



TITLE:

**SPECIFICATION FOR  
PERSONAL PROTECTIVE  
EQUIPMENT-FOOTWEAR**

Part 1: Safety Boots

Doc. No.

KP1/6C.1/13/TSP/01/010-1

Issue No.

1

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0

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**ANNEX A:** **Guaranteed Technical Particulars** *(to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, four customer reference letters, the manufacturer's experience and copies of complete test reports for tender evaluation, all in English Language)*

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**0.1 Circulation List**

COPY NO.	COPY HOLDER
1	Manager, Standards
Electronic copy (pdf) on Kenya Power Server (currently: Network→stima-fprnt-001→techstd&specs)	

**0.2 Amendment Record**

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2015-08-03	New Issue	Michael Apudo	Dr. Eng. P. Kimemia 

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Authorized by: Head of Department, Standards

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Date: 2015-08-03

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## FOREWORD

This specification has been prepared by the Standards Department in collaboration with the Human Resource Services Department, and Safety, Health & Environment (SHE) Department all of The Kenya Power and Lighting Company Ltd (Kenya Power) and The Kenya Electrical Trade & Allied Workers Union. The specification lays down requirements for Personal Protective Equipment –Safety Boots. It is intended for use by Kenya Power in purchasing the items.

The supplier shall submit information which confirms satisfactory service experience with products which fall within the scope of this specification.

### 1.0. SCOPE

- 1.1. This document specifies the general requirements for personal protective equipment – safety boots which are intended to protect the wearer against mechanical injury.
- 1.2. This specification also covers the basic and additional (optional) requirements for safety boots.
- 1.3. The specification stipulates the minimum requirements for personal protective equipment – safety boots in the company and it shall be the responsibility of the supplier to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the items for The Kenya Power & Lighting Company.

The specification does not purport to include all the necessary provisions of a contract.

### 2.0. REFERENCES

The following standards contain provisions which, through reference in this text constitute provisions of this specification. Unless otherwise stated, the latest editions (including amendments) apply.

ISO 20345: Personal Protective equipment –Safety footwear

ISO 20344: Personal protective equipment — Test methods for footwear

EN 12568: Foot and leg protectors – Requirements and test methods for toecaps and metal penetration resistant inserts

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ISO 13287: Personal protective equipment -- Footwear -- Test method for slip resistance

### 3.0. Terms and Definitions

The definitions given in the reference standards for each item shall apply.

### 4.0. REQUIREMENTS

#### 4.1. Operating Conditions

The Safety Boots shall be suitable for use in Industrial Work, outdoors in Tropical Climate with average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C.

#### 4.2. Design and construction

##### 4.2.1. General design

- 4.2.1.1. The safety boots in this specification shall be designed, manufactured and tested to ISO 20345, ISO 20344 and of this specification.
- 4.2.1.2. The safety boots shall incorporate protective features to protect the wearer from injuries which could arise through accidents, fitted with toecaps, designed to give protection against impact when tested at an energy level of at least 200J and against compression when tested at a compression load of at least 15kN.
- 4.2.1.3. The footwear shall be classified as **class I, designation B** - ankle boot of Strobel construction as per ISO 20344:2004 and shall be made from leather and other materials, excluding all-rubber or all-polymeric footwear. The footwear shall resemble Fig. 1.
- 4.2.1.4. Safety footwear shall comply with the basic requirements given in Table 2. It shall be complete with full insock, removable and not water permeable as per Table 3 of ISO 20344:2004.

#### 4.3. Specific design requirements

##### 4.3.1. Height of upper

The height of the upper measured in accordance with ISO 20344:2004, clause 6.2, shall be as given in Table 1. The seat region shall be closed.

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**Table 1- Height of Upper**

Footwear size	Height, mm (min)
36 and below	103
37 and 38	105
39 and 40	109
41 and 42	113
43 and 44	117
45 and above	121

**4.3.2. Whole footwear**

**4.3.2.1. Sole performance**

**4.3.2.1.1. Construction**

The insole shall be present in such a way that it cannot be removed without damaging the footwear.

**4.3.2.1.2. Upper/outsole bond strength**

When footwear, other than with a stitched sole, is tested in accordance with the method described in EN ISO 20344:2004, clause 5.2, the bond strength shall be not less than 4.0 N/mm, unless there is tearing of the sole, in which case the bond strength shall be not less than 3.0 N/mm.

**4.3.2.2. Toe protection**

**4.3.2.2.1. General**

4.3.2.2.1.1. Toecaps shall be incorporated in the footwear in such a manner that they cannot be removed without damaging the footwear.

4.3.2.2.1.2. The footwear shall be fitted with internal toecaps and shall have a vamp lining or an element of the upper that serves as a lining, and in addition the toecaps shall have an edge covering extending from the back edge of the toecap to at least 5 mm beneath it and at least 10 mm in the opposite direction.

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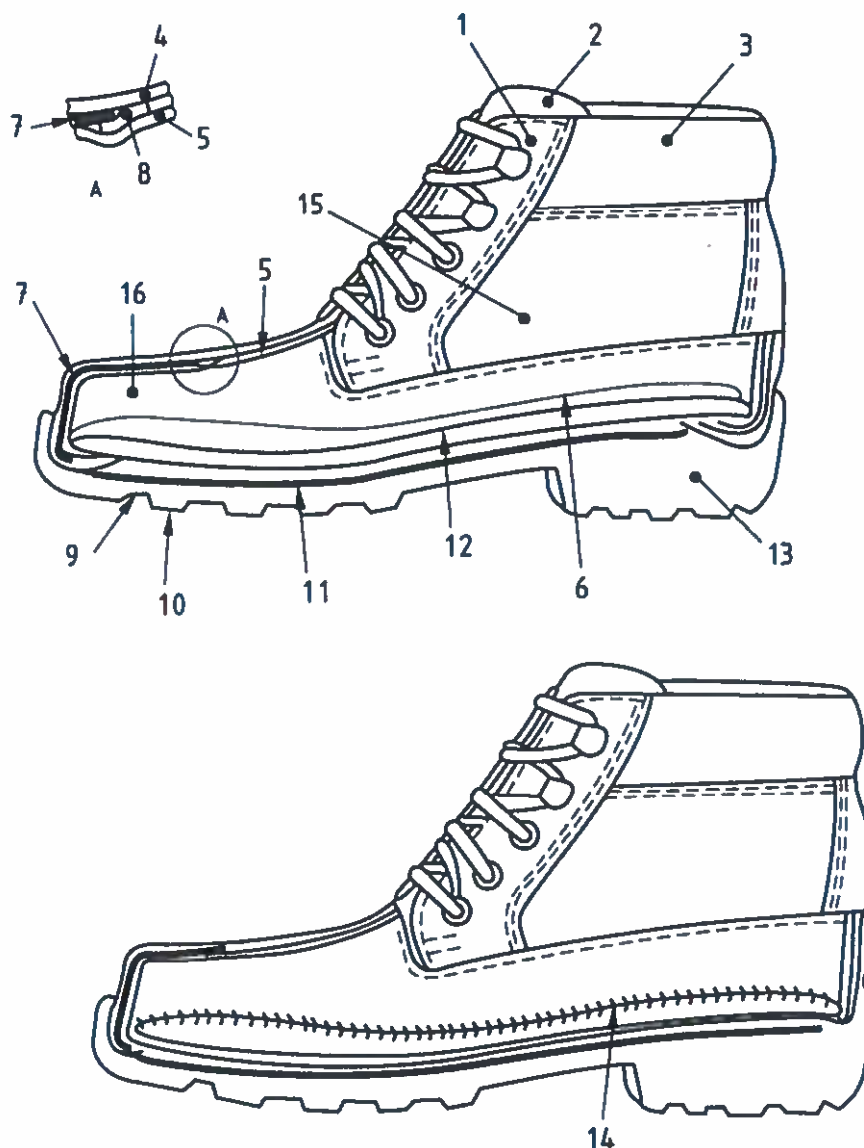
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**Key**

1	Facing	6	Insock	11	Penetration-resistant insert
2	Tongue	7	Toecap	12	Insole
3	Collar	8	Edge covering, e.g. foam strip	13	Heel
4	Upper	9	Outsole	14	Strobel stitching
5	Vamp lining	10	Cleat	15	Quarter
				16	Vamp

**Fig 1- Parts of safety footwear of Strobel construction**

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4.3.2.2.1.3. Scuff resistant coverings for the toe region shall be not less than 1 mm in thickness.

#### 4.3.2.2.2. Internal length of toecaps

When measured in accordance with the method described in ISO 20344:2004, clause 5.3, the internal toecap length shall be in accordance with Table 2.

**Table 2- Minimum internal length of toecaps**

Footwear size	Minimum internal lengths, mm
36 and below	34
37 and 38	36
39 and 40	38
41 and 42	39
43 and 44	40
45 and above	42

#### 4.3.2.2.3. Impact resistance of safety footwear

When safety footwear is tested in accordance with the method described in ISO 20344:2004, clause 5.4, at impact energy of at least  $200 \text{ J} \pm 4 \text{ J}$ , the clearance under the toecap at the moment of impact shall be in accordance with Table 3. In addition, the toecap shall not develop any cracks on the test axis which go through the material, i.e. through which light can be seen.

**Table 3 — Minimum clearance under toecaps at impact**

Footwear size	Minimum clearance, mm
36 and below	12.5
37 and 38	13.0
39 and 40	13.5
41 and 42	14.0
43 and 44	14.5
45 and above	15.0

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**4.3.2.2.4. Compression resistance of safety footwear**

When safety footwear is tested in accordance with ISO 20344:2004, clause 5.5, the clearance under the toecap at a compression load of  $15\text{kN} \pm 0.1\text{kN}$  shall be in accordance with Table 3.

**4.3.2.2.5. Behaviour of toecaps**

**4.3.2.2.5.1. Corrosion resistance of metallic toecaps**

Metallic toecaps to be used in classification I footwear when tested and assessed in accordance with ISO 20344:2004, 5.6.2, they shall exhibit no more than five areas of corrosion, none of which shall exceed  $2.5\text{ mm}^2$  in area.

**4.3.2.2.5.2. Non-metallic toecaps**

Non-metallic toecaps used in safety footwear shall comply with the requirements of EN 12568:1998, clause 4.3.

**4.3.2.3. Specific ergonomic features**

The footwear shall be considered to satisfy the ergonomic requirements if all the answers are positive in the questionnaire given in ISO 20344:2004, clause 5.1.

**4.3.3. Upper**

**4.3.3.1. General**

4.3.3.1.1. For designs of this footwear, the area which shall fulfil the upper requirements shall have a minimum height measured from the horizontal surface beneath the sole in accordance with Table 4.

4.3.3.1.2. When collar and insert materials are present above the heights given in Table 4, such materials shall meet the tear strength, clause 4.3.4.1, and abrasion resistance, clause 4.3.4.2, requirements for lining.

4.3.3.1.3. In the case of leather materials they shall meet in addition the requirements for the pH value, clause 4.3.5.2, and for the chromium VI content, clause 4.3.5.2.

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**Table 4 — Minimum height below which the upper requirements shall be completely fulfilled**

Footwear size	Design minimum height, mm
36 and below	64
37 and 38	66
39 and 40	68
41 and 42	70
43 and 44	72
45 and above	73

**4.3.3.2. Tear strength**

When determined in accordance with ISO 20344:2004, clause 6.3, the minimum tear force of the upper of classification I footwear shall be 120N

**4.3.3.3. Tensile properties**

When determined in accordance with ISO 20344:2004, clause 6.4, the minimum tensile strength shall be 12 N/mm<sup>2</sup> for leather

**4.3.3.4. Water vapour permeability and coefficient**

When tested in accordance with ISO 20344:2004, clauses 6.6, and 6.8, the water vapour permeability shall be not less than 0.8 mg/(cm<sup>2</sup>·h) and the water vapour coefficient shall be not less than 15 mg/cm<sup>2</sup>.

**4.3.3.5. pH value**

When leather uppers are tested in accordance with ISO 20344:2004, clause 6.9, the pH value shall be not less than 3.2 and, if the pH value is below 4, the difference figure shall be less than 0.7.

**4.3.3.6. Chromium VI content**

When leather uppers are tested in accordance with ISO 20344:2004, clause 6.11, chromium VI shall not be detectable.

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#### 4.3.4. Lining

**NOTE:** *The following requirements are applicable to vamp lining and quarter lining.*

##### 4.3.4.1. Tear strength

When determined in accordance with ISO 20344:2004, clause 6.3, the minimum tear force of the lining shall be 30N

##### 4.3.4.2. Abrasion resistance

When tested in accordance with ISO 20344:2004, clause 6.12, the lining shall not develop any holes before the following number of cycles has been performed:

- a) Dry: 25 600 cycles;
- b) Wet: 12 800 cycles.

##### 4.3.4.3. Water vapour permeability and coefficient

When tested in accordance with ISO 20344:2004, clauses 6.6, and 6.8, the water vapour permeability shall be not less than 2.0 mg/(cm<sup>2</sup>·h) and the water vapour coefficient shall be not less than 20 mg/cm<sup>2</sup>.

**NOTE:** *There is no requirement to test unlined stiffeners.*

##### 4.3.4.4. pH value

When leather linings are tested in accordance with ISO 20344:2004, clause 6.9, the pH value shall be not less than 3.2 and, if the pH value is below 4, the difference figure shall be less than 0.7.

##### 4.3.4.5. Chromium VI content

When leather linings are tested in accordance with ISO 20344:2004, clause 6.11, chromium VI shall not be detectable.

#### 4.3.5. Tongue

**NOTE:** *The tongue need only be tested if the material from which it is made or its thickness differs from that of the upper material.*

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**4.3.5.1. Tear strength**

When determined in accordance with ISO 20344:2004, clause 6.3, the minimum tear force of the tongue shall be 36 N

**4.3.5.2. pH value**

When leather tongues are tested in accordance with ISO 20344:2004, clause 6.9, the pH value shall be not less than 3.2 and, if the pH value is below 4, the difference figure shall be less than 0.7.

**4.3.5.3. Chromium VI content**

When leather tongues are tested in accordance with ISO 20344:2004, 6.11, chromium VI shall not be detectable.

**4.3.6. Insole and insock**

**4.3.6.1. Thickness**

When determined in accordance with ISO 20344:2004, clause 7.1, the thickness of the insole shall be not less than 2.0 mm.

**4.3.6.2. pH value**

When leather insoles or leather insocks are tested in accordance with ISO 20344:2004, clause 6.9, the pH value shall be not less than 3.2 and, if the pH is below 4, the difference figure shall be less than 0.7.

**4.3.6.3. Water absorption and desorption**

When tested in accordance with ISO 20344:2004, clause 7.2, the water absorption shall be not less than 70 mg/cm<sup>2</sup> and the water desorption shall be not less than 80 % of the water absorbed.

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#### **4.3.6.4. Abrasion resistance**

##### **4.3.6.4.1. Insoles**

When non-leather insoles are tested in accordance with ISO 20344:2004, 7.3, the abrasion damage shall not be more severe than that illustrated by the reference test pieces for the same family of materials before 400 cycles. (See ISO 20344:2004, clause 7.3.6).

##### **4.3.6.4.2. Insocks**

When non-leather insocks are tested in accordance with ISO 20344:2004, clause 6.12, the wearing surface shall not develop any holes before the following number of cycles has been performed

- a) Dry: 25 600 cycles;
- b) Wet: 12 800 cycles.

#### **4.3.6.5. Chromium VI content**

When leather insoles are tested in accordance with ISO 20344:2004, clause 6.11, chromium VI shall not be detectable.

#### **4.3.7. Outsole**

##### **4.3.7.1. Thickness of non-cleated outsoles**

When tested in accordance with EN ISO 20344:2004, 8.1, the total thickness of a non-cleated outsole, at any point, shall be not less than 6 mm.

##### **4.3.7.2. Tear strength**

When non-leather outsoles are tested in accordance with ISO 20344:2004, clause 8.2, the tear strength shall be not less than:

- a) 8 kN/m for a material with a density higher than 0.9 g/cm<sup>3</sup>;
- b) 5 kN/m for a material with a density lower or equal to 0.9 g/cm<sup>3</sup>

##### **4.3.7.3. Abrasion resistance**

When non-leather outsoles other than those from all-rubber or all-polymeric footwear are tested in accordance with ISO 20344:2004, clause 8.3, the relative volume loss

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shall be not greater than 250 mm<sup>3</sup> for materials with a density of 0.9 g/cm<sup>3</sup> or less and not greater than 150 mm<sup>3</sup> for materials with a density greater than 0.9 g/cm<sup>3</sup>.

**4.3.7.4. Flexing resistance**

When non-leather outsoles are tested in accordance with ISO 20344:2004, clause 8.4, the cut growth shall be not greater than 4 mm before 30 000 flex cycles.

**4.3.7.5. Hydrolysis**

When polyurethane outsoles and soles with an outer layer composed of polyurethane are tested in accordance with ISO 20344:2004, clause 8.5, then the cut growth shall be not greater than 6 mm before 150 000 flex cycles.

**4.3.7.6. Interlayer bond strength**

When tested in accordance with ISO 20344:2004, clause 5.2, the bond strength between the outer or cleated layer and the adjacent layer shall be not less than 4.0 N/mm unless there is tearing of any part of the sole, in which case the bond strength shall be not less than 3.0 N/mm.

**4.3.7.7. Resistance to fuel oil**

4.3.7.7.1. When tested in accordance with ISO 20344:2004, clause 8.6.1, the increase in volume shall be not greater than 12%.

4.3.7.7.2. If after testing in accordance with ISO 20344:2004, clause 8.6.1, the test piece shrinks by more than 0.5 % in volume or increases in hardness by more than 10 Shore A hardness units, a further test piece shall be taken and tested in accordance with the method described in ISO 20344:2004, clause 8.6.2, and the cut growth shall be not greater than 6 mm before 150 000 flex cycles.

**4.4. Additional requirements for safety footwear**

**4.4.1. General**

The safety footwear in this specification shall have additional requirements that shall conform to the appropriate additional requirements and corresponding marking, given in table 14 of ISO 20345: 2004.

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#### 4.4.2. Whole footwear

##### 4.4.2.1. Penetration resistance

###### 4.4.2.1.1. Determination of penetration force

When footwear is tested in accordance with ISO 20344:2004, clause 5.8.2, the force required to penetrate the sole unit shall be not less than 1,100 N.

###### 4.4.2.1.2. Construction

4.4.2.1.2.1. The penetration-resistant insert shall be built into the bottom of the shoe in such a manner that it cannot be removed without damaging the footwear. The insert shall not lie above the flange of the safety or protective toecap and shall not be attached to it.

###### 4.4.2.1.2.2. Dimensions

- The penetration-resistant insert dimensions shall be measured according to ISO 20344:2004, clause 5.8.1.
- The penetration-resistant insert shall be of such a size that, with the exception of the heel region, the maximum distance between the line represented by the feather edge of the last and the edge of the insert (X) is 6.5 mm. In the heel region the maximum distance between the line represented by the feather edge of the last and the insert (Y) shall be 17 mm (see figure 2).
- The penetration-resistant insert shall have no more than three holes of maximum diameter 3 mm to attach it to the bottom of the footwear.
- The holes shall not lie in the shaded area 1 (see figure 2).
- Holes in the shaded area 2 shall be disregarded (see figure 2).

###### 4.4.2.1.2.3. Flex resistance of penetration-resistant inserts

When penetration-resistant inserts in all types of footwear are tested in accordance with EN ISO 20344:2004, clause 5.9, they shall show no visible signs of cracking after being subjected to  $1 \times 10^6$  flexes.

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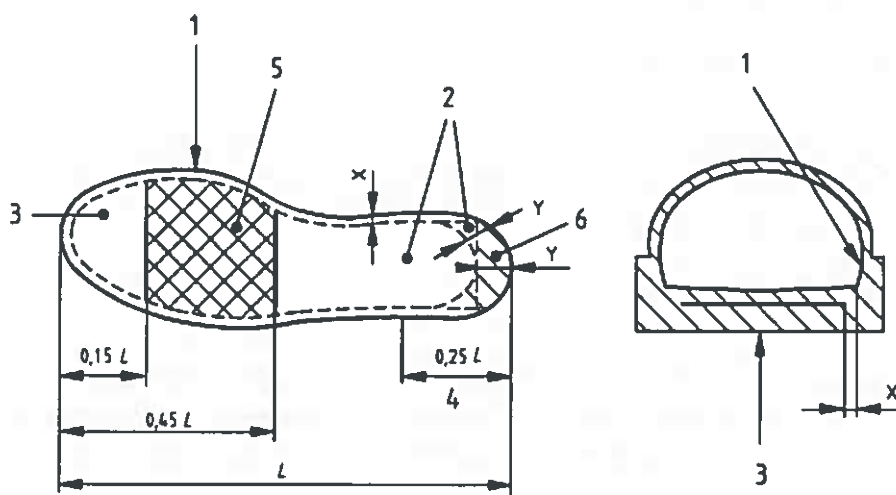
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**Key**

- |   |  |
|---|--|
| 1 Line left by feather edge of the last | 5 Shaded area 1                                      |
| 2 Alternative shapes of insert          | 6 Shaded area 2                                      |
| 3 Insert                                | L Length of the inside of the bottom of the footwear |
| 4 Heel region                           |  |

**Figure 2— Position of penetration-resistant insert**

**4.4.2.1.2.4. Behaviour of penetration-resistant inserts**

**a) Corrosion resistance of penetration-resistant metallic inserts**

When penetration-resistant metallic inserts to be used in this type of footwear are tested in accordance with the method described in ISO 20344:2004, clause 5.6.3, they shall exhibit no more than five areas of corrosion, none of which shall exceed 2.5 mm<sup>2</sup> in area.

**b) Penetration-resistant non-metallic inserts**

Penetration-resistant non-metallic inserts shall comply with the requirements of EN 12568:1998, clause 5.2, measuring the maximum force after being subjected to the treatments described in EN 12568: 1998, clause 7.1.5.

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#### 4.4.2.2. Electrical properties

##### 4.4.2.2.1. Conductive footwear

When measured in accordance with ISO 20344:2004, clause 5.10, after conditioning in a dry atmosphere (ISO 20344:2004, clause 5.10.3.3 a)), the electrical resistance shall be not greater than 100 kΩ.

##### 4.4.2.2.2. Antistatic footwear

When measured in accordance with ISO 20344:2004, clause 5.10, after conditioning in a dry and wet atmosphere (ISO 20344:2004, clause 5.10.3.3 a) and b)), the electrical resistance shall be above 100 kΩ and less than or equal to 1,000 MΩ.

#### 4.4.2.3. Resistance to inimical environments

##### 4.4.2.3.1. Heat insulation of sole complex

When footwear is tested in accordance with ISO 20344:2004, clause 5.12, the temperature increase on the upper surface of the insole shall be not greater than 22 °C. There shall be no distortion or embrittlement of the sole that reduces its functionality. The insulation shall be incorporated in the footwear in such a manner that it cannot be removed without damaging the footwear.

##### 4.4.2.3.2. Cold insulation of sole complex

When footwear is tested in accordance with ISO 20344:2004, clause 5.13, the temperature decrease on the upper surface of the insole shall be not more than 10 °C. The insulation shall be incorporated in the footwear in such a manner that it cannot be removed without damaging the footwear.

#### 4.4.2.4. Energy absorption of seat region

When footwear is tested in accordance with ISO 20344:2004, clause 5.14, the energy absorption of the seat region shall be not less than 20J.

#### 4.4.2.5. Water resistance

When tested in accordance with ISO 20344:2004, clause 5.15.1, the total area of water penetration after 100 trough lengths shall be not greater than 3 cm<sup>2</sup> or when tested in

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accordance with ISO 20344:2004, clause 5.15.2, no water penetration shall occur before 15 min.

#### **4.4.2.6. Metatarsal protection**

##### **4.4.2.6.1. Construction**

- (i) The metatarsal protective device shall be made from suitable materials and be of a suitable shape, such that under impact the resulting forces are distributed over the sole, the toecap and as large a surface of the foot as possible.
- (ii) The metatarsal protective device shall be attached to the footwear in such a manner that it cannot be removed without damaging the footwear.
- (iii) The metatarsal protective device shall fit the shape of the footwear at the inner and outer side of the foot and shall be designed so as not to impair normal foot movement.

##### **4.4.2.6.2. Impact resistance of metatarsal protective device**

When tested in accordance with ISO 20344:2004, clause 5.16, the minimum clearance at the moment of impact shall be in accordance with Table 5.

**Table 5 — Minimum clearance at impact**

<b>Footwear size</b>	<b>Minimum clearance after impact, mm</b>
36 and below	37.0
37 and 38	38.0
39 and 40	39.0
41 and 42	40.0
43 and 44	40.5
45 and above	41.0

##### **4.4.2.7. Ankle protection**

When tested in accordance with ISO 20344:2004, clause 5.17, the mean value of the test results shall not exceed 20kN and no single value shall exceed 30kN.

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#### 4.4.3. Upper

##### 4.4.3.1. Water penetration and water absorption

When tested in accordance with ISO 20344:2004, clause 6.13, the water penetration (expressed as mass increase of the absorbent cloth after 60 min) shall not be higher than 0.2g and the water absorption shall not be higher than 30 %.

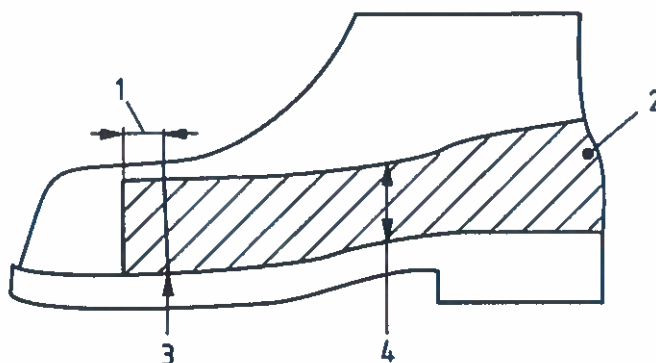
##### 4.4.3.2. Construction

Non-functional and decorative stitching and perforations shall not be used on footwear for which water resistance of the upper is claimed.

##### 4.4.3.3. Cut resistance

###### 4.4.3.3.1. Construction

- (i) Footwear shall have a protective area extending from the feather edge to at least 30 mm above it and from the toecap to the heel end of the footwear. It extends beyond the rear end of the toecap by at least 10 mm.
- (ii) There shall be no gap between the toecap and the protective material. The protective material shall be permanently attached to the footwear. If different materials are used for protection against cutting, they shall either be attached to each other or overlap (see figure 3).



**Key**

- 1 10 mm overlap over toecap
- 2 Protective area

- 3 Rear edge of toecap
- 4 30 mm minimum height above the feather line

**Figure 3— Coverage of protective area**

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#### 4.4.3.3.2. Resistance to cutting

When tested in accordance with the method described in ISO 20344:2004, clause 6.14, the factor shall be not less than 2.5.

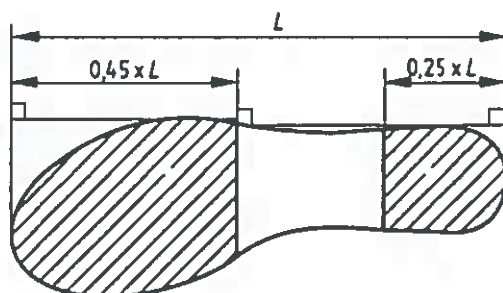
#### 4.4.3.3.3. Penetration resistance

Footwear shall also comply with the requirements of clause 4.4.2.1.

#### 4.4.4. Outsole

##### 4.4.4.1. Cleated area

With the exception of the region under the flange of the toecap, at least the shaded area as shown in figure 4 shall have cleats which are open to the side.



**Figure 4 — Cleated area**

##### 4.4.4.2. Thickness of cleated outsoles

When tested in accordance with ISO 20344:2004, clause 8.1, for direct-injected, vulcanized or cemented outsoles

- (i) The thickness  $d_1$ , shall be not less than 4 mm, for multilayered outsoles,
- (ii) The thickness  $d_1$  shall be not less than 4 mm.

##### 4.4.4.3. Cleat height

When tested in accordance with ISO 20344:2004, 8.1, for direct-injected, vulcanized or cemented outsoles

- (i) The cleat height  $d_2$  shall be not less than 2.5 mm.
- (ii) For multi-layered outsoles the cleat height  $d_2$  shall be not less than 2.5 mm.

**NOTE:** Outsoles with a cleat height of less than 2.5 mm are regarded as uncled.

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**4.4.4.4. Resistance to hot contact**

When tested in accordance with ISO 20344:2004, 8.7, rubber and polymeric outsoles shall not melt and shall not develop any cracks when bent around the mandrel. When tested in the same way leather outsoles shall develop no cracks or charring which extend into the corium when bent around the mandrel.

**4.4.4.5. Slip resistance of outsole**

4.4.4.5.1. The footwear outsoles shall also be slip resistant (Category 2) and shall meet the requirements for slip resistance as detailed in Table 2 of ISO 20345:2004 and ISO 13287:2012. The footwear shall be marked with code "SRC" – Slip Resistance on Ceramic tile floor with Sodium Lauryl Sulphate (SLS) solution and steel floor with glycerol as detailed in Table 2 of ISO 20345:2004.

4.4.4.5.2. The coefficient of friction (CoF) values shall be as per Table 5.

**Table 5: Coefficient of Friction values for safety footwear as per ISO 13287:2012**

Surface	Coefficient of Friction Values (CoF)	
	Heel	Flat
Ceramic Soapy water	0.28	0.32
Steel with Glycerol	0.13	0.18

**4.5. Weight of The Safety Shoe**

The safety boots shall be light weight and approximate weight shall be between 900g to 1000g.

**4.6. Colour finish**

The safety boots in this specifications shall have a black colour finish.

**4.7. QUALITY MANAGEMENT SYSTEM**

4.7.1. The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the requirements for protection, ergonomic characteristics, innocuousness, mechanical properties, marking of the safety footwear, will fulfil the requirements stated in the contract documents, standards, specifications and regulations.

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4.7.2. The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications shall be submitted with the tender for evaluation.

4.7.3. The bidder shall indicate the delivery time of the items, manufacturer's monthly & annual production capacity and experience in the production of the type and size of items being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the safety footwear sold in the last five years as well as reference letters from at least four of the customers shall be submitted with the tender for evaluation.

## 5. TESTS AND INSPECTION

5.1. The safety boot shall be inspected and tested in accordance with ISO 20345, ISO 20344, EN 12568 and the requirements of this specification. It shall be the responsibility of the supplier to perform or to have performed all the tests specified.

5.2. Copies of previous **Test Reports confirming full conformity to clause 4 for the safety boot issued by a third party testing laboratory that is accredited to ISO/IEC 17025 shall be submitted with the tender for the purpose of technical evaluation.** The accreditation certificate for the third party testing laboratory shall also be submitted with the tender (all in English Language).

5.3. Test Reports for the safety boot to be supplied under the contract shall be submitted to The Kenya Power & Lighting Company for approval before shipment/delivery and shall include all the tests in clause 4.3 and 4.4 on the following parts:

- (i) Footwear design tests
- (ii) Tests on the whole footwear
- (iii) Tests on upper
- (iv) Tests on the tongue
- (v) Tests on the outsole
- (vi) Tests on the insole and insock
- (vii) Tests on the lining – Vamp and Quarter lining

5.4. The safety boot shall be subject to acceptance tests at the manufacturer's works before dispatch. Acceptance tests (routine & sample tests) will be witnessed by at least two (2) Tender Processing Committee (TPC) members appointed by The Kenya Power and Lighting Company Limited (KPLC). Routine and sample test reports for the safety boots to be supplied shall be submitted to KPLC for approval before shipment of the goods.

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5.5. Tests to be witnessed at the factory before shipment shall be in accordance with ISO 20345, ISO 20344, EN 12568 and this specification and shall include all the tests in clause 4.3 and 4.4 on the following parts:

- (i) Footwear design tests
- (ii) Tests on the whole footwear
- (iii) Tests on upper
- (iv) Tests on the tongue
- (v) Tests on the outsole
- (vi) Tests on the insole and insock
- (vii) Tests on the lining – Vamp and Quarter lining

5.6. On receipt of the boots, KPLC will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification. The supplier shall replace without charge to KPLC, boots which upon examination, test or use fail to meet any of the requirements in the specification.

## 6. MARKING AND PACKING

### 6.1. Marking

Each item of safety footwear shall be clearly and permanently marked, for example by embossing or branding, with the following:

- a) Size;
- b) Manufacturer's identification mark;
- c) Manufacturer's type designation;
- d) Year of manufacture and at least quarter;
- e) The number and year of this European Standard, i.e. ISO 20345:2003;
- f) The symbol(s) from table 14 of ISO 20345:2003 appropriate to the protection provided or, where applicable, the appropriate
- g) Category (S3), as described in table 16 of ISO 20345:2003.
- h) The words, "Property of KPLC".

**NOTE:** The markings for e) and f) should be adjacent to one another.

### 6.2. Packaging

The packaging in which the safety footwear is sold or is to be sold shall have indelibly printed on it or otherwise permanently affixed to it, clearly and prominently displayed, the information required by clause 6.1.

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## 7. DOCUMENTATION

- 7.1. The bidder shall submit its tender complete with technical documents required by Annex A (Guaranteed Technical Particulars) for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:
- Guaranteed Technical Particulars signed by the manufacturer;
  - Copies of the Manufacturer's catalogues, brochures, drawings and technical data;
  - Sales records for the last five years and at least four customer reference letters;
  - Details of the manufacturer's experience;
  - Copies of required test reports by a third party testing laboratory accredited to ISO/IEC 17025 and a copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;
  - Manufacturers letter of authorization, QMS certificate and other technical documents required in the tender.
  - Packaging details (including packaging materials).
- 7.2. The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:
- Guaranteed Technical Particulars signed by the manufacturer;
  - Design Drawings with details of the safety boots to be manufactured for KPLC.
  - Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfil the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfil the requirements of ISO 9001:2008
  - Detailed test program to be used during factory testing;
  - Marking details and method to be used in marking the safety boots;
  - Manufacturer's undertaking to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the safety boots for The Kenya Power & Lighting Company;
  - Packaging details (including packaging materials).
- 7.3. The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the safety boots to KPLC store. All information shall be unambiguous. The following information shall be given:
- Name and full address of the manufacturer and/or his authorized representative;
  - Notified body involved in type examination; for category III products the notified body involved with article 11;
  - Number and year of the standard of manufacture;

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- (iv) Explanation of any pictograms, markings and levels of performance. A basic explanation of the tests that have been applied to the footwear, if applicable;
- (v) Instructions for use:
- Tests to be carried out by the wearer before use, if required;
  - Fitting; how to put on and take off the footwear, if relevant;
  - Application; basic information on possible uses and, where detailed information is given, the source;
  - Limitations of use (e.g. temperature range, etc.);
  - Instructions for storage and maintenance, with maximum periods between maintenance checks (if important, drying procedures to be defined);
  - instructions for cleaning and/or decontamination;
  - Obsolescence deadline or period of obsolescence;
  - If appropriate, warnings against problems likely to be encountered (modifications can invalidate the type approval, e.g. orthopaedic footwear);
  - If helpful, additional illustrations, part numbers etc.
- (vi) Reference to accessories and spare parts, if relevant;
- (vii) The type of packaging suitable for transport, if relevant.

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**ANNEX A: Guaranteed Technical Particulars** (to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, four customer reference letters, the manufacturer's experience and copies of complete type test reports for tender evaluation, all in English Language)

Tender No. ....

Clause number			KPLC requirement	Bidder's offer
1	Manufacturer's Name and address			Specify
2	Country of Manufacture			Specify
3	Bidder's Name and address			Specify
	General design			
4	Standard of manufacture			Specify
5	Model or catalogue number			Specify
6	Class of shoes and designation			Specify
7	Type of shoes			Specify
	Safety boots characteristics measured in accordance with ISO 20344:2004			
8	Whole footwear	Height of upper, mm		Specify
		Penetration resistance of the insert, N		Specify
		Dimensions of insert, mm		Specify
		Flex resistance of penetration-resistance insert, flexes		Specify
		Corrosion properties of insert (metallic)		Specify
		Electrical resistance for conductive footwear, Ω		Specify
		Electrical resistance for antistatic footwear, Ω		Specify
		Resistance to inimical environments of sole complex	Heat insulation °C	Specify
			Cold insulation °C	Specify
		Energy absorption of seat region, J		Specify
		Water resistance-	Total area of water penetration, cm <sup>2</sup>	Specify
			Duration, min	Specify
		Metatarsal protection	Construction	Specify
			Minimum clearance after impact, mm	Specify
	Ankle protection – impact withstand force , kN			Specify
	Slip resistance of outsole – marking code			Specify
9	Sole performance	Upper/outsole bod strength, N/mm.		Specify
		internal toecaps edge covering, mm		Specify
		Vamp lining thickness, mm		Specify
10	Toe protection	Internal length of toe caps, mm		Specify
		Impact resistance , J		Specify
		Minimum clearance of toe caps after impact, mm		Specify
		Compression resistance load, kN		Specify
		Corrosions resistance area , of metallic toecaps, mm <sup>2</sup>		Specify
		Non-metallic toe caps		Specify

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Clause number		KPLC requirement		Bidder's offer
		Specific ergonomics features		Specify
		Minimum height measured from horizontal surface beneath the sole, mm		Specify
11		Construction – no non-functional or decorative stitching or perforations		Specify
12	Upper	Minimum height of upper, mm		Specify
		Tear force strength, N		Specify
		Tensile properties	Tensile strength-leather, N/mm <sup>2</sup>	Specify
			Breaking force – rubber, N	Specify
		Waterproof permeability of leather used, mg/(cm <sup>2</sup> ·h)		Specify
		pH value of leather used		Specify
		Chromium (VI) content in leather used		Specify
		Water	Penetration, m/s <sup>2</sup>	Specify
			Absorption, %	Specify
		Cut resistance – protective area, mm		Specify
		Resistance to cutting factor		Specify
13	Lining	Tear force, N		Specify
		Abrasion resistance	Dry, cycles	Specify
			Wet, cycles	Specify
		Water vapour	Permeability, mg/(cm <sup>2</sup> ·h)	Specify
			Coefficient, mg/cm <sup>2</sup>	Specify
		pH value of leather used		Specify
14	Tongue	Tear force, N		Specify
		Chromium (VI) content in leather used		Specify
		pH value of leather used		Specify
15	Insole & insock	Thickness, mm		Specify
		pH value of leather used		Specify
		Water	Absorption, mg/cm <sup>2</sup>	Specify
			Desorption, %	Specify
		Abrasion resistance	Insoles Dry, cycles	Specify
			Wet, cycles	Specify
			Insoles Dry, cycles	Specify
			Wet, cycles	Specify
15	Outsole	Chromium (VI) content in leather used		Specify
		Thickness of non-cleated outsoles, mm		Specify
		Tear strength, kN/m		Specify
		Abrasion resistance - relative volume loss, mm <sup>3</sup>		Specify
		Flexing resistance, flex cycles		Specify
		Hydrolysis cut growth before 150,000 flex cycles, mm		Specify
		Interlayer bond strength, N/mm		Specify
		Resistance to fuel oil-increase in volume, %		Specify

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		Cleated area, mm <sup>2</sup> – (Attach drawing)			Specify
		Coefficient of Friction Values (CoF)	Ceramic soapy water	Heel	Specify
				Flat	Specify
			Steel with glycerol	Heel	Specify
				Flat	Specify
16	Approximate weight (Quote weight as per the size)				Specify
17	Colour finish				
4.5	Quality Management System				Provide
	Quality Assurance Plan				Provide
	Copy of ISO 9001:2008 Certificate				Provide
	Manufacturer's experience				Provide
	Manufacturing Capacity (units per month)				Provide
	List of previous customers				Provide
	Customer reference letters				Provide
5.1	Test standards and responsibility of carrying out tests				Provide
5.2	Copies of Type Test Reports submitted with tender				Provide
5.3	Acceptance tests to be witnessed by KPLC at factory before shipment				Provide
5.4	Test reports to be submitted by supplier to KPLC for approval before shipment				Provide
5.5	Replacement of rejected safety footwear				Provide
6.1	Markings				Provide
6.2	Packing				Provide
7.1	Documents submitted with tender				Provide
7.2	Documents to be submitted by supplier to KPLC for approval before manufacture				
7.3	General information at point of delivery				Provide
8.0	Statement of compliance to specification				Provide

.....  
**Manufacturer's Name, Signature, Stamp and Date**

**NOTE:**

*The **Guaranteed Technical Particulars (GTP)**, test reports & their certificates, drawings and/or catalogues shall form the basis of technical tender evaluation. Bidders shall ensure that the offered values for the item conform to the values in the test reports and their certificates, drawings, catalogue references and/or brochures. Failure to adhere by this requirement shall lead to automatic disqualification at the technical evaluation stage.*

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