



# Plumber

# Guide to Course Content

2024

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*Recognition:*

*To promote transparency and consistency, this document has been adapted from the 2023 Plumber Red Seal Occupational Standard (Employment and Social Development Canada).*

*A complete version of the Occupational Standard can be found at [www.red-seal.ca](http://www.red-seal.ca)*

# STRUCTURE OF THE GUIDE TO COURSE CONTENT

To facilitate understanding of the occupation, this guide to course content contains the following sections:

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

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

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

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

**Training Profile Chart:** a chart which outlines the model for Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training sequencing with a cross reference to the Harmonized apprenticeship technical training sequencing, at the topic level.

**Technical Training Course Content for the Plumber trade:** a chart which outlines the model for SATCC technical training sequencing. For the harmonized level of training, a cross reference to the Harmonized apprenticeship technical training sequencing, at the learning outcome level, is provided.

# TRAINING REQUIREMENTS FOR THE PLUMBER TRADE

To graduate from each level of the apprenticeship program, an apprentice must successfully complete the required technical training and compile enough on-the-job experience to total at least 1800 hours each year. Total trade time required is 7200 hours and at least 4 years in the trade.

There are four levels of technical training delivered by Saskatchewan Polytechnic in Saskatoon. Level one and two are also delivered by Saskatchewan Polytechnic in Regina:

Level One:	8 weeks
Level Two:	8 weeks
Level Three:	8 weeks
Level Four:	8 weeks

**\*Any person who is not a journeyman plumber must become registered as an apprentice to work in this trade.**

The information contained in this guide to course content details the technical training delivered for each level of apprenticeship. An apprentice spends approximately 15% of their apprenticeship term in a technical training institute learning the technical and theoretical aspects of the trade. The hours and percentages of technical and practical training may vary according to class needs and progress.

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

## Entrance Requirements for Apprenticeship Training

Your grade twelve transcripts (with no modified classes) or GED 12 is your guarantee that you meet the educational entrance requirements for apprenticeship in Saskatchewan. In fact, employers prefer and recommend apprentices who have completed high school. This ensures the individual has all of the necessary skills required to successfully complete the apprenticeship program and receive journeyman certification.

Individuals with “modified” or “general” classes in math or science do not meet our entry requirements. These individuals are required to take an entrance assessment prescribed by the SATCC.

English is the language of instruction in all apprenticeship programs and is the common language for business in Saskatchewan. Before admission, all apprentices and/or “upgraders” must be able to understand and communicate in the English language. Applicants whose first language is not English must have a minimum Canadian Language Benchmark Assessment of six (CLB6).

Note: A CLB assessment is valid for a one-year period from date of issue.

Designated Trade Name	Math Credit at the Indicated Grade Level❶	Science Credit at Grade Level
<b>Plumber</b>	<b>Grade 10</b>	<b>Grade 10</b>
<p>❶ - (One of the following) WA – Workplace and Apprenticeship; or F – Foundations; or P – Pre-calculus, or a Math at the indicated grade level (Modified and General Math credits are not acceptable.).</p> <p>*Applicants who have graduated in advance of 2015-2016, or who do not have access to the revised Science curricula will require a Science at the minimum grade level indicated by trade.</p> <p>For information about high school curriculum, including Math and Science course names, please see: <a href="http://www.curriculum.gov.sk.ca/#">http://www.curriculum.gov.sk.ca/#</a></p> <p><b>Individuals not meeting the entrance requirements will be subject to an assessment and any required training</b></p>		

# PLUMBER TASK MATRIX CHART

This chart outlines the major work activities, tasks and sub-tasks from the 2023 Plumber Red Seal Occupational Standard. Each sub-task details the corresponding essential skill and level of training where the content is covered. \*

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

## A - Performs Common Occupational Skills

**11%**

<b>A-1 Performs safety-related functions</b>	<b>1.01 Maintains safe work environment</b>  1	<b>1.02 Uses personal protective equipment (PPE) and safety equipment</b>  1	<b>1.03 Performs lock-out and tag-out (LOTO) procedures</b>  1		
<b>A-2 Uses and maintains tools and equipment</b>	<b>2.01 Uses common tools and equipment</b>  1 (2, 3, 4 In-Context)	<b>2.02 Uses access equipment</b>  1 (2, 3, 4 In-Context)	<b>2.03 Uses rigging, hoisting, lifting and positioning equipment</b>  1 (2, 3, 4 In-Context)	<b>2.04 Rigs loads for cranes</b>  1 (2, 3, 4 In-Context)	<b>2.05 Uses welding equipment</b>  1 (2, 3, 4 In-Context)
	<b>2.06 Uses soldering and brazing equipment</b>  1 (2, 3, 4 In-Context)				
<b>A-3 Organizes work</b>	<b>3.01 Organizes project tasks and procedures</b>  1 (2, 3, 4 In-Context)	<b>3.02 Organizes materials and supplies</b>  1 (2, 3, 4 In-Context)	<b>3.03 Uses Documentation</b>  1 (2, 3, 4 In-Context)		
<b>A-4 Performs routine trade activities</b>	<b>4.01 Plans layout for piping system</b>  1, 2 (3, 4 In-Context)	<b>4.02 Calculates tube, tubing and pipe lengths</b>  1, 2 (3, 4 In-Context)	<b>4.03 Installs piping supports</b>  1, 2 (3, 4 In-Context)	<b>4.04 Installs piping sleeves</b>  1, 2 (3, 4 In-Context)	<b>4.05 Commissions systems</b>  1, 2 (3, 4 In-Context)
	<b>4.06 Protects piping systems, equipment and structure from damage</b>  1, 2 (3, 4 In-Context)	<b>4.07 Coordinates excavation and backfilling of trenches</b>  1, 2 (3, 4 In-Context)	<b>4.08 Installs fire stopping devices and materials</b>  1, 2 (3, 4 In-Context)		

**A-5 Uses communication and mentoring techniques**

**5.01 Uses communication techniques**

1  
(2, 3, 4 In Context)

**5.02 Uses mentoring techniques**

3, 4

**B – Prepares and Assembles Tube, Tubing and Pipe** **10%**

**B-6 Prepares tube, tubing and pipe**

**6.01 Inspects tube, tubing, pipe and fittings before installation**

1  
(2, 3, 4 In-Context)

**6.02 Cuts tube, tubing and pipe**

1  
(2, 3, 4 In-Context)

**6.03 Bends tube, tubing and pipe**

1  
(2, 3, 4 In-Context)

**6.04 Prepares tube, tubing and pipe connections**

1  
(2, 3, 4 In-Context)

**B-7 Joins tube, tubing and pipe**

**7.01 Joins copper tube, tubing and pipe**

1  
(2, 3, 4 In-Context)

**7.02 Joins plastic tube, tubing and pipe**

1  
(2, 3, 4 In-Context)

**7.03 Joins steel tube, tubing and pipe**

1  
(2, 3, 4 In-Context)

**7.04 Joins cast iron pipe**

1  
(2, 3, 4 In-Context)

**7.05 Joins specialized tube, tubing and pipe**

1  
(2, 3, 4 In-Context)

**C – Installs, Tests and Services Sewers, Sewage Treatment Systems and Drainage, Waste and Vent (DWV) Systems** **26%**

**C-8 Installs, tests and services sewers**

**8.01 Plans layout and sizes piping for sewers**

3  
(4 In-context)

**8.02 Installs maintenance holes and catch basins**

3  
(4 In-Context)

**8.03 Installs piping for sewers**

3  
(4 In-Context)

**8.04 Tests maintenance holes, catch basins and piping for sewers**

3  
(4 In-Context)

**8.05 Services maintenance holes, catch basins and piping for sewers**

3  
(4 In-Context)

**C-9 Installs, tests and services sewage treatment systems**

**9.01 Plans installation of sewage treatment systems**

4

**9.02 Installs components for sewage treatment system**

4

**9.03 Tests sewage treatment systems**

4

**9.04 Services sewage treatment systems**

4

<b>C-10 Installs, tests and services interior drainage, waste and vent (DWV) systems</b>	<b>10.01 Plans layout and sizes piping for interior drainage, waste, and vent (DWV) systems</b>  1, 2, 3 (4 In-context)	<b>10.02 Installs underground piping and components for interior drainage, waste and vent (DWV) systems</b>  1, 2, 3 (4 In-context)	<b>10.03 Installs above-ground piping and components for interior drainage, waste and vent (DWV) systems</b>  1, 2, 3 (4 In-context)	<b>10.04 Tests interior drainage, waste and vent (DWV) systems</b>  1, 2, 3 (4 In-context)	<b>10.05 Services interior drainage, waste and vent (DWV) systems</b>  1, 2, 3 (4 In-context)
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## D – Installs, Tests and Services Water Service and Distribution

**19%**

<b>D-11 Installs, tests and services water service</b>	<b>11.01 Plans layout and sizes piping and components for water service</b>  3 (4 In-Context)	<b>11.02 Installs piping for water services</b>  3 (4 In-Context)	<b>11.03 Installs components for water service</b>  3 (4 In-Context)	<b>11.04 Tests water service piping and components</b>  3 (4 In-Context)	<b>11.05 Services water service piping and components</b>  3 (4 In-Context)
<b>D-12 Installs, tests and services potable water distribution systems</b>	<b>12.01 Plans layout and sizes piping and components for potable water distribution systems</b>  3 (4 In-Context)	<b>12.02 Installs piping for potable water distribution systems</b>  3 (4 In-Context)	<b>12.03 Installs components for potable water distribution systems</b>  3 (4 In-Context)	<b>12.04 Installs cross-connection controls</b>  3 (4 In-Context)	<b>12.05 Tests potable water distribution systems</b>  3 (4 In-Context)
	<b>12.06 Services potable water distribution systems</b>  3 (4 In-Context)				
<b>D-13 Installs, tests and services private water pressure systems</b>	<b>13.01 Plans layout and sizes piping and components for private water pressure systems</b>  4	<b>13.02 Installs piping for private water pressure systems</b>  4	<b>13.03 Installs components for private water pressure systems</b>  4	<b>13.04 Tests private water pressure systems</b>  4	<b>13.05 Services private water pressure systems</b>  4



## E – Installs, Tests and Services Fixtures, Appliances and Water Treatment Systems

13%

E-14 Installs, tests and services plumbing fixtures and appliances	14.01 Installs fixture supports  2 (3, 4 In-Context)	14.02 Installs plumbing fixtures and appliances  2 (3, 4 In-Context)	14.03 Tests plumbing fixtures and appliances  2 (3, 4 In-Context)	14.04 Services plumbing fixtures and appliances  2 (3, 4 In-Context)
E-15 Installs, tests and services water treatment systems	15.01 Sizes water treatment systems  4	15.02 Installs water treatment systems  4	15.03 Tests water treatment systems  4	15.04 Services water treatment systems  4

## F – Installs, Tests and Services Low Pressure Steam and Hydronic Systems

13%

Tasks within this Major Work Activity is not consistently performed by Plumbers across Canada, therefore content deemed not common core (MWA 16). will **not** be assessed on the Plumber certification examination.

F-16 Installs, tests and services low pressure steam systems (Not Common Core)	16.01 Plans layout and sizes piping and components for low pressure steam systems  (Not Common Core)	16.02 Installs piping and components for low pressure steam systems  (Not Common Core)	16.03 Tests low pressure steam systems  (Not Common Core)	16.04 Services low pressure steam systems  (Not Common Core)
F-17 Installs, tests and services piping and components for hydronic systems	17.01 Plans layout and sizes piping and components for hydronic systems  2, 3 (4 In-Context)	17.02 Installs piping and components for hydronic systems  2, 3 (4 In-Context)	17.03 Tests hydronic systems  2, 3 (4 In-Context)	17.04 Services hydronic systems  2, 3 (4 In-Context)
F-18 Installs, tests and services hydronic heating and cooling equipment	18.01 Installs hydronic heating equipment  2, 3 (4 In-Context)	18.02 Installs hydronic cooling equipment  2, 3 (4 In-Context)	18.03 Tests hydronic heating and cooling equipment  2, 3 (4 In-Context)	18.04 Services hydronic heating and cooling equipment  2, 3 (4 In-Context)

# G – Installs, Tests and Services Specialized Systems

**8%**

Tasks within this Major Work Activity is not consistently performed by Plumbers across Canada, therefore content deemed not common core (MVA 20) will not be assessed on the Plumber certification examination.

<b>G-19 Installs, tests and services specialized systems</b>	<b>19.01 Plans layout and sizes piping and components for process piping systems</b> 4	<b>19.02 Installs piping for process piping systems</b> 4	<b>19.03 Installs components for process piping systems</b> 4	<b>19.04 Tests process piping systems</b> 4	<b>19.05 Services process piping systems</b> 4
<b>G-20 Installs, tests and services potable water fire protection systems (Not Common Core)</b>	<b>20.01 Plans layout and sizes piping for potable water fire protection systems</b> (Not Common Core)	<b>20.02 Installs potable water fire protection systems</b> (Not Common Core)	<b>20.03 Tests potable water fire protection systems</b> (Not Common Core)	<b>20.04 Services potable water fire protection services</b> (Not Common Core)	
<b>G-21 Installs, tests, and services other specialized systems</b>	<b>21.01 Plans layout and sizes piping, components and equipment for other specialized systems</b> 3, 4	<b>21.02 Installs piping and components for other specialized systems</b> 3, 4	<b>21.03 Installs equipment for other specialized systems</b> 3, 4	<b>21.04 Tests other specialized systems</b> 3, 4	<b>21.05 Services other specialized systems</b> 3, 4

# TRAINING PROFILE CHART

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

Level One	Transcript Code	Hours
Trade Related Safety	SAFE 130 – Theory	15
	SAFE 131 – Shop	15
Basic Tools and Equipment	TOOL 137 – Theory	30
	TOOL 138 – Shop	30
Piping Fundamentals	PIPE 140 – Theory	30
	PIPE 141 – Shop	30
Introduction to Graphics	GRPH 132	30
Plumbing Codebook	CODE 170	30
Gasfitting (Exceed)	PIPE 150	30
		240

Level Two	Transcript Code	Hours
Plumbing Codebook	CODE 270 – Theory	27
	CODE 271 – Shop	27
Plumbing Systems	PIPE 240 – Theory	27
	PIPE 241 – Shop	27
Hydronic Systems	HDRO 260 – Theory	47
	HDRO 261 – Shop	7
Gasfitting (Exceed)	PIPE 280 – Theory	42
	PIPE 283 – Shop	12
Electric Controls (Exceed)	ELEC 281	24
		240

Level Three	Transcript Code	Hours
Plumbing Codebook	CODE 370 – Theory	27
	CODE 371 – Shop	27
Plumbing Systems	PIPE 340	54
Hydronic Systems	HDRO 360	27
Gasfitting (Exceed)	PIPE 350 – Theory	27
	PIPE 351 – Shop	27
Electric Controls (Exceed)	ELEC 370	24
Gas Appliance Service (Exceed)	HVAC 300	27
		240

Level Four	Transcript Code	Hours
Water Conditioning	WTER 421	27
Pump and Private Water Supply	WTER 420	27
Introduction to Low Pressure Steam	STEA 450	27
Special Piping Systems	PIPE 448	27
Process Piping	PIPE 449	27
Graphics	GRPH 432	27
Gasfitting (Exceed)	PIPE 450	27
Electric Controls (Exceed)	ELEC 470	24
Plumber Codebook	CODE 4XX*	27
*subject to change		240

### Exceed Topics

Throughout this guide to course content there are topics, which exceed the scope of work set out by the Plumber RSOS. Industry in Saskatchewan has deemed certain topics to fall within the scope of work of the Plumber trade and therefore require technical training to also cover these topics.

# TECHNICAL TRAINING COURSE CONTENT

This chart outlines the model for Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training sequencing. For the harmonized level of training, a cross reference to the Red Seal Occupational Standard (RSOS) apprenticeship technical training sequencing, at the learning outcome level, is provided.

The Red Seal Plumber Curriculum Outline, which provides additional detail of the Harmonized technical training, can be found at [www.red-seal.ca](http://www.red-seal.ca)

<b>Level One</b>	<b>8 weeks</b>	<b>240 hours</b>
<b>Trade Related Safety – Theory</b>		<b>15 hours</b>
<ul style="list-style-type: none"><li>• discuss safe work practices</li><li>• discuss WHMIS</li><li>• discuss lockout and tag out procedures</li></ul>		
<b>Trade Related Safety – Shop</b>		<b>15 hours</b>
<ul style="list-style-type: none"><li>• demonstrate safe work practices</li><li>• apply WHMIS</li><li>• perform lockout and tag out procedures</li></ul>		
<b>RSOS topics covered in this section of training:</b>		
<b>A-1 Safety-related functions</b>		
A-1.01 Maintains safe work environment		
A-1.02 Uses personal protective equipment (PPE) and safety equipment		
A-1.03 Performs lock-out and tag-out procedures		
<hr/>		
<b>Introduction to Graphics</b>		<b>30 hours</b>
<ul style="list-style-type: none"><li>• explain drafting tools</li><li>• use drafting tools</li><li>• discuss graphics language, measurements and standards</li><li>• explain graphical single line projections</li><li>• draw single line projections</li></ul>		
<b>RSOS topics covered in this section of training:</b>		
<b>A-5 Communication Techniques</b>		
A-5.01 Uses communication techniques		
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<b>Basic Tools and Equipment – Theory</b>		<b>30 hours</b>
<ul style="list-style-type: none"><li>• discuss the use and care of hand and power tools</li><li>• discuss access equipment</li><li>• explain hoisting and rigging equipment</li><li>• explain crane hand signals</li><li>• discuss knots and hitches describe welding equipment</li><li>• explain soldering and brazing equipment</li></ul>		
<b>Basic Tools and Equipment – Shop</b>		<b>30 hours</b>
<ul style="list-style-type: none"><li>• demonstrate the safe use and care of hand and power tools</li><li>• demonstrate access equipment use</li><li>• use hoisting and rigging equipment</li><li>• use crane hand signals</li></ul>		

- tie knots and hitches
- use welding equipment
- perform soldering and brazing

**RSOS topics covered in this section of training:**

**A-2 Tools and Equipment**

- A-2.01 Uses common tools and equipment
- A-2.02 Uses access equipment
- A-2.03 Uses rigging, hoisting, lifting and positioning equipment
- A-2.04 Rigs loads for cranes
- A-2.05 Uses welding equipment
- A-2.06 Uses soldering and brazing equipment

**A-3 Organizes Work**

- A-3.01 Organizes project tasks and procedures
- A-3.02 Organizes materials and supplies
- A-3.03 Uses documentation

**Piping Fundamentals – Theory**

**30 hours**

- discuss piping system layout
- discuss piping system measurements
- explain piping system offsets
- identify pipe support systems
- discuss pipe sleeves
- define piping system commissioning
- discuss piping system protection

**Piping Fundamentals – Shop**

**30 hours**

- assemble copper tube and tubing
- assemble plastic tube and tubing
- assemble steel pipe project
- install a hybrid piping system

**RSOS topics covered in this section of training:**

**A-4 Routine Trade Activates**

- A-4.01 Plans layout for piping systems
- A-4.02 Calculates tube, tubing and pipe lengths
- A-4.03 Installs piping supports
- A-4.04 Installs piping sleeves
- A-4.05 Commissions systems
- A-4.06 Protects piping systems, equipment, and structure from damage
- A-4.06 Protects piping systems, equipment, and structure from damage
- A-4.07 Coordinates excavation and backfilling of trenches
- A-4.08 Installs fire stopping devices and materials

**B-6 Prepares and Assembles Tube, Tubing and Pipe**

- B-6.01 Inspects tube, tubing, pipe and fittings before installation
- B-6.02 Cuts tube, tubing and pipe
- B-6.03 Bends tube, tubing and pipe
- B-6.04 Prepares tub, tubing and pipe connections

### **B-7 Joins Tube, Tubing, and Pipe**

- B-7.01 Joins copper tube, tubing and pipe
- B-7.02 Joins plastic tube, tubing and pipe
- B-7.03 Joins steel tube, tubing and pipe
- B-7.04 Joins cast iron pipe
- B-7.05 Joins specialized tube, tubing and pipe

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### **Plumbing Codebook**

**30 hours**

- explain drainage piping components
- explain dry venting
- explain wet venting
- size drainage, waste and venting (DWV) line drawings
- discuss rough-in requirements
- install bathroom rough-in

#### **RSOS topics covered in this section of training:**

#### **C-10 Installs, tests and services interior drainage, waste and vent (DWV) systems**

- C-10.01 Plans layout and sizes piping for interior drainage, waste and vent (DWV) systems
- C-10.02 Installs underground piping and components for interior drainage, waste and vent (DWV) systems
- C-10.03 Installs above-ground piping and components for interior drainage, waste and vent (DWV) systems
- C-10.04 Tests interior drainage, waste and vent (DWV) systems
- C-10.05 Services interior drainage, waste and vent (DWV) systems

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### **Gasfitting**

**30 hours**

- explain the delivery system for natural and propane gases
- discuss the properties of natural, propane and butane gases
- explain gas codes
- install a natural gas piping system
- commission a natural gas piping system

**This section of training exceeds the minimum sequencing as set out by the Plumber RSOS.**

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**There are no Level On topics from the RSOS that are taught in context.**

***For details regarding the In Context topics, see pages 26-27.***

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## Level Two

8 weeks

240 hours

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### Plumbing Systems – Theory

27 hours

- describe potable water distribution systems
- distinguish different piping materials for drainage, waste and vent and potable water systems
- discuss piping system protection
- discuss fire stopping materials
- explain fixtures and trim

### Plumbing Systems – Shop

27 hours

- plan piping system layout
- size piping system layout
- install rough-in plumbing
- install fixtures and trim
- test drainage, waste and venting (DWV) and potable water systems
- inspect DWV and potable water systems

### RSOS topics covered in this section of training:

#### A-4 Routine Trade Activities

A-4.01 Plans layout for piping systems

A-4.02 Calculates tube, tubing and pipe lengths

A-4.03 Installs piping supports

A-4.04 Installs piping sleeves

A-4.05 Commissions systems

A-4.06 Protects piping systems, equipment and structure from damage

A-4.07 Coordinates excavation and backfilling of trenches

A-4.08 Installs fire stopping devices and materials

#### E-14 Installs, tests and services plumbing fixtures and appliances

E-14.01 Installs fixture supports

E-14.02 Installs plumbing fixtures and appliances

E-14.03 Tests plumbing fixtures and appliances

E-14.04 Services plumbing fixtures and appliances

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### Hydronic Systems - Theory

47 hours

- explain the chemical and physical properties of water
- perform mathematical calculations
- describe boilers
- describe boiler trim
- explain circulating pump components
- describe zoning
- describe piping layouts
- discuss heat emitters

### Hydronic Systems - Shop

7 hours

- identify boiler trim components
- interpret circulating pump curves
- operate hydronic systems



**RSOS topics covered in this section of training:**

**F-17 Installs, tests and services piping and components for hydronic systems**

- F-17.01 Plans layout and sizes piping and components for hydronic systems
- F-17.02 Installs piping and components for hydronic systems
- F-17.03 Tests hydronic systems
- F-17.04 Services hydronic systems

**F-18 Installs, tests and services hydronic heating and cooling equipment**

- F-18.01 Installs hydronic heating equipment
- F-18.02 Installs hydronic cooling equipment
- F-18.03 Tests hydronic heating and cooling equipment
- F-18.04 Services hydronic heating and cooling equipment

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**Plumbing Codebook – Theory**

**27 hours**

- demonstrate orthographic projections
- demonstrate isometric projections
- apply codebook objectives for drainage, waste and venting (DWV) systems
- explain blueprints
- explain building specifications

**Plumbing Codebook – Shop**

**27 hours**

- construct an orthographic drawing using an isometric template
- construct an isometric drawing using an orthographic template
- perform mathematical calculations
- demonstrate the relationship between the plumbing code, blueprints and specifications
- size drainage, waste and vent (DWV) systems
- draw DWV single line piping systems

**RSOS topics covered in this section of training:**

**C-10 Installs, tests and services interior drainage, waste and vent (DWV) systems**

- C-10.01 Plans layout and sizes piping for interior drainage, waste and vent (DWV) systems
- C-10.02 Installs underground piping and components for interior drainage, waste and vent (DWV) systems
- C-10.03 Installs above-ground piping and components for interior drainage, waste and vent (DWV) systems
- C-10.04 Tests interior drainage, waste and vent (DWV) systems
- C-10.05 Services interior drainage, waste and vent (DWV) systems

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**Gasfitting – Theory**

**42 hours**

- discuss line sizing techniques for piping systems operating at two psi and less
- discuss the combustion process pertaining to gas appliances
- perform mathematical calculations
- apply the B149.1 and B149.2 national and provincial codes
- describe gas burners
- explain domestic controls

**Gasfitting – Shop**

**12 hours**

- layout gas distribution piping system
- layout the venting system
- apply manufacturers' guidelines for furnace positioning
- perform start up procedures

This section of training exceeds the minimum sequencing as set out by the Plumber RSOS.

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**Electric Controls**

**24 hours**

- describe basic electrical concepts
- measure voltage, current, resistance, and capacitance
- interpret wiring diagrams
- test standing pilot appliance controls
- terminate wires

This section of training exceeds the minimum sequencing as set out by the Plumber RSOS.

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**Level Two topics from the RSOS that are taught in context:**

*A-2 Tools and Equipment*

*A-3 Organizes Work*

*B-6 Prepares Tube, Tubing and Pipe*

*B-7 Joins Tube, Tubing, and Pipe*

*For details regarding the In Context Topics, see pages 26-27.*

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## Level Three

8 weeks

240 hours

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### Plumbing Codebook – Theory

27 hours

- demonstrate non-isometric lines
- identify procedures for establishing elevations with the builder's level
- identify procedures for establishing elevations with the laser level
- size storm drainage systems
- calculate grade and elevation
- solve sanitary drainage, waste and venting scenarios

### Plumbing Codebook – Shop

27 hours

- produce isometric drawings of drainage, waste and vent (DWV) systems
- demonstrate the use of a builder's level
- demonstrate the use of a laser level
- implement grid lines
- design a DWV system

#### RSOS topics covered in this section of training:

#### C-10 Installs, tests and services interior drainage, waste and vent (DWV) systems

C-10.01 Plans layout and sizes piping for interior drainage, waste and vent (DWV) systems

C-10.02 Installs underground piping and components for interior drainage, waste and vent (DWV) systems

C-10.03 Installs above-ground piping and components for interior drainage, waste and vent (DWV) systems

C-10.04 Tests interior drainage, waste and vent (DWV) systems

C-10.05 Services interior drainage, waste and vent (DWV) systems

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### Hydronic Systems

27 hours

- discuss pump sciences
- calculate circulator requirements
- explain radiant heating concepts
- discuss piping strategy for multi temperature applications
- discuss design requirements for radiant panel heating systems
- recognize control systems
- discuss hydronic heating and cooling distribution piping

#### RSOS topics covered in this section of training:

#### F-17 Installs, tests and services piping and components for hydronic systems

F-17.01 Plans layout and sizes piping and components for hydronic systems

F-17.02 Installs piping and components for hydronic systems

F-17.03 Tests hydronic systems

F-17.04 Services hydronic systems

#### F-18 Installs, tests and services hydronic heating and cooling equipment

F-18.01 Installs hydronic heating equipment

F-18.02 Installs hydronic cooling equipment

F-18.03 Tests hydronic heating and cooling equipment

F-18.04 Services hydronic heating and cooling equipment

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### Plumbing Systems

54 hours

- describe commercial plumbing fixtures
- recognize cross connection control devices
- explain potable hot water distribution systems

- size potable water distribution systems
- discuss municipal infrastructures
- discuss medical gas systems
- explain radon gas prevention systems
- discuss compressed air systems
- discuss underground sprinkler systems
- discuss swimming pools
- describe special piping systems

**RSOS topics covered in this section of training:**

**C-8 Installs, tests and services sewers**

- C-8.01 Plans layout and sizes piping for sewers
- C-8.02 Installs maintenance holes and catch basins
- C-8.03 Installs piping for sewers
- C-8.04 Tests maintenance holes, catch basins and piping for sewers
- C-8.05 Services maintenance holes, catch basins and piping for sewers

**D-11 Installs, tests and services water services**

- D-11.01 Plans layout and sizes piping and components for water service
- D-11.02 Installs components for water service
- D-11.03 Installs water service equipment
- D-11.04 Tests water service piping and components
- D-11.05 Services water service piping and components

**D-12 Installs, tests and services potable water distribution systems**

- D-12.01 Plans layout and sizes piping and components for potable water distribution systems
- D-12.02 Installs piping for potable water distribution systems
- D-12.03 Installs components for potable water distribution systems
- D-12.04 Installs cross-connection controls
- D-12.05 Tests potable water distribution systems
- D-12.06 Services potable water distribution systems

**G-21 Installs, tests and services specialized systems**

- G-21.01 Plans layout and sizes piping, components and equipment for other specialized systems
- G-21.02 Installs piping and components for other specialized systems
- G-21.03 Installs equipment for other specialized systems
- G-21.04 Tests other specialized systems
- G-21.05 Services other specialized systems

**Gasfitting – Theory**

**27 hours**

- apply line sizing techniques for piping systems operating at two psi and less
- analyze the air supply requirements for gas appliances
- categorize domestic gas fired equipment based on flue loss and draft characteristics
- interpret combustion air code requirements for appliances with inputs of 400 MBH or less
- interpret code requirements for flue gas removal from gas appliances
- examine category one vent system requirements

**Gasfitting – Shop**

**27 hours**

- size domestic gas line
- determine combustion air opening sizes for Category 1 appliances
- size vent, vent connectors and common vent connectors for Category 1 appliances
- interpret electrical control diagrams

**This section of training exceeds the minimum sequencing as set out by the Plumber RSOS.**

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**Gas Appliance Service****27 hours**

- perform investigative maintenance on a forced air, natural gas furnace system
- perform investigative maintenance on a self-contained heat/cool forced air unit with economizer
- perform investigative maintenance on a residential hydronic heating system
- troubleshoot the mechanical sub-systems of a residential hydronic heating system

**This section of training exceeds the minimum sequencing as set out by the Plumber RSOS.**

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**Electric Controls****24 hours**

- test the operation of electrical circuits
- describe the operation of electrical switches
- use electrical transformers
- use relays in electrical circuits
- compare the characteristics for alternating current (AC) motors

**This section of training exceeds the minimum sequencing as set out by the Plumber RSOS.**

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**Level Three topics from the RSOS that are taught in context:**

*A-2 Tools and Equipment*

*A-3 Organizes Work*

*A-4 Routine Trade Activates*

*B-6 Prepares Tube, Tubing and Pipe*

*B-7 Joins Tube, Tubing, and Pipe*

*E-14 Installs, tests and services plumbing fixtures and appliances*

*For details regarding the In Context Topics, see pages 26-27.*

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## Level Four

8 weeks

240 hours

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### Pump and Private Water Supply

27 hours

- compare the available water sources
- discuss potable water supply system components
- explain pump theory
- design a rural water supply system

#### RSOS topics covered in this section of training:

#### C-9 Installs, tests and services sewage treatment systems

C-9.01 Plans installation of sewage treatment systems

C-9.02 Installs components for sewage treatment system

C-9.03 Tests sewage treatment systems

C-9.04 Services sewage treatment systems

#### D-13 Installs, tests and services private water pressure systems

D-13.01 Plans layout and sizes piping and components for private water pressure systems

D-13.02 Installs piping for private water pressure systems

D-13.03 Installs components for private water pressure systems

D-13.04 Tests private water pressure systems

D-13.05 Services private water pressure systems

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### Graphics

27 hours

- construct isometrics views from orthographic projections
- produce plumbing system design
- produce materials list

#### RSOS topics covered in this section of training:

#### A-5 Uses communication and mentoring techniques

A-5.02 Uses mentoring techniques

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### Water Conditioning

27 hours

- examine common constituents
- perform water tests
- identify water treatment equipment
- size water treatment equipment
- discuss equipment installation procedures

#### RSOS topics covered in this section of training:

#### E-15 Installs, tests and services water treatment systems

E-15.01 Sizes water treatment systems

E-15.02 Installs water treatment systems

E-15.03 Tests water treatment systems

E-15.04 Services water treatment systems

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## Introduction to Low Pressure Steam

27 hours

- use terms and definitions
- discuss steam boilers
- discuss system components
- discuss piping arrangements

### RSOS topics covered in this section of training:

#### D-13 Installs, tests and services private water pressure systems

- D-13.01 Plans layout and sizes piping and components for private water pressure systems
  - D-13.02 Installs piping for private water pressure systems
  - D-13.03 Installs components for private water pressure systems
  - D-13.04 Tests private water pressure systems
  - D-13.05 Services private water pressure systems
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## Special Piping Systems

27 hours

- explain geothermal heat transfer systems
- explain solar heat transfer systems
- discuss rainwater and greywater reuse
- discuss medical gas systems

### RSOS topics covered in this section of training:

#### G-21 Installs, tests and services specialized systems

- G-21.01 Plans layout and sizes piping, components and equipment for other specialized systems
  - G-21.02 Installs piping and components for other specialized systems
  - G-21.03 Installs equipment for other specialized systems
  - G-21.04 Tests other specialized systems
  - G-21.05 Services other specialized systems
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## Process Piping

27 hours

- explain the Saskatchewan Onsite Waste Water guide
- explain piping materials used in water treatment systems
- explain piping materials used in food processing systems
- discuss water reclaim systems

### RSOS topics covered in this section of training:

#### G-19 Installs, tests and services process piping systems

- G-19.01 Plans layout and sizes piping and components for process piping systems
  - G-19.02 Installs piping for process piping systems
  - G-19.03 Installs components for process piping systems
  - G-19.04 Tests process piping systems
  - G-19.05 Services process piping systems
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## Gasfitting

27 hours

- discuss liquefied petroleum containers
- discuss the gas appliance valve train
- explain sequence of operation from wiring diagrams
- interpret flue gas analysis

**This section of training exceeds the minimum scope of work as set out by the Plumber RSOS.**

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**Plumber Codebook****27 hours**

- construct a drainage system
- construct a circuit-vented drainage system
- construct a potable water system
- install fixtures complete with fixture trim

**RSOS topics covered in this section of training:****C-8 Installs, tests and services sewers**

C-8.01 Plans layout and sizes piping for sewers

C-8.02 Installs maintenance holes and catch basins

C-8.03 Installs piping for sewers

C-8.04 Tests maintenance holes, catch basins and piping for sewers

C-8.05 Services maintenance holes, catch basins and piping for sewers

**C-10 Installs, tests and services interior drainage, waste and vent (DWV) systems**

C-10.01 Plans layout and sizes piping for interior drainage, waste and vent (DWV) systems

C-10.02 Installs underground piping and components for interior drainage, waste and vent (DWV) systems

C-10.03 Installs above-ground piping and components for interior drainage, waste and vent (DWV) systems

C-10.04 Tests interior drainage, waste and vent (DWV) systems

**E-14 Installs, tests and services plumbing fixtures and appliances**

E-14.01 Installs fixture supports

E-14.02 Installs plumbing fixtures and appliances

E-14.03 Tests plumbing fixtures and appliances

E-14.04 Services plumbing fixtures and appliances

**E-15 Installs, tests and services water treatment systems**

E-15.01 Sizes water treatment systems

E-15.02 Installs water treatment systems

E-15.03 Tests water treatment systems

E-15.04 Services water treatment systems

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**Electric Controls****24 hours**

- troubleshoot the electrical controls of a standing pilot appliance
- troubleshoot the electrical controls of direct spark or hot surface ignited appliances
- interpret ladder diagrams and connection diagrams
- explain electrical pump controls

**This section of training exceeds the minimum scope of work as set out by the Plumber RSOS.**

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**Level Four topics from the RSOS that are taught in context:**

***A-2 Tools and Equipment***

***A-3 Organizes Work***

***A-4 Routine Trade Activities***

***B-6 Prepares Tube, Tubing and Pipe***

***B-7 Joins Tube, Tubing, and Pipe***

***C-8 Installs, Tests and Services Sewers***

***C-10 Installs, Tests and Services Interior Drainage, Waste and Vent (DWV) Systems***

***D-11 Installs, Tests and Services Water Services***

***D-12 Installs, Tests and Services Potable Water Distribution Systems***

***E-14 Installs, Tests and Services Plumbing Fixtures and Appliances***

***F-17 Installs, Tests and Services Hydronic Heating and Cooling Piping Systems***

***F-18 Installs, Tests and Services Hydronic Heating and Cooling Systems***

***For details regarding the In Context Topics, see pages see pages 26-27.***

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# In Context Topics

In context means learning that has already taken place and is being applied to the applicable task. Learning outcomes for in context topics are accomplished in other topics in that level.

## **A-2 Tools and Equipment**

- A-2.01 Uses common tools and equipment
- A-2.02 Uses access equipment
- A-2.03 Uses rigging, hoisting, lifting, and positioning equipment
- A-2.04 Rigs loads for cranes
- A-2.05 Uses welding equipment
- A-2.06 Uses soldering and brazing equipment

## **A-3 Organizes Work**

- A-3.01 Organizes project tasks and procedures
- A-3.02 Organizes materials and supplies
- A-3.03 Uses documentation

## **A-4 Routine Trade Activates**

- A-4.01 Plans layout for piping systems
- A-4.02 Calculates tube, tubing and pipe lengths
- A-4.03 Installs piping supports
- A-4.04 Installs piping sleeves
- A-4.05 Commissions systems
- A-4.06 Protects piping systems, equipment, and structure from damage
- A-4.07 Coordinates excavation and backfilling of trenches
- A-4.08 Installs fire stopping devices and materials

## **A-5 Uses communication and mentoring techniques**

- A-5.01 Uses communication techniques

## **B-6 Prepares and Assembles Tube, Tubing and Pipe**

- B-6.01 Inspects tube, tubing, pipe and fittings before installation
- B-6.02 Cuts tube, tubing and pipe
- B-6.03 Bends tube, tubing and pipe
- B-6.04 Prepares tub, tubing and pipe connections

## **B-7 Joins Tube, Tubing, and Pipe**

- B-7.01 Joins copper tube, tubing and pipe
- B-7.02 Joins plastic tube, tubing and pipe
- B-7.03 Joins steel tube, tubing and pipe
- B-7.04 Joins cast iron pipe
- B-7.05 Joins specialized tube, tubing and pipe

## **C-8 Installs, tests and services sewers**

- C-8.01 Plans layout and sizes piping for sewers
- C-8.02 Installs maintenance holes and catch basins
- C-8.03 Installs piping for sewers
- C-8.04 Tests maintenance holes, catch basins and piping for sewers
- C-8.05 Services maintenance holes, catch basins and piping for sewers

## **C-10 Installs, tests and services interior drainage, waste, and vent (DWV) systems**

- C-10.01 Plans layout and sizes piping for interior drainage, waste, and vent (DWV) systems
- C-10.02 Installs underground piping and components for interior drainage, waste, and vent (DWV) systems
- C-10.03 Installs above-ground piping and components for interior drainage, waste, and vent (DWV) systems
- C-10.04 Tests interior drainage, waste and vent (DWV) systems
- C-10.05 Services interior drainage, waste and vent (DWV) systems

**D-11 Installs, tests and services water services**

- D-11.01 Plans layout and sizes piping and components for water service
- D-11.02 Installs components for water service
- D-11.03 Installs water service equipment
- D-11.04 Tests water service piping and components
- D-11.05 Services water service piping and components

**D-12 Installs, tests and services potable water distribution systems**

- D-12.01 Plans layout and sizes piping and components for potable water distribution systems
- D-12.02 Installs piping for potable water distribution systems
- D-12.03 Installs components for potable water distribution systems
- D-12.04 Installs cross-connection controls
- D-12.05 Tests potable water distribution systems
- D-12.06 Services potable water distribution systems

**E-14 Installs, tests and services plumbing fixtures and appliances**

- E-14.01 Installs fixture supports
- E-14.02 Installs plumbing fixtures and appliances
- E-14.03 Tests plumbing fixtures and appliances
- E-14.04 Services plumbing fixtures and appliances

**F-17 Installs, tests and services piping and components for hydronic systems**

- F-17.01 Plans layout and sizes piping and components for hydronic systems
- F-17.02 Installs piping and components for hydronic systems
- F-17.03 Tests hydronic systems
- F-17.04 Services hydronic systems

**F-18 Installs, tests and services hydronic heating and cooling equipment**

- F-18.01 Installs hydronic heating equipment
- F-18.02 Installs hydronic cooling equipment
- F-18.03 Tests hydronic heating and cooling equipment
- F-18.04 Services hydronic heating and cooling equipment

