



ASSP Standards-Based User Groups, Tech Brief Comparison:

OSHA LOTO Requirements CFR 1910.147,
ANSI/ASSP Z244.1 and ANSI/ASSP A10.44



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STANDARDS

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Introduction and Background



Safety Practices, Procedure & Training

Voluntary consensus standards can transform a safety program from a compliance-driven cost center into a corporate sustainability initiative that can save lives and boost profits. Many occupational safety and health professionals have requested information comparing the Occupational Safety and Health Administration (OSHA) Lockout/Tagout (LOTO) requirements in 29 CFR 1910.147 against the ANSI/ASSP Z244.1 Standard and the ANSI/ASSP A10.44 Standard. This paper is a product of the ASSP LOTO SBUG.

The goal of the ASSP SBUGs is to move beyond compliance to prevent serious injuries and fatalities (SIF). ASSP is looking to turn safety and health standards into measurable performance with SBUGs, structured subject matter expert-led working groups where environmental, health and safety (EHS) professionals, employers, and industry experts come together to tackle high-risk challenges. Through peer collaboration, expert guidance, and real-world testing, SBUGs help translate standards into practical implementation and measurable workplace safety outcomes.

With regular virtual meetings and ongoing engagement through a private online community, SBUGs connect you with professionals, organizations, and solution providers facing similar challenges, enabling you to benchmark performance and implement proven, effective strategies.





ANSI/ASSP Z244.1 Standard History and Background

The ANSI/ASSP Z244.1 Standard — officially titled “The Control of Hazardous Energy – Lockout, Tagout, and Alternative Methods” — is seen as a premier U.S. voluntary consensus standard for machine safety. It outlines the minimum safety requirements to prevent the unexpected release of hazardous energy during equipment maintenance, servicing or repair.

- 1970s (The Catalyst): Following the rise of specialized maintenance work, a drastic spike in equipment-related injuries and fatalities prompted the need for strict, standardized machine isolation procedures.
- 1973: The Accredited Standards Committee Z244 was officially organized in New York, with the National Safety Council (NSC) serving as the initial secretariat. NSC also published a document titled “B199-1970,” which was also listed as Z244.1-1970.
- 1982 (First Edition): After years of research and balloting, ANSI officially approved and published the first national consensus standard for LOTO (Z244.1-1982).
- 1989 (OSHA Adopts LOTO): OSHA promulgated its federal standard for the Control of Hazardous Energy (29 CFR 1910.147). OSHA used the 1982 ANSI/ASSP Z244.1 standard as a primary principal reference source.
- 1993: The standard was reaffirmed as an

American National Standard. The standard retained the same technical language from the original approval in 1982.

- 2003 (Evolution and Harmonization): The American Society of Safety Engineers (ASSE) became the secretariat of the Z244 Committee. The standard was updated to incorporate modern risk assessment principles, providing a more comprehensive framework than the 1982 edition.
- 2008: The standard was again reaffirmed as an American National Standard. The standard retained the same technical language from the original approval in 2003.
- 2016 (Modernization): Recognizing that federal OSHA regulations had not been updated to reflect technological advancements, the 2016 standard introduced guidelines on “alternative methods” of control (such as advanced control systems and robotics) where traditional lockout is physically impossible or impractical.
- 2024 (Latest Revision): ASSP published further revisions, elevating alternative methods to be a co-equal choice with LOTO to control hazardous energy.
- 2026: ASSP SBUGs formed with one focused on addressing the control of hazardous energy and LOTO.

Significance and OSHA Relationship

While OSHA LOTO standards are federal law, ANSI/ASSP Z244.1 is a voluntary consensus standard. Because technology and industrial processes evolve rapidly, the Z244 Committee, with ASSP serving as the secretariat, revises or reaffirms the standard every five years to keep pace with modern engineering.

Employers rely on the ANSI standard to go above and beyond the baseline federal requirements to ensure comprehensive worker safety. It is widely used by machine designers, safety professionals, and corporations to establish cutting-edge hazardous energy control programs.

Comparison Between OSHA 1910.147 and ANSI/ASSP Z244.1

Both OSHA 1910.147 and Z244.1 provide guidance on LOTO to protect personnel from harm resulting from the unexpected energization or start-up of machines or equipment, release of stored energy, breakdown of processes or the actions of persons.

Below is a comprehensive, actionable comparison of key gaps and differences between ANSI/ASSP Z244.1 (consensus standard for control of hazardous energy) and OSHA regulation 29 CFR 1910.147 (the OSHA LOTO standard). Use this for gap analysis, compliance planning or to inform site procedures. This comparison is between OSHA and the most current version of the standard. This does not address earlier versions of the standard.

Key Differences and Gaps

1. Scope, purpose and applicability

- OSHA 1910.147: Lists specific exclusions (e.g., cord-and-plug-connected equipment when unplugged and under exclusive control, normal production operations, hot tap operations under special procedures). It establishes minimum performance requirements to safely control electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other hazardous energy. OSHA does not recognize

alternative methods as equivalent compliance.

- Z244.1: A voluntary consensus standard offering more detailed/best-practice guidance and options not required by OSHA, instead focusing on risk-based compliance without a "minimum" framing. Conformance with Z244.1 can help meet or exceed OSHA requirements, but Z244.1 is not a substitute for regulatory compliance. Z244.1 has a broader scope and more explicit discussion of applicability for a wider range of equipment, processes and industry practices; it provides guidance on where LOTO may be appropriate even if OSHA excludes the situation. Alongside lockout/tagout, the standard addresses alternative methods to control hazardous energy.

2. Terminology and definitions

- OSHA: Uses defined terms (energy control program, authorized employee, affected employee, energy-isolating device, etc.) but fewer operational definitions.
- Z244.1: More comprehensive terminology and nuanced definitions (e.g., additional clarifications on energy types, isolation methods, group LOTO terminology), which can affect the interpretation of procedures.

3. Program structure and written procedures

- OSHA: Requires an energy control program and written procedures for hazardous energy control where machines have specific energy-isolating devices. Procedures may be general for similar machines.
- Z244.1: Encourages/defines procedure depth, risk-based procedure selection, and more prescriptive content for complex equipment, requiring more detailed step sequences, documentation, and justification where procedures are excluded or minimized.

4. Hazard/risk assessment and documented justification

- OSHA: Requires procedures but does not explicitly mandate a formal risk assessment process for every machine.

- Z244.1: Strong emphasis on risk assessment and use of hierarchy of controls; expects documented hazard analyses to justify the level of control selected (lockout vs. tagout, alternative measures).

5. Lockout vs. tagout and alternative methods

- OSHA: Requires lockout and allows for only tagout when lockout is not feasible.
- Z244.1: Provides more detailed criteria for when tagout-only or alternative measures (e.g., procedures plus additional engineered or administrative controls) can be used, and guidance for implementing and documenting alternatives.

6. Group lockout and complex operations

- OSHA: Permits group LOTO and requires procedures for transfer of responsibility (e.g., group lock boxes) but is less prescriptive on implementation details.
- Z244.1: Gives more explicit methods for group LOTO, transfer-of-control, multi-craft operations, and detailed practices for locks, hasp use, lock exchange, and communication protocols.

7. Verification of isolation and test/run procedures

- OSHA: Requires verification that isolation has been achieved before work begins; requires precautions when testing or positioning machinery (re-energization procedures).
- Z244.1: More detailed steps and acceptance criteria for verification, and prescriptive methods for safe testing, temporary re-energization, and restart; suggests engineering controls to reduce the need for live testing.

8. Training and authorization

- OSHA: Requires training for authorized and affected employees and periodic retraining, as necessary.
- Z244.1: Recommends more detailed training content, competency verification, refresher

intervals, and training records; emphasizes site-specific and task-specific competency.

9. Periodic inspection and auditing

- OSHA: Requires periodic inspection of the energy control procedure at least annually.
- Z244.1: Recommends more frequent and risk-based auditing, proactive performance metrics, and root-cause analysis methods for failures; provides more guidance on audit scope and methods.

10. Contractor and multi-employer worksites

- OSHA: Requires coordination and informs multi-employer responsibilities (host and contractor responsibilities).
- Z244.1: Offers expanded procedures for contractor interface, communication protocols, and detailed assignment of responsibilities and documentation exchange.

11. Equipment design, engineering controls and machine guarding

- OSHA: Addresses these indirectly; focus is on program/procedural controls during servicing.
- Z244.1: Encourages engineering solutions (energy isolation devices, remote isolation, lockable disconnects) and design considerations to minimize the need for LOTO; provides guidance for integrating LOTO considerations into machine design and procurement.

12. Stored energy types and complex energy sources

- OSHA: Covers stored energy generally, but is less detailed on some sources (hydraulic, pneumatic, thermal, chemical, capacitive, gravity).
- Z244.1: Provides expanded guidance and procedural approaches for varied and complex energy sources, including verification and residual energy control techniques.

13. Tags, labeling and information management

- OSHA: Requires tags to indicate the identity of the employee applying the tag and prohibits removal by others (with limited exceptions).
- Z244.1: Recommends standardized tag design, information fields, use of electronic tag systems, and integration with lock boxes and permit systems for better traceability.

14. Restoration, shifts and turnover procedures

- OSHA: Requires specific steps for release from LOTO and when the employee who applied the device is not available.
- Z244.1: Provides more prescriptive transfer, shift-change and abnormal-restoration procedures (including checklists, authorization delegation rules and supervisory verification).

15. Documentation and recordkeeping

- OSHA: Requires training documentation and periodic inspection records; not exhaustive.
- Z244.1: Encourages more comprehensive documentation (risk assessments, procedure justification, audits, corrective actions, equipment inventory, lock/tag logs).

16. Enforcement and legal status

- OSHA 1910.147: Legally enforceable; noncompliance can lead to citations/penalties.
- Z244.1: Voluntary; can be used as a recognized industry practice to demonstrate due diligence and may be referenced in enforcement/inspections or litigation as best practice.

Implementing Z244.1 elements reduces residual risk, improves program robustness, and helps in complex/multi-contractor and high-risk environments

Practical Implications for Employers

If your organization only meets the literal requirements of OSHA 1910.147, your organization may be compliant with OSHA but could still have gaps relative to industry best practices in Z244.1 (risk assessment, documentation, verification, design controls).

Implementing Z244.1 elements reduces residual risk, improves program robustness, and helps in complex/multi-contractor and high-risk environments.

Recommended Actions for OSH Professional

1. Map the current OSHA 1910.147 program to Z244.1: identify where procedures are less detailed, where formal risk assessments are missing and where engineering controls could reduce LOTO needs.

2. Add documented risk assessments for critical/complex machines and adopt Z244.1 guidance for those machines (verification steps, testing procedures).

3. Strengthen training and competency verification to Z244.1 recommendations.

4. Standardize group LOTO, shift-transfer and contractor coordination procedures per Z244.1.

5. Enhance auditing frequency and adopt corrective-action tracking from Z244.1.

6. Consider design/engineering changes recommended by Z244.1 when acquiring/modifying equipment.

See the next pages for a side-by-side table of the specific OSHA clauses vs. Z244.1 clauses for a particular machine type or operation and a prioritized gap-remediation plan tailored to a facility (requires basic details about equipment/processes).

LOTO Mapping Checklist: 1910.147 vs. Z244.1

OSHA 1910.147 Requirement	ANSI/ASSP Z244.1-2016 Provision	Additional Control/Note (Z244.1 Focus)
Scope/Application (1910.147(a))	Section 1, 3	Expands to include "tasks" beyond servicing/maintenance; applies to all energy types.
Energy Control Program (1910.147(c)(1))	Section 4.1, 4.2	Requires a comprehensive Management System, not just a procedure.
Procedures (1910.147(c)(4))	Section 5	Requires detailed, task-specific procedures based on risk assessment.
Individualized Lockout (1910.147(c)(5))	Section 6	Requires "singularly identified" hardware.
Training (1910.147(c)(7))	Section 4.3	Greater emphasis on proficiency-based training rather than just "instruction."
Notification (1910.147(c)(8))	Section 5.3	Mandatory notification of "affected employees."
Shut Down (1910.147(d)(2))	Section 5.2.2	Emphasizes "normal" stop sequences.
Isolation (1910.147(d)(3))	Section 5.2.3	Explicit identification of "energy isolating devices."
Lockout/Tagout (1910.147(d)(4))	Section 5.2.4	Focus on "substantial" devices.
Stored Energy (1910.147(d)(5))	Section 5.2.5	Requires relieving/restraining all stored energy.
Verification (1910.147(d)(6))	Section 5.2.6	Requires "zero energy state" verification.
Annual Inspection (1910.147(c)(6))	Section 4.4	Requires more comprehensive auditing.



Implementation Checklist

- 1. Adopt Risk Assessment:** Implement a formal risk assessment process to identify all hazardous energy sources and risks during maintenance.
- 2. Upgrade Procedures:** Review current written LOTO procedures to ensure they are machine-specific and include all potential energy sources, including secondary and stored energy.
- 3. Evaluate Alternative Methods:** If using alternative measures (e.g., interlocks), document the risk assessment, validating that the safety level is equivalent to a physical lock.
- 4. Enhance Training:** Move beyond basic recognition training to competency-based training, ensuring authorized employees understand the "why" behind the procedure.
- 5. Verify 'Zero Energy':** Ensure every LOTO procedure includes a documented verification step to prove zero energy.
- 6. Update Hardware:** Ensure all LOTO devices are standardized, durable and unique to the authorized employee.

While OSHA 1910.147 provides the regulatory baseline for the control of hazardous energy, the ANSI/ASSP Z244.1 consensus standard offers a modern, risk-based framework that includes newer technologies and "Alternative Methods."

Comparison Checklist: OSHA 1910.147 vs. ANSI/ASSP Z244.1

OSHA 1910.147 Requirement	Corresponding ANSI/ASSP Z244.1 Provision	Additional Controls Needed for Z244.1
Energy Control Program (c)(1)	Management of Control (Section 4)	Risk Assessment: Z244.1 requires a documented risk assessment for tasks and hazards.
Energy Control Procedures (c)(4)	Procedures (Section 6)	Specific Task Mapping: Z244.1 focuses on the specific tasks performed rather than just "service and maintenance."
Protective Materials/Hardware (c)(5)	Hardware (Section 7)	Standardization Plus: Higher emphasis on using modern safety-rated technology in the hardware mix.
Periodic Inspection (c)(6)	Monitoring (Section 4.3)	Effectiveness Reviews: Z244.1 requires more frequent or detailed auditing of the effectiveness of the program, not just compliance.
Training & Communication (c)(7)	Training (Section 4.4)	Alternative Method Training: Specific training is required for employees using alternative methods.
Group Lockout/Tagout (f)(3)	Complex/Group Control (Section 6.4)	Key Control: Utilization of lock boxes and formal group coordination is emphasized as a best practice.
Alternative Measures (c)(1) Exception	Alternative Methods (Section 8)	Engineering Controls: Use of safety-rated control systems (e.g., interlocks) must be validated for reliability.

Critical Areas for Additional Controls

To bridge the gap between OSHA compliance and the safer, more modern ANSI/ASSP Z244.1 standard, your organization must implement these additional controls:

- **Documented Risk Assessments:** Before choosing an energy control method, your organization must conduct a formal assessment to identify all hazards (mechanical, electrical, thermal, etc.) and evaluate the risk.
- **Hierarchy of Controls:** When traditional lockout is not feasible — such as for routine, repetitive and integral tasks — your organization must apply the hierarchy of controls (elimination, substitution, engineering controls) rather than relying solely on administrative rules.

- **Alternative Method Validation:** If using "Alternative Methods" like interlocked gates or control circuit devices, these systems must meet specific safety performance levels (e.g., ISO 13849) to be considered "effective protection" under ANSI.

- **Flowable Material Management:** ANSI explicitly highlights that standard LOTO may not eliminate hazards from flowable materials like steam or gas that cause engulfment or hazardous atmospheres, requiring specialized isolation like blinding or double-block-and-bleed.

ANSI Z244.1-2016 is a widely recognized, risk-based standard that is generally more robust than the 1989 OSHA standard.



Areas where Z244.1 Requires Additional Controls

ANSI/ASSP Z244.1-2016 is a best-practice, risk-based standard that is generally more stringent than the 1989 OSHA standard.

- Risk Assessment (Z244.1 Section 4.2 & 5.1): Z244.1 requires a documented risk assessment to determine the appropriate method of control (lockout vs. alternative methods). OSHA 1910.147 assumes lockout unless infeasible.
- Alternative Methods (Z244.1 Section 8): Z244.1 permits alternative measures (e.g., control circuit devices, light curtains) only if a risk assessment validates they are providing equivalent protection to a lock.
- Design-Stage Energy Control (Z244.1 Section 7): Encourages incorporating energy isolation into the design of machines, not just as an afterthought for maintenance.
- Complexity of Energy Sources (Z244.1 Section 5.3): Requires more detailed procedures for complex systems, such as multiple energy sources or robotics, whereas OSHA provides a more generic framework.
- Tagout Restrictions (Z244.1 Section 6.2): While OSHA allowed tagout, Z244.1 heavily emphasizes that if tagout is used, it must provide a level of safety equivalent to a lock, making it harder to justify using tags alone.
- Verification of Isolation (Z244.1 Section 5.2.6): Emphasizes a definitive “Zero Energy State” check, using specific steps to test isolation effectiveness.
- Documentation Verification (Z244.1 Section 4.4): Requires annual audit of procedures and training documentation to ensure they are current, like the LOTO checklist.

ANSI/ASSP A10.44 Standard History and Background



Construction & Demolition Operations (A10)

This section is a comprehensive, actionable comparison of key gaps and differences between ANSI/ASSP A10.44 (consensus standard for control of hazardous energy) and OSHA regulation 29 CFR 1910.147 (the OSHA lockout/tagout standard). Use this for gap analysis, compliance planning, or to inform site procedures.

- 2014: The original version of the standard was published.
- 2020: The standard was reaffirmed without a technical change.

ANSI/ASSP A10.44-2020 Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations

This standard establishes the minimum requirements for the control of energy sources to prevent release of harmful energy that could cause death, injury or illness to personnel performing construction and demolition work.

This standard does not cover the following: Installations under the exclusive control of electric utilities for the purpose of power generation, transmission and distribution, including related equipment for communication or metering; exposure to electrical hazards from work on, near or with

conductors or equipment in electric utilization installations.

The purpose of this standard is to establish procedures for the protection of property and personnel from injury due to the: unexpected energization; start-up; inadequate insulation; inadequate isolation; or release of active or stored energy of machines, equipment, vehicles, tools, etc. in, on or around machines, tools or equipment during repair, maintenance, servicing, installation, testing and associated construction and demolition activities.

The purpose is to ensure that before any worker services, maintains, works on or near equipment where the potential exists for exposure to un-isolated energy or unexpected energization, start-up of equipment or the release of stored energy, that the machine, equipment, vehicles or tools, etc. is isolated from the energy source and rendered inoperative.

Scope and Intent:

29 CFR 1910.147 (LOTO) is an OSHA general industry regulation providing mandatory requirements for control of hazardous energy during servicing/maintenance of machines and equipment. Key elements: written energy-control program, authorized/affected employee roles, energy-isolating devices, procedures, training, periodic inspection, group LOTO, shift changes, verification of isolation, and exceptions (e.g., minor servicing, cord-and-plug-connected equipment where unplugging provides control).

ANSI/ASSP A10.44 is an industry consensus standard tailored to construction

environments. It adapts LOTO principles to construction practices where temporary, demountable, mobile, multi-employer sites and rapidly changing conditions are common. It focuses on practical applications for temporary electrical/mechanical systems and equipment used in construction, including coordination among employers and unique controls for temporary systems.

Key Differences and Clarifications (Practical, Compliance-relevant)

1. Applicability and scope

- 1910.147: Applies to servicing/maintenance of machines/equipment in general industry; not written primarily for construction activities. OSHA applies 1910.147 requirements where appropriate, but construction-specific standards (29 CFR 1926) may cover some activities.
- A10.44: Explicitly aimed at construction operations and temporary/demountable systems. It clarifies how LOTO principles apply when equipment is temporary, moved frequently or when energy sources are temporary/distributed across a site.

2. Multi-employer and coordination emphasis

- 1910.147: Requires employers to inform affected employees and coordinate when multiple employers operate, but it has limited construction-specific coordination language.
- A10.44: Stronger, more detailed guidance for multi-employer worksites, transfer of control when systems are reconfigured, and coordination among general contractors, subcontractors, and owners — including responsibilities for identification, labeling and verification of temporary energy sources.

3. Temporary/demountable systems and identification of energy sources

- 1910.147: Assumes fixed equipment and clearly identifiable energy-isolating devices.
- A10.44: Provides procedures and requirements tailored to temporary panels, generators, modular units, and quickly reconfigured systems — addresses identification, marking, tagging, and secure isolation of temporary feeders and distribution panels.

4. Use of alternative controls and temporary measures

- 1910.147: Strict about energy-isolating devices; exceptions are narrow (e.g., plug-and-cord, minor servicing). Group and complex isolations require documented procedures.
- A10.44: Offers practical guidance for acceptable temporary controls (e.g., de-energizing remote panels, lockable blanking plates, temporary disconnects) and how to document/implement them safely in construction contexts — while maintaining the principles of energy control.

5. Tagout vs lockout and physical protection

- 1910.147: Prefers positive lockout; tagout is allowed only under limited procedures and additional safety measures when locks aren't feasible.
- A10.44: Addresses frequent situations in construction where locks may not be feasible on temporary systems and offers more prescriptive methods for using tags plus supplemental measures (e.g., exclusive access, physical barricades, continuous watch), tailored for transient equipment.

6. Authorized/affected employee definitions and training

- 1910.147: Defines authorized and affected employees; requires training and retraining, and periodic inspections at least annually.
- A10.44: Adapts role definitions for construction crews where employees may perform multiple roles, emphasizes documented site-specific training when systems are temporary/moved, and stresses frequent reorientation as systems change.

7. Group lockout procedures and multiple-person protection

- 1910.147: Requires group lockout procedures and specific devices for multiple workers (lockout hasps, group lockboxes, etc.).
- A10.44: Expands on group procedures in mobile/temporary settings — practical methods for transferring responsibility and ensuring each worker's protection where equipment moves, or crews change frequently.

8. Verification of isolation and testing

- 1910.147: Requires verification that isolation is effective before work begins (e.g., try/test).
- A10.44: Emphasizes verification in temporary electric distribution (e.g., verifying no backfeed from generators or parallel sources) and includes guidance on portable test equipment, bleed-down for hydraulic/pneumatic lines, and lockable blanking plates for piping.

9. Documented procedures and administrative controls

- 1910.147: Requires written program and procedures for specific equipment where energy sources cannot be isolated by a single device or are complex.
- A10.44: Encourages more extensive site-level documentation for temporary systems, single-line diagrams of temporary distribution and documented handover processes between shifts/contractors.

10. Enforcement and prescriptive references to construction standards

- 1910.147: OSHA enforces 1910.147 in applicable situations; for many construction electrical hazards, OSHA cites 1926 subparts (e.g., 1926.405, 1926.417).
- A10.44: Not enforceable by itself (consensus standard) but provides recommended practices that may be used to demonstrate recognized industry practice; OSHA or courts may reference it when assessing employer diligence.

Practical Gaps and Compliance Risks for Construction Employers

- Ambiguity about which standard applies: Some employers may assume 1910.147 is not applicable for construction; however, OSHA expects control-of-hazardous-energy principles to be applied where servicing/maintenance occurs — which could result in inconsistent implementation. This ambiguity is a gap that A10.44 addresses procedurally but cannot replace OSHA requirements.
- Temporary energy systems not clearly identified or documented: Leads to uncontrolled energization (e.g., parallel feeds, generator backfeed). A10.44 addresses this, but

many sites lack the required site diagrams or labeling.

- Lockability of temporary devices: Many temporary panels and isolating devices on construction sites are not lockable, and employers sometimes rely on tags alone without sufficient supplemental measures, risking noncompliance with 1910.147 if tags are used without required additional safeguards.
- Contractor coordination/transfer of control failures: General contractors may not clearly assign responsibility for isolation when subcontractors connect/disconnect temporary systems — A10.44 offers recommended practices but lacks regulatory enforcement unless incorporated into contract/plan.
- Training frequency and documentation: High worker turnover and changing site conditions mean annual retraining is insufficient; A10.44 recommends more frequent and task/site-specific training, but employers often do not implement this.
- Group LOTO logistics: Ensuring each worker has personal protection (locks, hasps, lockboxes) is more difficult on dispersed construction crews and mobile equipment; procedures are often inadequate.
- Verification of zero energy: Testing for de-energized conditions may be overlooked or performed with inadequate tools/technique; A10.44 emphasizes methods tailored to temporary systems (e.g., portable testers), but employers may lack protocols or equipment.
- Electrical construction exceptions and interplay with 1926: Some construction electrical work is governed by 29 CFR 1926 subparts (e.g., 1926.417 for electrical), creating potential overlap or uncertainty about whether to follow 1910.147 or 1926 provisions; employers may mistakenly omit LOTO when 1926 contains different phrasing for temporary/installation work.

Recommendations to Close Gaps and Align Practices

1. Establish a site-specific energy control plan that incorporates 1910.147 mandatory elements and A10.44 construction-specific guidance — include single-line diagrams for temporary electrical distribution and lists of temporary energy sources.
2. Clearly assign and document multi-employer responsibilities in contracts and site orientation: define who installs, maintains, isolates, and verifies temporary systems; require pre-task coordination meetings.
3. Require lockable isolation devices for temporary installations wherever feasible; when locks are infeasible, adopt A10.44-prescribed supplemental measures (physical barriers, continuous watch, exclusive control, documented procedural safeguards) and record justification.
4. Implement documented group LOTO procedures (lockboxes, multiple personal locks, designated responsible person) adapted for mobile crews and equipment transfers. Include a shift-change handover checklist and sign-off.
5. Increase frequency and specificity of training: Site-specific LOTO training at hire and when systems/configurations change; toolbox talks when temporary systems are modified.
6. Provide appropriate testing equipment and written verification procedures for electrical, hydraulic, pneumatic and other energy types common on the site; require positive verification (test before touch) and documented checks.
7. Use standardized labeling, tagging, and color-coding for temporary feeders, panels, and isolating devices; maintain updated drawings accessible to all crews.
8. Contractually require subcontractors to follow the site energy-control plan and to furnish evidence of compliance (procedures, training records, equipment) during

pre-mobilization.

9. Maintain documentation for alternate/tagout strategies and risk assessments showing why a lock cannot be used and what supplemental measures are deployed.
10. Where overlapping OSHA standards might apply (e.g., 1926 electrical rules), document the rationale for chosen procedures and ensure they meet the most protective applicable requirement. If in doubt, apply both 1910.147 principles and relevant 1926 provisions.

Employers should integrate A10.44 practices to reduce site-specific risks and to demonstrate recognized industry practice

Concluding Practical Notes

- 29 CFR 1910.147 remains the authoritative regulatory baseline for energy control; A10.44 should be used as a construction-focused supplement to interpret and implement LOTO principles on temporary and demountable systems. Employers should integrate A10.44 practices into their written programs to reduce site-specific risks and to demonstrate recognized industry practice, while ensuring mandatory OSHA requirements are fully met.
- ANSI/ASSP A10.44-2020 introduces enhanced requirements for preplanning, training, and dealing with complex, multi-employer sites.
- The following checklist maps the general industry requirements of OSHA 29 CFR 1910.147 (lockout/tagout) to the construction-specific provisions in ANSI/ASSP A10.44-2020. A10.44 is generally more stringent and specifically tailored to the transient nature of construction sites.

LOTO Mapping Checklist: 1910.147 vs. ANSI A10.44-2020

1910.147 Requirement	ANSI A10.44-2020 Provision	Construction-Specific Needs/Additional Controls
(c)(1) Program	Section 4 - Program & Management	Requires a formal, written program specifically tailored to construction, not just a general policy.
(c)(4) Procedures	Section 5 - Procedures	Must address transient, non-routine equipment and multi-employer coordination (contractor management).
(c)(5) Hardware	Section 6 - Materials	Must survive outdoor, high-dust, or corrosive construction environments.
(c)(7) Training	Section 7 - Training	Focus on recognizing transient energy sources (e.g., temporary power, portable generators).
(c)(6) Inspection	Section 8 - Audit	Requires annual inspection by a qualified person familiar with the specific project.
(d) Application	Section 9 - Execution	Demands stricter "de-energization verification" in the field (e.g., testing at the point of work).
(e) Removal	Section 10 - Restoration	Rigorous steps to ensure all workers are clear in a dynamic environment.
(f) Shift Changes	Section 9.5 - Transfers	Requires a written procedure for transferring control between shifts or contractors.

Additional Construction Controls Needed (ANSI A10.44)

Construction sites face higher risks due to changing conditions, temporary power and multiple contractors. ANSI A10.44 demands controls beyond 1910.147:

- **Pre-planning and Survey:** A qualified person must survey the site before starting work to identify all energy sources, especially overhead lines and underground utilities.
- **Contractor Coordination:** A "controlling contractor" must be designated to coordinate LOTO between different employers to ensure one contractor's lock does not conflict with another.
- **Temporary Power and Equipment:** Strict protocols for isolating portable generators, spider boxes, and temporary lighting, which are not covered in 1910.147's facility-based focus.
- **Vehicle and Mobile Equipment:** Specific procedures for locking out heavy machinery, which include isolating hydraulic, pneumatic and gravitational energy.

- **Tagout Limitations:** While 1910.147 permits tagout when lockout is not possible, A10.44 strongly favors lockout. If tagout is used, additional measures (e.g., removing a valve handle) are mandated.

- **Stored Energy Identification:** Specific focus on de-energizing stored energy, such as elevated crane booms, hydraulic jacks or charged capacitors.



Below are some of the 5A1 Citations (General Duty Clause) using the ANSI/ASSE Z244.1-2003 standard, which has now been reaffirmed. These examples are related to Federal OSHA States, as we have not seen the data from the OSHA State-Plan-States.

Inspection	Citation	Issuance	Report ID	Category	SIC	Establishment Name
311904452	01001	09/30/2008	0830500	Lockout	0213	Seaboard Foods, Lp
311133383	01001	07/22/2008	0214700	Lockout	7539	Bfs Retail And Commercial Operations, Llc
307502781	01001	02/27/2008	1032100	Electric	2092	American Seafoods Company
311177729	01002	02/07/2008	0134000	Lockout	1623	Defelice Corporation
311426662	01001A	12/03/2007	0729300	Confined	0724	D. G. & G. Inc.
311426662	01001B	12/03/2007	0729300	Unapequip	0724	D. G. & G. Inc.
311426662	01002	12/03/2007	0729300	Unapequip	0724	D. G. & G. Inc.
311426662	01003	12/03/2007	0729300	Struck By	0724	D. G. & G. Inc.
311426571	01001	10/15/2007	0729300	Unapequip	0724	Still Gin & Grain Inc.
311426571	01002	10/15/2007	0729300	Unapequip	0724	Still Gin & Grain Inc.
310463526	01001	05/16/2007	0830500	Struck By	1389	Schneider Energy Services, Inc.
310464565	01001	03/21/2007	0830500	Burns	1311	Petroleum Development Corp
310464573	01001	03/21/2007	0830500	Burns	1389	Carmin Welding & Pipeline
112570072	01001	02/01/2007	0111100	Lockout	1742	Zimba Company, Inc.
308661693	01001	07/13/2005	0215000	Lockout	1796	New York Elevator Inc.
308703321	01001	04/18/2005	0453730	Lockout	1711	United Mechanical Corporation
306480260	01001	06/22/2004	0626700	Lockout	3444	Tennille, Inc.





Resource Links

- ANSI/ASSP Z244.1-2024 The Control of Hazardous Energy – Lockout, Tagout, and Alternative Methods
- ANSI/ASSP A10.44-2020 Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations
- Episode 33: Lockout/Tagout in Construction and Demolition
- 3 Steps for Controlling Hazardous Energy in Construction and Demolition
- What Is the Lockout, Tagout and Alternative Methods Standard
- Episode 10: ANSI/ASSP Z244.1 Standard
- Z244 Committee Seeks Clarity From OSHA on Control of Hazardous Energy
- Episode 158: ANSI/ASSP Z244 and Controlling Hazardous Energy: What You Need to Know

Books and Publications

- Lockout/Tagout
- Machinery Safety: Finding the Right Safeguard Solutions
- Safety Trekr AI™ + Safety Professionals Handbook, Third Edition
- Safety Professionals Handbook, Third Edition
- ANSI B11 Machine Guarding Standards
- Views on the Current State of Controlling Hazardous Energy
- The Battle for the Control of Hazardous Energy - The Tortuous Conflicts and Impacts of ANSI/ASSP Z244.1 and OSHA's 29 CFR 1910.147

OSHA Links and Information

- 1910 Subpart S App A – Referenced Documents
- 1/31/1994 - Electric Power Generation,

Transmission, and Distribution; Electrical Protective Equipment

- 8/29/1994 - CPL 02-00-035 [CPL 2.35 CH-25] - Changes to the Regulatory and General Industry Standard Alleged Violation Elements
- 11/10/2004 - Recognition of ANSI/ASSE Z244.1-2003 "Control of Hazardous Energy — Lockout/Tagout and Alternative Methods"
- 10/27/2006 - CPL 03-00-003 [CPL 03-00-003] - National Emphasis Program on Amputations
- 2/14/2007 - Electrical Standard; Final Rule
- 2/26/2007 - Evaluation of the ElectroGuard Disconnect System for Use as an Energy Isolating Device
- 9/14/2007 - CPL 02-01-043 - Slide-locks – Enforcement Policy, Inspection Procedures and Performance Guidance Criteria
- 10/9/2008 – Cranes and Derricks in Construction
- Recognition of ANSI/ASSE Z244.1-2003
- "Control of Hazardous Energy — Lockout/Tagout and Alternative Methods" Consensus Standard
- Safety and Health Topics: OSHA Assistance for the Electrical Contractors Industry — Standards
- Safety and Health Topics: OSHA Assistance for the Electrical Contractors
- Safety and Health Topics: Control of Hazardous Energy (Lockout/Tagout)
- Safety and Health Topics: OSHA Assistance for the Plastics Industry
- Remediation Technology for Safety and Health Hazards
- Official Memorandum of Understanding Between OSHA and ANSI