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Test Report

Personal Fall Arrest Equipment
ANSI Z359.13-2013
Energy Absorbing Lanyards
(Qualification Testing)

Report no: 2.20.02.08

Client: Jinhua Jech Tools Co., Ltd.
No.1448 Tongxi Road, Linjiang Industrial Park
Wucheng District
Jinhua City
Zhejiang 321025
China

Manufacturer: Jinhua Jech Tools Co., Ltd.

Client order: T/0665B

Order received: 28 November 2019

Model: JE331227L

Dates of tests: 29 November 2019 to 14 February 2020

Signed:

Steven Sum, Laboratory Manager

Issued: 16 February 2020

Conditions

This report may be reproduced and distributed to your clients, provided that it is reproduced and distributed in full.

Specimens will be disposed of four weeks from the date of this report, unless otherwise instructed.

Opinions, comments and interpretations expressed in this report are shown in italics.

Copies of INSPEC interpretations referenced in this report are available upon request.

Tests marked ☒ are not included in our ANAB Scope of Accreditation.

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http://inspec-international.com/ToB.pdf

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Summary of assessment*

Clause	Requirement	Assessment (See Key)
3.1.5	Deployment Indicator	Pass
3.1.6	Activation force	Pass
3.2	Energy absorber	Ltd
3.2.1	Material	NAs
3.2.2	Terminations	Ltd
3.2.3	Connectors	
3.2.4	Dynamic performance – ambient dry	Pass
3.2.5	Dynamic performance – ambient wet	Pass
	Dynamic performance – cold dry	Pass
	Dynamic performance – hot dry	Pass
3.2.6	Static strength	Pass
3.2.7	Static test for wrap-around lanyards (3600 lbf – abraded)	
3.2.8	Static test for wrap-around lanyards (5000 lbf – unabraded)	
3.2.9	Static test for Y-lanyards	
3.2.10.1	Dynamic test for Y-lanyards (Single connection)	
3.2.10.2	Dynamic test for Y-lanyards (Dual connection)	
3.2.10.3	Dynamic test for Y-lanyards (Hip connection)	
5.1 / 5.2	Marking	Ltd
5.3 / 5.4	Instructions	Ltd

Key

	Shading shows the clauses requested. Any other clauses were not requested.
Pass	Requirement satisfied.
Ltd	Testing requested was insufficient completely to verify compliance with the clause. Refer to the "Result details" section for more information.
Fail	Requirement not satisfied. Refer to the "Result details" section for more information.
NAs	Assessment not carried out.
NAp	Requirement not applicable.
NT	Requested but not tested due to early termination following failure.

* Assessment relates only to those specimens which were tested and are the subject of this report.

Submission details 01

Product	Quantity	Dates received	INSPEC specimen no.
Shock absorbing lanyard, model JE332205N	20	25 November 2019	2G22601 – 2G22620
	01	27 November 2019	2G22621
Shock absorbing lanyard, model JE332205L	02	25 November 2019	2G22701 – 2G22702
	01	27 November 2019	2G22703
Shock absorbing lanyard, model JE331227L	02	25 November 2019	2G22901 – 2G22902
	01	27 November 2019	2G22903

Procedures

The specimens detailed within the submissions above were used for the tests covered by this report.

Testing was performed in accordance with ANSI Z359.13-2013 unless otherwise specified below. Reference should be made to the standard when reading this report.

Unless stated otherwise, specimens were tested in the condition as received by INSPEC.

Testing was performed at INSPEC's laboratory in Kunshan, China.

The manufacturer declared the following:

Shock absorbing lanyard JE331227L use the same shock pack as model JE332205N and JE332205L

Shock absorbing lanyard JE331227L is a single leg variant model of twin legged energy absorbing lanyard JE332205L. Both products use the same materials.

To avoid duplicate testing, some test results of model JE332205L and JE332205N are shared across to model JE331227L. See results details below.

Result details

3.1.5 Deployment indicator

Subsequent to the testing of specimens 2G22901, 2G22902 and 2G22903 against 3.2.4, it became obvious that the energy absorbers had been activated. Pass

3.1.6 Activation force

Specimens 2G22601, 2G22602 and 2G22603 were assessed.

The specimens showed no sign of activation when subjected to the 450 pounds static force. Pass

The permanent elongation of the specimen 2G22601, following the test, was 0.59 inches. This is less than the maximum 2 inches permitted. Pass

The permanent elongation of the specimen 2G22602, following the test, was 0.39 inches. This is less than the maximum 2 inches permitted. Pass

The permanent elongation of the specimen 2G22603, following the test, was 0.59 inches. This is less than the maximum 2 inches permitted. Pass

3.2 Personal Energy Absorbing Lanyard Component

Specimen 2G22604 was assessed.

The specimen incorporated a Personal Energy Absorber Component which satisfied this standard. Ltd

3.2.1 Materials

Specimen 2G22604 was assessed.

Webbing was used on the construction of the energy absorbing lanyard.

The materials used in the construction of this energy absorbing lanyard, and their characteristics, were not assessed. Manufacturer to certify. NAs

3.2.2 Terminations

Specimen 2G22604 was assessed.

The energy absorbing lanyard was constructed of webbing.

The end terminations satisfied 3.2.2.2, as appropriate (see below). Ltd

3.2.2.2 Webbing terminations

Specimen 2G22604 was assessed.

a)	Lock stitches sewn on all stitched eye termination straps were not assessed. Manufacturer to certify.	NAs
b)	The material and characteristics of thread used was not assessed. Manufacturer to certify.	NAs
	Threads used for sewing the webbing were black colour. This contrasted with the yellow colour of the webbing.	Pass
c)	Webbings were protected from concentrated wear at all interfaces with load-bearing connector elements.	Pass
e)	The ends of the webbing were hot-cut so as to prevent unravelling.	Pass

3.2.4 Dynamic performance test - Ambient dry condition (average arrest force)

Specimens 2G22901, 2G22902 and 2G22903 were assessed.

During the dynamic performance tests, the average arrest force of the specimens were recorded as follows:

Specimen 2G22901 was 835 pounds.	Pass
Specimen 2G22902 was 784 pounds.	Pass
Specimen 2G22903 was 798 pounds.	Pass

These values are less than the maximum 900 pounds permitted.
See Annex 1 for the plot of force versus time.

3.2.4 Dynamic performance test - Ambient dry condition (maximum arrest force)

Specimens 2G22901, 2G22902 and 2G22903 were assessed.

During the dynamic performance tests, the maximum arrest force of the specimens were recorded as follows:

Specimen 2G22901 was 1015 pounds.	Pass
Specimen 2G22902 was 944 pounds.	Pass
Specimen 2G22903 was 940 pounds.	Pass

These values are less than the maximum 1,800 pounds permitted.
See Annex 1 for the plot of force versus time.

3.2.4 Dynamic performance test - Ambient dry condition (deployment distance)

Specimens 2G22901, 2G22902 and 2G22903 were assessed.

During the dynamic performance tests, the deployment distance of the specimens were recorded as follows:

Specimen 2G22901 was 39.0 inches.	Pass
Specimen 2G22902 was 39.4 inches.	Pass
Specimen 2G22903 was 33.7 inches.	Pass

These values are less than the maximum 48 inches permitted.

3.2.5 Dynamic performance test - Ambient wet condition (average arrest force)

Specimens 2G22607, 2G22608 and 2G22609 were assessed.

During the dynamic performance tests, the average arrest force of the specimens were recorded as follows:

Specimen 2G22607 was 977 pounds.	Pass
Specimen 2G22608 was 983 pounds.	Pass
Specimen 2G22609 was 986 pounds.	Pass

These values are less than the maximum 1,125 pounds permitted.
See Annex 1 for the plot of force versus time.

3.2.5 Dynamic performance test - Ambient wet condition (maximum arrest force)

Specimens 2G22607, 2G22608 and 2G22609 were assessed.

During the dynamic performance tests, the maximum arrest force of the specimens were recorded as follows:

Specimen 2G22607 was 1467 pounds.	Pass
Specimen 2G22608 was 1443 pounds.	Pass
Specimen 2G22609 was 1461 pounds.	Pass

These values are less than the maximum 1,800 pounds permitted.
See Annex 1 for the plot of force versus time.

3.2.5 Dynamic performance test - Ambient wet condition (deployment distance)

Specimens 2G22607, 2G22608 and 2G22609 were assessed.

During the dynamic performance tests, the deployment distance of the specimens were recorded as follows:

Specimen 2G22607 was 31.7 inches.	Pass
Specimen 2G22608 was 32.0 inches.	Pass
Specimen 2G22609 was 31.5 inches.	Pass

These values are less than the maximum 48 inches permitted.

3.2.5 Dynamic performance test – Cold dry condition (average arrest force)

Specimens 2G22610, 2G22611 and 2G22612 were assessed.

During the dynamic performance tests, the average arrest force of the specimens were recorded as follows:

Specimen 2G22610 was 843 pounds.	Pass
Specimen 2G22611 was 853 pounds.	Pass
Specimen 2G22612 was 831 pounds.	Pass

These values are less than the maximum 1,125 pounds permitted.
See Annex 1 for the plot of force versus time.

3.2.5 Dynamic performance test - Cold dry condition (maximum arrest force)

Specimens 2G22610, 2G22611 and 2G22612 were assessed.

During the dynamic performance tests, the maximum arrest force of the specimens were recorded as follows:

Specimen 2G22610 was 1034 pounds.	Pass
Specimen 2G22611 was 1065 pounds.	Pass
Specimen 2G22612 was 995 pounds.	Pass

These values are less than the maximum 1,800 pounds permitted.
See Annex 1 for the plot of force versus time.

3.2.5 Dynamic performance test - Cold dry condition (deployment distance)

Specimens 2G22610, 2G22611 and 2G22612 were assessed.

During the dynamic performance tests, the deployment distance of the specimens were recorded as follows:

Specimen 2G22610 was 37.0 inches.	Pass
Specimen 2G22611 was 36.5 inches.	Pass
Specimen 2G22612 was 36.8 inches.	Pass

These values are less than the maximum 48 inches permitted.

3.2.5 Dynamic performance test - Hot dry condition (average arrest force)

Specimens 2G22613, 2G22614 and 2G22615 were assessed.

During the dynamic performance tests, the average arrest force of the specimens were recorded as follows:

Specimen 2G22613 was 807 pounds.	Pass
Specimen 2G22614 was 817 pounds.	Pass
Specimen 2G22615 was 854 pounds.	Pass

These values are less than the maximum 1,125 pounds permitted.
See Annex 1 for the plot of force versus time.

3.2.5 Dynamic performance test - Hot dry condition (maximum arrest force)

Specimens 2G22613, 2G22614 and 2G22615 were assessed.

During the dynamic performance tests, the maximum arrest force of the specimens were recorded as follows:

Specimen 2G22613 was 988 pounds.	Pass
Specimen 2G22614 was 1087 pounds.	Pass
Specimen 2G22615 was 1204 pounds.	Pass

These values are less than the maximum 1,800 pounds permitted.
See Annex 1 for the plot of force versus time.

3.2.5 Dynamic performance test - Hot dry condition (deployment distance)

Specimens 2G22613, 2G22614 and 2G22615 were assessed.

During the dynamic performance tests, the deployment distance of the specimens were recorded as follows:

Specimen 2G22613 was 39.8 inches.	Pass
Specimen 2G22614 was 40.3 inches.	Pass
Specimen 2G22615 was 39.2 inches.	Pass

These values are less than the maximum 48 inches permitted.

3.2.6 Static strength

Specimens 2G22604, 2G22605 and 2G22606 were assessed.

The specimens withstood the tensile tests of 5,000 pounds applied for 1 minute without breaking. Pass

5.1 General Marking Requirements

5.1.1	Markings shall be in English.	Pass
5.1.2	The legibility and attachment of required markings shall endure for the life of the component, subsystem or system being marked was not assessed.	NAs
	Marking labels provided electronically were used for assessment.	
	When pressure sensitive labels are used, they shall comply with the applicable provision of reference 8.5.1. This requirement was not assessed. Manufacturer to certify.	NAs
5.1.3	Equipment shall be marked with the following:	
	· part number and model designation; [JE331227L]	Pass
	· year of manufacture; [2019]	Pass
	· manufacturer's name or logo; [JECH]	Pass
	· capacity rating; [130-310 lbs]	Pass
	· serial number; [000001]	Pass
	· standard number; [ANSI/ASSE Z359.13-2013]	Pass
	· warning to follow the manufacturer's instructions included with the equipment at time of shipment from the manufacturer.	Pass

5.2 Specific Marking Requirements

5.2.1	Energy absorbing lanyards shall be marked to identify:	
	· the fiber used in the material of construction; [Polyester]	Pass
	· the length; [6 ft]	Pass
	· the need to avoid contact with sharp edges and abrasive surfaces;	Pass
	· the need to make only compatible connections;	Pass
	· the maximum elongation; [48 inch]	Pass
	· restriction, if any, on the types of components, subsystems, or systems with which the energy absorber is designed to be used;	NAp
	· the average arrest force, maximum free fall distance and capacity of the energy absorber on a separate label identical in size, color and content as figure 16a and 16b of the standard; [size and color were not assessed]	Ltd
	· 6 ft FF personal energy absorbers shall be in black print on a contrasting white background;	NAs
	· 12 ft FF personal energy absorbers shall be in white print on a contrasting black background;:	NAp
5.2.2	· In addition to 5.2.1, Y-lanyards that fail the Dynamic Hip Test detailed in 3.2.10, must include a warning label on both connecting ends of the lanyard specifically directing users how to safely store the unused leg of the lanyard.	NAp

5.3 General Instruction Requirements

The instructions to users have been assessed as detail below, with reference only to the relevant requirements of the Standard.

INSPEC Technical Services has not assessed these instructions with respect to claims made by the manufacturer outside of these requirements, and therefore accepts no responsibility for the legitimacy of any such claims.

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. *User Instructions were provided electronically and used for assessment*	NAs
5.3.2	Instructions shall contain the following information:	
	· a statement that the manufacturer's instructions shall be provided to users;	Pass
	· manufacturer's name, address, and telephone number;	Pass
	· manufacturer's part number and model designation for the equipment;	Pass
	· intended use and purpose of the equipment;	Pass
	· proper method of use and limitation on use of the equipment;	Pass
	· illustrations showing locations of markings on the equipment;	Pass
	· reproduction of printed information on all markings;	Pass
	· inspection procedures required to assure the equipment is in serviceable condition and operating correctly;	Pass
	· anchorage requirements;	Pass
	· an illustration of how to calculate free fall distances;	Pass
	· criteria for discarding equipment which falls inspection;	Pass
	· procedures for cleaning, maintenance, and storage;	Pass
	· reference to the ANSI/ASSE Z359.13, *Personal Energy Absorbers and Energy Absorbing Lanyards*, standard and applicable regulations governing occupational safety.	Pass
5.3.3	Instructions shall require that only the equipment manufacturer, or persons or entities authorized in writing by the manufacturer, shall make repairs to equipment.	Pass
5.3.4	Instructions shall require the user to remove equipment from field service if it has been subjected to the forces of arresting a fall.	Pass

5.4 Specific Instruction Requirements

5.4.1 In addition to general instruction the requirements, written instructions for personal energy absorbers shall include:

· the material used in the personal energy absorber construction;	Pass
· the need to make only compatible connections and limitations of compatibility;	Pass
· proper method of coupling the personal energy absorber to adjacent components of the system;	Pass
· the maximum arrest force of the personal energy absorber when dynamically tested in accordance with the requirements of this standard;	Pass
· the maximum elongation of the personal energy absorber when dynamically tested in accordance with the requirements of this standard.	Pass
· a reference chart that indicates the deployment distance of the personal energy absorber according to the user weight and free fall distance;	NAs
· a statement that indicates information necessary in designing fall protection systems shall be made available from the manufacturer.	Pass
· Manufacturers may provide designers of fall protection systems a representative graph(s) of the time history plot of the loading from a drop test.	NAs

Estimates of the uncertainty of measurement

Clause	Test		Uncertainty
3.1.1	Classifications		-
3.1.2	Material		-
3.1.3	Terminations		-
3.1.4	Connectors		-
3.1.5	Deployment indicator		*
3.1.6	Activation force		*
	Permanent elongation		0.33%
3.1.7	Static strength		*
3.1.8	Dynamic performance – ambient dry	Force	1.7%
		Deployment distance	1mm
3.1.9	Dynamic performance – various conditions	Force	1.7%
		Deployment distance	1mm

Estimates of the uncertainty of measurement

Clause	Test		Uncertainty
3.2	Personal Energy Absorber Component, if fitted		See report
3.2.1	Materials		-
3.2.2	Terminations		-
3.2.3	Connectors		See report
3.2.4	Dynamic performance – ambient dry	Force	± 3.0%
		Deployment distance	± 1mm
3.2.5	Dynamic performance – various conditions	Force	± 3.0%
		Deployment distance	± 1mm
3.2.6	Static strength – single lanyard		See Note 1
	Static strength – slippage		± 2.1%
3.2.7	Abrasion and Static strength - Wrap-around energy absorbing lanyards only		See Note 1
3.2.8	Static strength - Wrap-around energy absorbing lanyards only		See Note 1
3.2.9	Static strength - Y-lanyards only		See Note 1
3.2.10.1	Dynamic test, Y-lanyards only - Single connection	Force	± 3.0%
		Deployment distance	± 1mm
3.2.10.2	Dynamic test, Y-lanyards only - Dual connection	Force	± 3.0%
3.2.10.3	Dynamic test, Y-lanyards only - Hip connection		See Note 1
5.1 / 5.2	Marking		-
5.3 / 5.4	Information		-

Note 1. The acceptance criterion for this test is a straightforward "Pass/Fail", rather than a numerical value. Consequently, as there is no value to be reported, uncertainty has not been reported either.

Note 2. The uncertainty value is based on a standard uncertainty multiplied by a coverage factor k = 2, which provides for a confidence level of approximately 95%. Values expressed as a percentage (%) are relative.

Note 3. It should be noted that the above values have not been taken into account when making assessments against the pass/fail criteria.

ANNEX

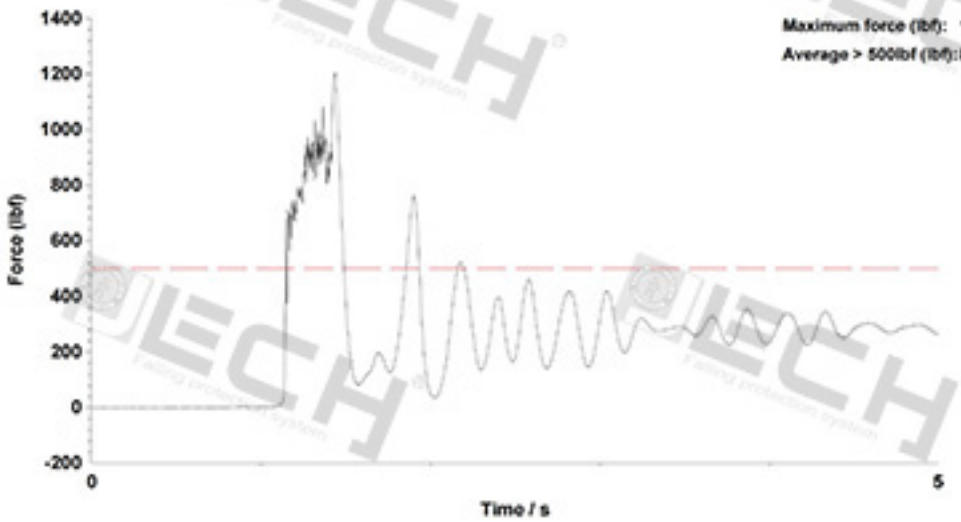
This Annex comprises two sections.

1. Plots of arrest force versus time. (12 pages)

2. Photograph of the product tested. (1 page)

INSPEC Technical Services

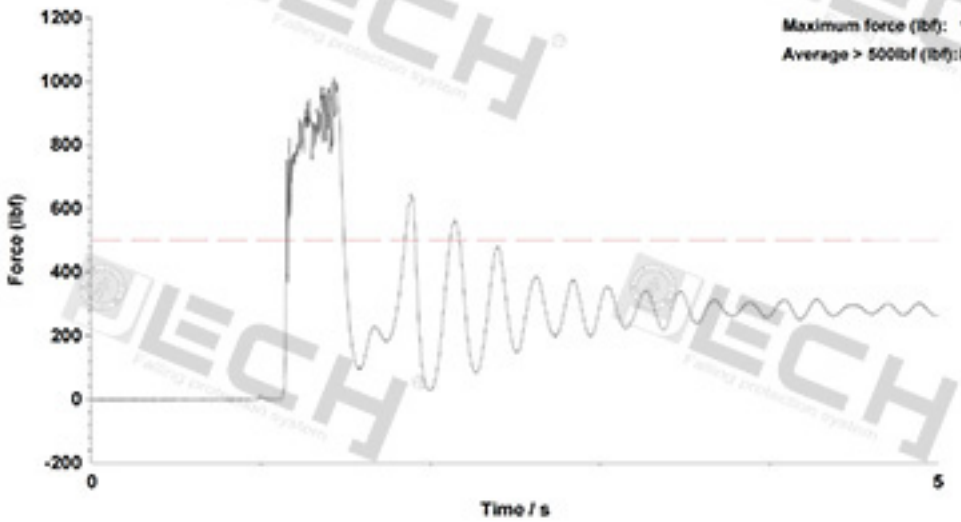
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2GZ2615
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	14:49 30/11/19



Results do not achieve full ANAB status until a formal test report has been issued.

INSPEC Technical Services

Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2GZ2901
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	10:13 30/11/19



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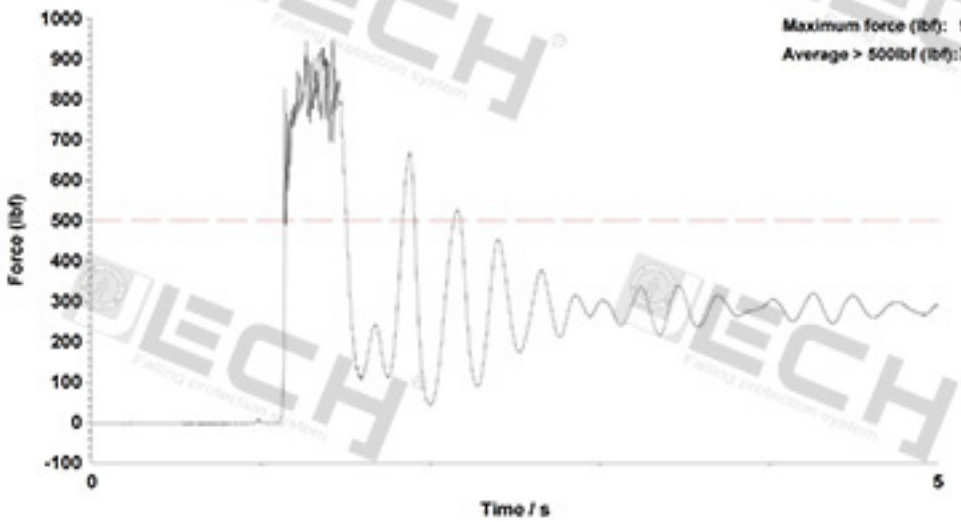
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2G22902
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	10:17 30/11/19



Results do not achieve full ANAB status until a formal test report has been issued.

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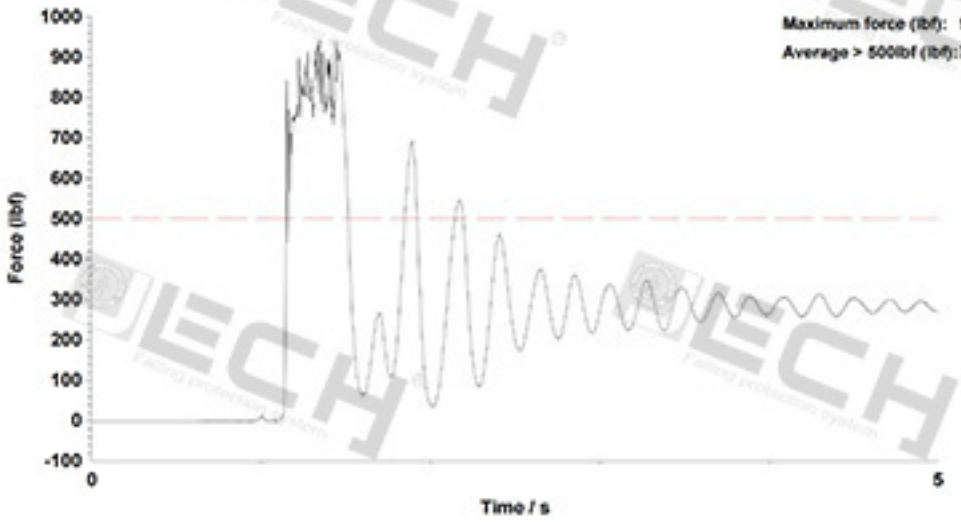
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2G22903
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	10:21 30/11/19



Results do not achieve full ANAB status until a formal test report has been issued.

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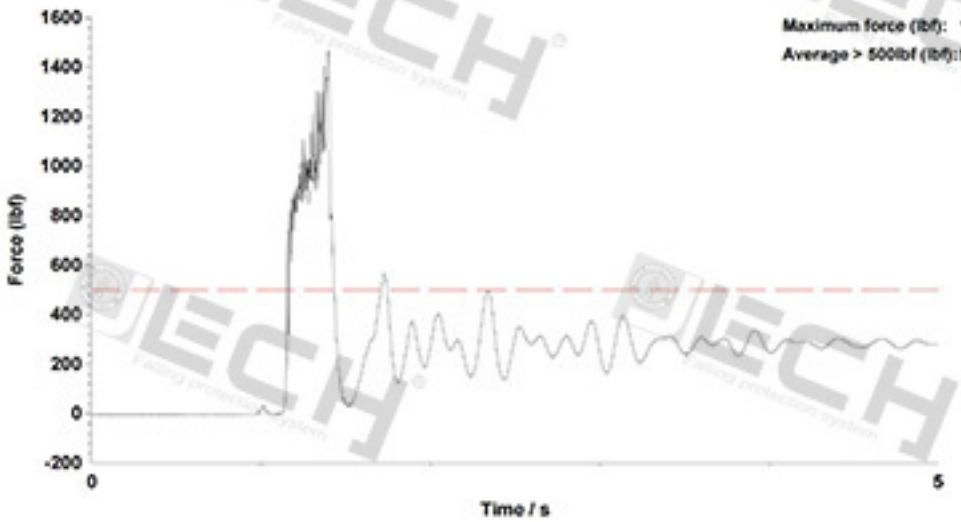
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2GZ2607
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	14:58 30/11/19



Results do not achieve full ANAB status until a formal test report has been issued.

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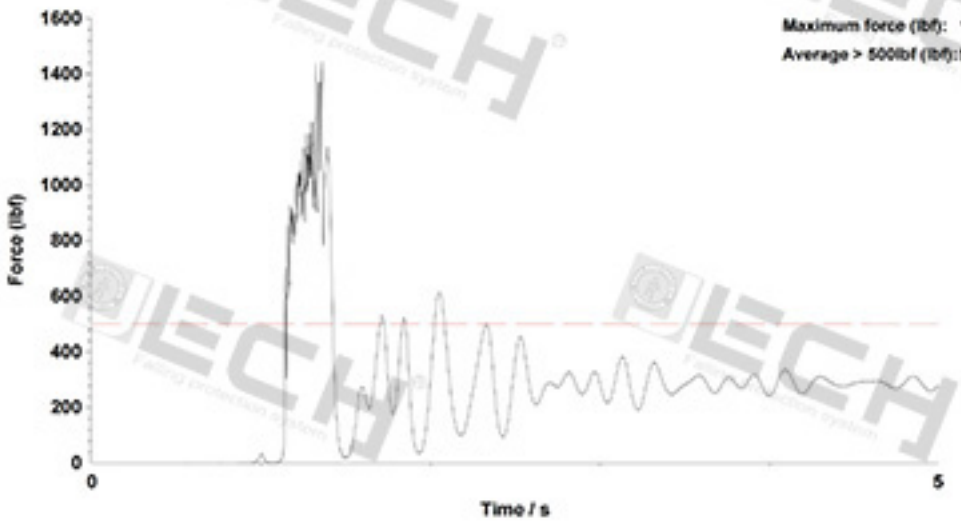
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2GZ2608
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	15:07 30/11/19



Results do not achieve full ANAB status until a formal test report has been issued.

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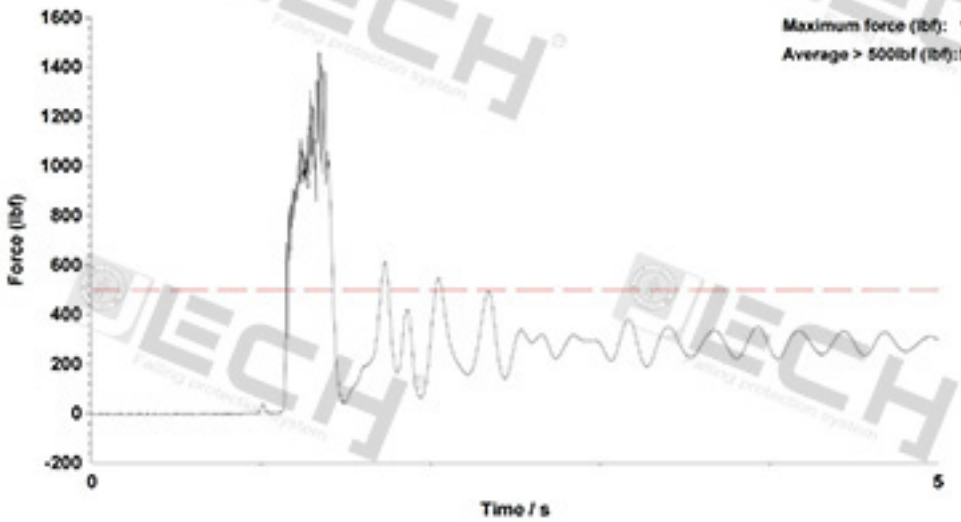
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2GZ2609
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	15:16 30/11/19



Results do not achieve full ANAB status until a formal test report has been issued.

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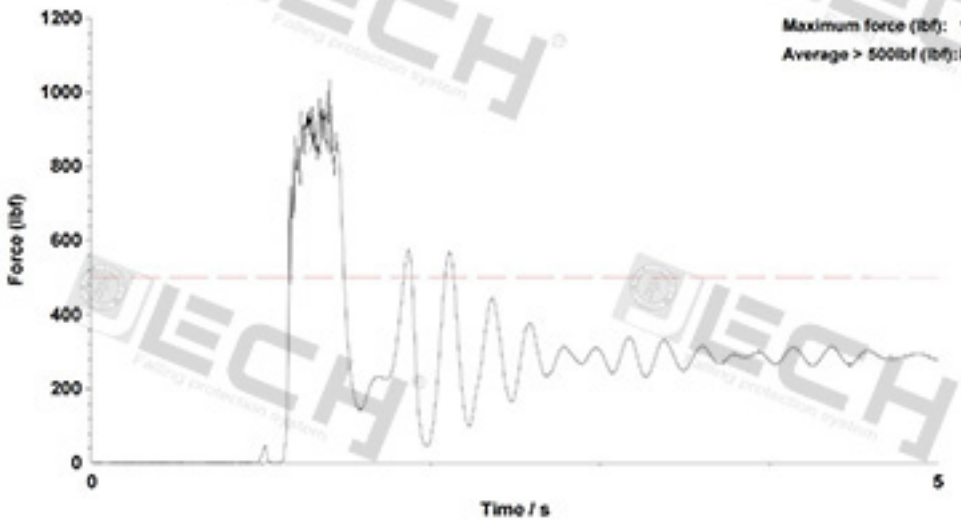
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2GZ2610
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	14:08 30/11/19



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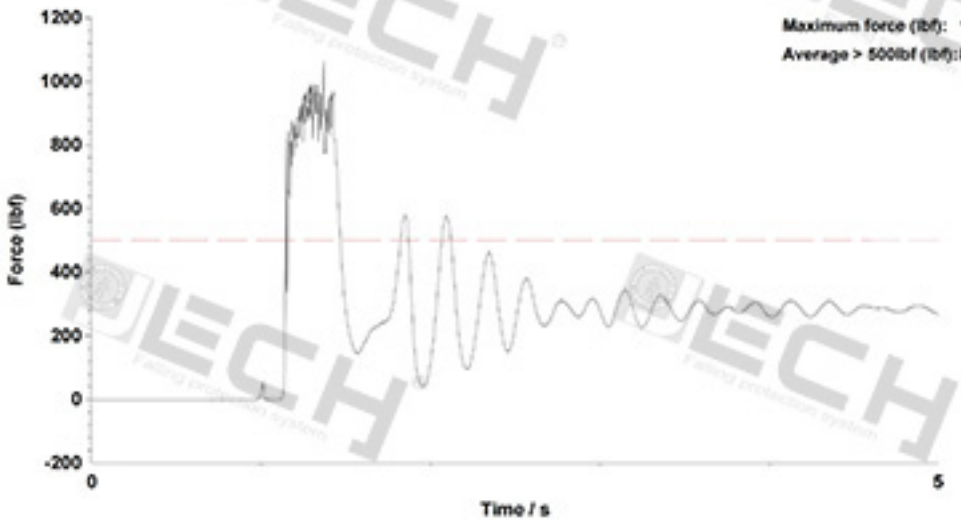
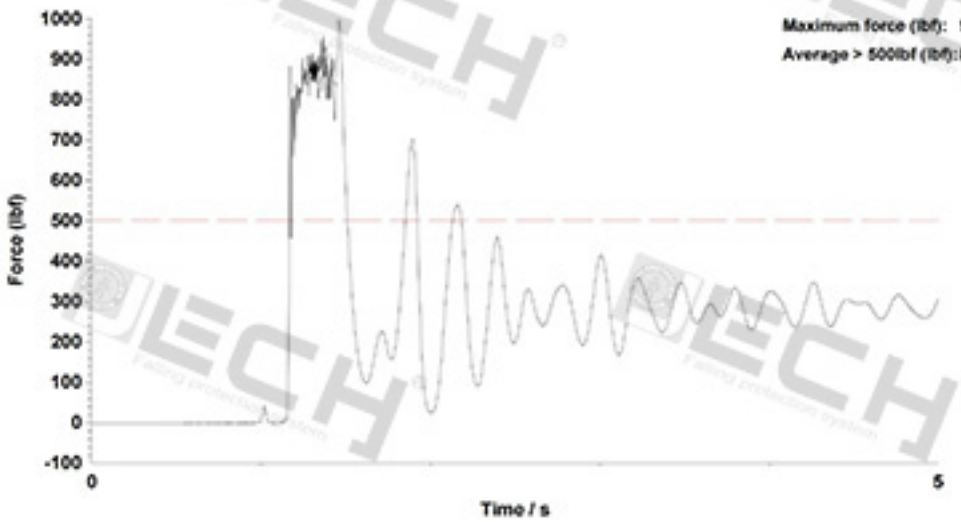
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2G22611
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	14:14 30/11/19



Results do not achieve full ANAB status until a formal test report has been issued.

INSPEC Technical Services

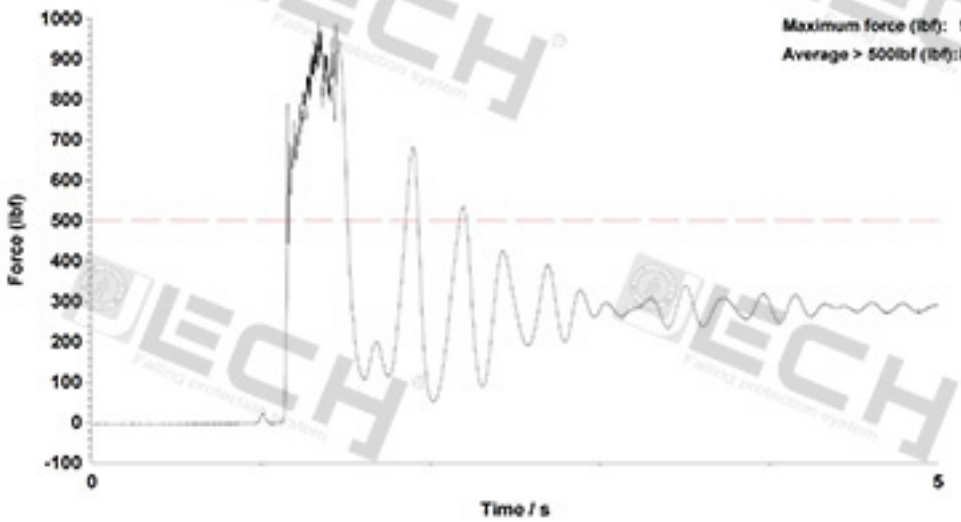
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2GZ2612
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	14:22 30/11/19



Results do not achieve full ANAB status until a formal test report has been issued.

INSPEC Technical Services

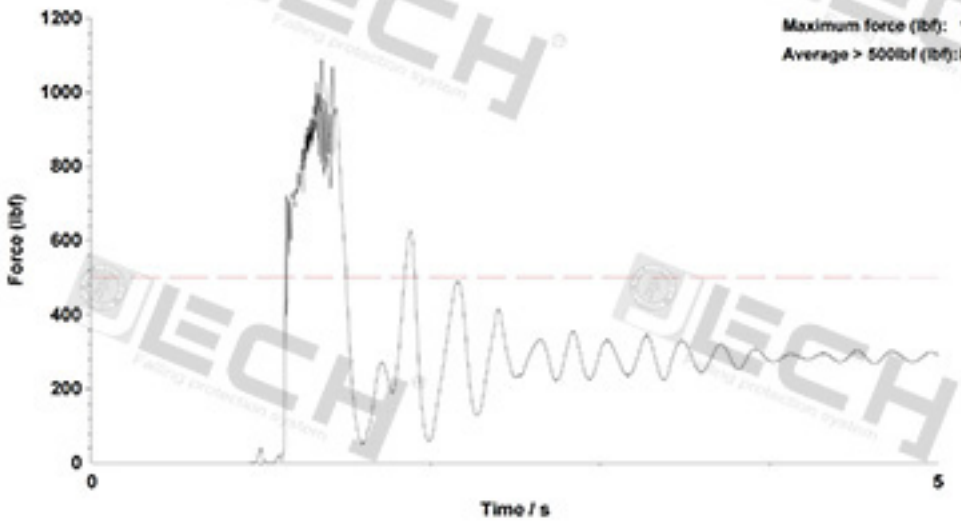
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2G22613
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	14:29 30/11/19



Results do not achieve full ANAB status until a formal test report has been issued.

INSPEC Technical Services

Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2G22614
Drop item	Drop weight, 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	14:41 30/11/19



Results do not achieve full ANAB status until a formal test report has been issued.