

2022

NATIONAL
CRAFT
CHAMPIONSHIPS

PRESENTED BY



2022 Electrical Commercial-Industrial Competition FACT SHEET

Project Manager

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Specific Competition Eligibility

The electrical competition has no competition-specific eligibility requirements. Please refer to overall eligibility requirements listed in the guidebook.

Special Competition Announcement

The conduit-bending portion of the electrical practical performance test will be conducted on Tuesday, March 15, 2022 from 2 PM to 4 PM, during the competitor practical performance test site orientation. **All tools to complete this portion of the exam will be provided. Competitors will be required to wear hardhats (provided by ABC), safety glasses, gloves (ABC will provide glasses and gloves, but competitors may prefer their own) and boots (competitors must bring their own boots), which must be worn during this portion of the competition.**

Online Exam

The written exam must be completed before competitors arrive onsite. Exceptions will be made for extreme circumstances with prior approval of the NCC director via email. If an exception is granted, the make-up exam will take place Tuesday, March 15, 8:30 a.m.-11 a.m. and be proctored onsite by NCCER. Only those competitors with prior approval from the NCC director will be allowed to exam the test onsite. All competitors must sit for the written exam or face disqualification from the NCC. The written exam continues to make up 25 percent of one's overall competition score.

Competitors will complete the written exam at a local NCCER Accredited Assessment Center prior to arriving onsite. It is the responsibility of the sponsor organization to schedule test sessions directly with NCCER by emailing a request to: NCCTest@nccer.org SUBJECT: Schedule NCC Test.

NCCER will contact the sponsoring organization to provide access to the written test in NCCER's Online Testing System. Information on accessing the Testing System will be provided including requirements for the testing proctor.

All exams/tests are based on the standardized craft training process. In addition to the knowledge and skills required for each competition, all competitors should have completed the NCCER Core Curriculum modules. A non-programmable calculator is permissible for the written exam, but no reference materials are permitted.

Practical Performance Test Description

Each competitor, over a two-day period, will perform three tasks utilizing knowledge and skills applicable to conduit bending (work boots or shoes must be worn during all tasks), and tasks utilizing knowledge and skills applicable to commercial and industrial construction.

Knowledge and Skills Required

Electrical Task: Commercial Construction

The competitor will be issued a drawing and a bill of materials. Working on an exposed stud wall, 6 feet, 6 inches by 4 feet, the competitor will be required to install a panel utilizing 120 volt, three-wire power source. Using an electrical plan drawing, the competitor may mount boxes, install EMT conduit and MC Cable, and install and wire switches, receptacles, and lamp holders. The installation will be tested for correct operation.

All hand tools will be provided.

Knowledge and Skills Required

Electrical Task: Industrial Construction

The competitor will be issued a written scope of work and specification to design and construct a motor control circuit. Working on a plywood wall, 6 feet, 6 inches by 4 feet, the competitor will install an enclosure, motor starter, lamps, lamp holders and motor control devices. The competitor may install rigid metal conduit, flexible metal conduit, liquid tight flexible metal conduit, tray cable and electrical metallic tubing. Raceways will be bent, cut, threaded, connected, and secured as appropriate. Circuit conductors will be installed, identified, and terminated per the competitor's design drawings. **All hand tools will be provided.**

The knowledge and skills for this competition are based on the 2017 National Electrical Code® and all levels of the NCCER Electrical curriculum 14 revisions with particular emphasis on the following modules:

- Electrical Safety
- Hand Bending
- Fasteners and Anchors
- Electrical Theory One
- Electrical Theory Two
- Electrical Test Equipment
- Introduction to National Electrical Code®
- Raceways, Boxes, and Fittings
- Conductors
- Introduction to Electrical Blueprints
- Wiring: Commercial and Industrial
- Alternating Current
- Motors: Theory and Application
- Grounding
- Conduit Bending
- Boxes and Fittings
- Conductor Installations
- Cable Tray
- Conductor Terminations and Splices
- Installation of Electric Services
- Circuit Breakers and Fuses
- Contactors and Relays
- Electric Lighting
- Calculations – Branch Feeders and Circuits
- Conductor Selection and Calculations
- Overcurrent Protection
- Raceway, Box, and Fitting Fill Requirements
- Wiring Devices
- Distribution Equipment
- Lamps, Ballasts, and Components
- Motor Calculations
- Motor Maintenance, Part One
- Motor Controls
- Hazardous Locations
- Load Calculations – Feeders and Services
- Practical Applications of Lighting
- Standby and Emergency Systems
- Basic Electronic Theory
- Fire Alarm Systems
- Specialty Transformers
- Advanced Motor Controls
- HVAC Controls
- Heat Tracing and Freeze Protection
- Motor Maintenance, Part Two
- High-Voltage Terminations/Splices
- Advanced Electronic Theory
- Voice and Data Systems
- Busses and Networks
- Fiber Optics
- Programmable Logic Controllers
- Medical Systems
- Television and Antenna Systems
- Medium Voltage
- Power Quality
- Energy Management Systems
- Traffic Signals
- Sound and Signal Systems
- Process and Distributed Control Systems
- Advanced Test Equipment

Tools

All hand tools will be provided.

Each competitor will be provided with the tools needed, listed below is an example of the tools provided by NCC, no other tools will be allowed.

- Medium and large screwdrivers, straight
- Medium Phillips
- Wire strippers
- VOM Meter
- Channel locks
- Awl or center punch
- Claw hammer
- Utility knife
- 9-inch lineman pliers
- Diagonal-cutting pliers
- Roto stripper (MC cable)
- Keyhole saw
- EMT conduit reamer
- EMT Benders
- Rigid bender
- Pencils- Sharpe marker
- Basic, non-programmable calculator
- 25' Tape Measure
- Hacksaw
- Torpedo Level
- Tool pouch and belt
- Hard Hat, gloves and safety glasses
- Conduit Threader ½"

Please be aware of the hazards associate with the above tools

- All hand tools should be used for their purpose.
- Hazards include cuts, scrapes, crush, pinch, puncture.
- Hazards particular to the conduit threader include, cuts, crush, pinch, scrapes and snagging of loose clothing.
- Gloves must be worn when cutting, sawing, or threading conduit.
- No loose clothing should be worn when using the power threader.

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.**

Continued on next page

ABC National Craft Championships Electrical Sample Score Sheet

Judging Criteria	Competitor Identification Numbers				
	Maximum Points				
Use of materials					
Grounding					
Placement					
Follow prints/plans					
NEC					
Accuracy					
Terminations of conductors and cables					
Proper circuiting and device makeup					
Trim out of devices and conductors					
Panel					
Devices					
Installation of devices					
Operation					
Sequence of work					
Care and use of tools					
Proper use of fasteners					
General – ability to follow directions, quality of workmanship, neatness, best use of time and completion					
Project disassembly					
SUBTOTAL:	160				
Safety – housekeeping					
Use of hard hat					
Use of safety glasses					
Use of power tools					
Proper footwear					
SUBTOTAL:	40				
GRAND TOTAL:	200				
Tie Breaker #1					
Tie Breaker #2					