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## TITLE:

## SAF-364 LADDER SAFETY PROGRAM

## 1.0 Introduction

### 1.1 Purpose

The purpose of this program is to establish the minimum requirements for the proper selection, care and use of portable ladders (including step-ladders, straight/extension ladders, and articulating ladders). Additional sections in the program will also address fixed ladders and mobile ladder stands to ensure safety under normal conditions of use as defined by the Occupational Safety and Health Administration's (OSHA's) Standards.

### 1.2 Scope

This program is inclusive of Emory employees, including healthcare, faculty, staff, and student employees, who are required to use ladders in the performance of normal work activities.

### 1.3 Definitions

**Articulated Ladder.** A portable ladder with one or more pairs of locking hinges which allow the ladder to be set up in several configurations such as a single or extension ladder, with or without a stand-off, a stepladder, a trestle ladder, scaffold or work table.

**Cage.** A guard that may be referred to as a cage or basket guard which is an enclosure that is fastened to the side rails of the fixed ladder or to the structure to encircle the climbing space of the ladder for the safety of the person who must climb the ladder.

**Extension Ladder.** A non-self-supporting portable ladder adjustable in length. It consists of two or more sections traveling in guides or brackets so arranged as to permit length adjustment. Its size is designated by the sum of the lengths of the sections measured along the side rails.

**Fixed Ladder.** A ladder permanently attached to a structure, building, or equipment.

**Ladder.** An appliance usually consisting of two side rails joined at regular intervals by cross-pieces called steps, rungs, or cleats, on which a person may step in ascending or descending.

**Ladder Gate.** A climb preventive shield or cover installed on a fixed ladder to control access to tanks or other high structures.

**Ladder Safety System.** A device, other than a cage or well, designed to eliminate or reduce the possibility of falls from ladders. A ladder safety system usually consists of a carrier (the track of flexible cable or rigid rail), safety sleeve (moving component which travels on the carrier), lanyard, connectors, and body belt or harness. (Formerly called a ladder safety device).

**Pitch.** The included angle between the horizontal and the ladder, measured on the opposite side of the ladder from the climbing side.

**Platform Ladder.** A self-supporting portable ladder that is non-adjustable in length, with a platform provided at the highest intended standing level. The top platform is surrounded on three sides by a railing that is at least 20 inches higher than the platform

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surface. (Also known as a podium ladder).

**Podium Ladder.** See Platform Ladder.

**Rungs.** Ladder cross-pieces of circular or oval cross-section on which a person may step in ascending or descending.

**Single Ladder.** A non-self-supporting portable ladder, nonadjustable in length, consisting of but one section. Its size is designated by the overall length of the side rail.

**Stepladder.** A self-supporting portable ladder, nonadjustable in length, having flat steps and a hinged back. Its size is designated by the overall length of the ladder measured along the front edge of the side rails.

**Trestle Ladder.** A self-supporting portable ladder, nonadjustable in length, consisting of two sections hinged at the top to form equal angles with the base. The size is designated by the length of the side rails measured along the front edge.

**Trolley Ladder.** A semi-fixed ladder, nonadjustable in length, supported by attachments to an overhead track, the plane of the ladder being at right angles to the plane of motion.

## 1.4 Responsibilities

### ***Environmental Health and Safety Office (EHSO) and applicable Hospital and Clinic Safety Management***

As the administrative department for the Ladder Safety Program, EHSO and applicable hospital and clinic safety management are responsible for:

- Developing and providing ladder safety training to affected personnel;
- Providing technical support and consultation to departments of affected employees to interpret requirements and establish safe practices;
- Evaluating the written Ladder Safety Program annually and updating it as needed;
- Verifying inspections are conducted on a subset of portable and fixed ladders annually; and
- Maintaining training records.

### ***Directors, Supervisors, and Managers***

Directors, supervisors, and managers have primary responsibility for the management and enforcement of the Ladder Safety Program in their areas. They are responsible for:

- Providing the proper type, rated, and ANSI-compliant ladders for employees, students, and faculty;
- Periodically evaluating the effectiveness of the program as it applies to the work that their affected employees perform and providing EHSO with their conclusions, compliance challenges, and recommendations;
- Contacting EHSO for technical support when questions arise regarding compliance and safe procedures;
- Ensuring that proper safety equipment is supplied to their affected employees where needed;
- Ensuring that employees attend all required training;

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- Ensuring that designated employees perform documented portable ladder inspections; and
- Informing EHSO or other appropriate personnel when new employees are assigned who need Ladder Safety Training.

**Employees**

All employees are responsible for complying with the rules set forth by this program and must:

- Ensure that all ladders used meet OSHA regulations and are ANSI-compliant;
- Comply with the guidelines covered in this document;
- Conduct visual inspections of ladders before each use;
- Document ladder inspections according to Section 7.0 of this program;
- Notify their supervisor when they are not physically able to use a ladder or when questions arise regarding the safe use of a ladder, such as: defective equipment, needed accessories or any other difficulties complying with the requirements of the Ladder Safety Program.
- Complete Ladder Safety Training.

**Contractors**

- Contractors working on campus are required to comply with all applicable OSHA workplace safety regulations and make their safety programs available for review upon request by a representative of Emory. Additionally, contractors are responsible for complying with applicable components of this program, including Sections 2.0, 3.0, 5.0, 6.0 and 7.0 of this program.
- Contractor's ladders are subject to inspection;
- Damaged or defective ladders are not allowed at Emory and may be immediately disposed of following the requirements in Section 3.1 of this program.

**1.5 Training Requirements**

- EHSO is responsible for ensuring that Ladder Safety Training is provided to all Emory University employees who are required to use ladders to perform any work activities. This training will be given:
  - Upon initial assignment;
  - Following any accident involving a ladder; and
  - Every three (3) years thereafter.
- EHSO will maintain documentation of attendance which will include the employee's name, department, and date of training.
- The training will include the following:
  - The requirements of 29 CFR 1910.25-27 and applicable sections of 1910.29;
  - The requirements of the Ladder Safety Program, including ladder inspections and proper use and maintenance of ladders.
- The applicable Hospital and Clinic Safety Management Group is responsible for ensuring training is conducted in healthcare.

**1.6 Recordkeeping Requirements**

Documentation of classroom training is recorded in the Emory Learning Management System (ELMS).

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## 2.0 General Ladder Safety

- Ensure all ladders at Emory are constructed and used in accordance with OSHA regulations and ANSI standards; and all commercially manufactured ladders have a label indicating it meets the requirements of the ANSI standard.
- Visually inspect portable ladders before use and following any incident (i.e. dropped ladders, employee accidents involving a ladder, etc.)
- Keep rungs and steps free of grease and oil. Before climbing a ladder:
  - Clean muddy or slippery work shoes/boots; and
  - Replace or remove greasy or dirt-laden work gloves.
- Do not carry tools or equipment in your hands when climbing a ladder. Carry tools on a work belt or in a shoulder-bag/back-pack, and use a hand line to raise or lower equipment.
- Always face the ladder when ascending or descending, except as permitted by certain mobile ladder stands.
- Keep the center of your body within the side rails of the ladder and maintain three points of contact at all times while ascending or descending a ladder.
- Only one person at a time is allowed on a single-width ladder, including portable or fixed ladders, unless otherwise indicated by the manufacturer.
- Never use a portable ladder, fixed ladder, or mobile ladder stand in excess of its intended working load.

## 3.0 Portable Ladders

### 3.1 General Requirements

- Only use ladders for their intended purpose and not for platforms or as walk-boards.
- Select the correct type of ladder by considering the duty rating, ladder type and height required to safely complete the job task. The five ladder types and their duty ratings are in Table 1 – *Ladder Types and Duty Ratings*.

**Table 1 – Ladder Types and Duty Ratings**

LADDER TYPE	DUTY RATING	LOAD CAPACITY	TYPICAL USE
Type IAA	Extra Heavy Duty	375 pounds	Heavy duty, such as utilities, contractors, and industrial use
Type IA	Extra Heavy Duty	300 pounds	Heavy duty, such as utilities, contractors, and industrial use
Type I	Heavy Duty (Industrial)	250 pounds	Heavy duty, such as utilities, contractors, and industrial use
Type II	Medium Duty (Commercial)	225 pounds	Medium duty, such as painters, office and light industrial use
Type III	Light Duty (Household)	200 pounds	Light duty, such as light household use

Note: Load capacities exceeding 375 pounds will carry the highest duty rating of IAA.

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- Ensure portable ladders meet OSHA design requirements, including:
  - The inside width between the side rails of each portable step ladder is at least eleven and a half (11-1/2 ) inches;
  - The minimum width between side rails of straight ladders or any section of an extension ladder is twelve (12) inches.
  - Step and rung spacing of portable ladders is uniform and not more than twelve (12) inches apart;
  - Rungs and steps are corrugated, knurled, dimpled, coated with skid resistant material, or otherwise treated to minimize the possibility of slipping.
- Remove damaged ladders from service and tag as “Dangerous, Do Not Use”, or with other similar language, until the repairs are made. Note: Ladders that cannot be repaired must be withdrawn from service and destroyed in such a manner as to render it useless.
- Ensure ladders are equipped with non-slip bases or safety feet.
- Place self-supporting and non-self-supporting ladders on a stable, slip-resistant surface.
- Note: Do not place ladders on boxes, barrels, or other unstable bases or splice ladders together to obtain additional height.
- Block open, lock or otherwise guard doorways that open towards a ladder.
- Use barricades or cones and signage when ladders must be set-up in high traffic areas, such as hallways or stairwells.
- Never attempt to move, shift or extend a ladder while standing or climbing on it. Set-up ladders close to the work area and do not over-reach.
- To maintain balance, do not climb higher than the second step from the top cap on a stepladder or the third rung from the top on a straight ladder.
- Do not use the rear horizontal or bracing attached to the rear rails of stepladders or platform ladders for climbing or standing. These are designed solely for increasing stability.
- When accessing an upper landing surface, such as a roof, ensure the side rails of non-self-supporting ladders extend at least three (3) feet above the upper landing, eave or edge.
- Ensure that the top of a non-self-supporting ladder is placed with the two rails supported, unless it is equipped with a single support attachment. Such an attachment is designed to provide greater stability.
- When setting up a non-self-supporting ladder, follow the One-fourth Rule: Place the base of the ladder one foot away from the supporting wall, for every four feet in height the ladder is extended.
- When transporting ladders on vehicles equipped with ladder racks, ensure the ladders are properly supported. The support points should be constructed of material that will minimize the effects of vibration, chafing and road shock.

### **3.2 Stepladders**

- The spreader assembly is a required component of all stepladders and must be fully opened and locked before use. Never climb a folded stepladder.
- Stepladders cannot exceed twenty (20) feet in height.
- Do not use the top cap of a stepladder as a step.

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### 3.3 Platform Ladders

- Platform Ladders range in size from two (2) feet to eighteen (18) feet in length as measured from the bottom along the side rail to the top of the platform.
- The top platform is surrounded on three sides by a railing that is at least 20 inches higher than the platform surface. A folding Bucket (Pail) Shelf may also be provided.
- Ensure that the platform ladder is on level ground before use, such that all four of its side rails are supported.
- Never use a platform ladder as a single ladder or in the partially open position.

### 3.4 Single Ladders and Extension Ladders

- Single wooden ladders, metal ladders, and individual sections of metal ladders cannot exceed thirty (30) feet in length.
- Two-section metal extension ladders cannot exceed forty-eight (48) feet in length.
- Metal extension ladders with more than two-sections cannot exceed sixty (60) feet in length.
- Wooden two-section extension ladders cannot exceed sixty (60) feet in length.
- When a person is climbing an extension ladder at heights of twenty (20) feet or higher, ensure that a second person is present to steady the ladder's base or that the top of the ladder is effectively secured to a sound anchor point.
- On two-section extension ladders, ensure that the minimum overlap for the two sections is in accordance with the following:

**Table 2 Two-Section Extension Ladders Minimum Overlap**

SIZE OF LADDER (FT.)	OVERLAP (FT.)
Up to and including 36	3
Over 36, up to and including 48	4
Over 48, up to and including 60	5

### 3.5 Articulated Ladders

- Read the on-product instruction labels and illustrations for proper operation of the locking hinges and all the acceptable configurations for each articulated ladder design.
- Never attempt unlocking or repositioning any of the hinges while standing on the ladder.
- Place a covering over exposed hinges while performing messy work to prevent contaminants from causing damage to the mechanisms.
- When set up in the stepladder configuration, Articulated Ladders range in size from three (3) feet to fifteen (15) feet. **Note: The size of an articulated ladder is determined when it is set up in the stepladder configuration.**
- When set up as a Single or Extension Ladder, Articulated Ladders may have a length of no more than thirty (30) feet.

### 3.6 Special Ladders/Restrictions

The table below describes special ladders and the associated restrictions.

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***Table 3 Special Ladders and Restrictions***

TYPE OF LADDER	RESTRICTION
Trestle (extension or base sections of extension trestle ladders)	Equal to or less than 20 ft.
Painter's Stepladders	Equal to or less than 12 ft.
Mason's Ladders	Equal to or less than 40 ft.
Trolley	Equal to or less than 20 ft.
Platform Ladders	
Side-Rolling Ladders	

### 3.7 Mobile Ladder Stands

- Ensure all mobile ladder stands meet the following design requirements:
  - The design working load is calculated on the basis of one or more 200-pound persons together with 50 pounds of equipment each, where the load is applied uniformly to a 3 1/2 inches wide area front to back at the center of the width span with a safety factor of four (4).
  - Capable of supporting at least four (4) times their designed working load;
  - Steps are uniformly spaced with a rise of not less than nine (9) inches, nor more than ten (10) inches, and a depth of not less seven (7) inches with a minimum sixteen (16) inch width;
  - Steps have slip resistant treads;
  - The slope of the steps are between fifty-five (55) degrees and sixty (60) degrees, as measured from the horizontal;
  - Ladder stands with more than five (5) steps or having sixty (60) inches vertical height to the top step are provided with handrails;
  - Handrails are a minimum of twenty-nine (29) inches high, as measured vertically from the center of the step;
  - Ladder stand platforms with a platform over ten (10) feet have standard guardrails and toeboards on exposed sides and at the ends of the platform; **Note: The use of removable gates or non-rigid members, such as chains, is allowed.**
  - Wheels or casters are properly designed to support four (4) times the design working load, have positive wheel and/or swivel lock to prevent movement, and at least two (2) of the four (4) casters are of the swivel type.
- Use mobile ladder stands and platforms on level surfaces.
- When provided, use the handrails while ascending or descending the mobile ladder.
- Always face the mobile ladder while ascending or descending, except when the slope of the steps is 50 degrees or less above the horizontal.
- Never move a mobile ladder stand while standing on climbing on it.
- Do not store materials and/or equipment on the steps or platform.
- Maintain mobile ladder stands in good condition and ensure exposed surfaces do not develop sharp edges, burrs or other safety hazards, such as corrosion or deterioration.
- Never exceed the maximum work-level height of a mobile ladder stand, which is calculated as four (4) times the minimum or least base dimension. Where the least



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base dimension requirement is not met:

- Install suitable outrigger frames, or
- Make provisions to guy or brace the unit against tipping.
- Never use boxes, ladders, or other objects on a platform, or sit or stand on the guard rails to increase the working height.

## 4.0 Fixed Ladders

### 4.1 General Requirements

- Know the basic minimum design requirements for fixed ladders:
  - Ladders, at a minimum, must support a single concentrated load of two-hundred (200) pounds;
  - The distance between rungs, cleats and steps must not exceed twelve (12) inches and must be uniform throughout the length of the ladder;
  - The clear length of rungs must be sixteen (16) inches;
  - The rungs of an individual-rung ladder must be designed so that an employee's foot cannot slide off the end;
  - Rungs are at least one and one-eighth (1-1/8) inch diameter on wood ladders;
  - The side rails of through or side-step ladder extensions must extend three and a half (3 -1/2) feet above parapets and landings;
  - The preferred pitch of fixed ladders is considered to be in the range of 75° and 90° with the horizontal;
  - Substandard pitch is considered to be in the range of 60° and 75° with the horizontal and is only permitted where it is necessary to meet the conditions of installation;
  - Ladders having a pitch in excess of 90° with the horizontal are prohibited.
- Maintain ladders in safe condition and perform fixed ladder inspections regularly, with the interval between inspections determined by use and exposure.
- When a defect is not repairable, ensure the ladder is tagged as "Out of Service" and a ladder gate is installed, until the ladder is replaced.

### 4.2 Requirements for Cages and Wells

- Ensure cages or wells are provided on ladders of more than twenty (20) feet to a maximum unbroken length of thirty (30) feet, except where suitable sliding fall protection devices are installed:
  - Cages must extend a minimum of forty-two (42) inches above the top of landing, unless other acceptable protection is provided;
  - Cages must extend down the ladder to a point not less than seven (7) feet nor more than eight (8) feet above the base of the ladder, with bottom flared not less than four (4) inches, or portion of cage opposite ladder shall be carried to the base.
- There should be no projections inside the cage or well.
- Ladder safety devices may be used on tower, water tank, and chimney ladders over twenty (20) feet in unbroken length in lieu of cage protection.

### 4.3 Requirements for Landing Platforms

- When ladders are used over twenty (20) feet in height (except on chimneys), ensure that landing platforms are provided for each thirty (30) feet of height:

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- If no cage, well, or ladder safety device is provided, a landing platform must be provided for each twenty (20) feet of height;
- Each ladder section must be offset from adjacent sections;
- Where an offset is required, a landing platform must be provided;
- Landing platforms cannot be less than twenty-four (24) inches in width by thirty (30) inches in length.
- Where a person has to step a distance greater than twelve (12) inches from the centerline of the rung of a ladder to the nearest edge of structure or equipment, ensure that a landing platform is provided with a minimum step-across distance of two and a half (2 -1/2) inches.
- Ensure all landing platforms are equipped with standard railings and toe boards.

**4.4 Requirements for Ladder Safety Systems (Devices)**

- All ladder safety systems, such as those that incorporate lifelines, friction brakes, and sliding attachments, must meet the design requirements of the ladders which they serve.
- Do not allow the connection between the carrier or lifeline and the point of attachment to the body belt or harness to exceed nine (9) inches in length.
- Ensure all ladder safety systems and related support systems on fixed ladders conform to the following:
  - All safety devices must be able to withstand, without failure, a drop test consisting of a five-hundred (500) pound weight dropping eighteen (18) inches;
  - All safety devices must permit the worker to ascend or descend without continually having to hold, push or pull any part of the system, leaving both hands free for climbing;
  - All safety devices must be activated within two (2) feet after a fall occurs and limit the descending velocity of an employee to seven (7) feet per second or less.
- Follow all requirements for mounting ladder safety systems on fixed ladders:
  - Mountings for rigid carriers must be attached at each end of the carrier, with intermediate mountings spaced along the entire length of the carrier, to provide the necessary strength to stop workers' falls;
  - Mountings for flexible carriers must be attached at each end of the carrier;
  - Cable guides for flexible carriers must be installed with a spacing between twenty five (25) feet and forty (40) feet along the entire length of the carrier, to prevent wind damage to the system;
  - Design and installation of mountings and cable guides must not reduce the strength of the ladder.

**5.0 Safe Use of Ladders on or Around Electrical Equipment**

- Follow safe work practices to prevent electric shock or other injuries resulting from either direct or indirect electrical contact when work is performed near or on equipment or circuits which may be energized:
  - The specific safety-related work practices must be consistent with the nature and extent of the associated electrical hazards;
  - Further information may be found in OSHA 29 CFR 1910.333.
- Never use metallic or metal type ladders around electrical energy, components and sources.

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- Only use fiberglass or wood ladders when working around electrical energy sources.


**Fig 1: Ladder Inspection Tags**

## 6.0 Maintenance Requirements

- Only trained and qualified persons can make repairs to ladders.
- Ladder repairs must restore the ladder to a condition meeting the manufacturer's original design criteria before the ladder is returned to service.
- Follow ladder manufacturer instructions for lubrication of mechanical parts, such as metal bearings of locks, wheels, and pulleys.
  - For articulated ladders, lubricate the hinges upon receipt and then annually or more frequently, depending upon use.
- Ensure all welding is performed in accordance with the "Code for Welding in Building Construction" (AWSD1.0-1966).
- Ensure metal ladders and appurtenances are painted or otherwise treated to resist corrosion and rusting, when location demands.
- Clean aluminum, fiberglass, wood and metal ladders with soap and water:
  - Immediately dry ladders;
  - Seal the fiberglass components with a clear or pigmented lacquer or paste wax, approved or recommended by the manufacturer;
  - Protect wood ladders with a clear shellac, varnish or wood preservative, as needed. Never paint a wood ladder.
- Do not store ladders in direct sunlight, extreme temperatures or in damp environments:
  - Store non-self-supporting ladders horizontally and ensure wall supports or brackets are provided at 4 to 6 foot intervals to prevent sagging;
  - Store self-supporting ladders vertically in the closed position.

## 7.0 Inspections

- Ensure that ladder inspections are conducted, as specified in this document, and that a record of the inspection is maintained either on a ladder inspection tag or via an electronic record.
  - Ladder inspection tags may be affixed (using an adhesive or zip ties) to the side rail of the ladder, preferably the inside face. (See Fig 1 for an example)
  - If an electronic record is used, the ladders must be marked with a reference number that corresponds to the electronic record.
  - Pre-numbered tags may be used for this purpose or a reference number may be written on the side rail of the ladder.
  - Never permanently affix (e.g. rivets, screws, etc.) a ladder inspection tag or reference number to the ladder, unless it is approved by the manufacturer. Modifications to a ladder without the manufacturer's approval may compromise the integrity such that the ladder no longer meets specification.
- Use the Ladder Inventory and Inspection Record template to generate an annual ladder inventory record and to create an electronic record of required inspections.

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- Portable ladders, including mobile ladder stands, must be inspected annually.
- Fixed ladder inspections must be conducted according to the following schedule:
  - Metal ladders and metal rungs imbedded in concrete that are exposed to atmospheres where corrosion and rusting may occur are to be inspected annually;
  - Wood ladders that are exposed to conditions where decay may occur are to be inspected annually;
  - All other fixed ladders are to be inspected a minimum of every five (5) years.
- When conducting portable ladder inspections, ensure that:
  - All side rails are free of dents or bends and rungs are not excessively dented;
  - All step-to-side rail or rung-to-side rail connections are intact and tight;
  - All hardware connections are secure and in good condition;
  - Rivets do not show signs of shear;
  - The safety feet or other auxiliary equipment (such as ropes) are kept in good condition; and
  - The stepping surfaces are free of oil, grease or other slippery substances.
- When conducting fixed ladder inspections, ensure that:
  - Ladders are secured to the structure or object to which they are attached;
  - All splices and connections have smooth transitions with the original members and have no sharp or extensive projections;
  - Side rails (used as climbing aids), rungs, cleats and steps are free of splinters, sharp edges and burrs.
- For all wood ladders, ensure the side rails, rungs or cleats are free from shake, wane, compression failures, decay, or other irregularities.

## 8.0 Program Evaluation

The written Ladder Safety Program will be re-evaluated annually and revised, if necessary.

## 9.0 References

- [American National Standards Institute \(ANSI\)](#) A14 Series for Ladders.
- Occupational Health and Safety Administration [OSHA], 1910 Subpart D, Walking Working Surfaces – Portable and Fixed Ladders, [29 CFR 1910.25-27](#).
- Occupational Health and Safety Administration [OSHA], 1910 Subpart D, Walking Working Surfaces – Manually propelled mobile ladder stands, [29 CFR 1910.29](#).
- Occupational Health and Safety Administration [OSHA], Walking-Working Surfaces and Personal Protective Equipment (Fall Protection Systems); Proposed Rule, [75 FR 28861](#).
- Occupational Health and Safety Administration [OSHA], Stairways and Ladders: A Guide to OSHA Rules, [OSHA 3124-12R 2003](#).
- OSHA Electrical Standard: [Selection and Use of Work Practices 29 CFR 1910.333](#).



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## **10.0 List of Associated Documents**

- Ladder Inventory and Inspection Record
- Toolbox Talks Training Resource – *Ladder Safety*