SkillsUSA Tennessee PS
Virtual Interview Contest

Electro-Mechanical Technician

(HVAC/R Focus)

SkillsUSA is focused on preparing students for career success. With the changes in our world, it is now more important than ever that you know not only how to interview for your future career, but how to do it in a virtual format.

Starting in summer 2020, SkillsUSA Tennessee Postsecondary is hosting statewide Virtual Interview Contests in all industry sectors!

Virtual Interview Contest Process:

Step #1: All chapters will receive *"How to Prepare for Virtual Interviews*" training packet created by the SkillsUSA Tennessee PS State Director

Step #2: Students practice virtual interviewing skills with their instructor. Create a professional resume geared towards the job description included. Participate in a virtual in-class competition to determine top 3 overall students in their program area.

Step #3 The top 3 students from each program submit their recorded virtual skills demonstration interviews and their professional resumes to the state director to be judged by industry professionals.
**Scenarios and detailed instructions are included in this packet*

Step #4 The Top 10 finalists from each sector will be notified of their scheduled time to interview in using *Microsoft Teams* with a panel of industry professionals from their sector. Interviews will be recorded, and once all are scored the overall winners will be awarded Gold, Silver, and Bronze medals.

SkillsUSA TENNESSEE POSTSECONDARY

SkillsUSA STATE STANDARDS OF EXCELLENCE GOLD LEVEL

Electro-Mechanical Technicians (HVAC/R Focus)

Job Summary and Responsibilities:

Electromechanical engineering technicians collaborate with electromechanical engineers in the development of electromechanical equipment. Electromechanical engineering technicians are responsible for building, installing, testing, monitoring, and maintaining the electromechanical equipment, circuits and systems. They test this by the use of test instruments such as oscilloscopes and voltmeters. Electromechanical engineering technicians also use soldering equipment and hand tools to repair electromechanical equipment.

Required Competencies:

Occupational Competencies

- **Soldering techniques:** Apply and work with a variety of techniques in the process of soldering, such as soft soldering, silver soldering, induction soldering, resistance soldering, pipe soldering, mechanical and aluminum soldering.
- **Test run:** Perform tests putting a system, machine, tool or other equipment through a series of actions under actual operating conditions in order to assess its reliability and suitability to realise its tasks, and adjust settings accordingly.
- **Soldering equipment:** Use soldering equipment to melt and join together pieces of metal or steel, such as a soldering gun, soldering torch, gas-powered iron, and others.
- **Electrical equipment regulations:** Familiarity with the national and international regulations with regards to the use and manufacture of electrical equipment on the workfloor. These regulations provide rules and guidelines on topics such as general risk management, electrical equipment manufacture, electrical equipment testing, electrical equipment installation, warning labels, and certificates.
- **Electromechanics:** Knowledge of the engineering processes that combine electrical and mechanical engineering in the application of electromechanics in devices that need electricity to create mechanical movement or devices that create electricity by mechanical movement.
- **Electric motors:** Experience with motors which are able to convert electrical energy into mechanical energy.
- **Design drawings:** Familiarity with understand design drawings detailing the design of products, tools, and engineering systems.
- **Electric drives:** Knowledge of electromechanical systems that utilize electric motors to control the movement and processes of electrical machinery.
- **Electricity:** Experience with understand the principles of electricity and electrical power circuits, as well as the associated risks.
- **Electrical wiring diagrams:** Familiarity with the visual schematic representation of an electrical circuit, its components, and the connections between these components.
- **Electrical machines:** Knowledge of electrical apparatus that are able to convert mechanical energy to electrical energy (generators), electrical energy to mechanical energy (motors), and change the voltage level of an AC or alternating current (transformers).

Foundational Competencies

- **Operation Monitoring:** Watching gauges, dials, or other indicators to make sure a machine is working properly.
- **Monitoring:** Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
- **Quality Control Analysis:** Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
- **Troubleshooting:** Determining causes of operating errors and deciding what to do about it.
- **Critical Thinking:** Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
- **Repairing:** Repairing machines or systems using the needed tools.

Preferred Competencies:

Occupational Competencies

- **Electrical engineering:** Understand electrical engineering, a field of engineering that deals with the study and application of electricity, electronics, and electromagnetism.
- **Electrical power safety regulations:** The compliance with safety measures which need to be taken during the installation, operation, and maintenance of constructions and equipment which function in the generation, transmission, and distribution of electrical power, such as the appropriate safety gear, equipment handling procedures, and preventive actions.
- **CAE software:** The software to perform computer-aided engineering (CAE) analysis tasks such as Finite Element Analysis and Computational Fluid Dynamics.
- **Power electronics:** The functioning, design, and usage of electronics that control and convert electric power. Power conversion systems are usually categorize d as AC-DC or rectifiers, DC-AC or inverters, DC-DC converters, and AC-AC converters.
- **Mechanical engineering:** Discipline that applies principles of physics, engineering and materials science to design, analyze, manufacture and maintain mechanical systems.
- **CAD software:** The computer-aided design (CAD) software for creating, modifying, analyzing or optimizing a design.
- **Power engineering:** Sub discipline of energy and electrical engineering which specialize s in the generation, transmission, distribution, and usage of electrical power through the connection of electrical devices to motors, generators, and transformers, such as an AC-DC power adapter.

Foundational Competencies

- **Complex Problem Solving**: Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
- **Operation and Control**: Controlling operations of equipment or systems.
- **Judgment and Decision Making**: Considering the relative costs and benefits of potential actions to choose the most appropriate one.
- **Reading Comprehension**: Understanding written sentences and paragraphs in work related documents.

Things You Need To Learn On The Job:

Example Activities:

- Test performance of electromechanical assemblies, using test instruments such as oscilloscopes, electronic voltmeters, or bridges.
- Read blueprints, schematics, diagrams, or technical orders to determine methods and sequences of assembly.
- Inspect parts for surface defects.
- Install electrical or electronic parts and hardware in housings or assemblies, using soldering equipment and hand tools.
- Verify part dimensions or clearances to ensure conformance to specifications, using precision measuring instruments.
- Align, fit, or assemble component parts, using hand or power tools, fixtures, templates, or microscopes.
- Develop, test, or program new robots.
- Prepare written documentation of electromechanical test results.

Pre-Recorded Skills Demonstration Scenario

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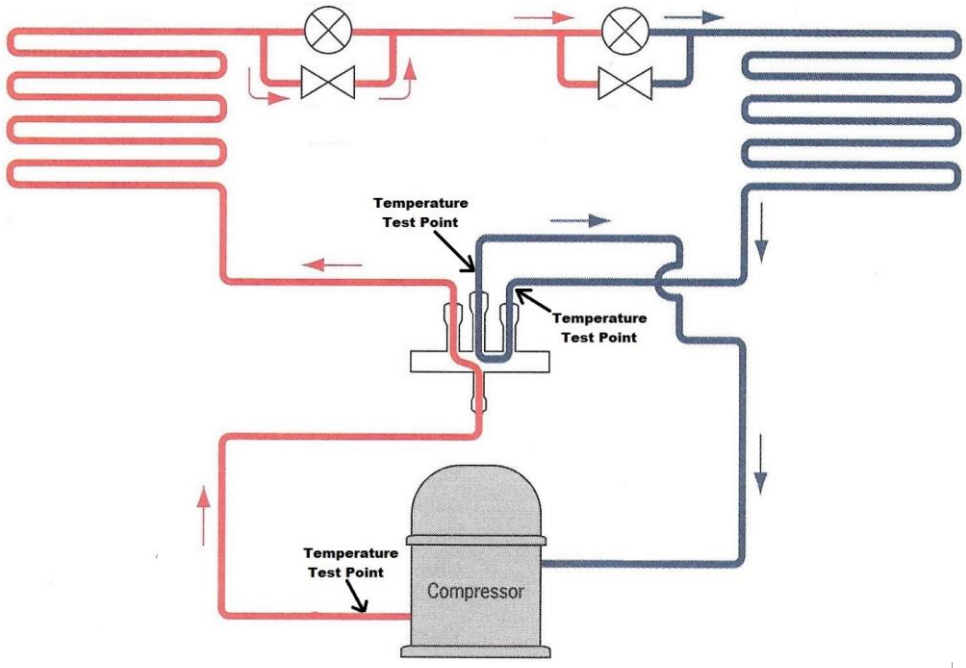
For this portion of the virtual interview contest, you are to record yourself responding to the following scenario. You may choose to use props, but they are not required. You will be scored on your ability to communicate the process clearly, and to demonstrate your knowledge of the technical skill.

Scenario:

In this troubleshooting situation your customer is requesting a second opinion on a proposed repair to their air-to-air heat pump. They originally called for service when they noticed that the house wasn't cooling down as they would like, and the technician who responded reported that, in his opinion, since the high and low side refrigeration system pressure differential wasn't what he expected, the compressor was no longer able to pump properly. Due to the price of the proposed repair, they decided to call for a second opinion.

When you arrive in the mid-afternoon, you confirm that the coil temperature splits are inadequate and the system is unable to obtain the necessary comfort level. When you check the refrigeration system pressures, you also note some irregularity, which prompts you to follow up with a temperature test at the compressor discharge, and an entering and leaving temperature test at two of the reversing valve tubing connections (see Figure One). Your results are as follows:

- Temperature on compressor discharge line: 200°F
- Temperature on the line from the indoor coil to the reversing valve assembly: 50°F
- Temperature on the compressor suction line exiting the reversing valve: 60°F



Your troubleshooting question: Have you confirmed the previous technician's diagnosis, or have you determined that there is another component that could be responsible for the poor performance of this system? In your video walk through all of the steps from the time you greet the customer, through diagnostics testing, to delivering the results to the customer with a plan for next steps.

Skills Demonstration Scenario	Possible Points	Points Earned	Notes
Professional Appearance/Grooming	5		
Virtual Setting: Backdrop, Lighting, Audio, Technical Quality, No Distractions	5		
Eye Contact/Body Language	5		
Demonstration of technical skill/knowledge	15		
Verbal communication skills/clarity	10		
Overall Impression	10		
Total	50		
Virtual Interview	**Possible Points**	**Points Earned**	**Notes**
Greeting and Introduction	5		
Professional Appearance/ Grooming	5		
Eye Contact/Body Language	5		
Demonstration of knowledge of the position and technical skills required for the job	10		
Verbal Communication Skills/Clarity	5		
Presentation: Self-Confidence, Persuasiveness	5		
Preparation: Knowledge of Position Applied for and Personal History	5		
Overall Impression	10		
Total	50		
Resume	**Possible Points**	**Points Earned**	**Notes**
Personal Information: Name, address, phone & email	1		
Skills:	2		
Education: Include program of study/Major	2		
Employment: And/or volunteer work or list NA	1		
Activities, Awards and Honors: Should include SkillsUSA membership/activities	2		
References: Or references available upon request	1		
Spelling, Punctuation & Grammar	1		
Total	10		
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