



CONTEST DESCRIPTION

Welding

TEAM CANADA

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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 2.4 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. 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.

This will be shown in 4 separate modules, utilizing SMAW, GMAW, FCAW and GTAW welding processes.

2.3 Duration of contest

Maximum 18 hours

2.4 Skills and Knowledge to be tested.

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.

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	January 2022
Addendum A	January 2022

3.2 Tasks that may be performed during the contest

Work organization and management

The individual needs to know and understand:

- The standards and legislation relating to the health, safety, security, and hygiene in the welding industry
- The range, use and maintenance of personal protective equipment used in the industry for any given circumstances
- The selection and use of safety equipment related to specific or hazardous tasks
- ISO A and/or E (American and European) drawing representation⁵
- Technical terms and symbols used in drawings and plans⁵
- Terminology and safety data supplied by manufacturers
- The requirements and effects of welding production for the environment and sustainability issues
- Basic mathematical manipulation and unit conversion¹
- Geometrical principles, techniques, and calculations¹

The individual shall be able to:

- Work safely with regard to themselves and others.

- Select, wear, and maintain PPE as required
- Recognize hazardous situations and take appropriate actions with regard to their own and others safety⁷
- Follow correct procedural processes when working in hazardous environments
- Locate and identify dimensions and weld symbols⁵
- Adhere to manufacturers' safety data sheets⁵
- Maintain a clean working environment
- Complete work within agreed timescales¹
- Make essential connections for specific welding procedures.

Preparation and assembly techniques

The individual needs to know and understand:

- The interpretation of fabrication or engineering drawings and weld symbols⁵
- The classification and specific uses of welding consumables including:
 - Coding and designation of welding rods
 - Diameters and specific use of welding wire
 - Choice and preparation of welding electrodes
- How surface contamination can influence the finished weld characteristics
- The correct machine settings to be aligned to:
 - Welding polarity
 - Welding position
 - Material
 - Material thickness
 - Filler material and feed speed
- Any fine adjustments needed to machine hardware, TIG electrode shape, wire type and diameter etc.⁷
- The methods of edge preparation to align with joint profile, strength, and material
- Methods of distortion control in steels, alloys, and aluminium

The individual shall be able to:

- Set up welding equipment to manufacturers' specifications including (but not limited to)
 - Welding polarity
 - Welding amperage
 - Welding voltage
 - Wire feed speed
 - Travel speed

- Travel/electrode angles
- Mode of metal transfer
- Prepare material edges in line with specifications and drawing requirements
- Set up and operate appropriate controls to minimize and correct distortion
- Carry out appropriate procedures to control heat input

Welding materials

The individual needs to know and understand:

- The mechanical and physical properties of:
 - carbon steels
 - aluminium and its alloys
 - stainless steels;
- Correct the alignment of process with the material being used
- The selection of welding consumables
- The correct storage and handling of welding consumables
- Terminology, characteristics, and safe use of welding and purging gases
- The effects of welding on the structure of the material

The individual shall be able to:

- Use materials with consideration to their mechanical and physical properties
- Store welding consumables correctly with reference to type, use and safety considerations
- Select and prepare materials with reference to drawing material list
- Select methods used in shielding the weld area from contamination
- Select gasses used for shielding and purging

SMAW (111) and GMAW (135) Process

The individual needs to know and understand:

- Drawing weld symbol interpretation⁵
- Weld positions, weld angles and travel speeds¹
- The techniques for efficient stops/starts
- The techniques utilised to deposit single sided root penetration welds
- The techniques utilised to deposit defect free butt and fillet welds

The individual shall be able to:

- Make welded joints in relation to international specifications⁷
- Interpret welding terminology to complete task to specification⁵
- Perform welding of carbon steel material in all positions (except vertical down) on pipe and plates deposit single sided full penetration root pass welds

- Deposit full penetration butt and fillet welds on pipe and plate
- Perform stop/starts

FCAW-G (136) Process

The individual needs to know and understand:

- Drawing weld symbol interpretation⁵
- Weld positions, weld angles and travel speeds
- The techniques for efficient stop/starts
- The techniques utilised to deposit defect free butt and fillet welds

The individual shall be able to:

- Make welded joints in relation to international specifications⁷
- Interpret welding terminology to complete task to specification⁵
- Perform welding on carbon steel material in all positions (except vertical down) on pipe and plate
- Perform stop/starts
- Deposit full penetration butt and fillet welds on pipe and plate

GTAW (141) Process

The individual needs to know and understand:

- Drawing weld symbol interpretation
- Weld positions, weld angles and travel speeds
- The techniques for efficient stops/starts
- The techniques utilised to deposit defect free butt and fillet welds

The individual shall be able to:

- Make welded joints in relation to international specifications⁷
- Interpret welding terminology to complete task to specification⁵
- Perform welding on carbon steel, aluminium sheet and stainless-steel sheet material in all positions (except vertical down) on pipe and plate
- Perform stop/starts
- Deposit full penetration butt and fillet welds on pipe and plate
- Deposit utilising a single pass on stainless steel and aluminium sheet, root and capping pass combination

Finishing, quality assurance, and testing

The individual needs to know and understand:

- The international specifications for the control of weld quality

- Specific terminology used in the welding industry
- Imperfections/defects that may occur during welding⁷
- The importance of weld metal cleanliness in weld quality
- A range of destructive and non-destructive testing⁷
- Welder certification test coupons in accordance with international standards

The individual shall be able to:

- Produce welds to meet drawing and legislative specifications¹
- Recognize weld defects and take appropriate action to rectify them⁷
- Utilize correct techniques to ensure weld metal cleanliness is maintained
- Dress welds using wire brushes, scrapers, chisels, etc.
- Check completed work against drawing requirements to reflect accuracy, square and flatness where necessary^{5,7}
- Carry out basic non-destructive testing and be familiar with more advanced testing methods
- Complete pressure vessels capable of withstanding hydrostatic pressure testing.

Skills for Success – ¹Numeracy, ⁵Reading, ⁷ Problem Solving

4 EQUIPMENT, MATERIAL, CLOTHING

4.1 Equipment and material provided by Skills/Compétences Canada

- Lincoln Power Wave® C300 Advanced Process
- Work space, welding table with positioning arm
- Practice materials
- All consumables (Filler Wire, Electrodes, & Shielding gases)

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

This list of tools IS SUBJECT TO CHANGE, DUE TO COVID-19

- No more than 3 5” Grinders. (can be battery type or plug in)
- No more than 2 2” Die Grinders (can be battery type or plug in)
- **Battery Charger if using battery type grinders**
- Locking C-clamps
- Metric tape measure

- Torpedo level
- Hammers
- Chisels
- Files
- Metric combination square
- C-clamps
- Scriber
- Weld gauges
- Metric steel ruler
- Soapstone
- Dividers

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.

The Competitor toolbox must not exceed 2 meters³ in volume. 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 Expert, 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.

4.3 Required clothing provided by the competitor

- Appropriate clothing (100% cotton coveralls recommended)
- Long Sleeve Denim Shirt or Jacket - 100% cotton

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 in order 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
- Welding helmet
- Welder's gloves

Note: Contestants who do not have the required protective gear will not be allowed to participate in the contest

6 ASSESSMENT

6.1 Point breakdown

Note: This list is subject to change.

TASKS	/100
Work organization and management	10
Preparation and assembly techniques	10
Welding Materials	10
SMAW (111) and GMAW (135) Process	25
FCAW-G (136) Process	10
GTAW (141) Process	15
Finishing, quality assurance, and testing	20

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, memory sticks and mobile phones	Competitors, Judges and Expert are allowed to use these devices during competition days.
Equipment failure	<ul style="list-style-type: none"> • If equipment or tools which are brought by the Competitor fail there is no extra time allowed. • If equipment or tools supplied by the Competition Organizer fail extra time is allowed only if the Technician of the sponsor or supplying company specifies and proves it is not a “user error”.

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 might not be guaranteed.

8.2 Ties

- **Tiebreaker #1:** The competitor that has the highest marks in the X-rays (combined)

- **Tiebreaker #2:** The competitor that has the highest marks on the module 2 (including pressure test)
- **Tiebreaker #3:** The competitor that has the highest marks on module 4 (Stainless steel)

8.3 Test Project change at the Competition

Where the Test Project has been circulated to Competitors in advance, Expert 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 TEAM CANADA EXPERT

Ken Heather

Contact the Skills/Compétences Canada national secretariat for any questions or concerns: Sophie Courchene at sophie@skillscanada.com