



Global EHS - Work At Heights Standard

CONTROL INFORMATION

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1 Purpose

This fatality and serious injury prevention program describe the expectations for workers to protect themselves from the hazards while working at a height specifically prevention and protection from fall hazards.

This standard also describes the expectations for working safely around raised metal floor (RMF) openings. Direction, purchasing guidance, and inspection/labeling criteria to team members engaged in work activities which require the use of ladders and scaffold procedure is also included in this program.

Sites shall comply with this standard at the minimum or local regulatory requirements whichever is more stringent.

2 Scope

Items	Details
Site(s) Impacted	All Micron sites
Target Audience	All Micron team members and its partners, suppliers, vendors, contractor employees working at heights at Micron facilities

3 Roles and Responsibilities

Roles	Responsibilities
Global EHS	<ul style="list-style-type: none"> Maintain the Work at Height Program and documentation Audit sites on implementation of and compliance to the Work at Height Ladder Program

Roles	Responsibilities
Site EHS	<ul style="list-style-type: none"> • Conduct training • Evaluate elevated work situations where traditional controls are not appropriate • Evaluate fall arrest equipment and potential anchor points • Inspect fall protection equipment subjected to forces of a fall • Assist Competent person establish WSH systems, procedures and implement control measures as prescribed in the FPP • Shall ensure the fall prevention is in place and where this is not feasible then ensure proper fall protection is selected for specific tasks • Select new or evaluate current fall prevention or protection in use on site • Ensure that fall prevention and/or protection requirements are addressed for required tasks • Responsible for auditing the program • Ensure that WAH Permit system is in placed • Approve barricade types, signage and tile pullers • Assist area owners in maintaining safe work areas • Approve any new type of ladder or ladder addition prior to purchase • Coordinate the making and distributing of the annual portable ladder stickers to be used by competent person • Review the requirements and subsequent changes of this standard and identify actions to ensure the requirements are effectively implemented • Evaluate continuous compliance to the updated requirements of this standard at least once every 3 years or more frequently (when risk of noncompliance is present) and implement actions to correct deficiency(ies) identified during the compliance evaluation process
Authorized Person (Team Members, Contractors and Vendors)	<ul style="list-style-type: none"> • Adhere to the requirements of this program: • Failure to comply with these requirements can result in disciplinary actions up to and including termination of employment for team members or revoked site access for contractors. • Avoid working at a height where possible • Conduct a Risk Assessment for the work activity and select appropriate equipment for the task • Prioritize Fall Prevention ahead of Fall Protection • Inspect fall protection equipment prior to use • Wear fall protection equipment as required • Attend required training sessions • Care for, clean, and maintain fall protection equipment as required • Register and report WAH equipment • Inform the supervisor of the need to repair or replace fall prevention equipment • Adopt and implement the “I open it, I own it” mentality to ensure your safety as well as the safety of others in the area. • Inform others in the immediate area that you have or will pull a tile and seek acknowledgment that they understand. • Set up and secure a barricade and appropriate signage around floor openings. • Properly remove and replace raised floor tiles and view tiles when access is necessary.

Roles	Responsibilities
Supervisors	<ul style="list-style-type: none"> • Work with EHS to identify tasks that require working at height • If fall protection needs to be worn determine the appropriate fall protection equipment and material • Provide the appropriate fall protection equipment and make it available to team members • Provide an adequate level of supervision to employees, contractors and vendors to ensure that the WAH elements are followed and that team members properly inspect, use, care, store and clean personal protective equipment (PPE) • Seek assistance from the EHS section to evaluate hazards so determination of proper fall prevention or protection can be made • Ensure adequate emergency procedures are in place for the rescue of a person who has fallen and where fall protection has been used e.g. safety harness • Ensure proper RMF equipment is available in work areas • Hold team members accountable for adhering to the requirements of this program • Establish the expectation of direct reports that if they open an RMF tile, they are responsible for the opening and the safety of others until it is closed, in other words; "I open it, I own it". • Communicate requirements in this standard to ladder using team members, contractors, vendors and visitors
Competent Person	<ul style="list-style-type: none"> • Conduct Fall Hazard Survey • Assess whether all reasonably practicable measures have been taken to ensure the safety and health of the persons who will be carry out work at height • Exercise due diligence when performing evaluation and endorsement of permit-to-work • Perform periodic inspections of Micron-owned ladders • Provide guidance to on determining the right ladder for the task • Provide guidance on the purchasing of new ladders
Qualified Person (Facilities Engineering)	<ul style="list-style-type: none"> • Design work areas with appropriate railing systems and working surfaces • Assist in determining appropriate anchor points for fall arrest • Oversee installation of horizontal lifelines
Floor Opening Attendant	<ul style="list-style-type: none"> • Complete the RMF training. • Constantly monitor and protect the entrance of a floor opening to prevent personnel from inadvertently entering the hole or opening. • Warn others in the area of the floor opening. • Serve as an Entry Attendant when necessary for the "Entrant". • Constantly monitor and protect the Entrant located beneath the RMF.
Entrant	<ul style="list-style-type: none"> • Complete RMF training. • Ensure an adequate barricade is placed around the floor opening that is used for entry. • Ensure the RMF Barricade Signage and Pre-entry Checklist is completed and posted prior to performing entry into the RMF. • Put on the correct Personal Protective Equipment (PPE) prior for entry into the RMF. • Obtain an Entry Attendant and maintain communication with the Entry Attendant. • Work in a safe manner while working in, around or beneath the RMF.

4 Terms and Definitions

Terms	Definitions
Alternating tread-type stair	A type of stairway consisting of a series of treads that usually are attached to a center support in an alternating manner such that an employee typically does not have both feet on the same level while using the stairway.
Anchorage	A secure point of attachment for equipment such as lifelines, lanyards, deceleration devices, and rope descent systems.
Authorized Entrant	An employee who is authorized by the employer to enter a permit-required confined space.
Authorized Worker	An employee who the employer assigns to perform a specific type of duty or allows in a specific location or area.
Barricade	A barrier put in place to block the area, prevent access, and prevent trips or falls. There are two acceptable types for use with raised floor: single tile and rigid.
Barricade Signage	Acceptable RMF barricade signage includes a "Danger" statement, barricade owner and contact information, start and end date and time, and the hazards present
Body belt (Safety belt)	A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device. Body belts are not acceptable for fall arrest applications.
Body harness	Straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.
Buckle	Any device for holding the body belt or body harness closed around the employee's body.
Cage	An enclosure mounted on the side rails of a fixed ladder or fastened to a structure behind the fixed ladder that is designed to surround the climbing space of the ladder. A cage also is called a "cage guard" or "basket guard."
Carrier	The track of a ladder safety system that consists of a flexible cable or rigid rail attached to the fixed ladder or immediately adjacent to it.
CAZ	Controlled Access Zone An area in which certain work (e.g., overhand bricklaying) may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.
Combination or Multi-Purpose ladder	Portable ladder that can be used as a stepladder, extension ladder, trestle ladder, or stairway ladder. The components of a combination ladder also may be used separately as a single ladder.
Confined Space	Any space with all three of the following characteristics: <ul style="list-style-type: none"> • Is large enough and so configured that an individual can bodily enter and perform assigned work. • Has limited or restricted entry or exit. • Is not designed for continuous human occupancy.
Connector	A device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or dee-ring sewn into a body belt or body harness, or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard).

Terms	Definitions
Dangerous equipment	Equipment, such as vats, tanks, electrical equipment, machinery, equipment or machinery with protruding parts, or other similar units, that, because of their function or form, may harm an employee who falls into or onto the equipment.
Deceleration device	Any mechanism, such as a rope grab, rip-stitch lanyard, specially woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.
Deceleration distance	The additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.
Designated area	A distinct portion of a walking-working surface delineated by a warning line in which employees may perform work without additional fall protection.
Dockboard	A portable or fixed device that spans a gap or compensates for a difference in elevation between a loading platform and a transport vehicle. Dockboards include, but are not limited to, bridge plates, dock plates, and dock levelers.
Entrant	An individual whose head and shoulders enter beneath a raised floor environment.
Entry Attendant	An individual stationed outside one or more permit-required confined spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.
Equivalent	Alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.
Extension ladder	A non-self-supporting portable ladder that is 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 section measured along the side rails.
Failure	Load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.
Fall hazard	Any condition on a walking-working surface that exposes an employee to a risk of harm from a fall on the same level or to a lower level.
Fall protection	Any equipment, device, or system that prevents an employee from falling from an elevation or mitigates the effect of such a fall.
Fixed ladder	A ladder with rails or individual rungs that is permanently attached to a structure, building, or equipment. Fixed ladders include individual-rung ladders, but not ship stairs, step bolts, or manhole steps.
Free fall	The act of falling before a personal fall arrest system begins to apply force to arrest the fall.
Free fall distance	The vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Terms	Definitions
Grab bar	An individual horizontal or vertical handhold installed to provide access above the height of the ladder.
Guardrail system	A barrier erected along an unprotected or exposed side, edge, or other area of a walking working surface to prevent employees from falling to a lower level.
Handrail	A rail used to provide employees with a handhold for support.
Hoist Area	Any elevated access opening to a walking-working surface through which equipment or materials are loaded or received.
Hole	A gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, roof, or other walking/working surface.
Infeasible	That it is impossible to perform the construction work using a conventional fall protection system (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.
Injury	Harm to any part of the body, either acute or chronic, caused by a traumatic or undesired event e.g. a fall from height, being struck by an object, ergonomic injuries, chemical exposure, occupational illnesses, etc.
JHA	Job Hazard Analysis A technique that focuses on job tasks to identify hazards before they cause an accident. A JHA focuses on the relationship between the worker, the task, the tools, and the work environment. Once identified, the hazards can be eliminated or controlled.
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 when ascending or descending.
Ladder Climbing Safety Device	Any device, other than a cage or well, designed to eliminate or reduce the possibility of accidental falls and which may incorporate such features as a full body harness, friction brakes, and sliding attachments.
Ladder safety system	A system designed to eliminate or reduce the possibility of falling from a ladder. A ladder safety system usually consists of a carrier, safety sleeve, lanyard, connectors, and body harness. Cages and wells are not ladder safety systems.
Lanyard	A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.
Leading edge	The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is an "unprotected side and edge" during periods when it is not actively and continuously under construction.
Lifeline	A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.
LockNclimb	LockNclimb patented specialty ladders provide safe, ergonomically correct access so mechanics can comfortably work in difficult to reach areas without damaging sensitive equipment or surfaces.
Lower levels	Those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.
Low-slope roof	A roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

Terms	Definitions
Maximum intended load	The total load (weight and force) of all employees, equipment, vehicles, tools, materials, and other loads the employer reasonably anticipates being applied to a walking-working surface at any one time.
Mechanical equipment	All motor or human propelled wheeled equipment used for roofing work, except wheelbarrows and mop carts.
Mobile	Manually propelled or moveable.
Mobile ladder stand (ladder stand)	A mobile, fixed-height, self-supporting ladder that usually consists of wheels or casters on a rigid base and steps leading to a top step. A mobile ladder stand also may have handrails and is designed for use by one employee at a time.
Mobile ladder stand platform	A mobile, fixed-height, self-supporting unit having one or more standing platforms that are provided with means of access or egress.
Open riser	The gap or space between treads of stairways that do not have upright or inclined members (risers).
Opening	A gap or void 30 inches (.76 meters) or higher and 18 inches (.48 meters) or wider, in a wall or partition, through which employees can fall to a lower level.
Permit Required Confined Space	Permit required confined spaces are confined spaces that meet one of the following criteria: <ul style="list-style-type: none"> • Contains or has the potential to contain a hazardous atmosphere • Contains a material that has the potential to engulf an Entrant • Has an internal configuration that could trap or asphyxiate an Entrant • Has any other serious safety or health hazard that is immediately dangerous to life or health
Personal fall arrest system	A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. The use of a body belt for fall arrest is prohibited.
Personal fall protection system	A system (including all components) an employer uses to provide protection from falling or to safely arrest an employee's fall if one occurs. Examples of personal fall protection systems include personal fall arrest systems, positioning systems, and travel restraint systems.
Platform	A walking-working surface that is elevated above the surrounding area.
Podium Ladder	A-frame style ladder which has a working platform at top of ladder with rails that allow a worker to work 360 degrees on platform.
Pop-Out	A pop-out is a circular or square hole in the concrete slab between the Fab and subfab areas. Pop-outs allow for facility lines and equipment to penetrate between these areas. Pop-outs are sometimes called waffle.
Portable ladder	A ladder that can readily be moved or carried, and usually consists of side rails joined at intervals by steps, rungs, or cleats.
Positioning system (work-positioning system)	A system of equipment and connectors that, when used with a body harness or body belt, allows an employee to be supported on an elevated vertical surface, such as a wall or windowsill, and work with both hands free. Positioning systems also are called "positioning system devices" and "work-positioning equipment."

Terms	Definitions
PPE	<p>Personal Protective Equipment</p> <p>Any of a series of specialized devices, clothing or equipment worn by employees for protection against hazards. PPE includes anything from gloves to full-body suits with self-contained breathing apparatus.</p>
Qualified Person	<p>Describes a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.</p>
RA	<p>Risk Assessment</p> <p>A procedure through which knowledge and experience of design, use, incidents and accidents and harm are brought together to measure risks for specified scenarios of the equipment being assessed. Risk assessment includes determining the limits of machinery, hazard identification, and risk estimation.</p>
Ramp	<p>An inclined walking working surface used to access another level.</p>
Riser	<p>The upright (vertical) or inclined member of a stair that is located at the back of a stair tread or platform and connects close to the front edge of the next higher tread, platform, or landing.</p>
RMF	<p>Raised Metal Floor</p> <p>Consisting of gridded metal tiles, perforated or non-perforated, supported by a substructure of support pedestals.</p>
RMF Floor Hole / Opening	<p>A hole or opening in the RMF caused by removing a full floor tile, or portion of a floor tile, opening a view tile, access panel, or an uncovered opening in a tool pedestal. A hole or opening can create a fall, trip, ergonomic, and/or mechanical hazards.</p>
RMF Pre-Entry Checklist	<p>A hazard assessment checklist that ensure the proper materials, Entry Attendant, and PPE are allocated and the hazards of entering the RMF are evaluated.</p>
Roof	<p>The exterior surface on the top of a building. This does not include floors or formwork which, because a building has not been completed, temporarily become the top surface of a building.</p>
Roofing work	<p>The hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.</p>
Rope descent system	<p>A suspension system that allows an employee to descend in a controlled manner and, as needed, stop at any point during the descent. A rope descent system usually consists of a roof anchorage, support rope, a descent device, carabiner(s) or shackle(s), and a chair (seat board). A rope descent system also is called controlled descent equipment or apparatus. Rope descent systems do not include industrial rope access systems.</p>
Rope grab	<p>A deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.</p>
Rung, step, or cleat	<p>The crosspiece of a ladder on which an employee steps to climb up and down.</p>
Runway	<p>An elevated walking working surface, such as a catwalk, a foot walk along shafting, or an elevated walkway between buildings.</p>
Safety-monitoring system	<p>A safety system in which a competent person has been appointed to be at or near a recognized hazardous zone to warn approaching persons of a fall hazard.</p>

Terms	Definitions
Scaffold	Any temporary elevated or suspended platform and its supporting structure, including anchorage points, used to support employees, equipment, materials, and other items. For purposes of this subpart, a scaffold does not include a crane-suspended or derrick-suspended personnel platform or a rope descent system.
Self-retracting lifeline/lanyard (SRL) / device (SRD)	A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.
Ship stair (ship ladder)	A stairway that is equipped with treads, stair rails, and open risers, and has a slope that is between 50 and 70 degrees from the horizontal.
Single Ladder	A non-self-supporting portable ladder, nonadjustable in length, consisting of but one length. Its size is designated by the overall length of the side rail.
Snaphook	A connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object.
Stair rail or stair rail system	A barrier erected along the exposed or open side of stairways to prevent employees from falling to a lower level.
Stairway (stairs)	Risers and treads that connect one level with another and includes any landings and platforms in between those levels. Stairways include standard, spiral, alternating tread-type, and ship stairs.
Standard stairs	A fixed or permanently installed stairway. Ship, spiral, and alternating tread-type stairs are not considered standard stairs.
Steep roof	A roof having a slope greater than 4 in 12 (vertical to horizontal).
Stepladder	A self-supporting, portable ladder that has a fixed height, flat steps, and a hinged back.
Stepstool	A self-supporting, portable ladder that has flat steps and side rails. For purposes of the final rule, stepstool includes only those ladders that have a fixed height, do not have a pail shelf, and do not exceed 32 inches (81 cm) in overall height to the top cap, although side rails may extend above the top cap. A stepstool is designed so an employee can climb and stand on all the steps and the top cap.
Through ladder	A type of fixed ladder that allows the employee to step through the side rails at the top of the ladder to reach a walking-working surface, such as a landing.
Tieback	An attachment between an anchorage (e.g., structural member) and a supporting device (e.g., parapet clamp or cornice hook).
Tile Puller	A tile puller is a device that is used to pull a tile out of the raised floor.
Toeboard	A low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.
Tool Pedestal	A tool pedestal is a steel frame installed beneath some tools to support the weight of the tool and dampen vibration.
Travel restraint system	A combination of an anchorage, anchorage connector, lanyard (or other means of connection), and body support that an employer uses to eliminate the possibility of an employee going over the edge of a walking-working surface.
Tread	A horizontal member of a stair or stairway but does not include landings or platforms.

Terms	Definitions
Unprotected sides and edges	Any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 1.0 meters high.
View Tile	View tiles are a metal floor tile with an inset transparent section that can be opened or removed. View tiles allow access to hazardous energy control points such as valves or disconnects.
Waffle Slab	See Pop-Out
Walking/working surface	Any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees shall be located in order to perform their job duties.
Warning line system	A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.
Work area	Portion of a walking/working surface where job duties are being performed.

5 References

Internal References	Link
RMF Barricade Signage and Pre-Entry Checklist	TEDSZF665RUJ-2038493890-613
Self-Fabricated Ladder Design Guideline	Global EHS Self Fabricated Ladder Design Guideline (FINAL).xlsx (micron.com)

External References	Link
Nil	Nil

6 Standard

6.1 General Requirements

6.1.1 Trigger Height

Fall prevention/protection shall be used in permanent installations whenever the employee is exposed to a fall exceeding 1.2 meters (4 feet) or during construction and remodeling activities whenever the employee will be exposed to a fall exceeding 2.0 meters (6 feet¹) All work at height activities shall be controlled with a Risk Assessment or Job Hazard Analysis (JHA).

6.1.2 Trigger Height - Exceptions and Clarifications

The following exceptions/clarifications apply to the stated general trigger height:

- **Aerial Lifts:** All aerial lifts shall have a standard guardrail. In addition, a fall arrest system is required to be worn for all workers in an aerial lift with an articulated boom, which permit workers to extend the work platform out past the footprint of the lift.
- **Cranes:** There are some cranes, and other types of heavy equipment, which are designed to permit occasional employee access to elevated areas in excess of 2.0 meters (6 feet) in height with fall protection provided by, grab rails, foot holds, and other non- standard techniques. Consult with the Safety Department to confirm that the alternatives provided are adequate.
- **Floor Holes:** For floor hole openings, especially the removal of floor tile in Fab raised floor systems, please refer to section 6.2 Raised Metal Floor Procedure below
- **Ladders:** Portable ladders may be used to access heights and as a work platform without additional fall protection if the ladder is being used per the manufacturer's recommendations. For fixed ladders of heights that extend beyond twenty-four feet, a ladder cage, a ladder climbing assist sure climb system grab, or a retractable lanyard shall be used. For further information on ladder usage please refer to section 6.3 Ladder Procedure below
- **Raised Surfaces:** At Micron, there are some raised working surfaces which are surrounded by pipe, conduit, duct, and other items which effectively prevent the worker from encountering an actual fall exposure, even when near the edge of the work surface. In these situations, additional fall protection is not required. Consult the Safety Department to evaluate the raised work surface to confirm that an actual fall exposure does not exist.
- **Roofs:** A RA/JHA with approved fall protection plan is required if working on roof tops that do not have an adequate height parapet wall 1.07 ± 0.08 meters (42 ± 3 inches)
NOTE: The use of a Safety Monitoring System shall only be used as a measure of last resort and only with the approval of the Safety Department.
- **Scaffolds:** A standard guardrail shall be used on scaffolds greater than 2meters (6 feet) in height. In addition, a standard guardrail – 1-meter (42 inches) top rail, 0.5 meters (21 Inches) mid rail, & toe-board - is required on all work levels of a scaffold. A competent person shall evaluate the feasibility of providing fall protection during scaffold erection and dismantling activities. The competent person shall determine when a standard guardrail may pose a greater hazard due to a specific work task and develop alternative protection for these situations through a job hazard analysis as appropriate. Reference 6.4 Scaffolding Procedure below
- **Steel Workers:** Fall protection is required for steel workers at heights greater than 2 meters (6 feet)
NOTE: Except, steel workers conducting leading edge work, and connectors engaged in bolting main member structural steel to columns, will be protected above fifteen feet. Installation of cross bracing,

¹ US only

lateral joist, and other steel components are not considered as main member structural steel. Consult with the Safety Department for assistance in determining if the exception to trigger heights for leading edge or structural member work is applicable to a specific task.

- The use of a “controlled access zone” in conjunction with a “safety monitoring system” for leading edge work is prohibited.
- **Other Unique Situations:** Employees shall consult with the Safety Department whenever they confront an elevated work situation which would preclude using fall protection above the trigger height.

6.1.3 Leading Edge

Work within 15 meters (50 feet) of a leading edge is not allowed without adequate protection that would prevent a worker from falling. The hierarchy of controls should be followed when determining the appropriate controls. At a minimum:

- A standard guard rail or other equivalent engineering control should be established.
- If a standard guard rail is not feasible, at least 4.5 meters (15 feet) from the leading edge a non-standard rail must be constructed with ropes, wires or chains with 500-lb (2.2 kN) tensile strength. The non-standard rail must be capable of supporting 16 lbs. (71N) of horizontal force 0.75 meters (30 inches) above the base.
- Work within this zone requires either a fall restraint or personal fall systems to be utilized by all workers.
- Lanyards used in personal fall arrest systems must be rated for leading edge work.

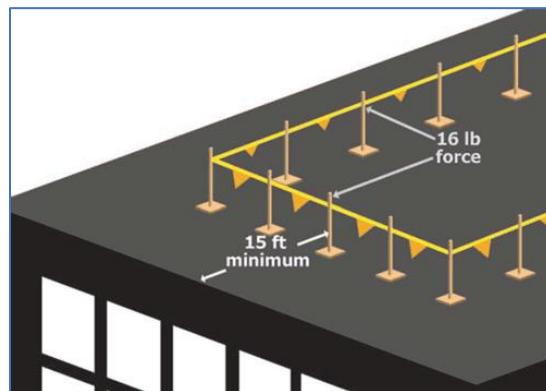


Figure 1 Non-Standard Rail Clearance from Edge

6.1.4 Competent Person

Each site shall have at least one person designated as a competent person. Site complexity and activity may require more than one competent person. Competent persons shall have training and experience, as well as the ability to recognize hazards, provide effective corrective actions, and the authority to stop work until a safe fall protection situation is established. The competent person is responsible for:

- Conducting a fall hazard survey, identifying existing and predictable hazards in the surroundings or working conditions which are hazardous, or dangerous to authorized employees.

- Evaluation of anchor points used in fall restraint and fall arrest systems
- Evaluation of the overall field conditions to assure employee safety and assure that a fall rescue plan is in place.
- Development of rescue plans before work commences to retrieve an employee who falls.
- Annual inspections are conducted on all relevant fall protection/restraint equipment

6.1.5 Fall Hazard Survey

- Sites shall conduct a fall hazard survey to identify all potential fall hazards to which an authorized person may be exposed to at the site, and a survey report prepared. The survey shall identify one or more methods to eliminate, prevent exposure to, or control each identified fall hazard.
- The fall hazard survey shall be developed by the competent person or qualified person who is familiar with, and has access to, information about local work processes, environmental factors, policy and best industry practices, and who collects input from the authorized person conducting the work and the work team familiar with workplace activities.
- Fall hazard surveys shall be revised or rewritten whenever there is a change to the task, process, structure, equipment or regulation that would render past surveys obsolete. The survey shall contain a revision level identifier, so it is clear which report is the most current.

6.1.6 Hierarchy of Fall Protection

There is a distinct hierarchy to be used when confronted with elevated work and fall protection challenges. When possible, use the solution that is the most protective:

Table 1 Protection Challenges and Its Proposed Solutions

Protection Challenge	Solution
Eliminate the Fall Hazard	Design Engineering
Protect the Opening	Hole Covers
Protect access to the area around the hole	Barricades
Protect the edge	Standard Guardrail
Eliminate the fall exposure at an edge	Fall Restraint
Minimize the severity of injury from a fall	Fall Arrest
Prevent the Fall	Dedicated Safety Monitor IMPORTANT: A Safety Monitoring System may ONLY be used with approval of the Safety Department

6.1.7 Design Engineering

Ideally, engineering teams design our facilities to eliminate all elevated work activities. Practically, we design our facilities to reduce elevated work as much as possible, and the most frequently serviced valves, gauges, dampers, and other manually operated devices are kept as low as possible. When such items are elevated, it is sometimes possible to use long valve extension handles, chain and sprocket drives, and other types of extensions to permit routine service without a need for elevated work. As a last resort, for items which require infrequent access, we need to design fall protection anchor points or other protection

to support the elevated installation. Since the facility is frequently changing, a remodel may create access problems for elevated items which were previously accessible.

6.1.8 Hole Covers

- Open floor holes may pose a hazard to all employees. All floor holes shall be provided with a cover which can support without failure, at least twice the maximum intended load that may be imposed on the cover at any one time and is secured to prevent accidental displacement. The manufactured structural floor grating typically used for our elevated floors in Fabs and office areas comply with this requirement.
- Job fabricated covers typically used to protect temporary floor holes during construction or remodeling shall be color coded or shall be marked with the word "HOLE" or "COVER" to provide warning of the hazard. Temporary floor hole covers used in areas with only pedestrian traffic should be mounted flush with the floor if possible. When temporary floor hole covers are used in areas which may have mechanical traffic, they shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.
- When hole covers are removed, protect the opening with a rigid barricade or guardrail system with a warning signage.

6.1.9 Standard Guardrail

- Guardrail requirements: Guardrail systems railings (top and midrail) and toe boards shall be installed on all mezzanines and catwalks, or an engineered fall arrest system shall be provided.
- The top edge height of top rails, or equivalent guardrail system members, are 1 meter (42 inches), plus or minus 8cm (3 inches), above the walking working surface. The top edge height may exceed 114cm (45 inches), provided the guardrail system meets all other applicable criteria
- Midrails are installed at a height midway between the top edge of the guardrail system and the walking working surface. (More than 1 mid-rail can be installed if required based on your risk assessment).
- Guardrail systems are capable of withstanding, without failure, a force of at least 200 pounds applied in a downward or outward direction within 5cm (2 inches) of the top edge, at any point along the top rail.
- Midrails, screens, mesh, intermediate vertical members, solid panels, and other equivalent intermediate members are capable of withstanding, without failure, a force of at least 150 pounds applied in any downward or outward direction at any point along the intermediate member.

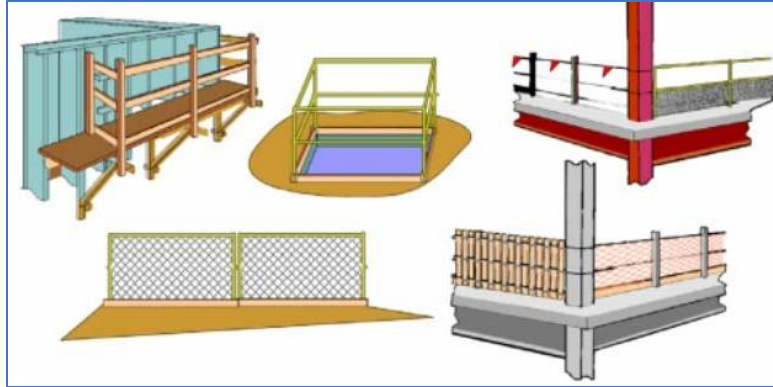


Figure 2 Examples of Standard Guardrails

6.1.10 Fall Restraint System

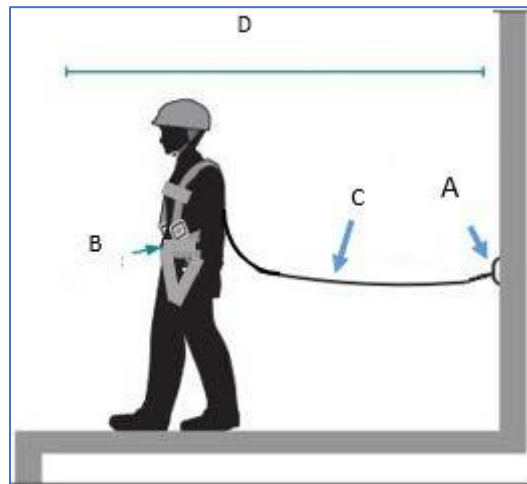


Figure 3 Fall Restraint System

- A fall restraint system is designed to prevent a worker from falling by using a lanyard or similar device to tie them back to something solid. The actual field application of a fall restraint system can present numerous challenges and the supervisor or lead should always consult the Safety Department to aid in establishing this system. If the system is not established precisely, a worker could go over the edge, which would then become a fall arrest situation with very different protection requirements. A properly designed fall restraint system unlike a fall arrest system in that it protects the worker from ever encountering the potential injuries associated with an actual fall.
- A fall restraint system is typically used for protection in situations when working near an otherwise unprotected edge; on a roof with a parapet less than 1.07 meters (42 inches) high, near a gate opening in a standard guardrail, or near an open material doorway in a wall opening.
- Common components of a fall restraint system are:
 - A – Anchor point capable of supporting 4.4 kN
 - B – Body Support, an approved full body harness
 - C – Connector typically a lanyard
 - D – The overall length of the restraint line shall keep the worker from going over the edge

6.1.11 Fall Arrest System

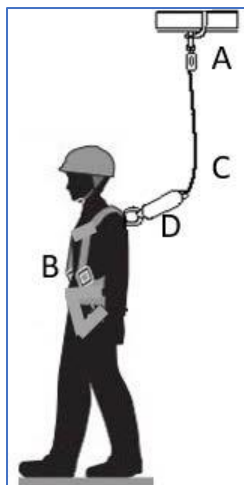


Figure 4 Fall Arrest System

- A fall arrest system is the choice of last resort for fall protection. With a fall arrest system, the employee may experience an actual fall. The fall arrest system is designed to minimize employee injury and death in a fall. A properly implemented fall arrest system shall be capable of reducing fall impact forces to 8kN when used with a full body harness. All fall arrest situations should be evaluated for the possibility to eliminate the need for elevated work through design engineering.
- Fall arrest system has four components:
 - A – Anchor point capable of supporting 22.2 kN per person attached
 - B – Body support, an approved full body harness
 - C – Connector a lanyard or Self Retracting Device that connects the body support to the anchor point
 - D – Shock Absorbing section
- Fall arrest systems shall be evaluated to ensure that the Anchor, Body support and Connector combination selected will protect the wearer from striking the ground or other objects. A standard 2.0-meter (6 foot) lanyard anchored at shoulder height will allow a fall distance of 5.3 meters (17.5 feet). A Self Retracting Lanyard in the same application would allow a fall of no more than 0.6meters (2 feet).
- Fall arrest equipment shall meet the requirements detailed in the ANSI 359 series document. Specialized fall arrest equipment shall be obtained if the total weight of the person and their equipment will exceed 141kg (310 pounds). Contact the Safety Department, prior to purchase, if any specialized manufactured equipment components are needed.

6.1.12 Anchor Points

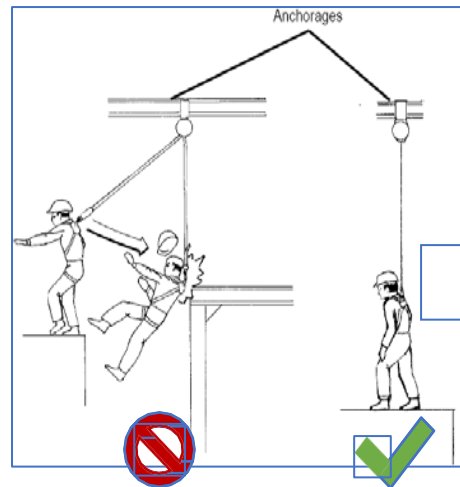


Figure 5 Anchor Points

- All Anchor points shall be designed and installed by a competent person or as per local regulatory requirements.
- Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage used to support or suspend platforms and capable of supporting at least 22.2 kN (for non-engineered anchorage) or 8kN (for engineered anchorage) per employee attached, or shall be designed, installed, and used as follows:
 - as part of a complete personal fall arrest system which maintains a safety factor of at least two; and
 - under the supervision of a qualified person
- Anchor points should be located directly overhead to reduce the potential for a swing fall. Anchor points below the foot level of the worker should be avoided. If foot level anchorage is the only option, the work shall be approved by the safety department and a competent person. Equipment approved-rated for foot level anchorage shall be used. Employees who have any questions about the suitability of a specific anchor point should contact the Safety Department for assistance before using it.

WARNING: Pendulum (swing) falls can occur when the system is not anchored directly above the worker. The force of striking an object in a pendular motion can cause serious injury. Always minimize swing falls by working as directly below the anchorage point as possible, staying within 30 degrees from vertical.
- Anchorage - 100 Percent Tie Off. A safety harness can provide protection from falls only if the harness is attached to a lanyard that is anchored. The term “100 percent tie-off” means that the anchorage is maintained always. This is done to allow for fall protection even when transferring between two separate anchorage points. 100 percent tie off requires twin tailed lanyards that allow the user to remain anchored to one point of anchorage with one lanyard, while transferring to another point of anchorage with the second one.

Exception: First man up. In situations where there is no available anchor point an anchor point needs to be installed. In this case during the installation of the anchor point it may be necessary to have one person working without 100 percent tie off. Whenever possible this work should be done using a man lift to access the location where the fall protection anchor will be installed.
- Contact the Safety Department or designated competent person to aid in locating the best available anchor points for a fall arrest system. When necessary the Safety Department can work with

engineering to create a system for fall arrest in specific situations, which may permit more flexibility in the requirements for the anchor point.

- The following provide acceptable anchor points:
 - Structural steel - structural steel includes all I-beams and seismic restraints attached at both ends, most of the box iron used for joist and cross support, and most of the steel webbing material used for joists (with the strong point in the valley of the bracing, rather than between braces).
 - Whenever something other than a direct connection to structural steel is used for an anchor point the best choice is always to locate a suitable alternative anchor point that is most nearly attached directly below the structural member. The anchor point is more suspect as the horizontal distance from structural steel to the anchor point increases.
 - Unistrut 3-1/4" P1001 or Equivalent under the following conditions:
 - Positioned long side horizontal
 - Not more than 1.5 meters (60 inches) between supports when using a shock absorbing lanyard
 - Not more than 3.0 meters (120 inches) between supports when using a retractable lanyard and not to exceed 114kg (250 pounds) When welded on the top of or inside the flange of an I-beam
 - When bolted on the top of the bottom lip of the I-beam
 - When secured by 3/8 inch (9.5mm) or larger "all-thread" to an I-beam clamp
 - Wooden trusses, if the unistrut is clamped at the connection points of the struts top and bottom with "all-thread" Two-bolt D-ring anchor plate.

6.1.12.1 Anchor Connectors

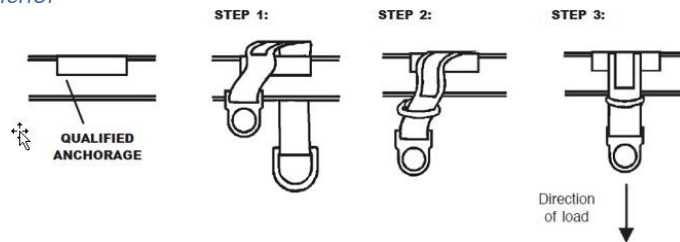


Figure 6 Two-bolt D-ring Anchor Plate attached with 1/2"-13 TPI UNC 1-1/2" long grade 8 socket head cap screws and lock washers (torque to 40 foot-lbs.)

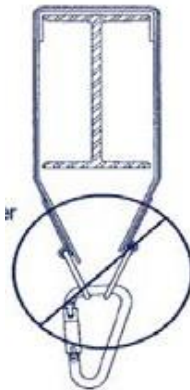


*Figure 7 Cleanroom Anchor Clip
torqued to the manufacturer recommendations. Contact the construction group for installation*

6.1.12.2 Beam Wrap Anchor



*Figure 8 Multiple Passes of Wrap Around the Anchorage
may be made to shorten the length. Pass the small D-ring through the large D-ring on each pass.*



*Figure 9 Tie-off Adapter Small D-ring passing through Large D-ring
The connecting subsystem shall be connected to the small D- ring only.
Do not attach the subsystem to both D-rings.*

6.1.12.3 Horizontal Lifeline

A horizontal lifeline is a complex system comprised of a flexible line with connectors at both ends for securing it horizontally between two anchorages or anchorage connectors. These systems are used to protect workers operating on a horizontal plane who may not have continuous access to other suitable anchorage points. Horizontal lifelines are classified as either permanent or portable:

- Permanent Horizontal Lifelines are designed by a qualified person to work only in a location for which it was designed. Consult with your competent person prior to using.
- Portable Horizontal Lifelines are designed by engineers so that the end user can install and use them, once they have been trained and are deemed qualified on the product.

6.1.12.4 Unacceptable Anchors

Some items should never be considered for use as an anchor point for a fall arrest system. Never use any part of a sprinkler pipe system; not even the unistrut that supports the sprinkler pipe. Never connect to a gas line, any pipe that contains a hazardous chemical, or any electrical conduit of any diameter; however, the unistrut that supports these systems may be used if the fall arrest system will not damage the line, pipe, or conduit.

6.1.13 Body Supports



Figure 10 Body Supports

A full body harness is an assembly of interconnected shoulder and leg straps with or without a body belt or saddle designed to spread the load over the body and to prevent the wearer from falling out of the assembly. All full body harnesses shall be ANSI Z359.11 approved or approved by local regulatory body. There are many types of full body harnesses available that can be used for a variety of applications. Consult with a competent person or your safety department to determine the appropriate full body harness for your application.

- Inspection – All full body harnesses shall be inspected per the manufacturer recommendations prior to each use
- Fit – the full body harness shall be worn so that the webbing is snug and secure
 - The user should be able to put no more than two fingers between themselves and the harness
 - The harness should allow freedom of movement to perform work
 - The chest strap shall be engaged and tightened to reduce the potential for fall out during a fall event
- Dorsal D-Ring – The fall arrest point shall be located on the back, positioned between the shoulder blades. No matter what additional connection points are included on a harness, it shall always include the dorsal attachment

6.1.14 Connectors

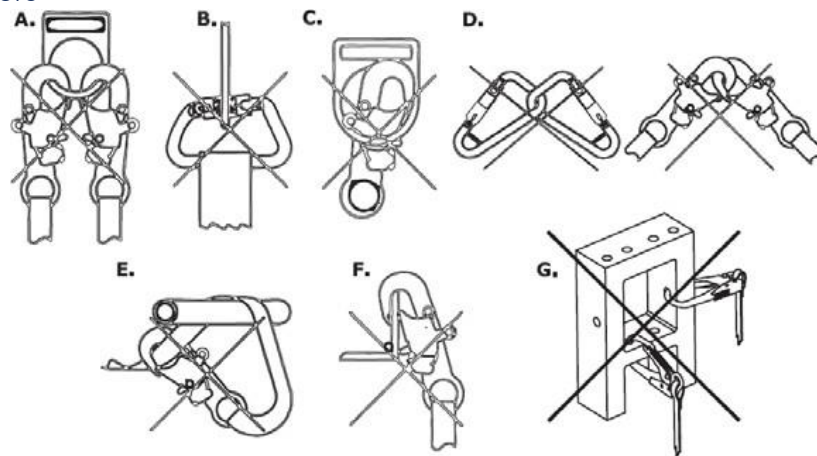


Figure 11 Connectors

- Connectors include equipment that is used to attach the body support to the anchorage. They include hard goods such as snap hooks and carabiners as well as self-retracting lifelines, lanyards and energy absorbers.
- Snap hooks and carabiners both have openings for attachment to a fall protection component and a self-closing gate to retain the component within the opening. Non-locking snap hooks and carabiners shall not be used in fall protection as they may unintentionally disengage (roll out) during operation.
- Auto locking snap hooks and carabiners are the only type that can be used for fall arrest applications.
- All snap hook and carabiner gates shall be rated for at least 3,600 lbs. The gate will be labeled accordingly.

6.1.15 Self-Retracting Lifeline & Lanyards



Figure 12 Lanyards

Ensure that the correct SRLs have been selected for work activities each use.

- Always read the product performance specifications before purchasing and using an SRL, as specifications may vary between manufacturers.
- Understand the fall clearance requirements. (example: pendulum fall, anchoring point, utility line etc.)
- Understand the product Maximum Total Fall Distance

Classes of SRL:

- Class A - Maximum Total Fall Distance = 24 in. (610 mm); Average Arresting Force \leq 1,350 lbs. (6 kN)
- Class B - Maximum Total Fall Distance = 54 in. (1,372 mm); Average Arresting Force \leq 900 lbs. (4 kN)
 - If the work activities require the TM to kneel or crouch near an edge, an additional 3ft (1m) of fall clearance is needed – fall clearance information can be found in product performance specifications or contact your PPE supplier if you need assistance.
 - ANSI Z359.14 class A SRLs shall be selected whenever possible as their maximum total fall distance is not more than 610mm. Where the same performance can be achieved with a class B SRL, they can be considered for use.
- Lanyards - used to connect the anchorage to the body support of a fall protection system.
 - Attach the lanyard directly overhead to minimize swing fall
 - For work under 5.6 meters (18 feet) an SRD is required, for above 5.6 meters (18 feet), selection of fall protection equipment can be determined based on the work activity risk assessment.
 - Inspect the lanyard prior to use
 - Never attach two lanyards together
 - Never tie knots in lanyards
 - Never connect a lanyard back on itself unless the manufacture indicates the lanyard is designed for that application
- Self-Retracting Device or SRDs contain a drum wound line. Under normal operation the line may be extracted and retracted under slight tension when the user moves away from or towards the device. In the event of a fall, the device quickly locks the drum and prevents the lifeline from paying out, thus arresting the users fall.
- SRDs have a shorter fall distance and can be used come in a variety of lengths and configurations.
- SRDs can be permanently mounted to an anchor point. SRDs cannot be stored with the line extended. A tagline should be attached to the SRD snap hook. The tagline is used to pull the snap-hook down to the user for connection to the SRD.
- Personal SRDs can be used in a Y configuration in place of a 100 percent tie-off lanyard.

6.1.16 Inspections

- Sites shall establish and implement an Inspection plan to periodically inspect and maintain work at height equipment to ensure that they are in good working condition (Refer to Table 3).
- All components of a fall arrest or fall restraint system shall be inspected for excessive wear or damage prior to each use by the end user. All fall protection equipment that does not pass inspection shall be tagged out of service and returned to the tool crib or the safety department for destruction.
- Harnesses, Lanyards, D-ring anchor straps, anchors, etc., are required to have an annual inspection by a competent person other than the one wearing the equipment.

Table 2 Inspection Plan for WAH Equipment

Equipment	Type of Inspection	Frequency of Inspection	Performed by:
Safety Harness, Lanyard	Visual inspection by respective workers / Supervisory Personnel. Check for damages, wear and tear and expiry date where applicable.	Pre-use	End User
	Checklist inspection	Yearly	Competent person
Fall Rescue Kit	Checklist inspection	Yearly	Competent person
Ladders	General inspection	Pre-use	Worker / Supervisor
	Checklist inspection	Yearly	EHS / Supervisor / Competent person
Lifelines	General inspection	Pre-use	Individual EHS Personnel / Competent person
Anchor Point	Visual inspection	Pre-use	End User
	Checklist inspection	Yearly	Competent person
Self-Retracting Device	Visual inspection	Pre-use	End User
	Checklist inspection	Yearly	Competent person

6.1.17 Removal from Service

- All components of a fall arrest system that are subjected to the forces of a fall shall be immediately tagged out of service and submitted to the Safety Department for inspection and disposition.
- End of service life for Micron owned fall protection equipment excluding SRDs is 7 years from date fall protection equipment is placed into service unless manufacturer specifically provides an end of service life (5 years or other).

6.1.18 Fall Rescue Plan

Sites shall develop a fall rescue plan when employees are engaged in work that requires the use of fall protection and the simple act of using a ladder for self-rescue is not possible. This plan shall include the following:

- A document that identifies how the rescuer will access the worker(s). This assessment shall include:
 - how and to whom the notification will occur to
 - response time (should at least have verbal contact with the fallen victim within 6 minutes)
 - how to assist the worker(s) with self-rescue
 - how to respond to an unconscious patient(s)
 - how to assist with aerial lift rescue

- the rescue equipment's needed for the job
- Verification of proper training for those individuals working on the project
- A review of the fall arrest system including the anchor points with the workers
- Discussion of the rescue plan with the workers

6.1.19 Training Requirements and Competency Assessment

- All Micron Team members that work in areas with fall hazards, perform work requiring fall protection devices, or use fall protection devices shall not carry out any job task until he/she has attended training (LI 605003 Global EHS - Work-At-Height - ILT). This includes all new Micron team members regardless of previous experience.
- Competent persons shall attend an initial third-party competent person training course. Credit for this course will be tracked (LI 614002 Global EHS - Work At Height Competent Person Training - EXT).
NOTE: Manufacturing and maintenance teams may have specific Fall Protection Learning Items allowing them to wear a full body harness used only for specific tasks.
- The training program provided by Micron Safety includes classroom instruction and operational training on specific fall hazards.
- Contractors will be trained on the fall protection policies and procedures specific to Micron. Micron team members and contractors will require retraining under any of the following conditions:
 - Changes in the workplace that render any previous training obsolete
 - Changes in the types of fall protection systems or equipment to be used that render any previous training obsolete
 - Inadequacies in an employee's knowledge of the use of fall protection systems or equipment or observed behavior indicate that the employee has not retained the required training/retraining.

6.2 Raised Floors

6.2.1 Raised Flooring

- The raised floor allows for facility services (i.e., exhaust, drain, water, gas, chemical, electrical, communication lines, etc.), to be routed and air to be distributed in the plenum beneath the floor.
- Raised Metal Floors consists of gridded metal tiles, metal concrete filled tiles, perforated or non-perforated, supported by a substructure of support pedestals.
- The floor tiles are removable and are a maximum of 61 x 61 centimeters (24 X 24 Inches) in size. Hazards exist when there are openings or uneven surfaces.

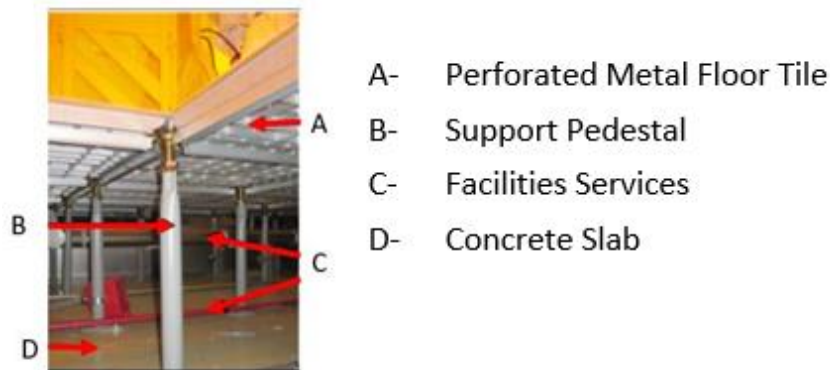


Figure 13 Cross Section of Raised Metal Floor

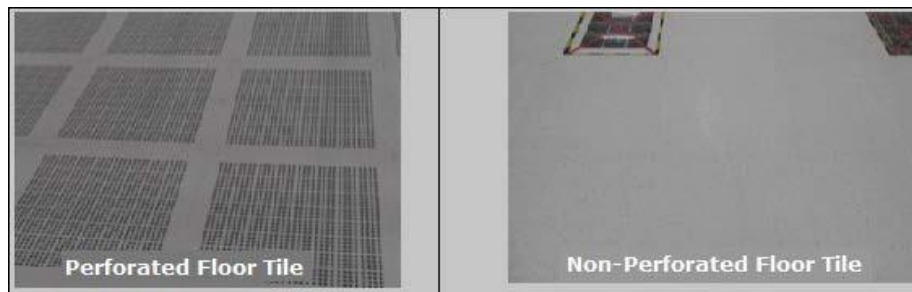


Figure 14 Perforated Floor Tile and Non-Perforated Floor Tile

6.2.2 Raised Floor Hole or Opening

- A raised floor hole or opening exists when a:
 - Full floor tile or a portion of a floor tile is removed
 - View tile or access panel is opened
 - Opening in a tool pedestal is present
- Floor tiles are commonly removed during tool install or deinstall to provide access to facility services, address failures or leaks, retrieve equipment, and perform maintenance.
- A view tile is a floor tile with a transparent section that can be opened or removed.
- View tiles allow access to hazardous energy control points such as valves or disconnects.
- View tiles may be opened for short durations and shall be 100% attended

- The transparent portion of the view tiles shall be clearly marked to indicate the clear tile is in place. This can be done with any mark that clearly indicates that presence of a tile.

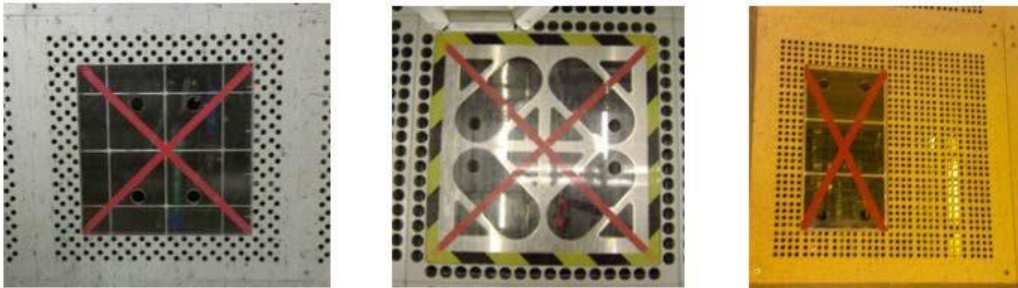


Figure 15 View Tiles

- A tool pedestal is a steel frame installed beneath some tools to support the weight of the tool and dampen vibration.



Figure 16 Tool Pedestal

6.2.3 Raised Floor Hole or Opening Hazards

- A raised floor hole or opening can create the following hazards:
 - Confined space
 - Head Bump
 - Ergonomic
 - Chemical Exposure
 - Other hazards
- All individuals who work in areas where floor openings have the potential to exist shall be aware of the hazards.
- To protect and maintain the safety of individuals working around raised floors, all holes or openings, present for any duration, shall be protected with a barricade, or securely covered.
- All loose or uneven raised floor surfaces that present a hazardous condition shall be reported to be corrected.
- Tile pullers and proper lifting techniques shall be used to reduce the potential for a strain, sprain, or pinch injury.

6.2.4 Pop-Out Openings

- A pop-out is a circular or square hole in the concrete slab between the fab and subfab areas and is located below the RMF.
- Pop-outs allow for facility lines and equipment to penetrate between these areas.
- A pop-out is not a floor tile, nor is it a view tile. The diameter of the pop-outs can vary from location to location.
- An open or unprotected pop-out can create a fall hazard and shall be protected.
- Acceptable protection includes a cover, grate, or cross bracing according to the requirements below.
 - A cover or grate made of a cleanroom-approved material that can withstand 2X the intended load.
 - The cover shall be secured to prevent accidental displacement via tape, welds, or other acceptable means.
 - Bracing or cross bracing with Patron sealant, Sikaflex, or an equivalent sealant that seals the pop-out opening is required when a potential for a leak exists.
- Pop-outs do not require such protection if they contain facilities or equipment that fill the diameter of the pop-out, do not present a fall hazard, and protection is not feasible.



Figure 17 Examples of Pop-Outs

- The duration in which a pop-out is unprotected for the installation or removal of facilities should be short.
- If an individual is inside an RMF opening that contains one or more unprotected pop-outs that present a fall hazard, fall prevention shall be used or fall protection shall be worn (i.e., during tool install, performing repairs, etc.).
- All efforts should be made to cover the pop-out(s) to eliminate the hazard and need for fall protection.
- When objects may fall through the unprotected pop-out, the subfab area below the pop-out shall be properly barricaded using red Danger tape and signage, or equivalent protection shall be required.

6.2.5 Tile Removal

- To remove a floor tile, a single or two man lift with an approved tile puller is to be used.
- If the floor tile is difficult to remove or is stuck, then a two-man lift shall be completed using approved tile pullers to remove the floor tile. View tiles can be removed without a tile puller.

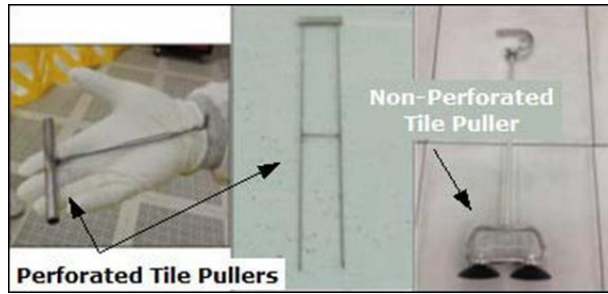


Figure 18 Tile Pullers

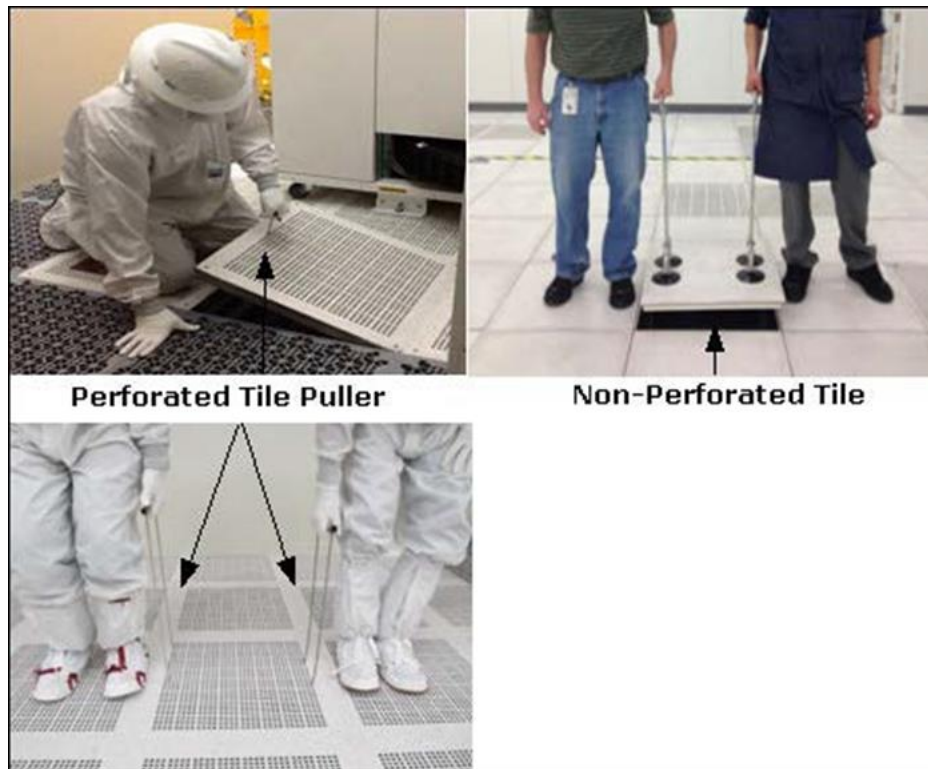


Figure 19 Tile Removal Techniques

6.2.6 Barricades

All floor openings present for any duration shall be protected with a barricade. A barricade is a barrier put in place to block the area, preventing access, trips, or falls. Multiple noncontiguous floor openings shall all be protected via one or more barricades. There are two types of acceptable barricades including a Single Tile Barricade, and a Rigid Barricade.

6.2.6.1 Single Tile Barricade

- A single tile barricade is a mobile barricade that can be used for the removal of one full floor tile 61 x 61 centimeters (24 X 24 inches) or a view tile.
- Requirements are as follows:

- May be left unattended if used for the removal of one full floor tile and the barricade is secured into the floor.
- Shall be constructed with the following requirements:
 - Vertical posts
 - Securely inserted into the floor opening
 - Capable of withstanding a load at least 91kg (200 pounds) applied at any point.
 - Top rails
 - Smooth-surfaced
 - 1 meter (42 Inches²) in height
 - Capable of withstanding a load at least 91kg (200 pounds) applied at any point.
 - A toe board is required when materials or tools could drop into the floor opening, which is a minimum of 4-inches nominal vertical height, securely fastened in place.
 - Position no more than ¼ of an inch above the raised floor surface, and store the single tile barricade out of walkways when not in use.



Figure 20 Single Tile Barricade

6.2.6.2 Rigid Barricade

- A rigid barricade is constructed of Unistrut or equivalent metal and can be used for removal of one or more floor tiles or a view tile.
- Requirements are as follows:
 - Shall fully enclose the floor opening or meet directly against a solid structure (e.g., wall, tool, equipment, etc.).
 - May be left unattended if the barricade is fastened or secured into the floor (e.g., tool install, wall modification, etc.).
 - Barricade signage is always required to be displayed.
 - Large raised metal floor openings may be enclosed with a rigid barricade that contains a gate that opens away from the floor hole or opening.
- Shall be constructed with the following requirements:
 - Vertical Posts
 - Securely fastened to the floor level and positioned with a maximum distance of 1 meter (42¹ Inches) from the floor opening.

² US only

- Capable of withstanding a load at least 91kg (200 pounds) applied at any point.
- Top Rail
 - Smooth-surfaced
 - 1 meter (42 inches³) in height
 - Capable of withstanding a load at least 91kg (200 pounds) applied at any point.
- Mid rail
 - Approximately halfway between the top rail and the floor.



Figure 21 Rigid Barricade

- Unacceptable floor opening barricades include:
 - Stanchions (an upright bar or post frequently referred to as a candlestick)
 - Chains
 - Barricade tape (danger or warning)
 - Safety cones
 - Visqueen® (plastic sheeting)
 - A person or a portion of a person's body does not constitute a barricade

6.2.7 Barricade Signage

- Acceptable barricade signage is required for rigid barricades and single-tile barricades left unattended.
- Barricade signage shall be visibly posted on the barricade. For rigid barricades, a sign shall be posted on all sides of the barricade. For single tile barricades, one sign is required.
- All individuals who work in areas where floor openings have the potential to exist shall heed to barricade signage.
- Acceptable barricade signage shall include:
 - Stop sign
 - Caution - Do Not Enter statement
 - Barricade owner and contact information
 - Start and end date and time
 - Hazards present
- Completion of the [RMF Pre-Entry Checklist](#) is not required unless entry is made beneath the RMF.

³ US only

- Entry is defined as head and shoulders being introduced beneath the raised floor. Only certified RMF Entry personnel completes the Pre-Entry Checklist hazard assessment or equivalent JHA and posts the form at the point of entry.

6.2.8 Temporary Opening of Rigid Barricade - Floor Opening Attendant

- A Floor Opening Attendant is required when a rigid barricade shall be removed for a limited duration (i.e. during tool install when moving a tool onto a pedestal or into final position, etc.) or when an entry will be made into the RMF by an Entrant (See Section RMF Entry).
- The responsibilities of a Floor Opening Attendant include:
 - Constantly monitor and protect the entrance of a floor opening to prevent personnel from inadvertently entering the hole or opening.
 - Notify individuals of the hazard as they approach.
 - Notify ERT in the event of an emergency.
 - Do not perform other duties that may interfere with the responsibility of being an Attendant.

6.2.9 RMF Opening Sequence of Events

- When removing a full floor tile, the following is an example of the sequence of events using a single-tile barricade:
 - Identify the floor tiles to be removed.
 - Obtain materials (tile-pullers, barricade, barricade signage).
 - Remove the RMF tile, using a single man lift or two-person lift with approved and tile pullers. One team member shall monitor the hole opening until the barricade is in place.
 - Barricade the RMF opening.
 - Attach the barricade signage, if the barricade is going to be left unattended.
 - Perform the work.
 - Remove the barricade and have one team member monitor the hole until the floor tile is replaced.
 - Using one or two team members replace the floor tile, lift with the approved tile pullers.
 - Store the barricade in the proper location.
- When removing multiple floor tiles, the following is an example of the sequence of events using a Rigid Barricade
 - Identify the floor tiles to be removed.
 - Obtain materials (tile-pullers, barricade, barricade signage).
 - Enclose with a barricade the entire RMF area to be opened. The barricade can end at a solid structure, if the entire opening or opening area is enclosed.
 - Attach the barricade signage, on each side of the rigid barricade.
 - Remove the RMF tile, using a single man lift or two-person lift with approved tile pullers.
 - Perform the work:
 - If a Rigid or portion of a Rigid Barricade shall be removed for a limited duration (i.e. during tool install when moving a tool onto a pedestal or into final position, etc.) a Floor Opening Attendant is required.
 - Using one or two team members replace the floor tile with the approved tile pullers
 - Remove the barricade

6.2.10 Raised Metal Floor Closing

- Barricades can be removed after the tiles, view tiles, or adequate hole covers have been replaced.
- All floor tiles that are replaceable shall be replaced when the work is completed.
- When work is completed under a View tile, and access is no longer needed, the transparent portion of the tile shall be put back in place.
- It is the responsibility of the individual who lifted, removed, or opened the tile or view tile to ensure that it is properly replaced so that the tile does not create a slip or trip hazard for others in the area.
- If such a hazard exists after replacement of the tile, due to an improper tile seating, uneven floor surface or other reason, the hazardous condition shall be reported so that it can be corrected.

6.2.11 RMF Entry (Only applicable to persons that enter the RMF)

Entry into the RMF is defined as the head and shoulders of one or more individuals being introduced beneath the raised floor. An individual entering beneath the RMF is referred to as an **Entrant**.



Figure 22 Example of Entrant

An individual is not performing entry if one or more floor tiles have been removed, and a portion or all their body is inside the open hole (e.g., standing on the concrete slab inside an open hole, head and shoulders are not beneath the RMF, etc.).



Figure 23 Example of Non-Entrant

Whenever possible, RMF entry needs to be avoided. Entry can commonly be avoided by removing floor tiles so that the work can be performed on the concrete slab without having to enter under the flooring.

6.2.11.1 RMF Pre-Entry Checklist

- A hazard assessment shall be performed prior to physical entry beneath the RMF using the RMF Barricade Signage and Pre-Entry Checklist.
- Both the Raised Floor Pre-Entry Checklist and barricade signage must be posted at the RMF barrier.
- It is the responsibility of the Entrant to allocate the checklist.
- Note: If the task or entry under the raised metal floor takes multiple days then a checklist needs to be filled out each day.
- The checklist ensures that the proper materials, Entry Attendant, and PPE are allocated, and applicable hazards are evaluated.
- An evaluation of the under RMF work area is performed and a four-question hazard assessment completed to document the evaluation.
- The assessment includes an evaluation of the potential hazards of the tools, associated utilities, and operational conditions
 - If all the questions have been answered No, the checklist is posted at the entry point or in the area work is being performed, and entry work commences.
 - If conditions change from the original assessment, or major construction occurs, the area shall be reevaluated.
 - If any of the questions on the RMF Barricade Signage and Pre-Entry Checklist have been answered Yes, the area may be considered a PRCS, and consultation with ERT/EHS is required prior to entry.

Example: Potential hazards that may cause the space beneath the raised floor to be classified as PRCS may include, but are not limited to, welding, exposed energized electrical, facility lines being disconnected or demolished, energized robotics, certain Fab maintenance, etc.

- Entry into a PRCS requires additional training and a Confined Space Entry Permit.
- All possible efforts should be made to eliminate the identified hazards to allow for the reclassification of a PRCS to a NPCCS.
 - Efforts may include cleaning up a leak, performing LOTO, removing floor tiles to avoid entry, rescheduling entry work until hazardous work is complete, etc.
 - Reclassification of the PRCS, can only be performed by ERT/EHS.

6.2.11.2 Entrant

- The responsibilities of an Entrant include the following in addition to the other responsibilities outlined in this document (See Section RMF Sequence of Events and RMF Closing):
 - Ensure an adequate barricade is placed around the floor opening used for entry.
 - Obtain an Entry Attendant.
 - Post barricade signage (STOP sign) at the entry point.
 - Ensure a hazard assessment using the RMF Barricade Signage and Pre-Entry Checklist is performed prior to entry. Post the Pre-Entry Checklist at the entry point.
 - Obtain and don PPE—minimum of a bump cap or hard hat, as required. Hang your Micron issued ID badge on the barricade at the entry point just prior to entry.
 - Always maintain contact with the Entry Attendant (sight, verbal or radio).

- Take caution not to damage facilities located under the raised floor. If damage does occur, report it so that it can be corrected.
- Notify the Entry Attendant with any concerns or if conditions change in the work area below the RMF.

6.2.11.3 RMF Floor Closing

- Do not replace floor tiles used for entry while an Entrant is under the RMF unless another floor tile that is used for exit is opened and the change is communicated with the Entrant.
- All floor tiles that are replaceable shall be replaced when the Entrant is out of the hole and the work is completed.

6.2.12 Training Requirements and Competency Assessment

Micron team members work that work on or in Raised metal floors must complete Raised Metal Floor Training (LI 664003 Global EHS - Raised Metal Floor Program - eLRN).

6.3 Ladders

Most ladder injuries result from a fall, but other injuries are caused by; lifting ladders (manual handling), slipping or falling when carrying the ladder, or the ladder collapsing or falling while in use.

Before working at height, the correct equipment should be selected following a risk assessment for the task. Mobile Elevated Platforms or scaffolds may be a better choice for specific tasks, but ladders may be more suitable for other tasks.

6.3.1 Ladder Selection

6.3.1.1 Style



Figure 24 Examples of Step Ladders & Platform Ladders

Figure 25 Examples of Multi Purposes Ladders

Which ladder is right for the job? There are four main types of ladders:

- **Step ladders:** These ladders are typically called A-Frame or Herring bone ladders are a self- supporting ladder that locks open for use. Depending on the manufactures intended use one or both sides may be used. Always read the label to determine the appropriate climbing side(s) of the ladder
- **Platform ladders:** A platform ladder is a step ladder with a work platform at the top that is intended to provide a stable work area.

- **Extension ladders:** Extension ladders are non-self-supporting. They are used for reaching higher areas or for transitioning from one level to another such as a roof line. Extension ladders are required to be secured either at the top of the ladder or at the base of the ladder prior to use.
- **Multi-Purpose or combination ladders:** A multi-purpose ladder is a versatile type of ladder that can be adjusted and configured into various positions to serve different functions.

6.3.1.2 Height

How high do you need to reach?

- The highest permitted standing level on a stepladder is two steps down from the top. A person standing higher may lose their balance and fall.
- A person's maximum safe reaching height is approximately 1.2 meters higher than the height of the ladder.
- Extension ladders should be 7 to 10 feet longer than the highest support or contact point, which may be the wall or roof line.
 - This will allow enough length for proper setup, overlap of ladder sections, height restrictions of the highest standing level, and where appropriate, the extension of the ladder above the roof line.
 - The highest standing level is four rungs down from the top
 - In cases where extension ladders are used for access to another level, this requirement must be strictly adhered to ensure safe access and egress whilst using the extension ladder.

6.3.1.3 Duty Rating

- **US Only:** Ladders with Duty rating less than 250 lbs. or less are prohibited from Micron US sites and should be tagged out of service and removed from the site.
Note: All ladders purchased February 1, 2017 forward will have a duty rating of 300 lbs. or greater.
- **All other locations:** Ladders should be selected based on the weight of the person performing the work with all equipment that will be used.

6.3.2 Pre-Use Ladder Inspection

Ladders shall be inspected prior to each use. Should a defect or problem be found during the inspection, tag the ladder as "out of service,". If a user is unsure about the ladder components, he/she should contact their area competent person for evaluation prior to using the ladder.

Inspect all ladder components for signs of wear, corrosion, and structural failure to include rungs, rails, hardware/welds and feet. Make sure ladder is clean and appropriate for job task.

6.3.3 Ladder Use Protocol

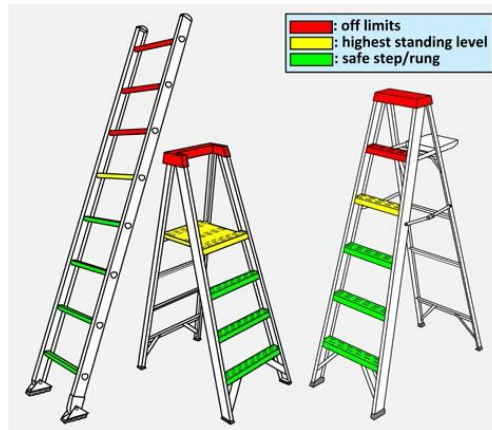


Figure 26 Ladder Use Protocol

- All work requiring the use of a ladder shall be planned and organized through a written procedure or RA/JHA.
- Ladders shall be visually inspected prior to each use.
- Ladders should be used for tasks of a short duration, where the risk is low, for work that does not involve carrying heavy or awkward equipment/tools.
- Maintain 3 points of contact (hands and feet) when ascending or descending ladders.
- Center your body between the rails and keep your hips square to the rungs. Never overreach.
- The worker shall always face the ladder climbing up or down. Using both hands.
- Ladders shall not be placed in front of doors unless the door is locked or guarded and appropriate warning sign posted.
- Neither the top step nor top cap of any step ladder shall be used as a step at any time.
- Extension Ladders are to be placed 30 centimeters (1 foot) away from the base of the structure for every 1.3 meters (4 feet) height of ascent. Or a 1:4 ratio.

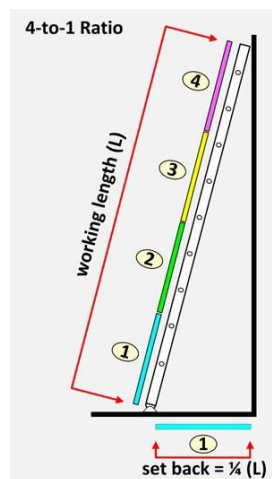


Figure 27 Extension Ladder Requirements (4:1 ratio)

- Extension ladders shall be secured prior to use either at the top of the ladder or at the base of the ladder.
- Extension ladders must extend 3 feet or 0.9 meters beyond the level being accessed if it is used to move from one level to another, such as roof line or interstitial space.
- The use of a fixed ladder equipped with a ladder climbing safety device requires the use of a full body harness with a front chest D-ring. The user shall positively connect with ladder climbing safety device before ascending or descending the ladder.
- Ladders shall never be used in the horizontal position as scaffolds or work platforms unless it is a multi-purpose or combination ladder that was built for the purpose and rated for the work activity.
- Ladders shall not be placed on boxes or unstable bases to obtain additional height.
- Multi-purpose or combination ladders shall be installed with a leading-edge protection at both leading sides as fall protection and provides an extension for 3 points of contact (hands and feet) for team members when ascending or descending the ladder. (In unique situations where leading-edge protection is not possible due to narrow space (e.g. tool blockage etc.) - Employees shall consult with the Site Safety Department and ensure a comprehensive risk assessment to address fall protection (including 3-point contact while ascending and descending).

6.3.4 Portable Ladder Storage

Each work area shall establish a designated storage area for portable ladders. The storage area shall allow ladders to be stored safely where they do not create a tripping hazard, block exits or restricted areas. After use, all portable ladders should be returned to a designated storage area. Portable ladders shall not be abandoned in the work area, blocking exits, emergency showers, fire extinguishers, or other restricted areas when not in use.

- Store ladders away from excessive moisture, humidity and sunlight
- Store non-self-supporting ladders in flat racks or on wall brackets.
- Ladders stored vertically shall be secured to prevent tipping or falling over. Use suitable means to secure vertically stored ladders such as rope, chain, ladder racks or hanging brackets.

6.3.5 Portable Ladder Materials

- Portable Fiberglass ladders, or other non-conductive rail materials, are acceptable for use at Micron.
- Portable Wooden ladders are prohibited.
 - Varnishes and other clear protective coatings used on wooden ladders can make them electrically conductive.
 - Wood is a known product contaminant within semiconductor production areas.
- Portable Aluminum ladders or step stools must be approved for use by the site EHS team.
 - Aluminum ladders are electrically conductive and a high risk of electrical exposure

6.3.6 Portable Ladder Purchase / Repair / Alteration

- All purchasers of portable ladders (including self-fabricated ladders – Self-Fabricated Ladder Design Guideline) shall consult with their site Safety Department before purchasing any new style, duty rating, or material for portable ladder to verify that the new ladder will conform to required design and specification requirements

- Defective ladders shall be tagged and removed from use. All damaged ladders shall be evaluated by a competent person to determine if the ladder can be repaired or disposed of, as appropriate.
- The ladder manufacturer shall be consulted before the purchase or use of ladder accessories such as tool holders, paint can holders, grab hooks, etc. Some accessories may undesirably alter the balance, structural integrity, stability, or configuration of the ladder and they shall to be evaluated for potential hazards associated with their use.

6.3.7 Competent Person Periodic Inspection

Competent person will perform the periodic inspection based on the criteria listed for portable and fixed ladders.

6.3.8 Competent Person Ladder Inspection Criteria

- The competent person shall visually inspect portable ladders for visible defects on a periodic basis (annual) and after any occurrence that could affect their safe use.
- Conduct overall visual inspection looking for signs of wear, corrosion, and structural failure and documented on the Portable Ladder Inspection Spreadsheet:
 - UV Degradation – Has the color started to fade and can you see the individual fiberglass fibers starting to breakoff – wearing gloves run your hands up the rails. Can you feel the glove catching or snagging on the ladder material?
 - Rungs – Check for broken, bent, split, cracked, corroded, and/or missing rungs
 - Side Rails – Check for broken, split, bent, cracked, corroded, and/or missing side rails
 - Cracks – Check carefully for cracks; they are hard to see, and cracks weaken a ladder
 - Excessive Bends – Check for bends in the rungs and side rails. Excessive Bends greatly reduce the strength of the ladder and can cause failure
 - Hardware] – Check for ladders with loose, corroded, missing, or weakened fasteners and hardware
 - Feet – Check ladders for missing or damaged feet. Ladder feet may have both nonskid pads for use on hard surfaces and metal feet for soft surfaces.

6.3.9 Fixed Ladders

- Fixed ladders that exceed 7.3 meters (24 feet) in height are required to be equipped either with a cage, a ladder climbing safety device, or a retractable lanyard. Consult the site Safety Department for guidance on which additional method is appropriate for specific applications.
- All fixed ladders over 7.3 meters (24 feet) in height installed after November 2017 shall be equipped with either a personal fall arrest system or a ladder safety system.
- All pre-existing fixed ladders over 7.3 meters (24 feet) in height shall be retrofitted equipped with either a personal fall arrest system or a ladder safety system by 2036.
- Full body harness with a front chest D-ring shall be used when ascending and descending a fixed ladder with a ladder climbing safety device.
- Vertical distance between any two “landing place” shall not exceed 9 meters (29 feet). Therefore “intermediate landing place” shall be provided if vertical height exceeds 9 meters (29 feet).

6.3.10 Assistance

Contact the Area Competent Person or EHS for assistance if there are questions or issues regarding ladder purchase, fabrication, installation, movement, storage, inspection, repair, alteration, or use.

6.3.11 Training Requirements and Competency Assessment

Micron team members that perform work using ladders must be complete the ladder safety training (LI 614003 Global EHS - Ladder Safety - eLRN). This includes all new Micron team members regardless of previous experience.

6.4 Scaffold

6.4.1 What is Scaffold?

Scaffolds are any temporary structures:

- On and from which a person performs work in any workplace;
- Which enable a person to access the location to perform work; or
- Which enable materials to be taken to any place at which work is being performed.

6.4.2 Scaffold requirements

All scaffolds must be inspected by a competent person:

- Before its first use;
- After substantial alteration;
- After any event likely to have affected its stability

Each scaffold and scaffold component shall be capable of supporting, without failure, its own weight and at least 4 times the maximum intended load applied or transmitted to it

Timber Scaffold is prohibited in Micron.

6.4.3 Design of certain metal scaffolds by professional engineer

Following criteria shall apply:

- To design tube and coupler scaffolds over 38 meters in height.
- To design fabricated frame scaffolds over 38 meters in height above their base plates.
- To design brackets on fabricated frame scaffolds used to support cantilevered loads in addition to workers.
- To design outrigger scaffolds and scaffold components

6.4.4 Preparing a Scaffold Plan

A Scaffold plan shall be established. Scaffold plan should include safe work procedure, risk management, clear roles and responsibilities and design of the scaffold. Information about the design of a scaffold should be provided by the scaffold designer to the scaffold erector and detailed in a scaffold plan or documented information provided by the supplier to Site. The plan should be kept at the Site for the duration of the work.

6.4.5 Erection of Scaffold

Scaffolding shall be erected in the way set out in the scaffold plan. Any variations in the way the scaffolding is to be designed should be referred to the scaffold designer and shall inform micron host immediately.

All scaffold components should be installed as the scaffold is erected. Examples of this are:

- the installation of all bracing and ties in accordance with the scaffold plan;
- the installation of counterweights.

6.4.6 Dismantling of Scaffold

- During dismantling, no component that endangers the stability of the remaining structure shall be removed.
- When dismantling scaffolding, components should be progressively removed in reverse of the erection order

6.4.7 Scaffold Types:

- Frame Scaffold
- Tower Scaffold
- Mobile Tower Scaffold
- Suspended Scaffold
- Hanging Scaffold
- Cantilever Scaffold
- Tube and Coupler Scaffold
- System Scaffold

6.4.7.1 Frame Scaffold

- Frame scaffolds are the most common type of scaffold because they are versatile, economical, and easy to use. They are frequently used in one or two tiers by residential contractors, painters, etc.
- Every frame scaffold shall be provided with horizontal bracings or lacings at intervals of not more than every 5 lifts.

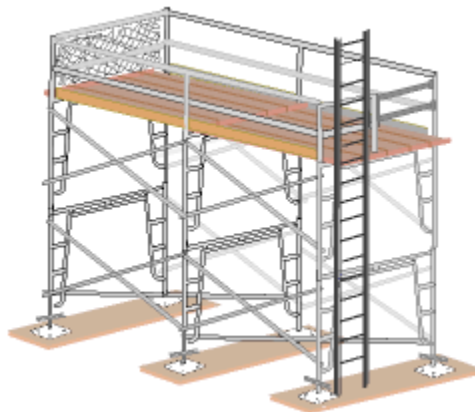


Figure 28 Frame Scaffold

6.4.7.2 Tower Scaffolds

- Tower scaffolds are a form of scaffolding that usually consist of fabricated frame units constructed as single-bay towers.
- Tower scaffold should be erected by a competent erector. It must be inspected by a competent person.
- Edge protection such as guard-rails and toe-boards must be provided at the highest landing.

- When the height of a tower scaffold in site, excluding the handrails and their supports at the uppermost lift of the scaffold, exceeds 3 times the lesser of the base dimensions of the scaffold, the scaffold shall be effectively tied to the building or a rigid structure so as to prevent toppling.
- The height of a tower scaffold in a workplace, shall not exceed 8 times the lesser of the base dimensions of the scaffold.

6.4.7.3 Mobile Tower Scaffold

A tower scaffold that is fitted with castor wheels equipped with effective locking devices is deemed to be a mobile tower scaffold.

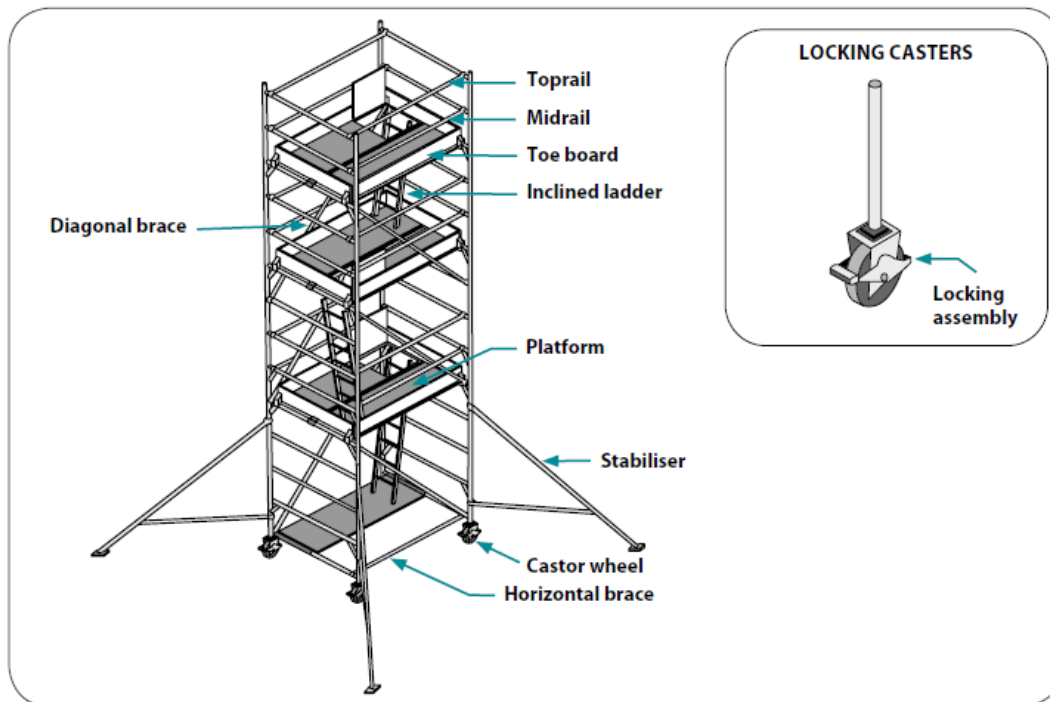


Figure 29 Mobile Tower Scaffold

When a tower scaffold is mounted on castors for use as a mobile scaffold, the following rules should be strictly observed:

- Prior to moving, the route must be checked for power lines, overhead obstructions and for holes and uneven surfaces on the ground (a small obstruction may cause a mobile scaffold to overturn);
- When it is necessary to deploy tower scaffolds on an inclined surface, measures must be taken to ensure stability, such as the use of outriggers. Otherwise, tower scaffolds should not be deployed on an inclined surface;
- Never access the scaffold until all its castors are locked to prevent movement;
- Never shift or move the scaffold while anyone is on it
- Brakes on the castors should be on before a person works on the scaffold

6.4.7.4 Suspended Scaffold

A suspended scaffold is mainly used for performing work on the sides of buildings. Workers should be protected by a personal fall arrest system with an independent vertical lifeline anchored from the top of the building.

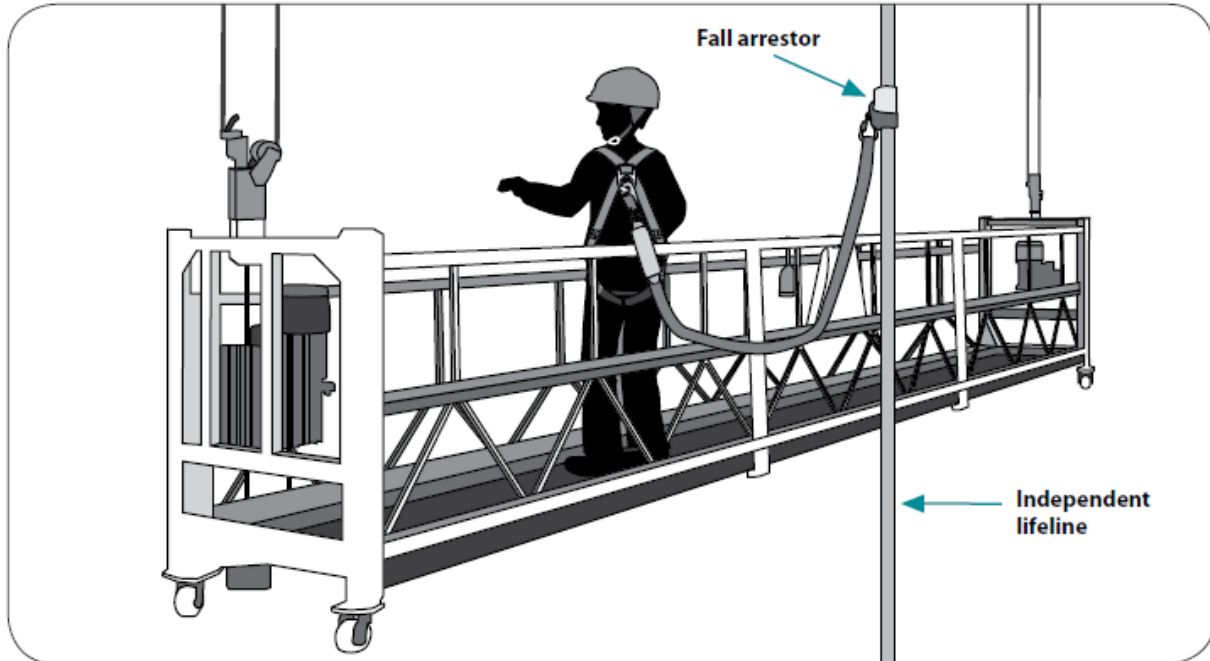


Figure 30 Suspended Scaffold

- A suspended scaffold is a power-operated suspended working platform that is fixed to a building structure. It is used for access during building maintenance or window cleaning.
- During the planning stage, consideration should be given to the methods by which maintenance, repairs or cleaning will be undertaken on buildings or structures.
- Consideration of future maintenance requirements in the early design stage will avoid the possibility of unsafe work practices occurring during routine maintenance. Sloping building exteriors and recline windows require priority consideration to ensure that maintenance can be carried out in a safe manner.
- All suspension scaffold support devices, such as outrigger beams, cornice hooks, parapet clamps, and similar devices, shall rest on surfaces capable of supporting at least 4 times the load imposed on them by the scaffold operating at the rated load of the hoist (or at least 1.5 times the load imposed on them by the scaffold at the stall capacity of the hoist, whichever is greater).
- Suspension scaffold outrigger beams, when used, shall be made of structural metal or equivalent strength material, and shall be restrained to prevent movement.
- The use of repaired wire rope as suspension rope is prohibited.
- A prominently display of notice stating the safe working load of the suspended scaffold and stating the maximum number of persons allowed to be in the scaffold shall be displayed.

6.4.7.5 Hanging Scaffold

A hanging scaffold is a scaffold hung from a structure that is static in the vertical plane; it cannot be raised or lowered by any means. Hanging scaffolds can be hung from tubes, wire ropes, ropes or chains etc.



Figure 31 Hanging Scaffold

6.4.7.6 Cantilever Scaffold

A cantilever scaffold is a scaffold that is supported by cantilevered load-bearing members.



Figure 32 Cantilever Scaffold

A scaffold in a workplace that is erected on cantilever or jib supports shall be adequately supported, fixed and anchored on the supports to prevent displacement.

The cantilever or jib supports used to support the scaffold shall —

- have outriggers of adequate length and cross section; and
- be constructed in accordance with the design and drawings of a professional engineer.

The Cantilever scaffold has been inspected by a professional engineer at least once every 3 months to ensure that it is safe for use.

6.4.7.7 Tube and Coupler Scaffold

Tube and coupler scaffolds are built from tubing connected by coupling devices. Due to their strength, they are frequently used where heavy loads need to be carried, or where multiple platforms must reach several stories high. Their versatility, which enables them to be assembled in multiple directions in a variety of setting.



Figure 33 Tube and Coupler Scaffold

6.4.7.8 Systems Scaffold

Systems scaffolding consists primarily of vertical and horizontal pre-engineered components that connect in a systematic fashion. Systems scaffolding is an umbrella term that includes many different types of scaffolding that can be used to create standardized scaffolding bays



Figure 34 Systems Scaffold

6.4.8 Foundation of Scaffolds

Every scaffold in a workplace shall be constructed, erected or installed on structures or foundations of adequate strength.

6.4.9 Loading requirements for scaffolds

- Site to ensure that signboards stating the maximum permissible weight of tools and materials and the maximum number of persons permissible on each bay are prominently displayed at suitable locations on the scaffold in a site.
- The maximum loading for persons and materials allowed on any work platform in any bay of a scaffold in a workplace shall be 220 kgf per square meter

6.4.10 Designated access point

Every scaffold shall have at least one designated access point from which a person may gain access onto the scaffold and it shall be clearly marked with a sign or label

6.4.11 Scaffold Tag

A tag, notice, or label shall be clearly displayed at the designated access point indicating that the scaffold is safe or unsafe for use.

6.4.12 Toe-boards and guard-rails

- Every side of a work platform or workplace from which a person is liable to fall more than 2 meters shall be provided with toe-boards and 2 or more guard-rails.
- The top guard-rail provided shall be at least 1 meter above the work platform.
- The mid guard-rail approximately halfway between the top rail and the floor. (You can install more than 1 mid guard-rail if required based on your risk assessment).
- The foot of a standard of any frame or modular scaffold in a workplace shall be secured to a base plate so that it does not rest directly on the ground or supporting surface.
- Toe-board or netting are required on all work levels of a scaffold to prevent falling objects.

6.4.13 Sole Plate and Base Plate

A scaffold in a workplace exceeding 15 meters in height or being erected on poorly drained soil, base plates shall bear upon sole plates that are —

- of strength not less than 670 kgf per square meter; or
- of a length suitable to distribute the load.

There shall be no cavity under the sole plate immediately below any standard of a scaffold at the site.

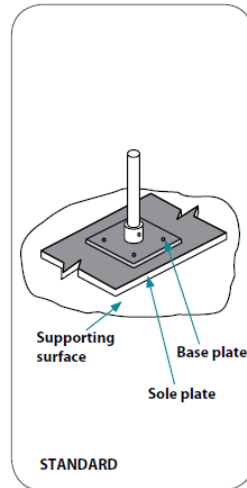


Figure 35 Sole Plate and Base Plate

6.4.14 Ties for metal scaffolds

- Every alternate lift and every uppermost lift of an independent tied metal scaffold in a workplace shall be effectively tied to the building or structure by means of ties.
- Ties shall be located no further than one bay from the ends of the independent tied metal scaffold and thereafter, at intermediate spacing of not more than 3 bays or 7.5 meters apart, whichever is the lesser.
- Every tie shall be capable of withstanding a force of 1,000 kgf applied in either direction along the length of the tie.

6.4.15 Counterweight

- Counterweights shall be made of non-flowable material. Sand, gravel and similar materials that can be easily dislocated shall not be used as counterweights.
- Only those items specifically designed as counterweights shall be used to counterweight scaffold systems. Construction materials such as, but not limited to, masonry units and rolls of roofing felt, shall not be used as counterweights.
- Counterweights shall be secured by mechanical means to the outrigger beams to prevent accidental displacement.
- Counterweights shall not be removed from an outrigger beam until the scaffold is disassembled.

6.4.16 Inspection and Maintenance Procedure

- All sites to ensure a master scaffold register is in place.
- Procedures should be developed for the inspection and maintenance of the scaffold to ensure it remains in a safe condition to avoid potential collapse. Attention should also be paid to the condition of scaffold components, for example corrosion or damage.
- Scaffold shall be inspected:
 - Upon completion of its construction, erection or installation;

- At intervals of not more than 7 days immediately following the date of the last inspection by the scaffold supervisor;
- after exposure to weather conditions likely to have affected its strength or stability or to have displaced any part.

6.4.17 Training Requirements and Competency Assessment

Scaffold erectors and scaffold supervisors shall successfully complete an approved scaffold training in their specific task that should include familiarization with the local statutory requirements or codes of practice.

7 Appendices

Appendix 1 Constructing Scaffolding Checklist

Constructing Scaffolding Checklist Date/Time: Inspected Area: Inspected By:			
Item	Yes	No	Actions/Comments
1. Is the Ground where the scaffold to be erected firm and not water-logged?			
2. Have any excavations near the scaffold which may endanger its stability or access to it?			
3. Have any overhead hazards such as power transmissions line in the vicinity?			
4. Are TM provided with Safety helmets and PPE?			
5. Are there a competent scaffolder on site to supervise the erection?			
6. Are the erection location barricaded to prevent non-relevant TM from entering?			
7. Are toes board provided and securely fastened in position?			
8. Are guardrail fitted?			

Appendix 2 Scaffolding In-Use Checklist

Scaffolding In-Use CHECKLIST Date/Time: Inspected Area: Inspected By:			
Item	Yes	No	Actions/Comments
Is the scaffold surrounding and in the vicinity of the bases for the scaffold not waterlogged?			
Are the scaffold components and fitting showing no signs of deteriorating by rusting?			
Are the sole plate and baseplates still in good condition and in its original position?			
Are guardrail fitted in the correct height?			
Are the working platform, access way and landings cleared off any obstruction, loose objects and tripping hazards?			
Ensure no unauthorized modification to the scaffold			

Appendix 3 Dismantling Scaffolding Checklist

Dismantling Scaffolding CHECKLIST			
Date/Time:			
Inspected Area:			
Inspected By:			
Item	Yes	No	Actions/Comments
Is the scaffold safe for dismantle?			
Has the dismantling sequence been explained to those working on it prior to starting work each day?			
Have barricades been erected to restricted access to the scaffold?			
Have all personnel not involved in the actual dismantling, removed from the site of the scaffold?			
Are the scaffolders wear safety helmets and PPE?			
IS there a competent person to supervise the dismantling operation?			

8 Document Control

Items	Details
ECN Facility	CORP EHS
ECN Area	EHS SAFETY
Approval	This document is approved by: GLOBAL_EHS_SEAL_LT
Notification	Notification of changes to this document is managed through Micron’s Engineering Change Notification (ECN) process to the following: <ul style="list-style-type: none"> • GLOBAL_EHS • GLOBAL_EHS_MANAGERS • GLOBAL_EHS_SEAL_LT • GLOBAL_EHS_TEAM_MEMBERS • GLOBAL_SAFETY_ENGINEERS • GLOBAL_FAC_NOTIFY • GLOBAL_FAC_MANAGER
Review	This document will be reviewed at least biennially (once per two years) by Global EHS / PSM through the Periodic Document Review (PDR) process.

9 Revision History

Rev	Date	Description	Requestor
0	27 Oct 2017	ECN Number: 600961003 First published version	JEREMIAHMOHR
0	08 Nov 2017	ECN Number: Not workflowed Section 5.3 Admin Update	JEREMIAHMOHR
0	08 Aug 2019	ECN Number: Not workflowed Periodic Document Review (PDR) completed. No changes required.	DZULEZWAN
1	23 Nov 2019	ECN Number: 101042006 Facilitate and align to Asian standards (6ft=2.0m) Was: 6.1 Trigger Height ...will be exposed to a fall exceeding six feet (1.8 m). All work at height activities shall be... 6.2 Trigger Height - Exceptions and Clarifications ...to elevated areas in excess of six feet (1.8 m) in height with fall protection provided by... 6.12 Fall Arrest System ...ground or other objects. A standard 6-foot (1.8 m) lanyard anchored at shoulder height will... Is: 6.1 Trigger Height ...will be exposed to a fall exceeding 6 feet* (2.0 m). All work at height activities shall be... 6.2 Trigger Height - Exceptions and Clarifications ...to elevated areas in excess of 6 feet* (2.0 m) in height with fall protection provided by... 6.12 Fall Arrest System ...ground or other objects. A standard 6-foot* (2.0 m) lanyard anchored at shoulder height will... * US Only	JEREMIAHMOHR
2	19 Jul 2020	ECN Number: 101103980 Consolidated Ladder and Raised Metal Floor Standards. Added scaffold procedures. Separate ECNs will be raised for obsolescence of the following documents. <ul style="list-style-type: none"> Global EHS - Work At Heights Ladder Program Standard (2W4373RQWREN-1568922467-47) Global EHS - Raised Metal Floor Program Standard (2W4373RQWREN-1568922467-46) WAS: <ol style="list-style-type: none"> Title: Global EHS - Work At Heights Program Standard Raised Metal Floor & Ladders standard was in a separate document. No Scaffold Procedure Standard 6.1.8 When hole covers are removed, protect the opening with a rigid barricade or guardrail system IS: <ol style="list-style-type: none"> Title: Global EHS - Work At Heights Standard Consolidated Raised Metal Floor & Ladders standard Added in Scaffold Standard 	WEIQI

		<p>4) 6.1.8 When hole covers are removed, protect the opening with a rigid barricade or guardrail system with a warning signage</p> <p>5) 6.1.9 (More than 1 mid-rail can be installed if required based on your risk assessment).</p> <p>6) 6.1.13 body hardness.... or approved by local regulatory body</p>	
3	27 Sep 2021	<p>ECN Number: 101103980</p> <p>Updated information about CIT 133: Self-retracting lifeline/landyard, and scaffold requirements.</p> <p>WAS:</p> <ul style="list-style-type: none"> • 4.0 Terms and definitions: Self-retracting lifeline/lanyard • 6.1.15 Lanyards: <ul style="list-style-type: none"> ○ For work under 5.5 meters (18 feet) an SRD is required. • 6.1.16 Inspections: <ul style="list-style-type: none"> ○ Lifelines Inspection: Daily • 6.4.2 Scaffold Requirements: <ul style="list-style-type: none"> ○ No prohibition of timber scaffold. <p>IS:</p> <ul style="list-style-type: none"> • 4.0 Terms and definitions: Self-retracting lifeline/lanyard (SRL) / device (SRD) • 6.1.15 Self-Retracting Lifeline & Lanyards: <ul style="list-style-type: none"> ○ Added in Selection of SRL and Classes & Anchoring ○ For work under 5.6 meters (18 feet) an SRD is required, for above 5.6 meters (18 feet), selection of fall protection equipment can be determined based on the work activity risk assessment. • 6.1.16 Inspections: <ul style="list-style-type: none"> ○ Lifelines Inspection: Pre-use • 6.4.2 Scaffold Requirements: <ul style="list-style-type: none"> ○ Timber Scaffold is prohibited in Micron. 	WEIQI
3	01 Mar 2022	<p>ECN Number: Not workflowed</p> <p>Minor changes in Section 6.1.16.</p> <p>WAS:</p> <p>Title: Type of Inspection (Typo)</p> <p>Lifelines: Type of Inspection - Individual EHS Personnel</p> <p>IS:</p> <p>Title: Performed by:</p> <p>Lifelines: Performed by - Individual EHS Personnel / Competent person</p>	WEIQI
4	16 Nov 2023	<p>ECN Number: 101153650</p> <p>Changes made to Section 6.3 Ladder to add clarity on the difference for multi-purpose ladders and include leading edge protection for multi-purpose/combination ladders due to CIT 145.</p> <p>WAS:</p> <p>Multi-purpose ladder was not added in as main types of ladders which is commonly used, and no requirements defined for multi-purpose ladder.</p> <p>IS:</p>	WEIQI

		<p>Added in Multi-purpose ladder as one of the main types of ladders used and included requirements as follows:</p> <ul style="list-style-type: none"> Multi-purpose or combination ladders shall be installed with a leading-edge protection at both leading sides as fall protection and provides an extension for 3 points of contact (hands and feet) for team members when ascending or descending the ladder. (In unique situations where leading-edge protection is not possible due to narrow space (e.g. tool blockage etc.) - Employees shall consult with the Site Safety Department and ensure a comprehensive risk assessment to address fall protection (including 3-point contact while ascending and descending). Ladders shall never be used in the horizontal position as scaffolds or work platforms unless it is a multi-purpose or combination ladder that was built for the purpose and rated for the work activity. 	
4	18 Jul 2024	<p>ECN Number: Not workflowed Minor changes to Section 6.3.3, 6.3.6 & Section 5 – References</p> <p>WAS: 6.3.3 - Nil 6.3.6 - All purchasers of portable ladders (including self-fabricated ladders) shall consult with their site Safety Department... Section 5 - Nil</p> <p>IS: 6.3.3 - Extension ladders must extend 3 feet or 0.9 meters beyond the level being accessed if it is used to move from one level to another, such as roof line or interstitial space. 6.3.6 - All purchasers of portable ladders (including self-fabricated ladders – Self-Fabricated Ladder Design Guideline) shall consult with their site Safety Department... Section 5 – Included Self-Fabricated Ladder Design Guideline & link</p>	WEIQI
4	19 Nov 2024	<p>ECN Number: Not workflowed Minor changes to Section 6.1.12 & 6.1.18</p> <p>WAS: 6.1.12 - Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage used to support or suspend platforms and capable of supporting at least 22.2 kN per employee attached, or shall be designed, installed... 6.1.18 - response time (shall be less than 6 minutes)</p> <p>IS: 6.1.12 - Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage used to support or suspend platforms and capable of supporting at least 22.2 kN (for non-engineered anchorage) or 8kN (for engineered anchorage) per employee attached, or shall be designed, installed... 6.1.18 - response time (should at least have verbal contact with the fallen victim within 6 minutes)</p>	WEIQI

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