



CONTEST DESCRIPTION

# Welding

POST-SECONDARY

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## **1 THE SKILLS FOR SUCCESS FOR CAREERS IN THE SKILLED TRADES AND TECHNOLOGY**

The Government of Canada has updated the previous Essential Skills framework to the new Skills for Success model in response to the evolving labour market and changing skill requirements. This model outlines nine fundamental skills Canadians need to thrive in work, education, training, and daily life.

Skills/Compétences Canada aims to highlight the importance of these skills, vital for success in trade and technology careers. Competitors can see how Skills for Success are integrated into contest descriptions, projects, and project documents. Recognizing these skills during the competition helps competitors match tasks with specific skills necessary for success and understand how these skills apply within their trade or technology programs and future careers.

The nine key Skills for Success, validated for workplace success, are:

1. Numeracy
2. Communication
3. Collaboration
4. Adaptability
5. Reading
6. Writing
7. Problem Solving
8. Creativity and Innovation
9. Digital

These Skills for Success are detailed in sections 2.3 and/or 3.2 (to be completed by SCC) of your Contest Description and, if relevant, in your Project and supporting documents.

## **2 CONTEST INTRODUCTION**

### **2.1 Description of the associated work role(s) or occupation(s)**

[https://www.skillscompetencescanada.com/en/skill\\_area/welding/](https://www.skillscompetencescanada.com/en/skill_area/welding/)

### **2.2 Purpose of the Challenge**

Assess the contestant's ability in the trade of welding. Contestants must demonstrate their knowledge in reading plans and interpreting welding symbols, and their mastery of the main welding processes used in today's industry.

### **2.3 Duration of contest**

12 hours: spread over two days, 6 hours per day.

## 2.4 Skills and Knowledge to be tested.

The assembly and welding work will be assessed based on the technical plans and welding processes specified in the projects.

## 3 CONTEST DESCRIPTION

### 3.1 List of documents produced and timeline for when competitors have access to the documents on the Skills/Compétences Canada website.

DOCUMENT	DATE OF DISTRIBUTION
Projects	December 2024

### 3.2 Tasks that may be performed during the contest.

#### 3.2.1 Theoretical elements

The contest's theoretical portion is limited to the knowledge required to execute the practical work. These elements are integrated into the contest for evaluation purposes, and include the following skills:

- Interpretation of plans (engineering drawing)<sup>5</sup>
- Interpretation of welding symbols<sup>5</sup>
- Knowledge of base metals and filler metals<sup>7</sup>
- Adjustment of welding machines<sup>1</sup>
- Workplace safety rules<sup>5</sup>

#### Notes

- All measurements are shown in metric.
- All instructions and plans will be provided in English and French.

*Skills for Success: <sup>1</sup>Numeracy, <sup>5</sup>Reading, <sup>7</sup>Problem Solving*

#### 3.2.2 Practical tasks

Post-secondary

- Shielded metal arc welding (SMAW, mild steel)
- Gas metal arc welding (GMAW, mild steel)
- Flux cored arc welding (FCAW, mild steel)
- Gas tungsten arc welding (GTAW, mild steel, stainless steel and aluminum)

#### 3.2.3 Tasks

The following types of joints and positions **may** be included.

Assemble and weld mild steel structures:
SMAW, GMAW, FCAW
Plate: 1G, 2G, 3G, 4G
Fillet Weld: 1F, 2F, 3F, 4F, 5F
Pipe: 1G, 2G, 3G, 5G,6G

Assemble and weld stainless steel, carbon steel and aluminum structures:
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GTAW / GTAW Pulse
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Plate: 1G, 2G, 3G, 4G
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Filet: 1F, 2F, 3F, 4F, 5F
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Pipe: 1G, 2G, 3G, 5G,6G
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## 4 EQUIPMENT, MATERIAL, CLOTHING

### 4.1 Equipment and material provided by Skills/Compétences Canada

- Cerium
- E3 electrodes
- Cups and collets
- Gas lenses will be provided: 2.4 and 3.2 Ø mm.
- Tungsten sharpener
- Plans and instructions
- Set or practice materials
- All basic materials required to complete projects
- Foot control (pedal) for the GTAW process
- All filler materials
- Aluminum solvent (cleaner) will be provided
- Angle grinder 4 1/2" 10 amp' - Stanley/Dewalt model: DWE4011cordless
- Grinding disc 1/4", 1/8", 3/32" - Stanley/Dewalt
- Welding machines and accessories for post-secondary competition: Lincoln Electric Powerwave 300c
- All equipment can be view at [www.lincolnelectric.ca](http://www.lincolnelectric.ca)
- Competitor can use any function on the machines.
- Low carbon steel
  1. Plate thickness: 3 mm - 9.5 mm
  2. Pipe wall thickness: 3.56 mm – 6.02 mm
  3. Diameter: 42.2 mm – 114.3 mm
- Stainless steel: 1.6 mm -3.2 mm
- Aluminum: 2mm - 3.2 mm
- Filler materials
  4. SMAW = E4918, 2.4 mm and 3.2 mm
  5. SMAW = E4310, 3.2 and 2.5 mm or E4311, 3.2 and 2.5 mm
  6. GMAW = ISO B-G49A SC G6 (ER49S-6), 0.9 mm
  7. FCAW = E491T-9-CH, 1.2 mm
  8. GTAW = ISO B-G49A SC G3 (ER49S-3),1.6 and 2.4 and 3.2 mm
  9. GTAW = ER308, 2.4 and 1.6 mm and
  10. GTAW = ER4043, 2.4 and 3.2 mm

- Shielding gas
  - 11. GMAW / FCAW = 75% Ar + 25% CO<sub>2</sub>
  - 12. GTAW = Argon

**COMPETITORS WILL BE REQUIRED TO USE THE MATERIAL AND EQUIPMENT PROVIDED BY SCC. ALL OTHER MATERIAL AND EQUIPMENT WILL BE REMOVED FROM THE SKILL AREA.**

**4.2** Equipment and material provided by the competitor.

- Tungsten, Cerium, E3 electrodes
- Helmet, #10, 11 or 12 lens
- Speed lenses (optional)
- Soap Stone / markers
- Centre punch
- Scriber
- Cold chisel
- 12" combination square (45° / 90°)
- Welding gauge
- Chipping hammer
- Steel and stainless-steel wire brushes
- Dividers
- Protractor gauge
- Digital level or level
- Ball peen hammer
- All-purpose pliers / side cutters
- Vice grip AND C-CLAMPS
- Magnet bracket
- Files/ with handles
- Wedges
- Wrap-A-Round
- Hacksaw (Stanley 20-807W mini)
- Measuring tape metric
- Metric ruler
- Magnetic work light.
- Trigger clamps
- Picks
- Flashlight
- Grinders are not permitted: Grinders will be provided in a grinding booth

#### 4.2.1 Toolboxes Guidelines

One of the objectives of SCC is the sustainability of the Competition. As a result, the toolboxes brought by Competitors will be restricted to the following maximum specifications.

The Competitor toolbox must not exceed .54 meters<sup>3</sup> in volume. (20" toolbox approximately) it can be multiple toolboxes, but the total of all toolboxes must not exceed the maximum volume indicated. There is no exception to this rule. If the Competitor toolbox is larger than what is indicated, the Competitor with the guidance of the NTC, will need to remove items from the toolbox and those items will not be used during the competition. All tools must fit inside one or more toolboxes. Tools outside of a toolbox will not be permitted.

## 5 HEALTH AND SAFETY

### 5.1 Safety program

SCC has implemented a comprehensive safety program as health and safety is an integral part of our competitions. Our safety program includes guidelines and procedures to make the work environment in each skill area safer.

#### 5.1.1 Safety manual

As part of our program a safety manual has been created to monitor and document health and safety within each skill area. It includes a definite plan of action designed to prevent accidents. The safety manual will be provided for every skill and these instructions must be followed and respected by all participants and officials at the SCNC.

#### 5.1.2 Safety workshop

During orientation, Competitors will participate in a Safety workshop and they will be expected to work and maintain a safe working area during the competition. Any Competitor breaking any health, safety, and environmental rules, may be required to undertake a second safety workshop, this will not affect the Competitor's competition time.

### 5.2 List of required personal protective equipment (PPE) provided by the competitor

- CSA approved safety shoes Footwear
- Welding helmet
- Welder's gloves
- Leather jacket or long sleeve denim shirt or cotton hoodie
- Safety glasses
- Hat or welding beanie

**5.3** List of required personal protective equipment (PPE) provided by Skills/Compétences Canada

- Hearing protection
- Safety glasses
- Rubber gloves
- Clear face shield

**Note:** Competitors who do not have the required protective equipment will not be allowed to participate in the competition

**6 ASSESSMENT**

JUDGING CRITERIA

Undercut-Are all the welds free of undercut?
Weld size-Are welds consistent in size per dwg requirement?
Crater fill-Are end craters filled in?
Weld profile-Are all weld profiles as per symbols?
Weld appearance-Are welds beads consistence in appearance?
Fitup-Are parts fitted as per drawing?
GMAW fillet size-Are the GMAW fillet sizes according to prints?
GMAW porosity-Are the GMAW welds free of surface porosity?
SMAW fillet size-Are the SMAW fillet sizes according to prints?
Are the SMAW welds free of surface porosity?
GMAW undercut & overlap-Are the GMAW beads free of undercut & overlap?
SMAW undercut & overlap-Are the SMAW beads free of undercut & overlap?
GMAW Fillet joints are completely fused to the parent material
SMAW Fillet joints are completely fused to the parent material
SMAW reinforcement-Does the SMAW groove weld have excessive reinforcement
GTAW fillet size-Are the GTAW fillet sizes according to prints?
Are the GTAW welds free of surface porosity?
GTAW penetration-Is the GTAW groove weld completely penetrated
Fitup-Are parts fitted as per drawing? GATW Projects



Crater fill-Are end craters filled in? (GTAW Aluminum project)
Joints are free from Misalignment
Arc strikes-Is the project free of arc strikes?
Cleanup-Is all weld spatter, fume residue and slag removed?
Overall appearance

**Note:** This list is subject to change.

TASKS	/100
Day 2 – Project Aluminum (3 hours)	26
Day 2 – Project Stainless Steel (3 hours)	24
Day 1 – Project (6 hours)	50

## 7 CONTEST SPECIFIC RULES

Contest specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from contest to contest. Any additional contest rules will be reviewed during the competitor orientation.

### 7.1 Welding of the pressure vessel

If any of the joint configurations on the pressure vessel i.e. butt, fillet or outside corners are welded with the incorrect process or in the incorrect position, that joint configuration shall not be visually assessed, and no marks are awarded for that type of joint configuration. If the vessel was tacked in the inside, competitor will take the vessel apart and remove those tacks. No extra time will be added.

### 7.2 Welding of the Aluminium or stainless-steel structures

If any of the joints are welded in the incorrect position, no further inspection shall be carried out and no marks are awarded for the complete structure.

TOPIC/TASK	CONTEST SPECIFIC RULE
(Use of technology - personal laptops, tablets and mobile phones)	Competitors are <b>not</b> allowed to bring personal laptops tablets or mobile phones into the skill area
Drawings, notes recording information)	Competitors can bring notes in for welding machine settings.
(Tools / Infrastructure)	Competitors can only bring the tools listed in section 4.2

## 8 ADDITIONAL INFORMATION

### 8.1 Interpreter

If a competitor requires the help of an interpreter once onsite during the competition, the Skills/Compétences Canada Provincial/Territorial offices must advise Skills/Compétences Canada National Secretariat a minimum of 1 month prior to the competition or this service may not be guaranteed.

### 8.2 Ties

- Tiebreaker #1: The competitor with the highest score in the first project, will be declared the winner.
- Tiebreaker #2: The competitor with the highest mark in the open groove weld or welds on day 1 project will be declared the winner.
- Tiebreaker #3: The Competitor with the highest score on second project will be declared the winner.

### 8.3 Test Project change at the Competition

Where the Test Project has been circulated to Competitors in advance, NTC shall change a maximum of 30% of the work content. Please refer to the Competition Rules.

### 8.4 Competition rules

Refer to the competition rules of the Skills Canada National Competition which can be found on our website.

## 9 NATIONAL TECHNICAL COMMITTEE MEMBERS

MEMBER ORGANIZATION	NAME
Newfoundland and Labrador	Brendan Mullett
Prince Edward Island	Patrick (Rick) Cheverie
Nova Scotia	Stephen Stewart
New Brunswick	Adam Stead
Ontario	Josh Hyde
Manitoba	Chris Hasell
Saskatchewan	Devin Milligan
Alberta	Dan Lyngé – Chair
British Columbia	Pat McGurk - Co-Chair
Yukon	Sky Pearson
Québec	Samuel Séguin

Contact the Skills/Compétences Canada national secretariat for any questions or concerns: Nathalie Maisonneuve ([nathaliem@skillscanada.com](mailto:nathaliem@skillscanada.com)).