AMERICAN NATIONAL STANDARD

ANSI/ASSE Z244.1 – 2016
The Control of Hazardous Energy
Lockout, Tagout and Alternative Methods

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AMERICAN SOCIETY OF SAFETY ENGINEERS

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American National Standard

The Control of Hazardous Energy
Lockout, Tagout and Alternative Methods

Secretariat

American Society of Safety Engineers
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American National Standard

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Foreword

(This Foreword is not a part of American National Standard Z244.1-2016.)

History

In March 1973, the Accredited Standards Committee Z244 held its first organizational meeting in New York to develop a standard on lockout/tagout. The National Safety Council functioned as the initial secretariat and provided a draft document "Guidelines for a Lockout Program" dated November 1971 that was used as a reference for the committee's deliberations. By the end of 1975, the standard work was complete and public review and balloting was finished. However, various administrative and procedural problems precluded the standard from being officially released. In March 1982, the American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements Z244.1 was finally approved and published.

In 1987, the standard was re-affirmed without any changes in content. In April 1988, the Occupational Safety and Health Administration (OSHA) released a proposed rule "The Control of Hazardous Energy Sources (Lockout/Tagout)" 29 CFR1910.147 which used ANSI Z244.1 as a principal reference source. The committee believed no consequential action should be taken on the Z244.1 standard while federal rulemaking was underway. In September 1989, OSHA promulgated its final rule 29 CFR1910.147, "The Control of Hazardous Energy Sources (lockout/tagout)." Again in 1992, the ANSI standard was reaffirmed without change.

During 1997, the committee was reconstituted and voted to revise the existing 1982 standard after over 20 years without change. Consequential meetings began in 1998 and the revision process began with writing task groups being formed and continued through 2003. The American Society of Safety Engineers became the secretariat of the Z244 Lockout/Tagout committee in 2003. The title of the standard was modified to recognize the broader universe of hazardous energy control. The standard more effectively addressed the need for greater flexibility through the use of alternative methods based on risk assessment and application of the hazard control hierarchy. In addition, the standard emphasized management's responsibility for protection of personnel against the release of hazardous energy.

The standard was processed and approved for submittal to ANSI by the Accredited Standards Committee (Z244) on Control of Hazardous Energy, Lockout/Tagout and Alternative Methods. The standard was approved by ANSI on July 29, 2003 with a publication date of April 14, 2004.

The Z244 committee and ANSI reaffirmed the standard without technical change in 2008 and again in 2014 with the stipulation that the ASC (Z244) committee begin meeting to revise the Z244 standard since no changes had been made since 2003. The ASC (Z244) committee agreed and began the revision process in July 2014.

Need for a Standard

A wealth of casualty data exists in the private, public and governmental sectors related to the unexpected release of hazardous energy. In fact, the issue is of global concern since all of the major industrialized countries of the world are actively addressing the problem in various ways. The U.S. Occupational Safety and Health Administration provided persuasive injury data in its justification for a lockout/tagout standard for general industry in 1989.

In spite of substantial efforts by employers, unions, trade associations and government during the past 50 years, the annual toll of injury and death related to hazardous energy release incidents remains unacceptable. We now know that all forms of energy must be addressed; that operational personnel are injured as often as maintenance workers; that often thermal and

gravitational forces and trapped materials under pressure are overlooked; that complex equipment and processes frequently demand unique approaches to energy isolation or control; and that employers need to commit resources and substantial effort in planning, training, procedure development and infrastructure before lockout/tagout application ever occurs.

The rapid growth of technology continues to require different methods and techniques for safeguarding workers from the unexpected release of hazardous energy. Each business sector is actively changing the way traditional work is done, which then requires employers to develop new equally effective responses for hazardous energy control. Protective standards need to be improved continually to provide guidance for current conditions as well as evolving technical developments. Advanced control systems provide new opportunities for addressing energy control where conventional lockout is not feasible, where energy is required to perform a task, where repetitive cycling of an energy-isolating device increases risk, and where energy is required to maintain equipment in a safe state, etc.

Standard Perspective

The content of this standard was approached from a business and industry perspective. However, the principles, methods and guidance are applicable to a variety of other settings and circumstances where unexpected release of hazardous energy can occur. The procedures, techniques, methods and design guidance contained in this standard are recommended for use by all those whose activities fall within its scope and purpose.

The standard recognizes that zero risk is only a theoretical possibility, but is not an operative reality - zero risk does not exist. The concept of feasible risk reduction to achieve acceptable or tolerable risk is emphasized whether using conventional lockout, tagout or alternative methods. With regard to hazardous energy control the term “safe” suggests the absence of risk. More accurately, “safe” should be viewed as the acceptability of risk to those who may be exposed. There are numerous terms that reflect the circumstances under which servicing and maintenance is done routinely today. Terms such as AFARP (as far as reasonably practical), ALARA (as low as reasonably achievable), or ALARP (as low as reasonably practicable) convey a more realistic approach to risk reduction and in particular the use of alternative methods.

The standards committee and the secretariat have made a concerted effort to produce a standard that represents the best practice regarding the control of hazardous energy. All circumstances or situations where personnel are exposed to unexpected energy release may not have been anticipated and adequately addressed with respect to the standard’s content. New developments are to be expected, and revisions of the standard will be necessary as the state of the art progresses and further experience is gained. However, uniform requirements are needed and the standard in its present form provides performance requirements that are necessary when developing and implementing a system for protecting personnel from unexpected hazardous energy.

Current Status

The committee held its first meeting in July 2014 for purposes of revision of the Z244 standard with an expanded membership. Several meetings were held to update the standard to include current best practices and technology learned over the past 40 years of controlling hazardous energy. Interest in participating on the Z244.1 revision committee was high and from diverse industries, reflecting the impacts that lockout/tagout has on companies.

With the increased use of risk assessment and advancing technologies, there are now conflicting views on the requirements for how and when to control hazardous energy. The current requirements for the control of hazardous energy appear in 29 CFR 1910.147 under OSHA, and in this American National Standard ANSI/ASSE Z244.1. A thorough discussion of

the similarities and differences between OSHA 29 CFR 1910.147 and the ANSI/ASSE Z244.1 standard can be found in other documents (see Bibliography).

ANSI procedures require that a standard be revised or reapproved every five years or the standard is subject to being withdrawn after a complete ten-year cycle following approval. As technology advances, better alternative methods can be developed to keep employees from harm. If the static standard is followed, the employees may be exposed to greater risks than if more current standards or technology is used as alternative methods of protection.

There is no disagreement on the basic principle that workers should be protected from the unexpected startup or release of hazardous energy. There continues to be disagreements over how, when and which requirements apply. The committee concentrated on how to control hazardous energy using methods based on current knowledge. The committee discussions focused on what was the right thing to do given current technology and industry best practices to protect workers from harm due to the unexpected release of hazardous energy.

This revised standard presents distinct requirements for controlling hazardous energy through three different approaches: lockout (the primary approach), tagout and alternative methods. Alternative methods and risk assessment have received additional attention to emphasize their importance in the energy control process. The revision better clarifies the necessary elements for a policy, program and procedures for controlling hazardous energy. The intent of the committee has been to write a standard that enables readers to effectively control hazardous energy based on current knowledge.

The Service and Maintenance Construct

With the 2016 revision, the committee has rejected the normal production operations versus service and maintenance construct as an artificial distinction without real world application. More specifically, the committee realized that work gets done based upon the tasks to be performed without regard to a characterization of whether the task is normal production operations, service or maintenance. Hazards associated with the unexpected release of hazardous energy need to be addressed – regardless of any labels or characterization attached to it.

Alternative Methods

The committee developed updated requirements for alternative methods for hazardous energy control. New requirements were written and new guidance was provided to assist readers to determine when lockout is required and when an alternative method may be used. Text was also developed that describes the parameters for what constitutes an acceptable alternative method.

The committee believes the new ANSI/ASSE Z244.1-2016 provides greater clarity and direction to companies seeking to control the release of hazardous energy. In particular, better guidance is provided for if, when and how alternative methods may be used to provide effective protection. These improvements should enable companies to use modern technology and innovative solutions to improve the safety and productivity of operations in the workplace.

Standard Guidance

Conformance language in the standard consists of the words “shall” and “should.” In this standard the word “shall” is intended to be prescriptive, specifying mandatory requirements for compliance with the standard. The word “should” specifies non-mandatory recommendations and good practices that have been found to be helpful. “May” is used to indicate that something is permitted, while “can” is used to indicate that something is possible or as a statement of fact.

The notation forward slash (/) is intended to mean and/or when used in the standard. It indicates that two words or expressions are to be taken together or individually.

Normative Requirements

This standard uses the single column format common to many international standards. The normative requirements appear aligned to the left margin. To meet the requirements of this standard, machinery, equipment and process suppliers and users must conform to these normative requirements. These requirements typically use the verb “shall.”

> *NOTE: The informative or explanatory notes in this standard appear indented, in italics, in a reduced font size, which is an effort to provide a visual signal to the reader that this is informative note, not normative text, and is not to be considered part of the requirements of this standard; this text is advisory in nature only. The suppliers and users are not required to conform to the informative note. The informative note is presented in this manner in an attempt to enhance readability and to provide explanation or guidance to the sections they follow.*

Annexes

Annex materials are provided to assist the user in applying the language of the standard and serve as guidance for implementation. They are not mandatory but are offered as relevant examples or references to facilitate improved use.

Suggestions for Improvements

Suggestions for improvements to this standard are welcome. They should be sent to: American Society of Safety Engineers, 520 N. Northwest Highway, Park Ridge, IL 60068 Attention: Z244 Secretariat.

Revisions: The Z244 committee welcomes proposals for revisions to this standard. Revisions are made to the standard periodically (usually five years from the date of the standard) to incorporate changes that appear necessary or desirable, as demonstrated by experience gained from the application of the standard. Proposals should be as specific as possible, citing the relevant clause number(s), the proposed wording and the reason for the proposal. Pertinent documentation would enable the Z244 committee to process the changes in a more-timely manner.

Interpretations: Upon a request in writing to the secretariat, the Z244 committee will render an interpretation of any requirement of the standard. The request for interpretation should be clear, citing the relevant paragraph number(s) and phrased as a request for a clarification of a specific requirement. Oral interpretations are not provided.

No one but the Z244 committee (through the Z244 secretariat) is authorized to provide any interpretation of this standard.

Approval: Neither the Z244 committee nor American National Standards Institute (ANSI) approves, certifies, rates or endorses any item, construction, proprietary device or activity.

Committee Meetings: The Z244 committee meets periodically but frequently when the standard is undergoing the revision process. Persons wishing to attend a meeting or join the committee should contact the secretariat for information.

Standard Approval: This standard was processed and approved for submittal to ANSI by the American National Standards Committee on Control of Hazardous Energy, Z244. Approval of the standard does not necessarily imply (nor is it required) that all committee members voted for its approval. At the time this standard was reaffirmed, the Z244 committee had the following members:

Edward V. Grund, CSP, P.E., Chair
Jeff Fryman, Vice Chair
Ovidiu Munteanu, Secretary
Timothy R. Fisher, CSP, CHMM, ARM, CPEA, Assistant Secretary
Jennie Dalesandro, Administrative Technical Support

Organization Represented	Name of Representative
Aluminum Association	Mark Eliopulos
American Chemistry Council	Paul Dobrowsky
American Foundry Society	James J. Murphy, IV
	Tom Slavin
American Petroleum Institute	Kendall C. Crawford, P.E., CSP
American Society of Safety Engineers	David Dodge, CSP, P.E.
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Arrowhead Systems, Inc./Busse/SJI Corporation	Al Sumner, P.E.
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Bridgestone Americas Tire Operations, LLC	Kenji Furukawa
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	Bill Horsford
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White Horse Safety, LLC	Ted Sberna

Contents

Introduction

This standard provides guidance regarding:

- responsibilities of the principal parties involved in hazardous energy control (clause 4);
- design issues that influence the effective application of control methodology (clause 5);
- hazardous energy control program elements necessary for employee protection (clause 6);
- communication and training requirements for involved personnel (clause 6.4);
- hazardous energy program review to ensure its effectiveness (clause 6.5);
- hazardous energy control methods (clause 7);
- alternative methods development for tasks where traditional lockout or tagout prohibits the completion of those tasks (clause 8); and
- special applications where typical methods of hazardous energy control are inappropriate or not practicable (clause 8.4).

The standard provides for decision-making flexibility regarding hazardous energy control methodology. Alternative methods, when used, are based upon risk assessment and application of the classic hazard control hierarchy (clause 8.1.2). However, lockout continues to be emphasized as the primary hazardous energy control method.

AMERICAN NATIONAL STANDARD Z244.1
THE CONTROL OF HAZARDOUS ENERGY
LOCKOUT, TAGOUT AND ALTERNATIVE METHODS

1. Scope and Purpose

1.1 Scope

This standard covers machines, equipment and processes in which the unexpected energization or start-up of the machines or equipment, release of stored energy or the actions of persons could result in harm.

This standard establishes requirements for the control of hazardous energy associated with machines, equipment or processes that could cause harm to personnel. The standard specifies the use of lockout (primary method), tagout or alternative methods to control hazardous energy associated with machines, equipment or processes that could cause harm to personnel.

This standard applies to activities such as erecting, installing, constructing, repairing, adjusting, inspecting, unjamming, set up, testing, troubleshooting, cleaning, dismantling, servicing and maintaining machines, equipment or processes.

> *NOTE: Different organizations characterize the above tasks as servicing, maintenance or operations. Each organization should evaluate how best to control hazardous energy for tasks that are performed.*

This standard does not apply to work on cord and plug connected electric equipment for which electricity is the single source of energy; is solely controlled by the unplugging of the equipment from the energy source; and by the plug being under the exclusive control of the person.

This standard does not apply to hot tap operations involving transmission and distribution systems for substances such as gas, steam, water or petroleum products when they are performed on pressurized pipelines.

This standard does not apply to standard passenger vehicles, personal pleasure boats, private aircraft or recreational/sport type vehicles.

1.2 Purpose

The purpose of this standard is to establish requirements that protect personnel where harm can occur as a result of the unexpected release of hazardous energy.

This document is a performance standard and, as such, is not intended to limit or restrict the use of other existing specific standards, procedures or regulations that meet the performance objectives defined in this standard and provide an acceptable level of personal protection from exposure to hazardous energy.

Deviations from the requirements of this standard shall be based on a documented risk assessment.

1.3 Application Exceptions

The presence of an energy source alone does not by itself warrant the need for energy control. The risk assessment process shall determine which energy sources are considered hazardous for each task.

Energy sources that do not present a hazard, or exposure to the hazard, do not require control of hazardous energies or alternative methods.