

Test Report

PPE against fall from a height EN 355 : 2002 Energy absorbers

Report no: 2.17.08.09

Client: INSPEC Certification Services
56 Leslie Hough Way
Salford
Greater Manchester
M6 6AJ
United Kingdom

On behalf of: Jinhua Jech Tools Co., Ltd

Client order: TA17/0057

Date received: 11 July 2017

Model: JE322210

Dates of test: 20 July 2017 to 10 August 2017

Signed:



Steven Sum, Laboratory Manager

Issued: 28 August 2017

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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* - EN 355:2002

Clause	Requirement	Assessment (See Key)
4.1	Design & ergonomics	Ltd
4.2	Materials and construction	Ltd
4.3	Static preloading	Pass
4.4	Dynamic performance	Pass
4.5	Static strength	Pass
4.6	Marking and information	
6	Marking	
7	Information	
8	Packaging	

Summary of assessment* - EN 354:2002

Clause	Requirement	Assessment (See Key)
4.1	Design & ergonomics	
4.2	Materials and construction	Ltd
4.3	Static strength	
4.4	Dynamic strength for lanyards with an incorporated adjustment device	
4.5	Marking and information	
6	Marking	
7	Information supplied by the manufacturer	
8	Packaging	

① *INSPEC Interpretation applies*

Summary of assessment* - EN 354:2010

Clause	Requirement	Assessment (See Key)
4.1	Design & ergonomics ①	
4.2	Materials	
4.3	Terminations	
4.4	Slippage - adjustable length lanyards ①	
4.5	Static strength ①	Pass
4.6	Dynamic strength - adjustable length lanyards	
4.6	Static strength after dynamic strength - adjustable length lanyards	
4.7	Corrosion resistance	
4.8	Marking and information	
6	Marking	
7	Information supplied by the manufacturer	
8	Packaging	

① *INSPEC Interpretation applies*

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. (2E148+)
Twin-legged Energy absorbing lanyard, model JE322210	06	8 July 2017	01 to 06

Procedures

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

Testing was performed in accordance with EN 355:2002, EN 354:2002 and EN 354:2010 unless otherwise specified below. Reference should be made to these standards 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 – EN355:2002**4.1 Design and ergonomics**

Specimen 2E14803 was assessed against the general requirements specified in clause 4.1 of EN 363:2002. The detailed results of the assessment are given on page 7 of this report.

4.2 Materials and construction**4.2.1 General**

Specimens 2E14804 and 2E14805 were assessed.

The specimens did incorporate a twin legged lanyard that cannot be removed without mutilating the lanyards or without the use of special tools.

The lanyards satisfied the requirements specified in clause 4.2 of EN 354:2002 and clause 4.5 of EN 354:2010. See detail results on page 8 and 9 of this report.

Ltd

Testing of connectors incorporated into the lanyards was not requested.

NAs

4.3 Static preloading

Specimen 2E14802 was assessed.

Static preloading was performed on the energy absorber of the specimen as a component.

The permanent extension of the specimen caused by activation resulting from a preload of 2 kN was 10 mm. This is less than the 50 mm maximum permitted.

Pass

4.4 Dynamic performance

Specimen 2E14803 was assessed.

The length L_t of the specimen (including energy absorber, one leg of the lanyard, and connector), measured to the nearest 5 mm between load bearing points, was 1601 mm.

The maximum braking force developed by the specimen during the drop test was 4.9 kN. This was less than the 6 kN maximum permitted. See page 1 of Annex 1 for the force/time curve.

Pass

The arrest distance A measured during the drop test was 4369 mm.

Pass

The requirement is that A shall be less than the value $(2L_t + 1,750)$ mm, where L_t is 1601 mm, the length reported above. Thus, this value is 4952 mm. The requirement was therefore satisfied.

4.5 Static strength

Specimen 2E14803 was assessed against Recommendation for Use sheet # 63, rev 02 issued by the Co-ordination of Notified Bodies and dated 19/09/2015 – in particular, Test 2.

When thus tested, the specimen withstood the 9 kN force applied for 3 minutes without separating, tearing or rupturing.

Pass

EN 363:2002, Clause 4.1, Design and ergonomics

A fall arrest system shall be so designed and manufactured:

- that, in the foreseeable conditions of use for which it is intended, the user can perform the risk-related activity normally while enjoying appropriate protection of the highest possible level; NAs
- as to preclude risks and other nuisance factors under foreseeable conditions of use; NAs
- as to facilitate correct positioning on the user and to remain in place for the foreseeable period of use, bearing in mind ambient factors, movements to be made and postures to be adopted. For this purpose, it shall be possible to optimize the adoption of a full body harness to user morphology by all appropriate means, such as adequate adjustment elements or the provision of an adequate size range; NAP
- that it is as light as possible without prejudicing design strength and efficiency; NAs
- as to become not incorrectly adjusted without the user's knowledge under the foreseeable conditions of use; NAP
- that, under the foreseeable conditions of use, the vertical drop of the user is minimized to prevent collision with obstacles and the braking force does not, however, attain the threshold value at which physical injury or the tearing or rupture of any component or element which might cause the user to fall can be expected to occur; NAs
- that, after arresting, the user is maintained in a correct position in which he may await help if necessary. NAP

Only the characteristics given in indents 3, 5 and 7 lend themselves to objective assessment. Compliance or otherwise with the relevant European standard, against which the specimen has been tested, support the assessments made against those characteristics.

The characteristics given in the other indents, whilst being desirable attributes, cannot be objectively assessed by a testing laboratory, because they involve parameters about which the technician may have only an opinion, not factual knowledge.

Result details – EN 354:2002**4.2 Materials and construction****4.2.1 General**

Specimen 2E14804 was assessed.

The specimen was a fixed length, twin legged rope lanyard with an integral energy absorber. The lanyards were of equal lengths.

One free end of the lanyard is connected to an energy absorber. The other free ends of the lanyard each incorporated an integral connector. Thus the free ends of the lanyards were suitably terminated. Pass

The length of the specimen, measured to the nearest 5 mm between load bearing points, was 1630 mm. This is less than the permitted maximum of 2 m. Pass

The minimum length of either splice, measured to the nearest 5 mm, was 110 mm. This is more than the permitted minimum of 100 mm. Pass

The splice was secured by plastic sleeve to prevent it coming open during use. Pass

Metallic elements incorporated into the lanyard 2E14805 satisfied the corrosion protection requirements specified in EN 362. Pass

4.2.2 Fibre ropes and webbing

The materials of the specimens were not assessed. Manufacturer to certify. NAs

As the specimen 2E14804 passed clause 4.5 of EN 354:2010 (see results on page 9 of this report), the materials used in the specimen may be deemed to be suitable for their intended use. Pass

4.2.3 Wire ropes NAp**4.2.4 Chains** NAp**4.2.5 Connectors**

Testing of connectors incorporated into the lanyards was not requested. NAs

Result details – EN 354:2010**4.5 Static strength – twin legged lanyard with integral energy absorber**

Specimen 2E14804 was assessed against Recommendation for Use sheet # 63; rev. 02 issued by the Co-ordination of Notified Bodies and dated 19/09/2015 – in particular Test 1 and Note 3.

When tested in accordance with 5.7, the specimen withstood the 22 kN force applied for 3 minutes without separating, tearing or rupturing.

Pass

Estimates of the uncertainty of measurement – EN 355:2002

Clause	Test	Uncertainty
4.1	Design & ergonomics	-
4.2	Materials and construction	See relevant reports
		Length $\pm 5.8\text{mm}$
4.3	Static preloading	$\pm 0.5\%$
4.4	Dynamic performance	Maximum breaking force
		Maximum arrest distance
		$\pm 4.4\%$
		$\pm 20\text{mm}$
4.5	Static strength	*
4.6	Marking and information	-
6	Marking	-
7	Information	-
8	Packaging	-

* 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.

Values expressed as a percentage (%) are relative.

It should be noted that the above values have not been taken into account when making assessment to the pass/fail criteria.

Estimates of the uncertainty of measurement – EN 354:2002

Clause	Test	Uncertainty
4.1	Design & ergonomics	-
4.2.1	Materials and construction – length of splice	Length $\pm 0.65\text{mm}$
4.2.2	Materials and construction – length of lanyard	Length $\pm 3.1\text{mm}$
4.2.4	Materials and construction	Corrosion *
4.3	Static strength	$\pm 0.5\%$
4.4	Dynamic strength - lanyards with an incorporated adjustment device	-
4.5	Marking and information	-
6	Marking	-
7	Information	-
8	Packaging	-

* 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.

Values expressed as a percentage (%) are relative.

It should be noted that the above values have not been taken into account when making assessment to the pass/fail criteria.

Estimates of the uncertainty of measurement – EN 354:2010

Clause	Test	Uncertainty
4.1	Design & ergonomics	-
4.1.6	Materials and construction – length of lanyard	Length ± 3.1 mm
4.2	Materials	-
4.3	Terminations	-
4.3.4	Terminations – length of knot tail	Length ± 1.8 mm
4.4	Slippage	$\pm 1.0\%$
4.5	Static strength	*
4.6	Dynamic strength	*
4.7	Corrosion	*
4.8	Marking and information	-
6	Marking	-
7	Information	-
8	Packaging	-

* 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.

Values expressed as a percentage (%) are relative.

It should be noted that the above values have not been taken into account when making assessment to the pass/fail criteria.

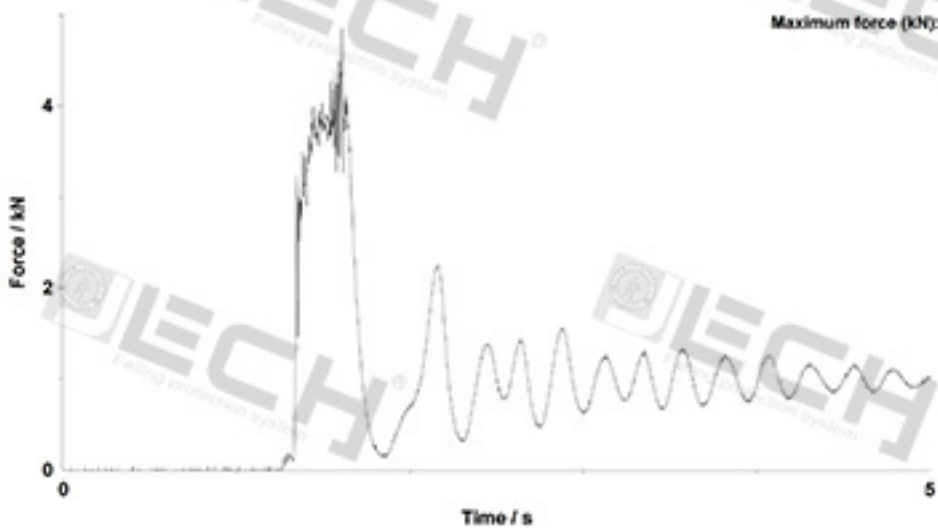
ANNEX

This Annex comprises two sections.

1. Plot of arrest force versus time. (1 page)
2. Photograph of the product tested. (1 page)

INSPEC Technical Services

Technician: Lu
Standard: EN355 Energy absorbing lanyard
Sample / File name: 2E14803
Drop item: K0079 Drop mass, 100 kg
Orientation/Attachment Point: Centre eyebolt
Time and Date of Test: 15.07 21/07/17



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

**Jinhua Jech Tools Co., Ltd –
Twin-Legged Energy absorbing lanyard, model JE322210**



INSPEC Testing Services' specimen 2E14801

20 July 2017