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Kenya Power

**PERSONAL PROTECTIVE EQUIPMENT**  
***Part 5: RESPIRATORY PROTECTIVE EQUIPMENT —***  
**SPECIFICATION**

A Document of the Kenya Power & Lighting Co. Ltd  
September 2017



**Kenya Power**

Kenya Power & Lighting Co. Ltd.

TITLE:

**PERSONAL PROTECTIVE  
EQUIPMENT.  
Part 5: RESPIRATORY PROTECTIVE  
EQUIPMENT — SPECIFICATION**

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| Doc. No.      | KP1/6C/4/1/TSP/01/003-5 |
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| Revision No.  | 0                       |
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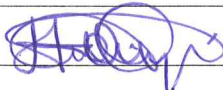

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**0.1 Circulation List**

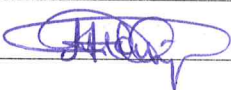
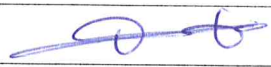
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**REVISION OF KPLC STANDARDS**

To keep abreast of progress in the industry, KPLC Standards shall be regularly reviewed. Suggestions for improvements to approved standards, addressed to the Manager, Standards department, are welcome.

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**0.2 Amendment Record**

| Rev No.          | Date (YYYY-MM-DD) | Description of Change                 | Prepared by (Name & Signature) | Approved by (Name & Signature) |
|------------------|-------------------|---------------------------------------|--------------------------------|--------------------------------|
| Issue 2<br>Rev 0 | 2017-09-12        | Cancels and replaces<br>Issue 1 Rev 0 | Rotich Benard                  | Dr. Eng. P. Kimemia            |
|                  |                   |                                       |                                |                                |
|                  |                   |                                       |                                |                                |

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**FOREWORD**

This Specification has been prepared by the Standards Department in collaboration with Human Resource & Administration Department of the Kenya Power and Lighting Company Limited (KPLC/Kenya Power). The Specification lays down requirements for Respiratory Protective Equipment (RPE). The type of RPE covered shall be respirators.

A respirator is a personal protective device that is worn on the face, covers at least the nose and mouth, and is used to reduce the wearer’s risk of inhaling hazardous airborne particles (including dust particles and infectious agents), gases, or vapours. The many types of respirators available include (1) particulate respirators, which filter out airborne particles; (2) “gas masks,” which filter out chemicals and gases; (3) airline respirators, which use compressed air from a remote source; and (4) self-contained breathing apparatus, which include their own air supply. The choice of the correct RPE shall be guided by BS EN 529:2005.

The RPEs covered in this Specification are particulate respirators and gas masks.

Other Kenya Power specifications dealing with Personal Protective Equipment and falling under the Kenya Power specification code *TSP/01/003*, and under the general title *Personal Protective Equipment* are listed below:

*TSP/01/003-1: Personal Protective Equipment. Part 1: Industrial Safety Helmet — Specification*

*TSP/01/003-2: Personal Protective Equipment. Part 2: Respirators — Specification*

*TSP/01/003-3: Personal Protective Equipment. Part 3: Protective Clothing — Specification*

*TSP/01/003-4: Personal Protective Equipment. Part 4: Motorcycle Riders — Specification*

*TSP/01/003-6: Personal Protective Equipment. Part 6: Hearing Protectors — Specification*

*TSP/01/003-7: Personal Protective Equipment. Part 7: Eye Protectors — Specification*

*TSP/01/003-8: Personal Protective Equipment. Part 8: Hand Protectors — Specification*

*TSP/01/003-9: Personal Protective Equipment. Part 9: Welders — Specification*

The Respiratory Protective Equipment (RPE) shall protect the individual wearer against the inhalation of hazardous substances in air at the workplace.

The following are members of the team that developed this specification:

| Name          | Department              |
|---------------|-------------------------|
| Ruth Kariuki  | Human Resource Services |
| Rotich Benard | Standards               |

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**1. SCOPE**

This Specification is for Respiratory Protective Equipment (RPE) for protecting the individual wearer against the inhalation of hazardous substances in air at the workplace.

The Specification covers the following types of Respiratory Protective Equipment:

- a) Half Facepiece Respirator (half mask)
- b) Disposable Respirator

**2. REFERENCES (NORMATIVE)**

The following standards contain provisions which through reference in this text constitute provisions of this Specification. For dated editions, the cited edition shall apply; for undated editions, the latest edition of the referenced document shall apply.

BS EN 140:1999: Respiratory protective devices. Half masks and quarter masks. Requirements, testing, marking

BS EN 143:2000: Respiratory protective devices. Particle filters. Requirements, testing, marking

BS EN 149:2001+A1:2009: Respiratory protective devices. Filtering half masks to protect against particles. Requirements, testing, marking

BS EN 405:2001+A1:2009: Respiratory protective devices. Valved filtering half masks to protect against gases or gases and particles. Requirements, testing, marking

BS EN 529:2005: Respiratory protective devices. Recommendations for selection, use, care and maintenance. Guidance document

**3. DEFINITIONS AND ABBREVIATION**


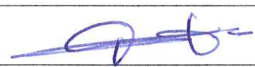
For this Specification, the definitions and abbreviations given in the reference standards shall apply.

**4. REQUIREMENTS**

**4.1. Service conditions**

The Respiratory Protective Equipment shall be suitable for use in Electrical and Mechanical Work, indoors and outdoors, in tropical areas and harsh climatic conditions including areas exposed to:

- a) Altitudes of up to 2200m above sea level
- b) Humidity of up to 95%
- c) Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C, in direct sunlight,

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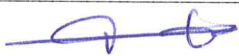
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**4.2. Design and Construction**

**4.2.1. Half Facepiece Respirator**

- 4.2.1.1. The Half Facepiece Respirator shall be used by workers exposed to toxic fumes, vapours or gases e.g. workers who handle treated wood poles as the poles are normally treated with creosote or Copper Chromium Arsenic compounds (CCA).
- 4.2.1.2. The Respirator shall be designed and manufactured in accordance with BS EN 140: 1999 and the requirements of this specification.
- 4.2.1.3. The Respirators shall be approved for Respiratory protection against organic vapours and acid gases at up to ten times the Permissible Exposure Limit (PEL). The air contaminants, against which the Respirator is approved for, shall be listed, and certificates from the approving body attached.
- 4.2.1.4. The Respirators shall be used in a variety of applications, including petrochemical, utilities, chemical handling, laboratories, and pulp and paper.
- 4.2.1.5. The Respirator shall be complete with harness (including neck strap and cradle headband), inhalation and exhalation valves, and two filters.
- 4.2.1.6. The harness shall be ergonomic, with four couplings, provided with a head rest adaptable by the user connected to a supporting rigid part.
- 4.2.1.7. The valves shall comprise of a frontal exhalation valve and two lateral inhalation valves fitted with special threaded connection for mounting two filters, equipped with the same connection.
- 4.2.1.8. The two filter cartridges and additional spare filters shall have the following properties:
  - a. Filter cartridges shall be specially designed and shaped to give "swept-back" position to enable excellent (wide) field of vision and balance.
  - b. Shall be Class P3 filter as per BS EN143:2000
  - c. Low breathing resistance
  - d. Well balanced when fitted to a mask
  - e. Bayonet fitting system to ensures precise and secure locking
  - f. Filters shall be carbon activated.
- 4.2.1.9. All metallic parts shall be corrosion resistant/aluminium alloy.

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4.2.1.10. The Respirator shall meet the following minimum requirements of BS EN 140:1999 standard as shown in Table 1:

Table 1: Respirator Minimum Test Requirements

| BS EN 140:1999 performance tests |                  | Minimum Requirements |
|----------------------------------|------------------|----------------------|
| Total Inward Leakage (%)         |                  | < 2.0                |
| Breathing resistance (mbar)      | Inhal. 30 l/min  | < 0.5                |
|                                  | Inhal. 95 l/min  | < 1.3                |
|                                  | Inhal. 160 l/min | < 2.0                |
|                                  | Exhal. 160 l/min | < 3.0                |
| CO <sub>2</sub> content (%)      |                  | <1.0                 |

4.2.1.11. The basic design shall be in accordance with Figures 1 below:

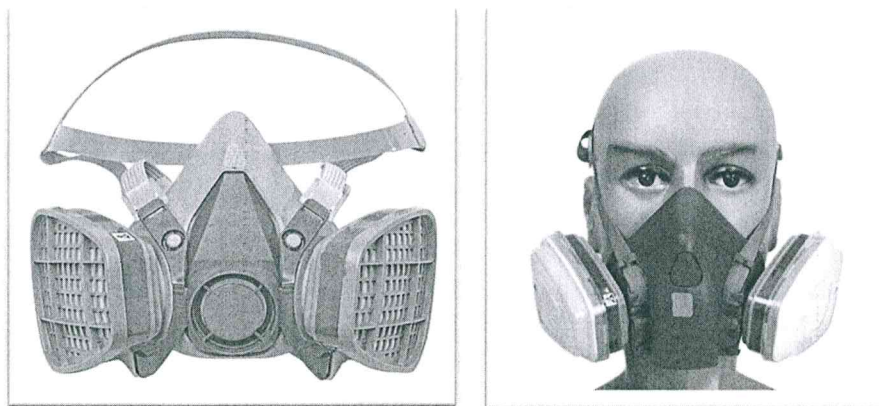


Figure 1: Typical Half Facepiece Respirator and Harness Arrangement

**4.2.2. Disposable Respirators**

4.2.2.1. The disposable Respirators shall meet the requirements of European Standard BS EN 149:2001 + A1:2009, filtering facepiece Respirators for use against solid and non-volatile liquid particles.

4.2.2.2. The Respirator shall be convex (cup-shaped) shape, nose clip and twin strap design, easy to fit with durable, collapse-resistant shell.

4.2.2.3. The disposable respirators shall be of Class FFP2 and an Assigned Protection Factor (APF) of 10 as per EN 149:2001 - offering protection against moderate levels of fine (nuisance) dusts, particulates and oil and water-based mists (including sanding and wood dust.

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- 4.2.2.4. The disposable Respirators shall be unvalved and shall not require to be used with cartridges or cloth filters. An efficient exhalation, high-efficiency, low breathing resistance filter material shall be used on the nose foam. The mask shall be easy to breathe and talk through.
- 4.2.2.5. Disposable Respirators shall make a good seal between the edges of the Respirator and the face to ensure effective protection.
- 4.2.2.6. The nose-seal, inside of the mask, shall be made of a water-repellent material that prevents eye-glasses from misting up.
- 4.2.2.7. Face and head comfort: The respirator’s edge shall be flexible and the shape and size shall cover the nose, mouth and chin without causing excessive pressure.
- 4.2.2.8. The headband material shall provide a good, even tension across the head to ensure a comfortable and secure fit for a range of head sizes. When worn, the upper strap shall be positioned on the crown of the head whilst the lower strap shall be positioned below the ears.
- 4.2.2.9. For skin comfort, a soft inner face seal and sweat absorbent nose foam shall be used to provide greater comfort. Skin comfort is affected by the smoothness and softness of the inner material in contact with the skin especially when masks are used for long.
- 4.2.2.10. The basic design shall be in accordance with Figure 2 below:

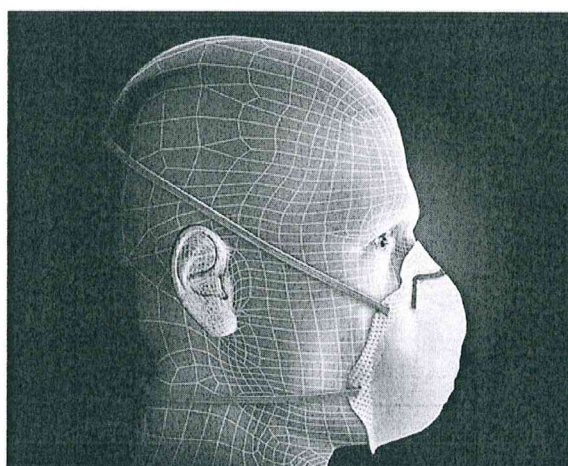
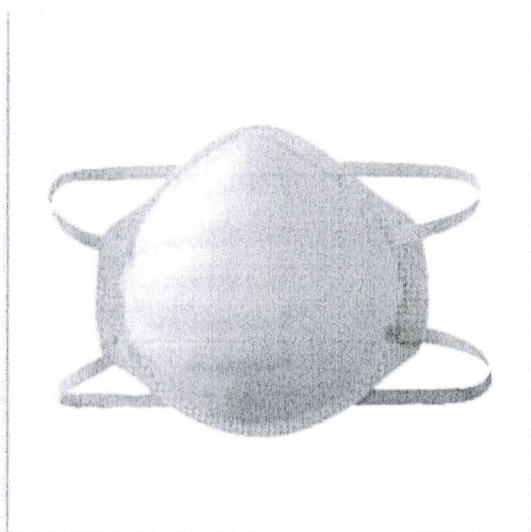


Figure 2: Typical Disposable Respirator and the strap arrangement

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## 5. TESTS AND ACCEPTANCE REQUIREMENTS

- 5.1. Tests for the materials used and standard of manufacture shall be done in accordance to BS EN 140: 1999, BS EN 149:2001 + A1:2009, applicable Kenya Standards & Regulations, and the requirements of this specification.
- 5.2. The following performance tests shall be carried out and shall meet the minimum requirements given in Clause 4.2.1.10:
- Total Inward Leakage test
  - Breathing resistance
  - Flammability tests
  - Carbon dioxide content test

## 6. MARKING AND PACKING

### 6.1. Marking

- 6.1.1. Labels shall be attached to each respirator and shall have the following information marked legibly and indelibly:
- Name/trademark of the manufacturer;
  - Standard to which the item complies;
  - Filter Class
  - Any other parameter(s) specified by the applicable standard of manufacture.
  - The words, “**Property of Kenya Power & Lighting Co. Ltd.**”
- 6.1.2. The labels and marking shall be done at the factory during manufacture and shall be permanent type.

### 6.2. Packaging

- 6.2.1. The Respiratory Protective Equipment shall be dispatched by the supplier in clean condition and shall be supplied packed in such a manner as to avoid soiling, contamination and damage in transport and storage.

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**APPENDICES**

**APPENDIX A: TESTS AND INSPECTION (NORMATIVE)**

- A.1. It shall be the responsibility of the manufacturer to perform or to have performed the tests in accordance with BS EN 140:1999, BS EN 149:2001+A1:2009 and other applicable standards, and the requirements of this specification.
- A.2. On receipt of the respirators, Kenya Power shall 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 Kenya Power, Respiratory Protective equipment which upon examination, test or use fail to meet any or all of the requirements in the specification.

**APPENDIX B: QUALITY MANAGEMENT SYSTEM (NORMATIVE)**

- B.1. The Supplier shall submit a Quality Assurance Plan (QAP) that will be used to ensure that the requirements for protection, ergonomic characteristics, innocuousness, marking of the respirators, 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 9001:2008/2015
- B.2. The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications, including copy of valid and relevant ISO 9001: 2008 or 2015 certificate, shall be submitted with the tender for evaluation.
- B.3. The Bidder shall indicate the delivery time of the respirators, manufacturer's monthly and annual production capacity and experience in the production of the type and size of items being offered. A detailed list and contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for the respirators sold in the last five years together with reference letters from four of the customers shall be submitted with the tender for evaluation.

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**APPENDIX C: TECHNICAL DOCUMENTATION (NORMATIVE)**

C.1. The Bidder shall submit its tender complete with technical documents required for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:



- a) A sample of the respirator.
- b) Fully-filled clause by clause Guaranteed Technical Particulars (GTPs)- Appendix D - stamped and signed by the manufacturer.
- c) Copies of the Manufacturer’s catalogues, brochures, pictures and technical data;
- d) Details of the manufacturer’s experience;
- e) 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;
- f) Certificate of approved contaminants that the respirator protects the wearer against (applicable to the Half Facepiece respirator)
- g) Packaging details (including packaging materials).

C.2. The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:

- a) A sample of the respirator
- b) Fully filled clause by clause Guaranteed Technical Particulars (GTPs) stamped and signed by the manufacturer (**these are not the ones submitted with the tender**);
- c) Copies of the Manufacturer’s drawings, catalogues, brochures, pictures and technical data; stamped and signed by the manufacturer.
- d) Marking and packing details and the method to be used in marking the respirator.

C.3. Test/Performance Reports for the respirators 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 including the following performance tests:

- (i) Total Inward Leakage test
- (ii) Breathing resistance
- (iii) Flammability tests
- (iv) Carbon dioxide content test

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C.4. The respirators shall be supplied with information written in English language to Kenya Power stores. All information shall be unambiguous. The following information shall be given:

- a) Name and full address of the manufacturer and/or his authorized representative;
- b) Number and year of the applicable standard(s);
- c) Explanation of any pictograms, markings and levels of performance. A basic explanation of the tests that have been applied to the respirators, if applicable;
- d) Detailed user's instructions guide item printed in English language that includes the following among others:
  - i. Areas where the respirators are used and not used;
  - ii. Fitting; how to put on and take off the respirators, if relevant;
  - iii. Application; basic information on possible uses and, where detailed information is given, the source;
  - iv. Limitations of use (e.g. temperature range, etc.);
  - v. Instructions for storage and maintenance, with maximum periods between maintenance checks (if important, drying procedures to be defined);
  - vi. Instructions for cleaning and/or decontamination;
  - vii. Obsolescence deadline or period of obsolescence;
  - viii. If appropriate, warnings against problems likely to be encountered

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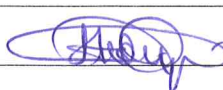
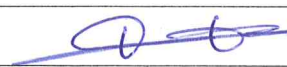
**APPENDIX D: GUARANTEED TECHNICAL PARTICULARS (GTPS) — NORMATIVE**

*(to be filled, stamped and signed by the Supplier and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records for previous five years, four customer reference letters, details of suppliers' capacity and experience; and copies of complete test certificates and test reports for tender evaluation or approval, all in English Language, as per clauses C.1 and C.2)*

**Tender No.** .....

**Bidder's name and Address**.....

| Clause number                   | KPLC requirement  |                          | Bidder's offer |
|---------------------------------|---|--------------------------|----------------|
| Manufacturer's Name and address |   |                          | Specify        |
| Country of Manufacture          |   |                          | Specify        |
| Bidder's Name and address       |   |                          | Specify        |
| 1.                              | Types of respirators offered                                      |                          | List           |
| 2.                              | Applicable Standards  |                          | Specify        |
| 3.                              | Definitions and abbreviation                                      |                          | Specify        |
| 4.                              | <b>REQUIREMENTS</b>   |                          |                |
| 4.1                             | Service Conditions  |                          | Specify        |
| 4.2                             | <b>Design &amp; Construction</b>                                  |                          |                |
| <b>4.2.1</b>                    | <b>Half Facepiece Respirator</b>                                  |                          |                |
| 4.2.1.1                         | Air contaminants against which the respirator protects            |                          | Specify        |
| 4.2.1.2                         | Design and manufacturing standards                                |                          | Specify        |
| 4.2.1.3                         | The air contaminants against which the respirator is approved for |                          | List           |
| 4.2.1.4                         | Variety of applications which the respirator shall be used        |                          | Specify        |
| 4.2.1.5                         | Components of the respirator is comprised of                      |                          | Specify        |
| 4.2.1.6                         | Parts of the full harness   |                          | Specify        |
| 4.2.1.7                         | The no and type of valves   |                          | Specify        |
| 4.2.1.8                         | Properties of filters/cartridges                                  |                          | Specify        |
| 4.2.1.9                         | Metallic parts treatment  |                          | Specify        |
| 4.2.1.10                        | Respirator Minimum Test Requirements                              | Total Inward Leakage (%) | Value          |
|                                 |   | Inhal. 30 l/min          | Value          |
|                                 |   | Inhal. 95 l/min          | Value          |

|   |  |
|---|--|
| <b>Issued by: Head of Section, Standards Development</b>                                    | <b>Authorized by: Head of Department, Standards</b>  |
| Signed:  | Signed:  |
| Date: 2017-09-12  | Date: 2017-09-12   |



Kenya Power

Kenya Power & Lighting Co. Ltd.

TITLE:

**PERSONAL PROTECTIVE  
EQUIPMENT.  
Part 5: RESPIRATORY PROTECTIVE  
EQUIPMENT — SPECIFICATION**

Doc. No.

KP1/6C/4/1/TSP/01/003-5

Issue No.

2

Revision No.

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| Clause number     | KPLC requirement  |                             | Bidder's offer |
|-------------------|---|-----------------------------|----------------|
|                   | Breathing resistance (mbar)   | Inhal. 160 l/min            | Value          |
|                   |   | Exhal. 160 l/min            | Value          |
|                   |   | CO <sub>2</sub> content (%) | Value          |
| 4.2.1.11          | Basic design shall be as per Fig 1  |                             | Specify        |
| <b>4.2.2</b>      | <b>Disposable Respirators</b>   |                             |                |
| 4.2.2.1           | Design and manufacturing standards  |                             | Specify        |
| 4.2.2.2           | Respirator shape  |                             | Specify        |
| 4.2.2.3           | The respirator Class and an Assigned Protection Factor (APF) as per EN 149:2001   |                             | Specify        |
| 4.2.2.4           | Respirator shall be unvalved and shall not require cartridges or cloth filters  |                             | Specify        |
| 4.2.2.5           | Respirator shall make a good seal between the edges and the face  |                             | State          |
| 4.2.2.6           | Material and properties of nose-seal, inside of the mask  |                             | State          |
| 4.2.2.7           | Respirator edge shall be flexible for comfort.  |                             | State          |
| 4.2.2.8           | Headband material comfortable and secure and fit for range of head sizes  |                             | State          |
| 4.2.2.9           | Inner face seal material provides skin comfort,   |                             | specify        |
| 4.2.2.10          | Basic design shall be as per Fig 2  |                             | specify        |
| 5.1               | Test and standards for carrying out tests   |                             | List           |
| 5.2               | Performance tests and minimum requirements to be met  |                             | List           |
| 6.1               | <b>Marking</b>  |                             |                |
| 6.1.1             | Information to be marked legibly and indelibly:   |                             | List           |
| 6.1.2             | Labels shall be permanent type  |                             | Specify        |
| 6.2               | <b>Packing</b>  |                             |                |
| 6.2.1             | Dispatch condition  |                             | Specify        |
| <b>APPENDICES</b> |   |                             |                |
| <b>A</b>          | <b>TESTS AND INSPECTION (NORMATIVE)</b>   |                             |                |
| A1                | Tests to be performed   |                             | State          |
| A2                | Supplier shall replace without charge to KPLC items that don't meet specification   |                             | State          |
| <b>B</b>          | <b>QUALITY MANAGEMENT SYSTEM (NORMATIVE)</b>  |                             |                |
| B1                | QAP   |                             | State          |
| B2                | Manufacturer's Declaration of Conformity to applicable standards and Copies of quality management certifications attached |                             | State          |

Issued by: Head of Section, Standards Development

Authorized by: Head of Department, Standards

Signed:

Signed:

Date: 2017-09-12

Date: 2017-09-12



Kenya Power

Kenya Power & Lighting Co. Ltd.

TITLE:

**PERSONAL PROTECTIVE EQUIPMENT.**  
**Part 5: RESPIRATORY PROTECTIVE EQUIPMENT — SPECIFICATION**

Doc. No.

KPI/6C/4/1/TSP/01/003-5

Issue No.

2

Revision No.

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| Clause number | KPLC requirement   | Bidder's offer |
|---------------|--|----------------|
| B3            | Delivery time, Production capacity & experience of the manufacturer  | State          |
| C             | <b>TECHNICAL DOCUMENTATION (NORMATIVE)</b>   |                |
| C1            | Technical documents to be submitted with tender documents  |                |
|               | a. A sample of the respirator  | state          |
|               | b. Fully-filled clause by clause Guaranteed Technical Particulars (GTPs)- Appendix D - stamped and signed by the manufacturer  | state          |
|               | c. Manufacturer's catalogues, brochures, pictures and technical data;  | state          |
|               | d. Details of manufacturing experience & capacity  | Specify        |
|               | e. 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 | State          |
|               | f. Certificate of approved contaminants that the respirator protects the wearer against (applicable to the Half Facepiece respirator)  | State          |
|               | g. Packaging details (including packaging materials).  | State          |
| C2            | Documents to be submitted for approval before manufacture  |                |
|               | a. Sample of the respirator  | State          |
|               | b. Fully filled clause by clause Guaranteed Technical Particulars (GTPs)   |                |
|               | c. Copies of the Manufacturer's catalogues, brochures, pictures and technical data; stamped and signed by the manufacturer   |                |
|               | d. Marking and packaging details   | State          |
| C3            | Test Reports for the respirators to be submitted to The Kenya Power & Lighting Company for approval before shipment/delivery and shall include all the tests including the following               | State          |
| C4            | Information to be supplied with the respirators  | State          |

*\* Words like 'agreed', 'confirmed', 'As per KPLC specifications', etc. shall not be accepted and shall be considered non-responsive.*

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

Issued by: Head of Section, Standards Development

Signed:

Date: 2017-09-12

Authorized by: Head of Department, Standards

Signed:

Date: 2017-09-12