



# ELECTRICAL SAFETY

## QUICK START GUIDE

### Take charge of electrical safety

Protect your workers with expert guidance on:

- Compliance standards
- Electrical hazards
- Training requirements
- Visual communication

# DuraLabel®

## FIVE CAUSES OF ELECTRICAL INCIDENTS



Contact with power lines



Lack of ground-fault protection



Path to ground is missing or discontinuous



Equipment is not used in the manner prescribed



Improper use of extension and flexible cords

**Questions?** We are here to help at any stage in your research process.

Call **877-534-5157** or visit us online at **DuraLabel.com**

# Regulations and Standards

## OSHA Requirements for Electrical Safety

OSHA requires that work practices be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts 29 CFR 1910 Subpart S.

Additional regulations require employers to "mark electrical equipment with descriptive markings, including the equipment's voltage, current, wattage, or other ratings as necessary." 29 CFR 1910.303(e), and "warn and protect employees from hazards which could cause injury due to electric shock, burns or failure of electric equipment parts." 29 CFR 1910.335(b).

Employer responsibilities under these regulations:

- Creation and documentation of a facility electrical safety plan with defined responsibilities
- Documented training in electrical and arc-flash safety, for both electrical workers and any other workers who might be affected
- Identification and analysis of arc flash hazards
- Provision of adequate personal protection equipment
- Placement of warning labels on equipment
- Provision of proper tools for safe electrical work
- Annual inspections to verify that employees are complying with established safe work practices





# NFPA Standards

OSHA regulations require employers to provide for the safety of their workers, but often do not specify exactly how that must be done. The NFPA has created a voluntary standard using expert opinion and industry consensus. OSHA uses these standards as benchmarks to determine if employers are taking appropriate steps to protect their employees. The regulations tell employers what they need to do; the industry standards tell employers an effective way to do it.

## NFPA 70B: Electrical Equipment Maintenance

NFPA 70B details preventive maintenance for electrical, electronic, and communication systems and equipment - such as those used in industrial plants, institutional and commercial buildings, and large multi-family residential complexes - to prevent equipment failures and worker injuries.

## NFPA 70E: Electrical Safety in the Workplace

NFPA 70E gives directions to avoid workplace injuries and fatalities due to shock, electrocution, arc flash, and arc blast. While OSHA does not specifically enforce NFPA 70E standards it recognized as the industry best practice for preventing electrical injuries.

### What Does NFPA 70E Require?

NFPA 70E requires an arc flash risk assessment be conducted to determine the degree of danger posed by given equipment under expected circumstances. More in-depth analysis is required if the assessment determines that there is a significant risk of arc flash. This data determines the information for the arc flash label, the Arc Flash Boundary, and the required PPE to work within that boundary.

### NFPA 70E requires arc flash labels include:

- Nominal System Voltage
- Arc Flash Boundary
- At least one of the following:
  - Either the Available Incident Energy and the corresponding Working Distance, or the Arc Flash PPE Category for the equipment, but not both
  - Minimum Arc Rating of Clothing
  - Site-Specific Level of PPE



# Required Safety Training

## Electrical Worker Training

OSHA considers any workers who will work on or near exposed energized parts to be “qualified workers.” Those individuals need specialized training to prevent electric shock. Other workers are considered “unqualified workers,” and primarily stay away from powered equipment.

OSHA regulations in 29 CFR 1910.332 require electrical safety training for any employees who “may reasonably be expected to face... risk of injury due to electric shock or other electrical hazards.”



### JOB TITLES THAT TYPICALLY INCLUDE THIS KIND OF RISK:

- Facility supervisors
- Electrical and electronic engineers
- Electrical and electronic equipment assemblers
- Electrical and electronic technicians
- Electricians
- Industrial machine operators
- Material handling equipment operators
- Mechanics and repairers
- Painters
- Riggers and roustabouts
- Stationary engineers
- Welders

## NFPA 70E Arc Flash Training Requirements

The NFPA describes its general training requirements in Article 110.2. The requirements there are divided into two broad categories:

- **Emergency Response Training.** Includes basic shock response training as a requirement for all workers exposed to shock hazards. More in-depth training is required for workers who are designated as responders for medical emergencies.

This training category requires a refresher at least once per year.

- **Employee Training.** This category covers OSHA-style worker training, separated into sections for qualified and unqualified persons. The NFPA offers more detailed training requirements for qualified workers.

This training category requires a refresher at least once every three years.

# Electricity Hazards



Electrical currents may not kill you initially, but they can still cause severe burns that lead to death. Arc flashes result in a burst of intense light and extreme heat that can reach thousands of degrees in a fraction of a seconds.

## Electrical Shock

Strong current flowing through a body will generate enough heat to cook living tissue.



## Arc Flash

An electrical explosion; begins with a small spark that becomes a runaway arc, drawing more and more power until it destroys the conductors around it or the power is cut off.

## Electrical Injuries

**Skin, Nerve & Muscle Damage**

**Brain Damage**

**Cardiac Arrest**

**Thermal Burns**

**Falling & Impact Injury**

## Long Term Effects



- Numbness
- Paresthesia “pins and needles”
- Chronic pain

**Memory loss •  
Attention disorders •  
Behavioral changes •**





# Prevent Electrical Incidents

According to NIOSH, in more than a third of electrical incidents, there was no safety program or written safe work procedures. In fact, many of the victims have no safety training at all.

Five critical factors cause or influence these incidents:



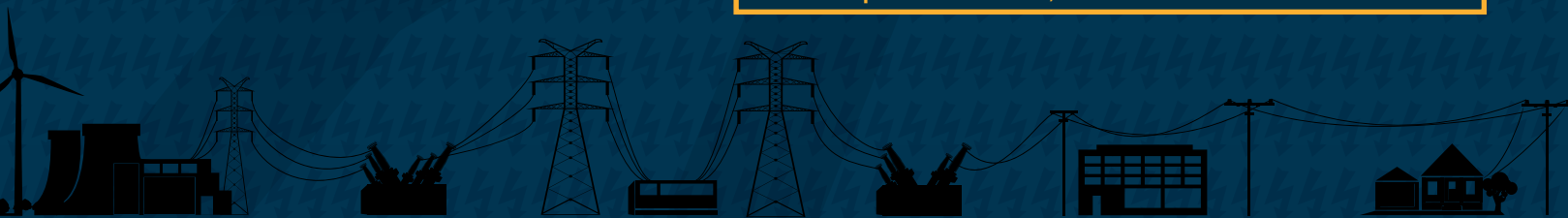
Existing OSHA, NEC, NESC requirements were not followed.

Electrical safety training was not adequate.

Recognized safe work procedures were not implemented, or were not followed.

Appropriate Personal Protective Equipment (PPE) was not provided, or was not worn.

Lockout/Tagout (LO/TO) procedures were not implemented, or were not followed.



## Establish Electrically Safe Conditions

The best way to prevent an electrical injury is to simply turn the power off. Lockout / Tagout is the name given to completing the process for industrial machines.

### 6 Ways to Charge Up Your Electrical Safety



Identify all possible sources of power to the equipment



Shut down the power, and then systematically disconnect each power source



Visually verify that all disconnections are complete if possible



Lock or tag out the power sources to prevent accidental re-energizing



Use an adequate test instrument to confirm that the equipment has been de-energized



Apply a grounding device rated for the available fault current when voltage may be induced

# Protect Your Workers: A Visual Guide

Visual communication is one of the most effective safety tools to protect employees and prevent injury. Safety signs, labels, and floor marking reinforce safety messages and ensures compliance. Effective signs and labels help employees comply with safety protocols, understand potential risks, and react properly in an emergency.

## Signs



**Hazard Communication**



**PPE Requirements**



**OSHA Compliance**

## Labels



**Shock Hazards**



**Voltage Warnings**



**Emergency Shutdown Procedures**

## Floor Marking



**Arc Flash Boundary**



**Exposure Areas**



**Safe Work Zones**

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# Take Action

## Do It Yourself: Onsite Sign & Label Creation

An on-site print system allows you to create the signs you need on demand. No more waiting for orders, address the safety or efficiency issue on the spot with a thermal transfer printer that creates long lasting messages. The DuraLabel line of print system and supplies provide you a way to print electrical safety labels on site. Tough-tested supplies ensure long lasting labels and signs don't peel or fade. Each industrial printer includes LabelForge PRO label design software preinstalled, with over 3,000 templates to print in seconds or customize. Also includes an arc flash label template that ensures compliance.

### INDUSTRIAL SIGN & LABEL PRINTER

DuraLabel Toro Max Industrial Sign and Label Print System is portable, allowing you to print wherever you need on supplies ½" to 4" wide. It's a perfect solution for printing on the jobsite, or taking with you to different locations if necessary. Pair with the optional battery and carrying case for the ultimate to truly print anywhere. Check out [DuraLabel.com](https://DuraLabel.com) or call **877-534-5157** to discuss your project.

### VINYL SUPPLY

On-site sign creation also lets you take advantage of a wide variety of sign materials that fit your worksite needs:

- **Premium Vinyl** for tough signs in any location
- **Outdoor Arc Flash Labels** with preprinted Warning and Danger headers
- **Extended-Life Vinyl** for the long lasting labels, indoors or out
- **Reflective material** for low-light settings
- **Ultra-Aggressive Vinyl** for rough or irregular surfaces
- **High-Temp Poly Tape** for extreme hot/cold surfaces
- **Circuit Board Polyimide Tape** for labeling electrical components
- **DuraTag™** Tag Stock for tear-resistance tags

# DuraLabel®

*Where and When You need it: Choose DuraLabel*



**KODIAK**  
MAX

**TORO**  
MAX

**BRONCO**  
MAX

## READY TO GET STARTED?

If you're ready to get started on your labeling project, we can help! Contact your dedicated representative at DuraLabel to help you get the tools you need to take control of your labeling. Call today!

CALL **877-534-5157**

VISIT **DuraLabel.com**

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