



FALLTECH[®]

Fall Protection. Precision Engineered.

ANSI Z359 Overview

George Stallings-Sales Solutions

March 15, 2018

PRESENTATION OVERVIEW

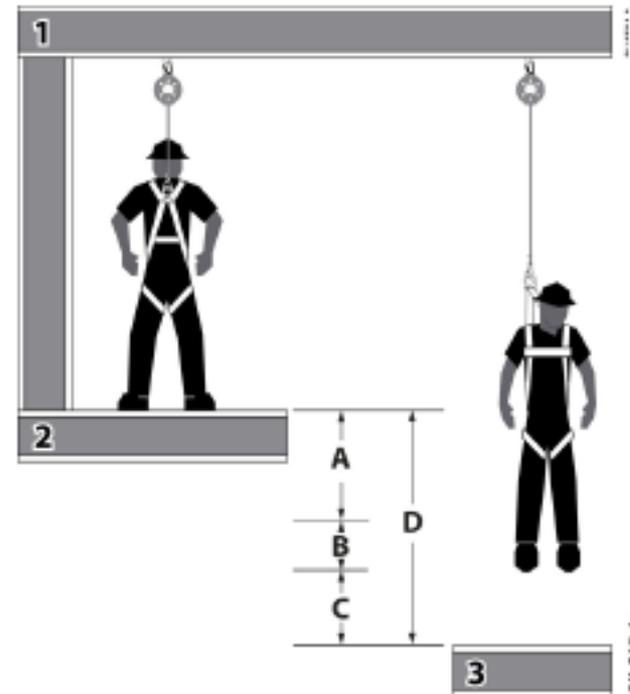
- Key Fall Statistics
- Brief Overview of What ANSI Is
- Overview of the ANSI Z359 Standards
- In Depth Look at Selected Standards
 - Z359.7 (Qualification and Verification Testing)
 - Z359.11 (Full Body Harnesses)
 - Z359.13 (Energy Absorbing Lanyards)
 - Z359.14 (SRDs)
 - Z359.18 (Anchors)
- Walkthrough Example Accreditation Certificates
- Walkthrough Example Declaration of Conformity (D.O.C.)
- Walkthrough Example Test Report
- Q & A

- **Total Fall Fatalities 849**
- **697 Falls to Lower Level**
- **152 from Same Working Surface**
- **388 in Construction (362 in 2015)**
- **309 in General Industry**
- **47% of all Falls to a Lower Level, were from 15' or less**

ANSI Class A SRD

Fig. 3 - Minimum Clear Fall Requirement: ANSI Class A Self-Retracting Device		
A	2 ft	Activation/Deceleration Distance Maximum allowable length of cable or web that may payout from the SRD once deceleration of the user has begun and after a fall event occurs
B	1 ft	Harness Stretch and Dorsal D-Ring Shift Combined amount of harness webbing elongation and dorsal D-ring up-shift during entire fall event
C	1½ ft	Safety Factor Added length to account for other factors such as an improperly adjusted harness, actual worker height or worker weight
D	4½ ft	Total Minimum Clear Fall Distance Required

1. Overhead Anchorage 2. Walking/Working Surface 3. Nearest Lower Level or Obstruction

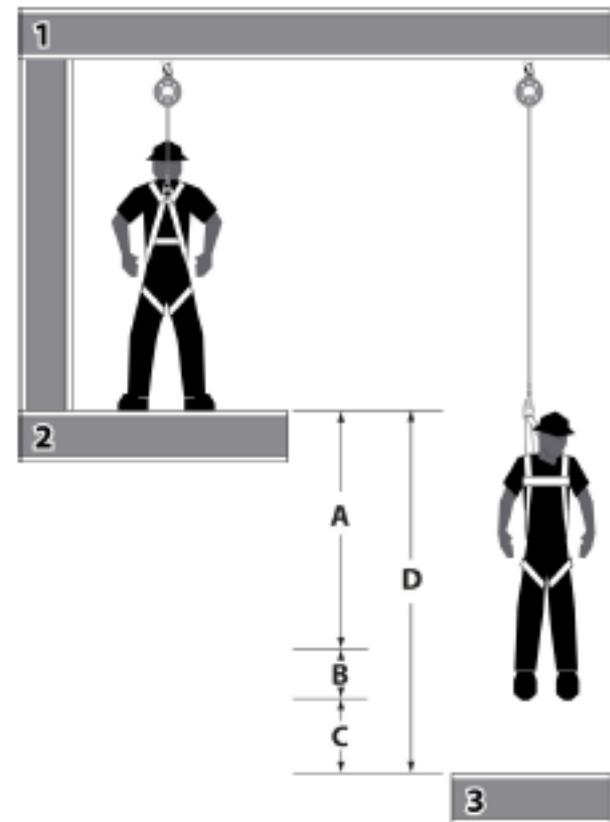


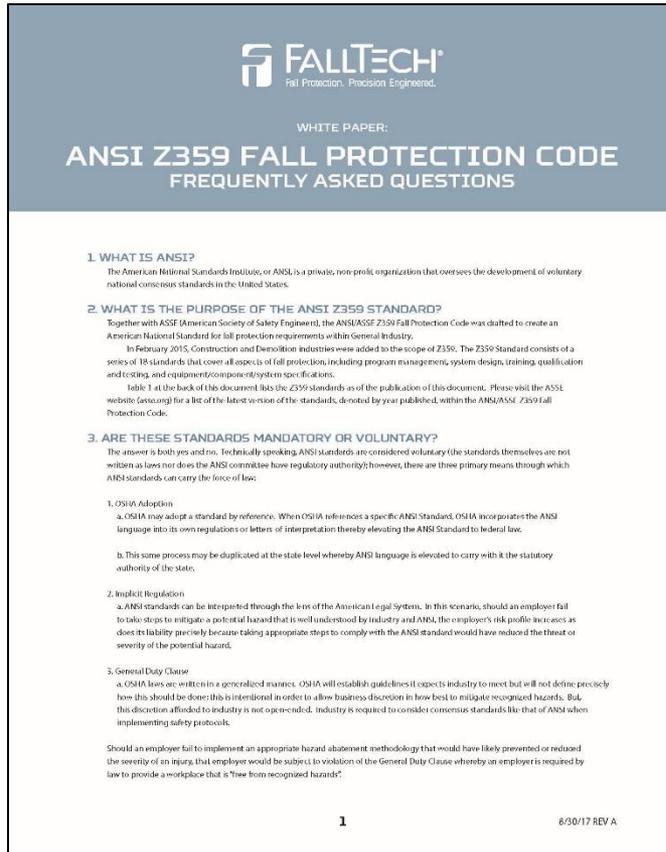
ANSI Class B SRD

Fig. 4 - Minimum Clear Fall Requirement: ANSI Class B Self-Retracting Device

A	4½ ft	Activation/Deceleration Distance Maximum allowable length of cable or web that may payout from the SRD once deceleration of the user has begun and after a fall event occurs
B	1 ft	Harness Stretch and Dorsal D-Ring Shift Combined amount of harness webbing elongation and dorsal D-ring up-shift during entire fall event
C	1½ ft	Safety Factor Added length to account for other factors such as an improperly adjusted harness, actual worker height or worker weight
D	7 ft	Total Minimum Clear Fall Distance Required

1. Overhead Anchorage 2. Walking/Working Surface 3. Nearest Lower Level or Obstruction



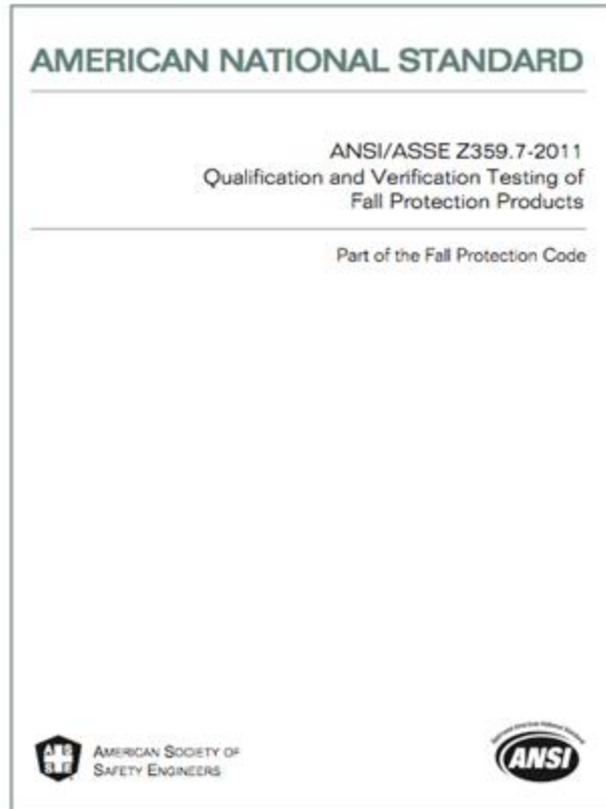


- Consensus standard developed by industry experts, safety professionals, end users, and manufacturers
- Voluntary compliance, but can carry the force of law
 - OSHA Adoption/Direct Citation
 - Implicit Regulation
 - General Duty Clause
- No enforcing body
- “Buyer beware”
- August 14th, 2017 Transition Recap

LIST OF CURRENT ANSI Z359 STANDARDS

- Z359.0-2012: Definitions & Nomenclature Used for Fall Protection/Arrest
- Z359.1-2016: The Fall Protection Code
- Z359.2-2017: Minimum Requirements for a Comprehensive Managed Fall Protection Program
- Z359.3-2017: Lanyards & Positioning Lanyards
- Z359.4-2013: Safety Requirements for Assisted/Self-Rescue Systems, Subsystems, & Components
- Z359.6-2016: Specifications and Design requirements for Active Fall Protection Systems
- Z359.7-2011: Qualification & Verification Testing of Fall Protection Products
- Z359.11-2014: Safety Requirements for Full Body Harnesses
- Z359.12-2009: Connecting Components for Personal Fall Arrest Systems (PFAS)
- Z359.13-2013: Personal Energy Absorbers and Energy Absorbing Lanyards
- Z359.14-2014: Safety Requirements for SRDs for PFAS & Rescue
- Z359.15-2014: Safety Requirements for Single Anchor Lifelines and Fall Arresters for PFAS
- Z359.16-2016: Safety Requirements for Climbing Ladder Fall Arrest Systems
- Z359.18-2017: Safety Requirements for Anchorage Connectors

Note: There are unreleased standards that are currently under development by the committee, which include: HLLs, Rope Access Systems, Descent Devices, and Rigid Rail Systems.



Key Takeaways

- All testing must be done in an ISO:17025 accredited lab
- Testing labs shall only test to the latest standards
- All testing done in manufacturer's lab must be witnessed by a third-party lab representative or a professional engineer
- No compliance claims to portions of product standard (all or nothing)
- Three test specimens per test, unless otherwise specified
- Manufacturer's must produce test reports upon request
- If manufacturer is not ISO:9001 accredited, they must recertify every two years.



Required Tests

- Static Pull Test (4.3.5)
- Dynamic Feet First Drop Test (4.3.3)
- Dynamic Head First Drop Test (4.3.4)
- Impact Indicator Test (4.3.6)

Design Requirements

- Sub-Pelvic Strap (the most important one) (3.1.2)
- Dorsal D-Ring (3.1.3)
- Back Strap (3.1.4)
- Lanyard Keepers (120 lbs. release) (3.1.10)
- Others for harnesses with more attachment points, features, etc.

Trauma Relief Straps



Required Tests

- Static Strength Test (4.6/4.7)
- 6' FF and 12' FF Dynamic Drop Tests (4.5/4.8)
- Y-Leg Dual Connection Drop Test (4.9/4.10)
- Wraparound Static Test (4.11)
- Wraparound Abrasion Test (4.12)
- Conditioned Testing (4.13)

Design Requirements

- 6' FF vs. 12' FF classification
- Lanyard construction requirements
- Labeling requirements include classification, forces, and arrest distance



Required Tests

- Static Strength Test
- Dynamic Strength Test
- Residual Dynamic Strength Test
- Salt Spray Corrosion Test

Design Requirements

- 3 types of Anchorage Connectors:
 - Type T = Tieback
 - Type D = Deforming
 - Type A = Everything Else
- Testing requirements are slightly different for each style
- All welds must be AWS/ANSI qualified
- Previous requirements were in Z359.1-2007
 - 5000 lbs. Static Strength Test only



Required Tests

- Static Strength Test (4.2.5)
- Dynamic Strength Test (4.2.3)
- Dynamic Performance Tests (4.2.1)
- SRL-LE Dynamic Drop Tests (4.2.2/4.2.4)
- Retraction Testing (4.2.6)
- Conditioned Testing (4.2.8)
- SRL-R (3-Way) Testing (4.3)

Class A vs. Class B

- Class A: 24" maximum arrest distance (higher forces allowed)
- Class B: 54" maximum arrest distance (lower forces allowed than Class A)
- OVERHEAD ONLY; classification is meaningless for below D-ring tieoff



Required SRL-LE Tests

- Dynamic Drop Tests over the Edge (Perpendicular and Lateral Offset) (4.2.2)
- Dynamic Strength Test over the Edge (4.2.4)
- Conditioned Testing (4.2.8)

Key Points

- Z359.14-2014 requires that all SRL-LE testing is done over a 0.005" radius edge
- Z359.14-2012 does not have this requirement!
- SRL-LE's must have an energy absorbing component that connects to the user

FallTech White Paper on Z359.14 SRL-LE



The Registrar Company

CERTIFICATE OF REGISTRATION

This is to certify that the Quality Management System of

Alexander Andrew, Inc. (FallTech)

1306 S. Alameda Street
Compton, CA 90221
USA

has been assessed by TRC, Inc. and found to be in conformance to the following standard(s):

ISO 9001:2008

This Registration is for the following scope:

Design, manufacture and service of fall protection equipment.

Original Issue Date: September 28, 2015

Current Term Issue Date: August 30, 2016

Expiry Date: September 15, 2018



President, The Registrar Company, Inc.



Certificate Number: TRC 00969

1400 Preston Road, Suite 400, Plano, TX 75093 USA
335 Laird Road, Unit 9, Guelph, ON N1G 4P7 CANADA



International Accreditation Service
CERTIFICATE OF ACCREDITATION

This is to signify that

ALEXANDER ANDREW INC. DBA FALLTECH
1306 SOUTH ALAMEDA STREET
COMPTON, CALIFORNIA 90221
Testing Laboratory TL-594

has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005, *General requirements for the competence of testing and calibration laboratories*, and has been accredited, commencing December 10, 2015, for the test methods listed in the approved scope of accreditation.



Patrick V. McCullen
Vice President, Chief Technical Officer



C. P. Ramani, P.E.
President



ACCREDITED

Page 1 of 3

Print Date: 12/17/2015

(see attached scope of accreditation for fields of calibration and accredited calibration methods)

This accreditation certificate supersedes any IAS accreditation certificate bearing an earlier date. The certificate becomes invalid upon suspension, cancellation or revocation of accreditation.
See the IAS Accreditation Listings on the web at www.iasonline.org for current accreditation information, or contact IAS directly at (562) 364-8201.

D.O.C. EXAMPLE WALKTHROUGH

Declaration of Conformity
In Accordance with ANSI/ISEA 125-2014

Alexander Andrew, Inc. 1306 S. Alameda St Compton, CA 90221

Declaration # Declaration Date

Tested Item #

Additional Items Conforming Under this Declaration:

Alexander Andrew, Inc. declares that the product(s) listed above is in conformity with the requirements of the following performance standard(s):

Conformity Assessment Method in accordance with ANSI/ISEA 125-2014

Level 1 Level 2 Level 3

Level 1: FallTech Lab Outside the Scope of ISO/IEC Standard 17025:2005	Level 2: FallTech Lab Within the Scope of ISO/IEC Standard 17025:2005	Level 3: Independent 3rd Party Lab accredited to ISO/IEC Standard 17025:2005
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Supporting Documentation	<input type="text" value="PC-0582"/>	<input type="text" value="210125-ASLa1"/>	<input type="text" value="210125-ASLc1"/>	<input type="text" value="210125-ASLh1"/>	<input type="text" value="210125-ASLw1"/>	<input type="text" value="PC-0993"/>
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Authorized Signature

Name Title Date

DoC Rev1 7.2.14

This is not a required document per the ANSI standards, but a higher degree of transparency that FallTech offers its customers. We even include our test reports with the D.O.C.

What to Look For

- Applicable product numbers
- ANSI Standard callout
- Test Reports cited match Test Reports for the product in question

Future Note: The latest draft of Z359.7-2011 requires that all manufacturers provide a D.O.C. as well as the test reports upon request. Projected 2018 approval with 2019 effectivity

TEST REPORT EXAMPLE WALKTHROUGH

Exova
3883 East Eagle Drive
Anaheim
California
USA
92807

T: +1 (714) 630-3003
F: +1 (714) 630-4443
E: sales@exova.com
W: www.exova.com



Test Report Requirements per Z359.7

- Title/Date
- Manufacturer's Name
- Products Tested
- ISO accreditation of lab
- Location of testing
- Applicable standards
- Signatures of authorizing personnel
- Testing results and comments
- Testing conditions (temp, etc.)
- All relevant testing information (test mass, data collection equipment, etc.)

Testing. Advising. Assuring.

April 22, 2015

FallTech Testing Laboratory
1306 S. Alameda Street
Compton, CA 90221

Attention: Peter Mahbubani
Quality Engineer Supervisor

Subject: **Attestation of Witnessing Testing**
Exova OCM Job # 350485
FallTech P.O.: 13825
Report No.: PC-0582
Base Part No. 727630LE
Description: 30' Leading Edge, Cable, Self-Retracting Device
Attached to Test Weight

Dear Mr. Mahbubani:

The purpose of this attestation is to attest to the fact that a representative of Exova OCM was on site at FallTech's facilities to confirm suitability of the equipment used, calibration status of the equipment and to witness testing performed by FallTech employees. Details of this visit are included below.

- Date of Testing:
 - April 16, 2015
- Exova OCM Test Witness:
 - Robert Fortner
- FallTech Test Operators:
 - Peter Mahbubani
 - Yesbet Sierra
- Specification:
 - ANSI Z359.14-2012 4.2.1, 4.2.3, 4.2.5, 4.2.6, 4.2.8.1, 4.2.8.2, 4.2.8.3
- Equipment Calibration Interval
 - 1 year

TEST REPORT EXAMPLE WALKTHROUGH

Exova
OCM

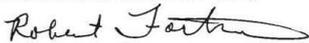
Test Report Requirements per Z359.7

- Title/Date
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- Products Tested
- ISO accreditation of lab
- Location of testing
- Applicable standards
- Signatures of authorizing personnel
- Testing results and comments
- Testing conditions (temp, etc.)
- All relevant testing information (test mass, data collection equipment, etc.)

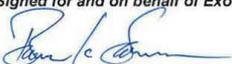
Attached to this attestation is the test report generated by FallTech Testing Laboratory. Exova OCM test witness certifies the report accurately presents the testing performed on the samples identified.

Test Report #	Date	Base Part #	Description	Sample ID's	Results
PC-0582	4/20/2015	727630LE	30' Leading Edge, Cable, Self-Retracting Device	318149 318234 318240 318215 318224 318249 318145 318170 318247 318225 318246 318248 318144 318241 318244 318166 318167 318167 318243	Pass

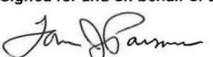
Test Witness Signature: (Signed for and on behalf of Exova-OCM)
 Robert Fortner
 Technician
 Mechanical Laboratory



Approval Signature: (Signed for and on behalf of Exova-OCM)
 Bruce K. Sauer
 Technical Director




Approval Signature: (Signed for and on behalf of Exova-OCM)
 Thomas J. (Tom) Parsons
 Manager
 Quality / Technical Services




This attestation shall not be reproduced except in full, without the written approval of Exova-OCM. The laboratory has witnessed the testing the material / items supplied by the client as sampled by the client. The testing is not within Exova OCM's L.A.B scope of testing and was not performed at Exova OCM.



TEST REPORT EXAMPLE WALKTHROUGH

Test Report Requirements per Z359.7

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FallTech Test Report							
Test Report Number	PC-0582	Date	4/20/2015	Rev	2	Rev Date	11/10/2015
Report Prepared For	FallTech						
Initiated By	Dan Redden	Test Specification	ANSI Z359.14-2012 4.2.1, 4.2.3, 4.2.5, 4.2.6, 4.2.7, 4.2.8.1, 4.2.8.2, 4.2.8.3				
Base Part #	727630LE	Description	30' Leading Edge, Cable, Self-Retracting Device				
Proposed Part #	N/A	Built By Whom	Production	BOM	No		
Test Request #	PC-0582	Date Received	4/15/2015	Date Complete	4/16/2015		
Test Operator	Peter Mahhubani	Test Operator	Yesbet Sierra				

Material/Sample Identification	
Sample ID	Description
318149	30' Leading Edge, Cable, Self-Retracting Device
318234	30' Leading Edge, Cable, Self-Retracting Device
318240	30' Leading Edge, Cable, Self-Retracting Device
318215	30' Leading Edge, Cable, Self-Retracting Device
318224	30' Leading Edge, Cable, Self-Retracting Device
318249	30' Leading Edge, Cable, Self-Retracting Device
318145	30' Leading Edge, Cable, Self-Retracting Device
318170	30' Leading Edge, Cable, Self-Retracting Device
318247	30' Leading Edge, Cable, Self-Retracting Device
318225	30' Leading Edge, Cable, Self-Retracting Device
318246	30' Leading Edge, Cable, Self-Retracting Device
318248	30' Leading Edge, Cable, Self-Retracting Device
318144	30' Leading Edge, Cable, Self-Retracting Device
318241	30' Leading Edge, Cable, Self-Retracting Device
318244	30' Leading Edge, Cable, Self-Retracting Device
318166	30' Leading Edge, Cable, Self-Retracting Device
318167	30' Leading Edge, Cable, Self-Retracting Device
318243	30' Leading Edge, Cable, Self-Retracting Device
2861306	30' Leading Edge, Cable, Self-Retracting Device
2861138	30' Leading Edge, Cable, Self-Retracting Device
2861286	30' Leading Edge, Cable, Self-Retracting Device

This laboratory is accredited in accordance with the recognized international standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated January 2009).

TEST REPORT EXAMPLE WALKTHROUGH

Test Report Requirements per Z359.7

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- Testing conditions (temp, etc.)
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FallTech Test Report					
Test Report Number	PC-0582	Date	4/20/2015	Rev	2
Report Prepared For	FallTech				
Initiated By	Dan Redden	Test Specification	ANSI Z359.14-2012 4.2.1, 4.2.3, 4.2.5, 4.2.6, 4.2.7, 4.2.8.1, 4.2.8.2, 4.2.8.3		
Base Part #	727630LE	Description	30' Leading Edge, Cable, Self-Retracting Device		
Proposed Part #	N/A	Built By Whom	Production	BOM/No	
Test Request #	PC-0582	Date Received	4/15/2015	Date Complete	4/16/2015

Test Summary				
Test Specification	Test Criteria	Test Result	Pass/Fail	
ANSI Z359.14-2012 4.2.1	Arrest Distance	Class A $\leq 24"$ Class B $\leq 54"$	15"	Pass
	Max Arrest Force	≤ 1800 Lbf	1173.4 lbf	Pass
	Avg Arrest Force	Class A ≤ 1350 Lbf Class B ≤ 900 Lbf	737.8 lbf	Pass
	Retraction Tension	1.25 Lbf - 25 Lbf $\leq 24"$ Extended	5.6 lbf	Pass
ANSI Z359.14-2012 4.2.1	Arrest Distance	Class A $\leq 24"$ Class B $\leq 54"$	19.75"	Pass
	Max Arrest Force	≤ 1800 Lbf	1266.5 lbf	Pass
	Avg Arrest Force	Class A ≤ 1350 Lbf Class B ≤ 900 Lbf	773.1 lbf	Pass
	Retraction Tension	1.25 Lbf - 25 Lbf $\leq 24"$ Extended	6.2 lbf	Pass
ANSI Z359.14-2012 4.2.1	Arrest Distance	Class A $\leq 24"$ Class B $\leq 54"$	15.3"	Pass
	Max Arrest Force	≤ 1800 Lbf	1094.3 lbf	Pass
	Avg Arrest Force	Class A ≤ 1350 Lbf Class B ≤ 900 Lbf	734.0 lbf	Pass
	Retraction Tension	1.25 Lbf - 25 Lbf $\leq 24"$ Extended	5.8 lbf	Pass
ANSI Z359.14-2012 4.2.3	Dynamic Strength	4' Fall w/ 300 Lb Test Weight; Weight Shall Not Strike the Ground	Did not strike ground	Pass
	Line Constituent Strength	≥ 1000 Lbf	1011 lbf	Pass
ANSI Z359.14-2012 4.2.3	Dynamic Strength	4' Fall w/ 300 Lb Test Weight; Weight Shall Not Strike the Ground	Did not strike ground	Pass
	Line Constituent Strength	≥ 1000 Lbf	1008.7 lbf	Pass
ANSI Z359.14-2012 4.2.3	Dynamic Strength	4' Fall w/ 300 Lb Test Weight; Weight Shall Not Strike the Ground	Did not strike ground	Pass
	Line Constituent Strength	≥ 1000 Lbf	1011.7 lbf	Pass

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communique dated January 2009).

TEST REPORT EXAMPLE WALKTHROUGH



FallTech Testing Laboratory
1306 S. Alameda Street,
Compton, CA 90221-4803
Tel: (323) 752-0060
www.falltech.com

FallTech Test Report							
Test Report Number	PC-0582	Date	4/20/2015	Rev	2	Rev Date	11/10/2015
Report Prepared For	FallTech						
Initiated By	Dan Redden	Test Specification	ANSI Z359.14-2012 4.2.1, 4.2.3, 4.2.5, 4.2.6, 4.2.7, 4.2.8.1, 4.2.8.2, 4.2.8.3				
Base Part #	727630LE	Description	30' Leading Edge, Cable, Self-Retracting Device				
Proposed Part #	N/A	Built By Whom	Production	BOM	No		
Test Request #	PC-0582	Date Received	4/15/2015	Date Complete	4/16/2015		
ANSI Z359.14-2012 4.2.8.3	Arrest Distance	Class A ≤ 24" Class B ≤ 54"	27.3"	Pass			
	Max Arrest Force	≤ 1800 Lbf	1040.4 lbf	Pass			
	Avg Arrest Force	Class A ≤ 1575 Lbf Class B ≤ 1125 Lbf	741.8 lbf	Pass			
	Retraction Tension	1.25 Lbf - 25 Lbf ≤ 24" Extended	5.6 lbf	Pass			
Conclusion							
FallTech P/N 727630LE Self-retracting Device meets the requirements of ANSI Z359.14-2012.							
Report Signatories and Approval							
Lab Quality Manager	<i>Jag Spornky</i>			Date	12/8/2015		
Witnessed by	<i>Robert Fortner</i>			Date	12/19/2015		

Test Report Requirements per Z359.7

- Title/Date
- Manufacturer's Name
- Products Tested
- ISO accreditation of lab
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Questions?

