

Midland Engineering Co., Inc. Safety Management System			Doc No:	SCAFFOLD
			Initial Issue Date	12/04/15
			Revision Date:	Initial Version
Chapter 33-Scaffold Safety			Revision No.	0
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## PURPOSE

To provide safety guidelines for erecting and dismantling elevated work platforms.

## SCOPE

This procedure applies to all Midland Engineering Co., Inc. divisions, on-site construction, and maintenance projects.

## DEFINITIONS

*Fixed Scaffolds* include the following; tubular welded frame, bracket scaffolds, tube and coupler (tube-lox) scaffolds, woodpole scaffolds and trestle scaffolds.

*Suspended Scaffolds* include the following: two-point suspended scaffolds, multilevel suspended scaffolds, floats, needle-beam scaffolds, boatswain's chair and electric hoist platforms.

*Qualified person* is one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

*Competent person* is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective action or measures to eliminate them.

## REFERENCES

- OSHA 29 CFR 1926.451 - Scaffolding
- ANSI A 10.8 - Safety Requirements for Scaffolding

## RESPONSIBILITY

Supervision is responsible for implementing and administering this procedure. In addition, supervision is in charge of the scaffolding erection and are responsible for the work being performed. Competent person must ensure scaffolds are safe prior to use.

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## SAFE WORK PRACTICE

- Any elevated work presents a potential fall hazard; therefore, it is essential that precautionary measures are thorough.
- All working platforms must be capable of sustaining a minimum-working load of 75 psf on 6-ft spans or have a safety factor of 4 to 1 for the intended load.
- Posts shall be plumb, and scaffold platforms shall be level.
- A stationary scaffold shall be secured to the building or a fixed structure vertically every 25 ft starting at the base of the scaffold and horizontally every 30 ft.
- A qualified person shall determine the structural integrity of structural steel, reinforcing steel, and concrete or building members prior to the attachment of scaffolds by bracing or tie off.
- Where persons are required to work or walk under scaffolding, a screen guard of No. 18 gage ½ in. wire mesh or equivalent shall be provided between the toe board and handrail.
- All employees shall tie off with a safety harness when there is a missing or incomplete handrail, when there are openings over 18 inches in the working platform, or when on suspended working platforms.
- Swinging stages, floats, and boatswain's chairs shall be tested before using (test by applying a dead load with unit close to floor or ground).
- Crews requiring scaffolds shall request them well in advance to avoid delays and to allow time to provide the best scaffold for the job.
- Scaffold erection crews shall inspect all components for defects as the erection proceeds. Any components found to be defective shall be set aside and tagged for repair or disposal.

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- Daily inspections shall be performed under the direction of competent supervision responsible for the work being performed. All defects shall be corrected at once or have defective tags attached.
- All lumber used in scaffolding should be fire-retardant treated except when otherwise specified in writing by the companies division or client. Fire retardant may be applied by pressure treatment or fire retardant paint. Non-combustible scaffolding such as aluminum pick boards or aluminum grating should be used whenever it is practical to do so.

## FIXED SCAFFOLDS REQUIREMENTS

Fixed scaffolds include tubular welded-frame scaffolds, bracket scaffolds, tube and coupler (Tube-lox) scaffolds, and trestle scaffolds.

### Tubular Welded-Frame Scaffolds Requirements

- Scaffolds of 10 ft or more in height shall include diagonal braces, handrails, mid-rails, toe boards, and 2 in. x 10 in. or 2 in. x 12 in. scaffold planks or manufactured scaffold decking which will provide a complete working deck without gaps or openings. Corner posts shall have the metal feet in place.
- On soft ground, wooden sills of at least 2 in. x 10 in. lumber or channel iron shall be provided. Scaffold planks shall be rough-cut undressed lumber.
- Scaffold planks shall be painted on each end for 12 in. to designate it as an inspected plank only to be used for scaffolding, and marked for overhang limits.
- When scaffold sections are erected, only scaffold pins are to be used for the corner post connections. (Do not use tie-wire or welding rods.)
- When casters are used for a rolling scaffold, they shall be locked except when the scaffold is being moved. No one shall be permitted on a scaffold while it is being moved.

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- Scaffold screw jacks shall be extended in accordance with the manufacturer's recommendations but in no case shall they be extended in excess of 12 in.
- Whenever screw jacks and casters wheels are not used, metal base plates must be used for adequate base support. All supports are to be pinned and secured.
- Scaffolds shall have solid footing and shall be erected so that vertical members are always plumb and the platform is as horizontal as practical.
- Scaffold planks must have cleats, be wired down, or otherwise secured against accidental displacement.
- Wedge shims shall not be used. Work from incomplete scaffolds, when approved, will require that the employee take added precautions to meet accident prevention and fall protection requirements.
- Safety harnesses must be worn if handrails are missing or the platform is incomplete or other fall hazards exist.
- Horizontal braces of 2 in. x 4 in. lumber or equivalent shall be secured across corner posts when it is necessary to remove the diagonal braces. Diagonal braces shall not be removed from more than one section in a series of sections unless there are four braced sections between.
- Ladders shall be used if access to the scaffold platform is blocked or the scaffold climbing devices are more than 16 in. apart.
- Every scaffold higher than 50 ft. must be inspected and approved by a licensed professional engineer. This inspection shall be documented and kept on file.
- Toe boards shall be secured in a firm manner by interlocking at the corner posts with notches, wiring, nailing, U-clamping to the bearing members, or by use of approved commercial toe board systems.
- Employees gaining access to scaffolds shall have both hands free at all times and shall use the hand-over-hand method of climbing on the rungs. Employees shall not use toe boards as handholds or footholds to gain access to the platform.

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### Bracket Scaffolds Requirements

- Where more than one layer of horizontal bars has been placed and conditions permit, the scaffold shall be secured to an inside horizontal bar.
- If conditions do not permit attaching the bracket scaffold to an inside horizontal bar, the scaffold shall be secured with a minimum of three 3/8-in. diameter U-bolts attached to each end and middle of the outer horizontal or vertical bar. Additionally, No. 9 wire shall be placed at a minimum of every fourth tie location.
- The horizontal reinforcing bar shall be secured to a vertical reinforcing bar that is either embedded in concrete or has been spliced by an approved method.
- Each scaffold shall have a 4 ft x 1/4 in. safety chain attached to the ends of the scaffold and secured to an inner rebar other than the bar that is supporting the scaffold.
- Guardrails and toe boards shall be installed on all open sides and ends of scaffolds.
- No more than three persons plus the necessary tools and equipment shall be permitted on a single scaffold section at any one time. The load is not to go beyond the scaffold's designed capacity. Bracket scaffolds shall be constructed to support 1,550 lb. and the capacity shall be posted on the scaffold.
- Employees working with safety harnesses shall have the lanyard secured above the point of operation, but under no circumstances shall it be attached to the scaffold.
- Scaffolds may be painted caution yellow to give the adjacent crane operators a better perspective when working close to them during the day or night.

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### Tube and Coupler (Tube-Lox) Scaffolds

- Posts shall be erected on suitable bases and maintained plumb.
- Diagonal cross bracing shall be provided horizontally every third section, vertically every fourth section, and whenever posts are farther apart than 7 ft, the braces shall be at 45 degree angles.
- Runners shall be erected along each side vs. the scaffold at the bottom and top of each section.
- Bearers and braces shall extend past the posts a minimum of 4 in., but not more than 12 in. Extensions of these shall not protrude into walking or climbing areas.

### Trestle Scaffolds

- Trestle scaffolds shall have at least a 6 in. ridgepole and should be limited to one level only.

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## SUSPENDED SCAFFOLDS REQUIREMENTS

Suspended scaffolds include two-point suspended scaffolds, multilevel suspended scaffolds, floats, needle-beam scaffolds, boatswain's chairs, and electric hoist platforms.

### Two-Point Suspended Scaffolds

When two-point suspended scaffolds are used, the following rules will apply:

- These scaffolds shall have standard toe boards, mid-rails and handrails.
- A lifeline for each employee shall be provided and secured independently from the scaffold support lines.
- Employees shall be tied off at all times when on the scaffold, using a triple sliding hitch or catch hardware. Employees must be provided with a safe method of moving to and from the scaffold.
- When moving the scaffold root supports, co-workers must remain behind the guardrail or be tied off with a safety boil to an independent support if there is no guardrail.
- Protection for areas below the work shall be provided by the use of signs and barricades and screened staging, when applicable.
- Do not lower the scaffold below the point of three turns of the supporting cables on the drum of a swinging stage scaffold. Supporting cables shall be marked or painted to include limits.
- Check the loading on the stage one foot off the ground before using it.
- Outrigger beams, when required, should extend from 1 ft to 6 ft beyond the edge of the building, and the inboard length from the fulcrum should be at least 1 ½ times the outboard length from the fulcrum. A mechanical stop to retain the supporting cables shall be secured at the outer end of the outrigger.
- If cornice hooks are used, each hook must be tied back to something solid. All hooks must be latched.

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### Multilevel Suspended Scaffolds Requirements

- Multilevel suspended scaffolds are used primarily for large-area vertical work such as installation of siding.
- Multilevel suspended scaffolds shall have two lifelines attached to the scaffold, independent of the supporting lines.
- Employees on the top stage will tie off with a safety harness to an independent lifeline.
- Employees on the lower stages will tie off with a safety harness to the scaffold itself.

### Floats

- Floats shall be in accordance with standard rigging practices, using a 1 in. manila rope, or equivalent. The supporting ropes shall be run diagonally under the platform from corner to corner.
- Employees working on floats shall tie off with a safety harness before getting on a float and untie after getting off a float.
- Floats are to be constructed to the standard 4 ft. x 6 ft. size, and additional support shall be given to the platform with diagonal 1 in. x 4 in. braces on the bottom.
- The platform shall be of 3/4 in. plywood or equivalent, with 4 in. x 1 in. minimum edging on top to prevent items from rolling off.



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### Needle-Beam Scaffolds

- Needle-beam scaffolds shall be supported by 1 in. manila rope, ½ in. wire rope cable, 1/4 in. or high test chain or equivalent, using a standard scaffold hitch or eye splice, with supports on the beam not to be more than 10 ft. apart for the 4 in. x 6 in. timbers.
- Needle-beams shall be construction grade lumber, with a minimum of 1,500-psi fiber stress.
- The platform span between needle-beams shall not exceed 8 ft. when 2-in. scaffold plank is used. The overhang of scaffold planks shall not be less than 6 in. or more than 12 in.
- Handrails and toe boards shall be used, and employees shall wear a safety harness.

### Boatswain's Chairs

- Seats shall be a minimum of 12 in. x 24 in. and 2 in. thick. Cleats fastened on the underside shall prevent splitting of the board.
- Boatswain's chairs shall be suspended with the standard 5/8-in. nylon rope boatswain's sling through four corner holes.
- The employee shall be tied off to an independent lifeline with a safety harness.

### Electric Hoist Platforms

- When working platforms are suspended from electric hoist mechanisms and used to raise and lower employees to and from working positions, a safety harness shall be worn and properly attached to a lifeline secured independently from the platform support line.
- Such platforms shall have sides 42 in. in height above the platform.
- Prior to each use, the hoist mechanism shall be visually inspected and the load support checked at 1 ft. off the ground.
- The cable and the lay of the cable on the spool shall be checked constantly.

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### Scaffold Erection and Dismantling Requirements

A risk of serious accident may exist when scaffolds are being erected or dismantled. All individuals working on scaffolds at these times shall comply with the following safety rules and regulations:

- Employees must keep both hands empty for secure handholds when moving above on scaffolds.
- Packets, pouches, and tool belts are to be used to carry the necessary tools for the work.
- Scaffold members shall be hoisted or lowered with a hand line or passed from and to hand. Throwing items up to employees or dropping them is not permitted.
- Constant fall prevention measures must be maintained. Provisions shall be established for using a safety harness and working on firm scaffold decks when this can be done safely.
- Scaffold feet shall be established on a firm and level base of support.
- When scaffolds are to be secured to fixed structures or outriggers are to be used, they shall be installed as soon as possible. When dismantling a scaffold, these should be left on as long as is practical.
- The coordination of this activity with surrounding operations and environment shall be given priority consideration.

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## MOUNTING & DISMOUNTING SCAFFOLDS

This activity is the most common cause of scaffold accidents. Therefore, all individuals mounting and dismounting scaffolds shall comply with the following safety rules and regulations:

- Do not carry objects in hands, but keep both hands empty for climbing handholds.
- Step only on secured ladder or access rungs.
- Give full attention to stability while getting on and off the working platform. Do not use the toe board as a handhold or foothold.
- Pay attention to each step and handhold; most falls occur near the top of the ladder or near the bottom.

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## SCAFFOLD TAGGING

### General Scaffold Tagging Requirements

This scaffold tagging procedure is designed to ensure the safe use of all jobsite scaffolds.

- A scaffold that is ready for use shall be tagged with either a green or a yellow tag.
- A green scaffold tag designates a complete scaffold, as defined by the manufacturer.
- A yellow scaffold tag designates a scaffold that is not complete but which is altered to suit a specific job and may be used safely. A yellow scaffold tag shall detail the reason or reasons the scaffold is incomplete and safety measures needed.
- An independent means of scaffold access/egress shall be erected as an integral component of the scaffold system. Access shall consist of a ladder securely affixed to the framing system, or a scaffold stair system of same manufacturer as the scaffold frame system.
- If scaffold is in the process of being erected, changed, or dismantled, it shall have a red tag. A scaffold that contains a red scaffold tag shall be considered unsafe and shall not be used.
- If a scaffold has been damaged or is defective, a Red Tag must be attached.
- The yellow, red, and green scaffold tags are approximately 4 in. wide by 8 in. long with a hole centered at the top of the tag.

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### Installation & Removal of Scaffold Tags

- A qualified person shall determine whether a useable scaffold receives a yellow or a green tag. He/she shall be responsible for completing all pertinent information on the tag and affixing the tag to any scaffold erected under his/her supervision.
- The scaffold tag shall be affixed to each scaffold access ladder approximately 5 ft., 6 in., from its base, where it will not interfere with normal access.
- The qualified person may remove a scaffold tag from a scaffold that has been damaged, has been improperly modified, is missing components, or is deficient in any safety aspect. A red tag may be used in these circumstances.
- After a scaffold has been repaired, the qualified person shall inspect it to determine whether it is ready to be re-tagged and shall do so accordingly.
- Periodic inspections shall be performed to ensure that all tags are legible and in good condition.
- Inspection, attention, and stability are three keys to scaffold safety. No tag on scaffold shall be considered the same as a red tag.

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## INSPECTION AND TESTING - SCAFFOLD PLANKS

- Competent person must ensure scaffolds are safe prior to use.
- Scaffold planks shall be inspected and tested upon receipt, prior to use, and users shall examine each plank visually prior to each use.
- Examine planks for knots, excessive grain slope, shakes, decay, dry rot, and other defects.
- Density of lumber should be equivalent to Douglas Fir and capable of supporting four times the intended load. Moisture content should not exceed 20 percent.
- All scaffold planks shall be scaffold grade or equivalent as recognized by approved grading rules.
- Planks shall be 2 in. x 10 in. or 2 in. by 12 in. heavy duty (75 psi on 6 ft. span).
- Discard the plank as a scaffold plank if evidence of a defect is noted.

## STORAGE OF SCAFFOLDING

Scaffold materials shall be temporarily stored in a manner that will protect and prevent damage to them. Scaffold materials shall not be left in work areas where they obstruct traffic and/or cause fire hazards.

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## SCAFFOLD FALL PROTECTION & TRAINING

Midland Engineering Co., Inc. does not erect its own scaffold. If this is not possible, a competent or qualified person within Midland Engineering Co., Inc. that has proper training evidence will use the site specific fall protection plan assessment form in the fall protection section of this manual to implement and maintain all fall protection requirements. Three different training requirements based on employee duties and actions:

1. EACH EMPLOYEE WHO PERFORMS WORK WHILE ON A SCAFFOLD MUST BE TRAINED by a qualified person in the subject matter to recognize the hazards associated with the type of scaffold being used and understand the procedures used to control or minimize those hazards. The training shall include the following areas, as applicable:
  - The nature of or potential for electrical hazards and the correct procedures for dealing with electrical hazards
  - The nature of fall hazards and falling object hazards in the work area and the correct procedures for dealing with fall hazards.
  - The correct procedures for erecting, maintaining, and disassembling the fall protection systems and falling object systems being used.
  - The proper use of the scaffold and handling of materials on the scaffold.
  - The maximum intended load capacity and the load-carrying capabilities of the scaffolds being used.
  - Any other pertinent requirements such as access and egress, different types of scaffold, site specific conditions, etc.
  
2. EMPLOYEES WHO ARE INVOLVED IN ERECTING, DISASSEMBLING, MOVING, OPERATING, REPAIRING, MAINTAINING, OR INSPECTING A SCAFFOLD MUST BE TRAINED as a competent person to recognize any hazards associated with the work in question. The training shall consist of the following topics, as applicable:
  - The nature of scaffold hazards.
  - The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold used.
  - The design criteria, maximum intended load-carrying capability and intended use of the scaffold.
  - Any other pertinent requirements such as access and egress, different types of scaffold, site specific conditions, etc.
  - Such training shall be conducted on an annual basis.
  
3. IF THERE IS REASON TO BELIEVE THAT AN EMPLOYEE LACKS THE SKILL OR UNDERSTANDING needed for (1) safe work and/or (2) erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold retraining shall be conducted. Retraining is required in at least the following areas:
  - Changes at the worksite which present a new hazard.
  - Changes in the type of scaffold, fall protection, falling object protection or other equipment which the employee has not been trained on.
  - Inadequacies in work performance indicate skills are not proficient

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**RECORDS**

Completed training and tags shall be kept on file in the corporate office.



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## SCAFFOLD SAFETY QUIZ

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Department: \_\_\_\_\_ Shift: \_\_\_\_\_

- |   |   |   |
|---|---|---|
| 1. A competent person cannot stop work on a scaffold.   | T | F |
| 2. Fall Protection is never required when working from a scaffold.  | T | F |
| 3. Three forms of fall protection are: Safe Walking/Working Surface, Personal Fall Arrest System, Work Rules.                                       | T | F |
| 4. A scaffold must be able to support at least 2 times its expected load.   | T | F |
| 5. A scaffold with a 4-foot wide base that stands 36 feet tall does not need to be tied to the supporting structure.                                | T | F |
| 6. Scaffolds shall be inspected prior to each use for damage, footing, and defective components, and shall be repaired before returning to service. | T | F |
| 7. The warning lines or barricades shall be used to control access to the scaffold.   | T | F |
| 8. Points of access, materials handling areas, and free fall zones areas shall be controlled to prevent unauthorized persons from entering.         | T | F |
| 9. Extension ladders should not be used as access to a scaffold.  | T | F |
| 10. Scaffolds used within a minimum of 10 feet from an electrical source must be protected from the energy source.                                  | T | F |
| 11. Falls can be prevented or their affects decreased by utilizing Safe Work Practices, Planning, and Personal Fall Protection Equipment.           | T | F |
| 12. The top rail of a scaffold guardrail shall be 39 to 42 inches above the walking/working surface.  | T | F |
| 13. Mid-rails are to be centered between walking/working surface and top rail and be not more than 19 inches apart.                                 | T | F |
| 14. A 10-inch wide scaffold board alone is considered a safe walking/working Surface.   | T | F |
| 15. Scaffolds boards must extend 12-24 inches past the supporting member.   | T | F |
| 16. Vertical members of a scaffold must be plumb and square.  | T | F |
| 17. A Competent person need not be at the jobsite during the entire scaffold assembly.  | T | F |
| 18. Any rope or strap can be used as a lanyard in a fall arrest system.   | T | F |
| 19. Toe boards are only used on scaffolds that are 10 feet or taller.   | T | F |
| 20. Scaffold walking/working platforms must be at least 18 inches wide with no more than 1-inch gaps between scaffold boards.                       | T | F |

*I acknowledge that I have received information and training on the potential hazards and proper procedures for Scaffold Safety. This training has given me an understanding of the importance of recognizing hazards associated with scaffold systems. If I do not understand any information presented to me, I will ask questions.*

\_\_\_\_\_  
Participant's Signature

\_\_\_\_\_  
Instructor's Signature

\_\_\_\_\_  
Date

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## SCAFFOLDING INSPECTION SHEET

The following inspection sheet is specifically for the initial inspection of a Tubular Frame type scaffold and is based on the content found in OSHA regulations 29 CFR 1926.451 General requirements and the non-mandatory appendices.

Has the scaffold been constructed to maintain a safety factor of 4 to 1? Yes No

Has the scaffold been designed by a qualified person? Yes No

Are all platforms at least 18 inches wide? Yes No

Are open sides of scaffold less than 14 inches from the face of the work? Yes No

Has the dissimilar metals been evaluated by a competent person? Yes No

If scaffold components of different manufacturers are used, do they fit together without force and has a competent person determined that they are safe for use? Yes No

Does the scaffold conform to the 4 to 1 base to height ratio requirement? Yes No

Scaffolds that do not conform to the 4 to 1 base to height ration must be secured to the structure by use of ties ( to include ties, guying, bracing or equivalent means) as follows:

Has the tie been installed at a horizontal member that supports the inner and outer legs? Yes No

Has the first vertical tie been installed at a height less than 4 times the minimum base dimension? Yes No

Is the vertical distance from the top tie to the top of the scaffold less than the 4 to 1 minimum base dimension? Yes No

Are ties installed at each end of the scaffold and at horizontal distances no to exceed 30 feet? Yes No

Are scaffolds erected on adequate firm footings? Yes No

Are footings capable of supporting 4 times the intended load without settling? Yes No

Is scaffold plumb and braced to prevent swaying or displacement? Yes No

Has safe access been provided for all scaffold platforms that are more than 2 feet above or below the point of access? Yes No

Is the bottom rung less than 24 inches above the supporting surface? Yes No

Are scaffolds and components loaded within their rated capacities? Yes No

Has the scaffold been inspected by a competent person as required? Yes No

Has any damaged part of the scaffold been repaired, replaced or removed as required? Yes No

Do scaffolds and any conductive material handled on them observe the proper clearances from power lines? Yes No

Are guardrails used on all scaffolds over 10 feet in height? Yes No

Are guardrails and midrails installed on all open sides, more than 14" from the work surface? Yes No

Are guardrails installed at 38 to 45 inches in height? Yes No

Will the guardrails withstand 200 pounds in a downward or outward direction? Yes No

Are frames secured by braces, which secure the vertical members laterally? Yes No

Do the braces automatically square automatically square and align the frames? Yes No

Are all brace connections secured? Yes No

Are frames joined together by coupling pins or equivalent means? Yes No

Where uplift may occur are the frames locked together? Yes No

Inspector Signature \_\_\_\_\_ Inspection Date \_\_\_\_\_