Saskatchewan Apprenticeship and Trade Certification Commission

Plumber

Guide to Course Content

2020

Online: www.saskapprenticeship.ca

Recognition:
To promote transparency and consistency, this document has been adapted from the 2016 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

STRUCTURE OF THE GUIDE TO COURSE CONTENT

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

Description of the Plumber trade: an overview of the trade's duties and training requirements.

Essential Skills Summary: an overview of how each of the 9 essential skills is applied in this trade.

Elements of harmonization of apprenticeship training: includes adoption of Red Seal trade name, number of levels of apprenticeship, total training hours (on-the-job and in-school) and consistent sequencing of technical training content.

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 with a cross reference to the Harmonized apprenticeship technical training sequencing, at the learning outcome level.

The Red Seal Plumber Curriculum Outline, which provides additional detail of the Harmonized technical training, can be found at www.red-seal.ca

DESCRIPTION OF THE PLUMBER TRADE

(An overview of the trade's description, duties and training requirements)

Plumbers install, replace and maintain water and sewage systems, and hydronic heating systems in residential, commercial and industrial buildings. They may also be licensed to perform gasfitting work.

Plumbers may be employed by plumbing/mechanical contractors, service companies, and maintenance departments of manufacturing, commercial, health care and educational facilities. They may also be self-employed. Plumbers install piping and equipment in residential, commercial, institutional and industrial buildings and sites.

Plumbers use a variety of tools and equipment such as hand and power tools, welding and soldering/brazing equipment, and hoisting and lifting equipment to perform the tasks in their trade. To perform some tasks or use some equipment, specific certification may be required. Plumbers work with a variety of piping materials such as copper, steel, plastic, glass, cast iron, cement, fibreglass and specialty materials. Before assembling and fitting pipe sections, tubing and fittings, the pipes must be measured, cut and bent as required. Joining pipe may be done by various means, such as threading, using mechanical joints, welding, soldering/brazing and using fastening materials and compounds. Plumbers test and commission systems to ensure proper operation. They perform scheduled, unscheduled and emergency maintenance and repair.

Safety awareness is essential for plumbers. They may work indoors or outdoors and working conditions vary from one job to another. The work of plumbers can be physically demanding. Plumbers often need to lift and carry heavy materials and equipment. While performing their duties, plumbers are also required to do considerable standing, climbing and kneeling. They may work at heights and in confined spaces. Special precautions may have to be taken when working with fluids, gases, steam and hazardous elements. Plumbers need to assess the systems and the environment to identify possible dangers.

Key attributes for people entering this trade are good mechanical, mathematical and spatial visualization skills. Plumbers also need good communication skills to communicate with co-workers and clients. Analytical/problem solving skills are required to interpret building plans, inspect piping systems and diagnose system faults and/or malfunctions.

With experience, plumbers act as mentors and trainers to apprentices in the trade. They may also move into other positions such as instructors, inspectors, estimators and project managers.

Training Requirements: 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: 7 weeks
Level Four: 7 weeks

***Any person who is not a journeyperson 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 journeyperson 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
Plumber	Grade 10	Grade 10

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.).

*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.

For information about high school curriculum, including Math and Science course names, please see: http://www.curriculum.gov.sk.ca/#

Individuals not meeting the entrance requirements will be subject to an assessment and any required training

ESSENTIAL SKILLS SUMMARY

(How each of the 9 essential skills is applied in this trade)

Essential skills are needed for work, learning and life. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Through extensive research, the Government of Canada and other national and international agencies have identified and validated nine essential skills. These skills are used in nearly every occupation and throughout daily life in different ways.

A series of CCDA-endorsed tools have been developed to support apprentices in their training and to be better prepared for a career in the trades. The tools can be used independently or with the assistance of a tradesperson, trainer, employer, teacher or mentor to:

- understand how essential skills are used in the trades;
- learn about individual essential skills strengths and areas for improvement; and
- improve essential skills and increase success in an apprenticeship program.

The tools are available online or for order at: www.esdc.gc.ca/eng/jobs/les/profiles/index.shtml

The application of these skills may be described throughout this document within the skills and knowledge which support each sub-task of the trade. The most important essential skills for each sub-task have also been identified. The following are summaries of the requirements in each of the essential skills, taken from the essential skills profile. A link to the complete essential skills profile can be found at www.red-seal.ca.

READING

Plumbers require strong reading skills to consult installation procedures, reference manuals, Safety Data Sheets (SDS), the National Plumbing Code (NPC) and industry standards and safety requirements when installing, repairing and maintaining plumbing fixtures and systems. They also refer to project specifications and work orders when planning a job.

DOCUMENT USE

Document use is important in the work of plumbers. Plumbers interpret diagrams in the NPC to ensure compliance with regulatory standards. They interpret schematics and working drawings when planning the installation of piping systems. Plumbers read assembly drawings to install fixtures and appliances. They prepare sketches and drawings to plan a job.

WRITING

Writing skills are used by plumbers to perform tasks such as writing lists of materials required for a job, completing order forms to request materials, and keeping daily logs to track work status and reminders. When required, they must write incident or accident reports. They may be required to communicate in writing to other trade professionals such as engineers and architects.

ORAL COMMUNICATION

Plumbers require good oral communication skills to interact with colleagues, apprentices, supervisors, suppliers, inspectors, clients and other tradespersons when co-ordinating work, resolving problems and ensuring safety.

NUMERACY

Plumbers work in both imperial and metric systems of measurement. They locate and mark positions for pipe connections. They perform a variety of calculations such as offsets, drain line fall, hydraulic load, and temperature and pressure calculations depending on the type of piping system being installed. Plumbers estimate materials and supplies needed to complete a project. They may estimate labour requirements and prepare quotations and invoices.

THINKING

Plumbers diagnose and solve problems. They decide on work priorities and plan and organize their work accordingly. Plumbers may determine the most cost effective way to use materials and supplies when installing plumbing and heating systems.

WORKING WITH OTHERS

During the course of a work day, plumbers must interact with others such as co-workers, suppliers, clients and other trades.

DIGITAL TECHNOLOGY

Plumbers use computers and other digital devices more commonly as sources of resource information, communication and cost reporting. They are also used as a tool for design, layout, research, system diagnosis and estimating.

CONTINUOUS LEARNING

Changes to the NPC periodically modify procedures and methods for the design and installation of piping systems. Advances in technology are also changing the design, applications and materials of systems. There is an increased emphasis on worker health and safety. All these changes mean that related training and certification is often mandatory for both apprentices and journeypersons.

ELEMENTS OF HARMONIZATION FOR APPRENTICESHIP TRAINING

At the request of industry, the Harmonization Initiative was launched in 2013 to *substantively align* apprenticeship systems across Canada by making training requirements more consistent in the Red Seal trades. Harmonization aims to improve the mobility of apprentices, support an increase in their completion rates and enable employers to access a larger pool of apprentices.

As part of this work, the Canadian Council of the Directors of Apprenticeship (CCDA) identified four main harmonization priorities in consultation with industry and training stakeholders:

1. Trade name

The official Red Seal name for this trade is Plumber.

2. Number of Levels of Apprenticeship

The number of levels of technical training recommended for the Plumber trade is 4.

3. Total Training Hours during Apprenticeship Training

The total hours of training, including both on-the-job and in-school training for the Plumber trade is 7200.

4. Consistent sequencing of training content (at each level) using the most recent Occupational Standard

White boxes are “Topics,” grey boxes are “In Context”. 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.

Level 1	Level 2	Level 3	Level 4
Organizes Work	Organizes Work	Organizes Work	Organizes Work
	Plumbing Fixtures and Appliances	Plumbing Fixtures and Appliances	Plumbing Fixtures and Appliances
Tools and Equipment	Tools and Equipment	Tools and Equipment	Tools and Equipment
Routine Trade Activities	Routine Trade Activities	Routine Trade Activities	Routine Trade Activities
Pipe Preparation	Pipe Preparation	Pipe Preparation	Pipe Preparation
Tube, Tubing, Pipe (Join)	Tube, Tubing, Pipe (Join)	Tube, Tubing, Pipe (Join)	Tube, Tubing, Pipe (Join)
Safety-Related Functions		Water Services	Water Services
		Potable Water Distribution	Potable Water Distribution

Level 1	Level 2	Level 3	Level 4
	Hydronic Systems	**Hydronic Systems**	**Hydronic Systems**
Interior Drainage, Waste and Vent (DWV) Systems - introduction	**Interior Drainage, Waste and Vent (DWV) Systems**	**Interior Drainage, Waste and Vent (DWV) Systems**	**Interior Drainage, Waste and Vent (DWV) Systems**
Communication Techniques (Communication)			**Communication Techniques (Mentoring)**
		Sewers	**Sewage Treatment Systems**
			Pressure Systems
			Low Pressure Steam Systems
			Water Treatment Equipment
			Process Piping
		Specialized Systems - residential irrigation - compressed air - green systems	**Specialized Systems** - fuel systems - medical gas

PLUMBER TASK MATRIX CHART

This chart outlines the major work activities, tasks and sub-tasks from the 2016 Plumber Red Seal Occupational Standard. Each sub-task details the corresponding essential skill and level of training where the content is covered.

A - PERFORMS COMMON OCCUPATIONAL SKILLS

A-1 Performs safety-related functions	**1.01 Maintains safe work environment** 1	**1.02 Uses personal protective equipment (PPE) and safety equipment** 1	**1.03 Performs lock-out and tag-out procedures** 1		
A-2 Uses and maintains tools and equipment	**2.01 Uses common tools and equipment** 1 2,3,4 In Context	**2.02 Uses access equipment** 1 2,3,4 In Context	**2.03 Uses rigging, hoisting, lifting and positioning equipment** 1 2,3,4 In Context	**2.04 Rigs loads for cranes** 1 2,3,4 In Context	**2.05 Uses welding equipment** 1 2,3,4 In Context
	2.06 Uses soldering and brazing equipment 1 2,3,4 In Context	**2.07 Uses oxy-fuel equipment** 1 2,3,4 In Context			
A-3 Organizes work	**3.01 Organizes project tasks and procedures** 1,2,3,4 In Context	**3.02 Organizes materials and supplies** 1,2,3,4 In Context			
A-4 Performs routine trade activities	**4.01 Performs piping system layout** 1,2 3,4 In Context	**4.02 Calculates pipe, tube and tubing lengths** 1,2 3,4 In Context	**4.03 Calculates piping offsets** 1,2 3,4 In Context	**4.04 Installs piping supports** 1,2 3,4 In Context	**4.05 Installs sleeves** 1,2 3,4 In Context
	4.06 Commissions systems 1,2 3,4 In Context	**4.07 Protects piping systems, equipment and structure from damage** 1,2 3,4 In Context	**4.08 Coordinates excavation and backfilling of trenches** 1,2 3,4 In Context	**4.09 Installs fire stopping devices and materials** 1,2 3,4 In Context	

A-5 Uses communication and mentoring techniques	5.01 Uses communication techniques 1	5.02 Uses mentoring techniques 2

B – PREPARES AND ASSEMBLES PIPE

B-6 Prepares 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 pipe and tubing 1 2,3,4 In Context	7.03 Joins steel pipe 1 2,3,4 In Context	7.04 Joins cast iron pipe 1 2,3,4 In Context	7.05 Joins specialized pipe 1 2,3,4 In Context

C – INSTALLS, TESTS AND SERVICES SEWERS, SEWAGE TREATMENT SYSTEMS AND DRAINAGE, WASTE AND VENT (DWV) SYSTEMS

C-8 Installs, tests and services sewers	8.01 Sizes pipe for sewers 3	8.02 Installs manholes and catch basins 3	8.03 Installs piping for sewers 3	8.04 Tests manholes, catch basins and piping for sewers 3	8.05 Services manholes, catch basins and piping for sewers 3
C-9 Installs, tests and services sewage treatment systems	9.01 Plans installation of sewage treatment systems 4	9.02 Installs sewage treatment system components 4	9.03 Tests sewage treatment systems and components 4	9.04 Services sewage treatment systems and components 4	

C-10 Installs, tests and services interior drainage, waste and vent (DWV) systems	**10.01 Sizes pipe for interior drainage, waste and vent (DWV) systems** **1,2,3** **4 In Context**	**10.02 Installs underground piping and components for interior drainage, waste and vent (DWV) systems** **1,2,3** **4 In Context**	**10.03 Installs piping and components for interior drainage, waste and vent (DWV) systems above-ground** **1,2,3** **4 In Context**	**10.04 Tests interior drainage, waste and vent (DWV) systems** **1,2,3** **4 In Context**	**10.05 Services piping and components for interior drainage, waste and vent (DWV) systems** **1,2,3** **4 In Context**

D – INSTALLS, TESTS AND SERVICES WATER SERVICE AND DISTRIBUTION

D-11 Installs, tests and services water services	**11.01 Sizes pipe for water services** **3**	**11.02 Installs piping for water services** **3**	**11.03 Installs water service equipment** **3**	**11.04 Tests water service piping and components** **3**	**11.05 Services water services** **3**
D-12 Installs, tests and services potable water distribution systems	**12.01 Sizes piping and equipment for potable water distribution systems** **3** **4 In Context**	**12.02 Installs piping for potable water distribution systems** **3** **4 In Context**	**12.03 Installs potable water distribution equipment** **3** **4 In Context**	**12.04 Installs and uses cross-connection control devices and methods** **3** **4 In Context**	**12.05 Tests potable water distribution systems** **3** **4 In Context**
	12.06 Services potable water distribution systems **3** **4 In Context**				
D-13 Installs, tests and services pressure systems	**13.01 Sizes pressure systems** **4**	**13.02 Installs piping for pressure systems** **4**	**13.03 Installs equipment and components for pressure systems** **4**	**13.04 Tests pressure systems** **4**	**13.05 Services pressure systems** **4**

E – INSTALLS, TESTS AND SERVICES FIXTURES, APPLIANCES AND WATER TREATMENT SYSTEMS

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 equipment	**15.01 Sizes water treatment equipment** **4**	**15.02 Installs water treatment equipment** **4**	**15.03 Tests water treatment equipment** **4**	**15.04 Services water treatment equipment** **4**

F – INSTALLS, TESTS AND SERVICES LOW PRESSURE STEAM AND HYDRONIC HEATING AND COOLING SYSTEMS

F-16 Installs, tests and services low pressure steam systems	**16.01 Sizes piping and components for low pressure steam systems** **4**	**16.02 Installs piping and components for low pressure steam systems** **4**	**16.03 Tests piping and components for low pressure steam systems** **4**	**16.04 Services piping and components for low pressure steam systems** **4**
F-17 Installs, tests and services hydronic heating and cooling piping systems	**17.01 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 piping and components for hydronic systems** **2,3** **4 In Context**	**17.04 Services piping and components for hydronic systems** **2,3** **4 In Context**
F-18 Installs, tests and services hydronic heating and cooling generating systems	**18.01 Installs hydronic heating generating systems** **2,3** **4 In Context**	**18.02 Installs hydronic cooling generating systems** **2,3** **4 In Context**	**18.03 Tests hydronic heating and cooling generating systems** **2,3** **4 In Context**	**18.04 Services hydronic heating and cooling generating systems** **2,3** **4 In Context**
F-19 Installs, tests and services hydronic system controls and transfer units	**19.01 Installs hydronic system controls** **2,3** **4 In Context**	**19.02 Installs hydronic transfer units** **2,3** **4 In Context**	**19.03 Tests hydronic system controls and transfer units** **2,3** **4 In Context**	**19.04 Services hydronic system controls and transfer units** **2,3** **4 In Context**

G – INSTALLS, TESTS AND SERVICES FIRE PROTECTION SYSTEMS (NOT COMMON CORE)

This Major Work Activity is not consistently performed by Plumbers across Canada, therefore this content is deemed not common core and will not be assessed on the Plumber certification examination.

G-20 Installs, tests and services flow-through fire protection systems (Not Common Core)	**20.01 Installs flow-through fire protection systems (Not Common Core)**	**20.02 Tests flow-through fire protection systems (Not Common Core)**	**20.03 Services flow-through fire protection systems (Not Common Core)**
G-21 Installs, tests and services standpipe systems (Not Common Core)	**21.01 Installs piping and equipment for standpipe systems (Not Common Core)**	**21.02. Tests standpipe systems (Not Common Core)**	**21.03. Services standpipe systems (Not Common Core)**

H – INSTALLS, TESTS AND SERVICES SPECIALIZED SYSTEMS

H-22 Installs, tests and services specialized systems	**22.01 Installs piping for specialized systems** **3,4**	**22.02 Installs equipment and components for specialized systems** **3,4**	**22.03 Tests specialized systems** **3,4**	**22.04 Services specialized systems** **3,4**
H-23 Installs, tests and services process piping systems	**23.01 Installs piping for process piping systems** **4**	**23.02 Installs equipment and components for process piping systems** **4**	**23.03 Tests process piping systems** **4**	**23.04 Services process piping systems** **4**

TRAINING PROFILE CHART

The Harmonization Initiative's goal is to *substantively align* apprenticeship systems across Canada by making apprenticeship training requirements more consistent in Red Seal trades. This Training Profile Chart represents Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training sequencing in relation to the Harmonized apprenticeship technical training sequencing, at the topic level, as published in the 2016 Plumber Red Seal Occupational Standard (RSOS).

SATCC Level One	Transcript Code	Hours	Pan-Canadian Harmonized Level One
			Organizes Work (In-Context)
Trade Related Safety	SAFE 130 - Theory	15	Safety-Related Functions
	SAFE 131 - Shop	15	
BasicTools and Equipment	TOOL 137 - Theory	30	Tools and Equipment
	TOOL 138 - Shop	30	
Piping Fundamentals	PIPE 140 - Theory	30	Routine Trade Activities
			Pipe Preparation
	PIPE 141 - Shop	30	Tube, Tubing, Pipe (Join)
Introduction to Graphics	PLUM 171	30	Communication Techniques (Communication)
Plumbing Codebook	PLUM 170	30	Interior DWV Systems
Gasfitting (Exceed)	GFTG 150	30	
		240	

SATCC Level Two	Transcript Code	Hours	Pan-Canadian Harmonized Level Two
			Organizes Work (In-Context)
			Tools and Equipment (In-Context)
			Pipe Preparation (In-Context)
			Tube, Tubing, Pipe (Join) (In-Context)
Plumbing Codebook	PLMB 270 - Theory	27	Interior DWV Systems
	PLMB 271 - Shop	27	
Plumbing Systems	PIPE 240 - Theory	27	Routine Trade Activities
	PIPE 241 - Shop	27	Plumbing Fixtures and Appliances
Hydronic Systems	HYDR 260 - Theory	47	Hydronic Systems
	HYDR 261 - Shop	7	
Gasfitting (Exceed)	GFTG 250 - Theory	42	
	GFTG 251 - Shop	12	
Electric Controls (Exceed)	ELEC 281	24	
		240	

SATCC Level Three	Transcript Code	Hours	Pan-Canadian Harmonized Level Three
			Organizes Work (In-Context)
			Tools and Equipment (In-Context)
			Pipe Preparation (In-Context)
			Tube, Tubing, Pipe (Join) (In-Context)
			Routine Trade Activities (In-Context)
			Plumbing Fixtures and Appliances (In-Context)
Plumbing Codebook	PLMB 370 - Theory	27	Interior DWV Systems
	PLMB 371 - Shop	27	
Plumbing Systems	PIPE 340	54	Sewers
			Water Services
			Potable Water Distribution Systems
			Specialized Systems
Hydronic Systems	HYDR 360	27	Hydronic Systems
Gasfitting (Exceed)	PLMB 370 - Theory	27	
	PLMB 371 - Shop	27	
Electric Controls (Exceed)	ELEC 281	21	
		210	

SATCC Level Four	Transcript Code	Hours	Pan-Canadian Harmonized Level Three
			Organizes Work (In-Context)
			Tools and Equipment (In-Context)
			Pipe Preparation (In-Context)
			Tube, Tubing, Pipe (Join) (In-Context)
			Routine Trade Activities (In-Context)
			Plumbing Fixtures and Appliances (In-Context)
			Interior DWV Systems (In-Context)
			Water Services (In-Context)
			Potable Water Distribution (In-Context)
			Hydronic Systems (In-Context)
Water Conditioning	PLMB 472	27	Water Treatment Equipment
Pump and Private Water Supply	PLMB 470	27	Sewage Treatment Systems
			Pressure systems
Introduction to Low Pressure Steam	STEA 450	27	Low Pressure Steam Systems
Special Piping Systems	PIPE 471	27	Specialized Systems
Process Piping	PIPE 449	27	Process Piping
Graphics	GRPH 432	27	Communication Techniques (Mentoring)
Gasfitting (Exceed)	PLMB 470	27	
Electric Controls (Exceed)	ELEC 281	21	
		210	

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 with a cross reference to the Red Seal Occupational Standard (RSOS) apprenticeship technical training sequencing, at the learning outcome level.

The Red Seal Plumber Curriculum Outline, which provides additional detail of the Harmonized technical training, can be found at www.red-seal.ca

Level One — 8 weeks — 240 hours

Trade Relate Safety – Theory — 15 hours

- discuss safe work practices
- discuss WHMIS
- discuss lockout and tag out procedures

Trade Related Safety – Shop — 15 hours

- demonstrate safe work practices
- apply WHMIS
- perform lockout and tag out procedures

RSOS topics covered in this section of training:

A-1 Safety-related functions

A-1.01 Maintains safe work environment

- safe work practices
- regulatory requirements pertaining to workplace safety

A-1.02 Uses personal protective equipment (PPE) and safety equipment

- PPE and safety equipment, its applications, maintenance and procedures for use
- regulatory requirements pertaining to PPE and safety equipment

A-1.03 Performs lock-out and tag-out procedures

- regulations, applications and procedures for locking out equipment

Introduction to Graphics — 30 hours

- explain drafting tools
- use drafting tools
- discuss graphics language, measurements and standards
- explain graphical single line projections
- draw single line projections

RSOS topics covered in this section of training:

A-5 Communication Techniques

A-5.01 Uses communication techniques

- trade terminology
- effective communication practices

Basic Tools and Equipment – Theory — 30 hours

- discuss the use and care of hand and power tools
- discuss access equipment
- explain hoisting and rigging equipment
- explain crane hand signals
- discuss knots and hitches describe welding equipment
- explain soldering and brazing equipment

Basic Tools and Equipment – Shop **30 hours**

- demonstrate the safe use and care of hand and power tools
- demonstrate access equipment use
- use hoisting and rigging equipment
- use crane hand signals
- 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

- tools and equipment, their applications, maintenance and procedures for use

A-2.02 Uses access equipment

- ladders and aerial work platforms, their applications, limitations and procedures for use

A-2.03 Uses rigging, hoisting, lifting and positioning equipment

- rigging, hoisting, lifting and positioning equipment, their application, limitations and procedures for use
- calculations required when performing hoisting and lifting and positioning operations
- inspection for rigging, hoisting, lifting and positioning equipment

A-2.04 Rigs loads for cranes

- rigging, hoisting, lifting and positioning equipment, their applications, limitations and procedures for use

A-2.05 Uses welding equipment

- welding equipment, applications and procedures for not-pressure and non-structural welds

A-2.06 Uses soldering and brazing equipment

- soldering and brazing equipment, application and procedures
- disarming the work area location within the fire monitoring system

A-2.07 Uses oxy-fuel equipment

- oxy-fuel equipment, application and procedures

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 Performs piping system layout
- various *piping* and *equipment* layouts and applications
- layout *tools and equipment*

A-4.02 Calculates pipe, tube and tubing lengths
- procedures to calculate pipe, tube and tubing length

A-4.03 Calculates piping offsets
- mathematical calculations of piping offsets

A-4.04 Installs piping supports
- piping supports and hangers and their installation

A-4.05 Installs sleeves
- piping sleeves and their installation

A-4.06 Commissions systems
- commissioning and its associated procedures

A-4.07 Protects piping systems, equipment and structure from damage
- methods used to protect piping systems, equipment and structure from damage

B-6 Pipe Preparation

B-6.01 Inspects tube, tubing, pipe and fittings before installation
- tube, tubing, piping, fittings and accessories
- procedures used to measure tube, tubing and piping, and fitting allowance

B-6.02 Cuts tube, tubing and pipe
- tube, tubing, piping, fittings and accessories
- procedures used to measure and cut tube, tubing and pipe

B-6.03 Bends tube, tubing and pipe
- tube, tubing and pipe
- procedures used to bend tube, tubing and pipe

B-6.04 Prepares tub, tubing and pipe connections
- tube, tubing, piping, fittings and accessories
- techniques for preparing tube, tubing and pipe connections
- procedures used to measure tube, tubing and pipe

B-7 Tube, Tubing, and Pipe (Join)

B-7.01 Joins copper tube, tubing and pipe
- copper tube, tubing and pipe, and associated fittings and accessories
- procedures used to join copper tube, tubing and pipe

B-7.02 Joins plastic pipe and tubing
- plastic pipe and tubing, and associated fittings and accessories
- procedures used to join plastic pipe and tubing

B-7.03 Joins steel pipe
- steel piping and associated fittings and accessories
- procedures used to join steel piping

B-7.04 Joins cast iron pipe
- cast iron piping, and associated fittings and accessories
- procedures used to join cast iron piping

B-7.05 Joins specialized pipe
- specialized piping, fittings and accessories

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 Interior Drainage, Waste and Venting (DWV) Systems (Introduction)

C-10.01 Sizes pipe for interior drainage, waste and vent (DWV) systems

- DWV systems, their components, applications and operation
- procedures used to determine and transfer grade and elevation measurements for DWV systems

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

- DWV systems, applications and operation
- procedures used to determine and transfer grade and elevation measurements for DWV systems
- procedures used to layout and install DWV systems

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

- DWV systems, applications and operation
- procedures used to determine and transfer grade and elevation measurements for DWV systems
- procedures used to layout and install DWV systems

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

- interior DWV systems and their application
- testing equipment and procedures used for testing interior DWV systems

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

- interior DWV system equipment and components, their applications and operation
- procedures used to service interior DWV systems

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.

Level One topics from the RSOS that are taught in context:

A-3 Organizes Work

For details regarding the In Context Topic, see pages 34-37

Level Two — 8 weeks — 240 hours

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 Activates

A-4.01 Performs piping system layout
- various piping and equipment layouts and applications
- layout tools and equipment

A-4.02 Calculates pipe, tube and tubing lengths
- procedures to calculate pipe, tube and tubing length

A-4.03 Calculates piping offsets
- mathematical calculations of piping offsets

A-4.04 Installs piping supports
- piping supports and hangers and their installation

A-4.05 Installs sleeves
- piping sleeves and their installation

A-4.06 Commissions systems
- commissioning and its associated procedures

A-4.07 Protects piping systems, equipment and structure from damage
- methods used to protect piping systems, equipment and structure from damage

A-4.08 Coordinates excavation and backfill of trenches
- procedures used and considerations to excavate and backfill, and compact trenches

A-4.09 Installs fire stopping devices and materials
- procedures to install fire stopping devices and materials

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

E-14.01 Installs fixture supports
- plumbing fixtures, supports and accessories, their applications and operation
- procedures used to install plumbing fixtures, supports and accessories

E-14.02 Installs plumbing fixtures and appliances
- plumbing fixtures, appliances and accessories, their applications and operation
- procedures used to install plumbing fixtures, appliances and accessories

E-14.03 Tests plumbing fixtures and appliances
- plumbing fixtures and appliances and their application
- procedures used for testing plumbing fixtures and appliances

E-14.04 Services plumbing fixtures and appliances
- plumbing fixtures and appliances, their applications and operation
- procedures used to maintain plumbing fixtures and appliances

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 hydronic heating and cooling piping systems

F-17.01 Sizes piping and components for hydronic systems
- fluid fundamentals
- factors that impact the design
- sizing pipe and components for hydronic systems

F-17.02 Installs piping and components for hydronic systems
- installing piping and components for hydronic systems

F-17.03 Tests piping and components for hydronic systems
- testing piping and components for hydronic systems
- principles of hydronic system operation

F-17.04 Services piping and components for hydronic systems
- principles of hydronic system operation
- servicing piping and components for hydronic systems

F-18 Installs, tests and services hydronic heating and cooling generating systems

F-18.01 Installs hydronic heating generating systems
- hydronic heat sources and their operation

F-18.02 Installs hydronic cooling generating systems
- principles of heat transfer
- hydronic cooling sources and their operation

F-18.03 Tests hydronic heating and cooling generating systems
- testing hydronic heating and cooling sources and their operation
- interpreting manufacturers' data

F-18.04 Services hydronic heating and cooling generating systems
- the principles of hydronic heating and cooling generating systems operation
- servicing for hydronic heating and cooling generating systems
- documenting the service for hydronic heating and cooling generating systems and associated piping and components

F-19 Installs, tests and services hydronic system controls and transfer units

F-19.01 Installs hydronic system controls
- hydronic system control components and accessories, their applications and operation
- procedures used to install hydronic system controls

F-19.02 Installs hydronic transfer units
- hydronic transfer units, their applications and operation
- procedures used to install hydronic transfer units

F-19.03 Tests hydronic system controls and transfer units
- types of hydronic system controls and transfer units, related equipment and components, their applications and operation
- testing hydronic system controls and transfer units, their procedures and equipment

F-19.04 Services hydronic system controls and transfer units

- hydronic system controls and transfer unit equipment and components, their applications and operation
- the procedures used to service hydronic system controls and transfer units

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 Sizes pipe for interior drainage, waste and vent (DWV) systems

- DWV systems, their components, applications and operation
- the procedures used to determine and transfer grade and elevation measurements for DWV systems

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

- DWV systems, applications and operation
- procedures used to determine and transfer grade and elevation measurements for DWV systems
- procedures used to layout and install DWV systems

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

- DWV systems, applications and operation
- procedures used to determine and transfer grade and elevation measurements for DWV systems
- procedures used to layout and install DWV systems

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

- interior DWV systems and their application
- testing equipment and procedures used for testing interior DWV systems

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

- interior DWV system equipment and components, their applications and operation
- procedures used to service interior DWV systems

Gasfitting – Theory (Exceed) **42 hours**

- discuss line sizing techniques for piping systems operating at two pounds per square inch 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 (Exceed) **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.

Electric Controls (Exceed) **24 hours**

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

Exceeds RSOS scope of work.

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

A-2 Tools and Equipment
A-3 Organizes Work
B-6 Pipe Preparation
B-7 Tube, Tubing, and Pipe (Join)

For details regarding the In Context Topics, see pages 34-37

Level Three — 7 weeks — 210 hours

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 Sizes pipe for interior drainage, waste and vent (DWV) systems

- DWV systems, their components, applications and operation
- the procedures used to determine and transfer grade and elevation measurements for DWV systems

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

- DWV systems, applications and operation
- procedures used to determine and transfer grade and elevation measurements for DWV systems
- procedures used to layout and install DWV systems

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

- DWV systems, applications and operation
- procedures used to determine and transfer grade and elevation measurements for DWV systems
- procedures used to layout and install DWV systems

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

- interior DWV systems and their application
- testing equipment and procedures used for testing interior DWV systems

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

- interior DWV system equipment and components, their applications and operation
- procedures used to service interior DWV systems

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

F-17.02 Installs piping and components for hydronic systems
- installing piping and components for hydronic systems

F-17.03 Tests piping and components for hydronic systems
- testing piping and components for hydronic systems
- principles of hydronic system operation

F-17.04 Services piping and components for hydronic systems
- principles of hydronic system operation
- servicing piping and components for hydronic systems

F-18 Installs, tests and services hydronic heating and cooling generating systems

F-18.01 Installs hydronic heating generating systems
- hydronic heat sources and their operation

F-18.02 Installs hydronic cooling generating systems
- principles of heat transfer
- hydronic cooling sources and their operation

F-18.03 Tests hydronic heating and cooling generating systems
- testing hydronic heating and cooling sources and their operation
- interpreting manufacturers' data

F-18.04 Services hydronic heating and cooling generating systems
- the principles of hydronic heating and cooling generating systems operation
- servicing for hydronic heating and cooling generating systems
- documenting the service for hydronic heating and cooling generating systems and associated piping and components

F-19 Installs, tests and services hydronic system controls and transfer units

F-19.01 Installs hydronic system controls
- hydronic system control components and accessories, their applications and operation
- procedures used to install hydronic system controls

F-19.02 Installs hydronic transfer units
- hydronic transfer units, their applications and operation
- procedures used to install hydronic transfer units

F-19.03 Tests hydronic system controls and transfer units
- types of hydronic system controls and transfer units, related equipment and components, their applications and operation
- testing hydronic system controls and transfer units, their procedures and equipment

F-19.04 Services hydronic system controls and transfer units
- hydronic system controls and transfer unit equipment and components, their applications and operation
- the procedures used to service hydronic system controls and transfer units

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 Sizes pipe for sewers
- sanitary drainage, storm and combination drainage systems, their components, applications and operation
- procedures used to determine and transfer grade and elevation measurements for sanitary drainage systems

C-8.02 Installs manholes and catch basins
- manholes and catch basins, their components, applications and operation
- procedures used to determine and transfer grade and elevation measurements for manholes and catch basins
- procedures used to lay out and install manholes and catch basins

C-8.03 Installs piping for sewers
- sewers, their components, applications and operation
- procedures used to determine and transfer grade and elevation measurements for sewers
- procedures used to lay out and install piping for sewers

C-8.04 Tests manholes, catch basins and piping for sewers
- manholes, catch basins and piping for sewers and their application
- procedures used for testing manholes, catch basins and piping for sewers

C-8.05 Services manholes, catch basins and piping for sewers
- manholes, catch basins and piping for sewers, their components, applications and operation
- procedures used to repair and troubleshoot manholes, catch basins and piping for sewers

D-11 Installs, tests and services water services

D-11.01 Sizes pipe for water services
- water service piping, components, their applications and operation
- procedures used to determine elevation, friction loss, velocity and required pressure for water service

D-11.02 Installs piping for water services
- water service piping their applications and operation
- procedures used to install water service components
- procedures used to install water service

D-11.03 Installs water service equipment
- water service equipment, their applications and operation
- procedures used to install water service equipment

D-11.04 Tests water service piping and components
- water service piping and components and their application
- procedures used for testing water service piping and components

D-11.05 Services water services
- water service equipment and components, their applications and operation
- the procedures used to maintain water service

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

D-12.01 Sizes piping and equipment for potable water distribution systems
- potable water distribution equipment and components, their applications and operation
- procedures used to determine elevation, friction loss and required pressure for potable water distribution systems

D-12.02 Installs piping for potable water distribution systems
- potable water distribution system and components, their applications and operation
- procedures used to install piping and components for potable water distribution systems

D-12.03 Installs potable water distribution equipment
- potable water distribution equipment and components, their applications and operation
- procedures used to install potable water distribution equipment
- volumetric expansion calculations

D-12.04 Installs and uses cross-connection control devices and methods
- cross-connection control devices and methods, their applications and operation

- information pertaining to cross-connection control devices and methods
- procedures used to install cross-connection control devices

D-12.05 Tests potable water distribution systems
- procedures used to test potable water distribution systems

D-12.06 Services potable water distribution systems
- potable water distribution systems, components, their applications and operation
- procedures used to service potable water distribution systems
- procedures used to service cross-connection control devices

H-22 Installs, tests and services specialized systems

H-22.01 Installs piping for specialized systems
- piping for specialized systems, their applications and operation
- procedures used to install piping for specialized systems

H-22.02 Installs equipment and components for specialized systems
- equipment and components for specialized systems and their applications and operation
- procedures used to install equipment and components of specialized systems

H-22.03 Tests specialized systems
- procedures used to test specialized systems

H-22.04 Services specialized systems
- procedures used to service specialized systems

Gasfitting – Theory (Exceed) — 27 hours

- apply line sizing techniques for piping systems operating at two pounds per square inch 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 (Exceed) — 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.

Electric Controls (Exceed) — 21 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

Exceeds RSOS scope of work.

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 Pipe Preparation

B-7 Tube, Tubing, and Pipe (Join)
E-14 Installs, tests and services plumbing fixtures and appliances

For details regarding the In Context Topics, see pages 34-37.

Level Four — 7 weeks — 210 hours

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
- private sewage treatment systems, their components, applications and operation
- public sewage treatment systems, their components, applications and operation

C-9.02 Installs sewage treatment system components
- sewage treatment systems, their components, applications and operation
- procedures used to install sewage treatment systems

C-9.03 Tests sewage treatment systems and components
- sewage treatment systems and their application
- testing equipment and procedures used for testing sewage treatment systems

C-9.04 Services sewage treatment systems and components
- sewage treatment system, their components, applications and operation
- procedures used to maintain, repair and troubleshoot sewage treatment system

D-13 Installs, tests and services pressure systems

D-13.01 Sizes pressure systems
- types of pressure systems, related equipment and components, their applications and operation

D-13.02 Installs piping for pressure systems
- types of pressure systems, related equipment and components, their applications and operation
- procedures used to install piping for pressure systems

D-13.03 Installs equipment and components for pressure systems
- procedures used to install pressure system equipment and components
- pumps and their application and operation
- basic concepts of electricity
- pumps for pressure systems and their application and operation
- installing pumps for pressure systems and their application and operation

D-13.04 Tests pressure systems
- types of pressure systems, related equipment and components, their applications and operation
- testing pressure systems, their procedures and equipment

D-13.05 Services pressure systems
- pressure system equipment and components, their applications and operation
- procedures used to service pressure systems

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
- strategies for learning skills in the workplace
- steps for teaching workplace skills

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 equipment

E-15.01 Sizes water treatment equipment
- water treatment systems, their components, applications and operation
- procedures used to size water treatment systems

E-15.02 Installs water treatment equipment
- water treatment systems, their components, applications and operation
- procedures used to install water treatment systems

E-15.03 Tests water treatment equipment
- water treatment equipment and their application
- testing water treatment systems

E-15.04 Services water treatment equipment
- water treatment systems, their components, applications and operation
- procedures used to service water treatment systems

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:

F-16 Installs, tests and services low pressure steam systems

F-16.01 Sizes piping and components for low pressure steam systems
- sizing pipe and components for low pressure steam systems

F-16.02 Installs piping and components for low pressure steam systems
- installing pipe and components for low pressure steam systems
- principles of low pressure steam system operation

F-16.03 Tests piping and components for low pressure steam systems
- testing piping and components for low pressure steam systems
- principles of low pressure steam system operation
- procedures used for testing piping and components for low pressure steam systems

F-16.04 Services piping and components for low pressure steam systems
- low pressure steam system operation
- servicing piping and components for low pressure steam systems
- documenting the service for the low pressure steam system

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:

H-22 Installs, tests and services specialized systems

H-22.01 Installs piping for specialized systems
- piping for specialized systems, their applications and operation
- procedures used to install piping for specialized systems

H-22.02 Installs equipment and components for specialized systems
- equipment and components for specialized systems and their applications and operation
- procedures used to install equipment and components of specialized systems

H-22.03 Tests specialized systems
- procedures used to test specialized systems

H-22.04 Services specialized systems
- procedures used to service specialized systems

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:

H-23 Installs, tests and services process piping systems

H-23.01 Installs piping for process piping systems
- process piping systems, their applications and operation
- procedures used to install piping for process piping systems

H-23.02 Installs equipment and components for process piping systems
- types of process piping systems, equipment and components and their applications and operation
- procedures used to install process piping equipment and components

H-23.03 Tests process piping systems
- procedures used to test process piping systems

H-23.04 Services process piping systems
- procedures used to service process piping systems

Gasfitting (Exceed) — 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.

Electric Controls (Exceed) — 21 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

Exceeds RSOS scope of work.

Level Four 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 Pipe Preparation
B-7 Tube, Tubing, and Pipe (Join)
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 generating systemsF-19 Installs, tests and services hydronic system controls and transfer units

For details regarding the In Context Topics, see pages 34-37

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
- tools and equipment, their applications, maintenance and procedures for use

A-2.02 Uses access equipment
- ladders and aerial work platforms, their applications, limitations and procedures for use

A-2.03 Uses rigging, hoisting, lifting and positioning equipment
- rigging, hoisting, lifting and positioning equipment, their application, limitations and procedures for use
- calculations required when performing hoisting and lifting and positioning operations
- inspection for rigging, hoisting, lifting and positioning equipment

A-2.04 Rigs loads for cranes
- rigging, hoisting, lifting and positioning equipment, their applications, limitations and procedures for use

A-2.05 Uses welding equipment
- welding equipment, applications and procedures for not-pressure and non-structural welds

A-2.06 Uses soldering and brazing equipment
- soldering and brazing equipment, application and procedures
- disarming the work area location within the fire monitoring system

A-2.07 Uses oxy-fuel equipment
- oxy-fuel equipment, application and procedures

A-3 Organizes Work

A-3.01 Organizes project tasks and procedures
- procedures used to plan and organize work
- project costs and efficient trade practices
- job specific technology

A-3.02 Organizes materials and supplies
- procedures used to organize and maintain materials and supplies

A-4 Routine Trade Activities

A-4.01 Performs piping system layout
- various piping and equipment layouts and applications
- layout tools and equipment

A-4.02 Calculates pipe, tube and tubing lengths
- procedures to calculate pipe, tube and tubing length

A-4.03 Calculates piping offsets
- mathematical calculations of piping offsets

A-4.04 Installs piping supports
- piping supports and hangers and their installation

A-4.05 Installs sleeves
- piping sleeves and their installation

A-4.06 Commissions systems
- commissioning and its associated procedures

A-4.07 Protects piping systems, equipment and structure from damage
- methods used to protect piping systems, equipment and structure from damage

A-4.08 Coordinates excavation and backfill of trenches
- procedures used and considerations to excavate and backfill, and compact trenches

A-4.09 Installs fire stopping devices and materials
- procedures to install fire stopping devices and materials

B-6 Pipe Preparation

B-6.01 Inspects tube, tubing, pipe and fittings before installation

- tube, tubing, piping, fittings and accessories
- procedures used to measure tube, tubing and piping, and fitting allowance

B-6.02 Cuts tube, tubing and pipe

- tube, tubing, piping, fittings and accessories
- procedures used to measure and cut tube, tubing and pipe

B-6.03 Bends tube, tubing and pipe

- tube, tubing and pipe
- procedures used to bend tube, tubing and pipe

B-6.04 Prepares tub, tubing and pipe connections

- tube, tubing, piping, fittings and accessories
- techniques for preparing tube, tubing and pipe connections
- procedures used to measure tube, tubing and pipe

B-7 Tube, Tubing, and Pipe (Join)

B-7.01 Joins copper tube, tubing and pipe

- copper tube, tubing and pipe, and associated fittings and accessories
- procedures used to join copper tube, tubing and pipe

B-7.02 Joins plastic pipe and tubing

- plastic pipe and tubing, and associated fittings and accessories
- procedures used to join plastic pipe and tubing

B-7.03 Joins steel pipe

- steel piping and associated fittings and accessories
- procedures used to join steel piping

B-7.04 Joins cast iron pipe

- cast iron piping, and associated fittings and accessories
- procedures used to join cast iron piping

B-7.05 Joins specialized pipe

- specialized piping, fittings and accessories

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

C-10.01 Sizes pipe for interior drainage, waste and vent (DWV) systems

- DWV systems, their components, applications and operation
- the procedures used to determine and transfer grade and elevation measurements for DWV systems

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

- DWV systems, applications and operation procedures used to determine and transfer grade and elevation measurements for DWV systems
- procedures used to layout and install DWV systems

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

- DWV systems, applications and operation
- procedures used to determine and transfer grade and elevation measurements for DWV systems
- procedures used to layout and install DWV systems

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

- interior DWV systems and their application
- testing equipment and procedures used for testing interior DWV systems

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

- interior DWV system equipment and components, their applications and operation
- procedures used to service interior DWV systems

D-11 Installs, tests and services water services

D-11.01 Sizes pipe for water services

- water service piping, components, their applications and operation
- procedures used to determine elevation, friction loss, velocity and required pressure for water service

D-11.02 Installs piping for water services
- water service piping their applications and operation
- procedures used to install water service components
- procedures used to install water service

D-11.03 Installs water service equipment
- water service equipment, their applications and operation
- procedures used to install water service equipment

D-11.04 Tests water service piping and components
- water service piping and components and their application
- procedures used for testing water service piping and components

D-11.05 Services water services
- water service equipment and components, their applications and operation
- the procedures used to maintain water service

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

D-12.01 Sizes piping and equipment for potable water distribution systems
- potable water distribution equipment and components, their applications and operation
- procedures used to determine elevation, friction loss and required pressure for potable water distribution systems

D-12.02 Installs piping for potable water distribution systems
- potable water distribution system and components, their applications and operation
- procedures used to install piping and components for potable water distribution systems

D-12.03 Installs potable water distribution equipment
- potable water distribution equipment and components, their applications and operation
- procedures used to install potable water distribution equipment
- volumetric expansion calculations

D-12.04 Installs and uses cross-connection control devices and methods
- cross-connection control devices and methods, their applications and operation
- information pertaining to cross-connection control devices and methods
- procedures used to install cross-connection control devices

D-12.05 Tests potable water distribution systems
- procedures used to test potable water distribution systems

D-12.06 Services potable water distribution systems
- potable water distribution systems, components, their applications and operation
- procedures used to service potable water distribution systems
- procedures used to service cross-connection control devices

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

E-14.01 Installs fixture supports
- plumbing fixtures, supports and accessories, their applications and operation
- procedures used to install plumbing fixtures, supports and accessories

E-14.02 Installs plumbing fixtures and appliances
- plumbing fixtures, appliances and accessories, their applications and operation
- procedures used to install plumbing fixtures, appliances and accessories

E-14.03 Tests plumbing fixtures and appliances
- plumbing fixtures and appliances and their application
- procedures used for testing plumbing fixtures and appliances

E-14.04 Services plumbing fixtures and appliances
- plumbing fixtures and appliances, their applications and operation
- procedures used to maintain plumbing fixtures and appliances

F-17 Installs, tests and services hydronic heating and cooling piping systems

F-17.01 Sizes piping and components for hydronic systems

- fluid fundamentals
- factors that impact the design
- sizing pipe and components for hydronic systems

F-17.02 Installs piping and components for hydronic systems
- installing piping and components for hydronic systems

F-17.03 Tests piping and components for hydronic systems
- testing piping and components for hydronic systems
- principles of hydronic system operation

F-17.04 Services piping and components for hydronic systems
- principles of hydronic system operation
- servicing piping and components for hydronic systems

F-18 Installs, tests and services hydronic heating and cooling generating systems

F-18.01 Installs hydronic heating generating systems
- hydronic heat sources and their operation

F-18.02 Installs hydronic cooling generating systems
- principles of heat transfer
- hydronic cooling sources and their operation

F-18.03 Tests hydronic heating and cooling generating systems
- testing hydronic heating and cooling sources and their operation
- interpreting manufacturers' data

F-18.04 Services hydronic heating and cooling generating systems
- the principles of hydronic heating and cooling generating systems operation
- servicing for hydronic heating and cooling generating systems
- documenting the service for hydronic heating and cooling generating systems and associated piping and components

F-19 Installs, tests and services hydronic system controls and transfer units

F-19.01 Installs hydronic system controls
- hydronic system control components and accessories, their applications and operation
- procedures used to install hydronic system controls

F-19.02 Installs hydronic transfer units
- hydronic transfer units, their applications and operation
- procedures used to install hydronic transfer units

F-19.03 Tests hydronic system controls and transfer units
- types of hydronic system controls and transfer units, related equipment and components, their applications and operation
- testing hydronic system controls and transfer units, their procedures and equipment

F-19.04 Services hydronic system controls and transfer units
- hydronic system controls and transfer unit equipment and components, their applications and operation
- the procedures used to service hydronic system controls and transfer units