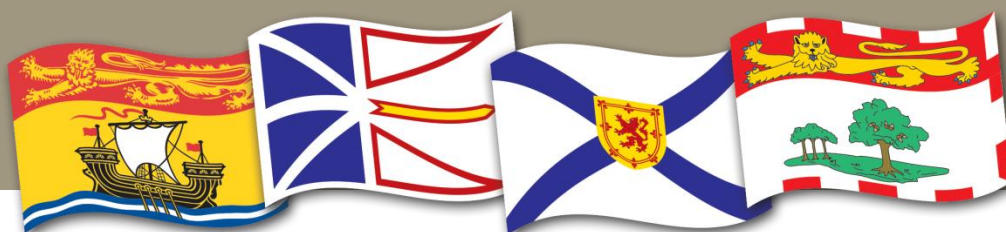


# Insulator (Heat and Frost)

Version: 2020

Revised: N/A





# Atlantic Apprenticeship Curriculum Standard

## Insulator (Heat and Frost)

## Preface

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This Atlantic Apprenticeship Curriculum Standard is intended to assist instructional staff in the design and delivery of technical, in-class training in support of the Insulator (Heat and Frost) program.

This document contains all the technical training elements required to complete the Insulator (Heat and Frost) apprenticeship program and has been developed based on the Red Seal Occupational Standard (RSOS). The RSOS can be found on the Red Seal website ([www.red-seal.ca](http://www.red-seal.ca)).

Implementation of this AACS for Apprenticeship training is outlined in the following table.

Level	Implementation Effective
Level 1	2021-2022
Level 2	2022-2023
Level 3	2023-2024
Level 4	2024-2025

**\*\* The above implementation schedule was current at time of printing. Please confirm with Apprenticeship Staff prior to commencing training.**

Granting of credit or permission to challenge level examinations for pre-employment or pre-apprenticeship training for the Insulator (Heat and Frost) trade will be based on the content outlined in this standard. Training providers must contact their provincial apprenticeship authority for more information on the process and requirements for determining eligibility for credit towards an apprenticeship program. Programs which have been deemed acceptable by the jurisdictional apprenticeship authority will be identified in transfer credit matrix developed through the Atlantic Apprenticeship Harmonization Project.

## **Acknowledgements**

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The development of the Atlantic Apprenticeship Curriculum Standard (AACS) is an initiative of the Atlantic Apprenticeship Council's Atlantic Apprenticeship Harmonization Project (AAHP) through the Atlantic Workforce Partnership and Employment and Social Development Canada.

The Atlantic Apprenticeship Council wishes to acknowledge the contributions of the following industry and instructional representatives on the Atlantic Trade Advisory Committee (ATAC) who participated in the development of this document in February, 2020.

Anthony Boyce	New Brunswick
Joshua Sherrard	New Brunswick
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## **User Guide**

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Atlantic Apprenticeship Curriculum Standards (AACS) are developed based on Red Seal Occupational Standards (RSOS), National Occupational Analyses (NOA), Interprovincial Program Guides (IPG), if available, and extensive industry consultation. This document represents the minimum content to be delivered as part of the harmonized Atlantic program for the Insulator (Heat and Frost) trade.

The AACS's are deliberately constructed for ease of use and flexibility of structure in order to adapt to all delivery requirements. They detail units of training, unit outcomes and objectives. They do not impose a delivery model or teaching format.

Jurisdictions and/or training providers will select and develop delivery materials and techniques that accommodate a variety of learning styles and delivery patterns. The AACS does not dictate study materials, textbooks or learning activities to be used in delivery.

The document includes a Level Structure to facilitate mobility for apprentices moving from one jurisdiction to another.

### **Structure**

The content of the AACS is divided into units. Unit codes are used as a means of identification and are not intended to convey the order of delivery. It is at the discretion of the training provider to deliver the content in the required logical sequence of delivery within the level. Jurisdictions are free to deliver units one at a time or concurrently within a level, provided all outcomes are met.

The Learning Outcomes describe what the apprentice should know or be able to do at the end of training. Wording of the Learning Outcomes, "Demonstrate knowledge of..." acknowledges the broad spectrum of ways in which knowledge can be assessed, i.e, practical projects, multiple choice testing, presentations, etc.) by instructional staff within the training.

Summative evaluation will be through a multiple-choice Level Examination administered through the jurisdictional Apprenticeship Authority.

## User Guide (continued)

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The 2018 Red Seal Occupational Standard (RSOS) to AACS comparison chart outlines the relation between each RSOS sub-task and the AACS units. RSOS references have also been detailed in each unit to highlight the direct link between the unit and relevant sub-tasks in the RSOS.

In the Level Structure section, the document identifies suggested hours in order to provide an indication of the time it should take to cover the material in the unit and is provided as a guide only. Adjustments to the suggested hours for each unit may be required to account for rate of apprentice learning, statutory holidays, storm days, registration and examinations. These suggested hours detailed for each unit will represent both theory and practical training (if relevant) and for consistency will be based on a standard of 30 hours per week of training. The true length of time required to deliver an outcome successfully will depend upon the learning activities and teaching methods used.

There are two types of objectives found in the AACS document: theoretical and practical.

The theoretical objectives represent the material that is to be covered during the technical training in order to convey the required knowledge to the apprentice.

The practical objectives represent the tasks or skills that have been deemed by the Atlantic Trade Advisory Committee as critical for the apprentices to receive exposure to while attending technical training. For example, exposure could be done through instructor demonstration or individual or group performance of the skill or task. Training providers are encouraged to use practical demonstration and opportunities for hands-on learning whenever possible. Practical objectives are not intended to replace the on-the-job training component of the apprentice's program or to mirror or replace the logbook skills that are to be taught and evaluated in the workplace.

Detailed content for each objective has not been developed. Where detail is required for clarity, content has been provided.

## **Glossary of Terms**

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These definitions are intended as a guide to how language is used in the document.

<b>Adjust</b>	To put in good working order; regulate; bring to a proper state or position.
<b>Application</b>	The use to which something is put and/or the circumstance in which an individual would use it.
<b>Characteristic</b>	A feature that helps to identify, tell apart or describe recognizably; a distinguishing mark or trait.
<b>Component</b>	A part that can be separated from or attached to a system; a segment or unit.
<b>Define</b>	To state the meaning of (a word, phrase, etc.).
<b>Describe</b>	To give a verbal account of; tell about in detail.
<b>Explain</b>	To make plain or clear; illustrate; rationalize.
<b>Identify</b>	To point out or name objectives or types.
<b>Interpret</b>	To translate information from observation, charts, tables, graphs and written material.
<b>Maintain</b>	To keep in a condition of good repair or efficiency.
<b>Method</b>	A means or manner of doing something that has procedures attached to it.
<b>Operate</b>	How an object works; to control or direct the functioning of.
<b>Procedure</b>	A prescribed series of steps taken to accomplish an end.
<b>Purpose</b>	The reason for which something exists or is done, made or used.

## **Glossary of Terms (continued)**

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### **Service**

Routine inspection and replacement of worn or deteriorating parts.

An act or business function provided to a customer in the course of an individual's profession (e.g., haircut).

### **Technique**

Within a procedure, the manner in which technical skills are applied.

### **Test**

v. To subject to a procedure that ascertains effectiveness, value, proper function or other quality.

n. A way of examining something to determine its characteristics or properties, or to determine whether or not it is working correctly.

## Essential Skills Profiles

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Through extensive research, the Government of Canada and other national and international agencies have identified and validated key essential skills for the workplace. These skills are used in nearly every job and at different levels of complexity. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Essential Skills Profiles describe how workers in various occupations use each of the key essential skills. They include:

- a brief description of the occupation;
- examples of tasks that illustrate how each essential skill is applied; and,
- complexity ratings that indicate the level of difficulty of the example tasks.

Essential Skills profiles can be found on the Employment and Social Development Canada (ESDC) website at [www.canada.ca/en/employment-social-development/programs/essential-skills/profiles.html](http://www.canada.ca/en/employment-social-development/programs/essential-skills/profiles.html)

The development and improvement of these Essential Skills is inherent throughout the apprenticeship training program as apprentices work towards achieving journeyman status.

## Recommended Atlantic Level Structure

### Level 1 - 10 Weeks

Unit Code	Unit Title	Sugg Hrs*	Pg #	Practical Objectives*
INS-100	Safety	18	18	Tie knots using basic rigging applications to lift materials safely.
INS-105	Tools and Equipment	30	21	Use and maintain hand, power and shop fabrication tools.
INS-110	Work Scheduling and Materials	12	23	N/A
MENT-700	Mentoring I	6	25	N/A
INS-120	Math for Insulators	42	27	N/A
INS-125	Substrates	24	29	N/A
INS-130	Introduction to Industrial Applications	18	30	Fabricate miters, equal tees and end caps/bevels.
INS-135	Piping and Fittings I	30	32	N/A
INS-140	Commercial Applications	24	34	Apply insulation and finishings for commercial application.
INS-145	Plumbing and Mechanical Piping I	12	36	N/A
INS-150	Fire Stop Systems I	12	38	Apply firestopping materials to penetrations.
INS-155	Fireproofing I	6	40	N/A
INS-160	Asbestos Abatement	14	41	N/A
INS-165	Asbestos Removal	14	44	N/A
INS-170	Asbestos Maintenance and Repair	14	46	N/A
INS-175	Lead Abatement and Mould Remediation	6	48	N/A
INS-180	Hot Work	18	49	N/A

### Level 2 - 7 Weeks

Unit Code	Unit Title	Sugg Hrs*	Pg #	Practical Objectives*
INS-200	Drawings	24	52	N/A
INS-205	Tank, Vessel and Equipment I	24	54	Install insulation on a tank.
INS-210	Plumbing and Mechanical Piping II	24	56	Apply insulation to plumbing and piping fixtures with vapour barriers and complete with cladding.
INS-215	Mechanical Ducting I	21	58	Apply insulation to ducting, and seal with vapour barrier and necessary cladding.
INS-220	Mechanical Equipment I	15	60	Apply vapour barrier to a vessel.
INS-225	Soundproofing	12	62	N/A
INS-230	Underground Systems	18	65	N/A
INS-235	Sealers, Coatings and Spray-On Insulation	12	67	N/A
INS-240	Refractory Systems	12	70	N/A

Unit Code	Unit Title	Sugg Hrs*	Pg #	Practical Objectives*
INS-245	Cryogenic Systems	18	72	Apply insulation to cryogenic systems.
INS-250	Trade Practices I	30	74	N/A

### Level 3 - 6 Weeks

Unit Code	Unit Title	Sugg Hrs*	Pg #	Practical Objectives*
INS-300	Piping and Fittings II	48	76	Develop radial line/parallel line layouts.
INS-305	Tank, Vessel and Equipment II	30	78	Apply cladding to an insulated tank and seal all joints.
INS-310	Mechanical Ducting II	18	80	Install finish to insulated duct.
INS-315	Mechanical Equipment II	6	82	N/A
INS-320	Removable Soft Covers	18	84	Measure and fabricate a removable soft cover.
INS-325	Specifications and Drawings	30	86	1. Interpret and sketch drawings and diagrams. 2. Estimate materials required from a drawing.
INS-330	Marine Applications	6	88	N/A
INS-335	Trade Practices II	24	90	N/A

### Level 4 - 6 Weeks

Unit Code	Unit Title	Sugg Hrs*	Pg #	Practical Objectives*
INS-400	Fire Stop Systems II	24	92	Apply firestopping system to penetrations.
INS-405	Fireproofing II	6	94	N/A
INS-410	Removable Hard Covers	30	95	Measure and fabricate a removable hard cover.
INS-415	Transitions and Reducers	30	97	1. Fabricate a pattern for reducers. 2. Fabricate a pattern for transitions.
INS-420	Triangulation	30	98	Perform triangulation layout.
INS-425	Trade Practices III	24	99	N/A
MENT-701	Mentoring II	6	100	N/A
INS-435	Program Review	30	101	N/A

**\*Suggested Hours:** The time it should take to cover the unit (a guide only).

**\*Practical Objectives:** The tasks/skills apprentices must be exposed to during technical training. An individual or group performance of the task/skill is recommended; if not possible, an instructor demonstration is acceptable. Training Providers should use practical, hands-on learning whenever possible, whether identified in the curriculum as a practical objective or not.

## 2018 RSOS Sub-Task to AACS Unit Comparison

RSOS Sub-Task		AACS Unit	
<b>Task A-1 – Performs safety-related functions.</b>			
1.01	Uses personal protective equipment (PPE) and safety equipment.	INS-100	Safety
		INS-180	Hot Work
1.02	Maintains safe work environment.	INS-100	Safety
		INS-180	Hot Work
<b>Task A-2 – Uses and maintains tools and equipment.</b>			
2.01	Uses tools and equipment.	INS-105	Tools and Equipment
2.02	Uses access equipment.	INS-105	Tools and Equipment
<b>Task A-3 – Organizes work.</b>			
3.01	Performs task scheduling.	INS-110	Work Scheduling and Materials
3.02	Organizes materials on site.	INS-110	Work Scheduling and Materials
<b>Task A-4 – Uses communication and mentoring techniques.</b>			
4.01	Uses communication techniques.	MENT-700	Mentoring I
4.02	Uses mentoring techniques.	MENT-700	Mentoring I
<b>Task A-5 – Performs routine trade practices.</b>			
5.01	Performs measurements and calculations.	INS-120	Math for Insulators
		INS-205	Tank, Vessel and Equipment I
		INS-250	Trade Practices I
		INS-300	Piping and Fittings II
		INS-305	Tank, Vessel and Equipment II
		INS-310	Mechanical Ducting II
		INS-315	Mechanical Equipment II
		INS-320	Removable Soft Covers
		INS-325	Specifications and Drawings
		INS-335	Trade Practices II
		INS-400	Fire Stop Systems II
		INS-415	Transitions and Reducers
		INS-420	Triangulation
5.02	Interprets specifications and drawings.	INS- 425	Trade Practices III
		INS-200	Drawings
		INS-325	Specifications and Drawings
		INS-410	Removable Hard Covers
		INS-415	Transitions and Reducers
5.03	Prepares substrates.	INS-420	Triangulation
		INS-125	Substrates
		INS-235	Sealers, Coatings and Spray-On Insulation
		INS-410	Removable Hard Covers

RSOS Sub-Task		AACs Unit	
<b>Task B-6 – Prepares for installation of insulation in industrial applications.</b>			
6.01	Selects materials for industrial applications.	INS-130	Introduction to Industrial Applications
		INS-210	Plumbing and Mechanical Piping II
		INS-300	Piping and Fittings II
		INS-305	Tank, Vessel and Equipment II
		INS-320	Removable Soft Covers
		INS-325	Specifications and Drawings
6.02	Performs layout for industrial applications.	INS-130	Introduction to Industrial Applications
		INS-205	Tank, Vessel and Equipment I
		INS-300	Piping and Fittings II
		INS-305	Tank, Vessel and Equipment II
		INS-320	Removable Soft Covers
		INS-415	Transitions and Reducers
		INS-420	Triangulation
<b>Task B-7 – Insulates piping and fittings.</b>			
7.01	Installs insulation on piping, fittings and hangers.	INS-135	Piping and Fittings I
7.02	Applies vapour barrier on piping and fittings.	INS-135	Piping and Fittings I
7.03	Installs cladding, jacketing and finishes on piping and fittings.	INS-300	Piping and Fittings II
		INS-400	Fire Stop Systems II
		INS-410	Removable Hard Covers
		INS-415	Transitions and Reducers
<b>Task B-8 – Insulates tanks, vessels and equipment.</b>			
8.01	Installs insulations on tanks, vessels and equipment.	INS-205	Tank, Vessel and Equipment I
8.02	Applies vapour barrier on tanks, vessels and equipment.	INS-205	Tank, Vessel and Equipment I
8.03	Installs cladding, jacketing and finishes on tanks, vessels and equipment.	INS-305	Tank, Vessel and Equipment II
<b>Task C-9 – Prepares for installation of insulation in commercial applications.</b>			
9.01	Selects materials for commercial applications.	INS-140	Commercial Applications
		INS-205	Tank, Vessel and Equipment I
		INS-210	Plumbing and Mechanical Piping II
		INS-215	Mechanical Ducting I
		INS-220	Mechanical Equipment I
		INS-225	Soundproofing
		INS-300	Piping and Fittings II
		INS-305	Tank, Vessel and Equipment II

RSOS Sub-Task		AACs Unit	
9.02	Performs layout for commercial applications.	INS-310	Mechanical Ducting II
		INS-315	Mechanical Equipment II
		INS-140	Commercial Applications
		INS-210	Plumbing and Mechanical Piping II
		INS-215	Mechanical Ducting I
		INS-220	Mechanical Equipment I
		INS-300	Piping and Fittings II
		INS-305	Tank, Vessel and Equipment II
		INS-310	Mechanical Ducting II
		INS-315	Mechanical Equipment II
		INS-415	Transitions and Reducers
INS-420	Triangulation		
<b>Task C-10 – Insulates plumbing and mechanical piping systems.</b>			
10.01	Installs insulation on plumbing and mechanical piping systems.	INS-145	Plumbing and Mechanical Piping I
10.02	Applies vapour barrier on insulated plumbing and mechanical piping systems.	INS-145	Plumbing and Mechanical Piping I
10.03	Installs cladding, jacketing and finishes on insulated plumbing and mechanical piping systems.	INS-210	Plumbing and Mechanical Piping II
<b>Task C-11 – Insulates mechanical ducting.</b>			
11.01	Installs insulation on mechanical ducting.	INS-215	Mechanical Ducting I
11.02	Applies vapour barrier on insulated mechanical ducting.	INS-215	Mechanical Ducting I
11.03	Installs cladding, jacketing and finishes on insulated mechanical ducting.	INS-310	Mechanical Ducting II
<b>Task C-12 – Insulates mechanical equipment.</b>			
12.01	Installs insulation on mechanical equipment.	INS-220	Mechanical Equipment I
12.02	Applies vapour barrier on insulated mechanical equipment.	INS-220	Mechanical Equipment I
12.03	Installs cladding, jacketing and finishes on insulated mechanical equipment.	INS-315	Mechanical Equipment II
<b>Task D-13 – Installs fire stop systems.</b>			
13.01	Identifies approved fire stop system.	INS-150	Fire Stop Systems I
		INS-400	Fire Stop Systems II
13.02		INS-150	Fire Stop Systems I

RSOS Sub-Task		AACs Unit	
	Applies fire stop materials to architectural, structural, mechanical and electrical components.	INS-400	Fire Stop Systems II
<b>Task D-14 – Insulates for soundproofing.</b>			
14.01	Insulates piping for soundproofing.	INS-225	Soundproofing
14.02	Insulates turbines, equipment and mechanical systems for soundproofing.	INS-225	Soundproofing
14.03	Fabricates acoustic panels.	INS-225	Soundproofing
14.04	Installs acoustic panels to ceilings and walls.	INS-225	Soundproofing
<b>Task D-15 – Installs removable covers.</b>			
15.01	Fabricates removable covers.	INS-320	Removable Soft Covers
		INS-410	Removable Hard Covers
15.02	Fastens removable covers.	INS-320	Removable Soft Covers
		INS-410	Removable Hard Covers
<b>Task D-16 – Installs underground insulating systems.</b>			
16.01	Installs pipe insulation to underground systems.	INS-230	Underground Systems
16.02	Installs pour-in-place and spray-on insulations to underground systems.	INS-230	Underground Systems
<b>Task E-17 – Sprays sealers, coatings and spray-on insulation.</b>			
17.01	Protects surrounding work area for spraying.	INS-235	Sealers, Coatings and Spray-On Insulation
17.02	Prepares materials, equipment and substrate for spraying.	INS-235	Sealers, Coatings and Spray-On Insulation
17.03	Installs reinforcing material for spraying.	INS-235	Sealers, Coatings and Spray-On Insulation
17.04	Applies spray-on insulation, coatings and sealers.	INS-235	Sealers, Coatings and Spray-On Insulation
<b>Task E-18 – Installs fireproofing.</b>			
18.01	Applies fireproofing to architectural, structural, mechanical and electrical components.	INS-155	Fireproofing I
18.02	Applies protective covering to fireproofing materials.	INS-405	Fireproofing II
<b>Task E-19 – Installs insulation for refractory systems.</b>			
19.01	Applies insulation to refractory systems.	INS-240	Refractory Systems

RSOS Sub-Task		AACs Unit	
19.02	Installs reflective systems.	INS-240	Refractory Systems
19.03	Installs cladding, jacketing and finishes to refractory systems.	INS-240	Refractory Systems
<b>Task E-20 – Installs insulation for cryogenic systems.</b>			
20.01	Applies insulation to cryogenic systems.	INS-245	Cryogenic Systems
20.02	Applies vapour barrier to insulated components of cryogenic systems.	INS-245	Cryogenic Systems
20.03	Installs cladding, jacketing and finishes to cryogenic systems.	INS-245	Cryogenic Systems
<b>Task E-21 – Insulates for marine applications.</b>			
21.01	Insulates bulkheads, deckheads and hulls.	INS-330	Marine Applications
21.02	Installs cladding, jacketing and finishes on marine applications.	INS-330	Marine Applications
<b>Task F-22 – Prepares for asbestos abatement.</b>			
22.01	Determines required personal protective equipment (PPE) for asbestos abatement.	INS-160	Asbestos Abatement
22.02	Retrieves sample of asbestos for testing.	INS-160	Asbestos Abatement
22.03	Determines scope of work.	INS-160	Asbestos Abatement
22.04	Prepares site for removal and containment of asbestos.	INS-160	Asbestos Abatement
22.05	Builds temporary enclosure.	INS-160	Asbestos Abatement
<b>Task F-23 – Performs asbestos removal procedures.</b>			
23.01	Removes asbestos.	INS-165	Asbestos Removal
23.02	Disposes of asbestos materials.	INS-165	Asbestos Removal
23.03	Performs decontamination of area and equipment.	INS-165	Asbestos Removal
<b>Task F-24 – Performs maintenance and repair.</b>			
24.01	Encapsulates asbestos.	INS-170	Asbestos Maintenance and Repair
24.02	Encloses asbestos.	INS-170	Asbestos Maintenance and Repair
<b>Task F-25 – Performs lead abatement and mould remediation.</b>			
25.01	Performs lead abatement.	INS-175	Lead Abatement and Mould Remediation
25.02	Performs mould remediation.	INS-175	Lead Abatement and Mould Remediation

# Level 1

Unit Code	Title	Hours	Page
MENT-700	Mentoring I	6	25
INS-100	Safety	18	18
INS-105	Tools and Equipment	30	21
INS-110	Work Scheduling and Materials	12	23
INS-115	Communication	6	25
INS-120	Math for Insulators	42	27
INS-125	Substrates	24	29
INS-130	Introduction to Industrial Applications	18	30
INS-135	Piping and Fittings I	30	32
INS-140	Commercial Applications	24	34
INS-145	Plumbing and Mechanical Piping I	12	36
INS-150	Fire Stop Systems 1	12	38
INS-155	Fireproofing I	6	40
INS-160	Asbestos Abatement	14	41
INS-165	Asbestos Removal	14	44
INS-170	Asbestos Maintenance and Repair	14	46
INS-175	Lead Abatement and Mould Remediation	6	48
INS-180	Hot Work	18	49

## INS-100

## Safety

### Learning Outcomes:

- Demonstrate knowledge of PPE and safety equipment, their applications, and procedures for use.
- Demonstrate knowledge of safe work practices.
- Demonstrate knowledge of regulations related to PPE and safety equipment.
- Demonstrate knowledge of regulations related to safety.

### 2018 Red Seal Occupational Standard Reference:

- 1.01 Uses personal protective equipment (PPE) and safety equipment.
- 1.02 Maintains safe work environment.

### Suggested Hours:

18 Hours

### Theoretical Objectives:

1. Identify hazards and describe safe work practices.
  - i) pinch points
  - ii) tripping hazards
  - iii) chemical hazards
  - iv) electric shock hazards
  - v) burn hazards
  - vi) noise hazards
  - vii) height hazards
  - viii) respiratory hazards
  - ix) environmental hazards
2. Identify and interpret jurisdictional health and safety acts and regulations related to PPE, safety equipment and safe work practices.
3. Identify types of personal protective equipment (PPE) and describe their applications, and procedures for use.
  - i) eye protection
  - ii) gloves
  - iii) boots
  - iv) respirators
  - v) hearing protection
  - vi) fall protection equipment
  - vii) hard hats

- viii) wristlets
  - ix) coveralls
4. Identify types of safety equipment and describe their applications and procedures for use.
    - i) warning tapes
    - ii) first aid kits
    - iii) eye wash stations
    - iv) fire extinguishers
  5. Identify the procedures used to inspect, maintain and store PPE and safety equipment.
  6. Identify company policies and procedures related to safe work practices.
    - i) evacuation routes
    - ii) muster stations
    - iii) warning signals
    - iv) incident procedures
    - v) emergency phone numbers
    - vi) location of safety equipment
    - vii) lock-out procedures
  7. Identify company or site-specific safety training requirements.
    - i) fall protection
    - ii) confined space entry
    - iii) asbestos awareness
    - iv) Workplace Hazardous Materials Information System (WHMIS)
    - v) H2S awareness
    - vi) rigging and hoisting
    - vii) lift training
    - viii) lock-out procedures
  8. Identify required work permits.
    - i) confined space
    - ii) hot work
    - iii) safe work
    - iv) cold work
    - v) blanket (general access)
  9. Describe safety watch requirements.
    - i) fire watch
    - ii) man watch
    - iii) bottle watch
  10. Describe housekeeping practices related to safe work practices.

**Practical Objectives:**

1. Tie a knot using basic rigging applications to lift materials safely.

## **INS-105                      Tools and Equipment**

### **Learning Outcomes:**

- Demonstrate knowledge of tools and equipment, their applications, maintenance and procedures for use.
- Demonstrate knowledge of access equipment, their applications, maintenance and procedures for use.

### **2018 Red Seal Occupational Standard Reference:**

- 2.01 Uses tools and equipment.
- 2.02 Uses access equipment.

### **Suggested Hours:**

30 Hours

### **Theoretical Objectives:**

1. Identify hazards and describe safe work practices related to the use of tools, equipment and access equipment.
2. Identify and interpret codes and regulations related to the use of access equipment.
3. Identify jurisdictional regulations, limitations and training requirements for access equipment.
4. Identify types of tools and equipment, and describe their application and procedures for use.
  - i) specialty hand tools
    - band tensioners
    - band crimpers
  - ii) standard power tools
    - electric shears
    - drills
    - electric saws
  - iii) specialty power tools
    - High Efficiency Particulate Air Filter (HEPA) vacuums
    - sewing machines
    - stud guns
    - pin welders
    - negative air machines
  - iv) layout tools

- dividers
  - squares
  - straight edges
  - tape measures
  - circumference rulers
  - scratch awls
- v) fabrication tools
- lockformers
  - brakes
  - combination machines (beaders/crimpers)
  - tin snips
5. Identify types of access equipment, and describe their applications and procedures for use.
- i) step ladders
  - ii) extension ladders
  - iii) aerial platforms
  - iv) scissor lifts
  - v) crane baskets
  - vi) scaffolding
  - vii) rope access equipment
6. Describe the procedures used to inspect and maintain access equipment.
7. Describe the procedures used to erect, level and dismantle scaffolding.
8. Describe the procedures used to store and secure access equipment.

**Practical Objectives:**

1. Use and maintain hand, power and shop fabrication tools.

## **INS-110**

## **Work Scheduling and Materials**

### **Learning Outcomes:**

- Demonstrate knowledge of the procedures to plan and schedule tasks.
- Demonstrate knowledge of procedures used to organize materials on site.

### **2018 Red Seal Occupational Standard Reference:**

- 3.01 Performs task scheduling.
- 3.02 Organizes materials on site.

### **Suggested Hours:**

12 Hours

### **Theoretical Objectives:**

1. Identify factors to consider when planning and scheduling daily tasks.
  - i) project requirements
  - ii) safety considerations
  - iii) field-level risk assessments
  - iv) contractors' requirements
  - v) environmental conditions
  - vi) work in progress (WIP) log
2. Identify sequence of task activities.
3. Identify work order, work release and safe work permit procedures.
4. Identify designated areas for storage and disposal of waste materials.
5. Identify factors to consider for storing materials and describe storage procedures.
  - i) requirements of daily tasks
  - ii) environmental factors
  - iii) sequence of retrieval
  - iv) weight
6. Describe the considerations for determining types, sizes and amounts of materials required for a project.
7. Describe the procedures for coordinating work tasks with other trades.
8. Describe the procedures used to secure materials.

9. Describe the procedures used to dispose of waste materials.

**Practical Objectives:**

N/A

## **MENT-700**

## **Mentoring I**

### **Learning Outcomes:**

- Demonstrate knowledge of effective communication practices as a learner.
- Demonstrate knowledge of strategies for learning skills in the workplace.

### **Red Seal Occupational Standard Reference:**

4.01 Uses communication techniques

4.02 Uses mentoring techniques

### **Suggested Hours:**

6 hours

### **Theoretical Objectives:**

1. Describe the importance of one's own individual experiences.
2. Identify behaviours that demonstrate positive learning experiences.
3. Identify the benefits of workplace mentoring for the apprentice, mentor, and employer.
4. Identify the partners involved in apprenticeship training.
5. Describe the shared responsibilities for workplace learning in apprenticeship.
6. Identify different learning needs and strategies to address challenges or barriers in the workplace.
  - i) learning disabilities
  - ii) language
  - iii) underrepresentation
7. Identify the components that create a positive and inclusive workplace culture.
  - i) workplace characteristics
  - ii) individual behaviours
8. Identify various learning styles and determine one's own learning preferences.
9. Explain how learning preferences impact learning new skills.

10. Identify different learning strategies to meet individual learning needs.
11. Describe the importance of adapting to a variety of teaching and learning methods in the workplace.
12. Identify techniques for effective communication as a learner.
  - i) verbal and non-verbal
  - ii) active listening
13. Identify and describe personal responsibilities and attitudes that contribute to on-the-job success.
  - i) self advocating
  - ii) asking questions
  - iii) accepting constructive feedback
  - iv) working safely
  - v) employing time management techniques and being punctual

**Practical Objectives:**

N/A

## INS-120

## Math for Insulators

### Learning Outcomes:

- Demonstrate knowledge of measurements and calculations (introduction).

### 2018 Red Seal Occupational Standard Reference:

5.01 Performs measurements and calculations.

### Suggested Hours:

42 Hours

### Theoretical Objectives:

1. Describe the procedures used to perform basic math functions using whole numbers.
  - i) addition
  - ii) subtraction
  - iii) multiplication
  - iv) division
2. Describe the procedures used to perform basic math functions using fractions.
  - i) addition
  - ii) subtraction
  - iii) multiplication
  - iv) division
3. Describe the procedures used to perform basic math functions using decimals.
  - i) addition
  - ii) subtraction
  - iii) multiplication
  - iv) division
4. Describe the procedures used to convert.
  - i) common fraction to decimal
  - ii) decimal to fraction
  - iii) decimal to nearest practical fraction
5. Describe the procedures used to perform math calculations involving percentages and ratio.
  - i) calculating ratio and proportion
  - ii) converting percent to decimal or fraction
  - iii) determining percent of one number is of another

- iv) determining base given rate and percentage
6. Describe the procedures used to calculate perimeter, area and volume of simple shapes.
- i) perimeter
    - rectangle
    - triangle
    - circle (circumference)
  - ii) area
    - rectangle
    - triangle
    - circle
  - iii) volume
    - rectangular vessel
    - spherical vessel
    - cylindrical vessel
7. Describe the procedures used to calculate surface area of solids.
- i) rectangular shapes
  - ii) cylindrical shapes
    - excluding ends
    - including ends
  - iii) conical shapes
  - iv) spherical
8. Describe the procedures used to perform metric to imperial conversions and imperial to metric conversions.

**Practical Objectives:**

N/A

## INS-125

## Substrates

### Learning Outcomes:

- Demonstrate knowledge of substrates and the procedures used to prepare them for installation of insulation.

### 2018 Red Seal Occupational Standard Reference:

5.03 Prepares substrates.

### Suggested Hours:

24 Hours

### Theoretical Objectives:

1. Identify types of substrate material, and the methods used to prepare them.
  - i) steel
  - ii) copper
  - iii) galvanized metal
  - iv) iron
  - v) stainless steel
  - vi) glass
  - vii) plastic
  - viii) fiberglass
  - ix) aluminum
2. Identify types of protrusions, penetrations and irregularities in the substrate.
3. Identify compatibility of insulating material and substrate based on factors.
  - i) temperature ranges
  - ii) age
  - iii) environment
  - iv) oxidization
  - v) chemical corrosion
4. Describe substrate preparation techniques for installation of insulation.

### Practical Objectives:

N/A

## **INS-130**

## **Introduction to Industrial Applications**

### **Learning Outcomes:**

- Demonstrate knowledge of material selection for industrial applications.
- Demonstrate knowledge of layout procedures for industrial applications.

### **2018 Red Seal Occupational Standard Reference:**

- 6.01 Selects materials for industrial applications.
- 6.02 Performs layout for industrial applications.

### **Suggested Hours:**

18 Hours

### **Theoretical Objectives:**

1. Identify layout tools and their procedures for use.
  - i) dividers
  - ii) squares
  - iii) tape measures
  - iv) calculators
  - v) scratch awls
  - vi) markers
  - vii) trammel points
2. Identify types of materials, their application and procedures for use.
3. Identify the factors to consider for selecting cladding.
  - i) reaction to the environment and other materials that are in contact with the cladding
  - ii) finished size of insulation
  - iii) specifications
4. Describe the procedures used to perform a layout for industrial applications.
5. Explain the calculations used to develop a layout.
  - i) elbows
  - ii) tees
  - iii) end caps/bevels
6. Identify type of insulation used in industrial applications.
  - i) fibrous

- fibreglass
  - mineral wool
  - ceramic fibre
- ii) cellular
- glass
  - Foam
  - polys
- iii) granular
- calcium
  - silicate
  - perlite

**Practical Objectives:**

1. Fabricate miters, equal tees and end caps/bevels.

## INS-135

## Piping and Fittings I

### Learning Outcomes:

- Demonstrate knowledge of procedures used to install insulation on piping, fittings and hangers.
- Demonstrate knowledge of vapour barriers, their application and the procedures used for installation.

### 2018 Red Seal Occupational Standard Reference:

- 7.01 Installs insulation on piping, fittings and hangers.  
7.02 Applies vapour barrier on piping and fittings.

### Suggested Hours:

30 Hours

### Theoretical Objectives:

1. Identify the hazards associated with insulation materials.
2. Identify specifications and describe their application to the installation of insulation.
  - i) scope of work
  - ii) operating temperature
  - iii) insulation thickness
  - iv) requirements
3. Identify types of piping, fittings and hangers and application of pipe insulation.
  - i) piping
    - stainless
    - copper
    - iron
    - plastic
    - fiberglass
  - ii) fittings
    - valves
    - tees
    - transitions
    - elbows
  - iii) hangers
    - shoes
    - sleeves
    - clevises

- iv) application of pipe insulation
  - fiberglass
  - calcium silicate
  - cellular glass
  - urethane
  - mineral fibre
  - elastomeric foam
- 4. Identify fastening devices and techniques.
- 5. Identify types of vapour barriers and describe their characteristics and applications.
- 6. Identify types of adhesives and describe their applications.
- 7. Describe the results of poor fitting pipe insulation.
  - i) energy loss
  - ii) frost build up
  - iii) personal injury (burns from excess heat or frost)
- 8. Describe insulation application techniques.
- 9. Describe expansion and contraction joint fabrication.
- 10. Describe the procedures used to install insulation on piping, fittings and hangers.
- 11. Describe the importance of vapour barriers on piping and fittings.
- 12. Describe the procedures used to install vapour barriers on piping and fittings.

**Practical Objectives:**

N/A

## **INS-140**

## **Commercial Applications**

### **Learning Outcomes:**

- Demonstrate knowledge of material selection for commercial applications.
- Demonstrate knowledge of procedures used to lay out materials for commercial applications.

### **2018 Red Seal Occupational Standard Reference:**

- 9.01 Selects materials for commercial applications.
- 9.02 Performs layout for commercial applications.

### **Suggested Hours:**

24 Hours

### **Theoretical Objectives:**

1. Identify hazards of materials and locations as they relate to selecting materials for commercial applications.
  - i) insulation
  - ii) cladding, jacketing and finishes
  - iii) fittings
  - iv) vapour barriers
  - v) fasteners
  - vi) sealants
2. Identify types of insulation, their commercial applications and procedures for use.
  - i) preformed pipe covering
  - ii) fibreglass (rigid board, flexible blankets/batts)
  - iii) mineral fibre
  - iv) elastomeric foam
  - v) insulation cement
3. Identify types of cladding, jacketing and finishes, their commercial applications and procedures for use.
  - i) PVC
  - ii) stainless steel
  - iii) aluminum
  - iv) canvas
  - v) weatherproof membranes

4. Identify types of vapour barriers, their commercial applications and describe their importance and procedures for use.
  - i) RFFRK
  - ii) FSK facing
  - iii) Mastics
  - iv) ASJ
  - v) membrane barriers
  - vi) films
  
5. Describe the procedures used to develop patterns for components.
  - i) tees
  - ii) valves
  - iii) elbows
  - iv) reducers
  - v) boxing in multiple parallel pipes of the same size
  
6. Describe the procedures used to lay out materials for commercial applications.
  
7. Apply basic geometry related to material selection for commercial applications.
  
8. Apply basic geometry related to layout of materials for commercial applications.

**Practical Objectives:**

1. Apply insulation and finishings for commercial application.

## INS-145

## Plumbing and Mechanical Piping I

### Learning Outcomes:

- Demonstrate knowledge of procedures used to install insulation on plumbing and mechanical piping systems.
- Demonstrate knowledge of vapour barriers, their characteristics and applications and the procedures used for installation.

### 2018 Red Seal Occupational Standard Reference:

10.01 Installs insulation on plumbing and mechanical piping systems.

10.02 Applies vapour barrier on insulated plumbing and mechanical piping systems.

### Suggested Hours:

12 Hours

### Theoretical Objectives:

1. Identify plumbing systems, their characteristics and insulation requirements.
  - i) hot
  - ii) cold
  - iii) recirculation water
  - iv) rainwater leaders
  - v) vent piping
  - vi) sanitary drains
2. Identify mechanical piping systems, their characteristics and insulation requirements.
  - i) heating
  - ii) chilled water
  - iii) refrigeration
  - iv) glycol
3. Identify pre-formed products, their application and procedures for use.
4. Identify fastening devices and techniques.
5. Identify types of vapour barriers and describe their characteristics and applications.
  - i) ASJ
  - ii) RFFRK
  - iii) MLV
  - iv) mastics

6. Identify types of adhesives and describe their applications.
7. Describe the procedures used to install insulation on plumbing and mechanical piping.
8. Describe the procedures used to install vapour barriers on plumbing and mechanical piping systems.
9. Describe the importance of vapour barriers on plumbing and mechanical piping systems.

**Practical Objectives:**

N/A

## INS-150

## Fire Stop Systems I

### Learning Outcomes:

- Demonstrate knowledge of fire stop systems for architectural, structural, mechanical and electrical components (introduction).
- Demonstrate knowledge of applying fire stop materials to architectural, structural, mechanical and electrical components (introduction).

### 2018 Red Seal Occupational Standard Reference:

13.01 Identifies approved fire stop system.

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

### Suggested Hours:

12 Hours

### Theoretical Objectives:

1. Identify types of cutting tools used to cut materials in fire stop installation.
  - i) saws
  - ii) snips
  - iii) knives
  
2. Identify types of tools used to fasten materials for fire stop system installation.
  - i) band tensioners
  - ii) powder-actuated tools
  - iii) drills
  - iv) pin welders
  - v) caulking guns
  - vi) trowels
  
3. Identify types of fire stop materials used in fire stop systems.
  - i) caulking
  - ii) wrap strips
  - iii) intumescent boards and collars
  - iv) bricks
  - v) pillows
  - vi) putty
  - vii) mortar
  - viii) mineral fiber
  - ix) foams

x) cement

4. Describe fire stop applications and their purpose.
5. Describe the procedures used to apply fire stopping materials to penetrations.

**Practical Objectives:**

1. Apply firestopping materials to penetrations.

## **INS-155**

## **Fireproofing I**

### **Learning Outcomes:**

- Demonstrate knowledge of applying fireproofing to architectural, structural, mechanical and electrical components.

### **2018 Red Seal Occupational Standard Reference:**

18.01 Applies fireproofing to architectural, structural, mechanical and electrical components.

### **Suggested Hours:**

6 Hours

### **Theoretical Objectives:**

1. Identify types of materials used in fireproof systems.
2. Identify types of cutting tools used to cut materials for fireproofing installation.
  - i) saws
  - ii) snips
  - iii) knives
3. Identify types of tools used to fasten materials for fireproofing installation.
  - i) band tensioners
  - ii) powder-actuated tools
  - iii) drills
  - iv) pin welders
4. Describe material application techniques for fireproofing installation.

### **Practical Objectives:**

N/A

## INS-160

## Asbestos Abatement

### Learning Outcomes:

- Demonstrate knowledge of PPE used for asbestos abatement, their applications and procedures for use.
- Demonstrate knowledge of regulations related to asbestos abatement.
- Demonstrate knowledge of retrieving sample of asbestos.
- Demonstrate knowledge of determining scope of work required for asbestos abatement.
- Demonstrate knowledge of preparing site for removal and containment of asbestos.

### 2018 Red Seal Occupational Standard Reference:

- 22.01 Determines required PPE for asbestos abatement.
- 22.02 Retrieves sample of asbestos for testing.
- 22.03 Determines scope of work.
- 22.04 Prepares site for removal and containment of asbestos.
- 22.05 Builds temporary enclosure.

### Suggested Hours:

14 Hours

### Theoretical Objectives:

1. Identify and interpret regulations related to asbestos abatement.
  - i) health and safety requirements and responsibilities
  - ii) PPE
  - iii) disposal
    - disposable coveralls
    - filters
    - gloves
    - rags
  - iv) decontamination
  - v) removal and containment
2. Identify electrical safety risks.
3. Identify tools and safety equipment required for abatement.
  - i) manometer
  - ii) aviation snips
  - iii) negative air machines
  - iv) glove bags

- v) High Efficiency Particulate Air (HEPA) vacuum
  - vi) fall protection equipment
  - vii) PPE
    - respirators
    - disposable coveralls
    - gloves
    - disposable booties
    - eye protection
4. Identify equipment used in asbestos abatement.
  5. Identify the types of asbestos and their characteristics.
  6. Identify types of temporary enclosures.
  7. Identify classifications of asbestos abatement.
    - i) type I (low)
    - ii) type II (moderate)
    - iii) type III (high)
  8. Identify decontamination requirements for PPE used with asbestos abatement.
  9. Identify storage, cleaning and maintenance for PPE.
  10. Identify materials used for temporary enclosures.
    - i) studs and polyethylene
    - ii) control cubes
  11. Identify sampling information required to document sample.
    - i) date and time taken
    - ii) line number
    - iii) who took the sample
    - iv) location
    - v) chain of evidence
  12. Identify the procedures used for the collection of samples.
  13. Identify materials required for abatement.
    - i) polyethylene
    - ii) studs
    - iii) tape
    - iv) adhesive
    - v) fasteners

14. Describe applications and limitations of PPE used for asbestos abatement.
15. Describe personal health and medical issues relating to asbestos.
16. Describe the procedures used to secure work area.
17. Describe the procedure to determine required number of negative air machines and their locations.

**Practical Objectives:**

N/A

## INS-165

## Asbestos Removal

### Learning Outcomes:

- Demonstrate knowledge of procedures used for removing asbestos.
- Demonstrate knowledge of regulations related to the removal and containment of asbestos.
- Demonstrate knowledge of procedures used for disposal of asbestos.
- Demonstrate knowledge of regulations related to the disposal of asbestos.
- Demonstrate knowledge of procedures used for decontamination area and equipment.
- Demonstrate knowledge of regulations related to the decontamination of area and equipment.

### 2018 Red Seal Occupational Standard Reference:

- 23.01 Removes asbestos.
- 23.02 Disposes of asbestos materials.
- 23.03 Performs decontamination of area and equipment.

### Suggested Hours:

14 Hours

### Theoretical Objectives:

1. Identify and interpret regulations related to the removal of asbestos.
  - i) health and safety requirements and responsibilities
  - ii) removal and disposal of asbestos
  - iii) containment of area and equipment
  - iv) decontamination of area and equipment
  
2. Identify types of tools and equipment used for asbestos removal.
  - i) HEPA vacuum
  - ii) hoses
  - iii) nylon brushes
  - iv) scrapers
  - v) knives
  - vi) snips
  - vii) airless spray machines
  - viii) shovels
  - ix) brooms
  
3. Identify types of containment devices for asbestos samples.

4. Identify materials used to construct containment area.
5. Identify precautions required for removal of asbestos.
6. Describe the methods used for asbestos removal.
7. Describe the procedures used for hot and cold removal.
8. Describe the methods used for disposal of asbestos.
9. Describe the procedures used to decontaminate area, equipment and personnel.
10. Describe the methods used to take an air sample.

**Practical Objectives:**

N/A

## INS-170

## Asbestos Maintenance and Repair

### Learning Outcomes:

- Demonstrate knowledge of procedures used to encapsulate asbestos.
- Demonstrate knowledge of regulations related to the encapsulation of asbestos.
- Demonstrate knowledge of procedures used to enclose asbestos.
- Demonstrate knowledge of regulations related to the enclosure of asbestos.

### 2018 Red Seal Occupational Standard Reference:

24.01 Encapsulates asbestos.

24.02 Encloses asbestos.

### Suggested Hours:

14 Hours

### Theoretical Objectives:

1. Identify and interpret regulations related to the maintenance and repair of asbestos.
  - i) health and safety requirements and responsibilities
  - ii) encapsulation
  - iii) enclosure
2. Explain the purpose of labelling encapsulated area with asbestos warning.
3. Explain the purpose of labelling enclosure with asbestos warning.
4. Identify types of tools and equipment used to apply encapsulant materials.
  - i) airless sprayer
  - ii) brush
  - iii) cutting tools
  - iv) trowels
5. Identify types of encapsulant materials.
  - i) mastic
  - ii) jacketing
  - iii) sealants
  - iv) coatings
6. Identify types of materials used to build enclosure around asbestos.
7. Identify situations that require encapsulating asbestos.

8. Identify situations that require enclosing asbestos.
9. Identify method of repair when enclosing asbestos.
  - i) boxing
  - ii) covering
  - iii) taping
10. Describe the procedures used to apply encapsulant materials.
11. Describe factors to consider when determining method of repair.
  - i) type of asbestos
  - ii) abatement classification
  - iii) size of project

**Practical Objectives:**

N/A

## **INS-175**

## **Lead Abatement and Mould Remediation**

### **Learning Outcomes:**

- Demonstrate knowledge of lead, its health risks and abatement procedures.
- Demonstrate knowledge of mould remediation, its health risks and procedures for remediation.

### **2018 Red Seal Occupational Standard Reference:**

- 25.01 Performs lead abatement.
- 25.02 Performs mould remediation.

### **Suggested Hours:**

6 Hours

### **Theoretical Objectives:**

1. Identify health and safety exposure limits.
2. Identify lead and its health risks.
3. Identify mould remediation and its health risks.
4. Identify jurisdictional guidelines.
5. Identify lead abatement procedures.
6. Identify mould remediation procedures.
7. Identify environment and substrates that support mould growth.

### **Practical Objectives:**

N/A

## **INS-180**

## **Hot Work**

### **Learning Outcomes:**

- Demonstrate knowledge of hot work environments.
- Demonstrate knowledge of procedures to work safely in hot work environments.

### **2018 Red Seal Occupational Standard Reference:**

- 1.01 Uses personal protective equipment (PPE) and safety equipment.
- 1.02 Maintains safe work environment.

### **Suggested Hours:**

18 Hours

### **Theoretical Objectives:**

1. Define hot work and its relation to the insulator occupation.
2. Describe the potential health effects of working in hot work environments.
  - i) body's ability to cool itself
    - blood circulation
    - sweating
  - ii) effect of hot work on the body's cooling system
    - metabolic heat
  - iii) heat disorders
    - symptoms
    - treatments
3. Describe the procedures used to prevent heat disorders when working in hot work environments.
  - i) workplace prevention
    - hot work supervisor
    - schedules
    - worker's records
  - ii) monitoring hot work areas
    - wet bulb globe thermometer
    - determine stay times
    - acclimatization
  - iii) personal prevention
    - knowledge of personal medical/work history
    - knowledge of personal limits

4. Describe site setup and procedures used in hot work environments.
  - i) hot work conditions
    - setting up a workplace
    - steps
      - posting signs
      - shutting off ventilation system
      - shutting off electricity
    - procedures
      - use of extension cords
      - use of scaffolds
      - use of large equipment
      - building a decontamination unit
      - hooking up negative air machines
  
5. Identify special personal protective clothing used in hot work environments.
  - i) cooling suits
  - ii) ice vests
  - iii) flame retardant
  
6. Describe fire protection and safe work practices used in hot work environments.
  - i) proper prevention measures
  - ii) dangers of high temperatures
  - iii) flammable materials
  - iv) fire extinguishers
  - v) logbook
  - vi) emergency exits
  - vii) emergency phone numbers
  - viii) preplanned escape plan

**Practical Objectives:**

N/A

# Level 2

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**Learning Outcomes:**

- Demonstrate knowledge of basic drawings and their applications (introduction).
- Demonstrate knowledge of the procedures to extract and interpret information from drawings.
- Demonstrate knowledge of preparing basic drawings and diagrams.

**2018 Red Seal Occupational Standard Reference:**

5.02 Interprets specifications and drawings.

**Suggested Hours:**

24 Hours

**Theoretical Objectives:**

1. Identify types of drawings and describe their applications.
  - i) civil
  - ii) architectural
  - iii) structural
  - iv) mechanical
  - v) electrical
  - vi) process
  - vii) isometric
  
2. Identify and describe the components of drawings
  - i) scales
  - ii) details
  - iii) legends
  - iv) elevations
  - v) notes
  
3. Identify and describe basic architectural symbols found on drawings.
  - i) earth
  - ii) concrete
  - iii) block
  - iv) metal
  - v) structural steel
  - vi) wood
  - vii) gyproc over wood
  - viii) insulation

- ix) windows
  - x) doors
4. Identify and describe types of projections and views.
    - i) orthographic projections
      - multi-view
    - ii) pictorial drawings
      - perspective
      - oblique
      - isometric
    - iii) general arrangements
    - iv) plot plans
  5. Describe the procedures used to interpret and extract information found on drawings.
  6. Describe the procedures used to prepare basic drawings and diagrams.
  7. Describe the procedures used to determine measurements from scaled drawings.
    - i) scales
    - ii) ratios
    - iii) imperial/metric scales
    - iv) using a scale

**Practical Objectives:**

N/A

## INS-205

## Tank, Vessel and Equipment I

### Learning Outcomes:

- Demonstrate knowledge of insulating tanks, vessels and equipment.
- Demonstrate knowledge of procedures used to install insulation on tanks, vessels and equipment.
- Demonstrate knowledge of vapour barriers, their application and the procedures used for installation.

### 2018 Red Seal Occupational Standard Reference:

- 5.01 Performs measurements and calculations.
- 6.02 Performs layout for industrial applications.
- 8.01 Installs insulation on tanks, vessels and equipment.
- 8.02 Applies vapour barrier on tanks, vessels and equipment.
- 9.01 Selects materials for commercial applications.
- 9.02 Performs layout for commercial applications.

### Suggested Hours:

24 Hours

### Theoretical Objectives:

1. Identify hazards and describe safe work practices related to insulation.
2. Explain tank, vessel and equipment expansion and contraction.
3. Identify types of insulation and describe their applications.
  - i) fiberglass
  - ii) cellular glass
  - iii) mineral fibre
  - iv) calcium silicate
  - v) urethane
  - vi) nano-like technology
4. Identify types of tanks, vessels and equipment that require insulation.
  - i) tanks
    - crude oil
    - liquefied natural gas
    - asphalt tanks
  - ii) vessels
    - desalters

- aerators
  - crackers
  - exchangers
- iii) equipment
- boilers
  - pumps
  - turbines
5. Identify types of vapour barriers and describe their applications.
- i) mastics
  - ii) all service jacket (ASJ)
  - iii) foil scrim kraft (FSK)
  - iv) reinforced foil flame retardant kraft (RFFRK)
  - v) blue skin
  - vi) pitt wrap
6. Identify types of adhesives and describe their applications.
7. Identify specifications related to installing insulation on tanks, vessels and equipment.
- i) location of pins and studs
  - ii) types and spacing of banding
  - iii) expansion springs
8. Describe procedures used to install insulation on tanks, vessels and equipment.
9. Describe the procedures used to apply vapour barrier to tanks, vessels and equipment.
10. Apply basic geometry related to insulating tanks, vessels and equipment.
11. Apply basic geometry related to the installation of vapour barriers on tanks, vessels and equipment.

**Practical Objectives:**

- 1. Install insulation on a tank.

## **INS-210**

## **Plumbing and Mechanical Piping II**

### **Learning Outcomes:**

- Demonstrate knowledge of cladding, jacketing and finishes, their purposes and applications.
- Demonstrate knowledge of procedures used to install cladding, jacketing and finishes on insulated plumbing and mechanical piping systems.

### **2018 Red Seal Occupational Standard Reference:**

- 6.01 Selects materials for industrial applications.
- 9.01 Selects materials for commercial applications.
- 9.02 Performs layout for commercial applications.
- 10.03 Installs cladding, jacketing and finishes on insulated plumbing and mechanical piping systems.

### **Suggested Hours:**

24 Hours

### **Theoretical Objectives:**

1. Identify types of cladding, jacketing and finishes, and describe their characteristics and applications.
  - i) ASJ
  - ii) stainless steel
  - iii) aluminum
  - iv) PVC
  - v) canvas
  - vi) lagging
  - vii) foil scrim kraft (foil skin)
  - viii) cements
2. Identify fasteners and describe their characteristics and applications.
  - i) lagging
  - ii) screws
  - iii) banding
  - iv) PVC welding adhesives
  - v) tacks
  - vi) tape
  - vii) rivets
3. Identify plumbing systems and describe their characteristics.

- i) hot
  - ii) cold
  - iii) recirculation water
  - iv) rainwater leaders
  - v) vent piping
  - vi) sanitary drains
4. Identify mechanical piping systems and describe their characteristics.
- i) heating
  - ii) chilled water
  - iii) refrigeration
5. Describe the procedures used to install cladding, jacketing and finishes on insulated plumbing and mechanical piping systems.
- i) watershed
  - ii) lap placement
  - iii) fastening

**Practical Objectives:**

1. Apply insulation to plumbing and piping fixtures with vapour barriers and complete with cladding.

## INS-215

## Mechanical Ducting I

### Learning Outcomes:

- Demonstrate knowledge of installing insulation on mechanical ducting systems.
- Demonstrate knowledge of the procedures used to install insulation on mechanical ducting systems.
- Demonstrate knowledge of the application of vapour barrier on insulated mechanical ducting.

### 2018 Red Seal Occupational Standard Reference:

- 9.01 Selects materials for commercial applications.
- 9.02 Performs layout for commercial applications.
- 11.01 Installs insulation on mechanical ducting.
- 11.02 Installs vapour barrier on insulated mechanical ducting.

### Suggested Hours:

21 Hours

### Theoretical Objectives:

1. Identify types of insulation, their characteristics and applications.
  - i) fiberglass
    - rigid board
    - flexible blankets/batts
  - ii) elastomeric foam
2. Identify types of vapour barriers and describe their characteristics and applications.
  - i) ASJ
  - ii) RFFRK
  - iii) tar paper
  - iv) mastics
  - v) weatherproof membranes
3. Identify mechanical ducting systems, their characteristics and insulation requirements.
  - i) conditioned air
  - ii) outside air
  - iii) heat
  - iv) exhaust
4. Identify fastening devices and techniques.

5. Identify vapour barrier requirements.
6. Describe the procedures used to install insulation on mechanical ducting systems.
7. Describe the procedures used to apply vapour barriers on insulated mechanical ducting.
8. Describe the importance of vapour barriers on mechanical ducting.

**Practical Objectives:**

1. Apply insulation to ducting, and seal with vapour barrier and necessary cladding.

## INS-220

## Mechanical Equipment I

### Learning Outcomes:

- Demonstrate knowledge of installing insulation on mechanical equipment.
- Demonstrate knowledge of procedures used to install insulation on mechanical equipment.
- Demonstrate knowledge of the application of vapour barrier on insulated mechanical equipment.
- Demonstrate knowledge of substrates and the procedures used to prepare them for installation of insulation.

### 2018 Red Seal Occupational Standard Reference:

- 9.01 Selects materials for commercial applications.
- 9.02 Performs layout for commercial applications.
- 12.01 Installs insulation on mechanical equipment.
- 12.02 Applies vapour barriers on insulated mechanical equipment.

### Suggested Hours:

15 Hours

### Theoretical Objectives:

1. Identify types of insulation, their characteristics and applications.
  - i) fiberglass
    - rigid board
    - flexible blankets/batts
  - ii) elastomeric foam
  - iii) cellular glass (foam glass)
  
2. Identify types of mechanical equipment, their characteristics and insulation requirements.
  - i) pumps
  - ii) fans
  - iii) tanks
  - iv) boilers
  - v) chillers
  - vi) condensers
  - vii) heat exchangers
  - viii) precipitators

3. Identify types of vapour barriers and describe their importance, characteristics and applications.
  - i) ASJ
  - ii) RFFRK
  - iii) tar paper
  - iv) mastics
  - v) films
  - vi) weatherproof membranes
4. Identify fastening devices and techniques.
5. Identify vapour barrier requirements.
6. Describe the procedures used to install insulation on mechanical equipment.
7. Describe the procedures used to apply vapour barriers on insulated mechanical equipment.

**Practical Objectives:**

1. Apply vapour barrier to a vessel.

## INS-225

## Soundproofing

### Learning Outcomes:

- Demonstrate knowledge of insulating piping for soundproofing and their installation procedures.
- Demonstrate knowledge of insulating turbines, equipment and mechanical systems for soundproofing and their installation procedures.
- Demonstrate knowledge of acoustic panels, their applications and the procedures used to fabricate them.
- Demonstrate knowledge of acoustic panels, their applications and installation procedures.

### 2018 Red Seal Occupational Standard Reference:

- 9.01 Selects materials for commercial applications.
- 14.01 Insulates piping for soundproofing.
- 14.02 Insulates turbines, equipment and mechanical systems for soundproofing.
- 14.03 Fabricates acoustic panels.
- 14.04 Installs acoustic panels to ceilings and walls panels.

### Suggested Hours:

12 Hours

### Theoretical Objectives:

1. Identify types of piping requiring soundproofing.
2. Identify types of sound deadening materials and describe their characteristics and applications.
  - i) lead sheeting
  - ii) MLV (barium-impregnated material)
  - iii) rigid board
  - iv) flexible acoustic liners
3. Identify types of fasteners used when insulating pipe for soundproofing and describe their characteristics and applications.
  - i) self-seal laps
  - ii) tape
  - iii) wire
  - iv) banding
  - v) staples

4. Identify types of fasteners used with acoustic panels and describe their characteristics and applications.
  - i) pins
  - ii) adhesives
  - iii) perforated hangers
  
5. Identify types of finishes used when insulating turbines and describe their characteristics and applications.
  - i) aluminum
  - ii) cement
  - iii) fiberglass cloth with adhesive
  - iv) mastic
  
6. Identify the purpose of soundproofing piping.
  
7. Identify the purpose of soundproofing turbines, equipment and mechanical systems.
  
8. Describe the procedures used to apply finish material.
  - i) aluminum
  - ii) stainless steel
  - iii) PVC
  
9. Describe measuring techniques for installing soundproofing.
  
10. Describe the methods used to secure insulation.
  - i) pin welding
  - ii) banding
  - iii) wiring
  - iv) using hexagonal wire mesh
  
11. Describe the procedures used to install soundproofing on turbines, equipment and mechanical systems.
  
12. Describe the properties of acoustic materials.
  - i) mineral wool
  - ii) mineral fiber
  - iii) acoustic duct liner
  - iv) urethane
  
13. Describe the materials and procedures used to fabricate acoustic panels.
  - i) vinyls
  - ii) fabrics
  - iii) adhesives

iv) perforated metals

14. Describe the procedures used to install acoustic panels.

**Practical Objectives:**

N/A

## INS-230

## Underground Systems

### Learning Outcomes:

- Demonstrate knowledge of insulating piping in underground systems and the installation procedures.
- Demonstrate knowledge of pour-in-place insulation for underground systems and the procedures used for its installation.

### 2018 Red Seal Occupational Standard Reference:

16.01 Installs pipe insulation to underground systems.

16.02 Installs pour-in-place and spray-on insulations to underground systems.

### Suggested Hours:

18 Hours

### Theoretical Objectives:

1. Identify hazards and describe safe practices related to underground systems.
  - i) confined spaces
  - ii) working in trenches
    - cave-ins
    - gases
    - limited access/egress
    - grading
2. Explain expansion and contraction of pipe.
3. Identify types of pipe insulation, their characteristics and describe their applications.
  - i) cellular glass
  - ii) urethane
  - iii) nano-like materials
4. Identify types of protective membranes for underground systems.
  - i) asphalt-based membrane
  - ii) fibreglass cloth
  - iii) resin
  - iv) mastic
5. Identify types of pour-in-place insulation.
  - i) diatomaceous earth
  - ii) polystyrene beads

- iii) perlite
  - iv) hydrophobic pourable insulation
6. Identify application methods for insulation (pour-in-place or spray-on).
  7. Describe trenching and formwork requirements related to installing pour-in-place insulation to underground systems.

**Practical Objectives:**

N/A

## INS-235

## Sealers, Coatings and Spray-On Insulation

### Learning Outcomes:

- Demonstrate knowledge of protecting work area for spraying sealers, coatings and spray-on insulation.
- Demonstrate knowledge of preparing material, equipment and substrate for spraying.
- Demonstrate knowledge of installing reinforcing materials for spraying.
- Demonstrate knowledge of applying spray-on insulation, coatings and sealers.

### 2018 Red Seal Occupational Standard Reference:

- 5.03 Prepares substrates.
- 17.01 Protects surrounding work area for spraying.
- 17.02 Prepares materials, equipment and substrate for spraying.
- 17.03 Installs reinforcing materials for spraying.
- 17.04 Applies spray-on insulation, coatings, and sealers.

### Suggested Hours:

12 Hours

### Theoretical Objectives:

1. Identify types of protective sheeting used to protect surfaces for spraying sealers, coatings and spray-on insulation.
  - i) drop cloths
  - ii) polyethylene
2. Identify types of tapes and adhesives used when spraying sealers, coatings and spray-on insulation.
  - i) duct tape
  - ii) tuck tape
  - iii) masking tape
  - iv) spray glue contact adhesive
  - v) brush-on adhesive
3. Identify types of spray equipment used when preparing material, equipment and substrate for spraying.
  - i) airless
  - ii) two-part guns
  - iii) hoppers
  - iv) spray dispenser

4. Identify types of cleaners used to clean substrate.
  - i) soap and water
  - ii) tri-sodium phosphate (TSP)
  - iii) methyl ethyl ketone (MEK)
  - iv) methyl hydrate
  
5. Identify types of materials used to spray when preparing material, equipment and substrate.
  - i) polyurethane
  - ii) cellulose fibre
  - iii) sealants
  - iv) coatings
  - v) mastics
  
6. Identify types of spray equipment used when applying spray insulation, coatings and sealers and their procedures for use.
  - i) airless
  - ii) two-part guns
  - iii) hoppers
  - iv) spray dispenser
  
7. Identify factors to consider when inspecting substrate.
  - i) temperature
  - ii) deficiencies
  - iii) cleanliness
  
8. Describe the procedures used to assemble/disassemble spray equipment.
  
9. Describe the procedures used to perform a layout when installing reinforcing material for spraying.
  
10. Describe fastening techniques used to secure anchors.
  - i) pin welding
  - ii) bonding
  - iii) self-adhering
  
11. Describe the procedures used to attach reinforcing materials to anchors.
  
12. Describe the material application techniques used when applying spray insulation, coatings and sealers.
  
13. Explain calculations used to develop a layout for installing reinforcing material for spraying.

**Practical Objectives:**

N/A

## INS-240

## Refractory Systems

### Learning Outcomes:

- Demonstrate knowledge of insulating refractory systems.
- Demonstrate knowledge of procedures used to install insulation on refractory systems.
- Demonstrate knowledge of reflective systems, their applications and the procedures used to install them.
- Demonstrate knowledge of procedures used to install cladding, protective jacketing and finishes to refractory systems.

### 2018 Red Seal Occupational Standard Reference:

- 19.01 Applies insulation to refractory systems.
- 19.02 Installs reflective systems.
- 19.03 Installs cladding, jacketing and finishes to refractory systems.

### Suggested Hours:

12 Hours

### Theoretical Objectives:

1. Identify types of refractory insulation.
  - i) castable
  - ii) mortars
  - iii) high-temperature cements
  - iv) calcium silicate
  - v) ceramic fibre
2. Identify types of reflective material, their characteristics and describe their applications.
  - i) impregnated high-temperature reflective fabrics
  - ii) stainless steel
3. Identify types of cladding, protective jacketing and finishes.
  - i) aluminum
  - ii) stainless steel
  - iii) high-temperature (HT) cement
  - iv) fiberglass cloth
4. Describe the procedures used to install insulation on refractory systems.
  - i) troweling
  - ii) pouring

- iii) spraying
  - iv) multi-layer application
5. Explain temperature range of refractory application.
  6. Explain expansion and contraction of joints related to refractory systems.
  7. Explain the procedures for elimination of thermal shock.
  8. Describe the procedures used to install reflective material using fasteners.
    - i) latches
    - ii) wire
    - iii) screws
    - iv) rivets
    - v) banding
    - vi) pins
    - vii) j-hooks
  9. Describe procedures used to install cladding, protective jacketing and finishes to refractory systems.

**Practical Objectives:**

N/A

## INS-245

## Cryogenic Systems

### Learning Outcomes:

- Demonstrate knowledge of cryogenic insulation systems and their applications.
- Demonstrate knowledge of the procedures used to apply insulation to cryogenic systems.
- Demonstrate knowledge of the procedures used to apply vapour barrier on insulated components of cryogenic systems.
- Demonstrate knowledge of the procedures used to install cladding, protective jacketing and finishes to cryogenic systems.

### 2018 Red Seal Occupational Standard Reference:

20.01 Applies insulation to cryogenic systems.

20.02 Applies vapour barriers to insulated components of cryogenic systems.

20.03 Installs cladding, jacketing and finishes to cryogenic systems.

### Suggested Hours:

18 Hours

### Theoretical Objectives:

1. Identify types of insulation and describe their applications.
  - i) cellular glass
  - ii) polyurethane
  - iii) nano-like technology
  - iv) perlite
  - v) oil-free mineral wool
  
2. Identify types of vapour barrier material and describe their importance, characteristics and applications.
  - i) films
  - ii) laminates
  - iii) metals
  - iv) mastics
  - v) sealants
  
3. Identify types of cladding, protective jacketing and finishes.
  - i) aluminum
  - ii) stainless steel
  - iii) PVC
  - iv) Mastic

4. Identify types of fasteners used to install cladding, protective jacketing and finishes to cryogenic systems.
  - i) banding
  - ii) adhesives
  - iii) latches
5. Identify vapour barrier requirements.
6. Describe the procedures used to install insulation on cryogenic systems.
  - i) pouring
  - ii) spraying
  - iii) wrapping
  - iv) multi-layer application
7. Describe the methods used to apply vapour barrier material on insulated components of cryogenic systems.
  - i) mastics
  - ii) adhesives
  - iii) tapes
8. Describe the procedures used to install cladding, protective jacketing and finishes to cryogenic systems.
9. Describe the temperature range of cryogenic applications.
10. Describe the importance of accurate measurements in cryogenic applications.

**Practical Objectives:**

1. Apply insulation to cryogenic systems.

## INS-250

## Trade Practices I

### Learning Outcomes:

- Demonstrate knowledge of measurements and calculations.

### 2018 Red Seal Occupational Standard Reference:

5.01 Performs measurements and calculations.

### Suggested Hours:

30 Hours

### Theoretical Objectives:

1. Identify mathematical formulas (surface area, volume, circumference, diameter, radius) for calculating dimensions of components.
  - i) insulation
  - ii) protective finishes
  - iii) cladding/jacketing
  - iv) removable covers
  - v) insulation blankets
2. Identify imperial and metric systems and the conversion from one to the other.
3. Perform calculations related to the Insulator (Heat and Frost) trade.
  - i) drawings
  - ii) tank, vessel and equipment
  - iii) plumbing and mechanical piping
  - iv) mechanical ducting
  - v) mechanical equipment
  - vi) sealers, coatings and spray-on

### Practical Objectives:

N/A

# Level 3

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## INS-300

## Piping and Fittings II

### Learning Outcomes:

- Demonstrate knowledge of cladding, jacketing and finishes, their purpose and application.
- Demonstrate knowledge of procedures used to install cladding, jacketing and finishes on insulated piping and fittings.

### 2018 Red Seal Occupational Standard Reference:

- 5.01 Performs measurements and calculations.
- 6.01 Selects materials for industrial applications.
- 6.02 Performs layout for industrial applications.
- 7.03 Installs cladding, jacketing and finishes on piping and fittings.
- 9.01 Selects materials for commercial applications.
- 9.02 Performs layout for commercial applications.

### Suggested Hours:

48 Hours

### Theoretical Objectives:

1. Identify types of cladding, jacketing and finishes, and describe their characteristics and applications.
  - i) stainless steel
  - ii) aluminum
  - iii) polyvinyl chloride (PVC)
  - iv) cements
  - v) galvanized steel
  - vi) mastic
  - vii) reinforced asphalt-based membrane
  - viii) mass-loaded vinyl (MLV) (barium-impregnated material)
  - ix) self-adhering jacketing tape
  - x) weatherproof membranes
  
2. Identify fasteners and describe their characteristics and applications.
  - i) screws
  - ii) banding
  - iii) PVC glue
  - iv) tacks
  - v) tape
  - vi) rivets

3. Describe the procedures used to install cladding, jacketing and finishes on insulated piping and fittings.
  - i) tees
  - ii) radial line development
  - iii) elbows
  - iv) end caps/bevels
  - v) valves
  
4. Identify mathematical formulas for calculating dimensions of components.

**Practical Objectives:**

1. Develop radial line/parallel line layouts.

## INS-305

## Tank, Vessel and Equipment II

### Learning Outcomes:

- Demonstrate knowledge of cladding, jacketing and finishes, their purpose and application.
- Demonstrate knowledge of procedures to install components on tanks, vessels and equipment.

### 2018 Red Seal Occupational Standard Reference:

- 5.01 Performs measurements and calculations.
- 6.01 Selects materials for industrial applications.
- 6.02 Performs layout for industrial applications.
- 8.03 Installs cladding, jacketing and finishes on tanks, vessels and equipment.
- 9.01 Selects materials for commercial applications.
- 9.02 Performs layout for commercial applications.

### Suggested Hours:

30 Hours

### Theoretical Objectives:

1. Identify types of cladding, jacketing and finishes, and describe their properties and applications.
  - i) stainless steel
  - ii) aluminum
  - iii) PVC
  - iv) cements
  - v) weatherproof membranes
  
2. Identify fasteners and describe their characteristics and applications.
  - i) screws
  - ii) banding
  - iii) PVC glue
  - iv) tacks
  - v) tape
  - vi) rivets
  - vii) temporary holding devices
  - viii) expansion springs
  - ix) S-clips
  - x) belt loops

3. Describe the procedures used to install components on tanks, vessels and equipment.
  - i) head segments
  - ii) rings
  - iii) transitions
  - iv) end caps
  - v) laterals
  - vi) flashing
  - vii) inspection port
  - viii) standing seams
  
4. Identify mathematical formulas for calculating dimensions of components.

**Practical Objectives:**

1. Apply cladding to an insulated tank and seal all joints.

## INS-310

## Mechanical Ducting II

### Learning Outcomes:

- Demonstrate knowledge of cladding, jacketing and finishes, their characteristics and applications.
- Demonstrate knowledge of procedures used to install cladding, jacketing and finishes on insulated mechanical ducting systems.

### 2018 Red Seal Occupational Standard Reference:

- 5.01 Performs measurements and calculations.
- 9.01 Selects materials for commercial applications.
- 9.02 Performs layout for commercial applications.
- 11.03 Installs cladding, jacketing and finishes on insulated mechanical ducting.

### Suggested Hours:

18 Hours

### Theoretical Objectives:

1. Identify types of cladding, jacketing and finishes, and describe their characteristics and applications.
  - i) stainless steel
  - ii) aluminum
  - iii) PVC
  - iv) canvas
  - v) mastic
  - vi) weatherproof membranes
2. Identify fasteners and describe their characteristics and applications.
  - i) lagging
  - ii) screws
  - iii) banding
  - iv) PVC welding adhesive
  - v) tacks
  - vi) tape
  - vii) rivets
3. Identify mechanical ducting systems and describe their characteristics.
  - i) conditioned air
  - ii) outside air
  - iii) heat

- iv) exhaust
4. Describe the procedures used to install cladding, jacketing and finishes on insulated mechanical ducting systems.
- i) watershed
  - ii) lap placement
  - iii) fastening
  - iv) sealants
5. Identify mathematical formulas for calculating dimensions of components.

**Practical Objectives:**

1. Install finish to insulated duct.

## INS-315

## Mechanical Equipment II

### Learning Outcomes:

- Demonstrate knowledge of cladding, jacketing and finishes, their characteristics and applications.
- Demonstrate knowledge of procedures used to install cladding, jacketing and finishes on insulated mechanical equipment.

### 2018 Red Seal Occupational Standard Reference:

- 5.01 Performs measurements and calculations.
- 9.01 Selects materials for commercial applications.
- 9.02 Performs layout for commercial applications.
- 12.03 Installs cladding, jacketing and finishes on insulated mechanical equipment.

### Suggested Hours:

6 Hours

### Theoretical Objectives:

1. Identify types of cladding, jacketing and finishes, and describe their characteristics and applications.
  - i) stainless steel
  - ii) aluminum
  - iii) PVC
  - iv) canvas
  - v) mastic
  - vi) weatherproof membranes
2. Identify fasteners and describe their characteristics and applications.
  - i) lagging
  - ii) screws
  - iii) banding
  - iv) PVC welding adhesive
  - v) tacks
  - vi) tape
  - vii) rivets
3. Describe the procedures used to install cladding, jacketing and finishes on insulated mechanical equipment.
  - i) watershed
  - ii) lap placement

- iii) fastening
- iv) sealants

4. Identify mathematical formulas for calculating dimensions of components.

**Practical Objectives:**

N/A

## INS-320

## Removable Soft Covers

### Learning Outcomes:

- Demonstrate knowledge of removable soft covers, their applications and the procedures used to fabricate them.
- Demonstrate knowledge of removable soft covers, their applications and the procedures used to fasten them.

### 2018 Red Seal Occupational Standard Reference:

- 5.01 Performs measurements and calculations.
- 6.01 Selects materials for industrial applications.
- 6.02 Performs layout for industrial applications.
- 15.01 Fabricates removable covers.
- 15.02 Fastens removable covers.

### Suggested Hours:

18 Hours

### Theoretical Objectives:

1. Identify types of layout tools used to lay out removable soft covers.
  - i) dividers/trammel points
  - ii) levels
  - iii) tape measures
  - iv) squares
2. Identify types of tools used to fabricate soft covers.
  - i) C-ring pliers
  - ii) stitch staplers
  - iii) sewing machines
  - iv) shears
3. Identify types of fastening devices used for soft covers.
  - i) lacing anchors
  - ii) D-rings
  - iii) hook and loop
  - iv) draw strings or wire
4. Describe the procedures used to install fastening devices.
5. Describe the procedures used to fit covers to equipment and fittings.

6. Describe the procedures used to install fastening devices.
7. Perform measurements and calculations for materials used to create drawings and fabricate removable soft covers.

**Practical Objectives:**

1. Measure and fabricate a removable soft cover.

## INS-325

## Specifications and Drawings

### Learning Outcomes:

- Demonstrate knowledge of reading and interpreting information from related construction drawings.
- Demonstrate knowledge of the interpretation of basic information from blueprints or drawings.
- Demonstrate knowledge of preparing basic drawings and diagrams.

### 2018 Red Seal Occupational Standard Reference:

- 5.01 Performs measurements and calculations.
- 5.02 Interprets specifications and drawings.
- 6.01 Selects materials for industrial applications.

### Suggested Hours:

30 Hours

### Theoretical Objectives:

1. Identify components of architectural drawings.
  - i) sheets
  - ii) drawings
  
2. Identify components of structural drawings.
  - i) identify symbols and abbreviations
    - valves
    - fittings
    - tees
    - welds
    - flanges
    - unions
    - elbows
    - equipment
    - temperature range
    - heat trace
    - change in direction
  - ii) interpret elevation markings
  - iii) identify sections and details
  - iv) identify steel beams
  
3. Identify components of plumbing drawings.

- i) domestic water system
  - ii) hot water
  - iii) cold water
  - iv) drainage
  - v) lines that need to be insulated
  - vi) lines that do not need to be insulated
4. Identify components of electrical drawings.
- i) types of heat tracing
  - ii) exhaust pipe on emergency generator
5. Identify components of mechanical drawings.
- i) insulation requirements of sections of the HVAC system
  - ii) systems requiring insulation
6. Identify components and interpret ductwork drawings.
7. Identify components and interpret pipe drawings.
8. Describe the procedure to interpret scale ruler and symbols in ledger.
9. Describe the procedure to perform estimates of material quantities.
10. Describe the procedures used to determine measurements from scaled drawings.
- i) the alphabet of lines
    - center
    - hidden
    - cutting plane
    - break
    - dimension
    - extension
    - object
    - leader

**Practical Objectives:**

1. Interpret and sketch drawings and diagrams.
2. Estimate materials required from a drawing.

## **INS-330**

## **Marine Applications**

### **Learning Outcomes:**

- Demonstrate knowledge of insulating bulkheads, deckheads and hulls.
- Demonstrate knowledge of the procedures used to install cladding, protective jacketing and finishes on marine applications.
- Demonstrate knowledge of materials used for marine applications.

### **2018 Red Seal Occupational Standard Reference:**

21.01 Insulates bulkheads, deckheads and hulls.

21.02 Installs cladding, jacketing and finishes on marine applications.

### **Suggested Hours:**

6 Hours

### **Theoretical Objectives:**

1. Define terminology related to marine applications.
2. Identify specifications related to marine applications.
  - i) coast guard
  - ii) project
  - iii) manufacturers'
  - iv) ULC
3. Explain the importance of the sequencing of application when installing insulation materials.
4. Identify types of cladding, protective jacketing and finishes on marine applications.
  - i) stainless steel
  - ii) aluminum
  - iii) fiberglass
5. Identify types of cutting tools and procedures used to cut insulation.
  - i) hand saws
  - ii) knives
6. Identify types of fasteners used to install cladding, protective jacketing and finishes on marine applications.
  - i) dome caps
  - ii) washers

- iii) clips
  - iv) rivets
  - v) screws
7. Describe types of finish material, their procedures for use and applications.
- i) perforated metal
  - ii) RFFRK
  - iii) fabric finish system
  - iv) aluminum
  - v) steel
8. Identify fire-rated systems used to fireproof bulkheads, deckheads and hulls.
- i) A60
  - ii) A90
  - iii) H120
9. Identify types of insulating materials used in marine applications.
- i) mineral fibre
  - ii) fiberglass
  - iii) fabric-faced insulation
  - iv) polyimide foam
10. Describe the procedures used to fasten insulation.
11. Describe the procedures used to fasten wire mesh.
12. Describe the procedures used to install cladding, protective jacketing and finishes on marine applications.
13. Describe pin and clip fastening systems.
14. Describe multi-layer application of insulation.

**Practical Objectives:**

N/A

## INS-335

## Trade Practices II

### Learning Outcomes:

- Demonstrate knowledge of measurements and calculations.

### 2018 Red Seal Occupational Standard Reference:

5.01 Performs measurements and calculations.

### Suggested Hours:

24 Hours

### Theoretical Objectives:

1. Identify mathematical formulas (surface area, volume, circumference, diameter, radius) for calculating dimensions of components.
  - i) insulation
  - ii) protective finishes
  - iii) cladding/jacketing
  - iv) removable covers
  - v) insulation blankets
2. Identify imperial and metric systems and the conversion from one to the other.
3. Perform calculations related to the Insulator (Heat and Frost) trade.
  - i) piping and fitting insulation
  - ii) specifications and drawings
  - iii) tank, vessel and equipment
  - iv) mechanical ducting
  - v) mechanical equipment
  - vi) removable soft covers
  - vii) marine applications

### Practical Objectives:

N/A

# Level 4

Unit Code	Title	Hours	Page
INS-400	Fire Stop Systems II	24	92
INS-405	Fireproofing II	6	94
INS-410	Removable Hard Covers	30	95
INS-415	Transitions and Reducers	30	97
INS-420	Triangulation	30	98
INS-425	Trade Practices III	24	99
MENT-701	Mentoring II	6	100
INS-435	Program Review	30	101

## INS-400

## Fire Stop Systems II

### Learning Outcomes:

- Demonstrate knowledge of fire stop systems for architectural, structural, mechanical and electrical components (advanced).
- Demonstrate knowledge of applying fire stop materials to architectural, structural, mechanical and electrical components (advanced).

### 2018 Red Seal Occupational Standard Reference:

5.01 Performs measurements and calculations.

13.01 Identifies approved fire stop system.

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

### Suggested Hours:

24 Hours

### Theoretical Objectives:

1. Identify regulations related to fire stop systems.
2. Identify types of fire stop materials used in fire stop systems.
  - i) caulking
  - ii) wrap strips
  - iii) intumescent boards and collars
  - iv) bricks
  - v) pillows
  - vi) putty
  - vii) mortar
  - viii) mineral fiber
  - ix) foams
  - x) cement
3. Identify types of tools used to cut materials in fire stop installation.
  - i) saws
  - ii) snips
  - iii) knives
4. Identify types of tools used to fasten materials for fire stop system installation.
  - i) band tensioners
  - ii) powder-actuated tools

- iii) drills
- iv) pin welders
- v) caulking guns
- vi) trowels

5. Identify measurements and calculations required for fire stop systems.
6. Identify types of fire stop systems and describe their purpose and applications.
7. Describe fire stop installation material application techniques.
8. Calculate material requirements for fire stop systems.

**Practical Objectives:**

1. Apply firestopping system to penetrations.

## **INS-405**

## **Fireproofing II**

### **Learning Outcomes:**

- Demonstrate knowledge of protective fireproofing materials.

### **2018 Red Seal Occupational Standard Reference:**

18.02 Applies protective covering to fireproofing materials.

### **Suggested Hours:**

6 Hours

### **Theoretical Objectives:**

1. Identify types of protective covering used to protect fireproofing materials.
2. Identify types of fasteners used to fasten protective coverings.
  - i) screws
  - ii) rivets
  - iii) adhesives
  - iv) banding
3. Describe the procedures used to cut protective coverings.
4. Describe the procedures used to fabricate protective coverings.
5. Describe the procedures used to spray protective coverings.

### **Practical Objectives:**

N/A

## INS-410

## Removable Hard Covers

### Learning Outcomes:

- Demonstrate knowledge of removable hard covers, their applications and the procedures used to fabricate them.
- Demonstrate knowledge of removable hard covers, their applications and the procedures used to fasten them.

### 2018 Red Seal Occupational Standard Reference:

- 5.02 Interprets specifications and drawings.
- 5.03 Performs measurements and calculations.
- 7.03 Installs cladding, jacketing and finishes on piping and fittings.
- 15.01 Fabricates removable covers.
- 15.02 Fastens removable covers.

### Suggested Hours:

30 Hours

### Theoretical Objectives:

1. Identify types of layout tools used to lay out removable hard covers.
2. Identify types of tools used to fabricate hard covers.
  - i) sheet metal brake
  - ii) lockformer
  - iii) easy edgers
  - iv) hand and power tools
3. Identify types of fastening devices used for hard covers.
  - i) rivets
  - ii) suitcase latches
  - iii) screws
  - iv) hinges
  - v) banding
4. Describe the procedures used to install fastening devices.
5. Describe the procedures used to fit covers to equipment and fittings.
6. Perform measurements and calculations for materials used to fabricate removable covers.

**Practical Objectives:**

1. Measure and fabricate a removable hard cover.

## **INS-415**

## **Transitions and Reducers**

### **Learning Outcomes:**

- Demonstrate knowledge of patterns for transitions.
- Demonstrate knowledge of patterns for reducers.
- Demonstrate knowledge of procedures used to lay out and develop patterns for transitions and reducers.

### **2018 Red Seal Occupational Standard Reference:**

- 5.01 Performs measurements and calculations.
- 5.02 Interprets specifications and drawings.
- 6.02 Performs layout for industrial applications.
- 7.03 Installs cladding, jacketing and finishes on piping and fittings.
- 9.02 Performs layout for commercial applications.

### **Suggested Hours:**

30 Hours

### **Theoretical Objectives:**

1. Describe the procedures used to layout patterns for square to round or round to square transition.
2. Describe the procedures used to develop a pattern for a cylindrical reducer (concentric reducer).
3. Describe the procedures used to develop pattern for square to square concentric reducer.
4. Describe the procedures used to layout pattern for eccentric reducing reducers.
5. Explain the usage of math calculations related to introduction to transitions and reducers.

### **Practical Objectives:**

1. Fabricate a pattern for reducers.
2. Fabricate a pattern for transitions.

## **INS-420**

## **Triangulation**

### **Learning Outcomes:**

- Demonstrate knowledge of triangulation.
- Demonstrate knowledge of types of applicable layouts.
- Demonstrate knowledge of procedures used to perform triangulation.

### **2018 Red Seal Occupational Standard Reference:**

- 5.01 Performs measurements and calculations.
- 5.02 Interprets specifications and drawings.
- 6.02 Performs layout for industrial applications.
- 9.02 Performs layout for commercial applications.

### **Suggested Hours:**

30 Hours

### **Theoretical Objectives:**

1. Identify the types of layouts produced by triangulation.
2. Identify the basic geometry skills required for triangulation.
3. Identify the necessary view of object required for triangulation.
4. Describe triangulation.
5. Describe the procedures for triangulation.
  - i) true length lines
  - ii) Pythagorean theorem
6. Perform math calculations related to introduction of triangulation.

### **Practical Objectives:**

1. Perform triangulation layout.

## INS-425

## Trade Practices III

### Learning Outcomes:

- Demonstrate knowledge of measurements and calculations.

### 2018 Red Seal Occupational Standard Reference:

5.01 Performs measurements and calculations.

### Suggested Hours:

24 Hours

### Theoretical Objectives:

1. Identify mathematical formulas (surface area, volume, circumference, diameter, radius) for calculating dimensions of components.
  - i) insulation
  - ii) protective finishes
  - iii) cladding/jacketing
  - iv) removable covers
  - v) insulation blankets
2. Identify imperial and metric systems and the conversion from one to the other.
3. Perform calculations related to the Insulator (Heat and Frost) trade.
  - i) fire stop systems
  - ii) fireproofing
  - iii) removable hard cover
  - iv) transitions and reducers
  - v) triangulation

### Practical Objectives:

N/A

## **MENT-701            Mentoring II**

### **Learning Outcomes:**

- Demonstrate knowledge of effective communication practices as a mentor.
- Demonstrate knowledge of strategies for teaching workplace skills.

### **Red Seal Occupational Standard Reference:**

- 4.01 Uses communication techniques
- 4.02 Uses mentoring techniques

### **Suggested Hours:**

6 hours

### **Theoretical Objectives:**

1. Identify the different roles played by a workplace mentor.
2. Identify strategies to create a supportive learning environment.
3. Identify techniques for effective communication as a mentor.
  - i) constructive feedback
  - ii) active listening
  - iii) leading meetings and one-on-one sessions
4. Describe the steps in teaching a skill.
  - i) identifying the point of lesson
  - ii) linking the lesson
  - iii) demonstrating the skill
  - iv) providing practice
  - v) giving feedback
  - vi) assessing skill and progress
5. Identify strategies to assist in teaching a skill while meeting individual learning needs.
  - i) principles of instruction
  - ii) coaching skills
6. Explain how to adjust a lesson for various situations.

## **INS-435**

## **Program Review**

### **Learning Outcomes:**

- Demonstrate knowledge of the Red Seal Occupational Standard (RSOS) and its relationship to the Red Seal Examination.
- Demonstrate knowledge of overall comprehension of the trade in preparation for the Red Seal Examination.

### **2018 Red Seal Occupational Standard Reference:**

Entire Red Seal Occupational Standard (RSOS)

### **Suggested Hours:**

30 Hours

### **Theoretical Objectives:**

1. Define and explain terminology associated with an RSOS.
  - i) major work activities (MWA)
  - ii) tasks
  - iii) sub-tasks
2. Explain how an RSOS is developed and the link it has with the Red Seal Examination.
  - i) development
  - ii) validation
  - iii) MWA and task weighting
  - iv) examination breakdown (pie-chart)
3. Identify Red Seal products and describe their use for preparing for the Red Seal Examination.
  - i) Red Seal website
  - ii) examination preparation guide
  - iii) sample questions
  - iii) self-assessment
  - iv) examination breakdown
  - v) types of exam questions
  - vi) acronyms
  - vii) mathematical formulas (if applicable)
4. Explain the relationship between the RSOS and the Atlantic Apprenticeship Curriculum Standard (AACCS).

5. Review Common Occupational Skills for the Insulator (Heat and Frost) trade as identified in the RSOS.
  - i) safety-related functions
  - ii) tools and equipment
  - iii) organizes work
  - iv) communication and mentoring
6. Review process to perform routine trade practices for the Insulator (Heat and Frost) trade as identified in the RSOS.
  - i) prepares measurements and calculations
  - ii) interprets specifications and drawings
  - iii) prepares substrates
7. Review process to perform industrial applications for the Insulator (Heat and Frost) trade as identified in the RSOS.
  - i) preparation for installation of insulation in industrial applications
  - ii) piping and fittings
  - iii) tanks, vessels and equipment
8. Review process to perform commercial applications for the Insulator (Heat and Frost) trade as identified in the RSOS.
  - i) prepares for installation of insulation in commercial applications
  - ii) insulates plumbing and mechanical piping systems
  - iii) insulates mechanical ducting
  - iv) insulates mechanical equipment
9. Review process to perform applications common to industrial and commercial systems for the Insulator (Heat and Frost) trade as identified in the RSOS.
  - i) installs fire stop systems
  - ii) insulates for soundproofing
  - iii) installs removable covers
  - iv) installs underground insulating systems
10. Review process to perform specialized applications for the Insulator (Heat and Frost) trade as identified in the RSOS.
  - i) spray sealers, coatings and spray-on insulation
  - ii) installs fireproofing
  - iii) installs insulation for refractory systems
  - iv) installs insulations for cryogenic systems
11. Review process to perform asbestos, lead and mould abatement for the Insulator (Heat and Frost) trade as identified in the RSOS.
  - i) prepares for asbestos abatement
  - ii) performs asbestos removal procedures

- iii) performs maintenance and repair
- iv) performs lead abatement and mould remediation

**Practical Objectives:**

N/A

## Feedback and Revisions

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This AACS will be amended periodically; comments or suggestions for improvements should be directed to:

**New Brunswick:**

Apprenticeship and Occupational  
Certification  
Post-Secondary Education, Training and  
Labour  
470 York St., Rm. 110, PO Box 6000  
Fredericton, NB E3B 5H1  
Tel: 506-453-2260  
Toll Free in NB: 1-855-453-2260  
[www.gnb.ca](http://www.gnb.ca)

**Prince Edward Island:**

Apprenticeship, Training and  
Certification  
Atlantic Technology Centre  
212-176 Great George St.,  
PO Box 2000  
Charlottetown, PE C1A 7N8  
Tel: 902-368-4460  
[www.apprenticeship.pe.ca](http://www.apprenticeship.pe.ca)

**Newfoundland and Labrador:**

Apprenticeship and Trades Certification  
Immigration, Population Growth & Skills  
Confederation Bldg., West Block  
Prince Philip Dr., PO Box 8700  
St. John's, NL A1B 4J6  
Toll Free: 877-771-3737  
[www.gov.nl.ca/atcd](http://www.gov.nl.ca/atcd)

**Nova Scotia:**

Nova Scotia Apprenticeship Agency  
1256 Barrington St.  
Halifax, NS B3J 1Y6  
Tel: 902-424-5651  
Toll Free in NS: 1-800-494-5651  
[www.nsapprenticeship.ca](http://www.nsapprenticeship.ca)

Any comments or suggestions received will be reviewed and considered to determine the course of action required. If the changes are deemed to be minor, they will be held for implementation during the next review cycle. If immediate change is deemed appropriate and approved by the Atlantic Trade Advisory Committee, it will result in a revision to this version of the AACS and will be detailed in the following section.

### Version Changes

Revision Date	Section	Description of Change
May 2024	Levels 1 and 4	Integration of MENT-700 Mentoring I and MENT-701 Mentoring II