

## Semiautomatic Welding Production Operator Proficiency Certificate

### Practical Examination Information

**This information is current as of August 28, 2012**

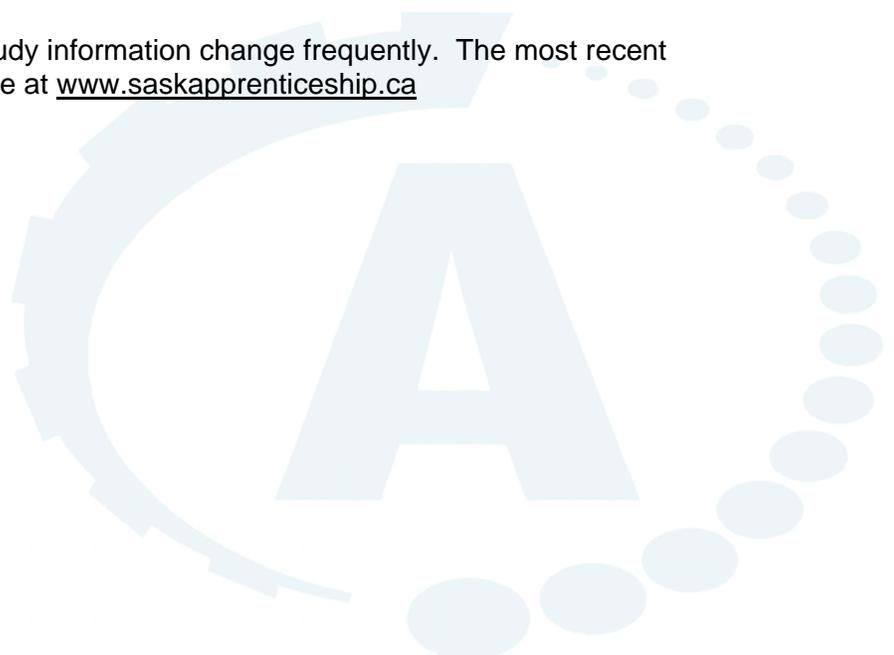
There is a written and a practical component to the certification examination. With the exception of apprentices attending the final level of technical training, the written examination must be completed successfully before applying for the practical examination.

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[www.saskapprenticeship.ca](http://www.saskapprenticeship.ca)

**All communication and/or imaging devices are prohibited from use at all times during the practical examination.**

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## Semiautomatic Welding Practical Examination Information

***Please read all the information provided before you start the examination.***

This examination is comprised of six gas metal arc welding tests (measurement, visual and/or bend) and three oxy-acetylene cutting tests (measurement and visual). Unless advised otherwise by the examining officer, you may do the tests in any logical order. Review the enclosed marking sheet for specifications.

### Materials Provided:

- 6 pieces - 4" x 5" x 3/8" Mild Steel A-36 Plates cut at 30° both ends
- 3 pieces 2" x 12" x 3/8" Mild Steel A-36 Plate
- 3 pieces 2" x 12" Mild Steel 14 gauge
- 1 piece - 4" x 5" x 3/8" Mild Steel A-36 Plate cut at 90° both ends
- All required welding wire and shielding gas as described in the following pages
- Smaller plate/gauge pieces for setting of welding machine or for run off/bridge tabs

### Candidate to Provide:

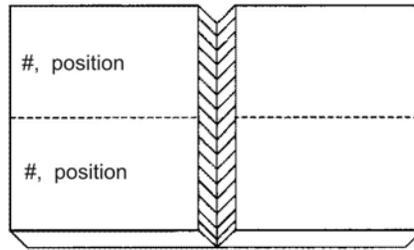
- Helmet, goggles, gloves, personal hand tools and appropriate safety equipment including CSA approved work boots or other suitable footwear. **Candidates not having this safety equipment will be sent home.**
- Angle grinder, grinding discs and buffing wheel

### General Instructions:

1. You will be allowed five (5) hours to complete this examination. The pass mark is 70%.
2. **You must follow these instructions precisely**, as well as any additional instructions by the examiners. You may ask the examiners for clarification of these instructions at any time.
3. You are required to wear and/or use all appropriate safety equipment.
4. **There is no extra set of coupons issued during this examination.** The original coupons issued at the beginning of the examination are the only coupons you will have to work with. Extra coupons will only be issued in the event of a retest as described in #6 below.
5. **Plates must be stamped** with candidate number and/or position letter, as illustrated on the following pages, **before** beginning the exam.
6. **This retest procedure is applicable to the three open root 3/8" V-groove butt joint projects only.** Any **single** strap receiving a complete fracture rating (see last point of page 2) will result in a retest of the failed position immediately following this examination. During the retest both straps of the coupon will be bent on the face or root as applicable. One (1) hour will be allowed for this retest. **Note: Failure to complete this retest when instructed to do so by the examiners will result in failure of the entire examination. This retest may not be done at any time other than the day of the original examination.**
7. Any **two** straps receiving a complete fracture rating will result in failure of the entire examination.
8. Do not engage in needless conversation with examiners or other candidates.
9. When you have completed the examination, clean up your workstation.
10. Tests will be marked in the absence of the candidates. Stay away from the bending station until called by the examiners to review your examination results.
11. There is no "partial" retest following the **failure** of this examination.
12. Official examination results will be mailed to you in six to eight weeks.

# Semiautomatic Welding Practical Examination Information

## GMA Welding Tests



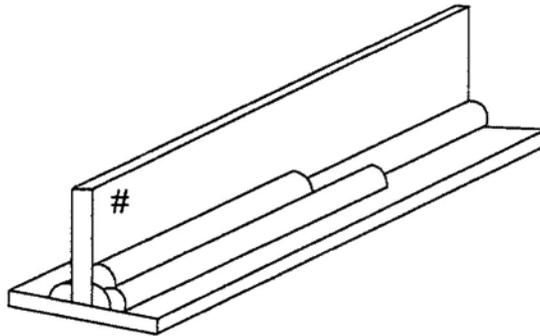
- Before beginning to weld, stamp your 3 sets of open root V-groove butt joint project coupons as illustrated above with your candidate number, **leave a space**, and then the position letter. For example, if your candidate number is 3 and the coupon is for the vertical position, mark the coupon **3 V** on both halves. **Retest coupons** (if required) are to be stamped in the same way, except **double stamp** the position letter before beginning any welding. All other projects to be stamped with your candidate number as shown on each of the following illustrations.
- The open root 3/8" V-groove butt joint coupons are allowed to be tacked together using bridge tacks **within the bevel only** or by the use of run on/run off tabs or bridge tabs **tacked to the edges only**. These bridge tacks, run on/off tabs or bridge tabs may be done in any position.
- All welding on the open root 3/8" V-groove butt joint coupons is to be done from the bevel side **only**.
- **All roots are to be completed as described for each project then buffed using a wire wheel or wire brush. All finished roots are to be presented to the examiners for inspection before grinding or any further welding process begins.**
- Root passes must be completed and ground **in position only**.
- Where required, fill and cover passes **may not** be ground during the welding process.
- When completed, **wire wheel or wire brush only** and present your completed coupons to the examiners for marking **before surface grinding begins**.
- Grind the welded surfaces to the thickness of the original parent metal. **Maximum** deviation is  $-1/32"$ . **Failure to maintain original coupon thickness to within this tolerance throughout the weld area will result in a COMPLETE FRACTURE rating for the strap.** See last point at the bottom of this page.
- The excess weld metal deposited at the edges of the 5" coupons may be ground flush with the parent metal. **Do not grind parent metal.**
- Cut the coupons lengthways once down the middle. **Only freehand cutting is allowed.** Outside edges may **not** be cut. Straps measuring less than  $2\ 3/8"$  will have 2 points deducted. **Minimum width is  $2\ 5/16"$ .** Straps measuring less than this minimum will receive a **COMPLETE FRACTURE RATING. Do not grind the cut edges of the coupons.** Knock off the slag and **lightly** file the edges to remove any burrs.
- During bending, a **complete fracture** is a fracture exceeding  $1/4"$  starting from either edge or exceeding  $1/8"$  anywhere else. A **single** strap having a complete fracture will result in a **retest** of the failed position at the end of this examination. **Two** straps having a complete fracture will represent a **failure of the entire examination**. Partial fractures less than the above limitations will have 1 point deducted per  $1/16"$ .

# Semiautomatic Welding Practical Examination Information

## GMA Welding Tests

### 6 Projects

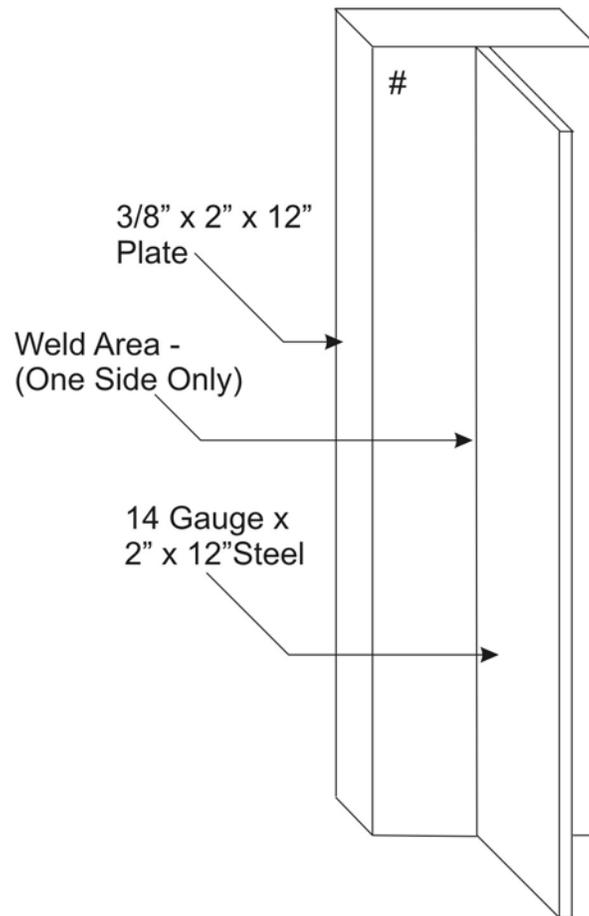
#### Project 1: Horizontal Tee



- 2 pieces 3/8" x 2" x 12" mild steel plate
- The single pass weld on the left side is to be completed using the **short circuit transfer method only** and is to be full length
- The three welds on the right side are to be completed using the **spray transfer method only** and are to be the following lengths
- First pass on right side to be full length
- Second pass on right side to be 8"
- Third pass on right side to be 6"
- Required fillet widths are 3/8" to 7/16" for the multi-pass side and 1/4" to 5/16" on the single-pass side
- 0.035 wire

# Semiautomatic Welding Practical Examination Information

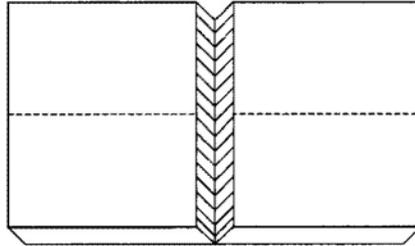
## Project 2: Vertical Downhand Tee



- 1 piece 3/8" x 2" x 12" mild steel plate
- 1 piece 14 gauge x 2" x 12" mild steel
- Steel pieces to be at 90° to each other
- 0.035 wire
- Downhand welding required
- Weld one side only as shown above
- **Three tacks only** are allowed on the backside of the weld area.  
Length and location of tacks are at the discretion of the candidate

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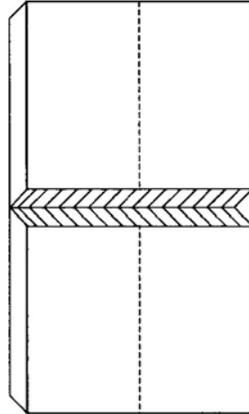
### Project 3: Vertical Open Root Uphand



- 3/8" plate V-groove butt joint
- 0.035 wire
- Uphand welding required
- Land and gap to be determined by candidate
- Bridge tacks **within the bevel only** will be allowed at the discretion of the candidate
- Run on/run off tabs or bridge tabs **tacked to the edges only** will be allowed at the discretion of the candidate

# Semiautomatic Welding Practical Examination Information

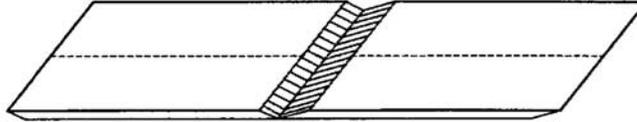
## Project 4: Horizontal Open Root



- 3/8" plate V-groove butt joint
- 0.035 wire
- Land and gap to be determined by candidate
- Bridge tacks **within the bevel only** will be allowed at the discretion of the candidate
- Run on/run off tabs or bridge tabs **tacked to the edges only** will be allowed at the discretion of the candidate

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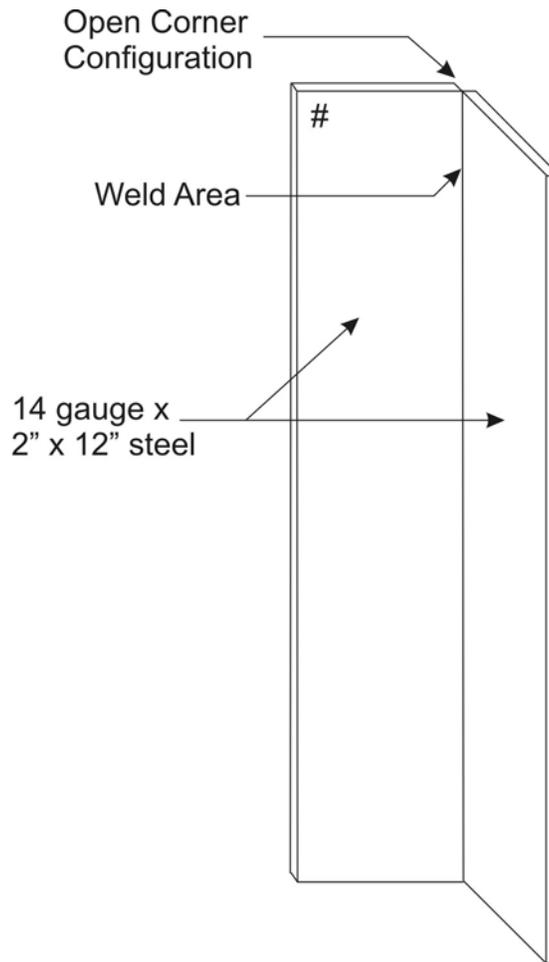
## Project 5: Flat Open Root



- 3/8" plate V-groove butt joint
- 0.035 wire
- Land and gap to be determined by candidate
- Bridge tacks **within the bevel only** will be allowed at the discretion of the candidate
- Run on/run off tabs or bridge tabs **tacked to the edges only** will be allowed at the discretion of the candidate

## Semiautomatic Welding Practical Examination Information

### Project 6: Inside Open Corner Vertical Downhand

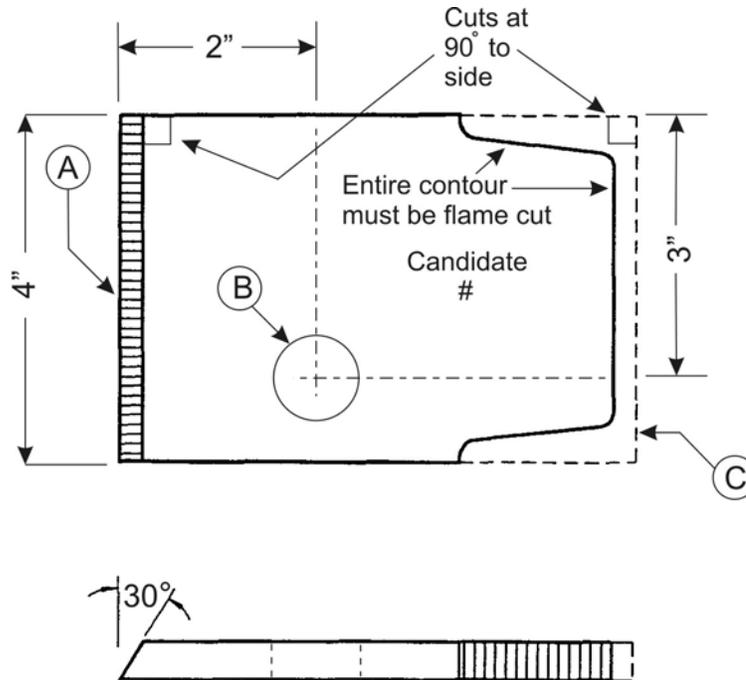


- 2 pieces 14 gauge x 2" x 12" mild steel
- Steel pieces to be at 90° to each other in an open corner configuration
- 0.035 wire
- Downhand welding required
- Weld the inside only as shown above
- **Three tacks only** are allowed on the backside of the weld area. Length and location of tacks are at the discretion of the candidate

# Semiautomatic Welding Practical Examination Information

## Oxy-fuel Cutting Tests

### 3 Projects



- One 4" x 5" x 3/8" Mild Steel plate cut at 90° both ends will be provided for this portion of the test.
- Any measuring device may be used for marking layout lines. A 1" pipe and a section of 4" channel will be provided for marking the layout lines for the applicable projects of this test.
- **All cuts are to be made freehand.** Failure to do so will result in a deduction of 10 points for that portion of this test.
- **No grinding is permitted on any cut edges.** Knock off the slag and **lightly** file the edges to remove any burs.

**Project A:** Perform a 30° cut along the 4" end as shown in the diagram. Cut must be at 90° to the sides. The cut angle is allowed a **maximum** tolerance of +/- 3°. Cut angle between +/- 4° to +/- 10° of 30° will result in a deduction of 2 points. Cut angle in excess of +/- 10° of 30° will result in a deduction of 10 points.

**Project B:** Locate and perform a circular 90° cut to accept a 1" pipe as shown in the diagram. The fit of the pipe is allowed a **maximum** 3/32" clearance at any point. Clearance between 3/32" and 1/4" will result in a deduction of 2 points. Clearance of 1/4" or more will result in a deduction of 10 points.

**Project C:** Perform a coping cut to accept a 4" channel as shown in the diagram. Cut must be at 90° to the sides. The fit of the channel is allowed a **maximum** 3/32" clearance at any point. Clearance between 3/32" and 1/4" will result in a deduction of 2 points. Clearance of 1/4" or more will result in a deduction of 10 points.

<b>Test Factors and Maximum Deductions per Strap/Coupon</b>  <b>SERIES 57/P/05</b>	<b>Gas Metal Arc Welding Process Tests</b>										<b>Oxy-fuel Test</b>			
	<b>Horizontal Tee</b>		<b>Vertical Downhand Tee</b>	<b>V-Butt Vertical Uphand</b>		<b>V-Butt Horizontal</b>		<b>V-Butt Flat</b>		<b>Inside Open Corner Vertical</b>	<b>Cope</b>	<b>30°</b>	<b>Circle</b>	
	<b>3 pas s</b>	<b>1 pas s</b>		<b>R</b>	<b>F</b>	<b>R</b>	<b>F</b>	<b>R</b>	<b>F</b>					
Incomplete Penetration - 3 points per 1/4" (10 maximum)														
Undercut - 1 point per 1/8" (maximum 10 point deduction)														
Appearance - (maximum 10 point deduction)														
Excess Penetration - (maximum 4 point deduction)														
Bead Width - if over 3/4" on plate or 5/16" on gauge (on all projects except project #1) (maximum 2 point deduction)														
Pin Holes - 2 points each; 10 points if 3 or more														
Presence of Whiskers - deduct 2 points for each														
Partial Fracture - Deduct 1 point for each 1/16"														
Grinding Straps for Thickness strap = complete fracture if over .035" (1 = retest; 2 = fail exam)														
Strap Width - deduct 2 points if less than 2 3/8"; complete fracture rating if less than 2 5/16"														
Angle of cut: +/- 3° (deduct 0) +/- 4° - 10° (deduct 2 points) Exceed +/- 10° (deduct 10 points)														
Excessive Heating - (maximum 2 point deduction)														
Clearance of pipe or channel: 3/32" or less (deduct 0 points) 1/8" to 7/32" (deduct 2 points) 1/4" or more (deduct 10 points)														
Position of Cut (90° to sides) or location of hole on coupon up to 1/8" out = 2 point deduction 1/8" to 1/4" out = 5 point deduction over 1/4" out = 10 point deduction														
Complete Fracture: 1 strap = retest 2 straps = fail exam														
<b>Maximum Credit per Strap or Coupon</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	
<b>Less Points Deducted</b>														
<b>Final Credit for Strap or Coupon</b>														
<b>Date:</b>				<b>Location:</b>				<b>Candidate Number:</b>						
<b>Roots Checked:</b>	<b>V</b>	<b>H</b>	<b>F</b>	<b>Single Strap Failure Position:</b>				<b>V</b>	<b>H</b>	<b>F</b>	<b>ROOT</b>	<b>FACE</b>		
<b>CONSULTANT TO COMPLETE:</b>				<b>TOTAL CREDIT:</b> _____ X .77 = _____ %				<b>PASS or FAIL (CIRCLE ONE)</b>						