

## Fall Protection - Appendix E: Requirements for Travel Restraint and Personal Fall Arrest Systems

- Connectors must be drop forged, pressed or formed steel, or made of equivalent materials.
- Connectors must have a corrosion-resistant finish, and all surfaces and edges must be smooth to prevent damage to interfacing parts of the system.
- When vertical lifelines are used, each employee must be attached to a separate lifeline.
- Lanyards and vertical lifelines must have a minimum breaking strength of 5,000 pounds (22.2 kN).
- Self-retracting lifelines and lanyards that automatically limit free fall distance to 2 feet (0.61 m) or less must have components capable of sustaining a minimum tensile load of 3,000 pounds (13.3 kN) applied to the device with the lifeline or lanyard in the fully extended position.
- The use of knots should be avoided wherever possible because of the reduction in strength associated with their use. Where a knot is used, a competent person or qualified person must inspect each knot in a lanyard or vertical lifeline to ensure that it meets the requirements strength and load requirements before any employee uses the lanyard or lifeline. Knots shall not be used to shorten lanyards.
- D-rings, snaphooks, and carabiners must be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 kN).
- D-rings, snaphooks, and carabiners must be proof tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or incurring permanent deformation. The gate strength of snaphooks and carabiners, must be proof tested to 3,600 lbs. (16 kN) in all directions.
- Snaphooks and carabiners must be the automatic locking type that require at least two separate, consecutive movements to open.
- Snaphooks and carabiners must not be connected to any of the following unless they are designed for such connections:
  - Directly to webbing, rope, or wire rope;
  - To each other;
  - To a D-ring to which another snaphook, carabiner, or connector is attached;

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- To a horizontal life line; or
- To any object that is incompatibly shaped or dimensioned in relation to the snaphook or carabiner such that unintentional disengagement could occur when the connected object depresses the snaphook or carabiner gate, allowing the components to separate.
- Each horizontal lifeline:
  - Is designed, installed, and used under the supervision of a qualified person; and
  - Is part of a complete personal fall arrest system that maintains a safety factor of at least two.
- Anchorages used to attach to personal fall protection equipment must be independent of any anchorage used to suspend employees or platforms on which employees work. Anchorages used to attach to personal fall protection equipment on mobile work platforms on powered industrial trucks must be attached to an overhead member of the platform, at a point located above and near the center of the platform.
- Anchorages must be:
  - Capable of supporting at least 5,000 pounds (22.2 kN) for each employee attached; (For travel restraint systems anchorage points must be capable of supporting 3000 pounds (13.34 kN) per employee attached), or
  - Designed, installed, and used, under the supervision of qualified person, as part of a complete personal fall protection system that maintains a safety factor of at least two.
- Travel restraint lines must be capable of sustaining a tensile load of at least 5,000 pounds (22.2 kN).
- Lifelines must not be made of natural fiber rope. Polypropylene rope must contain an ultraviolet (UV) light inhibitor.
- Personal fall protection systems and their components must be used exclusively for employee fall protection and not for any other purpose, such as hoisting equipment or materials.
- A personal fall protection system or its components subjected to impact loading must be removed from service immediately and not used again until a competent person inspects the system or components and determines that it is not damaged and safe for use for employee personal fall protection.

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- Personal fall protection systems must be inspected before initial use during each work shift for mildew, wear, damage, and other deterioration, and defective components must be removed from service.
- Ropes, lanyards, and harnesses used for personal fall protection must be compatible with all connectors used.
- Ropes, lanyards, lifelines, and harnesses used for personal fall protection must be protected from being cut, abraded, melted, or otherwise damaged.
- The employer must provide for prompt rescue of each employee in the event of a fall.
- Personal fall protection systems must be worn with the attachment point of the body harness located in the center of the employee's back near shoulder level. The attachment point may be located in the pre-sternal position if the free fall distance is limited to 2 feet (0.6 m) or less. (For travel restraint systems the attachment point to the full body harness may be at the back, front or side D-ring).
- Personal fall arrest systems
- System performance criteria. In addition to the general requirements in paragraph (c) of this section, the employer must ensure that personal fall arrest systems:
  - Limit the maximum arresting force on the employee to 1,800 pounds (8 kN);
  - Bring the employee to a complete stop and limit the maximum deceleration distance the employee travels to 3.5 feet (1.1 m);
  - Have sufficient strength to withstand twice the potential impact energy of the employee free falling a distance of 6 feet (1.8 m), or the free fall distance permitted by the system; and
  - Sustain the employee within the system/strap configuration without making contact with the employee's neck and chin area.

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- Personal fall arrest systems meeting the above criteria and protocols are acceptable for use by an employee having a combined body and tool weight of less than 310 pounds (140 kg). If the system is used by an employee having a combined body and tool weight of 310 pounds (140kg) or more, the system will need to be modified to provide the employee with appropriate protection.
- System use criteria.
  - On any horizontal lifeline that may become a vertical lifeline, the device used to connect to the horizontal lifeline is capable of locking in both directions on the lifeline.
- Personal fall arrest systems are rigged in such a manner that the employee cannot free fall more than 6 feet (1.8 m) or contact a lowerlevel. A free fall may be more than 6 feet (1.8 m) provided the employer can demonstrate the manufacturer designed the system to allow a free fall of more than 6 feet and tested the system to ensure a maximum arresting force of 1,800 pounds (8 kN) is not exceeded.