Project Manager
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Specific Competition Eligibility
The HVAC competition has no competition-specific eligibility requirements. Please refer to overall eligibility requirements listed in the guidebook.

Online Exam
The online exam must be completed before competitors arrive on site, at a local NCCER Accredited Training Sponsor or Assessment Center. Accommodations will be made for extreme circumstances with prior approval of the NCC director. All competitors must sit for the online exam or face disqualification from the NCC. The online exam continues to make up 25% of one’s overall competition score. It is the responsibility of the sponsor organization to schedule test sessions directly with NCCER. Test registration and guidelines will be available in January 2023.

Practical Performance Test Description
The practical performance test involves the reading and interpretation of blueprints, recovery, evacuation, leak test and recharge refrigerant of air conditioning equipment. Competitors must perform soldering and brazing techniques on a specific application, wire high- and low-voltage power supplies and perform electrical troubleshooting techniques. All competitors should possess basic blueprint reading skills, air conditioning and heating systems experience, including startup and commissioning of air conditioning systems, as well as knowledge of programmable thermostats, and perform some pipe threading exercises.

Knowledge and Skills Required
The knowledge and skills for this competition are based on all levels of the HVAC curriculum, with particular emphasis on the following modules:

- Introduction to HVAC
- Tools of the Trade
- Copper and Plastic Piping Practices
- Soldering and Brazing
- Basic Electricity
- Introduction to Cooling
- Introduction to Heating
- Introduction to Control Circuit
- Troubleshooting
- Accessories and Optional Equipment
- Leak Detection, Evacuation, Recovery and Charging
- Troubleshooting Electric Heating
- Troubleshooting Cooling
- Troubleshooting Accessories
- Troubleshooting Electronic Controls
- System Startup and Shutdown
- Pipe Threading Process
Tools Required
Each competitor must bring the tools listed below to the competition. Tools may be examined prior to the practical performance test below.

- Digital thermometer
- Swedging tool (3/8-inch)
- Striker
- Manifold gauge set (410A refrigerant)
- Micron vacuum gauge with additional

Tools and equipment supplied by NCC onsite:

- Turbo torch kit
  - Ear plugs at competitors’ discretion
- Vacuum pump
- Flaring tool
- Recovery machine with a bottle
- Refrigerant scales
- Threading machine
- Pipe vise
- Pipe cutter
- Cordless drill gun with assorted bits
- Tubing cutter and tubing reamer
- Volmeter
- Ohmmeter
- Black electrical tape
- Small spray water bottle
- Needle-nose pliers
- Level
- Channellock pliers
- Screwdrivers (Phillips and Straight)
- Nut runners (1/4-5/16-inch)
- Tape measure
- Allen wrenches
- Adjustable wrenches
- Wire strippers
- Utility knife

Sample Score Sheet
The following sample score sheet is provided to give competitors an example of the criteria that may be included in the practical performance test. However, this score sheet is only a sample and not intended to act as a study guide in preparation or to imply specific criteria that will be judged during the actual practical performance test.
### ABC National Craft Championships
### HVAC Sample Score Sheet

<table>
<thead>
<tr>
<th>Judging Criteria</th>
<th>Competitor Identification Numbers</th>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soldering and brazing</td>
<td></td>
<td></td>
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<tr>
<td>Layout of work</td>
<td></td>
<td></td>
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<tr>
<td>Leak check</td>
<td></td>
<td></td>
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<tr>
<td>System components</td>
<td></td>
<td></td>
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<tr>
<td>Diagram accuracy</td>
<td></td>
<td></td>
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<tr>
<td>Troubleshooting</td>
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<tr>
<td>System recovery, evacuation and recharge</td>
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<td></td>
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<tr>
<td>Sequence of work</td>
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<td></td>
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<tr>
<td>Care and use of tools</td>
<td></td>
<td></td>
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<tr>
<td>General—ability to follow directions, quality of workmanship, neatness, best use of time and completion</td>
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<td></td>
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<tr>
<td>Project disassembly</td>
<td></td>
<td></td>
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<tr>
<td><strong>SUBTOTAL:</strong> 160</td>
<td></td>
<td></td>
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<tr>
<td>Safety—housekeeping</td>
<td></td>
<td></td>
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<tr>
<td>Use of hard hat</td>
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<td></td>
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<tr>
<td>Use of safety glasses</td>
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<td></td>
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<tr>
<td>Use of power tools</td>
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<td></td>
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<tr>
<td>Proper footwear</td>
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<tr>
<td><strong>SUBTOTAL:</strong> 40</td>
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<td></td>
</tr>
<tr>
<td><strong>GRAND TOTAL:</strong> 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tie Breaker #1</td>
<td></td>
<td></td>
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<tr>
<td>Tie Breaker #2</td>
<td></td>
<td></td>
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</tbody>
</table>