



## **2019 Electrical: Industrial-Commercial Competition**

### **FACT SHEET**

**Project Manager**  
Timothy Ely, Beacon Electric Company

For questions related specifically to the electrical competition, contact 2019 Electrical Project Manager Timothy Ely, (513) 309-1586, or [tim.ely@beacon-electric.com](mailto:tim.ely@beacon-electric.com). For all event questions, contact Lisa Nardone, National Craft Championships director, (202) 595-1789 or [nardone@abc.org](mailto:nardone@abc.org).

### **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 26, 2019 from 2:30 PM to 4:00 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 but competitors may bring their own), and approved work boots during this portion of the competition.

### **Written Exam**

Every competitor should have a thorough understanding of the craft in which he/she is registered. 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 Contren® Learning Series Electrical curriculum **2014** revisions and Core Curriculum modules 2014 revisions. Each competitor must bring a **2014** National Electrical Codebook to the written exam. A basic non-programmable calculator will be provided.

### **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), utilizing all facets of industrial/commercial construction utilizing knowledge and skills applicable to industrial applications.

## **Electrical Task: Industrial-Commercial Construction**

Working on a plywood wall, 6 feet, 6 inches by 4 feet, the competitor will be required to install multiple boxes, start/stop, pilots, motor controllers, timers and various other components to create a working control circuit. The control circuit is to be connected to power via a flexible cord and plug connector to a 120-volt power source utilized by judges. The competitor will install electrical metallic tubing, GRC, sealtight, MC Cable, TC Cable, Cable Tray, SJO cord, metallic flex and various other wiring methods and boxes. **All hand tools will be provided.**

## **Safety Orientation**

A safety program containing a general safety overview and safe work practices will be conducted during the scheduled competitor orientation. Attendance is mandatory for all competitors.

## **Personal Protective Equipment (PPE)**

All personal protective equipment (PPE) must be appropriate for task and meet current ANSI standards, which have been incorporated into the Occupational Safety and Health Administration (OSHA) PPE regulations as follows: Eye and Face Protection ANSI Z87.1; Head Protection ANSI Z89.1; Foot Protection ANSI Z41.1. There are no ANSI standards for gloves; however, selection must be based on the performance characteristics of the glove in relation to the tasks to be performed. During the practical performance test, ABC National will provide and require the proper use of the following personal protective equipment for all competitors:

- Ear protection;
- Hard hat;
- General work gloves;
- Each competitor may bring his own PPE, gloves, safety glasses;
- Exceptions to the provided PPE, with prior approval from the respective project manager, are:

Prescriptive safety glasses with side shields;

Prescriptive goggles; and

Task-specific gloves per industry standards, designed to protect against sharp edges or high heat.

## **Competitors must provide and use the following:**

- Standard work shoes or boots (tennis shoes and sandals are not permitted);
- Blue jean pants or work pants; and
- Shirts with sleeves of minimum 4 inches in length (baggy or excessively loose-fitting clothing is not permitted).

## **Jewelry**

**Exposed jewelry is not permitted. Examples include (but are not limited to):**

- Earrings (stud or dangling);
- Wrist watches;
- Rings;
- Studs exposed through the nose, jaw, lip, eyebrow or any part of the body that is visible; and
- Gauges.

## **Safety Judging**

Judges will be present during the practical performance test to score competitors in such safety areas as the use of personal protective equipment, hand and power tool safety, clean work area, etc. Depending on the severity and/or frequency of a violation or violations, the judges, in consultation with the project manager, have the authority to disqualify competitors.

Note: Competitors continue to be judged during disassembly/clean-up activities and are subject to disqualification or deduction of points for safety violations.

## **First Aid**

All injuries should be reported to the project manager immediately. The project manager will determine the appropriate action, including assistance by onsite EMT personnel.

## **Knowledge and Skills Required**

The knowledge and skills for this competition are based on the **2014** National Electrical Code and all levels of the NCCER Contren® Learning Series Electrical curriculum **2014** revisions. It is strongly recommended that competitors have a working knowledge equivalent to a third-year apprentice.

- 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
- Load Calculations – Feeders and Services
- Practical Applications of Lighting
- 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
- Standby and Emergency Systems
- Basic Electronic Theory
- Fire Alarm Systems

## Tools

Each competitor will be provided with the needed tools. Listed below are examples of the tools provided by NCC. No other tools will be allowed.

- |   |                                       |
|---|---------------------------------------|
| Medium and large screwdrivers<br>straight | ▪ Diagonal-cutting pliers             |
| Medium Phillips                           | ▪ Keyhole saw                         |
| Wire strippers                            | ▪ EMT conduit reamer                  |
| VOM Meter                                 | ▪ EMT Benders                         |
| Channel locks                             | ▪ Rigid bender                        |
| Awl or center punch                       | ▪ Pencils- Sharpe marker              |
| Claw hammer                               | ▪ Basic, non-programmable calculator  |
| Utility knife                             | ▪ 25' Tape Measure □ Hacksaw          |
| Romex stripper                            | ▪ Torpedo Level                       |
| 9-inch lineman pliers                     | ▪ Tool pouch and belt                 |
|   | ▪ Hard Hat, gloves and safety glasses |

Please be aware of the hazards associated with the above tools.

- All hand tools should be used for their intended purpose.
- Hazards include cuts, scrapes, crush, pinch and 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.