

## Test Report

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

**Report no:** 2.17.07.03

**Client:** INSPEC Certification Services  
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Salford  
Greater Manchester  
M6 6AJ  
United Kingdom

**On behalf of:** Jinhua Jech Tools Co., Ltd

**Client orders and dates received:** TA17/0030 (31 May 2017)  
TA17/0030A (2 June 2017)  
TA17/0030B (3 July 2017)

**Model:** JE321205-SN2

**Dates of tests:** 8 June 2017 to 3 July 2017

**Signed:**



Steven Sum, Laboratory Manager

**Issued:** 5 July 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
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. (2E114+)
Adjustable length Energy absorbing lanyard, model JE321205-SN2	07	19 May 2017	01 to 07

**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 2E11403 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 8 of this report.

**4.2 Materials and construction****4.2.1 General**

Specimens 2E11405, 2E11406 and 2E11407 were assessed.

The specimens did incorporate an adjustable 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 9 and 10 of this report.

Ltd

Testing of connectors incorporated into the lanyards was not requested.

NAs

**4.3 Static preloading**

Specimen 2E11402 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 20 mm. This is less than the 50 mm maximum permitted.

Pass

**4.4 Dynamic performance – (Energy absorbing lanyard adjusted to the shortest length)**

Specimen 2E11403 was assessed.

The length  $L_t$  of the specimen (including energy absorber, lanyard, and snaphooks), measured to the nearest 5 mm between load bearing points, was 1460 mm.

The maximum braking force developed by the specimen during the drop test was 4.2 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 3945 mm.

Pass

The requirement is that  $A$  shall be less than the value  $(2L_t + 1,750)$  mm, where  $L_t$  is 1460 mm, the length reported above. Thus, this value is 4670 mm. The requirement was therefore satisfied.

**4.4 Dynamic performance – (Energy absorbing lanyard adjusted to the longest length)**

Specimen 2E11404 was assessed.

The length  $L_t$  of the specimen (including energy absorber, lanyard, and snaphooks), measured to the nearest 5 mm between load bearing points, was 1988 mm.

The maximum braking force developed by the specimen during the drop test was 4.7 kN. This was less than the 6 kN maximum permitted. See page 2 of Annex 1 for the force/time curve.

Pass

The arrest distance  $A$  measured during the drop test was 5262 mm.

Pass

The requirement is that  $A$  shall be less than the value  $(2L_t + 1,750)$  mm, where  $L_t$  is 1988 mm, the length reported above. Thus, this value is 5726 mm. The requirement was therefore satisfied.

**4.5 Static strength**

Specimen 2E11403 was assessed.

The fully developed energy absorber withstood the 15 kN force applied for 3 minutes without 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**

Specimens 2E11406 and 2E11407 were assessed.

The specimen 2E11406 was an adjustable length, fibre rope lanyard with an integral energy absorber.

The end of the adjustment part of the lanyard was fitted with an end stop (stitched eye-loops). Pass

One free end of the lanyard was terminated with an integral snaphook. The other free end of the lanyard incorporated an energy absorber and a snaphook. Thus the free ends of the lanyard were suitably terminated. Pass

Splices were not used for the lanyard terminations. NAp

The length of the specimen, measured to the nearest 5 mm between bearing points, when adjusted to its maximum length, was 1985 mm and to its minimum length was 1465 mm. They are less than the permitted maximum of 2 m. Pass

Metallic elements incorporated into the lanyard 2E11407 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 specimens 2E11405 and 2E11406 passed clause 4.5 of EN 354:2010 (see results on page 10 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 – single lanyard (adjustable length)****4.5.1 Specimens 2E11405 and 2E11406 were assessed.**

When tested in accordance with 5.7, (with the lanyard adjusted to its minimum and to its maximum lengths,) the specimens withstood the 22 kN force applied for 3 minutes without separating, tearing or rupturing.

Pass

**4.5.2 This clause is not applicable to the type of lanyard tested.**

NAp

**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	$\pm 0.4\%$
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	-

**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 $\pm 2.9\text{mm}$
4.2.4	Materials and construction	Corrosion *
4.3	Static strength	$\pm 0.4\%$
4.4	Dynamic strength - lanyards with an incorporated adjustment device	*
4.5	Marking and information	-
6	Marking	-
7	Information	-
8	Packaging	-

**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 $\pm 3.1$ mm
4.2	Materials	-
4.3	Terminations	-
4.3.4	Terminations – length of knot tail	Length $\pm 1.8$ 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.



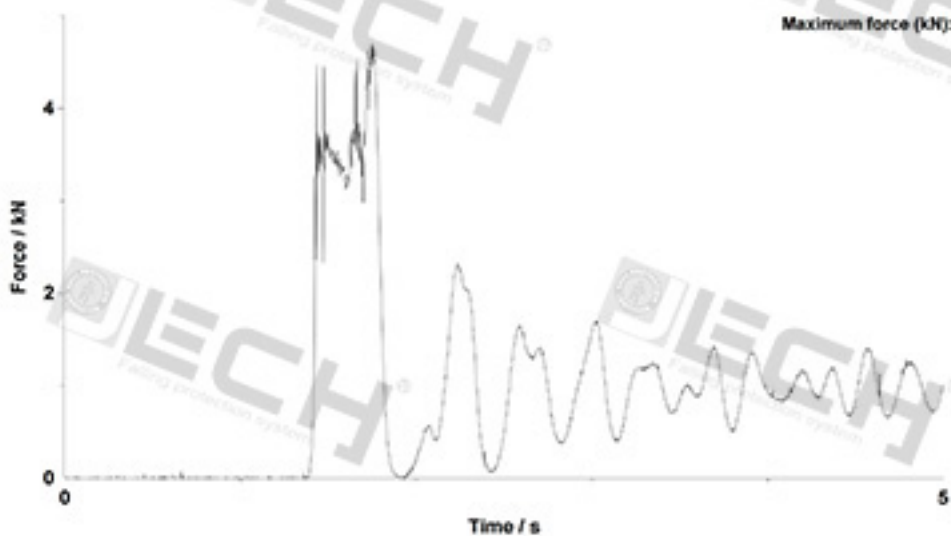
## ANNEX

This Annex comprises two sections.

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

INSPEC Technical Services

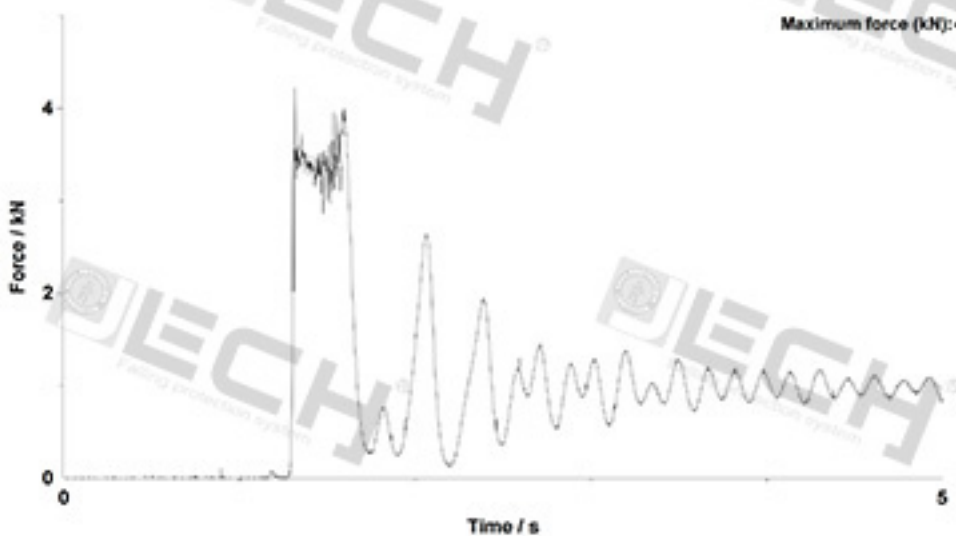
Technician:	Lu
Standard:	EN355 Energy absorbing lanyard
Sample / File name:	2E11404
Drop item:	K0079 EN drop mass, 100 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	14.02.2005/17



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

INSPEC Technical Services

Technician:	Lu
Standard:	EN355 Energy absorbing lanyard
Sample / File name:	2E11403
Drop item:	K0079 EN drop mass, 100 kg
Orientation/Attachment Point:	Centre eyebolt
Time and Date of Test:	13:50 20/05/17



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

**Jinhua Jech Tools Co., Ltd –  
Adjustable length Energy absorbing lanyard, model JE321205-SN2**



**INSPEC Testing Services' specimen 2E11401**

**8 June 2017**