

Test Report

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

Report no: 2.19.12.15

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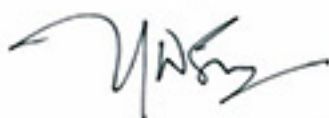
Manufacturer: Jinhua Jech Tools Co., Ltd.
No.1448 Tongxi Road, Linjiang Industrial Park
Wucheng District
Jinhua City, Zhejiang
China

**Client orders:
and dates received** T/0660 (9 September 2019)
T/0660A (24 September 2019)
T/0660B (9 December 2019)

Model: JE311237N

Dates of test: 22 October 2019 to 12 December 2019

Signed:



Steven Sum, Laboratory Manager

Issued: 13 December 2019

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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	See 6 and 7 below
6	Marking	Pass
7	Information	Pass
8	Packaging	Pass

Summary of assessment * - EN 354:2002

Clause	Requirement	Assessment (See Key)
4.1	Design & ergonomics	
4.2	Materials and construction ①	Ltd
4.3	Static strength ①	
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. (2G174+)
Energy absorbing lanyard, model JE311237N	04	16 October 2019	01 to 04

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 – EN 355:2002**4.1 Design and ergonomics**

Specimen 2G17404 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 9 of this report.

4.2 Materials and construction**4.2.1 General**

Specimen 2G17404 was assessed.

The specimen did incorporate a lanyard that cannot be removed without mutilating the lanyard or without the use of special tools.

The lanyard satisfied the requirements specified in clause 4.2 of EN 354:2002. See detail results on page 15 of this report. Ltd

The lanyard satisfied the requirements specified in clause 4.5 of EN 354:2010. See detail results on page 16 of this report. Pass

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

4.3 Static preloading

Specimen 2G17402 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 2G17403 was assessed.

The length of the specimen, L_t (including energy absorber, lanyard and connectors), measured to the nearest 5 mm between load bearing points, was 1830 mm.

The maximum braking force developed by the specimen during the drop test was 4.5 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 4203 mm.

The requirement is that A shall be less than the value $(2L_t + 1,750)$ mm, where L_t is 1830 mm, the length reported above. Thus, this value is 5410 mm. The requirement was therefore satisfied. Pass

4.5 Static strength

Specimen 2G17403 was assessed.

The fully developed energy absorber withstood the 15 kN force applied for 3 minutes without tearing or rupturing.

Pass

4.6 Marking and information - see clauses 6 and 7 below.

6 Marking

Labels provided electronically were used for marking assessment against the specific requirements of EN 355 and the results are detailed below.

The same labels were assessed against the requirements specified in clause 4.8 of EN 365:2004 and are given on page 10 of this report. The 2004 issue of EN 365 was used in accordance with Recommendation for Use sheet CNB/P/11.101, issued by the Co-ordination of Notified Bodies Committee.

- a) The label was marked with an 'information' pictogram.
- b) The label was marked with the maximum length, thus [1800 mm].
- c) The label was marked with the model / type identification, thus [JE311237N].
- d) The label was marked with EN 355.

Pass

Pass

Pass

Pass

7 Information supplied by the manufacturer

Information provided electronically was assessed against the specific requirements of EN 355 and the results are detailed below.

The same results were assessed against the requirements specified in clauses 4.1 to 4.7 of EN 365:2004 and are given on page 11 to 14 of this report. The 2004 issue of EN 365 was used in accordance with Recommendation for Use sheet CNB/P/11.101, issued by the Co-ordination of Notified Bodies Committee.

The information supplied by the manufacturer shall be provided in the languages of the country of destination and shall include at least advice or information as follows.

The language assessed was English.

- | | |
|---|------|
| a) that the total length of a sub-system with an energy absorber including lanyard, terminations and connectors shall not exceed 2 m (e.g. connector plus lanyard plus energy absorber plus connector); | Pass |
| b) the characteristics required for a reliable anchor point; | Pass |
| c) on how to connect to a reliable anchor point, to a full body harness and to other components of a fall arrest system; | Pass |
| d) on how to ensure the compatibility of any components to be used in conjunction with the energy absorber, e.g. by reference to other European Standards; | Pass |
| e) the necessary minimum clearance below the feet of the user, in order to avoid collision with the structure or ground in a fall from the height. With a mass of 100 kg and a fall factor two situation (worst case) the clearance is the arrest distance H (see 3.5) plus an extra distance of 1 m; | Pass |
| f) the material from which the energy absorber is made; | Pass |
| g) on limitations of the materials in the product or hazards which may affect its performance, e.g. temperature, the effect of sharp edges, chemical reagents, electrical conductivity, cutting, abrasion, UV degradation, other climatic conditions; | Pass |
| h) that, before and during use, consideration should be given as to how any rescue could be safely and efficiently carried out; | Pass |
| i) that the product should only be used by a trained and/or otherwise competent person or the user should be under the direct supervision of such a person; | Pass |
| j) on how to clean the product, including disinfection, without adverse effect; | Pass |
| k) if information exists, the expected lifespan of the product (obsolescence) or how this may be determined; | Pass |
| l) on how to protect the product during transportation; | Pass |
| m) on the meaning of any markings on the product; | Pass |
| n) the model/type identification mark of the energy absorber; | Pass |
| o) the number of this European Standard, i.e. EN355. | Pass |

8 Packaging

Specimen 2G17401 was assessed.

The specimen was wrapped in a plastic box.

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; NAs
- 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; NAs
- 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. NAs

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.

EN 365:2004, Clause 4.8, Marking

- 4.8.1** Each item of PPE or other equipment shall be clearly, indelibly and permanently marked by the manufacturer in the official language of the country of destination, by any suitable method not having a harmful effect on the materials so marked, and shall include at least:

The language assessed was English.

Labels were provided electronically and used for marking assessment.

- a) means of identification, e.g. manufacturer's name, supplier's name, or trademark; Pass

Note 1. When PPE is marked with the supplier's name this should be with the approval of the Notified Body.

- b) manufacturer's production batch or serial number or other means of traceability; Pass

- c) model and type/identification; Pass

- d) number and year of the document to which the equipment conforms; Pass

- e) pictogram or other method to indicate the necessity for users to read the instructions for use; Pass

Note 2: Any additional relevant marking specific to the item of equipment should also be included.

- 4.8.2** The characters in the markings shall be legible and unambiguous. Pass

EN 365:2004, Clause 4.1 to 4.7, Instructions**4.1 General**

The manufacturer shall prepare instructions for use, for maintenance and for periodic examination for each item of PPE or other equipment, in the official languages of the country of destination.

The language assessed was English.

Information supplied by the manufacturer were provided electronically and used for assessment

Note. The instruction for use, for maintenance and for periodic examination may be supplied in separate documents.

4.2 Instructions for use

4.2.1 The instructions for use shall be in a written format, shall be clear, legible and unambiguous, and shall contain appropriate detail, supplemented by diagrams if necessary, to enable the PPE or other equipment to be used correctly and safely. Pass

4.2.2 The instructions for use shall include:

- a) name and contact details of the manufacturer or authorised representative as appropriate; Pass
- b) statements describing the equipment, its intended purpose, application and limitations; Pass
- c) warning about medical conditions that could affect the safety of the equipment user in normal and emergency use; Pass
- d) warning that the equipment shall only be used by a person trained and competent in its safe use; Pass
- e) warning that a rescue plan shall be in place to deal with any emergencies that could arise during the work; Pass
- f) warning against making any alterations or additions to the equipment without the manufacturer's prior written consent, and that any repair shall only be carried out in accordance with manufacturer's procedures; Pass
- g) warning that the equipment shall not be used outside its limitations, or for any purpose other than that for which it is intended; Pass
- h) advice as to whether the equipment should be a personal issue item, where this is applicable; Pass
- i) sufficient information to ensure the compatibility of items of equipment when assembled into a system; Pass
- j) warning of any dangers that may arise by the use of combinations of items of equipment in which the safe function of any one item is affected by or interferes with the safe function of another; Pass
- k) instruction for the user to carry out a pre-use check of the equipment, to ensure that it is in a serviceable condition and operates correctly before it is used; Pass

Note1. A pre-use check by the user may not be applicable in the case of certain parts of equipment for emergency use which have been pre-packed or sealed by a competent person.

- l) features of the equipment that require the pre-use check, the method of checking, and the criteria against which the user can decide whether or not the equipment is defective; Pass

- | | | |
|----|---|------|
| m) | warning stating that it is essential for safety that equipment is withdrawn from use immediately should: | Pass |
| | 1) any doubt arise about its conditions for safe use or; | |
| | 2) it have been used to arrest to fall | |
| | and not used again until confirmed in writing by a competent person that it is acceptable to do so; | |
| n) | requirements of the anchor device or structural member chosen to serve as the anchor point(s), in particular the minimum required strength, the suitability and the position; | Pass |
| o) | where relevant, instruction on how to connect to the anchor device or structure; | Pass |
| p) | where relevant, an instruction detailing the correct harness attachment point to use, and how to connect to it; | NAp |
| q) | for equipment intended for use in fall arrest systems, a warning to emphasise that it is essential for safety that the anchor device or anchor point should always be positioned, and the work carried out in such a way, as to minimise both the potential for falls and potential fall distance. Where it is essential that the anchor device/point is placed above the position of the user, the manufacturer shall make a statement to that effect; | Pass |
| r) | where relevant, an instruction that a full body harness is the only acceptable body holding device that can be used in a fall arrest system; | Pass |
| s) | for equipment intended for use in fall arrest systems, a warning to emphasise that it is essential for safety to verify the free space required beneath the user at the workplace before each occasion of use, so that, in the case of a fall, there will be no collision with the ground or other obstacle in the fall path; | Pass |
| t) | information on the hazards that may affect the performance of the equipment and corresponding safety precautions that have to be observed, e.g. extremes of temperature, trailing or looping of lanyards or lifelines over sharp edges, chemical reagents, electrical conductivity, cutting, abrasion, climatic exposure, pendulum falls; | Pass |
| u) | instruction as relevant on how to protect the equipment against damage during transportation; | Pass |
| v) | information on the meaning of any markings and/or symbols on the equipment; | Pass |
| w) | statement describing the equipment model, type, identification marks and, if appropriate, the document and year to which it conforms; | Pass |
| x) | where it is a requirement that an EC type examination be carried out by a Notified Body, the name, address and identification number of the Notified Body involved with the design stage and of the Notified Body involved in the production control phase; | Pass |
| y) | statement of any known limit to the safe useable life of the product or any part of the product and/or advice on how to determine when the product is no longer safe to use; | Pass |
| z) | warning that it is essential for the safety of the user that, if the product is re-sold outside the original country of destination, the reseller shall provide instructions for use, for maintenance, for periodic examination and for repair in the language of the country in which the product is to be used. | Pass |

Note 2. Any additional relevant information specific to the item of equipment should also be provided.

4.3 Instructions for maintenance

4.3.1 The maintenance instruction shall be clear, legible and unambiguous, and shall contain appropriate detail, supplemented by diagrams if necessary, to enable the PPE or other equipment to be maintained correctly and safely. Pass

4.3.2 The maintenance instructions shall include:

- a) cleaning procedures, including disinfection where applicable, without causing adverse effect on the materials used in the manufacture of the equipment, or to the user, and a warning that the procedure is to be strictly adhered to; Pass
- b) where appropriate, a warning that, when the equipment becomes wet, either from being in use or when due to cleaning, it shall be allowed to dry naturally, and shall be kept away from direct heat; Pass
- c) storage procedures, including all necessary preventative requirements where environmental or other factors could affect the condition of components, e.g. damp environment, sharp edges, vibration, ultraviolet degradation; Pass
- d) other maintenance procedures as relevant to the equipment, e.g. lubrication. NAp

4.4 Instructions for periodic examination

Instructions for periodic examination shall include:

- a) warning to emphasize the need for regular periodic examinations, and that the safety of users depends upon the continued efficiency and durability of the equipment; Pass
- b) recommendation in regard to the frequency of periodic examinations, taking account of such factors as legislation, equipment type, frequency of use, and environmental conditions. The recommendation shall include a statement to the effect that the periodic examination frequency shall be at least every 12 months; Pass
- c) warning to emphasize that periodic examinations are only to be conducted by a competent person for periodic examination and strictly in accordance with the manufacturer's periodic examination procedures; Pass
- d) where deemed necessary by the manufacturer, e.g. due to the complexity or innovation of the equipment, or where safety critical knowledge is needed in the dismantling, reassembly, or assessment of the equipment, (e.g. a retractable type fall arrester), an instruction specifying that periodic examinations shall only be conducted by the manufacturer or by a person or organisation authorised by the manufacturer; Pass
- e) requirement to check the legibility of the product markings. Pass

4.5 Instructions for repair

Where the manufacturer permits repair, repair instructions shall be supplied in the official languages of the country in which the item is in service. These instructions shall include a statement to the effect that any repair shall only be conducted by a competent person for repair, who has been authorised by the manufacturer, and that the repair procedure shall be strictly in accordance with the manufacturer's instructions. NAp

Repair was not permitted by the manufacturer.

4.6 Records

Advice shall be given that a record is kept for each component, subsystem and system. The record should contain headings for, and spaces to allow entry of, the following details:

- | | |
|--|------|
| a) product, (e.g. full body harness), model and type/identification and its trade name; | Pass |
| b) name and contact details of the manufacturer or supplier; | Pass |
| c) means of identification, which could be the batch or serial number; | Pass |
| d) where applicable, the year of manufacturer or life expiry date, (refer to 4.2.2 y); | Pass |
| e) date of purchase; | Pass |
| f) any other information as necessary, e.g. maintenance and frequency of use; | Pass |
| g) date first put into use; | Pass |
| h) history of periodic examinations and repairs, to include: | Pass |
| 1) dates and details of each periodic examination and repair, and the name and signature of the competent person who carried out the periodic examination or repair; | |
| 2) next due date of periodic examination. | |

Note. It is the responsibility of the user organisation to provide the record and enter into the record the details required.

4.7 Periodic examination

Manufacturers shall provide all the necessary information and equipment e.g. instructions, checklists, spare parts lists and special tools etc, to enable periodic examinations to be carried out by a competent person. Pass

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

Specimen 2G17404 was assessed.

The specimen was a fixed length, webbing lanyard.

Both ends of lanyard were terminated with connectors. 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 load bearing points, was 1835 mm. This is less than the permitted maximum of 2 m. Pass

There were no metallic elements incorporated into the lanyard. NAp

4.2.2 Fibre ropes and webbing

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

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 (fixed length)**

Specimen 2G17404 was assessed against Recommendation for Use sheet # 63; rev. 03 issued by the Co-ordination of Notified Bodies and dated 08/10/2014, in particular Test 1..

When tested in accordance with 5.7, the specimen did withstand the 22 kN force applied for 3 minutes.

Pass

Estimates of the uncertainty of measurement – EN 355:2002

Clause	Test	Uncertainty
4.1	Design & ergonomics	See Note 1
4.2	Materials and construction	See INSPEC Reports
	Length	±5.8mm
4.3	Static preloading	±0.4%
4.4	Dynamic performance	Maximum breaking force
		Maximum arrest distance
		±4.4%
		±20mm
4.5	Static strength	See Note 1
4.6	Marking and information	See 6 and 7
6	Marking	See Note 1
7	Information	See Note 1
8	Packaging	See Note 1

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 assessment to the pass/fail criteria.

Estimates of the uncertainty of measurement – EN 354:2002

Clause	Test	Uncertainty
4.1	Design & ergonomics	-
4.2	Material and construction	-
	Length of splice	±0.65mm
	Length of lanyard	±3.1mm
	Metallic elements - corrosion test	See Note 1
	Connectors	See report
4.3	Static strength	See Note 1
4.4	Dynamic strength – lanyards with an incorporated adjustment device	See Note 1
4.5	Marking and information	-
6	Marking	-
7	Information	-
8	Packaging	-

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 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	±3.1 mm
4.2	Materials	-
4.3	Terminations	-
4.3.4	Terminations – Length of knot tail	±1.8 mm
4.4	Slippage	±1.0%
4.5	Static strength	See Note 1
4.6	Dynamic strength	See Note 1
	Static strength after dynamic strength	See Note 1
4.7	Corrosion	See Note 1
4.8	Marking and information	-
6	Marking	-
7	Information	-
8	Packaging	-

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 assessment to the pass/fail criteria.

ANNEX

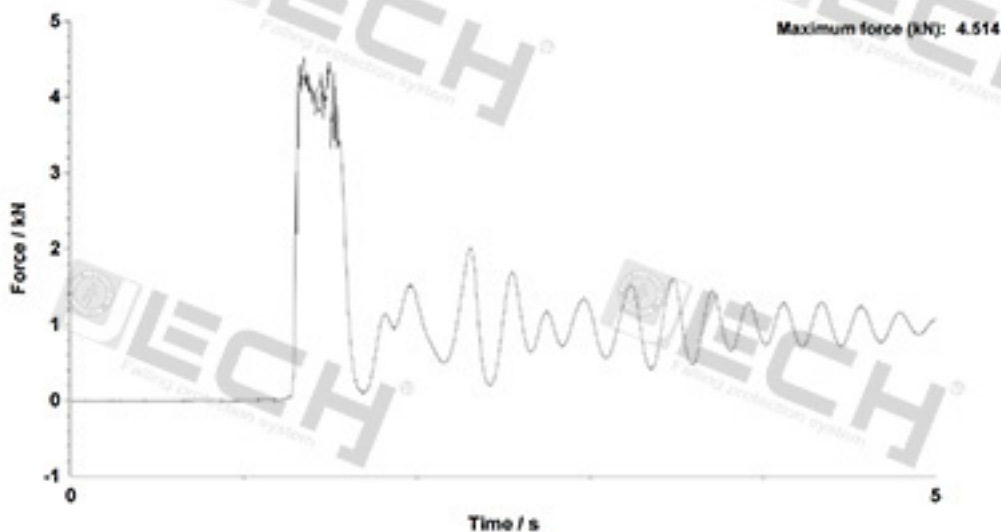
This Annex comprises two sections.

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

END OF REPORT

INSPEC Technical Services

Technician: LJ/SS
Standard: EN 355 Energy absorbing lanyard
Sample / File name: 2G17403
Drop item: EN drop mass, 100 kg
Orientation/Attachment Point: Centre eyebolt
Time and Date of Test: 11:02 22/10/19



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

**Jinhua Jech Tools Co., Ltd –
Energy absorbing lanyard, model JE311237N**



INSPEC Testing Services' specimen 2G17401

22 October 2019