Electrical Safety IN THE WORKPLACE

2023 Electrical Safety Standards

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NFPA 70E® 2021 for Electrical Safety in the Workplace®

IMPORTANT TO KNOW

Electricity has long been recognized as a serious workplace hazard, for both people who work directly with it – such as electricians and engineers – and others who may work with electricity indirectly. Potential sources of exposure are many: overhead lines, cable harnesses, circuit assemblies and more. In a fraction of an instant, an electrical incident can kill, injure, or disable a worker. Electrical injuries to workers can result from electrocution, shock, burns, or from falls caused by the worker coming into contact with electrical energy. In 2018, 160 workers were killed and 1,560 injured in U.S. workplaces, according to the Electrical Safety Foundation International (ESFI).[1] More than half of the fatal electrical injuries that year occurred in the construction industry.

NFPA 70E, which was originally developed at OSHA's request, is considered the definitive standard for electrical safety in the workplace. It includes information about arc flash incident energy, lockout-tagout procedures and personal protective equipment (PPE) that can mitigate the risk of an electrical injury.

1 https://tinyurl.com/y5723f9f

STANDARD REQUIREMENTS

Whenever possible, turn off electrical power during the work being done and verify that it stays off until the task is completed. This can be done by: individual qualified employee control; simple lockout/tagout or complex lockout/tagout.

When it is necessary to work "live" near exposed energized parts, a live work permit that describes the work to be performed and why it must be performed should be signed by the customer, engineers or other person in charge.

For shock protection, three shock hazard boundaries should be determined: limited approach, restricted, and prohibited. These boundaries help identify who should be allowed (i.e., only qualified persons can enter the restricted approach boundary) and when workers must use voltage-rated rubber gloves and fiberglass tools.

The flash protection boundary (FPB) must also be determined. Anyone working closer than 48in to live parts must wear PPE to protect against arc flash. This may include overalls, jackets, and vests made of material that blocks heat energy and that has non-conducive hardware.

DID YOU KNOW?

The National Fire Protection Association (NFPA) uses public input and public comment in the development of its standards, which are then considered at an NFPA Technical Meeting and are subject to appeals or issuance through Standards Council Action. All NFPA standards are revised and updated every three to five years, in revision cycles that begin twice each year.

The NFPA formed a new electrical standards development committee in order to develop an electrical safety standard in 1976, at the request of OSHA. NFPA 70E was first published in 1979. A noteworthy development occurred in 1995, when the arc flash hazard was mentioned in NFPA 70E. This was the first time arc flash was formally addressed in a safety standard. NFPA describes an arc flash hazard as a "source of possible injury or damage to health associated with the release of energy caused by an electric arc." Arc flash had been identified and named as an electrical hazard only 13 years prior to version of NFPA 70E.

The standard is important for electrical engineers, safety managers, electricians, electrical contractors, plant managers, facility maintenance personnel, electrical inspectors, risk managers, mechanical engineers, HVAC installers, designers, and project managers.

NFPA 70E continues to evolve (an update will be released this year), to contain the latest information about the effects of arc flash, arc blast, and direct current (dc) hazards, and recent developments in electrical design and PPE. The standard now emphasizes using the hierarchy of risk controls to eliminate hazards.

Work practices including using boundaries, signs and barricades to designate a "safe work zone" can also help keep workers safe.

The Hazard/Risk Category (HRC) must be determined, based on tables provided by the standard. Determine Hazard/Risk Category (HRC). The HRC level helps electrical workers select the correct type of PPE to wear, based upon the task they are performing live.

Workers must wear appropriate PPE whenever they are performing tasks within the FPB, whether or not they are actually touching the live equipment.

A LOOK AT THE REVISIONS

Some of the 2021 revisions have been reorganizing. For instance, Article 110 of the standard – General Requirements for Electrical Safety-Related Work Practices — has been revised to consolidate general requirements for electrical safety-related work programs, practices and procedures from other articles. The first priority in implementing these work practices is hazard elimination. Energized electrical conductors and circuit parts operating at voltages equal to or greater than 50 volts are to be put into an electrically safe condition before an employee performs work if the individual is within the limited approach boundary and/or the individual interacts with equipment where conductors or circuit parts are not exposed but an increased likelihood of injury from an exposure to an arc flash hazard exists.

Electrical safety training for employees exposed to specific hazards associated with electrical energy is to be classroom-based, on-the-job, or a combination of the two. New to the 2021 edition: classroom training can include interactive electronic or interactive web-based training components.

The 2021 70E® edition places a new emphasis on keeping on file, documenting, and following the recommendations of electrical equipment and PPE manufacturers' instructions. Manufacturers' instructions sometimes have been skipped because the information might be hard to access, forcing workers to dig through equipment packaging, or small print instructions have made readability difficult. Manufacturers must now make instructions and recommendations more readable and more accessible.

Personal protective equipment (PPE) constitutes part of NFPA 70E®. PPE includes nonconductive head protection, eye protection, hearing protection, and arc-rated clothing whenever there is possible exposure to an electric arc flash, insulating blankets, and non-melting footwear. The 2021 edition addresses the common practice of wearing high-visibility vests over arc rated clothing. In the past qualified workers that were required to wear high-visibility vests had to remove the vests if the vest did not meet the level of arc flash protection required. Now qualified workers can wear a category 1 arc rated high-visibility vests (4 cal/cm2) during the workday and not have to remove it to perform electrical troubleshooting or voltage measurements.

Acceptable electrical safety footwear has been expanded in the 2021 edition to go beyond traditional leather footwear to include other types footwear other than leather or dielectric as long as it has been tested to demonstrate no ignition, melting, or dripping at the estimated incident energy exposure or the minimum arc rating for the respective arc flash PPE category.

In addition, the definition of balaclava has been changed. The word "hood" and "sock" were removed. The new definition: an arc-rated head-protective fabric that protects the neck and head except for a small portion of the facial area.

The 2024 edition of NFPA 70E, Standard for Electrical Safety in the Workplace, is scheduled to be published later this year. Go to **catalog.nfpa.org** and type in the search bar "2024 NFPA 70E" and it will come up to order when its available later this year.

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A Brief History of Electrical Codes, Standards, and Regulations and How Proactive Implementation Sustains Long-Term Safety

By George T. Cole, Contributor

Ever since electricity was first harnessed as a clean, affordable, reliable, and efficient form of energy, it has brought about untold improvements to the quality of life for countless people around the world for nearly a century and a half. However, no different than any technological advancements, electrical energy too has its share of hazards and is the culprit behind many disasters. From structural fires to electrocutions, arc flash and serious injuries, electricity like any other form of energy, can pose significant dangers to users if not installed, maintained, and used correctly.

For this reason, various codes, standards, and regulations were developed to help protect people and their property from the dangers of electricity. The National Electrical Code (NEC) was first compiled in 1897 and was championed by the National Board of Fire Underwrites as one of the very first attempts to reduce the numbers of fires caused by the improper installation of electrical equipment. The insurance industry at the time recognized this new marvel of science also came with many challenges, significant risks to safety and a high price due to a lack of standardization of installation rules. Consequently, individual engineers and electrical workers, who at the time were also learning about electricity in its infancy, were entrusted with authoring installation practices based on personal preferences rather than through a consensus of expertise thought. This led to much confusion and a plethora of different types and configurations of installations, sometimes with devastating outcomes. A few years later representatives of different electric code organizations came together to form the National Fire Protection Agency which was later revised to the National Fire Protection Association (NFPA). In 1911 the NFPA became the official sponsor of the NEC, also called NFPA 70.

THE NEC WAS NOT ALONE

However other organizations targeting electrical safety in one form, or another were also being founded at the same time as the NEC, such as the American National Standards Institute (ANSI) and ASTM International – formerly American Standard for Testing and Materials (ASTM) and were developing their own standards in parallel. While the multitude of codes and standards under development simultaneously by different organizations may have inadvertently contributed to contrary information in the early days, through voluntary harmonization and collaboration by these organizations has steadily minimized duplicity and confusion. As a result, the cumulative efforts by countless

dedicated individuals over the years has significantly reduced the number of electrical fires and increased the safe use of electricity over the decades.

Now some one hundred and fifty years later, the NEC is the installation code used by nearly all township, city, county, and state building inspectors, better known as the Authority Having Jurisdiction (AHJ) to ensure electrical equipment is properly designed and constructed, throughout most of the US, sometimes with amendments. The newest revision of the NEC was released in 2023.

THE FEDERAL GOVERNMENT ENTERS THE PICTURE WITH OSHA

But there were problems. First, the previously mentioned groups were founded by private enterprises which severely limited any enforcement authority of their standards and codes other than on a local level and carried little teeth other than through voluntary compliance. Secondly their standards primarily targeted installation practices and equipment design, while important had very little focus on electrical safety practices by workers once the equipment was installed and became operational. But due to the high number of fatalities, serious injuries and long-term negative health impacts to employees (from all forms of hazards in the workplace and not just from electricity), the federal government finally stepped into the picture in 1970 with Congress passing the Occupational Safety and Health Act, better known as the "OSH Act of 1970." Prior to the OSH act, an estimated 15,000 employees lost their lives annually to job-related accidents with an additional 2.5 million workers suffering some type of disability after surviving an accident. Obviously, not all the pre-OSH act statistics were caused by electricity, but a good percentage were. The purpose of the OSH act is annotated in section 2 "to assure so far as possible every working man and woman in the Nation safe and healthful working conditions." and birthed not only the Occupational Safety and Health Administration (OSHA) but also the National Institute of Occupational Safety and Health (NIOSH).

OSHA's mission is to ensure safe and healthy working conditions for workers by setting and enforcing standards and by providing training, outreach, education, and assistance. NIOSH on the other hand is a research agency focused on the study of worker safety and health, and empowering employers and workers to create safe and healthy workplaces.

Now with the OSH act firmly in place certain portions of electrical safety standards and codes moved from the realm of recommendations to regulations and from voluntary adherence to mandatory compliance backed by the authority of law and punishable through civil and criminal prosecution pursuant to the Code of Federal Regulations (CFR).

NFPA REACHES OUT TO OSHA WITH ASSISTANCE

Soon after OSHA was established, the scope of the various workplace hazards they had to contend with continued to expand with electrical energy being an obvious threat to worker safety. Through forward looking vision, NFPA understood a new document was needed to address electrical safety practices that also aligned with the NEC's focus on installation requirements. As a result, the NFPA formed a special committee with the primary goal to aid OSHA in its mission by developing a set of rules specific to safety practices of workers when using electricity rather than just on the electrical installations and design criteria alone. NFPA reached out to OSHA with an offer of assistance in the mid 1970's

From structural fires to electrocutions, arc flash and serious injuries, electricity like any other form of energy, can pose significant dangers to users if not installed, maintained, and used correctly.

which was well received by the newly formed governmental agency. Soon after Subpart S of Part 1910 was revised relying heavily on certain parts of the 1978 edition of the NEC with subsequent revisions incorporating earlier versions of the new document titled NFPA 70E.

OSHA'S GENERAL DUTY CLAUSE AND CONSENSUS RECOGNIZED STANDARDS

And while the NEC and NFPA 70E are not officially the law, once OSHA or a state and/or local municipality has adopted it, either wholly or partially, those parts become law. At the same time, even if a safety hazard and its subsequent abatement method is not directly mandated by OSHA regulations but is identified within a nationally recognized industry consensus standard, such as NFPA 70E, then the "General Duty Clause" can be cited in certain situations. Under Section 5(a)(1), employees have a right to "employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees…" This means if a recognized hazard exists in the workplace and the employer does not take reasonable steps to prevent, abate or protect the worker from the hazard, then there's a case for a General Duty Clause citation if the follow four elements are present:

1. The employer failed to keep the workplace free of a hazard to which employees of that employer were exposed.
2. The hazard was recognized.
3. The hazard was causing or was likely to cause death or serious physical harm; and
4. There was a feasible and useful method to correct the hazard.

Take for example the dangers workers face from arc flash hazards. For those industries under the provisions of 29CFR1910 subpart S, there is very little guidance regarding arc flash protection. According to 1910.335(a)(1)(iv) and (v), we find generic PPE requirements to protect the employee's head, eyes, and face from injury by "electric burns or electric arcs or flashes" as shown below.

1910.335(a)(1)(iv)
Employees shall wear nonconductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts.

1910.335(a)(1)(v)
Employees shall wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.

But a Letter of Interpretation dated November 14, 2006, to a Ms. Joanne B. Linhard states OSHA won't cite an employer for failing to implement a non-OSHA standard such as NFPA 70E. But within the letter we read an interesting statement "The General Duty Clause is not used to enforce

the provisions of consensus standards, although such standards are sometimes used as evidence of hazard recognition and the availability of feasible means of abatement," emphasis added. The latter part of the sentence explains non-OSHA standards can be used "as evidence" the employer should have recognized a serious hazard existed and implemented some kind of abatement means. And this "evidence" is especially true, after an incident where a worker is seriously or fatally injured. Common sense and good business practices fully understand that reactive measures are never as effective nor desired as proactive methods which addresses hazards before they injure employees. This is where we can once again learn from our distant past through the old but true adage penned by Benjamin Franklin "An ounce of prevention is worth a pound of cure."

OSHA IS NOT ONLY ABOUT ISSUING CITATIONS

Unfortunately, many mistakenly think OSHA is limited to only the role of an enforcement agency of workplace safety regulations, who issue citations for non-compliance infractions after concluding investigations or inspections. But OSHA also has a consultation section that helps employers who are proactively trying to self-improve their industrial safety programs. For such employers who are preemptively attempting to improve safety at their worksites and prevent injuries to their employees, OSHA has several programs to aid companies toward this worthy goal. Therefore, by collaborating with OSHA and proactively seeking more effective means of protecting employees from electrical hazard is a recipe for long-term sustainability for any business model.

George T. Cole *is an electrical safety consultant and instructor for E-Hazard (https://e-hazard.com). He has over 30 years of experience in the electric utility industry and is currently the electrical safety consultant and subject matter expert at the largest nuclear power plant in the U.S. Cole holds credentials as a Certified Electrical Safety Compliance Professional (CESCP) and a Certified Electrical Safety Worker (CESW) from the NFPA and serves as a member of NFPA's Certification Advisory Group (CAG) for the CESCP and CESW.*

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Preventing Fire & Dust Explosions: NFPA 654

"NFPA 654 is a great place to start when taking steps to identify hazards and developing action items designed to reduce risk within a facility handling explosible or combustible materials. There are NFPA codes specific to an industry, but NFPA 654 covers all other processes where combustible material is present." Fauske & Associates, 1-877-328-7531, https://www.fauske.com/chemical-industrial/testing/combustible-dust

HISTORY

NFPA 654, the "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids," is an all-encompassing standard on how to design a safe dust collection system. This standard also points people to more direct standards that deal with different types of dust and explosion protection equipment.

In the U.S., OSHA and the National Fire Protection Association (NFPA) regulate combustible dust issues, each with its own area of responsibility. OSHA, together with local authorities, enforces the NFPA's combustible standards. OSHA's Combustible Dust National Emphasis Program (NEP) outlines policies and procedures for inspecting workplaces that create or handle combustible dusts that have the potential to cause a deflagration, fire or explosion.

The Standards Council of the National Fire Protection Association (NFPA), Quincy, Mass., issued the 2013 revision of the NFPA 654 "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids." This standard applies to all combustible particulate solids or hybrid mixtures, regardless of concentration or particle size, where the materials present a fire or explosion hazard. The owners or operators of affected facilities are responsible for implementing the requirements.

Some of the changes in the past 15 years include administrative controls, such as safety-management practices; added training requirements for contractors and subcontractors; and incident investigation and reporting requirements. Important sections regarding housekeeping programs and hierarchy of clean-up operations also are included in the 2014 revision. Incident history and statistics clearly indicate that secondary dust explosions—caused by inadequate housekeeping and excessive dust accumulations—have cause much of the damage and casualties experienced in major industrial dust explosions.

WHY STANDARD MATTERS

Dust explosions are an ever-present risk faced by process plants that handle combustible powders or other bulk solids. To minimize this risk and provide plant officials with practical requirements to protect against dust explosions, NFPA, in August 2005, first revised NFPA 654 to include Best Engineering Practice designed to protect facilities from combustible dust explosions.

Combustible dust is any finely divided solid—such as flour, wood dust or coal dust—that will burn when dispersed in air and ignited. The standard identifies measures to be taken to avoid dust explosions by designing facilities and work practices that prevent the production and spreading of dust, as well as controlling ignition sources, and provides mitigation recommendations for explosions that cannot be prevented.

NFPA standards are typically adopted by state fire marshals, insurance companies and consultants. The standard applies to "all phases of the manufacturing, processing, blending, pneumatic conveying, repackaging and handling of combustible particulate solids or hybrid mixtures,

"NFPA 654 is a great place to start when taking steps to identify hazards and developing action items designed to reduce risk within a facility handling explosible or combustible materials. There are NFPA codes specific to an industry, but NFPA 654 covers all other processes where combustible material is present."


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regardless of concentration or particle size, where the materials present a fire or explosion hazard." (paragraph 1.1.1)

KEY COMPLIANCE REQUIREMENTS

The standard contains comprehensive guidance on the control of dusts to prevent explosions. The following are some of its recommendations:

- Minimize the escape of dust from process equipment or ventilation systems
- Use dust collection systems and filters
- Utilize surfaces that minimize dust accumulation and facilitate cleaning
- Provide access to all hidden areas to permit inspection
- Inspect for dust residues in open and hidden areas, at regular intervals
- Clean dust residues at regular intervals
- Use cleaning methods that do not generate dust clouds, if ignition sources are present
- Only use vacuum cleaners approved for dust collection
- Locate relief valves away from dust hazard areas
- Develop and implement a hazardous dust inspection, testing, housekeeping & control program (preferably in writing, with established frequency & methods)

When all of the recommendations of NFPA 654 are met and the potential for dust explosions is still present, an explosion-prevention system should be implemented where needed. IHW

RESOURCES:

To purchase the standard, go to the NFPA catalog online store: https://tinyurl.com/h4eb48n5

The OSHA standard for The Control of Hazardous Energy (Lockout/Tagout)

Title 29 Code of Federal Regulations (CFR) Part 1910.147

IMPORTANT TO KNOW:

If your employees service or maintain machines, where the unexpected startup, energization, or the release of stored energy could cause injury, then OSHA's Control of Hazardous Energy (Lockout/Tagout) Standards should be at the forefront of your safety protocols and procedures.

According to OSHA, employees servicing or maintaining machines or equipment may be exposed to serious physical harm or death if hazardous energy is not properly controlled. Craft workers, machine operators, and laborers are among the 3 million workers who service equipment and face the greatest risk. Compliance with the lockout/tagout (LOTO) standard prevents an estimated 120 fatalities and 50,000 injuries each year. Workers injured on the job from exposure to hazardous energy lose an average of 24 workdays for recuperation.

The LOTO standard establishes the employer's responsibility to protect employees from hazardous energy sources on machines and equipment during service and maintenance. The standard gives each employer the flexibility to develop an energy control program suited to the needs of the particular workplace and the types of machines and equipment being maintained or serviced. This is generally done by affixing the appropriate lockout or tagout devices to energy-isolating devices and by deenergizing machines and equipment. Remember, employees need to be trained to ensure that they know, understand, and follow the applicable provisions of the hazardous energy control procedures.

THE STANDARDS ESTABLISH REQUIREMENTS THAT EMPLOYERS MUST FOLLOW AND OUTLINED BELOW ARE THE MOST CRITICAL:

- Develop, implement, and enforce an energy control program.
- Use lockout devices for equipment that can be locked out. Tagout devices may be used in lieu of lockout devices only if the tagout program provides employee protection equivalent to that provided through a lockout program.
- Ensure that new or overhauled equipment is capable of being locked out.
- Develop, implement, and enforce an effective tagout program if machines or equipment are not capable of being locked out.
- Develop, document, implement, and enforce energy control procedures. [See the note to 29 CFR 1910.147(c)(4)(i) for an exception to the documentation requirements.]
- Use only lockout/tagout devices authorized for the particular equipment or machinery and ensure that they are durable, standardized, and substantial.
- Ensure that lockout/tagout devices identify the individual users.
- Establish a policy that permits only the employee who applied a lockout/tagout device to remove it. [See 29 CFR 1910.147(e)(3) for exception.]
- Inspect energy control procedures at least annually.
- Provide effective training as mandated for all employees covered by the standard.
- Comply with the additional energy control provisions in OSHA standards when machines or equipment must be tested or repositioned, when outside contractors work at the site, in group lockout situations, and during shift or personnel changes.

INCREASE YOUR KNOWLEDGE:

Visit OSHA's eTool for an interactive training program that will expand your knowledge of the LOTO standard. Additionally, OSHA has various publications, standards, technical assistance, and compliance tools to help you. These are available at www.osha.gov.

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OSHA 1910.144: Safety Color Code for Marking Physical Hazards

Safety marking and safety signage in the workplace is an important component of an overall safety program – and color is key to making it instantly recognizable. It helps people identify the nature of a hazard at a glance. OSHA's safety color code regulation makes use of primary colors which have general, commonly understood associations. Red in the workplace, for example, represents danger or the need to immediately stop an action or a movement, just as it does in traffic stop signs. Yellow denotes a warning. Red warns of a certain hazard, while yellow alerts people to potential threats. In short, colors are an effective way to raise awareness about hazards and help prevent incidents.

PROVISIONS OF THE REQUIREMENT

Red - Per OSHA 1910.144. red shall be the basic color for the identification of: *Fire protection equipment and apparatus*. It should also be used to indicate:

- *Danger.* On safety cans or other portable containers of flammable liquids having a flash point at or below 80° F, table containers of flammable liquids (open cup tester), excluding shipping containers, shall be painted red with some additional clearly visible identification either in the form of a yellow band around the can or the name of the contents conspicuously stenciled or painted on the can in yellow. Red lights shall be provided at barricades and at temporary obstructions. Danger signs shall be painted red.
- *Stop.* Emergency stop bars on hazardous machines such as rubber mills, wire blocks, flat work ironers, etc. shall be red. Stop buttons or electrical switches which letters or other markings appear, used for emergency stopping of machinery shall be red.

Yellow - Yellow shall be the basic color for designating caution and for marking physical hazards such as: Striking against, stumbling, falling, tripping and "caught in between."

HOW COLOR IS PERCEIVED

Light is made up of wavelengths, which fall along various parts of the spectrum and thus, appear to be different colors. When we "see" a color, light travels into the eye and interacts with receptors in the retina. Those receptors send messages about perceived color to the brain, which activates familiar associations with the colors being seen. Yellow is the most visible color in the spectrum, and the first one the eye will notice. Red, which also has a long wavelength, is the second most visible. In color psychology, though, red is the most intense hue, which is why it is universally used to warn of impending danger.

In order to comply with the regulation, managers must conduct a thorough safety assessment of the facilities and applications for which they are responsible, and identify areas, equipment and tasks which should be marked with red or yellow. In addition to the uses specified in OSHA 1910.144, red and yellow can be used to draw attention to:

- The need to use personal protective equipment
- The location of emergency equipment
- Communicate prohibited actions
- Communicate mandatory action

"Visual communication in the workplace is standardized by signs and color codes and has become an important method for communicating hazards. OSHA and ANSI have identified specific safety colors for consistency within the U.S. It is imperative that employers maintain their safety signage within the workspace to properly communicate potential hazards and keep their equipment compliant. To assist in this maintenance, Markal has created Paint-Riter®+ Safety Colors liquid paint markers which are formulated to make durable marks that meet the OSHA and ANSI color standard for safety identification. Paint-Riter®+ Safety Colors markers can be used for touch-up work of safety-colored equipment or signage and can be used for OSHA compliant general marking applications."

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Industrial grade paint and ink markers may be used to comply with OSHA 1910.144. Choosing the right markers requires identifying the types of surfaces on which they'll be used and determining whether the markings will need to be fast-drying, and permanent or semi-permanent. Paint markers, for instance, are optimal in situations that require wear- and extreme-temperature resistance. Ink markers are appropriate where the markings will need to be semi-permanent, as they can be removed with solvents. Paint markers can be used on smooth, rusty or clean surfaces and in operations that require quality control during manufacturing, and then a clean surface for painting, powder-coating or plating. There are low-corrosion markers that are appropriate for use on stainless steel and other alloy metals. WMHS

INCREASE YOUR KNOWLEDGE

OSHA 1910.145 recommends additional color coding:

- Orange for CAUTION
- Fluorescent orange or orange-red for BIOLOGICAL HAZARD

To read OSHA 1910.144, visit: https://tinyurl.com/2p8fzs6a

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