Skills Compétences Canada
Québec2021

CONTEST DESCRIPTION

Refrigeration and air conditioning

POST-SECONDARY

Skills Compétences Canada Québec2021

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

SCC is currently working with Employment and Social Development Canada (ESDC) in order to bring awareness to the importance of Essential Skills that are absolutely crucial for success in the workforce. Part of this ongoing initiative requires the integration and identification of Essential Skills in contest descriptions, projects, and project documents. The next phase and very important aspect of our Essential Skills (ES) initiative is to provide an ES report card to each competitor at the Skills Canada National Competition. The purpose of the ES report card is to inform the competitor about their current level of essential skills based on their competition scores. With this knowledge, the competitor will be made aware which essential 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 essential skills for the workplace in the legend below:

[1]Numeracy, **[2]**Oral Communication, [3]Working with Others, [4]Continuous Learning, [5]Reading Text, [6]Writing, **[7]**Thinking, [8]Document Use, [9]Digital

These essential skills have been identified in section 3.2 of your Contest Description and if applicable, in your Project and all other supporting project documents.

2 CONTEST INTRODUCTION

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

https://www.skillscompetencescanada.com/en/skills/construction/refrigeration/

2.2 Purpose of the Challenge.

To assess the contestant's skills relating to the installation, operation, maintenance and repair of mechanical and/or electrical components and equipment for a refrigeration and/or air Conditioning system.

2.3 Duration of contest.

12 hours

2.4 Skills and Knowledge to be tested.

The goal of the contest is to encourage students to learn more about refrigeration and air-conditioning. Refrigerant handling is an important component, and contestants must be aware of current regulations.

3 CONTEST DESCRIPTION

3.1 List of documents produced and timeline for when competitors have access to the documents.

DOCUMENT	DATE OF DISTRIBUTION VIA WEBSITE
Refrigeration standards	November 2020

3.2 Tasks that may be performed during the contest

- Applying basic and advanced control circuit concepts (electrical and, or electronic)
- From a provided electrical schematic, install electrical components and wiring to achieve provided sequence of operation[8]
- Diagnose electrical and mechanical fault(s) in an operating refrigeration and/or air conditioning system as required[7]
- Calculate and record required refrigerant charge and verify through subcooling and superheat measurement and calculations[1]
- Calculate and record required settings for temperature and/or pressure controls[1]
- Perform brazing procedures.
- Project: Install refrigeration tubing, mechanical components and indicated accessories, on a refrigeration system. Test, evacuate, charge and commission the system.[7]
- Comply with all Provincial and Federal codes and regulations[7]
- Applying health and safety regulations
- Pre-requisites:
  - Thorough knowledge of the refrigeration cycle[7]
  - The ability to use refrigeration tools and specialized equipment
  - The ability to measure accurately[1] and use tools required for working with copper tubing
  - Knowledge of and compliance with current industry codes and safety regulations[5]
  - The ability to use precision electrical test equipment
  - The ability to interpret electrical diagrams[8]
  - A good operating knowledge of typical controls used in refrigeration and air-conditioning systems (mechanical, electrical and electronic)

Essential Skills – [1]Numeracy, [5]Reading Text, [7]Thinking (Problem Solving, Significant use of Memory), [8]Document Use,

4 EQUIPMENT, MATERIAL, CLOTHING

4.1 Equipment and material provided by Skills/Compétences Canada

- All consumables will be provided by the organization
- HVAC Multimeter and Clamp Meter Combo Kit
- Any additional required safety equipment, testing equipment or special tools will be supplied if not indicated on competitor tool list.

4.2 Equipment and material provided by the competitor

Competitors may only bring the tool in the list below. Should the competitor not bring any of the tools on the following list, SCC will not supply the tool(s).

- 1 – Set of common screwdrivers
- 1 – Control screwdriver
- 1 – Set of Phillips screwdrivers
- 1 – Set of Robertson screwdrivers
- 1 – Set of nut-drivers
- 1 – Set of combination wrenches ¼ to $^{15}/_{16}$ in.
- 1 – 6in, 8in, 10in and 12in adjustable wrench
- 1 – Linesman pliers
- 1 – Electrical side cutters
- 1 – Needle nose pliers
- 1 – Slip joint pliers
- 1 – Wire crimpers
- 1 – Wire Strippers
- 1 – Set of imperial and metric allen keys
- 1 – Combination ratchet valve wrench
- 1 – Flaring/swaging kit
- 1 - Hammer
- 1 – Tubing cutter ¼ to 1-$^{1}/_{8}$in.
- 1 - File
- 1 – Tube reaming tool
- 1 – Mirror
- 1 - Flashlight
- 1 – Multimeter, minimum Cat III(Optional) (Meters are available)
- 1 – Clamp-on ampmeter, minimum CAT III (Meters are available)
- 1 – Thermometer (electronic or mechanical)
- 1 – Brazing blanket/heat shield
- 1 – Leak detector
- 1 – Tape measure
- 1 – Valve core remover (4 in 1 ball valve tool)
- 1 – Micron vacuum gauge and necessary connections
- 1 – Solenoid Magnet

- 1 – Nitrogen Purge Regulator
- 1 – Torpedo Level
- 1 – Utility knife
- 1 – Assortment of screwdriver bits i.e.: #2 Robertson, # 2 Phillips
- 1 – Set of Analog refrigeration manifold and gauges (complete with: environmental hoses in good condition)
- 1 mini tube cutter
- 1 A5 turbo torch tip
- Pencils, pens, notepad
- Calculator

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 0.10 meters^3 in volume. It can be multiple toolbox but the total of all toolbox, 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.

4.3 Required clothing provided by the competitor.

- Competitors must wear appropriate clothing and standard safety gear
- Long sleeve (non-synthetic shirt for brazing) and long pants
- Leather gloves to be worn when brazing/soldering.

5 SAFETY REQUIREMENTS

5.1 Safety workshop.

Upon arrival at the Skill area, 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 Personal protective equipment (PPE) provided by Skills/Compétences Canada

- No PPE required

5.3 Personal protective equipment (PPE) provided by the competitor

- Clear Safety Glasses
- "Mechanics-style" work Gloves
- CSA approved Safety shoes
- All-Leather gloves for brazing

6 ASSESSMENT

6.1 Point breakdown

POINT BREAKDOWN	/100
Piping, Commissioning, and Electrical Controls	75
Troubleshooting	10
Safety	15

7 ADDITIONAL INFORMATION

7.1 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.

7.2 Ties

- Tiebreaker #1: The competitor with the highest score for Troubleshooting & Safety criteria shall be declared the winner.
- Tiebreaker #2: The competitor with the shortest time in troubleshooting shall be declared the winner.
- Tiebreaker #3: The competitor with the highest score in the Piping, Commissioning, and Electrical Controls criteria will be declared the winner.

7.3 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.

7.4 Competition rules

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

8 NATIONAL TECHNICAL COMMITTEE MEMBERS

Member Organization	Name
Manitoba	Brad Peters
Ontario	Shane McCarthy
New Brunswick	Paul St-Onge
British-Columbia - Chair	Larry Nohr
Saskatchewan	Lee Blakely
Prince Edward Island	Nick Green
Alberta	Justin Evernden
Newfoundland and Labrador	Maurice Tarrant
Nova Scotia	Brian Nicholl
Quebec – Co-Chair	Hugo Tremblay

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