Insulator (Heat and Frost)
Level 1

Rev. December 2018

Apprenticeship Manitoba

Insulator (Heat and Frost)

Unit: A1 Learning About Work

Level: One

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

One sign that an apprentice has become competent in a task or technique is to be asked to share this knowledge. Jobsite skills-exchange has long been fundamental to trade-learning. Even trade veterans rely on peers to refine their knowledge and skill. The opportunity to benefit from this process, however, is shaped by complex factors that include jobsite 'politics' and industrial/construction deadlines. As adult trade-learners, apprentices at all levels of training must use their observational, listening and interpersonal skills to benefit from the JP's knowledge and experience. This requires understanding the trade's dynamics, as well as the roles and responsibilities which order workplace/jobsite work-life.

This unit profiles the trade's structure and scope as determined by the Apprenticeship and Certification Act, regulations, Provincial Advisory Committees and the Red Seal Occupational Standard from which the training standards are derived (core tasks and skill requirements), as well as its job-ladders and long-term career options and social competencies. This includes information about major areas of working knowledge, activities and interactions at work, and expansive and restrictive workplaces, stressing their application to apprenticeship on-the-job training.

A sound grasp of the roles, workplace relationships, and possibilities introduced in this unit are part of 'learning to learn' in Manitoba's apprenticeship system. Senior apprentices are later offered information about learning to *teach* in this system – a central and time-honored foundation of Trades journeywork.

Note: No percentage-weightings for test purposes are prescribed for this unit's objectives. Instead, a 'Pass/Fail" grade will be recorded for the unit in its entirety.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Describe structure and scope of the Insulator (Heat and Frost) trade.	**n/a**

a. The Apprenticeship and Certification Act
- Apprenticeship and Certification Board and Provincial Advisory Committees
- General and specific trade regulation
- Policies regarding attendance, evaluation procedures, conduct and progression requirements (Apprenticeship Manitoba, Training provider)

b. Uses of the Red Seal Occupational Standard (RSOS)
- Technical training in-school curriculum
- On-the-job record book of hours (Manitoba blue book)
- Logbook of on-the-job task competencies
- Examinations (level placement tests, final certification examinations)

c. Opportunities and future career options
- Generalists and specialists. The move toward specialization is well known to

modern tradespeople. Some prefer to specialize and others want to do it all. Supervisory positions require a broad scope.

- Lead hands and other immediate supervisors. Apprentices need to know how to become a lead-hand as much as they need to know the benefits and pit-falls of leadership between management and shop floor workers.
- Geographic mobility. What does it mean to a construction/industrial worker to have to travel to find work? Are there more opportunities if they do? What are they? What are the draw-backs to being away from home for several weeks at a time?
- Job hierarchies and innovations. What trade specific special training opportunities are available in your trade? Is there travel involved? Is there an opportunity to move up the ladder on a work crew as opposed to staying in the shop?

2. Describe two levels of workplace competency. **n/a**

a. Job competencies related to workplace culture
   - Knowledge of workplace equipment and materials
   - Skills and techniques

b. Social competencies related to workplace culture
   - Frame of reference for evaluation workplace events
   - Language of work
   - Workplace belief systems
   - Rules and meanings
   - Multiculturalism and equity in the workplace

3. Describe accommodation for apprentices with disabilities. **n/a**

a. Technical training
   - Requirements
   - 1 Roles and responsibilities
   - 2 Services and information required by persons with disabilities

b. On-the-job
   - Requirements
   - 3 Roles and responsibilities
   - 4 Services and information required by persons with disabilities

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Apprenticeship Manitoba

Insulator (Heat and Frost)

Unit: A2 Trade Safety Awareness

Level: One

Duration: 14 hours

Theory: 14 hours

Practical: 0 hours

Overview:

Safe working procedures and conditions, injury prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers, and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to incidents or injury. It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe, and accident-free working environment. It is imperative to apply and be familiar with the Workplace Safety and Health Act and Regulations. As well, it's essential to determine workplace hazards and take measures to protect oneself, co-workers, the public, and the environment. Safety education is an integral part of trade apprenticeship training both in school and on-the-job. Unit content is supplemented throughout Technical Training by trade-specific information about trade safety hazards and precautions presented in the appropriate contexts of discussion and study.

Note: No percentage-weightings for test purposes are prescribed for this unit's objectives. Instead, a 'Pass/Fail" grade will be recorded for the unit in its entirety.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Identify safety and health requirements.	**n/a**
a. Overview of The Workplace Safety and Health Act ("the Act") • Rights and responsibilities of employees under the Act • Rights and responsibilities of employers under the Act • Rights and responsibilities of supervisors under the Act b. Fourteen (14) regulations c. Codes of practice d. Guidelines e. Right to refuse • Explanation of right to refuse process • Rights and responsibilities of employees • Rights and responsibilities of employers • Rights and responsibilities of supervisors under the Act	
2. Identify personal protective equipment (PPE) and procedures.	**n/a**
a. Employer and employee responsibilities as related to personal protective equipment. b. Standards: Canadian Standards Association (CSA), American National Standards Institute (ANSI) and guidelines c. Work protective clothing and danger if it fits poorly.	

d. Gloves – Importance of proper glove selection (when handling chemicals, cold items, slivers, etc.)
e. Headwear – appropriate protective headwear when required and the approved type of headwear.
f. Eye protection – comparison and distinction of everyday eyeglasses, industrial safety glasses and safety goggles
g. Foot protection – when required according to safety standards
h. Hearing protection
   - Hazards of various noise levels (hearing protection must be worn)
   - Laws
   - Types of hearing protection
i. Respiratory protection – types, overview of proper selection
j. Fall protection – Manitoba requirements standards guidelines
   - ANSI (U.S.A. standards), etc.
k. Ladders and scaffolding
l. Safety principles for working with or around industrial trucks site-specific (forklifts, pallet trucks, etc.)

3. Identify electrical safety. **n/a**

a. Effects of electric current on the human body
b. Three factors that affect the severity of an electric shock
c. The effects of arc and blast on the human body and equipment
d. Work with energized equipment

4. Identify fire safety. **n/a**

a. Types of fires
b. Types of firefighting equipment
c. Classifications of fire extinguishers (A, B and C)
d. Location of fire extinguishers and fire exits
e. Fire alarms and drills

5. Identify ergonomics. **n/a**

a. Definition of ergonomics and conditions that may affect the body
   - Working postures
   - Repetition
   - Force
   - Lifting (simple safety procedures and precautions related to material handling procedures on how to lift carry and put down a load)
   - Tools
   - Identify tool and safety equipment
   - Causes of hand tool accidents
   - Equipment

6. Hazard recognition and control. **n/a**

a. Safe work practices
b. Basic risk assessment
c. Injury prevention and control measures
d. Identification of hazards involved in pneumatic tool use and explanation of how to guard against them

7. Hazard of confined space entry: **n/a**

a. Identification of a confined space
b. Hazards of a confined space
   - Physical
   - Biological

c. Working in a confined space
d. Emergency response plan
e. Self contained breathing apparatus (SCBA)

8. Identify First Aid/CPR: **n/a**

a. Overview of First Aid Regulation
b. Obligations of employers regarding First Aid
   - Who is certified to provide First Aid?
   - What to do while waiting for help?
   - Where is First Aid kit?
c. Describe basic First Aid requirements and techniques
   - Scope and limits of First Aid intervention
   - Specific interventions (cuts, burns, abrasions, fractures, suffocation, shock, electrical shock, etc.)
   - What is it?
   - Interface with other services and agencies (e.g. Workers Compensation claims)
d. Describe basic Cardiopulmonary Resuscitation (CPR) requirements and techniques
   - How do you get certified?
   - Scope and limits of CPR intervention (include varieties of CPR certification)

9. Identify the safety requirements as they apply to WHMIS with emphasis on: **n/a**

a. WHMIS is a system
b. Provincial Regulation under The Workplace Safety and Health Act
   - Each province has a WHMIS regulation
c. Federal Hazardous Products Act
d. WHMIS generic training:
   - WHMIS defined and the format used to convey information about hazardous materials in the workplace
   - Information found on supplier and workplace labeling using WHMIS
   - Hazardous materials in accordance with WHMIS
   - Compliance with government safety standards and regulations
e. Description of WHMIS (include varieties of WHMIS Certification)
   - Typology of WHMIS labels, symbols, and classifications
   - Scope and use of Materials Safety Data Sheets (MSDS)

10. Identifying and controlling hazards: **n/a**

a. Basic control measures (injury prevention)
b. Safe work procedures
c. Explanation on the importance of industrial housekeeping
d. Employer responsibilities
e. How and where to store materials
f. Safety measures related to walkways, stairs and floor openings
g. Explanation of how to protect the worker and others when working in traffic paths

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Apprenticeship Manitoba

Insulator (Heat and Frost)

Unit: A3 Computer and Communication Skills

Level: One

Duration: 14 hours

Theory: 7 hours

Practical: 7 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about computers and communication skills. The unit includes coverage of the importance of the customer and effective techniques for addressing customer complaints. Part of the unit covers trade related documents and general organization skills. Finally, the unit covers trade related computer skills.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Describe the communication skills/modes used in the workplace.	**10%**
a. Verbal communications • Face to face contact • Telephone • Group environment b. Written communications • Letters and memos • Fax • Email	
2. Describe the importance of the customer.	**10%**
a. Costs and benefits of retaining a customer b. Costs and benefits of gaining new customers c. Value of repeat business d. Techniques for recovering 'lost' customers	
3. Describe effective techniques for addressing customer complaints.	**10%**
a. Written complaints b. Difficult situations with customers • Angry customers • Impatient customers • Indecisive customers • Other situations	
4. Describe techniques for maintaining good communications in the workplace.	**10%**
a. Internal communications • Support staff • Fellow staff (colleagues)	

- Supervisors
- Management

b. External communications
- Tradespersons
- Retail customers
- Wholesale customers
- Suppliers
- Authorities (inspectors, general contractors)

5. Describe general organization and basic reading strategies for trade-related documents. **10%**

a. Service bulletins
b. Tech bulletins
c. Service manuals
d. Other publications
e. Computer-based resources
f. Online resources

6. Create trade-related documents using proper writing techniques. **20%**

a. Prepare a business email
b. Define technical terms using expansion techniques
c. Write instructions to inform readers
d. Project planning

7. Demonstrate trade-related computer skills as specified by instructor. **30%**

a. Office application programs
- Word processor (e.g. Microsoft Word)
- Spreadsheet (e.g. Microsoft Excel)
- Presentation software (e.g. Microsoft PowerPoint)

b. Internet searching skills for trade-related research
- Search engines via Universal Resource Locator (URL) addresses
- Key word search
- Filtering results

c. Using email for work related communications
- Public email service
- Email addresses
- Sending and replying to email
- Adding attachments to email (text, documents, graphs)
- Email website links

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Apprenticeship Manitoba

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Unit: A4 Tools and Equipment

Level: One

Duration: 21 hours

Theory: 21 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about tools and equipment. The unit begins with coverage of measuring, layout and hand tools. Part of the unit covers power and fastening tools, and portable welding machines. Finally, the unit covers sheet metal tools and equipment.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Describe measuring and layout tools. a. Types of measuring tools b. Types of layout tools • Procedures for use • Maintenance	**5%**
2. Describe hand tools. a. Types of cutting tools • Knives • Saws • Scissors • Snips and end nippers b. Types of brushes and rollers c. Types of trowels d. Procedures for use e. Maintenance	**30%**
3. Describe power tools. a. Types of power tools • Drills • Electric shears b. Procedures for use c. Maintenance	**5%**
4. Describe portable welding machines. a. Capacitor discharge b. Arc discharge c. Procedures for use d. Maintenance	**15%**

5. Describe fastening tools. **15%**

a. Types
   - Banders
   - Crimpers
   - Staple guns
   - Seals

b. Procedures for use

c. Maintenance

6. Describe sheet metal tools and equipment. **30%**

a. Types
   - Shears
   - Metal breaks
   - Combination machines
   - Easy edgers
   - Pittsburgh
   - Slip rollers

b. Procedures for use

c. Maintenance

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Apprenticeship Manitoba

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Unit: A5 Routine Trade Practices I

Level: One

Duration: 49 hours

Theory: 49 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with introductory knowledge about routine trade practices. The unit begins with coverage of organizing work, piping installation procedures and types of insulation materials. Part of the unit covers insulation procedures for plumbing and mechanical systems; cladding, jacketing and finishes; and application aids. Finally, the unit covers layouts and a review of trade-related math concepts.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Describe procedures in organizing work. a. Task scheduling b. Organizing materials on site	**5%**
2. Describe piping installation procedures. a. Piping compositions b. Piping fittings c. Piping supports d. Substrate preparation	**5%**
3. Describe types of insulation materials. a. Fibrous b. Cellular c. Granular d. Cements e. Health hazards f. Selection factors g. Adhesives	**25%**
4. Describe insulation procedures for plumbing and mechanical piping systems. a. Piping b. Fittings c. Supports • Hangers • Shoes d. Vapour barriers	**5%**
5. Describe cladding, jacketing and finishes.	**10%**

a. Types of cladding
   - Aluminum
   - Stainless steel
   - Galvanized

b. Types of jacketing
   - PVC
   - Canvass
   - All service jacket (ASJ)

c. Types of finishes
   - Vapour barrier mastic
   - Weather barrier mastic

6. Describe application aids. **5%**

a. Securement of insulation
b. Securement of cladding, jacketing and finishes

7. Review trade-related math. **35%**

a. Fractions
b. Imperial and metric systems
c. Converting numbers
   - Fractions to decimals
   - Decimals to fractions

d. Use of calculators including square roots and powers
e. Geometric problems
   - Circumference and perimeter
   - Area
   - Volume

f. Thermal values
   - K-Value
   - R-Value
   - U-Value

8. Describe layouts. **10%**

a. Layout tools
b. Layout of various geometric shapes
c. Use of lines
   - Line developments
   - Machine and layout allowances

d. Parallel line pattern development
   - Measurements and calculations
   - Equal and unequal tees
   - Bevel
   - Equal and unequal lateral
   - Elbows (miter and gore development)

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Apprenticeship Manitoba

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Unit: A6 Industrial and Commercial Applications I

Level: One

Duration: 70 hours

Theory: 0 hours

Practical: 70 hours

Overview:

This unit is designed to provide the apprentice with introductory knowledge about industrial and commercial applications. The unit covers insulation application for industrial settings, and for plumbing and mechanical piping systems.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Perform layouts.	**30%**
a. Layout of various geometric shapes b. Parallel line pattern development • Measurements and calculations • Equal and unequal tees • Bevel • Equal and unequal lateral • Elbows (miter and gore development)	
2. Perform insulation application for industrial settings.	**35%**
a. Insulation application • Measurements and calculations • Piping • Fittings • Hangers b. Vapour barrier application • Measurements and calculations • Piping • Fittings	
3. Perform insulation application for plumbing and mechanical piping systems.	**35%**
a. Insulation application • Measurements and calculations • Piping • Fittings • Hangers	

b. Vapour barrier application
   - Measurements and calculations
   - Piping
   - Fittings

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Apprenticeship Manitoba

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Unit: A7 Fire Stopping I

Level: One
Duration: 14 hours
Theory: 7 hours
Practical: 7 hours

Overview:

This unit is designed to provide the apprentice with introductory knowledge about fire stopping and fireproofing. The unit covers fire stopping, fire stopping penetrations, fire stopping systems and fireproofing.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Describe fire stopping. a. Definitions b. Standards • American Society for Testing and Materials (ASTM) Ratings • Underwriters Laboratory (UL) Ratings/Systems c. Materials d. Types and properties	**50%**
2. Describe fire stopping penetrations. a. Locations and types of penetrations • Electrical components • Smoke sealing • Curtain walls b. Safety precautions c. Measurements and calculations	**25%**
3. Perform installation of fire stopping systems.	**15%**
4. Describe fireproofing. a. Types of materials used b. Application techniques c. Tools • Cutting Tools • Fastening tools	**10%**

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Apprenticeship Manitoba

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Unit: A8 Asbestos, Lead and Mould Abatement

Level: One

Duration: 21 hours

Theory: 14 hours

Practical: 7 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about asbestos and lead abatement, and mould remediation.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Describe asbestos abatement.	**80%**
a. Definitions	
b. Regulations	
• Sampling	
• PPE	
• Air monitoring	
• Disposal	
• Fibre exposure limits	
c. Control options	
• Removal	
• Encapsulation	
• Enclosure	
d. Removal procedures	
• Type 1 (low risk)	
• Type 2 (moderate risk)	
• Type 3 (high risk)	
2. Describe lead abatement.	**10%**
a. Definitions	
b. Regulations	
• Sampling	
• PPE	
• Air monitoring	
• Disposal	
• Exposure limits	
c. Control options	
• Removal	
• Encapsulation	
• Replacement	

d. Removal procedures

3. Describe mould remediation. **10%**

a. Definitions
b. Regulations
   - Sampling
   - PPE
c. Removal procedures

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