



## MITIGATING ARC FLASH INJURIES THROUGH REMOTE WIRELESS CUTTING

Arc Flashes – they're brighter and hotter than the sun, louder than a jet, and capable of creating arc blasts that could send metal debris flying at over 700 miles per hour. Determining the maximum energy associated with an arc flash requires complex calculations and advanced computer programs – and even then, experts still disagree on the actual explosive capabilities of an arc flash when applied to an actual jobsite setting.

There is one thing all experts will agree on, though – it's extremely hazardous to be anywhere near an arc flash when it occurs.



### **NFPA 70E – At a Glance**

When work must be performed on electrical equipment, NFPA 70E calls for normally energized conductors and circuit parts to be put in an electrically safe work condition before work begins whenever possible. In situations where work must be performed on energized conductors, or where the condition of the circuit cannot readily be determined, there is an increased risk of injury due to electric shock and a hazard known as an arc flash. NFPA 70E provides information regarding qualifications, approach boundaries, and the PPE required to help mitigate the risks of working on energized conductors.

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### **What is an “arc boundary” or AFB?**

The 2015 edition of NFPA 70E defines the arc flash boundary (AFB) as, “When an arc flash hazard exists, an approach limit at a distance from a prospective arc source within which a person could receive a second-degree burn if an electrical arc flash were to occur.”



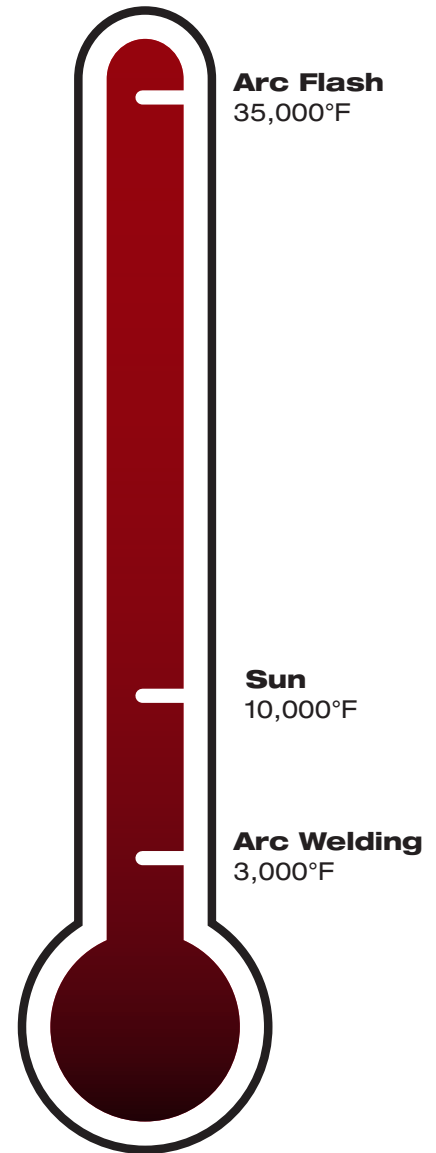
Electric arcing can produce temperatures as high as 35,000°F – nearly four times as hot as the surface of the sun. Even though this intense heat can last for just a fraction of a second, it’s enough time to cause severe burns, potential hearing loss, blindness, skin damage from blasts of molten metal and copper, lung damage and blast injuries from shrapnel, and even death.

All of this is why the Occupational Safety and Health Administration (OSHA®), the Institute of Electrical and Electronics Engineers (IEEE), and the National Fire Protection Association have drawn up three major industry standards associated with arc flash:

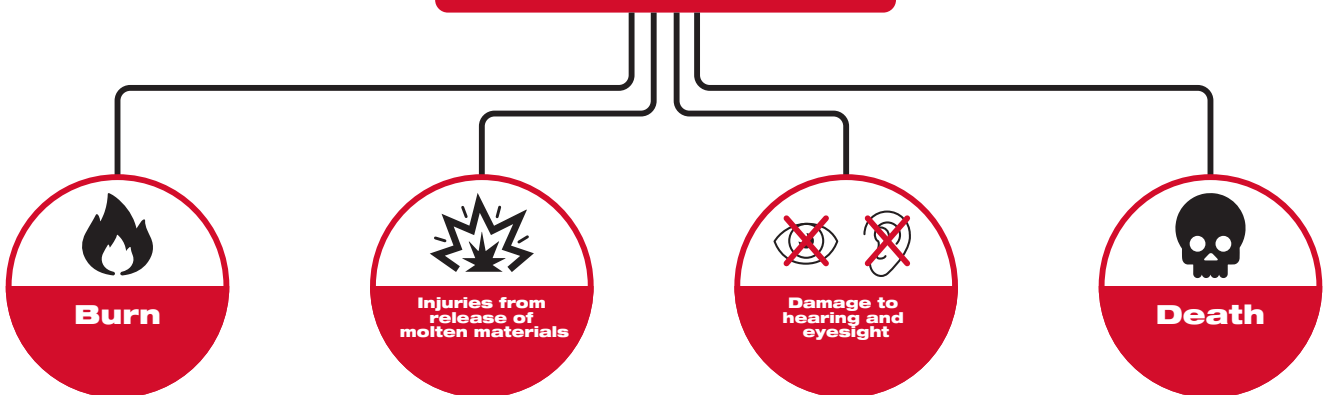
- OSHA 29 Code of Federal Regulations Part 1910 Subpart S
- NFPA 70E
- IEEE Standard 1584

NFPA 70E in particular has been influential in directing safety related practices and maintenance requirements for jobsites that have the potential of arc flash incidents.

But despite the effectiveness of these requirements, there remains the unfortunate fact that arc flash is unpredictable. In a report by the IEEE, the organization stated, “Workers and equipment may be at risk from electrical arc, even at times when codes, standards, and procedures are seemingly adequately addressed” and that “workers should ‘assume the worst’ and use available personal protective equipment.” Simply put – the unpredictable nature of arc flash accidents is why it is so important to know about them and stay away from dangerous situations.



## ARC FLASH INJURIES





## The Impact on Your Crew & Company

According to OSHA® standards, an arc flash incident only needs to be reported if (A) A fatality occurs or (B) Three or more employees require hospitalization. With that in mind, it's not a stretch to assume that current data does not capture the full landscape of arc flash risks and incidents occurring each day. This inconsistent reporting practice has led to a wealth of conflicting data on the frequency of arc flash accidents, with figures ranging from 5 – 10 per day to 30,000 per year. These reports also estimate that those incidents result in an average annual total of 7,000 burn injuries, 2,000 hospitalizations, and 400 fatalities per year. In fact, according to the Bureau of Labor Statistics about 80% of these incidents involve “qualified workers,” showing that even trained experts can get hurt – another reminder of the unpredictable nature of arc flash.

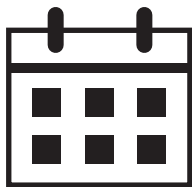
**The direct monetary costs to your injured crew member and the indirect monetary costs for your company? They're numerous.**

**Direct Monetary Costs** – Includes medical treatment and rehabilitation, workers compensation, cost of accident investigation, and downtime/loss of production.



**1.5 DAYS** of hospitalization for EVERY PERCENT of the body that is burned

**19 DAYS** is the average hospitalization resulting from an arc flash event



**8-12** is the average amount of months needed for a worker to return, if injured by an arc flash

**\$61 K** is the average an employee can receive for workers compensation

**Indirect Monetary Costs** – Such as legal costs and judgments related to litigation, potential fines, increased insurance premiums, repair costs, and the cost of replacement workers.



**\$10.5 M** is the average litigation cost to defendants for a general industry incident

**\$10 K OR JAIL** can become the penalty for an employee death resulting in failure to comply with OSHA regulations



## The Safest Solution – Cutting Conductors from a Distance

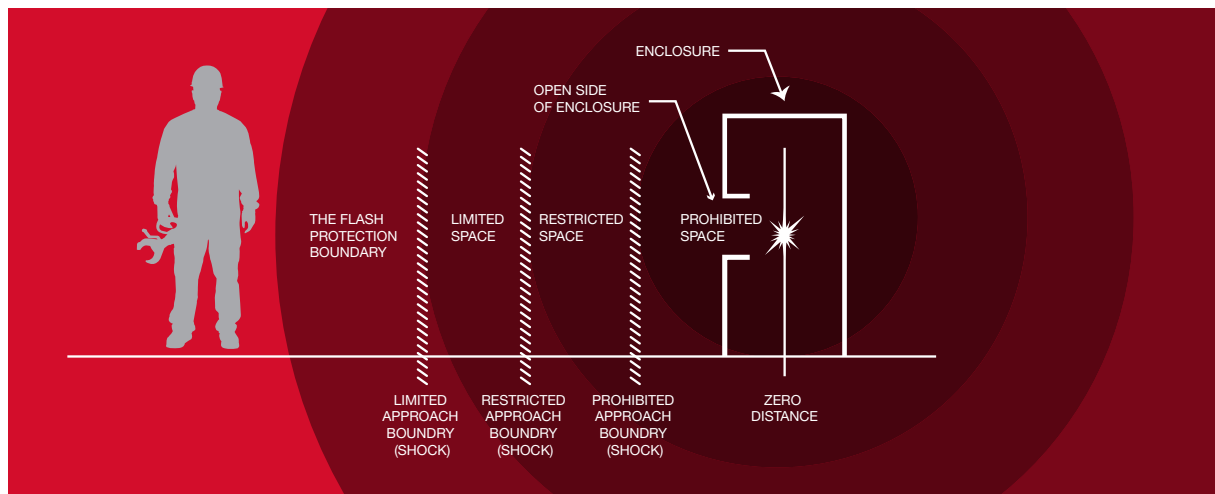
With all this data considered, the goal for any arc flash mitigation technique is to reduce contact with conductor being cut as much as reasonably possible. PPE and proper training are critical for protection but, as detailed earlier, an arc flash accident can still occur despite the preparation and expertise of those involved.

Historically, the methods to make a cut on a potentially live conductor have tried to create space between the worker and the cut, but ultimately these methods don't safely distance workers enough.

The most common method – utilizing a hydraulic pump – in theory protects workers from any potential conductive path. However, if debris got into the hydraulic pump's hose it's possible that the conductive path could still be intact. In addition, most hydraulic pumps still require that users physically press the button to operate them, thus maintaining the physical connection between the worker and the live line.

**“ The only ideal method to cut an energized conductor from a safe distance is to completely remove the physical connection of the worker to the cut area. ”**

Many companies have already started to implement remote devices for maintenance operations such as monitoring, control and diagnostics, and racking. This same approach is needed for the actual cutting of the potentially energized conductor. The pairing of a cutter and a wireless remote creates a safer cutting process for crews. Using a wireless remote, workers can communicate via Bluetooth connection with the tool and initiate a cut from a safe distance. An indicator light on the wireless remote would then alert the user immediately after the tool is done cutting. The M18™ FORCE LOGIC™ 3" Underground Cable Cutter w/ Wireless Remote utilizes this technology to keep workers further away from the cut. Currently, this is the leading technology of its kind – offering physical separation between the worker and the energized conductor.





Only the paired wireless remote can initiate the cut, eliminating the potential for other devices to connect to the tool and initiate a cut unintentionally. Additionally, for wrecking or new line installs, the tool can easily interchange between remote mode and local mode through a Remote Cut Switch on the back of the tool.



2776R-21  
M18™ FORCE LOGIC™ 3" Underground Cable Cutter Kit  
w/ Wireless Remote



2776R-21  
M18™ FORCE LOGIC™ 3" Underground Cable Cutter Kit  
w/ Wireless Remote

The overall design of this underground cutter also enables crews to easily set it up within a vault, manhole, or trench, make the cut, and reset quickly for the next cut. A handle and hang hook suspend the tool in vaults and manholes and a top handle keeps users' wrists in a neutral position to improve wrist posture and decrease muscle effort when a remote cut is not needed. The open scissor-style jaws provide easier set-up in trenches, allowing users to easily scoop up the conductor to prepare for the next cut.

## Bottom Line

Arc flash accidents can be hugely detrimental for crews and the companies they work for – causing serious bodily harm or fatal injuries to large fines and expensive lawsuits. Though no combination of countermeasures can eliminate the risks altogether, initializing remote work throughout the entire process of cutting an energized conductor vastly improves the safety of those doing the work.

## References

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# MITIGATING ARC FLASH INJURIES THROUGH REMOTE WIRELESS CUTTING



## ARC FLASH INJURIES PER YEAR

**7,000**  
Burn Injuries

**400**  
Fatalities

**2,000**  
Hospitalizations



## DIRECT COST

Includes medical treatment and rehabilitation, workers compensation, cost of accident investigation, and downtime/loss of production.

**1.5 DAYS**  
hospitalization for EVERY PERCENT of the body that is burned

**19 DAYS**  
average hospitalization resulting from an arc flash event

**8-12 MONTHS**  
average time it takes workers to return, if injured by an arc flash

**\$61K**  
average an employee can receive for workers compensation



## INDIRECT COST

Such as legal costs and judgments related to litigation, potential fines, increased insurance premiums, repair costs, and the cost of replacement workers.

**\$10.5 MILLION**  
average litigation cost to defendants for a general industry incident

**\$10K OR JAIL**  
can become the penalty for an employee death resulting in failure to comply with OSHA regulations

## THE SOLUTION - INITIATING CUTS FROM A DISTANCE



**The M18™ FORCE LOGIC™ 3" Underground Cable Cutter w/ Wireless Remote** utilizes Bluetooth Technology to distance workers further from cuts. This is the leading technology of its kind - offering the most distance between workers and live wires.

**LEARN MORE**



or visit <https://qr.mke.tl/2ddmx>