

13th PROVINCIAL SKILLS COMPETITION 2010 SKILLS CANADA NEWFOUNDLAND AND LABRADOR



REFRIGERATION Scope document Post Secondary Level

Duration of Contest: 6 hrs.

PURPOSE OF THE CHALLENGE

Assess contestant's problem-solving skills relating to the installation, operation, maintenance and repair of refrigeration systems.

SKILLS AND KNOWLEDGE TO BE TESTED

- Applying basic and advanced control circuit concepts (electrical and, or electronic).
- From a written functional description prepare an electrical schematic diagram and wire a control circuit and it's components.
- Troubleshoot refrigeration system component(s) electrical and mechanical.
 - Identify various types of refrigerants.
 - Perform brazing procedures.
 - Project:Install refrigeration tubing and accessories on a fractional horsepower split refrigeration system. Test, evacuate, charge and commission the system.
 - Comply with all Provincial and Federal codes and regulations.
 - Applying health and safety regulations.

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

PRE-REQUISITITES

- Thorough knowledge of the refrigeration cycle.
- The ability to use refrigeration tools and specialized equipment.
- The ability to use tools required for working with copper tubing.
- Knowledge of and compliance with current industry codes and safety regulations.
- The ability to use precision electrical test equipment.
- A good operating knowledge of typical controls used in refrigeration and air-conditioning systems.
(To include: mechanical, electrical and electronic)

EQUIPMENT, TOOLS, SUPPLIES, CLOTHING

- Contestants must wear the appropriate clothing and standard safety gear (Gloves, CSA approved hardhat, safety boots and safety goggles). Contestants must provide their own personal safety equipment.
- Contestants must provide the basic hand tools listed below.
 - All consumables will be provided by the organization.
 - Any additional safety equipment, testing equipment or special tools will be supplied.

List of tools to be supplied by the contestant:

- 1 – Set of common screwdrivers
- 1 – Set of phillips screwdrivers
- 1 – Set of robertson screwdrivers
- 1 – Set of nutdrivers
- 1 – Set of combination wrenches $\frac{1}{4}$ to $\frac{15}{16}$ in.
- 1 – 6in, 10in and 12in adjustable wrench
- 1 – linesman pliers
- 1 – electrical side cutters
- 1 – needle nose pliers
- 1 – slip joint pliers
- 1 – combination wire crimpers
- 1 – ball peen hammer
- 1 – Set of imperial allen keys
- 1 – combination ratchet valve wrench
- 1 – flaring/swedging kit
- 1 – tubing cutter $\frac{1}{4}$ to $1\text{-}\frac{1}{8}$ in.
- 1 – tube reaming tool
- 1 – Mirror
- 1 – Multimeter
- 1 – Clamp-on ampmeter
- 1 – Thermometer
- 1 – Leak detector
- 1 – Tape measure
- 1 – Micron vacuum gauge
- 1 – Set of refrigeration manifold gauges
(complete with: environmental hoses)
- Pencils, pens, notepad
- Pressure / saturation temperature chart.
- Calculator

This is a minimum require list of tools for each contestant, additional tools can be added.

EVALUATION WILL BE BASED ON THE FOLLOWING

- Testing will be performed on refrigeration and air-conditioning equipment. Judging will determine proficiency by knowledge, skills and speed of task. Special consideration will be paid to health and safety rules.
- In the case of a tied score the best over all time from the troubleshooting task will be used to break the tie.
- The test project will not be posted prior to the competition day.

- Point break down 1000 Total
- Marking Scheme: Applied practical 100%

PROVINCIAL TECHNICAL COMMITTEE

Randy LeDrew (chair)

George LeShane