

Heating, Ventilation, Air Conditioning and Refrigeration (HVACR)- 2024

April 20, 2024 – 8 a.m.

Virginia Beach Convention Center

1000 19th St. Virginia Beach, Va. 23451

Please refer to the current SkillsUSA Virginia Technical Standards for detailed description of guidelines and requirements. The scope of the contest will be drawn from these standards. NOTE: ALL contest are subject to increased difficulty levels from previous state competitions in order to align the scope and skill level to that of National Competitions.

- **Resumes, one page** go to www.vaskillsusa.org State Leadership Conference Announcements for Resume Worksheet; resume is worth 10% of the total contest score.
- **OSHA card, certificate or letter** verifying OSHA training
- Contestants should report a few minutes early to the contest site with their nametag turned so that their contestant number is showing.
- The contest is not considered over until the area has been cleaned.

Clothing

Official SkillsUSA khaki work shirt **or** SkillsUSA Virginia conference t-shirt and pants, black or brown leather work shoes, and safety glasses with side shields or goggles. (Prescription glasses can be used only if they are equipped with side shields. If not, they must be covered with goggles.)

Contestant's Tool List

Each Air Conditioning & Refrigeration competitor should bring the following tools and meters to the contest:

1. Flare Block and yoke
2. Swaging tool
3. Tube cutter
4. 4 inch 0 sandpaper
5. Gauge manifold
6. Wiping cloth
7. Measuring tape
8. Safety glasses
9. 2 1/4 inch flare nut wrench or Equivalent
10. Ball peen hammer
11. 1/4 inch tubing wire brush
12. Gloves
13. Two thermometers or an electronic thermometer with two probes
14. Volt-Ohm meter with Amprobe
15. Nut driver set
16. Pressure temperature chart
17. 10 inch crescent wrench
18. Common pliers
19. Lineman pliers
20. Service valve wrench
22. Screwdrivers, straight and Phillips
22. Thermostat screwdriver
23. Pinch off tool
24. Resume

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Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) State Contest 2024

Station 1: Brazing (30 minutes) 2 people

Interpret piping diagram, assemble piping, braze per instruction, and pressurize for testing.

Station 2: Mechanical Troubleshooting (Refrigeration) (20 minutes) 1 person

Read work order ticket and diagnose problem with Heat Pump system.

Station 3: Electrical Wiring (30 minutes) 2 people

Read given diagram and wire up provided components to simulate an electric furnace and air conditioning operation.

Station 4: Diagnostic of components (15 minutes) 1 person

Using the proper instruments and procedures, determine and explain the nature of each component, and log your answer.

Station 5: Interview (15 minutes) 1 person

Student will conduct a job interview answering a series of questions

Station 6: Written exam (30 minutes) Everyone

Answer general knowledge questions pertaining to the air conditioning and refrigeration field.

2.20 hours

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**Heating, Ventilation, Air Conditioning and Refrigeration
(HVACR)
State Contest 2024**

**Contestants Instructions
Station: 1**

Time Limit: 30 minutes

The purpose of this station is to test the proficiency of the contestant in the use of the tools and materials used to fabricate piping as needed in the field. The project is simple but will require all the skills and speed the contestant can muster to do it accurately in the time allotted.

Accuracy is very important.

Use the below instructions to build your project. All joints will be hard soldered. Be as neat and craftsman like as you can.

Project Instructions

1. Cut 1 piece of 3/8" copper tubing 4" long, Flare 1 end and plug with fittings
2. Cut 1 piece of 3/8" copper tubing 4" long, Swag 1 end
3. Silver solder the 3/8" pieces of copper together
4. Cut 1 piece of 1/4" copper tubing 4" long, Flare 1 end
5. Insert the 1/4" copper into the 3/8" copper and crimp connect them together and silver solder
6. Tighten all fittings and have judge test for leaks

Please don't ask the judge any questions about your answers as he is only responsible for pressure testing.

You will be judged on the following:

1. Proper use of tools and instruments.
2. The accuracy of your measurements.
3. Integrity and neatness of your finished product.
4. General safety practices.
5. Leaks

DO NOT START UNTIL YOU ARE TOLD TO DO SO....

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**Contestants Instructions
Station: 2**

Time Allowed: 20 minutes

This exercise involves diagnostic of heat pump system:

The complaint is unit does not heat properly. What is the diagnostics?
Also measure and write down the following information while in the heating mode:

- **Common Suction Pressure**
- **Liquid Line Pressure**
- **Amp reading of compressor**

Record your answers from above along with your diagnosis and hand to the judge when complete.

NOTES:

1. Follow all normal safety procedures.
2. Use proper tools and/or instruments.
3. Perform task in proper sequence.
4. Return all doors and equipment to proper state when finished.

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**Contestants Instructions
Station: 3**

Time Allowed: 30 minutes

This exercise involves wiring of conventional thermostat and check for proper operation.

After wiring is complete, run through the following sequence:

- 1. Cut fan only switch to on, light labeled high speed fan should come on, then cut fan switch back to auto**
- 2. Second put thermostat in cool mode and lower set point. Cool light and high speed fan light should come on. Then raise set point so that lights cut off.**
- 3. Third cut thermostat to heat mode and raise set point. Heat light and low speed fan should come on. Then lower set point so that lights cut off.**
- 4. Lastly, remove all of your low voltage wiring so board is ready for next contestant just like you found it.**

NOTES:

1. Follow all normal safety procedures.
2. Use proper tools and/or instruments.
3. Perform task in proper sequence.
4. Return all equipment to proper state when finished.

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**Contestants Instructions
Station: 4**

Time Allowed: 15 minutes

This exercise involves diagnostic of components.
Using the proper tools you are to:

Check each component and label name of component and if you feel this component is bad or good. Provide your answers to the judge when you are completed.

NOTES:

1. Follow all normal safety procedures.
2. Use proper tools and/or instruments.
3. Perform task in proper sequence.
4. Return all equipment to proper place when finished

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**Contestants Instructions
Station: 5**

Time Allowed: 15 minutes

This exercise involves an interview with a human resource director of a major HVAC company:

Using your communications skills you are to:

Answer each question the judge ask of you with the intent you are trying to land a job at a major HVAC company and begin your career path. Have fun with this, and remember you are trying to convince this person you are the right person for the job.

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**Contestants Instructions
Station: 6**

Time Allowed: 30 minutes

Read each question carefully on the provided written test. Select the best answer and write the letter on the line to the left of each number. **Be sure to write your contestant number on your answer sheet.** When you have finished, turn paper over so we know you are complete. We will take up all tests at the same time.

This Contest Update must be signed by student and advisor and is to be submitted to chairman upon arrival to the contest area the day of competition.

Advisor: _____ Date: _____

Student: _____ Date: _____