



Insulator (Heat and Frost)

On-the-Job Training Guide

2024

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Saskatchewan
Apprenticeship and
Trade Certification
Commission

Online: www.saskapprenticeship.ca

Recognition:

To promote transparency and consistency, portions of this document has been adapted from the 2018 Insulator (Heat and Frost) Red Seal Occupational Standard (Employment and Social Development Canada).

A complete version of the Occupational Standard can be found at www.red-seal.ca

STRUCTURE OF THE ON-THE-JOB TRAINING GUIDE

To facilitate understanding of the occupation, this on-the-job training guide contains the following sections:

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard detailing the essential skills and the level of training where the content is covered.

Major Work Activity (MWA): the largest division within the standard that is comprised of a distinct set of trade activities.

Task: distinct actions that describe the activities within a major work activity.

Sub-task: distinct actions that describe the activities within a task.

On-the-Job and In-school Training Content for the Insulator (Heat and Frost) trade: a chart which outlines on-the-job examples for apprentices to achieve relevant work experience to prepare for topics of technical training.

TRAINING REQUIREMENTS FOR THE INSULATOR (HEAT & FROST) TRADE

7200 hours and 4 years, including two 6-week and one 8-week training sessions in Regina or at NAIT and SAIT in AB.

Journeyman to apprentice ratio for this trade is: 2:1

The information contained in this document serves as a guide for employers and apprentices. Apprenticeship training is mutually beneficial to both employer and apprentice. The employer's investment in training apprentices' results in skilled and certified workers. The document summarizes the tasks to be covered by the apprentice during their on-the-job portion of apprenticeship training. An apprentice spends approximately 85% of their apprenticeship term training on-the-job.

It is the employer's or journeyman's responsibility to supervise an apprentice's practical skills development until a satisfactory level of proficiency has been reached.

EMPLOYER TRAINING RESPONSIBILITY

- introduce the apprentice to daily practice in approved safety procedures
- provide guided, hands-on, practical experience and theory in the tasks and skills of the Insulator trade
- where possible, expose the apprentice to new technology in the trade.

Employers should make every effort to expose their apprentices to work experience in as many areas of the trade as possible.

In the On-the-Job Training Guide, in-school instruction is listed first; on-the-job suggestions to help employers assist the apprentice to prepare for in-school training are listed next.

The content of the training components is subject to change without notice.

INSULATOR (HEAT AND FROST)

TASK MATRIX CHART

This chart outlines the major work activities, tasks and sub-tasks from the 2018 Insulator (Heat & Frost) Red Seal Occupational Standard. Each sub-task details the corresponding essential skill and level of training where the content is covered. *

* Sub Tasks with numbers in the boxes is where the content will be delivered in training.

A - Performs Routine Occupational Skills

12%

A-1 Performs safety-related functions	A-1.01 Uses personal protective equipment (PPE) and safety equipment 1,2,3	A-1.02 Maintains safe work environment 1,2,3	
A-2 Uses and maintains tools and equipment	A-2.01 Uses tools and equipment 1,2,3	A-2.02 Uses access equipment 1,2,3	
A-3 Organizes work	A-3.01 Performs task scheduling 1	A-3.02 Organizes materials on site 1	
A-4 Uses communication and mentoring techniques	A-4.01 Uses communication techniques 1 (2, 3 In-Context)	A-4.02 Uses mentoring techniques 3	
A-5 Performs routine trade practices	A-5.01 Performs measurements and calculations 1, 2, 3	A-5.02 Interprets specifications and drawings 2, 3	A-5.03 Prepares substrates 1, 2

B - Performs Industrial Applications

31%

B-6 Prepares for installation of insulation in industrial applications	B-6.01 Selects materials for industrial applications 1, 2, 3	B-6.02 Performs layout for industrial applications 1, 2, 3	
B-7 Insulates piping and fittings	B-7.01 Installs insulation on piping, fittings and hangers 1	B-7.02 Applies vapour barrier on piping and fittings 1	B-7.03 Installs cladding, jacketing and finishes on piping and fittings 3
B-8 Insulates tanks, vessels and equipment	B-8.01 Installs insulation on tanks, vessels and equipment 2	B-8.02 Applies vapour barrier on tanks, vessels and equipment 2	B-8.03 Installs cladding, jacketing and finishes on tanks, vessels and equipment 3

C - Performs Commercial Applications

30%

C-9 Prepares for installation of insulation in commercial applications	C-9.01 Selects materials for commercial applications 1, 2	C-9.02 Performs layout for commercial applications 1, 2	
C-10 Insulates plumbing and mechanical piping systems	C-10.01 Installs insulation on plumbing and mechanical piping systems 1	C-10.02 Applies vapour barrier on insulated plumbing and mechanical piping systems 1	C-10.03 Installs cladding, jacketing and finishes on insulated plumbing and mechanical piping systems 2
C-11 Insulates mechanical ducting	C-11.01 Installs insulation on mechanical ducting 2	C-11.02 Applies vapour barrier on insulated mechanical ducting 2	C-11.03 Installs cladding, jacketing and finishes on insulated mechanical ducting 3

C-12
Insulates mechanical equipment

C-12.01 Installs insulation on mechanical equipment

2

C-12.02 Applies vapour barrier on insulated mechanical equipment

2

C-12.03 Installs cladding, jacketing and finishes on insulated mechanical equipment

3

D - Performs Applications Common to Industrial and Commercial Systems

12%

D-13 Installs fire stop systems

D-13.01 Identifies approved fire stop system

2

D-13.02 Applies fire stop materials to architectural, structural, mechanical and electrical components

2

D-14 Insulates for soundproofing

D-14.01 Insulates piping for soundproofing

2

D-14.02 Insulates turbines, equipment and mechanical systems for soundproofing

2

D-14.03 Fabricates acoustic panels

(Not Common Core)
2

D-14.04 Installs acoustic panels to ceilings and walls

(Not Common Core)
2

D-15 Installs removable covers

D-15.01 Fabricates removable covers

3

D-15.02 Fastens removable covers

3

D-16 Installs underground insulating systems

D-16.01 Installs pipe insulation to underground systems

2

D-16.02 Installs pour-in-place and spray-on insulation to underground systems

2

E - Performs Specialized Applications

9%

<p>E-17 Sprays sealers, coatings and spray-on insulation</p>	<p>E-17.01 Protects surrounding work area for spraying</p> <p>2</p>	<p>E-17.02 Prepares material, equipment and substrate for spraying</p> <p>2</p>	<p>E-17.03 Installs reinforcing material for spraying</p> <p>2</p>	<p>E-17.04 Applies spray-on insulation, coatings and sealers</p> <p>2</p>
<p>E-18 Installs fireproofing</p>	<p>E-18.01 Applies fireproofing to architectural, structural, mechanical and electrical components</p> <p>2</p>	<p>E-18.02 Applies protective covering to fireproofing materials</p> <p>2</p>		
<p>E-19 Installs insulation for refractory systems</p>	<p>E-19.01 Applies insulation to refractory systems</p> <p>2</p>	<p>E-19.02 Installs reflective systems</p> <p>2</p>	<p>E-19.03 Installs cladding, jacketing and finishes to refractory systems</p> <p>2</p>	
<p>E-20 Installs insulation for cryogenic systems</p>	<p>E-20.01 Applies insulation to cryogenic systems</p> <p>2</p>	<p>E-20.02 Applies vapour barrier to insulated components of cryogenic systems</p> <p>2</p>	<p>E-20.03 Installs cladding, jacketing and finishes to cryogenic systems</p> <p>2</p>	
<p>E-21 Insulates for marine applications (Not Common Core)</p>	<p>E-21.01 Insulates bulkheads, deckheads and hulls</p> <p>(Not Common Core)</p> <p>2</p>	<p>E-21.02 Installs cladding, jacketing and finishes on marine applications</p> <p>(Not Common Core)</p> <p>2</p>		

F - Performs Asbestos, Lead and Mould Abatement

6%

F-22 Prepares for asbestos abatement	F-22.01 Determines required personal protective equipment (PPE) for asbestos abatement 1	F-22.02 Retrieves sample of asbestos for testing 1	F-22.03 Determines scope of work 1	F-22.04 Prepares site for removal and containment of asbestos 1
F-22.05 Builds temporary enclosure 1				
F-23 Performs asbestos removal procedures	F-23.01 Removes asbestos 1	F-23.02 Disposes of asbestos materials 1	F-23.03 Performs decontamination of area and equipment 1	
F-24 Performs maintenance and repair	F-24.01 Encapsulates asbestos 1	F-24.02 Encloses asbestos 1		
F-25 Performs lead abatement and mould remediation	F-25.01 Performs lead abatement 1	F-25.02 Performs mould remediation 1		

TRAINING PROFILE CHART

This Training Profile Chart represents Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training at the topic level.

Level One	Hours
Orientation and Safety	12
Insulation Accessories, Tools, and Equipment	23
Blueprint Reading and Pattern Development	27
Insulation Materials, Applications, and Safety	82
Asbestos Abatement	18
Trade Mathematics (Exceeds)	18
	180

Level Two	Hours
Safety, Noise Control and Exposure to Heat and Cold	6
Canvas on Piping, Ducts and Equipment	24
Polyvinyl Chloride Pipe Covering	18
Introduction to Metals	18
Miscellaneous Applications (*Includes Firestop Systems)	12
Blueprint Reading and Pattern Development	78
Trade Mathematics (Exceeds)	28
	180

Level Three	Hours
Safety, Tools, and Codes (Exceeds)	6
Metal Fabrication	39
Equipment Layout	36
Pipe Rack Layout	39
Extruded Foam Pattern Development	24
Blueprint Reading and Pattern Development	48
Trade Mathematics (Exceeds)	48
	240

ON-THE-JOB AND IN-SCHOOL TRAINING CONTENT FOR THE INSULATOR (HEAT AND FROST) TRADE

This chart outlines on-the-job examples for apprentices to achieve relevant work experience to prepare for the topics of technical training. Topics of technical training are provided with the associated learning outcomes.

Level One	8 weeks	240 hours
Orientation and Safety		23 hours
<ul style="list-style-type: none">• apprenticeship overview• OH&S regulations and safety• Occupational Exposure Limits (OEL) and control measures• safe work practices• K and R factor principals• pipe sizes		
Mentors can assist the apprentice to prepare for this section of technical training by:		
<ul style="list-style-type: none">• <i>ensuring the delivery of the Construction Safety Training System (CSTS)</i>• <i>reviewing OH&S Rights and Responsibilities</i>• <i>delivering site-specific orientation</i>• <i>reviewing contractor-specific safety procedures</i>• <i>ensuring training in trade-specific safety equipment (wet-bulb thermometer)</i>• <i>ensuring regulations, policies and procedures are complied with</i>		
Insulation Accessories, Tools and Equipment		12 hours
<ul style="list-style-type: none">• mastics and cements• mitres• metal mesh, wire and bands• hand and power tools• material handling		
Mentors can assist the apprentice to prepare for this section of technical training by:		
<ul style="list-style-type: none">• <i>familiarizing the apprentice with material selection procedures for commercial application</i>• <i>demonstrating the proper use and care of common hand and power tools</i>• <i>ensuring the proper availability, use and care of personal protective equipment</i>• <i>identifying vapour barriers, their characteristics and applications and the procedures used for installation</i>		
Insulation Materials, Application and Safety		82 hours
<ul style="list-style-type: none">• insulation types, including fasteners• fibreglass pipe covering• fibreglass rigid and flex duct insulation• acoustic insulation (fibreglass and mineral wool)• Foamglass and Pittwrap• mineral wool• calcium silicate and ceramic fibres• extruded foam plastic		

- polystyrenes and polyurethanes

Mentors can assist the apprentice to prepare for this section of technical training by:

- *giving demonstrations and orientations to the products and materials used for the assigned tasks*
- *familiarizing the apprentice with factors to consider when planning and scheduling daily task*
- *explaining the theory and demonstrating the practical skills of tasks i.e. roughing-in*
- *identifying types, sizes and amounts of materials required for each project*
- *demonstrating procedures used to organize materials on site*
- *familiarizing the apprentice with trade terminology*
- *demonstrating effective communication practices*
- *demonstrating effective measurement practices*
- *identifying mathematical formulas for calculating dimension of components*
- *familiarizing the apprentice with substrates and procedures used to prepare them for installation of insulation*
- *demonstrating procedures used to install insulation on piping, fittings and hangers*
- *providing opportunities to learn knowledge of vapour barriers, their application and the procedures used for installation*
- *familiarizing the apprentice with material selection procedures for commercial application*
- *identifying plumbing and mechanical piping systems, their characteristics and insulation requirements*
- *identifying vapour barriers, their characteristics and applications and the procedures used for installation*

Blueprint Reading and Pattern Development

27 hours

- lines, scale rulers, symbols
- pictorial and orthographic drawings
- divisions of blueprints and print assessment

Mentors can assist the apprentice to prepare for this section of technical training by:

- *identifying pipes, ducts, etc. on the site*
- *training in general blueprint awareness*
- *providing the apprentice with the opportunity to identify specifications and types of drawings, and to learn their applications and procedures for use*
- *providing the apprentice with the opportunity to identify symbols and abbreviations found on types of drawings*

Asbestos

18 hours

- asbestos history and types
- methods of control, health effects and respirators
- site preparation, equipment and disposal
- regulations
- OH&S regulations and examinations

Mentors can assist the apprentice to prepare for this section of technical training by:

- *ensuring safety orientation (awareness of the hazards associated with asbestos)*
- *providing site specific training and supervision*
- *providing the apprentice with the project-specific written procedures*
- *ensuring on-site training in the operation and maintenance of equipment associated with asbestos removal*
- *reviewing the safety rules and procedures of the abatement at hand*
- *holding a daily tool-box talk (briefing) to prepare for day's activities*

Trade Mathematics (Exceeds)**18 hours**

- whole numbers
- fractions and decimals
- conversions and percentages
- perimeters and area
- band spacing
- board feet

Mentors can assist the apprentice to prepare for this section of technical training by:

- *training and supervision in basic mathematical and measurement calculations*

Level Two

6 weeks

180 hours

Safety, Noise Control and Exposure to Heat and Cold

6 hours

- piping materials
- safety and noise control
- exposure to heat and cold

Mentors can assist the apprentice to prepare for this section of technical training by:

- *continuing to promote and enforce safe work practices and procedures*
 - *confirming the proper availability, use and care of personal protective equipment*
-

Canvas on Piping, Ducts and Equipment

24 hours

- application identification and surface preparation
- practical application
- stud welder use

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing enhanced understanding and hands-on practical training in the application of materials*
 - *supporting proper training in the use and maintenance of the stud welder*
-

Polyvinyl Chloride Pipe Covering

18 hours

- pipe covering application types
- surface preparation
- practical application

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing enhanced understanding and hands-on practical training in the application of materials*
-

Introduction to Metals

18 hours

- line and circle division
- shop equipment and layout tools
- bevels
- equal and unequal tees
- end caps
- gore and butterfly elbows

Mentors can assist the apprentice to prepare for this section of technical training by:

- *identifying layout tools and their procedures for use*
 - *explaining the calculation used to develop a layout*
 - *identifying types of piping, fittings, hangers and application of pipe insulation*
-

Miscellaneous Applications

12 hours

- underground systems
- breeching
- expansion joints
- fireproofing/firestopping

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing enhanced understanding and hands-on practical training in the application of materials*
- *providing enhanced understanding of insulating piping in underground systems and the installation procedures*

- *providing enhanced understanding of pour-in-place insulation for underground systems and the procedures used for its installation*

Blueprint Reading and Pattern Development**78 hours**

- orthographic drawings
- isometric drawings
- specifications and addendums
- commercial and industrial systems
- mechanical drawings and symbols

Mentors can assist the apprentice to prepare for this section of technical training by:

- *further instruction in blueprints and site plans that are relevant to the task at hand*
- *familiarizing the apprentice with material selection procedures for commercial application*
- *procedures used to install insulation on piping, fittings and hangers*
- *demonstrating layout procedures for industrial applications*

Trade Mathematics (Exceeds)**24 hours**

- trade problems
- insulation on ducts and band spacing
- lags
- metal and canvas on ducts

Mentors can assist the apprentice to prepare for this section of technical training by:

- *exposing the apprentice to advanced tasks which involve layout and mathematics*

Level Three

8 weeks

240 hours

Safety, Tools and Codes (Exceeds)

6 hours

- regulations and building codes
- hand and power tool use and safety
- heat loss detection

Mentors can assist the apprentice to prepare for this section of technical training by:

- *continuing to promote and enforce safe work practices and procedures*
 - *developing an awareness of specifications and regulations relevant to the trade (Thermal Insulation Association of Canada or TIAC)*
 - *demonstrating the proper use and care of common hand and power tools*
 - *verifying the proper availability, use and care of personal protective equipment*
 - *provide awareness of heat loss and demonstration of heat loss detection equipment where applicable*
-

Metal Fabrication

39 hours

- pattern development and line and circle division
- schedules of metals, fasteners and pipe sizes

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing hands-on training in the fabrication and installation of the finished product*
 - *exposing apprentice to the theory and practical skills required in pattern development*
-

Equipment Layout

36 hours

- spherical and elliptical heads
- box coverings
- concentric reducers
- eccentric reducers
- transitions

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing enhanced understanding and hands-on practical training in the application of lay out materials for commercial applications*
-

Pipe Rack Layout

39 hours

- bevels
- end caps
- equal and unequal tees
- gore and butterfly elbows
- laterals
- removable covers

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing enhanced understanding and hands-on practical training in the material selection for industrial applications*
-

Extruded Foam Pattern Development

24 hours

- extruded foam concepts
- elbows
- reducers and reducing elbows
- extruded foam plastics for pumps

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing hands-on training in the application of fire stop materials to architectural, structural, mechanical, and electrical components*
-

Blueprint Reading and Pattern Development

48 hours

- blueprint reading and material take-offs
- commercial and industrial systems
- estimating

Mentors can assist the apprentice to prepare for this section of technical training by:

- *practicing system identification, material take-off and estimating*
 - *promoting awareness in the use of prints in scheduling and*
 - *providing further instruction in blueprints and site plans that are relevant to the task at hand*
-

Trade Mathematics (Exceeds)

48 hours

- trade problems
- mathematical operations for insulation on ducts and band spacing
- mathematical operations for calculating lags
- mathematical operations for calculating metal and canvas on ducts

Mentors can assist the apprentice to prepare for this section of technical training by:

- *exposing the apprentice to advanced calculations related to estimating, layout and pattern development*

Consider apprenticeship training as an investment in the future of your company and in the future of your workforce. Ultimately, skilled and certified workers increase your bottom line.

Get involved in the apprenticeship training system. Your commitment to training helps to maintain the integrity of the trade.

Do you have employees who have been working in the trade for a number of years but don't have trade certification? Contact your local apprenticeship office for details on how they might obtain the certification they need.

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