

Welding

POST-SECONDARY

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

In response to the evolving labour market and changing skill needs, the Government of Canada has launched the new Skills for Success (*former Essential Skills*) model defining nine key skills needed by Canadians to participate in work, in education and training, and in modern society more broadly. SCC is currently working with Employment and Social Development Canada (ESDC) to bring awareness of the importance of these skills that are absolutely crucial for success in Trade and Technology careers. Part of this ongoing initiative requires the integration and identification of the Skills for Success in contest descriptions, projects, and project documents. The next phase and very important aspect of our Skills for Success (SfS) initiative is to provide a *Skills Report Card* to each competitor at the Skills Canada National Competition. The purpose of the report card is to inform the competitor about their current level of nine identified Skills for Success based on their competition scores. With this knowledge, the competitor will be made aware which skill may require improvement. Full implementation is expected in the next Skills Canada National Competition.

The following 9 skills have been identified and validated as key skills for success for the workplace in the legend below:

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

These Skills for Success have been identified in section 2.3 and/or 3.2 of your Contest Description and if applicable, 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/

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 a 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
Project	December 2021

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)⁸
- Interpretation of welding symbols⁸
- Knowledge of base metals and filler metals⁷
- Adjustment of welding machines¹
- Workplace safety rules⁵
- Notes
 - All measurements are shown in metric
 - All instructions and plans will be provided in English and French.

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.

Post-Secondary
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: GTAW / GTAW Pulse
Plate: 1G, 2G, 3G, 4G Fillet: 1F, 2F, 3F, 4F, 5F Pipe: 1G, 2G, 3G, 5G, 6G

Essential Skills -

4 EQUIPMENT, MATERIAL, CLOTHING

4.1 Equipment and material provided by Skills/Compétences Canada

- Cerium
- E3 and zirconium types of 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: DWE4011 cordless
- Grinding disc 1/4", 1/8", 3/32" - Stanley/Dewalt
- Welding machines and accessories for post-secondary competition: Lincoln Electric Square Wave TIG 200 AC/DC, with foot pedal control and Power MIG 360 Multi Process.
- All equipment can be view at www.lincolnelectric.ca
- Competitor can use any function on the machines.
- Low carbon steel
 - Plate thickness: 3 mm - 9.5 mm
 - Pipe wall thickness: 3.56 mm – 6.02 mm
 - Diameter: 42.2 mm – 114.3 mm

- Stainless steel: 1.6 mm -3.2 mm
- Aluminum: 3.2 mm
- Filler materials
 - SMAW = E4918, 2.4 mm and 3.2 mm
 - SMAW = E4310, 3.2 and 2.5 mm or E4311, 3.2 and 2.5 mm
 - GMAW = ISO B-G49A SC G6 (ER49S-6), 0.9 mm
 - FCAW = E491T-9-CH, 1.2 mm
 - GTAW = ISO B-G49A SC G3 (ER49S-3), 1.6 and 2.4 and 3.2 mm
 - GTAW = ER308, 2.4 and 1.6 mm and
 - GTAW = ER4043, 2.4 and 3.2 mm
- Shielding gas
 - GMAW / FCAW = 75% Ar + 25% CO₂
 - 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
- 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
- Water spray bottle (e.g., Windex bottle)

- 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 items in section 4.2 only. There is no exception to this rule. If the Competitor brings other tools, they will be removed and will not be used during the competition.

4.3 Required clothing provided by the competitor

- Appropriate work clothes (no synthetics clothing's or hoodies)

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 COVID-19 Protocol

The COVID-19 guidelines will be shared as soon as they are available.

The COVID-19 guidelines will be subject to change based on the BC COVID-19 guidelines in place at the time of the competition.

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

- Hearing protection – McCordick
- Safety glasses – McCordick
- Rubber gloves – McCordick
- Leather work gloves – McCordick
- Clear face shield - McCordick

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

- CSA approved safety shoes Footwear
- Welding helmet
- Welder's gloves

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

6 ASSESSMENT

6.1 Point breakdown

Note: This list is subject to change.

TASKS	/100
Day 2 – Project and Aluminum (3 hours)	26
Day 2 – Project and 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.

TOPIC/TASK	CONTEST SPECIFIC RULE
Use of technology - personal laptops, tablets, and mobile phones	<ul style="list-style-type: none"> • Competitors are not allowed to bring personal laptops tablets or mobile phones into the skill area

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
Quebec	Martin Daignault
Ontario	Josh Hyde
Manitoba	Toby Punton
Saskatchewan	Devin Milligan – Co-Chair
Alberta	Dan Lynge – Chair
British Columbia	Pat McGurk
Yukon	Sky Pearson

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