



**RESIDENTIAL
ELECTRICAL INDUSTRY
CONSTRUCTION TRAINING
CRITERIA**

0*NET CODE 47-2111.00A

**Revised
May 2020**

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ELECTRICAL INDUSTRY TRAINING COMMITTEE MEMBERS
May 2020

Christine Hall, Chair
Western Electrical Contractors
Association, Inc.
3695 Bleckely Street
Rancho Cordova, CA 95655
chall@goweca.com

David Nott
Los Angeles County Chapter
National Electrical Contractors Association
100 E. Corson Street
Suite 410
Pasadena, CA 91103
dnott@laneca.org

Kathleen Barber, Co-Chair
San Mateo JATC
625 Industrial Road
San Carlos, CA 94070
kathleen@smjatc617.org

David Lawhorn
Orange County Electrical Training Trust
717 South Lyon Street
Santa Ana, CA 92705
dlawhorn@ocett.org

Sergio Cortez
Associated Builders and Contractors, Inc.
Northern California Chapter
4577 Las Positas Road, Unit C
Livermore, CA 94551
sergio@abcnorcal.org

Anthony Mazarella
Bergelectric
955 Borra Place
Escondido, CA 92029
amazarella@bergelectric.com

Kevin Hartnett
Laser Electric
2250 Micro Place #200
Escondido, CA 92029
kevinhartnett@laserelectric.com

Scot VanBuskirk
Northern California Chapter
National Electrical Contractors Association
7041 Koll Center Parkway
Suite 100
Pleasanton, CA 94566
scotv@norcalneca.org

INTRODUCTION

The Electrical Industry Training Committee is appointed by the California Apprenticeship Council (CAC) with the assigned task of scheduled and periodic reviews of the uniform Minimum Industry Training Criteria for the occupation of Residential Electrician. During this review process, the Committee's responsibility is to recommend updates and revisions to the CAC. This will ensure the minimum training criteria for all Electrical Apprenticeships within California are current and relevant to the Electrical Construction Industry. We believe this document contains the current knowledge, skills, and abilities required to be successful in a career as a Residential Construction Electrician.

LENGTH OF TRAINING

Program sponsors shall establish a minimum of a three (3) year program of not less than 4,800 hours of on-the-job training and 480 hours of classroom instruction both of which are further detailed below.

RELATED SUPPLEMENTAL INSTRUCTION

The required prescribed courses of related and supplemental instruction shall be no less than 160 hours per year. This instruction must include, at a minimum, the related and supplemental training processes listed in Exhibit "A".

ON-THE-JOB TRAINING

On-the-Job Hands-on Skill Training shall be as continuous as possible throughout the program and shall be no less than 4,800 hours. This training must include, at a minimum, the processes listed in Exhibit "B".

COMPETENCY TESTING

All apprentices must prove a satisfactory competency of prior skills and knowledge at the time of their advancement to the next higher level. The tests shall be based on all Related and Supplemental Instruction and hands-on manipulative skills. Periodic testing shall be done during each level of coursework and apprentices shall not advance to the next level unless they have achieved an average total score of 70% or higher.

COMPLETION PERCENTAGES

Program sponsors must have a 50% graduation rate of all apprentices who satisfactorily complete the first year of their program

EXHIBIT A

RESIDENTIAL ELECTRICAL CONSTRUCTION INDUSTRY ELECTRICAL WORKER TRAINING CRITERIA

RELATED SUPPLEMENTAL INSTRUCTION

Safety

- A. General job-site safety awareness
- B. First Aid/CPR Certification
- C. Emergency Procedures
- D. Compliance with OSHA, NFPA and EPA Regulations
- E. Substance Abuse Awareness

Tools, Materials and Handling

- A. Proper care and use of hand and power tools
- B. Proper rigging methods
- C. Proper digging techniques
- D. Proper material lifting and handling
- E. Proper use of stationary and mobile work platforms

Math

- A. Appropriate mathematical calculations to solve for related problems.

Electrical Theory

- A. Basic electro -magnetic principals
- B. Ohm's Law
- C. AC/DC Theory
- D. Series, parallel and combination circuits
- E. Characteristics of circuits; voltage, current, power, resistance, impedance, capacitance and reactance.
- F. Theory of superposition and solving for multiple voltage-sourced circuits
- G. Operation and characteristics of three-wire systems
- H. Use of electronics in the electrical industry

Code Requirements

- A. National Electrical Code and Local Codes
- B. NFPA 70 E
- C. Title 24 Part 6 Building Energy Efficiency Standard

Conductors

- A. General characteristics
- B. Conductor installation codes and techniques
- C. Methods for selecting proper size and type of conductors

Lighting Systems

- A. Function, operation and characteristics of various lighting systems
- B. Lighting distribution and layout
- C. Installation and connection of fixtures

Over-current Devices

- A. Function, operation and characteristics of over-current protection devices
- B. NEC requirements for over-current protection devices
- C. NEC requirements for ground-fault and arc-fault protection

Grounding Systems

- A. Functions, operation and characteristics of grounding systems
- B. Sizing, layout and installation of grounding systems
- C. Insulation and isolation
- D. Proper grounding and bonding techniques
- E. Special circumstances

Services and Distribution Systems

- A. Function, operation and requirements for various panel boards and switch gear
- B. Grounding requirements
- C. Code requirements

Prints and Specifications

- A. Creation of residential blueprints, plans and specification
- B. Use of residential blueprints, plans and specification
- C. Recognizing information contained within residential blueprints
- D. Introduction to digital plans and blueprints

Motors, Motor Controllers and Process Controllers

- A. Function, operation and characteristics of motors (AC only)
- B. Basic motor control devices

Generation and Power Supplies

- A. Principles of generating electricity
- B. Installation and maintenance of emergency battery systems
- C. Photo-Voltaic Systems

Personal Development

- A. Orientation to organization and structures
- B. Working with others
- C. Personal financial development
- D. Anti-Harassment Training

Electrical Testing

- A. Steps used for various testing processes
- B. Proper selection and use of test meters
- C. Utilizing the results of testing procedures

Specialty Systems

- A. Fire Alarms
- B. Basic telephone, television and security systems

EXHIBIT B

RESIDENTIAL ELECTRICAL CONSTRUCTION INDUSTRY ELECTRICAL WORKER TRAINING CRITERIA

WORK PROCESSES

1. Planning and Initiating a Project
2. Implementing Conservation and Recycling Practices on a Project
3. Establishing OSHA and Customer Safety Requirements
4. Establishing temporary power during construction
5. Installing Service to Buildings and Other Structures
6. Installing Alternative Energy Generation Systems
7. Establishing a Grounding System
8. Layout, Boxing and Drilling
9. Installing Electrical Systems
10. Installing Indoor and Outdoor Receptacles, Lighting Circuits and Fixtures
11. Providing Power and Controls to Motors, HVAC and Other Residential Equipment
12. Energy-Efficient Lighting and Residential Control Systems
13. Troubleshooting and Repairing Electrical Systems
14. Installing Telephone, Television and Security Systems

By signature of the Chair and Co-Chair below, we jointly confirm the Electrical Minimum Industry Training Criteria Committee recommends approval of this document by a greater than the required two-thirds majority.

Respectfully submitted to the California Apprenticeship Council,

Name: **Christine Hall** /s/ Christine Hall
Signature

Date: May 18, 2020

Name: **Kathleen Barber** /s/ Kathleen Barber
Signature

Date: May 18, 2020