Highlights of the New ANSI/ASSE Z244.1 Standard

Control of Hazardous Energy -

Lockout/Tagout and Alternative Methods



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How the New ANSI Z244 Standard influences the Practice of Lockout/Tagout and Alternative Methods

Certainly, the methods of protecting workers against the sudden startup of machinery have evolved greatly over the years. The most often referenced source of lockout/tagout information is OSHA’s 29 CFR1910.147 regulation which came out in 1989. It was based heavily on ANSI’s original Z244.1 Lockout Standard first published in 1982. We have come a long way since then in terms of technology and new methods, but there certainly is a long way to go. Each year OSHA publishes its Top 10 Most Cited Violations and again, for Fiscal 2016, Lockout was ranked fifth (with very similar outcomes as 2015) in terms of the particular rules that were cited and value of the citations issued. Heightened self-reporting requirements for serious injuries and fatalities are bringing more violations to OSHA’s attention and it seems that many U.S. employers are coming to an understanding that these types of accidents continue to occur with significant frequency and often with great severity.

ANSI/ASSE Z244.1 (2016) The Control of Hazardous Energy – Lockout, Tagout and Alternative Methods seeks to address these trends with the most significant expansion of best practice guidance since the 2003 Z244 Standard revision was published. Although OSHA has clarified their position on elements of the 1910.147 regulation through letters of interpretation, no definitive updates or substantial changes have been issued in the more than 25 years the law has been in effect. The American National Standards Institute, on the other hand, has looked closely at the progression of technology and solutions as represented by a wide range of industries, and has reaffirmed or revised Z244.1 every five years to continuously improve the application of this important safety practice. This serves as an effort to better protect people doing potentially hazardous work on machinery, equipment or processes.

The Z244 committee agrees with OSHA; workers should be protected from injury due to unexpected equipment startup or release of potentially hazardous energy. However, the committee did not try to align fully with every historic OSHA compliance requirement. Instead, they took carefully into consideration the improvements made in safety rated technology and other advancements in energy control methods proven by experience to effectively provide protection beyond basic lockout regulatory requirements. This offers enhanced opportunities to meet the needs of technology driven and fast paced modern workplaces without compromising the safety of personnel working hard to keep the wheels of industry turning.

The Committee has made deliberate efforts not to make major changes in recommended practice that would create completely new obligations for employers and participating personnel. Instead, they focused on addressing the right thing to do to prevent sudden startup accidents based on the current knowledge available to us. The intent has been to offer a plain language approach that describes how a range of well proven energy control practices can be accomplished and adapted to a wide range of industries. The 2016 standard was written to be scalable to meet the needs of both large and small companies with varying levels of technology present in their machinery and processes. Sections 1-3 respectively address Scope and Purpose, References and Definitions. They are not commented on here for reasons of brevity. Important new and expanded information provided in the 2016 revision of Z244.1 covers the following Sections.

Section 4 – Responsibilities:

A reference is given to **Supplier;** which is defined in the 2016 standard as;*An entity that designs, redesigns, fabricates, modifies, integrates, assembles or supplies machines, equipment or processes.* The section directs Suppliers to provide the Users of machinery provided to them, with equipment meeting the requirements of this section, addressed below. It further compels Users to obtain machinery equipment and processes that complies with Section 5.

Section 5 - Design of Machinery/Equipment for the Control of Hazardous Energy:

The advancement of technology and engineering options in new machinery construction has resulted in a heightened capability for it to be dependably controlled during servicing operations. This section provides guidance on roles and responsibilities of suppliers and builders to design for integral lockability, tamper resistance and the use of control reliable safeguarding technology when applicable. Suppliers are compelled by the standard to document safety systems, provide risk assessments, and offer procedures that can justify alternative methods of protection if necessary and how risk exposures can be minimized during routine and repetitive servicing, repair, and maintenance activities.

This results in end users being better prepared to finalize their own safe work procedures for personnel operating the equipment. Machinery Manufacturers, integrators, modifiers, and remanufacturers are encouraged to use the tenants of Section 5 to enhance the value of their product offerings to customers who are looking for engineering safeguards and information to be part of their purchase considerations. End users purchasing new or modified equipment can also use the guidance in section 5 in their specifications to make sure equipment is designed to be readily isolated, securable, and ready to be serviced safely and efficiently.

There is significant detail provided on the location and identification requirements for energy isolating devices. This includes providing the capability to be locked or otherwise secured in an isolating position. And there are documentation requirements for Suppliers to provide users with relevant procedural information and instructions along with posting any special warnings. When stored or residual energy presents a risk, the ability to effectively release or dissipate these energy hazards must be incorporated into the design of the machinery.

Section 6 – The Hazardous Energy Control Program:

The importance of a well thought out and documented lockout program is broadened by the additional information provided in this section. Section 6.3 provides detail on the required elements of the control program including; Identifying responsibilities, tasks, energy sources and isolation devices. Operational procedures and implementation requirements for hardware as well as communications and training are covered in terms of content expectations. And a review process is provided to periodically determine the effectivity of the Hazardous Energy Control Program and the need for continuous improvement where indicated.

Methods for managing change for new or modified equipment in the workplace and ways of timely updating and document control are noteworthy additions in Section 6. This assures analysis is performed prior to startup to allow for proper engineering and personnel preparation. Also benefitting are new or revised operating procedures, maintenance requirements, lockout instructions, training information and tasks that may require alternative procedures.

Section 7 – Control of Hazardous Energy:

This section has been expanded significantly to discuss improved hazardous energy control procedures, the identification of energy isolating devices, verification by testing of the effectiveness of de-energization, as well as new provisions for interrupting energy isolation for positioning and testing requirements. Lockout and Tagout practices are clearly laid out in 7.1.

Lockout is required in the following situations:

* When no risk assessment has been completed.
* When the tasks and/or hazards are unknown.

Lockout or tagout is required:

* During assembly and disassembly of the machine, equipment or process.
* When energy is not required to perform the task
* For major repairs

Section 7.2 addresses the detailed requirements of hazardous energy control procedures. A clear explanation of when equipment specific procedures are required is provided along with the elements that make up a well prepared lockout or tagout procedure. Procedure management is also discussed as a means of providing timely access to the most up to date information. Information is also offered on protective hardware and tags, as well as transfer of responsibility between work shifts including the use of transfer locks.

Section 7.6 continues with step by step guidance on the elements to apply Lockout/Tagout including the use of warning placards where applicable. Details regarding partial energization of machinery as required for operational and maintenance tasks are allowed provided no danger is posed to the individuals performing work on the equipment. The section continues with information regarding partial energization when some energy is required to be present in machinery, equipment or processes in order to complete the work assignment (this is also further addressed in Section 8 of the standard). 7.6 also covers the processes of verifying isolation has been successfully achieved, and returning equipment back to service.

Section 7.9 contains an expanded discussion of working with outside service or contractors is found in section. Details regarding notification of hazards, and coordinating contractor programs with host programs are given for integrated tasks. Group lockout techniques are covered in Section 7.10 and complex group lockout guidance is covered in 7.11. Both of which reference extensive technical discussion in the ANSI/ASSE Z244.1 annexes I and J which draws information from the OSHA Instruction to their compliance officers titled CPL 02-00-147 The Control of Hazardous Energy – Enforcement Policy and Inspection Procedures.

Section 8 - Alternative Methods:

This section expand guidance beyond OSHA’s regulatory limitation to tasks that are routine, repetitive and integral to production operations. The Z244 Committee recognized that there are also many maintenance, repair or service work assignments where energy may need to be present to perform the job properly that do not allow for the full application of isolation and lockout. The outcome was that competent evaluation methods completed specific to the task being performed is the best method of determining the feasibility of applying full energy isolation techniques or justifying dependable alternative methods to lockout or tagout.

The Z244 committee’s position is made clear, Lockout (or Tagout) shall be used unless the user can demonstrate that a well-established alternative method will provide effective protection. In situations where the task is not well understood or risk assessed, Lockout shall be the default protective measure applied to control machinery or processes. Section 8.2.1 specifies that alternative methods shall only be used after hazards have been assessed and documented through the application of a Practicability (or Justification) Study. This results in a first step decision as to whether a risk assessment is reasonable to perform as the next step in the determination process.

Once a decision to move forward has been justified, Section 8.2.2 requires that a risk assessment process be completed to determine that the techniques used will result in a negligible risk or no risk for sudden start up. A description of multiple methods of risk reduction methods is found in this section as follows:

* Industry best practices / methods (8.2.3);
* Architecture/Structure (8.2.4);
* Using well-tried components (8.2.5);
* Using well-tried designs (8.2.6);
* Common cause failure (8.2.7);
* Fault tolerance (8.2.8);
* Exclusivity of control (8.2.9);
* Tamper resistance (8.2.10);
* Program to support (8.2.11);
* Procedures in place (8.2.12);
* Periodic checking and testing (8.2.13);
* Review by a qualified person (8.2.14).

These assessment methods are intended to provide supportive details on suitable control measures that confirm whether or not reliance can be placed on technically reliable safeguarding methods to engineer out hazard exposures. These engineering controls are considered to potentially be an improvement over the procedural measures provided by the behavior-reliant application of lockout techniques to significantly reduce the likelihood of human error. Following the Hierarchy of Control model, ANSI/ASSE Z244.1 (2016) provides detailed guidance on if, when, and how a range of alternative control methods can be applied to result in equal or improved protection for people performing specific tasks.

Additionally, the new Standard offers over two dozen informational Annexes that provide examples of risk assessment techniques, sample policies and lockout/tagout procedures, group lockout guidance and inspection information. Alternative risk reduction methodology is covered in detail specific to a number of new technologies including the Packaging, Pharmaceutical, Plastics, Printing, and Steel Industries; Semiconductor and Robotic Applications and others challenged by the current regulatory limitations.

The author reflects the position of the Z244 Committee that injuries and fatalities related to unexpected startup of machinery or release of hazardous energy are preventable while recognizing that zero risk is only a theoretical possibility. The better understood tasks are associated with potentially hazardous energy exposures and protected by the use of hazard elimination, engineered controls, procedures and training, the more reliably we can move risk levels to acceptable levels. The newly revised ANSI/ASSE Z244.1 Standard provides the latest information on achieving acceptable levels of risk by knowledgeably applying conventional lockout, tagout or well determined alternative methods to prevent these avoidable accidents from occurring.

**Endnotes**

Todd Grover has over 30 years of experience as a practicing safety professional and EHS Manager and has worked with a wide range of industries to prepare numerous lockout policies and detailed procedures, develop company-specific compliance policies, related training, as well as performing lockout related accident investigations. He has worked on behalf of many employers to address and mitigate violations during 29CFR 1910.147 related OSHA citation cases. He has worked with the implementation of Lockout/ Tagout since the inception of the OSHA standard in 1989 and is currently a participating member of the ANSI/ASSE Z244.1 (2016) committee on Control of Hazardous Energy - Lockout, Tagout and Alternative Methods and the ANSI/ASSE Z10 Safety Management System committee.

The cumulative experience of author is that to-date, the majority of U.S. employers struggle to maintain a consistently effective lockout/tagout protocol with their workers, contractors and vendors. Driven by the limited guidance provided by regulatory requirements only, compliance is very difficult to routinely achieve.

The latest version of the ANSI/ASSE Control of Hazardous Energy Lockout, Tagout and Alternative Methods standard released in December 2016 is a well-resourced and progressive look at how to include well described energy control practices into daily productive operations. This appeals to employers who seek to understand how to improve their energy related protective practices and resonates with people whose work exposes them to the hazards of sudden machine startup. The newly revised Z244 standard speaks to these needs by offering comprehensive information on the latest methodology and how to accomplish across all industries, and especially in your workplace.

The ideas, opinions and summary of content of the ANSI/ASSE Z244.1 (2016) Standard expressed in this technical paper reflect the opinion and experience of the author and cannot be implied to represent a consensus of the thoughts of the many organizations and individuals that also participated in the Z244.1 Standard revision process. Best practice guidance is subject to interpretation, and the author encourages those interested in this standard to obtain a copy and explore the possibilities and applications they believe will best suit the needs of their working environment. Every ANSI committee encourages feedback from those who put these standards into practice and encourages participation in the continuous improvement process via committee membership and other valuable contributions.

Bibliography

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