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Test Report

Personal Fall Arrest Equipment
ANSI Z359.13-2013
Energy Absorbing Lanyards

Report no: 2.20.04.03

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/0731A

Order received: 3 March 2020

Model: N312206

Dates of tests: 12 March 2020 to 13 April 2020

Signed:

Steven Sum, Laboratory Manager

Issued: 14 April 2020

Conditions

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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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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	
3.2.5	Dynamic performance – ambient wet	Pass
	Dynamic performance – cold dry	Pass
	Dynamic performance – hot dry	Pass
3.2.6	Static strength	
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	Pass
3.2.10.1	Dynamic test for Y-lanyards (Single connection)	Pass
3.2.10.2	Dynamic test for Y-lanyards (Dual connection)	Pass
3.2.10.3	Dynamic test for Y-lanyards (Hip connection)	Pass
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

Product	Quantity	Date received	INSPEC specimen no. (2H035+)
Energy absorbing lanyard, model N312206	10	7 March 2020	01 - 10

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.

Result details

3.1.5 Deployment indicator

Subsequent to the testing of specimen 2H03502 against 3.2.10.1, it became obvious that the energy absorber had been activated. Pass

3.1.6 Activation force

Specimen 2H03501 showed no sign of activation when subjected to the 450 pounds static force. Pass

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

3.2 Personal Energy Absorbing Lanyard Component

Specimen 2H03501 incorporated a Personal Energy Absorber Component which satisfied this standard. Ltd

3.2.1 Materials

Specimen 2H03501 was assessed.

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 2H03501 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 2H03501 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 white 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. Wear pieces were used. Pass

e) The ends of the webbing were hot-cut so as to prevent unravelling. Pass

3.2.5 Dynamic performance test - Ambient wet condition

Specimen 2H03503 was assessed.

During the dynamic performance test, the average arrest force was 893 pounds. Pass
This value is less than the maximum 1,125 pounds permitted.
See Annex 1 for the plot of force versus time.

During the dynamic performance test, the maximum arrest force was 1223 pounds. Pass
This value is less than the maximum 1,800 pounds permitted.
See Annex 1 for the plot of force versus time.

During the dynamic performance test, the deployment distance was 36.2 inches. Pass
This value is less than the maximum 48 inches permitted.

3.2.5 Dynamic performance test – Cold dry condition

Specimen 2H03504 was assessed.

During the dynamic performance test, the average arrest force was 894 pounds. Pass
This value is less than the maximum 1,125 pounds permitted.
See Annex 1 for the plot of force versus time.

During the dynamic performance test, the maximum arrest force was 1034 pounds. Pass
This value is less than the maximum 1,800 pounds permitted.
See Annex 1 for the plot of force versus time.

During the dynamic performance test, the deployment distance was 36.2 inches. Pass
This value is less than the maximum 48 inches permitted.

3.2.5 Dynamic performance test - Hot dry condition

Specimen 2H03505 was assessed.

During the dynamic performance test, the average arrest force was 762 pounds. Pass
This value is less than the maximum 1,125 pounds permitted.
See Annex 1 for the plot of force versus time.

During the dynamic performance test, the maximum arrest force was 1015 pounds. Pass
This value is less than the maximum 1,800 pounds permitted.
See Annex 1 for the plot of force versus time.

During the dynamic performance test, the deployment distance was 46.5 inches. Pass
This value is less than the maximum 48 inches permitted.

3.2.9 Static strength – Y-lanyards only

Leg A of the specimen 2H03502 withstood the tensile test of 5,000 pounds applied for 1 minute without breaking. Pass

Legs A and B of the specimen 2H03506 withstood the tensile test of 5,000 pounds applied for 1 minute without breaking. Pass

3.2.10.1 Dynamic test, Y-lanyards – Single connection

Specimen 2H03502 was assessed.

During the dynamic performance test, the average arrest force was 726 pounds. This value is less than the maximum 900 pounds permitted. Pass
See Annex 1 for the plot of force versus time.

During the dynamic performance test, the maximum arrest force was 964 pounds. This value is less than the maximum 1,800 pounds permitted. Pass
See Annex 1 for the plot of force versus time.

During the dynamic performance test, the deployment distance was 44.3 inches. This value is less than the maximum 48 inches permitted. Pass

3.2.10.2 Dynamic test, Y-lanyards - Dual connection

Specimen 2H03506 was assessed.

During the dynamic test, the maximum arrest force was 1002 pounds. This value is less than the maximum 1,800 pounds permitted. Pass
See Annex 1 for the plot of force versus time.

3.2.10.3 Dynamic test, Y-lanyards only - Hip connection

Specimen 2H03507 was assessed.

During the dynamic test, the nylon keeper attached to the specimen was broken.

The energy absorbing lanyard did include a warning label on each leg according to clause 5.2.2. 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; [N312206] 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; Pass
- 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. Pass

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
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

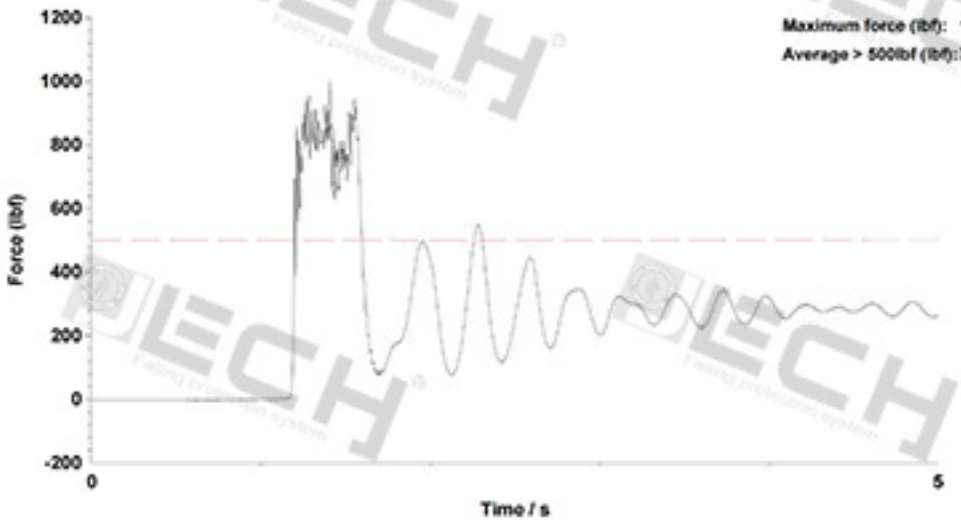
This Annex comprises two sections.

1. Plots of arrest force versus time. (5 pages)

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

INSPEC Technical Services

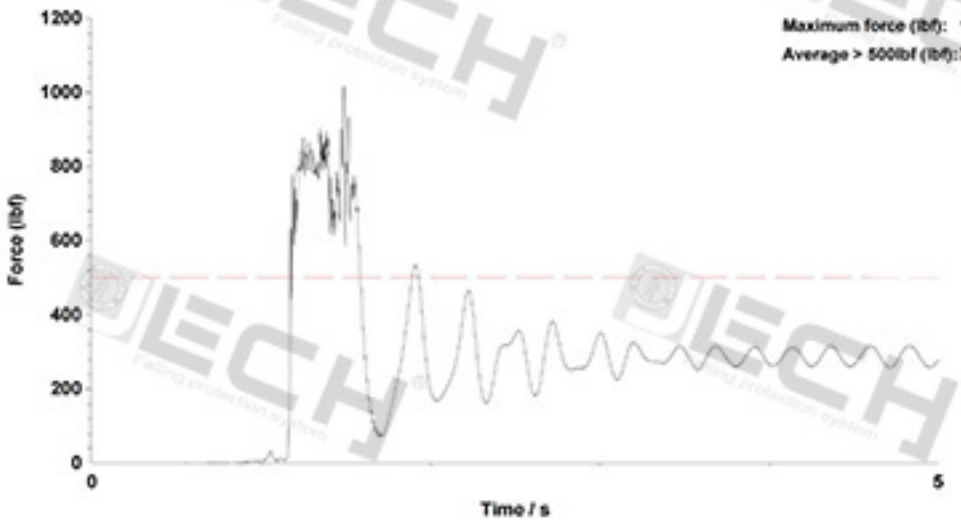
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2H03506
Drop item	Drop weight U.S - 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	15:03 19/03/20



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

INSPEC Technical Services

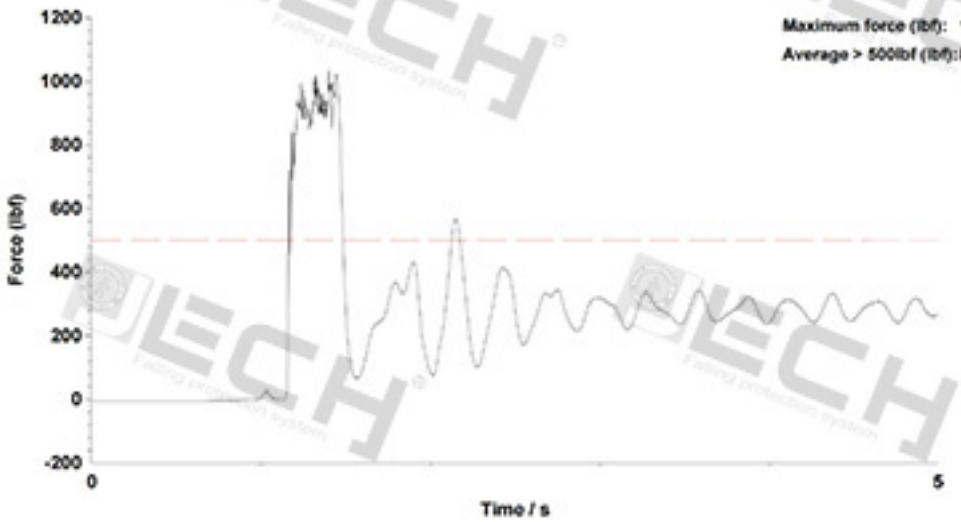
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2H03505
Drop item	Drop weight U.S - 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	17:33 19/03/20



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

INSPEC Technical Services

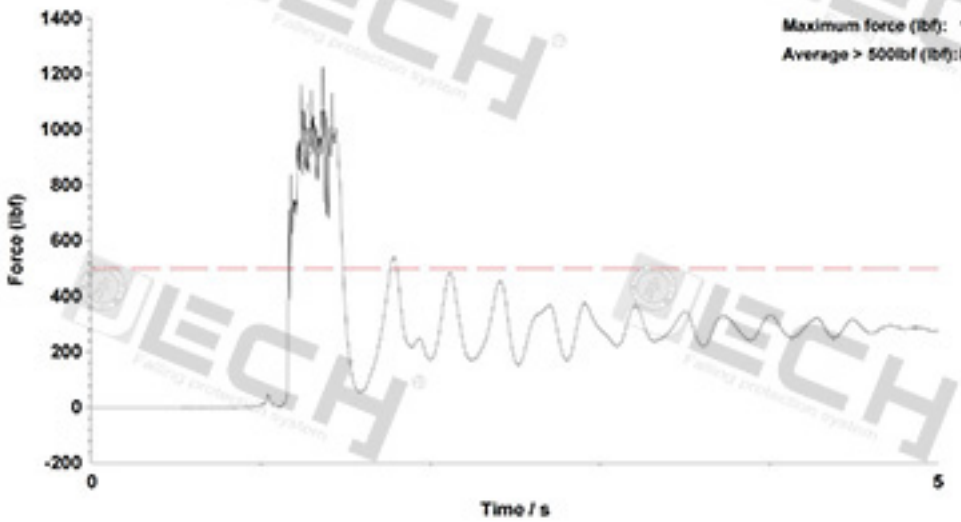
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2H03504
Drop item	Drop weight U.S - 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	17:40 19/03/20



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

INSPEC Technical Services

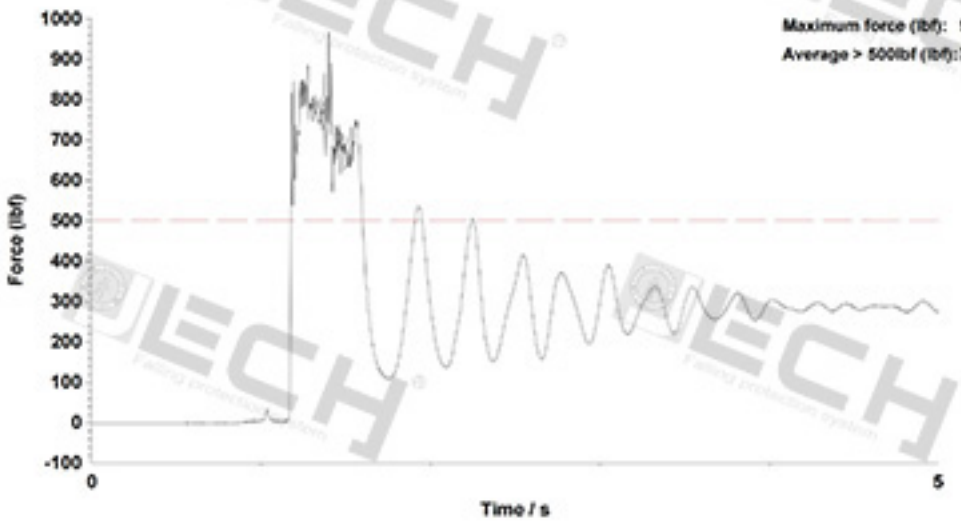
Technician:	LJ/SS
Standard	ANSI Z359.13:2013 Energy absorbing lanyard
Sample / File name:	2H03503
Drop item	Drop weight U.S - 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	18:15 19/03/20



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:	2H03502
Drop item	Drop weight U.S - 128 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	15:52 19/03/20



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

Jinhua Jech Tools Co., Ltd –
Energy absorbing lanyard, model N312206

INSPEC Testing Services' specimen 2H03501 13 April 2020