

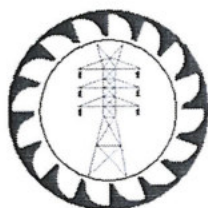
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CEB
SPECIFICATION

SPECIFICATIONS FOR PERSONAL PROTECTIVE EQUIPMENT

FALL PROTECTION

- [01] BELTS FOR WORK POSITIONING
- [02] FULL BODY HARNESSSES



CEYLON ELECTRICITY BOARD
SRI LANKA



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1. SCOPE

This specification specifies the requirements of Ceylon Electricity Board for the design, manufacture and testing of belts for work positioning and full body harnesses.

2. SERVICE CONDITIONS

(i)	Annual average ambient temperature	30 °C
(ii)	Maximum ambient temperature	40 °C
(iii)	Maximum relative humidity	90%
(iv)	Environmental conditions	Humid tropical climate

3. APPLICABLE STANDARDS

The equipment and components supplied shall be in accordance with the latest edition of the standards specified below and amendments thereof.

(i)	BS EN 358	Belts for work positioning
(ii)	BS EN 361	Full body harnesses
(iii)	BS EN 362	Connectors
(iv)	BS EN 355	Energy absorbers
(v)	JIS T 8165	Safety belts for line-men

4. BASIC FEATURES AND TECHNICAL REQUIREMENTS

Belts for work positioning shall consist of a waist belt, a work positioning lanyard and relevant connectors.

Full Body Harness shall consist of the harness and a fall protection lanyard (with or without an energy absorber).

In some cases, full body harness (including fall protection lanyard) can be equipped with back support and a work positioning lanyard (refer Annex B).

4.1 WAIST BELT

A waist belt shall be designed to enable the wearer to perform his work without undue discomfort and remain secure against the hazard of a fall from a height. Essential fastening and adjustment elements shall remain accessible to the wearer and shall operate effectively when manipulated by hand.

A waist belt shall not be less than 43 mm wide and shall be capable of adjustment to fit the wearer. The waist belt shall have at least one attachment element intended for the connection of load bearing components.

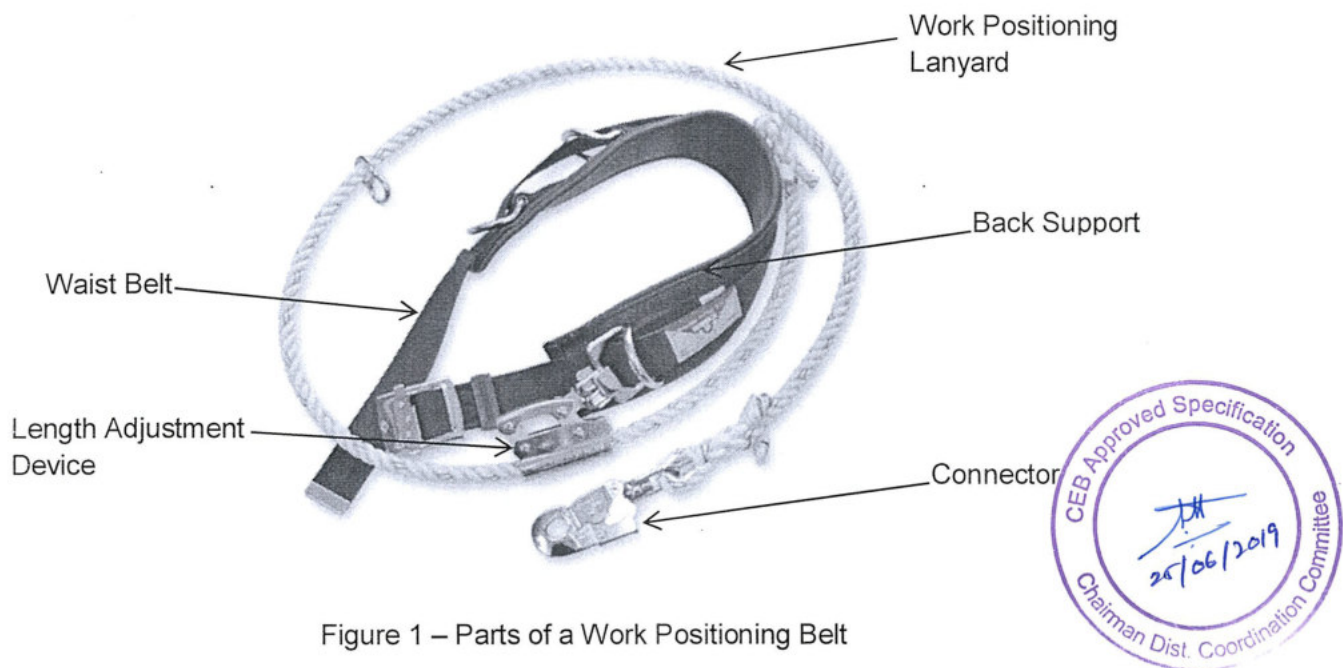
The fastening and adjustment elements of a waist belt shall be designed and constructed and correctly fastened such that involuntary release or opening of the element cannot occur. When fastening or adjustment elements can be secured in more than one manner, then the



waist belt shall comply with the performance requirements of this standard when the elements are secured in each available manner.

It shall be possible to carry out a visual inspection of the waist belt and all its attachments even when the belt is incorporated into a garment or if it is a component in a full body harness.

A back support shall be fitted to a waist belt to give physical support to the wearer without inhibiting either arm or leg movements. The minimum length of the back support shall be 50 mm longer than half the circumference of the belt when adjusted to the maximum radial length (waist size) specified by the manufacturer. The minimum width of the back support shall be 85 mm for a length of 200 mm centred on the spine of the wearer and shall be a minimum of 60 mm elsewhere.



4.2 LANYARDS (WORK POSITIONING LANYARD / FALL PROTECTION LANYARD)

Lanyards made of textile materials (e.g. synthetic fibre) shall be able to sustain a force of 22kN when tested as per EN 354:2010 or similar test method. In addition, Lanyards shall be able to retain a mass of 100 kg when dropped from a height of 4 m when tested as per EN 354:2010 or similar test method.

A work positioning lanyard equipped with a length adjustment element shall be capable of adjustment to the minimum length which enables freedom to work and prevents the wearer from falling when the lanyard is incorporated into a specified work positioning system.

Every work positioning lanyard shall be so constructed that involuntary release of the lanyard when connected to a waist belt is prevented. The material of the work positioning lanyard shall be terminated in such a way that a length adjuster when fitted cannot be released from the lanyard involuntary. When a work positioning lanyard can be assembled in more than one manner then the lanyard shall meet the performance requirements when tested with each method of assembly.

A work positioning lanyard equipped with a length adjustment element shall be either:

- a) Permanently attached to the waist belt at one end and have a connector compatible with an attachment element fitted to the waist belt at the other hand.
- b) Detachable, in which case there shall be a connector at each end compatible with the attachment element(s) of the waist belt.

The work positioning lanyards described above shall have a maximum length of 2 m.

4.3 FULL BODY HARNESS

A full body harness shall comprise straps or similar elements which are placed in the pelvic area and on the shoulders. The full body harness shall fit the wearer. Means of adjustment may be provided.

Straps shall not migrate from position and shall not loosen by themselves.

The width of primary straps shall be at least 40 mm and of secondary straps at least 20 mm.

4.4 MATERIALS OF FULL BODY HARNESS/WORK POSITIONING BELT/ LANYARD

Webbing and yarns shall be made from virgin filament or multifilament synthetic fibres suitable for the use intended. The breaking tenacity of the synthetic fibre shall be known to be at least 0.6N/ tex.

Threads used for sewing shall be physically compatible with the webbing and of a quality comparable with that of the webbing. They shall be of a contrasting colour or shade in order to facilitate visual inspection.

The material used in the manufacture of a lanyard shall be known to have a minimum breaking force of 22 kN.

4.5 CONNECTORS

Connectors shall not have sharp edges or burrs that may cause injury to the user or that may cut, abrade or otherwise damage webbing or rope. Materials, which may come into contact with the skin of a user, shall not be known to cause irritating and sensitization effects during normal use of the connector

Gates in the connectors shall be self-closing and shall have an automatic self-locking feature. Self-locking feature shall lock the gate automatically when the gate shuts and shall require at least two different deliberate manual actions to open the gate.

Screw link connectors and manual-locking gates are not accepted.



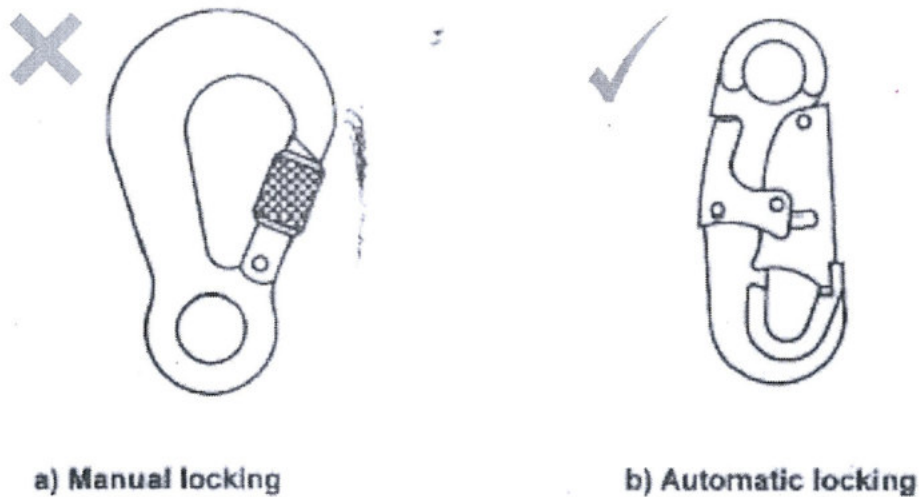


Figure 2 - Screw link (manual-locking gates) vs. Automatic locking gates

4.6 ENERGY ABSORBERS

When an energy absorber is required for a full body harness, the energy absorber should be integral with the fall protection lanyard. (i.e. the energy absorber cannot be removed without mutilating the lanyard).

4.7 PERFORMANCE

4.7.1 Work Positioning Belt (including the lanyard)

a) Static strength test

Work Positioning Belt (including the lanyard) shall be able to withstand a force of 15 kN for 3 min when tested as per EN 358:2000 or similar test method.

b) Dynamic Strength Test (Applicable only for Belts conforming to EN Standards)

Work Positioning Belt (including the lanyard) shall not release a dummy torso (of 100 kg) when dropped from 1m height as per EN 358:2000 or similar test method.

4.7.2 Full Body Harness

a) Static strength test

Full body harness shall not release a dummy torso (of 100 kg) under a force of 15 kN as per EN 364:21992 or similar test method.

b) Dynamic Strength Test

Full body harness shall withstand two successive drop tests of a dummy torso (of 100 kg) when dropped from 4 m height as per 364:21992 or similar test method.

4.8 MARKING

Each item of PPE or other equipment shall be clearly, indelibly and permanently marked by the manufacturer and shall include the following general information in addition to specific information

4.8.1 General Information

- a) Means of Identification. E.g. Manufacturer's Name or Trade Mark
- b) Model and type/identification
- c) Number and year of the document to which the equipment conforms
- d) Pictogram or other method to indicated the necessity for users to read the instructions for use.
- e) Month and year of manufacture

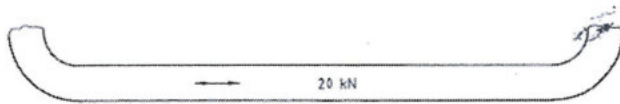
4.8.2 Specific Information

Full Body Harness

A capital letter "A" at each fall arrest attachment element

Connectors

If the minimum strength claimed by the manufacturer for the major axis is marked on the connector, the marking shall be for the closed and locked position as per below figure. The marked strength shall be in whole number kN.



Lanyard

Maximum lanyard length

Energy Absorber

Maximum length allowed of the energy absorber including lanyard

5. TESTING

Work Positioning Belt (including connectors) and Full Body Harness shall be subjected to the following tests according to the relevant standard. A summary sheet of tests carried out or test reports shall be submitted as specified in 5.2.



5.1 TESTS

5.1.1 Work Positioning Belt and Full Body Harness that conform to EN Standard

- a. Static Strength (of Work Positioning Belt/ Full Body Harness)
- b. Dynamic Strength (of Work Positioning Belt/ Full Body Harness)
- c. Static Strength of Lanyard
- d. Dynamic Strength of Lanyard
- e. Slippage for Lanyards with Length Adjustment Device
- f. Corrosion Resistance of Metal Parts of Work Positioning Belt
- g. Static Strength of Connectors
- h. Gate Function of Connectors
- i. Corrosion Resistance of Connectors
- j. Static Preloading of Energy Absorbers (if applicable)
- k. Dynamic Performance of Energy Absorbers (if applicable)
- l. Static Strength of Energy Absorbers (if applicable)

5.1.2 Work Positioning Belt and Full Body Harness that conform to Japanese (JIS) Standard

Tensile Strength Test of following parts

- a. Belt
- b. Lanyard
- c. Connectors
- d. Length adjustment device
- e. Belt buckle



5.2 TEST REPORTS

A *summary sheet* of the tests carried out shall be submitted where the summary sheet clearly shows the equipment concerned, the manufacturer's identity, the tests carried out, test results and the standard's requirements against the test results to determine passing or failing of the test.

The summary sheet shall be preferably from an accredited independent testing laboratory (or other testing laboratories which maintain superior testing facilities acceptable to the purchaser) where the testing was carried out and this testing laboratory shall be acceptable to the purchaser. Proof of accreditation of the testing laboratory by a national/international authority shall be forwarded if requested by the purchaser.

Submission of individual test reports is not necessary if duly authenticated summary sheet is submitted as described above.

6. QUALITY ASSURANCE

The manufacturer shall possess ISO 9001:2008 or latest Quality Assurance certifications for the plant where the manufacturer of helmet is done.

Bidders shall furnish a copy of the ISO certificate certified as true copy of the original by the manufacturer, along with the offer.

7. ADDITIONAL REQUIREMENTS

PACKAGING AND DELIVERY

Work positioning belt shall be packaged in an individual container or package of sufficient strength to properly protect the product from damage. The outside of the container or package shall be marked as specified in relevant standard.

The type of packaging suitable for transport shall be defined by the manufacturer. At the request of the customer or according to government specifications any additional or amended instructions shall be included in the package.

8. INFORMATION TO BE SUPPLIED WITH THE OFFER

The bid shall be accompanied with the following;

- a) English version of catalogues describing the equipment and indicating the type/model number.
- b) Technical literature in English describing the constructional and operational features, relevant drawings etc. of the equipment.
- c) Information on the following:
Instructions for use, information on storage, fitting and adjustment, handling, cleaning, disposal, periodic inspection, periodic testing and useful service life
- d) Packing details.
- e) Completed schedule of particulars as per Annex A.
- f) Test reports or summary sheet conforming to clause 5:

9. SAMPLE STUDY

One sample of the offered equipment including accessories if any, shall accompany the bid to facilitate analysis and evaluation. Any additional sample may be requested by the purchaser if such deemed necessary.

10. ANNEX

Annex A - Schedule of Guaranteed Technical Particulars

Annex B – Example of a full body harness with back support



SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS

(CEB Requirements shall be filled by the procurement entity and information of the offer shall be filled by the manufacturer/supplier)

Fall Protection			
Sr No	Item	CEB Requirement	Offered
1	Required PPE item	<input type="checkbox"/> Work Positioning Belt with back support (including Work Positioning Lanyard) <input type="checkbox"/> Full Body Harness (including Fall Protection Lanyard) <input type="checkbox"/> Full Body Harness (including Fall Protection Lanyard) together with back support for work positioning (including Work Positioning Lanyard) <input type="checkbox"/> Energy Absorber for Fall Protection Lanyard	
2	Pouch for tools (Applicable only for work positioning belts)	<input type="checkbox"/> Required <input type="checkbox"/> Not required	
3	Brand	specify	
4	Model	specify	
5	Country of Manufacture	specify	
6	Applicable Standard	BS EN 358 - Belts for work positioning BS EN 361 - Full body harnesses JIS T 8165:2012 Safety belts for line-men	
Work Positioning Belt (if applicable)			
7	Width of the waist belt	minimum 43 mm	
8	Width of the back support	minimum 85 mm for a length of 200 mm centred on the spine and minimum 60mm elsewhere	
9	Maximum adjustable length of the lanyard	2 m	
10	Length adjustment device of the lanyard	Required	
11	Breaking force of the material of the lanyard	minimum 22 kN	
Full Body Harness (if applicable)			



11	Width of the primary straps	minimum 40 mm	
12	Width of the secondary straps	minimum 20 mm	
13	Breaking force of the material of the lanyard	minimum 22 kN	
14	Maximum length of the lanyard	2 m	
Connectors			
15	Gate closing and locking	Self-closing and self-locking	
16	Gate opening	require at least two different deliberate manual actions to open the gate	
17	Year and Month/Quarter of Manufacture	Manufactured within two years before the bid closing date.	
18	Marking on the equipment	Please refer clause 4.8	
19	Test Reports/ Summary Sheet submitted	Please refer clause 5	
20	Quality Assurance for Manufacturer	Please refer clause 6	
21	Samples	Please refer clause 9	
22	Warranty	specify	
23	Packing details submitted	Please refer clause 8	
24	Product catalogues, technical literature submitted	Please refer clause 8	
25	Information on the following should be submitted Instructions for use, information on storage, shelf life, fitting and adjustment, handling, cleaning, disposal, periodic inspection, periodic testing and useful service life	Please refer clause 8	

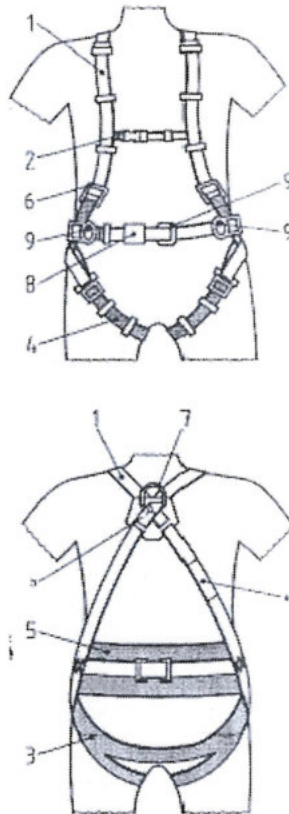
I/We certify that the above data are true and correct

.....
Signature of the Bidder/Manufacturer and Seal

.....
Date



EN 361:2002 (E)



Key

- 1 Shoulder strap
- 2 Secondary strap
- 3 Sit strap (Primary strap)
- 4 Thigh strap
- 5 Back support for work positioning
- 6 Adjustment element
- 7 Fall arrest attachment element
- 8 Buckle
- 9 Attachment element for work positioning

Figure 3 – Example of a full body harness with back attachment for fall arrest and attachment for work positioning

