

ELECTRICAL CONSTRUCTION WIRING NYS



PURPOSE

The Electrical Construction Wiring event will allow each contestant the opportunity to perform in a practical work environment. Each contestant will have the opportunity to use their acquired electrical wiring skills to construct an electrical wiring design, using electrical blue prints, written specifications and verbal instructions based on the National Electrical Construction Wiring standards in accordance with the National Electrical Code.

ELIGIBILITY

Open to active SkillsUSA members enrolled in programs with residential wiring or electrical trades as the occupational objective.

CLOTHING REQUIREMENT

White crew neck short-sleeved T-shirt, work pants, safety glasses or goggles, leather or steel-toed work shoes. (Prescription glasses can be used only if they are equipped with side shields. If not, they must be covered with goggles.) Also required a hard hat and gloves.

Note: Contestants must wear their contest clothing to the contest orientation meeting. Also bring #2 pencil, resume, and safety assurance form.

EQUIPMENT AND MATERIALS

1. Supplied by the NY chair/committee:
 - a. All wiring panels,
 - a) 250 feet 14-2 w/grnd Romex
 - b) 200 feet 14-3 w/grnd Romex
 - c) 100 single gang plastic nail-on outlet boxes (deep)
 - d) 2 boxes Residential Romex staples
 - e) 25 octagon or round plastic nail-on boxes
 - f) 25 plastic lamp holder bases

- a. (keyless porcelain fixture equivalent)
- g) 1 bag (100) red wire nuts
- h) 1 bag (100) tan wire nuts
- i) 1 bag (100) yellow wire nuts
- j) 20-20amp - 120 volt - 3 way switches
- k) 12-120 volt, 60 or 75 watt lamp (light bulbs)
- l) 25-4 square x @2 1/2 deep boxes
- m) 100 - Green ground screws
- n) 400 feet 1/2" EMT
- o) 50 - 1/2" Mineralac straps
- p) 500 1/2" Sheet rock screws
- q) 100 1/2" EMT Set screw connectors
- r) 100 feet - 4/0 aluminum SE cable
- s) 100-3" Wood or sheet rock screws (put walls together).
- t) 50 ft. Commercial grade extension cord w/ ground
- u) 1 GFCI - whip

2. Supplied by the contestant:

- a. a Latest edition of the National Electrical Code" is a must"
- b. *Note:* Bring NEC code book to orientation for the written test.
- c. Calculator (nonprogrammable)
- d. Electrician's hand tools, (Assorted screwdrivers, hammer, linesman pliers, channel locks, wire strippers, torpedo level, hacksaw, tape measure,
- e. PENCILS
- f. Cordless drill with Philips bits and wood bits
- g. Hacksaw with blade
- h. 1/2" EMT handbender
- i. All competitors must create a one-page resume and submit a hard copy to the NY chair/committee at orientation. Failure to do so will result in a 10-point penalty.

Note: Your contest may also require a hard copy of your résumé as part of the actual contest. Check the Contest Guidelines and/or the updates page on the NYS SkillsUSA Web site:
<http://www.nysskillsusa.org/>

SCOPE OF THE CONTEST

The contest will assess the ability to perform jobs or skills selected from the following list of competencies as determined by the NY Chair/Committee.

Knowledge Performance

The contest will include a written knowledge exam assessing general knowledge of residential wiring. Written portions may also exist during the skills portion of the contest. Knowledge of terms and principles used in residential wiring will be required for the skill demonstration portion of the contest.

Skill Performance

The skills portion of the contest will include a series of workstations that have information and instruction sheets for wiring a residence or completing a commercial installation.

All work must conform to the specifications of the latest edition of the National Electrical Code as of the January prior to the NYS SkillsUSA State Conference.

Standards and Competencies

ECW 1.0 — Define and apply safety rules and practices in residential wiring according to NEC standards

- 1.1 Apply shop rules and regulations to work stations
- 1.2 List the techniques and practices used to prevent fires
- 1.3 Use electrical and hand tools correctly
 - 1.4 Discuss the appropriate methods for lifting and climbing ladders
- 1.5 Explain appropriate clothing for electrical wiring construction.
- 1.6 Outline the safety requirements for installing temporary electrical services

ECW 2.0 — Apply knowledge of basic wiring theory according to NEC standards

- 2.1 Use wiring diagrams, schematic diagrams and prints successfully in a scenario
- 2.2 Apply math calculations to circuits and measurements
- 2.3 Discuss theory concepts for troubleshooting

ECW 3.0 — Discuss important trade information and standards

according to the NEC

- 3.1 Explain the purpose and use of the National Electric Code
- 3.2 Sketch and diagram effectively
- 3.3 Plan the layout of an electrical installation
- 3.4 Use trade catalogs and publications to solve electrical construction wiring problems
- 3.5 Correlate specifications, prints and job sites

ECW 4.0 — Use basic equipment and procedures defined by industry standards

- 4.1 Discuss techniques of residential and commercial wiring
- 4.2 Demonstrate wire-pulling techniques

ECW 5.0 — Apply knowledge of service loads and electrical safety to electrical construction wiring situations

- 5.1 Compute service loads
- 5.2 Calculate individual service loads
- 5.3 Determine the number of outlets permitted in a circuit
- 5.4 Compute the size of service entrance conductors
- 5.5 Use any types listed in NEC 310.16

ECW 6.0 — Install a service entrance to meet NEC standards

- 6.1 Install a main service panel and sub panel.
- 6.2 Install circuit breakers in a panel
- 6.3 Install a service entrance cable to service drop
- 6.4 Install temporary electrical service
- 6.5 Install equipment disconnect
- 6.6 Install meter bases

ECW 7.0 — Install switch boxes and outlet boxes to meet NEC standards

- 7.1 Install box hangers
- 7.2 Install recess boxes for outlets
- 7.3 Install hangable boxes
- 7.4 Install octagon boxes
- 7.5 Install surface mount boxes
- 7.6 Install recessed fixture housing in a ceiling
- 7.7 Install outlet boxes in dry wall, lath plaster or paneled walls
- 7.8 Install telephone boxes in dry wall, lath plaster or paneled walls

ECW 8.0 — Maintain already existing wiring to meet NEC standards

- 8.1 Diagnose and repair incandescent lights
- 8.2 Replace existing receptacles and switches
- 8.3 Troubleshoot a branch circuit
- 8.4 Test wiring for correct voltages

ECW 9.0 — Rough in, connect and install electrical devices to meet NEC standards

- 9.1 Rough in, connect and install a single pole switch
- 9.2 Rough in, connect and install a three-way switch
- 9.3 Rough in, connect and install a four-way switch
- 9.4 Rough in, connect and install a duplex grounded receptacle
- 9.5 Rough in, connect and install a 120–240 volt distribution panel
- 9.6 Rough in, connect and install a door chime system
- 9.7 Rough in, connect and install a ground fault interrupting device
- 9.8 Rough in, connect and install an emergency warning system
- 9.9 Rough in, connect and install a photoelectric cell control
- 9.10 Rough in, connect and install a surface raceway
- 9.11 Rough in, connect and install an exterior lighting fixture
- 9.12 Rough in, connect and install lighting dimmers
- 9.13 Rough in, connect and install TV outlets
- 9.14 Rough in, connect and install telephone Outlets

- 9.15 Rough in, connect and install emergency lighting systems
- 9.16 Rough in, connect and install appliance circuits
- 9.17 Rough in, connect and install occupancy sensor
- 9.18 Rough in, connect and install motion sensor

ECW 10.0 — Install PVC and EMT conduit to meet NEC standards

- 10.1 Make 90-degree bends from measurements
- 10.2 Make offset bends from measurements
- 10.3 Make back-to-back bends from measurements
- 10.4 Make saddle bends from measurements
- 10.5 Determine correct conduit measurements

ECW 11.0 — Install residential telecommunications infrastructure to meet current TIA/EIA 570 standards

- 11.1 Install a coaxial cable with “F” type connectors and terminating hardware
- 11.2 Install unshielded twisted-pair cable, connectors and terminating hardware
- 11.3 Install 110-type terminating hardware

ECW 12.0 — Apply knowledge of NEC Chapter 5 Special Occupancies

ECW 13.0 — Apply knowledge of the International Energy Conservation Code