



Welder Subtrade

Semi Automatic Welding

Production Operator

Guide to Course Content

Online: www.saskapprenticeship.ca

Recognition:

To promote transparency and consistency, this document has been adapted from the 2005 Semi Automatic Welding Production Operator Provincial Occupational Analysis (Saskatchewan Apprenticeship and Trade Certification Commission).

A complete version of the Provincial Occupational Analysis (POA) can be found at www.saskapprenticeship.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. The Task Matrix is broken down into the following:

Major Work Activity: 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.

Technical Training Course Content for the Semi automatic welding production operator trade: a chart which outlines the model for SATCC technical training sequencing.

TRAINING REQUIREMENTS FOR THE SEMI AUTOMATIC WELDING PRODUCTION OPERATOR 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 3600 hours and at least 2 years in the trade.

There is one level of technical training for Semi Automatic Welding Production Operator delivered by Saskatchewan Polytechnic:

Level One: 8 weeks

The information contained in this document 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.

Designated Trade Name	Math Credit at the Indicated Grade Level❶	Science Credit at Grade Level
Welder	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		

SEMI AUTOMATIC WELDING PRODUCTION OPERATOR TASK MATRIX CHART

This chart outlines the major work activities, tasks and sub-tasks from the 2005 Provincial Occupational Analysis. 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 – Occupational Skills			24%
Task A-1 Interprets blueprints and drawings	A-1.01 Determines required materials	A-1.02 Identifies work processes	A-1.03 Identifies dimensions and details
Task A-2 Prepares work area	A-2.01 Cleans work area	A-2.02 Plans sequence of operations	A-2.03 Gathers work materials and equipment
Task A-3 Lays out materials	A-3.01 Transfers dimensions from drawings to materials	A-3.02 Confirms material dimensions	
Task A-4 Prepares materials	A-4.01 Cuts material to specifications	A-4.02 Grinds materials	A-4.03 Cleans weld area
Task A-5 Fabricates components	A-5.01 Preheats weld areas (weldments)	A-5.02 Tacks components	A-5.03 Finishes final product
Task A-6 Maintains equipment	A-6.01 Performs visual inspection of equipment	A-6.02 Checks equipment for leaks	A-6.03 Repairs leaks
	A-6.04 Checks protective devices' operation and location		

Task A-7 Performs basic rigging operations

A-7.01 Selects rigging equipment

A-7.02 Operates basic lifting devices

B – Quality Control

14%

Task B-8 Performs inspections

B-8.01 Examines components (fit-up and preparation) prior to assembly

B-8.02 Examines completed welds

B-8.03 Measures completed welds

B-8.04 Measures final product for compliance to blueprints and drawings

C – Cutting Processes

32%

Task C-9 Cuts with mechanical and power cutting equipment

C-9.01 Selects mechanical and power cutting equipment

C-9.02 Selects operating parameters

C-9.03 Sets up mechanical and power cutting equipment

C-9.04 Operates mechanical and power cutting equipment

Task C-10 Cuts using oxy-fuel gas cutting process (OFC)

C-10.01 Selects oxy-fuel cutting equipment

C-10.02 Selects fuel gas

C-10.03 Selects tips

C-10.04 Selects operating parameters

C-10.05 Sets up oxy-fuel cutting equipment

C-10.06 Operates oxy-fuel cutting equipment

C-10.07 Shuts down oxy-fuel cutting equipment

Task D-11 Cuts using plasma arc cutting process (PAC)	D-11.01 Selects plasma arc cutting equipment	D-11.02 Selects gases	D-11.03 Selects consumables
	C-11.04 Selects operating parameters	C-11.05 Sets up plasma arc cutting equipment	C-11.06 Operates plasma arc cutting equipment

D – Gouging Processes

30%

Task D-12 Gouges using air carbon arc process (ACA)	D-12.01 Selects air carbon arc cutting equipment for gouging	D-12.02 Selects consumables	D-12.03 Sets operating parameters
	D-12.04 Sets air carbon arc cutting equipment for gouging	D-12.05 Operates air carbon arc cutting equipment for gouging	

E – Welding Processes

32%

Task E-13 Welds using gas metal arc welding process (GMAW)	E-13.01 Selects gas metal arc welding equipment	E-13.02 Selects gases	E-13.03 Selects consumables
	E-13.04 Selects operating parameters	E-13.05 Sets up gas metal arc welding equipment	E-13.06 Operates gas metal arc welding equipment
Task E-14 Welds using flux cored arc welding process (FCAW)	E-14.01 Selects flux cored arc welding equipment	E-14.02 Selects consumables	E-14.03 Selects operating parameters
	E-14.04 Sets up flux cored arc welding equipment	E-14.05 Operates flux cored arc welding equipment	

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
Heat Treatment of Metals	METL 100	20
Blueprint Interpretation	PRNT 114	30
Welding Safety	SFTY 103	25
Oxy-Fuel and Thermal Cutting	WLDR 146	30
Wire Feed Welding Process Theory	WLDR 147	15
Wire Feed Welding Process Shop 1	WLDR 164	60
Wire Feed Welding Process Shop 2	WLDR 165	60
		240

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 Saskatchewan Occupational Standard (SOS) apprenticeship technical training sequencing, at the learning outcome level, is provided.

*Sub-tasks listed are the minimum to be covered in a topic.

Level One	8 weeks	240 hours
Metallurgy and Heat Treatment of Metals		20 hours
- Identify the processes used in the production of metals - Identify ferrous and non-ferrous metals - Identify structural metals - Describe the physical, chemical, and mechanical properties of metals - Describe metal heat processes - Describe the techniques to control and correct heat distortion		
SOS topics covered in this section of training:		
A-2 Prepares work area		
A-2.02 Plans sequence of operations		
A-4 Prepares materials		
A-4.01 Cuts material to specifications		
A-4.02 Grinds materials		
A-5 Fabricates components		
A-5.03 Finishes final product		
B-8 Performs inspections		
B-8.04 Measures final product for compliance to blueprints and drawings		
Blueprint Interpretation		30 hours
- Interpret drawing components - Interpret welding symbols - Interpret industry drawings - Describe commonly used weld joints - Develop a bill of materials		
SOS topics covered in this section of training:		
A-1 Interprets blueprints and drawings		
A-1.01 Determines required materials		
A-1.02 Identifies work processes		
A-1.03 Identifies dimensions and details		
B-8 Performs inspections		
B-8.01 Examines components (fit-up and preparation) prior to assembly		
B-8.03 Measures completed welds		

Welding Safety

25 hours

- Describe WHMIS and Occupational Health and Safety
- Identify hazards in the workplace
- Describe firefighting equipment and procedures
- Describe proper methods of transportation and storage welding supplies
- Describe rigging equipment

SOS subtasks covered in this section of training:

A-2 Prepares work area

A-2.01 Cleans work area

A-7 Performs basic rigging operations

A-7.01 Selects rigging equipment

C-10 Cuts using oxy-fuel gas cutting process (OFC)

C-10.06 Operates oxy-fuel cutting equipment

Oxy-Fuel and Thermal Cutting

30 hours

- Describe the oxy-fuel cutting process
- Describe oxy-fuel cutting (OFC), plasma arc cutting, gouging and carbon arc air gouging equipment
- Describe safety concerns related to OFC plasma arc cutting and gouging and carbon arc air gouging
- Complete 90 degree and bevel cuts using manual oxy-fuel equipment
- Cut structural shapes using oxy-fuel process
- Cut plate using plasma arc cutting
- Perform air carbon arc gouging

SOS subtasks covered in this section of training:

A-2 Prepares work area

A-2.03 Gathers work materials and equipment

A-4 Prepares materials

A-4.01 Cuts material to specifications

C-10 Cuts using oxy-fuel gas cutting process (OFC)

C-10.01 Selects oxy-fuel cutting equipment

C-10.02 Selects fuel gas

C-10.04 Selects operating parameters

C-10.06 Operates oxy-fuel cutting equipment

C-11 Cuts using plasma arc cutting process (PAC)

C-11.01 Selects plasma arc cutting equipment

C-11.02 Selects gases

C-11.03 Selects consumables

C-11.05 Sets up plasma arc cutting equipment

C-11.06 Operates plasma arc cutting equipment

D-12 Gouges using air carbon arc process (ACA)

D-12.01 Selects air carbon arc cutting equipment for gouging

D-12.02 Selects consumables

D-12.03 Sets operating parameters

D-12.04 Sets air carbon arc cutting equipment for gouging

D-12.05 Operates air carbon arc cutting equipment for gouging

Wire Feed Welding Process Theory

15 hours

- Describe the components and operation of a gas metal arc welding (GMAW) welding station
- Describe GMAW safety concerns
- Describe the equipment and consumables of metal-cored arc welding (MCAW) and flux cored arc welding (FCAW)

SOS subtasks covered in this section of training:

A-5 Fabricates components

A-5.02 Tacks components

B-8 Performs inspections

B-8.02 Examines completed welds

E-13 Welds using gas metal arc welding process (GMAW)

E-13.01 Selects gas metal arc welding equipment

E-13.02 Selects gases

E-13.03 Selects consumables

E-14 Welds using flux cored arc welding process (FCAW)

E-14.01 Selects flux cored arc welding equipment

E-14.02 Selects consumables

E-14.03 Selects operating parameters

Wire Feed Welding Process Shop 1

60 hours

- Demonstrate safe gas metal arc welding (GMAW) work procedures
- Setup a GMAW welding station
- Perform surface build up in flat position
- Weld 14-gauge, T-joint, vertical down
- Weld 12-gauge, circular lap joint, flat, vertical down and overhead
- Weld 14-gauge, butt joint, vertical down
- Weld vertical up T-joint ¼ in. 3 pass using pulse wave forms

SOS subtasks covered in this section of training:

E-13 Welds using gas metal arc welding process (GMAW)

E-13.04 Selects operating parameters

E-13.05 Sets up gas metal arc welding equipment

E-13.06 Operates gas metal arc welding equipment

Wire Feed Welding Processes Shop 2

60 hours

- Weld 3/8 in. mild steel, horizontal, T-joint, 3 pass fillet, spray transfer
- Weld 3/16 in. mild steel, T-joint, overhead, 3 pass fillet
- Weld structural shapes, horizontal fillet, using metal-cored arc welding (MCAW)
- Weld ¼ in. mild steel, T-joint, vertical, 3 pass fillet, using flux-cored arc welding (FCAW)
- Weld aluminum horizontal T-joint
- Weld 3/8 in. mild steel, V-groove butt joint in flat position
- Weld 3/8 in. mild steel, V-groove butt joint in vertical position

SOS subtasks covered in this section of training:

E-14 Welds using flux cored arc welding process (FCAW)

E-14.04 Sets up flux cored arc welding equipment

E-14.05 Operates flux cored arc welding equipment
