

This instruction manual is intended to serve as the Manufacturer's Instructions required by OSHA and ANSI/ASSE Z359 Standards. The Manufacturer's Instructions must be followed for proper equipment use, inspection and maintenance, and as part of an employee training program. The following set of instructions must be provided to all users of this equipment. The user must read and understand these instructions prior to using this equipment. Contact Riggers Safety for additional copies or visit our website at riggersafety.com for a printable version.

The product detailed in this manual is a component in a Personal Fall Arrest System (PFAS) and/or restraint, work positioning, personnel riding or rescue system. According to state and federal laws, employers must ensure that users read, understand and follow the Manufacturer's Instructions, employer's safety protocols, state and federal regulations, and any relevant instructions, markings, warnings or product limitations for each component in the fall protection system as part of a safety training program.

WARNING

WARNING: Use of compatible fall protection system components is mandatory. Failure to comply with instructions regarding use, maintenance and inspection of fall protection equipment and/or failure to remove damaged or defective equipment from service may result in serious injury or death. If you have questions regarding use, compatibility, inspection or care, contact Riggers Safety and your company safety professional.

ALL FALL PROTECTION SYSTEM COMPONENTS MUST BE INSPECTED PRIOR TO INSTALLATION AND PRIOR TO EACH USE. A COMPETENT PERSON OTHER THAN THE USER MUST INSPECT THIS EQUIPMENT AND RECORD THE DETAILS IN THE INSPECTION LOG AT LEAST ANNUALLY

PLEASE READ THE FOLLOWING DISCLAIMERS:

- All PFAS or additional fall protection system components associated with the use of this equipment must comply with ANSI/ASSE Z359 Standards and any applicable new standards. Riggers Safety denies liability for incidents that occur due to non-compliant or incompatible components.
- Riggers Safety assumes no liability for the adequacy of installations incorporating connectors beyond the limitations set by this manual.
- Riggers Safety connectors contain no user-serviceable components. Do not attempt to disassemble, modify or repair. Riggers Safety assumes no liability for the consequences of disassembling or altering this equipment. If equipment is damaged or has been subject to a fall it must be taken out of service and destroyed.

DEFINITIONS AND FUNCTIONS

For a complete list of Riggers Safety definitions and functions please visit our website at <http://riggersafety.com/wp-content/uploads/2016/08/Def.-Functions.W.pdf>

CONNECTOR: A hardware component used to join parts of a fall protection system; for example: lifeline to an anchor using a carabiner as a connector.

CARABINER: The self locking carabiner is a metal loop with a spring-loaded gate that self-closes then locks and is used to securely connect components in a personal fall protection system. Some carabiners include a pin that may be used to permanently retain a lanyard or lifeline. For specifications see Section 5.0.

SNAP HOOK AND REBAR HOOK: Much like the carabiner, this hook is a self-closing/self-locking connector that has an eye for permanent attachment of a lifeline or lanyard. For specifications see Section 5.0.

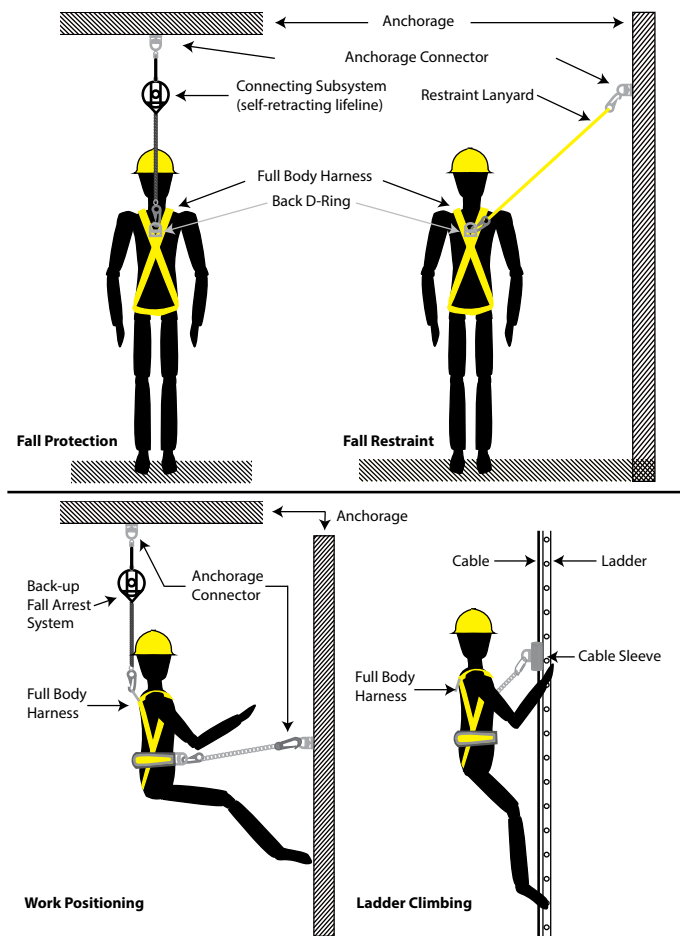
1.0 SYSTEM REQUIREMENTS

1.1 APPLICATION: Riggers Safety connectors are designed for use as a component in a personal fall arrest, restraint, work positioning, personnel riding, or rescue system. The Riggers Safety connectors must be used in combination with approved, compatible fall protection components and the impact force must not exceed 1,800 lbs. (8 kN).

A. PERSONAL FALL ARREST SYSTEM (PFAS): can be used to reduce potential injury whenever a worker at an elevated level is exposed to a fall hazard. All PFAS are required to comply with ANSI Z359 Standards. The height threshold (for example, 4 ft. for general industry workplaces, and 6 ft. for construction) is dictated by industry-specific OSHA standards. A PFAS typically includes a full body harness, a shock-absorbing lanyard and anchorage. Maximum arresting force must not exceed fall arresting forces of 1,800 lbs. (8 kN). For fall arrest applications the lanyard must be connected to the harness dorsal D-ring.

B. PERSONAL RESTRAINT SYSTEM: prevents a worker from reaching a location where a free fall hazard exists and typically includes a full body harness or body belt with dorsal D-ring and a positioning lanyard that is rigged to provide restraint of worker, but does not allow a free fall.

Figure 1: Applications and Functions



C. WORK POSITIONING SYSTEM: is used to hold an elevated worker in place while permitting hands-free work and typically includes a full body harness, positioning Y-lanyard and back-up PFAS. The free fall distance must not exceed 2 ft. For work positioning applications, connect the work positioning subsystem to the harnesses' work positioning D-rings or a body belt positioning attachment. Important: Harness connection points on the lower body must never be used for fall arrest. A secondary, independent PFAS must be connected to the dorsal D-ring and used in conjunction with a work positioning system when the user is at an elevated height.

E. PERSONNEL RIDING OR SUSPENSION SYSTEM: is designed to lower and support a worker vertically while allowing a hands-free work environment and typically includes a full body harness, vertical lifeline and secondary PFAS shock-absorbing lanyard attached to the dorsal D-Ring.

F. RESCUE SYSTEM: is primarily used to retrieve fallen workers or in confined space applications where a user must enter tanks, manholes, etc. and may require retrieval from above should an emergency occur. The configuration of the rescue system depends greatly on the worksite, but generally includes a full body harness and some type of compatible and compliant retrieval device. *Important: Full body harness, lanyard components and connectors are for personal fall protection only and never to load, hang, or support materials or tools.*

WARNING

WARNING: Rescue systems must be rigged so that no vertical free fall is possible. Full body harness and connecting subsystem components are for personal fall protection only and never to load, hang, or support materials or tools.

1.2 CAPACITY: Riggers Safety connectors may only be used by trained authorized persons within the working capacity range of 130 to 310 lbs. (including clothing, tools). Fall protection system components used in conjunction with a connector must have a capacity rating appropriate to the application. Important: No more than one harness-user may attach to a connecting subsystem at once. Each connecting subsystem user must have a separate anchor point and lifeline.

1.3 COMPATIBILITY: ANSI/ASSE Z359.12-2009 requires the use of self-locking snap hooks and carabiners that are compatible in size, shape and strength. Connectors must be capable of supporting at least 5,000 lbs. and are intended for use with approved compatible system components (i.e. D-rings) that meet ANSI/ASSE Z359.12-2009 and OSHA Standards. Substitutions made with non-compliant components are not allowed and may result in disengagement

(roll-out), or damage to snap hook or carabiner. When used properly, ANSI compliant connectors can reduce, but cannot eliminate the possibility of disengagement.

 **WARNING**

WARNING: Do not use fall protection equipment that is not compatible or non-compliant. Use of such equipment may jeopardize the safety of the user.

1.4 ANCHORAGE: before installation an anchorage site survey and hazard risk analysis must be conducted by a competent or qualified person to determine the safe ANSI/ASSE Z359.2-2007 compliant installation location. A competent or qualified person must ensure that the anchorage to which the fall protection system is attached is compatible and capable of supporting static loads in the directions permitted by the application. Anchorage certification requirements are detailed in ANSI/ASSE Z359 Standards and are subject to revision. The required anchorage strength will vary based on the application. The following table shows ANSI/ASSE Z359.2-2007 requirements by application:

Table 1: Anchorage Requirements by Application

1. APPLICATION	2. QUALIFIED PERSON CERTIFIED ANCHOR	3. NON-CERTIFIED ANCHOR	4. MORE THAN 1 SYSTEM ATTACHED TO THE SAME STRUCTURE
Personal Fall Arrest	Static strength of two times maximum arresting force or 3,600 lbs.	Static strength of 5000 lbs.	Multiply (2.) & (3.) by number of systems attached
Restraint	Static strength two times foreseeable force	Static strength of 1,000 lbs.	Multiply (2.) & (3.) by number of systems attached
Work Positioning	Static strength two times foreseeable force	Static strength of 3,000 lbs.	Multiply (2.) & (3.) by number of systems attached
Ladder Climbing	Must sustain the loads required by that particular system (See ANSI/ASSE A14.3-2008 for detailed requirements)		
Personnel Riding / Suspension	Static strength two times foreseeable force	Static strength of 3,000 lbs.	Multiply (2.) & (3.) by number of systems attached
Rescue	Static strength five times the applied load	Static strength of 3,000 lbs.	Multiply (2.) & (3.) by number of systems attached
Horizontal Lifeline	Static strength two times foreseeable force	Must be certified and designed by a qualified person	N/A

Important: Non-certified anchors are those that a competent person can judge to be capable of supporting the predetermined anchor forces prescribed by the standard. Fall protection systems connected to non-certified anchors must, in all cases, limit potential free fall distance to 6 ft or less and be equipped with an energy-absorbing device that limits maximum arrest forces to 900 lbs. or less.

 **WARNING**

WARNING: The anchor point should be above the user's head. Do not work above the anchorage point. Never use an anchor point that prevents connecting hardware from closing or causes any form of gate loading.

1.5 TRAINING: Prior to using this equipment, it is the responsibility of both the user and the employer that supplies this equipment to ensure that they are familiar with these instructions as well as trained under safe conditions (conditions free from risk of injury or fall hazards) in the correct use, limitations, maintenance, inspection, rescue protocols, and the consequences of improper use of this equipment. The user should not attempt to use fall protection equipment unless properly trained. Document and maintain records of all safety, equipment and application training.

Important: Training should be repeated on a periodic basis, when changes occur in company safety protocols or following any safety incident that may occur.

 **WARNING**

WARNING: Failure to train users to comply with Manufacturer's Instructions regarding use, maintenance and inspection of fall protection equipment may result in serious injury or death.

2.0 OPERATION AND USE

2.1 NORMAL OPERATION: Normal operation will allow the gates on all carabiners and snap hooks to self-close and lock when released. *Important: If any PFAS equipment is damaged or exposed to dynamic fall arrest forces, it must be removed from service and destroyed.*

2.2 BEFORE USE: A hazard assessment and a Comprehensive Managed Fall Protection Program based on ANSI/ASSE Z359.2-2007 must be established prior to installing and using fall protection system. Consider user safety before, during and after a fall. Important conditions and limitations to evaluate prior to use include:

A. USER: users should consult with a physician to evaluate their health, fitness level, and their ability to absorb shock from a fall arrest, or to be suspended while using fall arrest equipment. Before operating, a worker should be mentally and physically fit for the purpose, especially at heights or in confined spaces. They must be free from influence of alcohol or drugs, and trained under safe conditions. Individuals that do not meet these minimum health requirement, minors and pregnant women should not use this equipment.

 **WARNING**

WARNING: The installer must not be exposed to a fall hazard during fall protection system installation.

B. ANCHORAGE: a competent or qualified person must approve the anchorage point to be used in the fall protection system in accordance with ANSI and OSHA Standards outlined in Section 1.4. *Important: Only one employee fall protection system may be connected to an anchorage point at a time.*

C. FALL CLEARANCE: a competent or qualified person must calculate an appropriate fall clearance below an elevated work area that is free from obstructions to a potential fall, prior to beginning work. When calculating fall clearance the following must be considered:

C.1 Free Fall Distance: must be limited to a maximum of 6 ft. (Distance may vary by state. Check local standards.)

C.2 Deceleration Distance: the vertical distance a falling person travels, excluding lifeline elongation and free fall distance, between the activation of the PFAS and final fall arrest.

The deceleration distance must be included in the calculation of total necessary fall clearance. *Important:* employment of a rope grab will increase the deceleration distance.

C.3 Height of Worker

C.4 Connecting Subsystem: the length of the connecting subsystem must be factored into the fall clearance distance.

C.5 Stretch: during a fall arrest and after a fall, a harness can stretch by approximately 1 ft. and shock absorbers can elongate by an additional 3.5 ft.

C.6 Safety Factor: it is prudent to allow for an additional safety factor of 3 ft. below the fallen worker's feet.

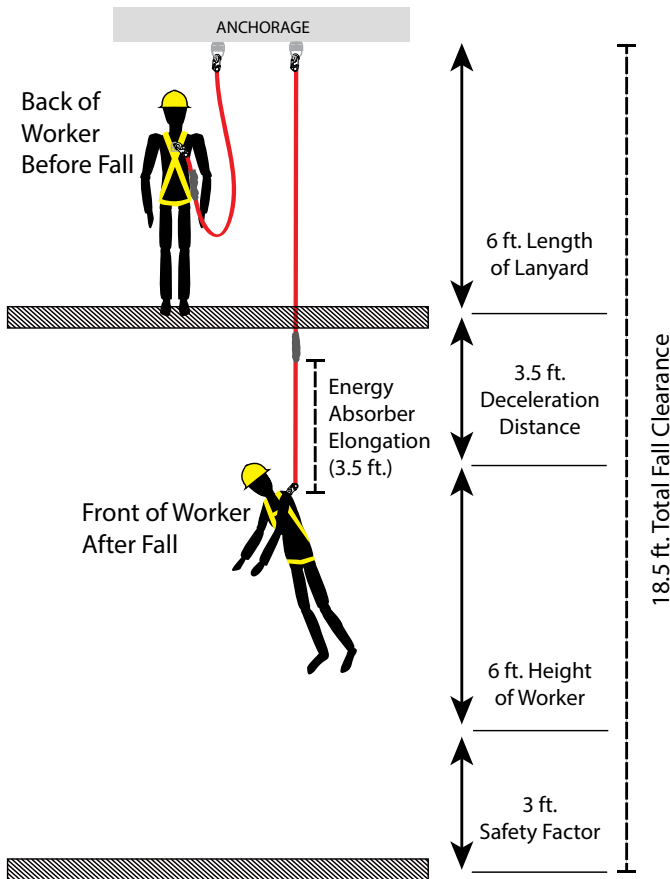
 **WARNING**

WARNING: All PFAS are required to comply with OSHA and ANSI standards and limit free fall to 6 ft. or less. Consult local government regulations for allowable free fall distances as they may vary between ANSI, OSHA, national and local codes. Plan and confirm that there is adequate, unobstructed fall clearance to prevent the user from striking lower levels. Avoid working above the anchorage level which increases the free fall distance.

D. ALTERNATE PERSONAL FALL ARREST SYSTEM: Some suspension and work positioning applications using non-shock absorbing lanyards may require a backup PFAS and an independent fall arrest anchorage. See OSHA and ANSI guidelines when designing the system.

E. SWING FALL: can occur when the worker moves laterally from the anchorage point. The impact force can cause serious injury or death. To prevent the risk of swing fall, Riggers Safety recommends that the lanyard, lifeline or other anchorage connector be installed to an anchor point that is above the user and that the user maintain a safe work

Figure 2: Fall Clearance Diagram



zone that does not exceed 30° on either side of anchor point. The risk of swing falls will significantly increase when a self-retracting lifeline or other variable length connecting subsystem is used.

F. SHARP EDGES: Avoid working where the equipment webbing will be in contact with an abrasive or sharp edge.

G. HAZARDS: Use of this equipment where surrounding hazards exist may result in injury to the user or damage to the equipment. Some hazards include: high heat, severe cold, corrosive or caustic chemicals, high voltage power lines, explosive or toxic gases, moving machinery, sharp edges or unstable overhead materials that could strike a user or fall protection system components. Important: Use caution when working near high voltage power lines; electricity can pass through the metal components and could electrocute the user.

H. TEMPERATURE: Riggers Safety equipment is not designed for high temperature environments. Important: keep equipment away from hot surfaces, excessive heat, flames or sparks.

I. IMPACT: Any connector, lanyard or harness that has been subjected to fall arrest forces shall be removed from service and destroyed.

J. RESCUE: Rescue protocol must be determined prior to use and training and put in writing by the company safety professional. Rescue systems must be rigged so that no vertical free fall is possible during rescue. The employer shall provide for prompt and safe rescue in the event of a fall.

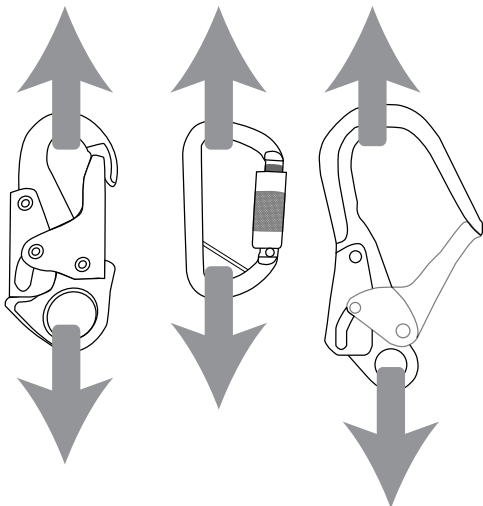
2.3 USE

A. CARABINER: To open the carabiner gate, rotate the gate clockwise and squeeze to open. For triple locking carabiners pull the gate up before rotating it clockwise. Once the gate is open position the carabiner hook over a compliant and compatible connection point and release the spring loaded gate.

Important: Riggers Safety repelling harness models have web loop connection points. Do not use snap hooks to connect to web loops; instead use a self-locking carabiner to connect to a web loop. Ensure the carabiner cannot cross-gate load (load against the gate rather than along the spine or backbone of the carabiner).

B. CAPTIVE CARABINER: To permanently attach carabiner to a fall protection system, drive the roll pin through both pre-drilled carabiner holes and tap it with punch tool until flush with outside of carabiner. Once installed, this captive eye pin should never be removed until retired from service.

Figure 3: Proper Load Directions



C. SNAP HOOKS: To open the snap hook gate, squeeze the locking mechanism on the back side and press in on the gate. With the gate open position the snap hook over a compliant and compatible connection point and release the gate.

2.4 MAKING CONNECTIONS

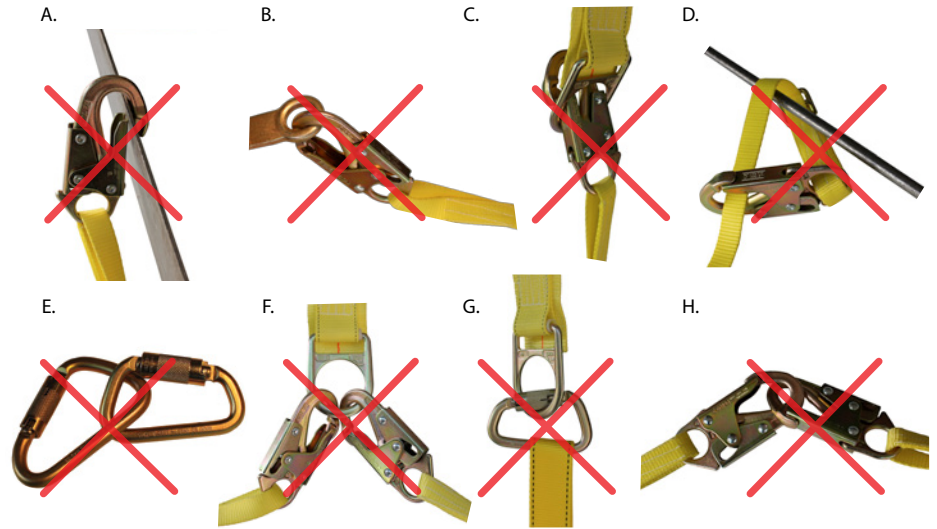
Do not attach a snap hook or carabiner directly to a horizontal lifeline, webbing loop or any system that can cross gate load the connector. When a web lanyard is used as a D-ring extension on a harness, connect the snap hook to the dorsal harness connector. Always follow the manufacturer’s instructions supplied with each subsystem component.

A. LOAD DIRECTION: See Figure 3 for the intended load direction for each carabiner and hook. Improper loading directions can cause the hook to fail or disengage.

B. LIMIT RISK OF ROLL-OUT AND CROSS GATE LOADING:

1. Do not use carabiner or snap hook that will not completely close and lock over the attachment. (Fig. A)
2. Do not connect to small rings or other non-compatible anchors (Fig. B)
3. Ensure that carabiner or snap hook has completely closed and fully engaged to the anchor point. (Fig. C)
4. Do not loop lanyard or rope through carabiner or snap hook and tie-back. (Fig. D)
5. Do not connect carabiners or snap hooks to other carabiners or snap hooks. (Fig. E and H)
6. Do not install more than one snap hook or carabiner into a single connection. (Fig. F)
7. Connect carabiner so that the load is only on the carabiner's fixed steel portion. Never allow load to be directed to the gate. (Fig. G)
8. Do not use knots to attach carabiner.
9. Only attach fall protection systems to anchorages that meet the application-specific criteria outlined in Section 1.4.

Figure 2: Inappropriate Connections



Important: A competent person, fully aware of applicable safety regulations for use, inspection and maintenance should ensure all components are installed correctly and that connections are compliant and compatible in size, shape and strength to prevent injury to the user or damage to the equipment. See the anchorage manufacturer's instructions for more information on making connections.

WARNING

WARNING: A person other than the user must verify that the connector is fully engaged and locked to the anchorage and the user's harness dorsal D-ring prior to being exposed to a fall hazard.

WARNING

WARNING: Rescue protocol must be determined prior to use and training and put in writing by the company safety professional. Do not allow fall protection equipment to be used near any physical hazards like those mentioned in section xxx. If fall occurs, the operator must await rescue and must not manipulate the shock-absorbing lanyard.

3.0 INSPECTION

3.1 FREQUENCY

A. PRIOR TO USE: OSHA and ANSI Standards require that the user or a competent or qualified person inspect all fall protection equipment according to the inspection guidelines listed in Section 3.2 including subsystem components and connectors attached and/or used in conjunction with body support and anchorages as per the Manufacturer's Instructions.

B. ANNUALLY: ANSI/ASSE Z359 Standards requires a formal inspection of all fall protection equipment including subsystem components and connectors attached and/or used in conjunction with body support and anchorages be completed by a competent or qualified person other than the user at least annually. This is subject to local, state, federal and provincial law, which can require more than one inspection a year. More frequent inspections by a competent person may also be required based on company policy or the nature and severity of workplace conditions affecting the equipment and the modes of use and exposure time of the equipment.

B.1 Record inspection results in this manual. Keep records on file. If in doubt about the safety or condition of any equipment, immediately mark it “Do Not Use” and remove from service and destroy to prevent accidental use. A user, competent or qualified person can remove any PFAS product from use.

 **WARNING**

WARNING: extreme working conditions may require that the user inspect equipment more frequently. Read and follow all instructions, markings and/or labels on this equipment. Markings and labels should be intact and legible.

C. AFTER A FALL ARREST: IF EQUIPMENT IS EXPOSED TO FALL FORCES, IT MUST BE IMMEDIATELY REMOVED FROM SERVICE AND DESTROYED.

Table 2: ANSI Z359.14 Inspection Requirements

Types of Use	Application Examples	Conditions of Use	Inspection Frequency by a Competent Person
Infrequent to light	Rescue & Confined space, Factory maintenance	Good storage conditions, indoor or infrequent outdoor use, room temperature, clean environments	Annually
Moderate to heavy	Transportation, Residential construction, Utilities, Warehouse	Fair storage conditions, indoor and extended outdoor use, all temperatures, clean or dusty environments	Semi-annually to annually
Severe to continuous	Commercial construction, Oil & Gas, Mining	Harsh storage conditions, prolonged or continuous outdoor use, all temperatures, dirty environment	Monthly

3.2 INSPECTION STEPS

1. Inspect connector for damage. Look carefully for cracks, sharp edges, burrs, dents, or deformities. Check for bending or distortion.
2. Inspect the snap hook or carabiner for excessive corrosion. The gate and lock should operate smoothly, with no difficulty. Spring lock gates must automatically close and fully engage the nose of the connector hook.
3. Ensure that markings are present and fully legible including serial numbers and date.
4. Inspect each system component or subsystem according to manufacturer’s instructions.
5. Record the inspection date and results in the in the inspection log in on the last page of this manual.

 **WARNING**

WARNING: If equipment fails inspection, do not attempt to alter or repair. ALL FALL PROTECTION EQUIPMENT THAT FAILS INSPECTION OR IS EXPOSED TO FALL ARREST FORCES MUST BE PERMANENTLY REMOVED FROM SERVICE AND DESTROYED.

4.0 MAINTENANCE

4.1 CLEANING: Periodically or as needed. Always clean the connector prior to inspection by using a clean cloth and compressed air to remove dirt and other particles. You may use dry graphite lubricant on hinge.

Important: an excessive buildup of dirt, chemicals, sweat or paint may weaken or damage the functionality of equipment. Do not machine wash or clean with petroleum, solvent agents, acids etc.

WARNING: If the connector device comes into contact with corrosives or acids, remove unit from service. In a safe manner, neutralize and wash with water and mild soap. Inspect PFAS equipment as described section xxx before returning to service.

4.2 STORAGE: Store in a cool, dry, clean environment. Never store in areas where the connector could come into contact with chemicals, moisture or other corrosive substances. This equipment must be kept away from contact with heat or sharp, abrasive surfaces. Important: Inspect the equipment according to section 3.0 after extended storage prior to issuing.

5.0 SPECIFICATIONS

PART #	DESCRIPTION	MATERIAL	WEIGHT (OZ)	SIZE	LENGTH (MM)	STANDARDS	INDIVIDUALLY SEQUENTIAL-LY SERIALIZED
C16500	Snap Hook Yellow Zinc Steel, Small	Zinc Plated Alloy Steel	13.7 oz	9 mm (0.35 in.)	147 mm	ANSI/ASSE Z359.12-2009	✓
C16700	Snap Hook Silver Aluminum, Large	Aluminum Alloy SAE 7075	8.5 oz	18.8 mm (0.74 in.)	152 mm	ANSI/ASSE Z359.12-2009	✓
C16800	Snap Hook Black Aluminum, Large	Aluminum Alloy SAE 7075	8.8 oz	18.8 mm (0.74 in.)	Unavailable	ANSI/ASSE Z359.12-2009	✓
C54500	Carabiner Yellow Zinc Steel, Medium	Zinc Plated Alloy Steel	7.6 oz	12.7 mm (0.5 in.)	Unavailable	ANSI/ASSE Z359.12-2009	✓
C56510	Carabiner Yellow Zinc Steel, Large Captive Pin	Zinc Plated Alloy Steel	8.8 oz	19.05 mm (0.75 in.)	111 mm	ANSI/ASSE Z359.12-2009	✓
C56600	Carabiner Silver Stainless Steel, X-Large	Rust Resistant Stainless Steel	9 oz	19.05 mm (0.75 in.)	112.5 mm	ANSI/ASSE Z359.1-2007	✓
C60020	Carabiner Black Aluminum, Small Double Lock	Aluminum Alloy SAE 7075	3.53 oz	16 mm (0.63 in.)	117 mm	ANSI/ASSE Z359.12-2009	✓
C65110	Carabiner Black Aluminum, Small Triple Lock	Aluminum Alloy SAE 7075	3.53 oz	16 mm (0.63 in.)	117 mm	ANSI/ASSE Z359.12-2009	✓
C66710	Carabiner Silver Aluminum, X-Large Captive Pin	Aluminum Alloy SAE 7075	5.3 oz	22 mm (0.87 in.)	124 mm	ANSI/ASSE Z359.12-2009	✓
C67710	Carabiner Silver Aluminum, XX-Large Captive Pin	Aluminum Alloy SAE 7075	15.9 oz	50.8 mm (2 in.)	237 mm	ANSI/ASSE Z359.12-2009	✓
C77510	Carabiner Yellow Zinc Steel, XX-Large Captive Pin	Zinc Plated Alloy Steel	27.3 oz	50.8 mm (2 in.)	217 mm	ANSI/ASSE Z359.12-2009	✓
C88500	Rebar Yellow Zinc Steel, Large	Zinc Plated Alloy Steel	27.8 oz	64.77 mm (2.55 in.)	244 mm	ANSI/ASSE Z359.12-2009	✓
C88700	Rebar Silver Aluminum, Large	Aluminum Alloy SAE 7075	24.7 oz	63.5 mm (2.5 in.)	248 mm	ANSI/ASSE Z359.12-2009	✓
C88900	Rebar Black Aluminum, Large	Aluminum Alloy SAE 7075	21.6 oz	63.5 mm (2.5 in.)	Unavailable	ANSI/ASSE Z359.12-2009	✓
C90540	D-Ring Yellow Zinc Steel, Large Non-Slot	Zinc Plated Alloy Steel	4.4 oz	53 mm (2.09 in.)	69 mm	ANSI/ASSE Z359.12-2009	✓
C93550	D-Ring Yellow Zinc Steel, X-Large Slotted	Zinc Plated Alloy Steel	5 oz	56 mm (2.2 in.)	103 mm	ANSI/ASSE Z359.12-2009	✓



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