Thinking About Fall Protection

DBI SALA®

f a l l p r o t e c t i o n e x p e r t s

PROTECTA®

A CAPITAL SAFETY COMPANY

DBI-SALA & PROTECTA

YOUR FALL PROTECTION EXPERTS

FOR YOUR MOST CRITICAL SAFETY CONCERN

Fall protection is a complicated issue and one of the most important faced by an employer or worksite supervisor. With over 100,000 reported incidents per year, falls from heights almost always result in serious injury. In the construction industry, falls are the number one cause of worker death. Falls result in millions of dollars of losses annually in lost work, insurance premiums and liability claims. The responsibility to prevent a catastrophe begins with the employer.

DBI-SALA & Protecta is the world's leading manufacturer solely dedicated to providing solutions in fall protection and industrial rescue systems. We understand our customers' needs, and we respond to them by offering the broadest fall protection line in the industry.

PROVIDING SOLUTIONS TO FALL PROTECTION CHALLENGES

Our years of experience providing fall protection solutions for different industries have shown us that employers and managers must take into consideration four important issues:

- **COST EFFECTIVENESS** – In addition to the cost of equipment, it's important to factor in product durability, the effect of equipment on productivity and the potential cost of an accident.
- **KNOWLEDGE** – If you don't have the knowledge in areas of program design, product selection, training and proper use of equipment, you can't have an effective fall protection program.
- **MOTIVATING COMPLIANCE** – Even a well-planned fall protection program will fail if personnel on the job don't use the equipment or don't use it properly.
- **PROTECTING YOUR PRODUCTIVITY** – You shouldn't have to choose between productivity and safety.

With our industry leading specialization, innovation and support, DBI-SALA & Protecta provides the solutions you need for a successful fall protection program.

As part of the ongoing DBI-SALA & Protecta commitment to improving on-the-job safety, this booklet gives an overview of the fall protection basics that serve as the foundation of an effective fall protection program.

TABLE OF CONTENTS

FALL PROTECTION BASICS

SORTING OUT THE TERMINOLOGY

- **FALL PROTECTION** refers to the overall industry and process of protecting workers at height.
- **FALL PREVENTION** refers to the systems and techniques that eliminate the possibility of a fall to a lower level. The most desirable method of fall prevention is to engineer out or modify the work plan to eliminate the hazard.
- **FALL ARREST SYSTEMS** protect the worker after a fall from hitting the ground and/or obstructions below the work platform. Passive systems require little or no personal involvement from the worker. Active systems require the worker to actively use the system in order for it to be effective. It is not always practical, cost effective or possible to employ passive systems. In these cases, a Personal Fall Arrest System is required.
- **PERSONAL FALL ARREST SYSTEMS** (PFAS) are Active Fall Protection methods that require the participation of the worker.
- **FALL RESTRAINT SYSTEMS** use lanyards or some kind of tethering system measured so that workers cannot go beyond the edge where a potential for a fall exists. They are sometimes called Travel Restraint Systems.
- **RESCUE** refers to the ability to retrieve or rescue an individual from confined spaces or heights and must always be a component of any fall protection program.

FALL PREVENTION

When we talk about Fall Protection, the image that often comes to mind is a worker using a full body harness connected to an anchor point with a lanyard, in other words, a Personal Fall Arrest System (PFAS). PFAS are actually one of the later choices in a comprehensive fall protection program. Your first step should be trying to eliminate the fall hazard altogether. This may be accomplished with a modification to the job description, work process and/or work area to eliminate the need to work at height.

The next step is to use fall prevention systems such as guardrails, handrails, ladder cages, warning lines or fall restraint systems. Where all else fails and when working on a flat roof a controlled access zone can be implemented as a form of fall prevention.

TYPES OF FALL PREVENTION SYSTEMS

Guardrails and handrails are barriers that prevent personnel from falling to lower levels. Where suitable, they protect the greatest number of employees with little or no training and no special maintenance. Government regulations dictate the requirements for the installation, testing and use of all barrier type systems.

Ladder cages are still a common site on most industrial workplaces, although some may consider them a dangerous form of fall protection. Ladder cages are not designed to arrest the fall of a worker or even prevent a fall except in the case of the worker's hands slipping off the rungs. They are intended to restrict the movement of the worker so that when falling backwards off the ladder he or she might regain a grip on it before falling too far away. If the worker falls directly downward (which is typical when their feet slip off the rungs) without regaining a grip, injury can result. Ladder cages are acceptable and required where the worker is at or above 24' for construction (20' for general industry), and there is no other form of fall arrest available.

Fall restraint systems are designed and rigged to eliminate the possibility of workers falling to lower levels. Through shortened lanyards and carefully positioned anchor points, workers are prevented from going where the potential for a fall exists. Equipment used in restraint systems is generally less sophisticated than that employed in fall arrest systems since it simply needs to hold the worker back, not support them in a fall.

Warning lines are used to cordon off a hazardous area. This method of fall prevention is predominately used while working on flat roofs.

Controlled access zones are used as a last resort where other fall protection systems can't be used effectively. If a controlled access zone is used, the site must have a written fall protection plan created by a "qualified" person and implemented by a "competent" person, according to OSHA definitions. Note that this option is accepted less and less as fall protection technology advances.

FALL ARREST SYSTEMS

Passive Fall Arrest Systems

Safety nets are passive systems that require little or no training. They are used to arrest or catch the fall of workers, materials or equipment from elevated surfaces. They are not common in general industry, but still used widely in construction and bridge maintenance. Safety nets must be installed, inspected and tested by a "qualified" or "competent" person, according to OSHA definitions.

Personal Fall Arrest Systems

Personal Fall Arrest Systems are much more complex than passive systems and require detailed training to ensure the worker is using the system properly.The basics of every personal fall arrest system can be described as the ABCD's of fall arrest.

OSHA says...

[1926.501(b)(1)]: "Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8M) or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems or personal fall arrest systems."

THE ABCD'S OF FALL ARREST

A – ANCHORAGE

Anchorage means a secure point of attachment (structure) for the fall arrest system. The type of anchorage varies with the industry, the job being performed, the type of installation and most importantly the structure available. Anchorage connectors provide a means of attaching the system to the anchorage. DBI-SALA & Protecta offer a wide line of anchorage connectors for all applications.

OSHA says...

*[1926.502(d)(15)(i)-(ii)]: "**Anchorages** used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 lb. (22kN) 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; ...under the supervision of a qualified person."*

B – BODY SUPPORT

Full body harnesses provide a connection point on the worker for the personal fall arrest system. Depending upon the application, they can be used as part of a system to protect the worker from falling and to limit the extent of potential injury in case of a fall.

OSHA says...
*[1926.502(d)(16)(iii), (iv), (v)]: "**Personal Fall Arrest Systems**, when stopping a fall, shall limit maximum arresting force on an employee to 1,800 lbs.(8 kN) when used with a body harness; be rigged such that an employee can neither free-fall more than 6-feet (1.8 M), not contact any lower level."*

C – CONNECTORS

Connectors are devices used to connect the worker's full body harness to the Anchor system. Connectors include lanyards, snap-hooks, carabiners, deceleration devices and specialty systems such as self-retracting lifelines, ladder climbing systems, vertical lifelines and rope grabs as well as horizontal lifeline.

OSHA says...
*[1926.502(e)(3)]: "**Connectors** shall be drop forged, pressed or formed steel or made of equivalent materials."*
[1926.502(e)(5)]: Connecting assemblies shall have a minimum tensile strength of 5,000 lbs. (22 kN)."

D – DESCENT & RESCUE

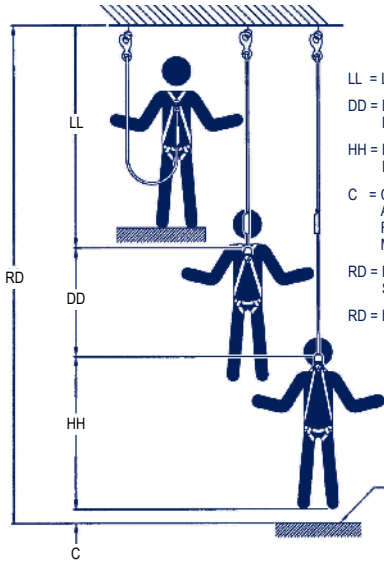
Rescue, the retrieval of a fallen worker or the self-rescue of workers, is a necessary component of any fall protection program. OSHA requires that where a worker is exposed to the risk of a fall, a rescue plan must be in place for the self-rescue or retrieval of that fallen worker.

OSHA says...
*[1926.502(d)(20)]: "The employer shall provide for prompt **rescue** of employees in the event of a fall or shall assure that employees are able to **rescue** themselves."*

CALCULATING FALL CLEARANCE

When setting up and using a personal fall arrest system, fall clearance and swing fall hazards are critical issues. Should a fall occur, there must be sufficient clearance below the user to arrest the fall before the user strikes the ground or any other object. The user of the equipment must determine if the system will arrest the fall within the available clearance. Some factors that affect this determination include anchorage location, type and length of connecting system (lanyard, self-retracting lifelines, rope grab), deceleration distance (the elongation of the decelerating device when deployed -- allow 3.5'), worker height, movement of harness attachment element (allow a safety factor of 2.5 ft.).

LANYARD FALL CLEARANCE



LL = LANYARD LENGTH

DD = ENERGY ABSORBER DECELERATION DISTANCE (3 1/2 FEET TOTAL)

HH = HEIGHT OF THE HARNESS DORSAL D-RING FROM THE WORKER'S FEET

C = CLEARANCE TO OBSTRUCTION DURING FALL ARREST (1 1/2 FET REQUIRED PLUS 1 FOOT FOR D-RING MOVEMENT AND SYSTEM MATERIALS STRETCH = 2 1/2 FEET TOTAL)

RD = REQUIRED DISTANCE BELOW WORKING SURFACE TO NEAREST OBSTRUCTION

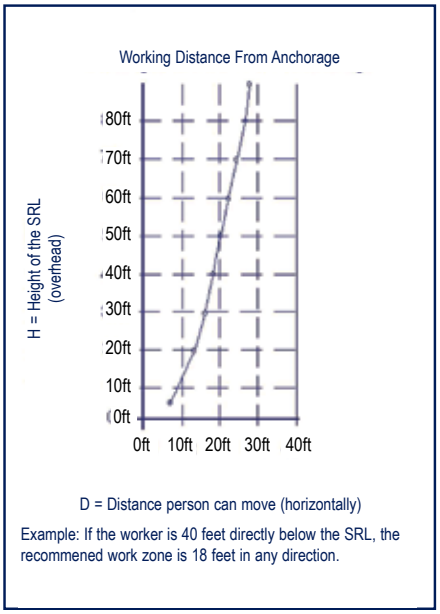
RD = LL + DD + HH + C

For lanyard type connecting systems, see the illustration for estimating fall clearance distances. For SRLs, a minimum of 6' of clearance from the working level to the lower level is recommended.

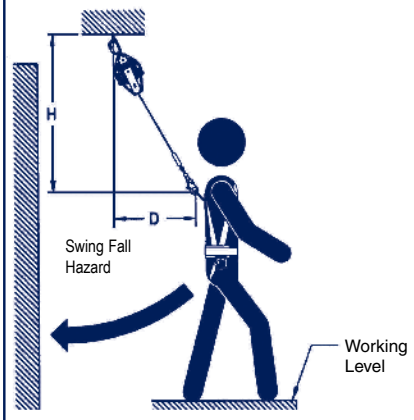
See user instructions supplied with each product for complete details on fall clearances.

SWING FALL HAZARD

Swing falls occur when the anchorage point is not directly above the point where a fall occurs. The force of striking an object while swinging (horizontal speed of the user due to pendulum effect) may cause serious injury. In a swing fall, the total vertical fall distance will be greater than if the user had fallen when directly below the anchorage point. The user must therefore account for an increase in the total free fall distance. SRLs provide greater horizontal and vertical mobility than lanyards, increasing the opportunity for swing falls. See the adjoining chart for recommended horizontal working distances for SRLs. Minimize swing falls by working as close to directly below the anchorage point as possible.



SRL SWINGFALL



See user instructions supplied with each product for complete details on swing fall.

EQUIPMENT INSPECTION & MAINTENANCE

Conscientious inspection of all fall protection equipment is essential to ensure product performance and the safety of the user.

Inspecting frequency

- Equipment should be inspected by the user before each use (OSHA 1910.66, 1926.502 and ANSI Z359.1).
- Formal inspection should be performed annually by a competent person (ANSI Z359.1).
- After fall arrest, equipment shall not be used again until inspected and determined by a competent person to be undamaged and suitable for reuse (OSHA 1910.66, 1926.502 and ANSI Z359.1).

Inspections should be recorded in a centralized logbook that includes the serial number, date of purchase, dates of inspection, servicing performed and authorized signatures.

Inspection guidelines

Hardware — Inspect hardware (including snap hooks, D-rings and buckles) for damage. Check for distortion, corrosion, burrs, cracks and worn parts. Inspect mechanical devices for correct assembly and operation. (For example, SRLs should retract and lock up.)

Webbing — Inspect webbing for frays, cuts or broken fibers. Check for tears, abrasion, mold, burns, heavy soiling or discoloration. Inspect stitching for damage. Inspect impact indicators (if present).

Wire rope, synthetic rope — Inspect for cuts, kinks, broken wires and fibers, corrosion, chemical contact and severely abraded areas. Inspect impact indicators (if present).

Labeling — All labels must be present and fully legible.

If inspection or operation reveals a defective condition, remove the product from service and destroy it or contact an authorized service center for repair.

Maintenance and Storage

Most webbing and hardware items can be washed with mild soap and detergent, water and a rag. Excess grease, dirt and grime should be removed. The equipment should be left to drip dry out of direct sunlight. Some hardware, if stiff or sticking, can be lubricated. However, any hardware that comes in contact with webbing should be free from grease or solvent. Additional servicing and maintenance should be performed only by factory authorized service centers.

Equipment should be stored in a cool, dry and clean environment that is out of direct sunlight. Protective bags that come with the equipment should be used.

Refer to manufacturer's instructions for complete details on inspection, storage and maintenance.

8 STEP FALL PROTECTION PLAN

A Fall Protection plan is essential for any company with personnel who work at heights. A well-designed, written plan is good evidence that an employer is making every effort to comply with mandated regulations. It can help prevent against the economic consequences of an incident including fines, liability and increased insurance costs. Most important, it reduces worker risk and saves lives!

OSHA 1926.502(k) states that the Fall Protection plan must be developed by a qualified person, must be made specific for each site and kept up to date. A copy of the plan must be maintained at the site, and only a qualified person may make changes to the plan.

STEP 1: Perform a **hazard analysis** to determine areas of risk.

STEP 2: Wherever possible, **engineer out the hazard**.

STEP 3: Wherever possible, implement **fall prevention systems** such as guardrails, handrails, and warning lines.

STEP 4: Select appropriate **fall arrest** equipment for your site and personnel.

STEP 5: Use expert analysis to determine and install appropriate **anchorages**, along with any necessary **horizontal and vertical** equipment.

STEP 6: Determine equipment required to cover all **rescue** contingencies.

STEP 7: Establish a comprehensive **training program** on all aspects of Fall Protection and Rescue.

STEP 8: Include it all in a written Fall Protection Plan. The complete Fall Prevention Plan should include a statement of policy, a description of the fall prevention measures being implemented, delegation of ongoing responsibilities in the areas of inspection, record keeping, maintenance, equipment replacement, incident reporting, enforcement, accident investigation, training and changes to the plan.

QUALIFIED AND COMPETENT PERSONS

Many fall protection regulations specify the involvement of a qualified or competent person as defined by OSHA regulations 29 CFR 1926.32(f) and (m):

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

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

UNDERSTANDING FALL PROTECTION APPLICATIONS

Fall protection needs vary depending on the type of task being performed and the industry involved. The DBI-SALA & Protecta complete line of fall protection and rescue equipment provides solutions for every type of fall protection need.

Safety systems for all applications

DBI-SALA & Protecta knows that whatever the job being performed, workers need comfort, mobility and safety! We've designed safety components to provide flexibility and mobility for all types of fall protection and rescue applications.

- **FALL ARREST** – Fall Arrest systems are typically used to protect workers when they are six feet or more above the ground. For maximum safety, all of our standard Fall Arrest systems are designed to limit the maximum arresting forces to 900 lbs. or less—half of the OSHA requirement of 1800 lbs. Typical fall arrest applications are steel erection, suspended platform activities and elevated maintenance work.

- **WORK POSITIONING** – Work positioning systems will hold and sustain the worker at a specific work location, limiting any free fall to two feet or less. Rebar tying and concrete wall-form work are typical applications.

- **RESTRAINT** – Restraint systems prevent the worker from reaching an area where a free fall could occur. Leading edge roof work typically calls for a restraint system.

- **SUSPENSION** – A suspension system supports and holds the worker without any possibility of a free fall while the worker is being raised or lowered. Boatswain's chair jobs, such as painting or window washing, are common examples.

- **RESCUE** – Rescue systems are designed to raise or lower a worker to safety in an emergency without any possibility of a free fall. Rescue systems are typically used in confined space work or anywhere where a worker may fall or become incapacitated.

The following charts will help you with specific product recommendations for common fall protection applications.

PRODUCT RECOMMENDATIONS BY INDUSTRY

FALL ARREST — To protect workers when they are six feet or more above the ground.

INDUSTRY	ANCHORAGE CONNECTOR	BODY HARNESS	CONNECTOR	HORIZONTAL LIFELINE	VERTICAL LIFELINE	RESCUE & DESCENT
General Construction	Glyder 2110808 or Tie-Off Adaptor 1003000	ExoFit XP 1110151 ExoFit 1108501 Delta 1101655 PROTECTA AB104A20	ShockWave 2 lanyard 1224306, Ultra-Lok SRL 3504430, AD212AG SRL or Force 2 lanyard 1225006 (for use with 2110808)	Iron Wing 7003020 BeamSafe 7400520 Sayfline 7600502 7602020	Rope Grab System 5000400	Winch-SRL-tripod combo 8304000, Y-lanyard 1201460, Delta harness 1101828
Plant Maintenance	Fixed Beam Anchors 2108406, Tie-Off Adaptor 1003000, D-ring Anchorage Plate 2101630	ExoFit XP 1110101 ExoFit 1107976 Delta 1102000 PROTECTA AB17530	ShockWave 2 lanyard, 1224306, EZ Stop II lanyard 1220006, PROTECTA lanyard AE57610, Ultra-Lok SRL 3103108, Rebel AD111A SRL	Sayfline 7600502 7602020	LAD-SAF system	Winch-SRL-tripod combo 8304000, Y-lanyard 1201460, Delta harness 1101828
Truck/Railcar Loading/Maintenance	Trolley 2103140	ExoFit XP 1110101 ExoFit 1107976 Delta 1102000 PROTECTA AB17530	Ultra-Lok SRL 3504430 Ultra-Lok 3103208	Sayfglida ARIANA Multi-span Sayfline 7603040	N/A*	N/A*
Warehousing/Order Picker	Cab Mount bracket 3100231	ExoFit XP 1110101 ExoFit 1107976 Delta 1102000 PROTECTA AB17530	Rebel AD111A SRL or Ultra-Lok SRL 3103108 for use with 3100231	Sayfglida ARIANA Multi-span Sayfline 7603040	N/A*	N/A*
Suspended Platform	Tie-Off Adaptor 1003000	ExoFit XP 1110101 ExoFit 1107976 Delta 1102000 PROTECTA AB17530	Rope lifeline 1202754 with 5002042 rope grab and lanyard	N/A*	Rope Grab System 5000400	Rescumatic 3300000
Telecommunications/ Tower Climbing	Tie-Off Adaptor 1003000	ExoFit XP 1110301 ExoFit 1108651 Delta 1107775 Delta 1103270	ShockWave2 lanyard 1224409	N/A*	LAD-SAF system	Rollgliss system 8902004
Petro/Chemical Maintenance	Scaffold Choker 1201390 Tie-Off Adaptor 1003000	Delta 1102000 Delta 1103321 PROTECTA AB17530	Sealed SRL 3403400 EZ Stop II lanyard 1220006	Sayfline Cable 7602020 or Iron Wing Pipe Rack 7007933	LAD-SAF system	RPD 3602000
Offshore Oil Drilling	Stainless steel carabiner 2000301	Derrick harness 1105825 Derrick Belt 1000544	Sealed SRL 3403400	Sayfline Cable 7602020	LAD-SAF system	Rollgliss 3303000
Bridge Construction	Glyder 2110808 Fixed Beam Clamp 2108406	ExoFit XP 1110151 ExoFit 1108501 Delta 1101654 PROTECTA AB104A20	Force2 lanyard 1225006 (for use with 2110808), ShockWave2 lanyard 1224306, Ultra-Lok SRL 3504450, Leading Edge SRL 3504500	Iron Wing Concrete 7003520 or Iron Wing system 7003020 or BeamSafe system 7400520	Rope Grab System 5000400	RPD 3602000
Bucket Truck/Utility Maintenance	Tie-Off Adaptor 1003000 Boom belt 1001250	Delta 1104730	ShockWave2 lanyard 1224310	N/A*	N/A*	Self Rescue Device 3304001
Steel Erection	Glyder 2110808 Fixed beam clamp 2108406	ExoFit XP 1110151 ExoFit 1108501 Delta 1101654	Rebel CT 211B SRL, Force2 lanyard 1225006 (for use with 2110808), ShockWave2 lanyard 1224306, Ultra-Lok SRL 3504450	Iron Wing system 7003020 or Beamsafe system 7400520	Rope grab system 5000400	RPD 3602000
Ladder Climbing	N/A*	ExoFit XP 1109726 ExoFit 1108526 Delta 1103270	LAD-SAF Sleeve 6116502	N/A*	LAD-SAF system	Rollgliss system 8902004
Roofing	Removable Roof Anchor 2103673 or Disposable Roof Anchor 2103672 or Permanent Roof Anchor 2103670	PROTECTA AB17530 Delta 110351	Rope adjuster with 3 ft Shock Absorbing Lanyard 1224005, 50 ft lifeline assembly with counter weight 1203000	Sayfline system 7600202	N/A*	N/A*
Concrete	2104602 or 2104600 Concrete Column Anchor, 2104560 Concrete D-Ring Anchor, 2105500 Concrete Leading Edge Anchor, 2100050 Concrete Anchor Strap	Exofit 110 8501 Delta 1101655 PROTECTA AB104A20	Shockwave 1224303 Lanyard, Ultra-Lok SRL 3504430, Ultra-Lok SRL Leading Edge 3504500	Sayfline 7600502 Sayfline 7602020	N/A*	N/A*

PRODUCT RECOMMENDATIONS BY INDUSTRY

WORK POSITIONING — To hold and sustain workers at a specific work location limiting free fall to two feet or less.

INDUSTRY	ANCHORAGE CONNECTOR	BODY HARNESS	CONNECTOR	HORIZONTAL LIFELINE	VERTICAL LIFELINE	RESCUE & DESCENT
General Construction	Tie-Off Adaptor 1003000 or D-ring Anchorage Plate 2101630	ExoFit XP 1110151 ExoFit 1108501 Delta 1101655 PROTECTA AB104A20	WrapBax lanyard 1221901, Tie-Back lanyard 1221106, Chain Rebar Assembly 5900050	Sayfline 7600502 7602020	Rope Grab System 5000400	RPD 3602000
Plant Maintenance	Tie-Off Adaptor 1003000 or D-ring Anchorage Plate 2101630	ExoFit XP 1110226 ExoFit 1108576 Delta 1102008 PROTECTA AB17540	WrapBax Tie-back lanyard 1221901, Tie-Back lanyard 1221106	Sayfglida ARIANA Multi-span Sayfline 7603040	LAD-SAF system	Rollgliss system 8902004
Communication Tower Maintenance	Scaffold Choker 1201390 or Tie-Off Adaptor 1003000	ExoFit XP 1110301 ExoFit 1108651 Delta 1107775	ShockWave2 lanyard 1224409 and Spreader Hook 2108403 and Lg. Carabiner 2000108	N/A*	LAD-SAF system	Rollgliss system 8902004 or Fisk Descender 2103189
Concrete Wall Form Work	D-ring and Wall-Form Hook Assembly 2101706	ExoFit XP 1110151 ExoFit 1108501 Delta 1101655	Wall-Form Hook Assembly 5904350	N/A*	Rope Grab System 5000400	RPD 3602000

RESTRAINT — To prevent workers from reaching an area where a free fall could occur.

INDUSTRY	ANCHORAGE CONNECTOR	BODY HARNESS	CONNECTOR	HORIZONTAL LIFELINE	VERTICAL LIFELINE	RESCUE & DESCENT
Roof Maintenance	D-ring Anchorage Plate 2101630	ExoFit XP 1110101 ExoFit 1107976 Delta 1102000	Adjustable Web Positioning Lanyard 1201016	Sayfglida system ARIANA system	LAD-SAF system	Rollgliss system 8902004

SUSPENSION — To support and hold workers without any possibility of a free fall while being raised or lowered.

INDUSTRY	ANCHORAGE CONNECTOR	BODY HARNESS	CONNECTOR	HORIZONTAL LIFELINE	VERTICAL LIFELINE	RESCUE & DESCENT
General Construction	Tie-Off Adaptor 1003000	ExoFit XP 1110101 ExoFit 1107976 Delta 1102000 with Boatswain chair 1001134	EZ Stop II lanyard 1220006 PROTECTA lanyard AE57610	N/A*	Rope Grab System 5000400	RPD 3602000 or Fisk Descender 2103189
Window Washing	D-Ring Anchorage Plate 2101630	Delta 1102010 with Boatswain chair 1001190	Rope lifeline 1202754 with 5002042 rope grab and lanyard	Sayfglida ARIANA system	Rope Grab System 5000400	Rollgliss system 8902004

RESCUE — To raise or lower workers to safety in an emergency without any possibility of a free fall.

INDUSTRY	ANCHORAGE CONNECTOR	BODY HARNESS	CONNECTOR	HORIZONTAL LIFELINE	VERTICAL LIFELINE	RESCUE & DESCENT
Utility Maintenance	Tie-Off Adaptor 1003000	ExoFit XP 1110376 ExoFit 1108752 Delta 1101254	Sealed SRL 3400115 Y-Lanyard 1201460	N/A*	N/A*	Modular Davit Arm and Portable Base 8000500 with Sala Lift II winch 8102001
Municipality Work	Tie-Off Adaptor 1003000	ExoFit XP 1110376 ExoFit 1108752 Delta 1101254	Sealed SRL 3400115 Y-Lanyard 1201460	N/A*	Ladder Mast 6116038 with ladder mounting bracket 6116027	Winch and tripod system 8300001
Fire Rescue	N/A*	Delta 1102010	N/A*	N/A*	N/A*	Tripod 8000000 with Rollgliss 8902004
Utility/Bucket Truck Rescue	N/A*	Delta 1102010	N/A*	N/A*	N/A*	Rollgliss Self Rescue 3304001 or Rescumatic 3300000

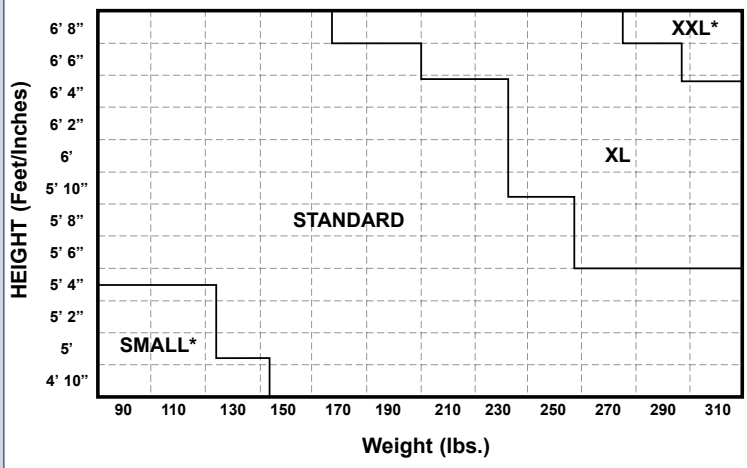
N/A* = Not Applicable

IMPORTANT PRODUCT INFORMATION

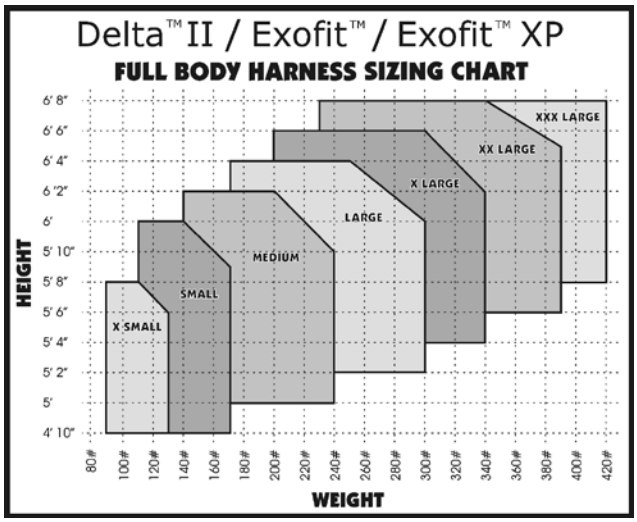
PROPER FIT IS ESSENTIAL FOR COMFORT & PRODUCTIVITY

Whether you wear a harness 4 hours a day or 14 hours a day, it needs to feel good and fit right for optimum comfort, safety and productivity. DBI-SALA & Protecta harnesses are designed to fit any body size or shape.

Protecta Harness Sizing Chart



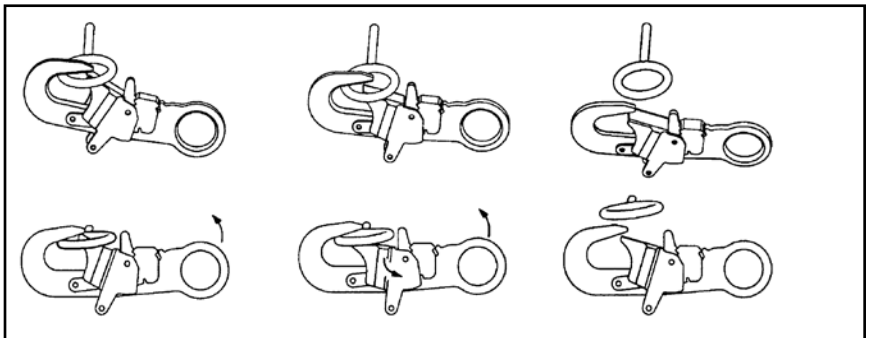
**Small and XXL sizes are available upon request.*



COMPATIBILITY OF CONNECTORS

Connectors are considered to be compatible with connecting elements when they have been designed to work together in such a way that their sizes and shapes do not cause their gate mechanisms to inadvertently open or "roll-out" regardless of how they become oriented.

If the connecting element is undersized or irregular in shape, it may apply force to the gate of the snap hook or carabiner, forcing it to open and disengage.



1. Force is applied to the snap hook	2. The gate presses against the connecting ring.	3. The gate opens allowing the snap hook to slip off.

Always use self-locking snap hooks and carabiners. Ensure that all connections are compatible in size, shape and strength. Ensure that all connectors are fully closed and locked. Contact DBI-SALA & Protecta if you have any questions about compatibility.

HARNESS DONNING INSTRUCTIONS

Step 1

Getting Started

Hold harness by back D-ring which is held in place by a D-ring pad, make certain straps are not twisted.

Step 2

Shoulder Straps

Slip harness over arms and onto shoulders. Make certain all straps are not tangled and hang freely. Shoulder straps should be kept vertical, not pulled into center of body.

Step 3

Leg Straps

Grab dark blue leg straps and connect to buckles attached to yellow straps on each hip (see photos below for your specific buckle type). Pass excess strap through loop keepers. Leg straps should fit snugly.

Step 4

Chest Strap

Attach chest strap by passing male buckle through female buckle (see buckle type photo below for further details). Strap should be six inches below top of shoulders. Pass excess strap through loop keeper.

Step 5

Adjust harness to fit snugly.

Shoulders:
To tighten, pull up on free ends of straps as shown, to loosen, push down on parachute adjuster buckle frame. Straps should be adjusted to same length.

Chest Strap:
To tighten, pull free end of strap, to loosen, push on strap from free end through adjuster buckle and take up slack by pulling on adjuster buckle. To position, slide keeper up or down shoulder strap.

Leg Straps:
See photos at left for your type of leg adjuster buckle.

Back D-ring:
Center between shoulder blades, slide D-ring and pad up or down along the webbing to position.

A properly donned and adjusted full body harness will effectively distribute impact forces throughout your body and provide appropriate support during suspension and rescue following a fall.

DBI-SALA TRAINING & CONSULTING

When it comes to fall protection, there is no margin for error. Every day, workers risk their lives to ccomplish elevated tasks that are essential to the development and operation of our world. From 1992-2000 there were over 3,400 deaths due to falls from heights.

DBI-SALA & Protecta recognizes that our commitment to the life-and-death field of fall protection means that every product we produce must meet or exceed the toughest standards. But we also know that even the best equipment must be used correctly. This is why we have established our training division with the same care and attention that is critical in our manufacturing process.

DBI-SALA & PROTECTA TRAINING SERVICES

The key to effective fall protection training is practical, hands-on experience. We offer a full range of fall protection and industrial rescue courses on-site or at one of our state-of-the-art training centers located throughout North America.

Courses on-site apply professional training to specific daily work activities. Courses at our institutes provide controlled environments uniquely designed to offer practical experience with scaffolding, fixed ladders, towers, sloped roofs, rebar and climbing walls, elevated catwalks, I-beams and confined spaces.

ON-SITE DEMONSTRATION VEHICLES

Workers from all over the world enjoy the experience of our hands-on demonstrations of DBI-SALA & Protecta fall arrest, restraint and rescue equipment. Our Mobile Demonstration Vehicles show drop-tests and force measuring instruments to demonstrate arresting forces workers would experience during a fall. The presentation provides an excellent introduction to fall protection equipment. The demo is available on video in both English and Spanish languages.

OSHA says...
*[1926.503]: (a) **Training Program**. (1) The employer shall provide a training program for each employee who might be exposed to fall hazards. The program shall enable each employee to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to minimize these hazards.*

DBI-SALA & PROTECTA TRAINING PROGRAMS

COURSE	DURATION	AUDIENCE	BENEFIT	OPEN ENROLLMENT	SITE SPECIFIC
Awareness	4 hours	Workers who are seldom at height	Provides general awareness, interest and support	YES	YES
System Specific	4 hours	Workers who use a single pre-engineered and pre-installed fall protection system	Provides the skills and theory necessary for that single system	NO	YES
Fundamentals	1 day	Workers who use a number of pre-determined systems with established anchorages	Establishes an understanding of the systems available on-site and where they are to be used	NO	YES
Detailed Skills	2 days	Workers who are at a variety of locations, often skilled trades (maintenance, electricians, etc.) using personal judgment in the selection, setup and use of fall protection including temporary anchorages	Develops a "toolbox" of skills and knowledge to work safely when there isn't a predetermined system or anchorage	YES	YES
Competent Person	5 days (or custom to site requirements)	Individuals charged with the development, implementation and /or maintenance of a site fall protection program	Creates the necessary skill and knowledge base to meet the requirements for a competent person as defined by OSHA	YES	YES
Qualified Person	5 days (or custom to site requirements)	Engineers charged with the design and setup of engineered fall protection systems	Details the technical requirements to design engineered systems	UPON DEMAND	YES
Equipment Inspection	4 hours	Safety personnel, tool crib operators or anyone who is required to complete formal equipment inspections	Provides the skills and knowledge necessary to complete a formal inspection	YES	YES
Train the Trainer	4 days	Established site trainers	Builds the techniques, theory and materials to teach the four hour awareness courses	YES	YES
Tower Climbing & Rescue	Custom to site requirements	Workers who are required to climb and work on towers both for erection and maintenance	Skills to properly protect oneself when working on the tower and while performing a rescue on the towers	YES	YES
Industrial Rescue	Custom to site requirements	Site rescue teams and/or peer rescue training	Provides the skills to safely retrieve a fallen worker	NO	YES

SELECTED OSHA FALL REGULATIONS

Fall Protection Requirements for Steel Erection (OSHA Subpart R1926.760)

(a) General requirements. (1) Except as provided by paragraph (a) (3) of this section, each employee engaged in a steel erection activity who is on a walking/working surface with an unprotected side or edge more than 15 feet (4.6m) above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.

Safety Standards for Fall Protection in the Construction Industry (OSHA 1926.501 - Duty to have fall protection)

(a) General. (1) This section sets forth requirements for employers to provide fall protection systems. All fall protection required by this section shall conform to the criteria set forth in 1926.502 of this subpart.

(b)(1) Unprotected sides and edges. Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8m) or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

Editors Note: The requirements stated in (b)(1) are similar for: leading edges, hoist area, holes, formwork and reinforcing steel, ramps, runways and other walkways, excavations, dangerous equipment, overhead bricklaying and related work, roofing work on low-slope roofs, steep roofs, precast concrete erection, residential construction and wall openings.

(OSHA 1926.502 - Fall protection system criteria and practices)

(a) General. (1) Fall protection systems required by this part shall comply with the applicable provisions of this section.

(2) Employers shall provide and install all fall protection systems required by this support for an employee, and shall comply with all other pertinent requirements of this subpart before that employee begins the work that necessitates the fall protection.

(d) Personal fall arrest systems. Personal fall arrest systems and their use shall comply with the provisions set forth below. Effective January 1, 1998, body belts are not acceptable as part of a personal fall arrest system. Note: The use of a body belt in a positioning device system is acceptable and is regulated under paragraph (e) of this section.

(5) Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper by the connected member, or shall be a locking type snaphook designed and used to prevent disengagement of the snaphook by the contact of the snaphook keeper by the connected member. Effective January 1, 1998, only locking type snaphooks shall be used.

(15) Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as follows:
(i) as part of a complete personal fall arrest system which maintains a safety factor of at least two; and
(ii) under the supervision of a qualified person.

(16) Personal fall arrest systems, when stopping a fall, shall:
(i) limit maximum arresting force on an employee to 900 pounds (4 kN) when used with a body belt;
(ii) limit maximum arresting force on an employee to 1,800 pounds (8 kN) when used with a body harness;
(iii) be rigged such that an employee can neither free fall more than 6 feet (1.8m), nor contact any lower level;
(iv) bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet (1.07m); and,
(v) have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (1.8m), or the free fall distance permitted by the system, whichever is less.

(e) Positioning device system. Positioning device systems and their use shall conform to the following provisions:

(1) Positioning devices shall be rigged such that an employee cannot free fall more than 2 feet (.9m).
(2) Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds (13.3 kN), whichever is greater.

(OSHA 1926.503 - Training requirements)

(a) Training Program. (1) The employer shall provide a training program for each employee who might be exposed to fall hazards.The program shall enable each employee to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to minimize these hazards.

Fixed Ladders (OSHA 1910.27)

(d.5) Ladder safety devices may be used on tower, water tank and chimney ladders over 20 feet in unbroken length in place of cage protection. No landing platform is required. All ladder safety devices, such as those that incorporate life belts, friction brakes, and sliding attachments, must meet the design requirements of the ladders they serve.

Powered Platforms For Building Maintenance (OSHA 1910.66)

(j) Personal Fall Protection. Employers must provide personal fall arrest systems meeting the requirements outlined. Requirements include the following:

Anchorages to which personal fall arrest equipment is attached shall be capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed and used as part of a complete personal fall arrest system which maintains a safety factor of at least two, under the supervision of a qualified person.

Personal fall arrest systems shall, when stopping a fall: 1) limit maximum arresting force on an employee to 900 pounds (4 kN) when used with a body belt; and 2) limit maximum arresting force on an employee to 1,800 pounds (8 kN) when used with a body harness.

Personal fall arrest systems shall be rigged such that an employee can neither free fall more than 6 feet (1.8m), nor contact any lower level.

Personal fall arrest systems or components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection unless inspected and determined by a competent person to be undamaged and suitable for reuse.

Before using a personal fall arrest system, and after any component or system is changed, employees shall be trained in accordance with the requirements of paragraph 1910.66 (i)(1), in the safe use of the system.

Personal fall arrest systems shall be inspected prior to each use for mildew, wear, damage and other deterioration. Defective components shall be removed from service if their strength or function may be adversely affected.

Permit-Required Confined Spaces (OSHA 1910.146)

(a) Scope and application.This section contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces.
(k)(3) To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements:
(i) Each authorized entrant shall use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which the employer can establish presents a profile small enough for the successful removal of the entrant. Wristlets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.
(ii) The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet deep.

SELECTED ANSI STANDARDS

Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components (ANSI Z359.1-1992)

1.1 Scope - This standard establishes requirements for the performance, design, marking, qualification, instruction, training, inspection, use, maintenance and removal from service of connectors, full body harnesses, lanyards, energy absorbers, anchorage connectors, fall arresters, vertical lifelines, and self retracting lanyards comprising personal fall arrest systems for users within the capacity range of 130 to 310 lbs. (59 to 140 kg.).

1.2.1 This standard addresses only personal fall arrest systems (PFAS) incorporating full body harnesses. Whenever the term "system" is used in the standard it refers to a personal fall arrest system.

3.1.2 When subjected to tests contained in 4.2, a personal fall arrest system in which a full body harness is used shall produce a maximum arrest force (MAF) of not more than 1,800 pounds (8.0kN) and shall bring the fall to a complete stop with a deceleration distance of not more than 42 inches (1,067 mm). In suspension, after the fall is arrested, the angle at rest which the vertical center line of the test torso makes with the vertical shall not exceed 30 degrees.

3.2.1.4 Snaphooks and carabiners shall be self closing and self-locking and shall be capable of being opened only by at least two consecutive deliberate actions.

3.2.2.4 The harness shall provide support for the body across the lower chest, over the shoulders and around the thighs when a tensile load is applied to the fall arrest attachment elements. The harness, when properly fitted and used, shall prevent fall-out.The fall arrest attachment shall be located at the back (dorsal) position.

3.2.4.7 When energy absorbers are dynamically tested in accordance with 4.3.5.2, the maximum arrest force shall not exceed 900 lbs. (4 kN).

3.2.8.7 Static Strength - When tested in accordance with 4.3.7.3, the SRL shall withstand a tensile load of 3,000 pounds (13.3 kN) statically applied directly to the point of SRL line connection to the SRL drum.

3.2.8.9 Dynamic Performance - When tested in accordance with 4.3.7.1, the SRL shall lock and remain locked until released.The arrest distance shall not exceed 54 inches (1,372 mm). Maximum arrest force shall not exceed 1,800 pounds (8 kN).

5.1.2 The legibility and attachment of required markings shall endure for the life of the component, subsystem, or system being marked.

5.3.1 Instructions shall be provided to the user, printed in English, and affixed to the equipment at the time of shipment from the manufacturer.

Ladder Safety Devices (ANSI A14.3-2002)

7.1.3 The ladder safety system shall be designed to absorb the impact of a solid object weighing at least 500 pounds in a free fall of 18 inches.

7.1.4 Design and installation of mountings shall not reduce the strength of the fixed ladder.

7.3.1 The safety sleeve shall be a type which can be operated entirely by the person using the ladder safety system. It shall permit the person using the ladder safety system to ascend or descend without having to continually manipulate the safety sleeve.

7.3.3 The maximum length of the connection between the centerline of the carrier and the point of attachment to the full body harness shall not exceed 9 inches.

SELECTED CSA FALL PROTECTION STANDARDS

Safety Belts and Lanyards (CSA Z259.1-95)

1.1 Scope - This standard covers safety belts of tongue buckle type and lanyards. It may be applied to an assembly consisting of a belt with an attached lanyard, or to a belt alone, or to a lanyard alone.

4.1 Belts covered by this standard should be used for travel restriction and work positioning only, and should not be used as body support in a fall arrest system due to the possibility of death or injury from the following causes" a) fallout from the belt; b) effects of extended static suspension in a belt; or c) abdominal injuries.

6.2.1.1... the attachment hardware shall have a minimum breaking strength of 22kN.

Fall Arresters, Vertical Lifelines, and Rails (CSA Z259.2. 1-98)

1.1 Scope - This standard provides design and performance requirements for manufactured fall-arresting devices, vertical lifelines, and rigid sections, including mounting components.

3.1 Classifications- Fall arresters shall be classified as follows: Class AD-(automatic-dorsal). Class AS- (automatic- sternal). Class ADP - (automatic - dorsal - panic hardware). Class MDP - (manual - dorsal - panic hardware).

4.2.5 Class AD fall arresters shall have an integral connecting linkage of 0.6m or less.

4.2.6.1 Class AS fall arresters shall be used with a connecting linkage of 0.2m or less.

Full Body Harnesses (CSA Z259.10-M90)

1.1 Scope - This standard covers full body harnesses intended for use as body supports in personal fall arrest systems and in other work situations that involve the risk of falling.

3.1 General Classification - Full body harnesses shall be classified as follows: A - Fall Arresting, D - Controlled Descent, E - Confined Entry and Exit (raising and lowering), L -Ladder Climbing (frontal attachment), P - Work Positioning.

4.2.2.1.1 When tested to destruction, the attachment hardware shall have a minimum breaking strength of 22 kN.

7.2 Special Marking - Special marking shall be required to indicate the only attachment point for a fall arresting application.

Shock Absorbers for Personal Fall Arrest Systems (CSA Z259.11-M92)

1.1 Scope - This standard outlines the requirements for testing the performance and strength for shock absorbers that absorb and dissipate kinetic energy when used as a com-ponent of a personal fall arrest system (FAS).

5.3 Dynamic Drop Test - ....a shock absorber shall limit the maximum arrest force to 4.0 kN .

5.4 Final Static Resistance Test - ....a shock absorber must be capable of supporting a load of 22 kN for a period of 5 min.

Self-Retracting Devices for Personal Fall-Arrest Systems (CSA-Z259.2.2-98)

1.1 Scope - This standard specifies the requirements for all self-retracting devices (SRDs) used as connecting components in personal fall-arrest systems. SRDs are further classified in this Standard according to method of use and effective length.

3.1 Classification - Self-retracting devices (SRDs) shall be classified by type as follows: a) Type 1 (SRL) A Type 1 device shall be classified as a self-retracting lanyard (SRL). A SRL shall have a working length of between 1.5 and 3.0m. b) Type 2 (SRL) A Type 2 device shall be classified as a self-retracting lanyard (SRL). A Type 2 SRL shall generally have a working length of more than 3.0m. c) Type 3 (RSRL) A Type 3 device shall be classified as a self-retracting lanyard with retrieval function (RSRL). A RSRL shall have a working length of more than 3.0m and be fitted with a retrieval device.

5.2.1 Dynamic Performance - When tested... the Type 1 SRL shall successfully arrest the fall.The arrest distance shall not exceed 1.0m.

5.3.1 Dynamic Performance - When tested...the Type 2 SRL/Type3 RSRL shall remain locked until released.When released the Type 2 SRL/Type 3RSRL shall exhibit normal operation. The arrest distance measured when the test weight comes to reat shall not exceed 1.4m The maximum arrest force (MAF) measured by the load cell shall not exceed 8kN.

Descent Control Devices (CSA-Z259.2.3-99)

1.1 Scope - This standard outlines requirements and classifications for automatic and manual descent control devices intended for use in the workplace.These devices are not used for fall arrest. Appropriate fall protection equipment is also required in the presence of a fall hazard, except in the case of emergency egress.

3.1 Classification by Type - Descent control devices shall be classified by type as follows: a) Type 1E: automatic descent control devices for emergency egresss (may allow multiple usage); b) Type 2E: manual descent control devices with automatic lockoff, for emergency egress; c) Type 2W: manual descent control devices with automatic lockoff, for work positioning; and c) Type 3W: manual descent control devices without automatic lockoff, for work positioning.

6.4.5 Rate of Descent - Type 1E Devices- ...The device shall not allow the test weight to travel faster than 2m/s if the device is intended for use over solid ground.

DBI-SALA & PROTECTA
YOUR FALL PROTECTION EXPERTS

SPECIALIZATION
Many companies are generalists in safety, but DBI-SALA & Protecta is the only company that has always been committed entirely to fall protection and rescue. We are the fall protection resource from the inception of the fall protection program through every aspect of this critical safety component.

INNOVATION
DBI-SALA & Protecta is known worldwide as a provider of innovative solutions to unique on-the-job fall protection challenges. We have the industry's highest number of engineers, largest patent portfolio, and the greatest number of industry firsts. Combining experience and knowledge, we produce the most technologically advanced safety equipment in the world. We call it "creating a higher standard of safety."

TRAINING & SUPPORT
The DBI-SALA & Protecta training institute in Red Wing, Minnesota, and regional facilities through the country offer state-of-the-art classroom and hands-on training, while our fleet of demo trailers and informational videos bring quality training to the field. Our dedicated customer service professionals, local distributors, technical experts and trainers ensure that you always have the solutions to your problems when and where you need them!

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