	**II, III**	**50%**

Outcomes for this supporting competence include:

2A1. Solve mathematical problems using basic arithmetic.

1. Perform calculations using whole numbers.
2. Perform calculations using the metric system.
3. Perform calculations using the imperial system.

2A2. Solve mathematical problems using decimal numbers.

1. Perform calculations using decimals.

2A3. Solve mathematical problems using fractions.

1. Perform calculations using fractions.

2A4. Solve mathematical problems using ratios, proportions and percentages.

1. Perform calculations using percentages.
2. Perform calculations using ratios and proportions.

2B.	Utilize and interpret blueprints and drawings.	**I, II**	**50%**

Outcomes for this supporting competence include:

2B1. Understand the role of blueprints in the construction industry.

1. List the basic components of a set of working drawings.
2. Explain the relationship between blueprints and specifications.

2B2. Identify and interpret various drawing styles.

1. Identify and interpret orthographic drawings.
2. Identify the various types of lines used in blueprints.

2B3. Identify the symbols and abbreviations used in blueprints.

1. Identify symbols on a set of blueprints.
2. Decipher abbreviations on a set of blueprints.

Core Competence 3: Steep Slope Roof Systems

Weighting – 25%

Roofers install various types of materials on steep slope structures. These roofing systems can be made of asphalt, concrete, metal, softwood and composite materials. Roofers ensure that steep slope roofing systems are installed safely. The roofing system is installed to mitigate and prevent effects caused by thermal cycling.

In this period, the apprentice will learn the safety requirements for varying slopes, how to identify the types of steep slope structures, how to assess, plan and install asphalt shingle steep slope roofing system and will demonstrate knowledge in ensuring ventilation requirements are met.

CS

Demonstrate knowledge, understanding, and proficiency when installing steep slope roof systems.

Core Competence 3: Steep Slope Roof Systems

Supporting Competence		Taxonomy	Weighting
3A.	Identify steep slope roof structures.	**I, II**	**12%**

Outcomes for this supporting competence include:

3A1. Describe steep slope roof structures.

1. Describe construction features found on steep slope buildings in relation to terminology.
2. Identify various types of roof styles and shapes in steep slope designs.

3B.	Install asphalt shingles.	**I, II, III**	**88%**

Outcomes for this supporting competence include:

3B1. Describe asphalt shingle systems and installation techniques.

1. Describe various components of an asphalt shingle system, such as:
   a) eave and valley components
   b) underlayment
   c) flashings.
2. Describe the equipment used in the application of asphalt shingles.
3. Demonstrate the application process for asphalt shingles.

Core Competence 4: Low Slope Roof Systems

Weighting – 35%

Roofers install low slope materials and systems on various types of structures. These roofing systems can be made of Built Up Roofing (BUR), Styrene Butadiene Styrene (SBS), liquid membranes, thermoplastics and thermosets. Safety and fire prevention are critical aspects of installing low slope roofing systems. The roofing system is installed to mitigate and prevent effects caused by thermal cycling. Low slope roofing systems are installed to ensure adequate drainage.

This training period will focus on building expertise and knowledge in the installation of modified bitumen and BUR low slope roofing systems. The apprentice will learn to evaluate different low slope roofing materials, determine their suitability for specific applications and master the techniques for their proper installation. This knowledge is crucial for ensuring energy efficiency, safety, and durability in low slope roofing projects.

CS

Demonstrate knowledge, understanding, and proficiency when installing low slope roof systems.

Core Competence 4: Low Slope Roof Systems

Supporting Competence		Taxonomy	Weighting
4A.	Demonstrate torch safety.	I, II	10%

Outcomes for this supporting competence include:

4A1. Identify and demonstrate torch safety standards and practices as they pertain to the roofing industry.

1. Perform site hazard assessments.
2. Describe Torch Safety practices including Fire Risk Management.
3. Set-up and operate LPG torches.
4. Perform fire watch techniques and recording.

4B.	Install modified bitumen roof systems.	I, II, III	52%

Outcomes for this supporting competence include:

4B1. List and demonstrate the installation of various modified bitumen roof systems.

1. List the various components of modified bitumen systems, such as:
   a) asphalts and adhesives
   b) vapour retarders
   c) insulations and cover boards
   d) base sheets
   e) cap sheets
   f) cold-process applications.
2. Demonstrate the installation techniques for various modified bitumen systems.

4C.	Describe BUR roof systems (Built Up Roofing).	I, II, III	22%

Outcomes for this supporting competence include:

4C1. Explain the installation of various BUR roof systems.

1. Discuss the prevention of asphalt burns.
2. List the various components of BUR systems, such as:
   a) asphalts and adhesives
   b) vapour retarders
   c) insulations and cover boards
   d) organic and glass felts
   e) cold-process applications.
3. Describe application methods for the installation of BUR roof systems.
4. Describe various membrane flashings for BUR systems.
5. Explain membrane protection requirements.

4D.	Identify low slope roofing structures.	I, III	8%

Outcomes for this supporting competence include:

4D1. Describe low slope roof structures.

1. Define construction features found on low slope roof systems in relation to terminology.
2. Identify various types of roof styles and shapes in low slope designs.

Core Competence 4: Low Slope Roof Systems

Supporting Competence		Taxonomy	Weighting
4E.	Apply liquid membrane flashing.	**I**	**8%**

Outcomes for this supporting competence include:

4E1. Describe the types and use of liquid membrane flashing.

1. Identify the types of liquid membrane flashing.
2. Describe safe practices for working with liquid membrane flashing.
3. Describe the uses for liquid membrane flashing.
4. Apply liquid membrane flashing.

Period Two
Course Content

(6 weeks – 180 hours)

Period Two Core Competences	Weighting
Foundational Skills, Job Responsibilities and Procedures	**In context**
Blueprints, Drawings and Calculations	**25%**
Steep Slope Roof Systems	**15%**
Low Slope Roof Systems	**40%**
Roof Assessment, Maintenance and Repair	**20%**

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Weighting – In Context

A Roofer uses a comprehensive set of foundational skills and abilities that are crucial for understanding and executing their job responsibilities, as well as applying procedures to everyday activities. These skills are developed, practiced, and refined through a combination of personal and professional learning environments, making them essential tools in the learner's working portfolio.

These skills encompass technical knowledge, problem-solving abilities, and the capacity to make informed decisions, all of which contribute to job readiness. The development of these competencies ensures that learners can perform tasks efficiently and safely, adapt to new situations, and maintain high standards of work. The apprentice will also learn techniques used in the handling, loading and securing of materials.

These skills support the learner in exhibiting positive behaviors and effective communication, which are vital for teamwork and customer interactions. They also help in managing the demands and challenges of everyday life, fostering resilience and adaptability.

Throughout the apprenticeship education program, these supporting competencies are not only observed and studied but are also practiced in real-world settings. This hands-on experience is integral to reinforcing theoretical knowledge and ensuring that learners are fully prepared to enter the workforce as competent, job-ready professionals.

CS

Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Supporting Competence		Taxonomy	Weighting
1A.	Apply legislation, regulations and practices ensuring safe work in the Roofer trade.		**In Context**
1B.	Select, use, and maintain hand and power tools.		**In Context**
1C.	Utilize roofing equipment.		**In Context**
1D.	Identify roof deck materials.		**In Context**
1E.	Describe roof deck loading procedures.		**In Context**

Core Competence 2: Blueprints, Drawings and Calculations

Weighting – 25%

A Roofer frequently relies on drawings and specifications to complete projects. These documents provide a wealth of details, including clear instructions for the construction, maintenance, or repair of a project or its components, dimensions of individual or collective components, and lists of materials required for the project. These documents are crafted using a universal language understood by skilled trades professionals.

This section will focus on intermediate principles regarding the interpretation of drawings and specifications. Mathematical principles are instructed to prepare apprentices to calculate roof slopes, areas, and perimeters.

CS

Demonstrate knowledge, understanding and proficiency when interpreting blueprints and drawings and calculating mathematical problems.

Core Competence 2: Blueprints, Drawings and Calculations

Supporting Competence		Taxonomy	Weighting
2A.	Demonstrate numeracy.	**III**	**60%**

Outcomes for this supporting competence include:

2A1. Calculate trade related problems using the Pythagorean theory and square roots.

1. Solve geometrical problems using the Pythagorean theory.
2. Solve geometrical problems using the square root formula.

2A2. Calculate trade related problems using perimeter and area for geometrical trade related problems.

1. Perform calculations using perimeter formulas on geometric shapes.
2. Perform calculations using area formulas on geometric shapes.

2A3. Calculate trade related problems for various roof slopes.

1. Perform calculations to determine the roof slope of steep slope roofs.
2. Perform calculations to determine the roof slope of low slope roofs.

2B.	Interpret drawings and specifications.	**I, II**	**40%**

Outcomes for this supporting competence include:

2B1. Demonstrate the ability to collect roofing related information from blueprints.

1. Demonstrate the ability to gather roofing information from working blueprints.
2. Demonstrate the ability to read and interpret specifications.

2B2. Demonstrate the ability to scale and draw various roofing details.

1. Read scale rulers using imperial and metric dimensions.
2. Demonstrate the ability to scale drawings and details.
3. Demonstrate the ability to sketch roofing details.

Core Competence 3: Steep Slope Roof Systems

Weighting – 15%

Roofers install various types of materials on steep slope structures. These roofing systems can be made of asphalt, concrete, metal, softwood and composite materials. Roofers ensure that steep slope roofing systems are installed safely. The roofing system is installed to mitigate and prevent effects caused by thermal cycling.

In this period, the apprentice will learn the safety requirements for varying slope structures, how to identify the types of steep slope structures and how to assess, plan and install softwood and composite steep slope roofing systems. The apprentice will gain knowledge that ensures ventilation requirements are met.

CS

Demonstrate knowledge, understanding, and proficiency when installing steep slope roof systems.

Core Competence 3: Steep Slope Roof Systems

Supporting Competence		Taxonomy	Weighting
3A.	Install softwood shakes and shingles.	**I, II**	**50%**

Outcomes for this supporting competence include:

3A1. Describe the types of softwood shingles and installation techniques.

1. Identify the types and grades of softwood shingles.
2. Describe installation techniques including underlayment and flashing requirements.

3A2. Describe the types of softwood shakes and installation techniques.

1. Identify the types and grades of softwood shakes.
2. Demonstrate the process used to remove existing roofing.
3. Describe installation techniques including underlayment and flashing requirements.
4. Demonstrate the methodused to apply softwood shakes on steep roofs.

3B.	Install composite roofing.	**I, II**	**50%**

Outcomes for this supporting competence include:

3B1. Describe the types of composite roofing and installation techniques.

1. Identify the types and grades of composite roofing.
2. Demonstrate the process used to remove existing roofing.
3. Describe installation techniques including underlayment and flashing requirements.
4. Demonstrate the methodused to apply composite roofing on steep roofs.

Core Competence 4: Low Slope Roof Systems

Weighting - 40%

Roofers install low slope materials and systems on various types of structures. These roofing systems can be made of BUR, SBS, liquid membranes, thermoplastics and thermosets. Safety and fire prevention are critical aspects of installing low slope roofing systems. The roofing system is installed to mitigate and prevent effects caused by thermal cycling. Low slope roofing systems are installed to ensure adequate drainage.

This training period will focus on building expertise and knowledge in the installation of thermoset and thermoplastic low slope roofing systems. The apprentice will learn to evaluate different low slope roofing materials, determine their suitability for specific applications and master the techniques for their proper installation. This knowledge is crucial for ensuring energy efficiency, safety, and durability in low slope roofing projects.

CS

Demonstrate knowledge, understanding, and proficiency when installing low slope roof systems.

Core Competence 4: Low Slope Roof Systems

Supporting Competence		Taxonomy	Weighting
4A.	Describe single ply tools and equipment.		**In Context**
4B.	Install thermoset materials.	**I, II, III**	**47%**
	Outcomes for this supporting competence include: ***4B1. Identify the materials and demonstrate the installation processes for thermoset single ply roof systems.*** 1. Describe and demonstrate the installation process of thermoset membranes. a) Ethylene Propylene Diene Monomer (EPDM) 2. Identify the various tools and equipment used in thermoset roofing. 3. Describe the purpose and operation of various thermoset tools and equipment. 4. Describe the maintenance and storage of thermoset tools and equipment.		
4C.	Install thermoplastic materials.	**I, II, III**	**53%**
	Outcomes for this supporting competence include: ***4C1. Identify the materials and demonstrate the installation processes for thermoplastic single ply roof systems.*** 1. Describe and demonstrate the installation process of thermoplastic membranes. a) PVC b) Thermoplastic Polyolefin (TPO) 2. Identify the various tools and equipment used in thermoplastic roofing. 3. Describe the purpose and operation of various thermoplastic tools and equipment. 4. Describe the maintenance and storage of thermoplastic tools and equipment.		

Core Competence 5: Roof Assessment, Maintenance and Repair

Weighting – 20%

Roofers are required to inspect and assess low slope and steep slope roofing systems for various defects, failures and required repairs. The roofer will learn the importance of preventative maintenance and leak detection procedures.

In this period the apprentice will learn to evaluate the different types of repair and re-roofing procedures and requirements. The apprentice will obtain knowledge regarding roof maintenance, leak detection and roof assessments.

CS	Demonstrate knowledge, understanding, and proficiency when assessing, maintaining, and repairing roofing systems.

Core Competence 5: Roof Assessment, Maintenance and Repair

Supporting Competence		Taxonomy	Weighting
5A.	Describe cause of steep slope roof failure.	**III**	**27%**

Outcomes for this supporting competence include:

5A1. Describe the causes and effects of roof failures and the repair techniques used.

1. Discuss examples of roof failures.
2. Explain various roof defects and deficiencies.
3. Describe methods used to repair roof defects and deficiencies.

5A2. Identify detection processes and probable causes of roof leaks.

1. Describe the process used to identify the source of a roof leak.
2. Explain condensation leaks.
3. Discuss potential sources of water ingress.

5A3. Explain the importance of regular roof maintenance to address normal wear.

1. Discuss various environmental conditions and their adverse effect on roofs.
2. Discuss the importance of preventative roof maintenance.
3. Discuss the elements of a roof evaluation.

Supporting Competence		Taxonomy	Weighting
5B.	Describe cause of low slope roof failure.	**III**	**62%**

Outcomes for this supporting competence include:

5B1. Describe the causes and effects of roof failures and the repair techniques used.

1. Discuss examples of roof failures.
2. Explain various roof defects and deficiencies.
3. Describe methods used to repair roof defects and deficiencies.

5B2. Identify detection processes and probable causes of roof leaks.

1. Describe the process used to identify the source of a roof leak.
2. Explain condensation leaks.
3. Discuss potential sources of water ingress.

5B3. Explain the importance of regular roof maintenance to address normal wear.

1. Discuss various environmental conditions and their adverse effect on roofs.
2. Discuss the importance of preventative roof maintenance.
3. Discuss the elements of a roof evaluation.

Core Competence 5: Roof Assessment, Maintenance and Repair

Supporting Competence		Taxonomy	Weighting
5C.	Describe re-roofing procedures.	**I, II, III**	**11%**

Outcomes for this supporting competence include:

5C1. Explain the steps taken to perform a re-roof.

1. Describe the demolition process to re-roof a building.
2. Describe the methods used to seal and maintain the integrity of a roof during re-roofing.
3. Describe the techniques used to cover open areas of roofs during sudden weather shifts.
4. Explain the potential safety issues specific to re-roofing projects.

Period Three
Course Content

(6 weeks – 180 hours)

Period Three Core Competences	Weighting
Foundational Skills, Job Responsibilities, and Procedures	**10%**
Blueprints, Drawings and Calculations	**21%**
Steep Slope Roof Systems	**37%**
Low Slope Roof Systems	**17%**
Waterproofing/Environmentally Sustainable Roof Systems	**15%**

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Weighting – 10%

A Roofer uses a comprehensive set of foundational skills and abilities that are crucial for understanding and executing their job responsibilities, as well as applying procedures to everyday activities. These skills are developed, practiced, and refined through a combination of personal and professional learning environments, making them essential tools in the learner's working portfolio.

These skills encompass technical knowledge, problem-solving abilities, and the capacity to make informed decisions, all of which contribute to job readiness. The development of these competencies ensures that learners can perform tasks efficiently and safely, adapt to new situations, and maintain high standards of work. The apprentice will also learn techniques used in the handling, loading and securing of materials.

These skills support the learner in exhibiting positive behaviors and effective communication, which are vital for teamwork and customer interactions. They also help in managing the demands and challenges of everyday life, fostering resilience and adaptability.

Throughout the apprenticeship education program, these supporting competencies are not only observed and studied but are also practiced in real-world settings. This hands-on experience is integral to reinforcing theoretical knowledge and ensuring that learners are fully prepared to enter the workforce as competent, job-ready professionals.

CS	Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Supporting Competence		Taxonomy	Weighting
1A.	Apply legislation, regulations and practices ensuring safe work in the Roofer trade.	I	10%

Outcomes for this supporting competence include:

1A1. Describe the minimum standards set by Roofer trade associations.

1. Identify the need for minimum roofing standards as required by the Alberta Roofing Contractors Association (ARCA) and the Alberta Allied Roofing Association (AARA).
2. Outline the conditions of guarantee offered by the Alberta Roofing Contractors Association (ARCA) and the Canadian Roofing Contractors Association (CRCA).
3. Discuss the roles and responsibilities of roof consultants.

1B.	Manage an apprenticeship to earn journeyperson certification and Red Seal endorsement.	I	39%

Outcomes for this supporting competence include:

1B1. Use coaching skills when training an apprentice.

1. Describe the process for coaching an apprentice.

1B2. Use Red Seal products to challenge an Interprovincial examination.

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

1C.	Select, use, and maintain hand and power tools.		In Context
1D.	Utilize roofing equipment.	I, II	33%

Outcomes for this supporting competence include:

1D1. Describe and perform maintenance tasks for motorized roofing equipment.

1. Perform required safety inspections.
2. Discuss routine on-deck maintenance.
3. Describe troubleshooting methods used.
4. Demonstrate maintenance techniques used.
5. Describe and demonstrate techniques used to troubleshoot and maintain small engines.

1D2. Describe and perform maintenance tasks for hoisting equipment.

1. Perform the required safety inspections.
2. Discuss routine on-deck maintenance.
3. Describe troubleshooting methods used.
4. Demonstrate maintenance techniques used.

1E.	Identify roof deck materials.		In Context

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Supporting Competence		Taxonomy	Weighting
1F.	Describe roof deck loading procedures.		**In Context**
1G.	Describe roofing crew dynamics.	**I**	**18%**

Outcomes for this supporting competence include:

1G1. Apply trade related Occupational Health and Safety regulations and safe work practices in the workplace.

1. Describe the potential injuries that could result from roofing work site hazards, such as:
   a) strains and sprains
   b) lacerations
   c) heat exhaustion
   d) sun stroke
   e) frost bite
   f) burns.

1G2. Understand the responsibilities of various members of a roofing crew.

1. Describe the various members of a roofing crew; both direct and indirect.
2. Discuss effective and efficient use of materials and labour for a roofing crew.

Core Competence 2: Blueprints, Drawings and Calculations

Weighting – 21%

A Roofer frequently relies on drawings and specifications to complete projects. These documents provide a wealth of details, including clear instructions for the construction, maintenance, or repair of a project or its components, dimensions of individual or collective components, and lists of materials required for the project. These documents are crafted using a universal language understood by skilled trades professionals.

This section will focus on mathematical principles required to calculate the materials for a steep slope or low slope roofing system. The apprentice will learn to interpret specifications and blueprints to identify the types and quantities of materials.

CS

Demonstrate knowledge, understanding and proficiency when interpreting blueprints and drawings and calculating mathematical problems.

Core Competence 2: Blueprints, Drawings and Calculations

Supporting Competence		Taxonomy	Weighting
2A.	Perform steep slope material calculations.	**III**	**50%**

Outcomes for this supporting competence include:

2A1. Calculate materials for various steep slope roof styles.

1. Determine the types of materials required for steep slope roofs.
2. Calculate material amounts on steep slope roofs.
3. Calculate flashing amounts on steep slope roofs.

2B.	Perform low slope material calculations.	**III**	**50%**

Outcomes for this supporting competence include:

2B1. Calculate materials for various low slope roof styles.

1. Determine the types of materials required for low slope roofs.
2. Calculate material amounts on low slope roofs.
3. Calculate flashing amounts on low slope roofs.

Core Competence 3: Steep Slope Roof Systems

Weighting – 37%

Roofers install various types of materials on steep slope structures. These roofing systems can be made of asphalt, concrete, metal, softwood and composite materials. Roofers ensure that steep slope roofing systems are installed safely. The roofing system is installed to mitigate and prevent effects caused by thermal cycling.

In this period, the apprentice will learn about the installation requirements and techniques for slate, concrete, clay, metal and composite tiles, and metal roofing systems. The apprentice will obtain knowledge that ensures ventilation and wind uplift requirements are met.

Demonstrate knowledge, understanding, and proficiency when installing steep slope roof systems.

Core Competence 3: Steep Slope Roof Systems

Supporting Competence		Taxonomy	Weighting
3A.	Describe concrete tile installation.	**I**	**12%**
	Outcomes for this supporting competence include: ***3A1. Outline the types of concrete tile and the application procedures.*** 1. List the types of concrete tile. 2. Describe the application techniques and requirements for concrete tile. 3. Describe the tools and equipment used for installation.		
3B.	Describe metal tile installation.	**I, III**	**13%**
	Outcomes for this supporting competence include: ***3B1. Outline the types of metal tile and the application procedures.*** 1. List the types of metal tile. 2. Describe the application techniques and requirements for metal tile. 3. Describe the tools and equipment used for installation.		
3C.	Apply metal roofing.	**I, II**	**53%**
	Outcomes for this supporting competence include: ***3C1. Describe the types of metal roofing and demonstrate the installation techniques.*** 1. List the types of metal roofs. 2. Explain the application techniques and requirements for metal roofs. 3. Identify the use of tools and equipment for installation. 4. Demonstrate application techniques for various metal roof systems.		
3D.	Describe steep slope roof insulation requirements.		**In Context**
3E.	Describe steep slope roof ventilation requirements.	**I, II, III**	**22%**
	Outcomes for this supporting competence include: ***3E1. Identify the different types and functions of ventilation systems.*** 1. Describe the importance of ventilation for roof systems. 2. Describe the different types of ventilation systems. 3. Determine the correct amount of ventilation required for various roof systems. 4. Explain the differences in venting for low slope and steep slope roofs.		
3F.	Identify steep slope roof drainage requirements.		**In Context**
3G.	Describe photovoltaic roof materials.		**In Context**

Core Competence 4: Low Slope Roof Systems

Weighting - 17%

Roofers install low slope materials and systems on various types of structures. These roofing systems can be made of BUR, SBS, liquid membranes, thermoplastics and thermosets. Safety and fire prevention are critical aspects of installing low slope roofing systems. The roofing system is installed to mitigate and prevent effects caused by thermal cycling. Low slope roofing systems are installed to ensure adequate drainage.

This training period will focus on building expertise and knowledge in the insulation and drainage requirements for low slope roofing systems. The apprentice will learn the methods and techniques used to lay out and fabricate metal flashings and flanged accessories. The apprentice will learn how to calculate Resistance (R) values for various roofing systems.

CS

Demonstrate knowledge, understanding, and proficiency when installing low slope roof systems.

Core Competence 4: Low Slope Roof Systems

Supporting Competence		Taxonomy	Weighting
4A.	Describe low slope roof insulation requirements.	**I, III**	**40%**
	Outcomes for this supporting competence include: ***4A1. Identify the different types and functions of roof insulations.*** 1. Describe the chemical classifications of roof insulations. 2. Describe the advantages and disadvantages of various types of insulation. 3. Identify the R value of various insulations. 4. Describe the application methods for the installation of roof insulations.		
4B.	Describe low slope roof ventilation requirements.		**In Context**
4C.	Identify Low Slope Roof Drainage Requirements.	**I**	**9%**
	Outcomes for this supporting competence include: ***4C1. Identify the various types and functions of roof drainage systems.*** 1. Explain the differences between interior and exterior drainage systems. 2. Describe the types of roof drainage systems.		

Core Competence 4: Low Slope Roof Systems

Supporting Competence		Taxonomy	Weighting
4D.	Identify vapour retarders.		**25%**
	Outcomes for this supporting competence include: ***4D1. Identify the different types and functions of vapour retarders.*** 1. Describe classifications of vapour retarders. 2. Describe the differences between a vapour retarder, vapour barrier and an air barrier. 3. Discuss the types of vapour retarder, vapour barrier and air barrier materials. 4. Discuss compatibility and continuity with the various building envelope systems.		
4E.	Interpret wind uplift tables.		**In Context**
4F.	Fabricate and install metal flashing and flanged accessories.	**I, II**	**26%**
	Outcomes for this supporting competence include: ***4F1. Demonstrate the ability to fabricate and install metal flashings.*** 1. Describe and operate metal flashing fabrication equipment. 2. Demonstrate the ability to layout and fabricate metal flashings. 3. Demonstrate the ability to install metal flashings. ***4F2. Demonstrate the fabrication of different types of flanged accessories.*** 1. List the various types of metals used for flanged accessories. 2. Demonstrate the ability to layout and fabricate flanged accessories.		

Core Competence 5: Waterproofing / Environmentally Sustainable Roof Systems

Weighting - 15%

A roofer is required to demonstrate knowledge regarding the differences between waterproofing and damp proofing applications. Roofers are required to be aware of safety requirements when working in confined or below grade spaces. Depending on local building codes, roof systems may be installed to incorporate environmentally sustainable systems. Roofers will be required to demonstrate knowledge regarding the installation of sustainable roofing systems.

This training period will focus on the materials and methods used in the waterproofing and damp proofing processes. The apprentice will learn about the types of materials and methods used in sustainable roofing systems.

CS	Demonstrate knowledge, understanding, and proficiency when installing waterproofing/environmentally sustainable roof systems.

Core Competence 5: Waterproofing / Environmentally Sustainable Roof Systems

Supporting Competence		Taxonomy	Weighting
5A.	Describe waterproofing / damp proofing materials.	**I**	**58%**
	Outcomes for this supporting competence include: ***5A1. Describe the materials and methods used in waterproofing and damp-proofing.*** 1. Define waterproofing and damp-proofing. 2. Discuss the types of materials used in waterproofing. 3. Discuss the types of materials used in damp-proofing. 4. Describe the application methods used in waterproofing and damp-proofing. 5. Outline the special safety requirements for working below grade or in a confined space.		
5B.	Describe sustainable roof systems.	**I**	**42%**
	Outcomes for this supporting competence include: ***5B1. Identify the types of materials and methods used for sustainable roofing.*** 1. Explain the construction of garden roof systems including the advantages and disadvantages. 2. Describe the components (layers and sequence) and the special structural requirements of a garden roof system. 3. Discuss roofing and the urban heat island effect including bright membranes, solar reflectivity and emissivity.		
5C.	Describe photovoltaic roof materials.		**In Context**

Taxonomy verb list

This is a list of commons verbs used to demonstrate the level and/or complexity of a given taxonomy. It is only intended as a guide and is not meant to exclude additional verbs.

Taxonomy I *(Recall It)*

Verb	
Identify	List
Describe	Define
Explain	Recognize

Taxonomy II *(Do It)*

Verb	
Apply	Prepare
Sketch	Layout
Draw	Use
Interpret	Calibrate
Calculate	Analyze
Perform	Design
Install	Inspect

Taxonomy III *(Know It)*

Verb	
Demonstrate	Use
Operate	Build
Maintain	Construct
Commission	Fabricate
Service	Troubleshoot
Repair	

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