



Kenya Power

**TITLE:**  
**SPECIFICATIONS**  
*For*  
**METER SEAL PLATE AND SEAL**  
**WIRE**

Doc. No.	KP1/3CB/TSP/14/002
Issue No.	1
Revision No.	0
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**ANNEX A:** *Guaranteed Technical Particulars (to be filled and signed by the supplier and submitted together with copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records and copies of test certificates and reports for tender evaluation)*

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**0.1 Circulation List**

COPY NO.	COPY HOLDER
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**0.2 Amendment Record**

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## FOREWORD

This specification has been prepared by the Research and Development Department in collaboration with the Commercial Services Department both of the Kenya Power & Lighting Company Ltd (abbreviated as KPLC) and it lays down requirements for meter seal plates and seal wire. The specification is intended for use by KPLC in purchasing the equipment.

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



### 1. SCOPE

- 1.1. This specification specifies requirements for circular or oval meter seal plates and seal wire for use with a sealing tool (pliers). The meter seal plates shall be used for encapsulating a sealing wire that will be placed through a hole in sealing screws of the meter terminal covers and metering fuse cut-out (carrier) among others.
- 1.2. The specification also covers inspection and test of the meter seal plates and seal wire as well as schedule of Guaranteed Technical Particulars to be filled, signed by the manufacturer and submitted for tender evaluation.
- 1.3. The specification stipulates the minimum requirements for meter seal plates and seal wire acceptable for use in the company (KPLC) and it shall be the responsibility of the supplier to ensure adequacy of the design, good workmanship, good engineering practice and adherence to applicable standards in the manufacture of meter sealing tool (pliers) for KPLC.
- 1.4. The specification does not purport to include all the necessary provisions of a contract.

### 2. REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this specification. Unless otherwise stated, the latest edition of the referenced documents (including any amendments) applies:

- ISO 16143-1:           Stainless steels for general purposes -- Part 1: Flat products
- ISO 16143-3:           Stainless steels for general purposes -- Part 3: Wire
- ISO 9445:              Continuously cold-rolled stainless steel narrow strip, wide strip, plate/sheet and cut lengths – Tolerances on dimensions and form

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### 3. TERMS AND DEFINITIONS

For the purpose of this specification, the definitions given in the reference standards shall apply.

### 4. REQUIREMENTS

#### 4.1 Operating Conditions

The meter seal plates and seal wire shall be suitable for continuous use outdoors in tropical areas at;

- a) Altitudes of up to 2200m above sea level,
- b) Humidity of up to 90%,
- c) Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C and
- d) Heavy saline conditions along the coast.

#### 4.2 Design and Construction

##### 4.2.1 Material

4.2.1.1 The seal plates and seal wire shall be manufactured from non-magnetic (low magnetic permeability) and non-corrosive stainless steel grade X5CrNi18-9 as per ISO 16143.

4.2.1.2 The chemical composition of the steel shall be as follows with permissible deviations between the product analysis and the limiting values given in Table 1 for the cast analysis of ISO 16143:

- a) Carbon – 0.07%,
- b) Silicon(max) – 1.00%,
- c) Manganese(max) – 2.00%,
- d) Phosphorus(max) – 0.045%,
- e) Sulphur(max) – 0.03%,
- f) Nitrogen(max) – 0.11%,
- g) Chromium – 17.5-19.5%,
- h) Nickel – 8.0-10.0%.

4.2.1.3 The mechanical properties shall be as follows:

- a) Modulus of elasticity – 970 MPa
- b) Tensile strength – 600-800MPa
- c) Minimum elongation – 40%

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#### 4.2.2 Seal Plate

- 4.2.2.1 The seal plate shall be manufactured as per the requirements of ISO 16143-1 standard; the plate shall be circular or oval (scallop) shaped and shall not be more than 20mm in width with less than 0.6mm in thickness.
- 4.2.2.2 The meter seal plate shall have a tongue-like section on which the ends of the 6" (152.4mm) long two strand-spiralled, 1.6mm diameter seal wire is placed.
- 4.2.2.3 With the use of a special sealing tool (seal pliers); this section of meter seal plate shall wrap around the sealing wire until the wire is completely encapsulated.
- 4.2.2.4 The meter seal plate shall be embossed with letters **KPLC** in the centre on an area not more than 10mm x 10mm square with the letters' height of not less than 3.5mm.
- 4.2.2.5 The plates shall be suitable for applications where the lapped stainless steel sealing wire is placed through holes on meter sealing screws or sealing holes in cartridge fuse carriers.
- 4.2.2.6 Sufficient samples of seals (minimum 15) shall be provided with the tender to test the suitability of the plates in a four (4)-step stage sealing process of Figure 1; with existing sealing tool (pliers). Failure to meet these conditions shall deem the seal plate unsuitable and thus the tender shall be non-responsive.

#### 4.2.3 Seal Wire

- 4.2.3.1 The meter sealing wire shall be manufactured and tested to ISO 16143-3 standard requirement.
- 4.2.3.2 Every seal wire shall be approximately 18" long two strands spiralled non-magnetic and non-corrosive stainless steel. The overall diameter shall be less than 1.6mm, and it shall be permanently integrated to the bottom of main seal plate body (female part).
- 4.2.3.3 The mechanical and chemical properties shall conform to ISO 16143-3 standard and the requirement of this specification in clause 4.2.1.

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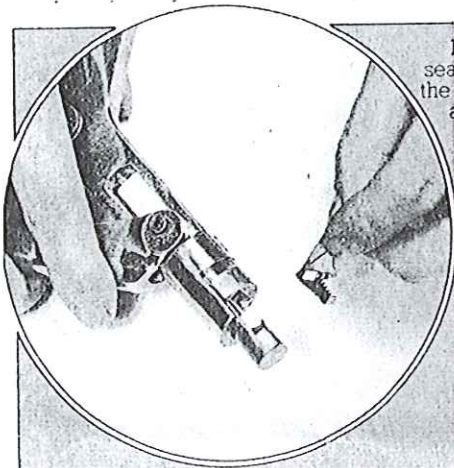
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- 4.2.3.4 The dimensions shall have normal tolerances of -0.015 and +0.02 in accordance with ISO 16143-3 requirements.
- 4.2.3.5 A sample of sealing wire of at least 1.0 metre in length shall be provided with the tender for testing with the seal plates & pliers.

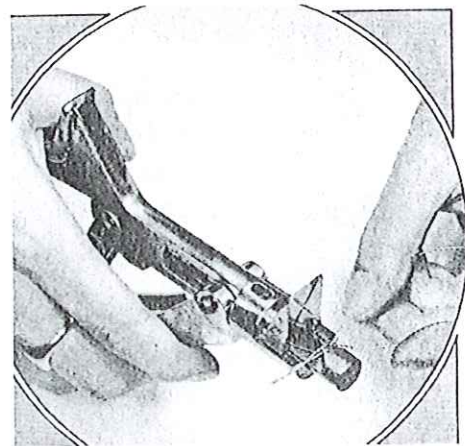
### 4.3 Drawings and Manuals

The following drawings and information (all in English Language) shall be submitted with the tender:

- a) Meter seal and seal wire drawing giving all the relevant dimensions
- b) Description leaflet and user's instruction manual/brochure
- c) Sample routine test reports & certificates in accordance with the references given in this specification



**Step 1** – Insertion of seal into sealing pliers.



**Step 2** –Apply the wire into meter (or cut-out) to be sealed. Rest the wire in curve at the end of the tongue.

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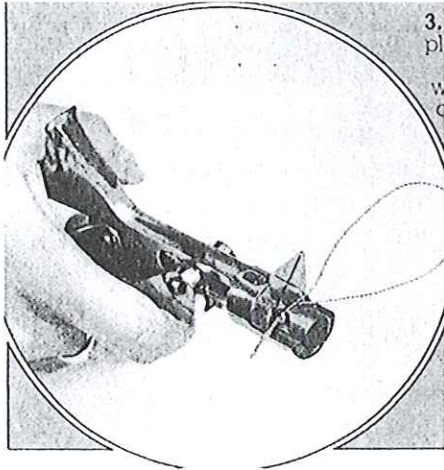
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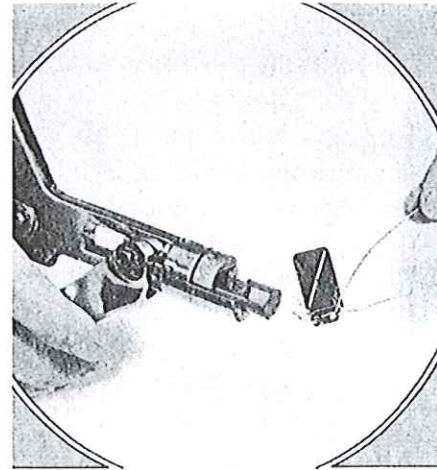
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**Step 3** – Apply pressure to pliers which will wrap the tongue of the seal onto seal wire.



**Step 4** – Open the pliers to release the seal check for proper encapsulation.

**Fig. 1: Sealing process**

#### 4.4 Quality Management System

- 4.4.1 The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the design, material, workmanship, tests, service capability, maintenance and documentation of the meter seal plate and seal wire, will fulfill the requirements stated in the contract documents, standards, specifications and regulations.
- 4.4.2 The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001:2008.
- 4.4.3 The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001: 2008 certificate shall be submitted with the tender for evaluation.
- 4.4.4 The bidder shall indicate the delivery time of the meter seal plate and seal wire, manufacturer's monthly & annual production capacity and experience in the production of the type and size of items being offered.

#### 5.0. TESTS AND INSPECTION

- 5.1. The meter seal plate and seal wire shall be inspected and tested in accordance with the requirements of ISO 16143-1 & 3 standards. It shall be the responsibility of the

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supplier to perform or to have performed the tests specified and whatever other tests he normally performs at works.

- 5.2. Copies of previous Type Tests Reports 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 to ISO/IEC 17025 for the same third party testing laboratory used shall also be submitted with the tender document (all in English Language).
- 5.3. Copies of type test reports to be submitted with the tender (by bidder) for evaluation shall be as stated below:
- a) Tensile test at room temperature
  - b) Ladle (chemical) Analysis
- 5.4. Routine and sample test reports for the meter seal plate and seal wire to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods. KPLC Engineers will witness tests at the factory before shipment.
- 5.5. On receipt of the goods, KPLC will perform any of the tests specified in order to verify compliance with this specification. The supplier shall replace without charge to KPLC the meter seal plate and seal wire which upon examination, test or use; fail to meet any of the requirements in the specification.
- 5.6. Tests to be witnessed before shipment shall be in accordance with ISO 16143-1 & 3 standards and this requirements of this specification and shall include the following:
- a) Tensile test at room temperature
  - b) Elongation test
  - c) Dimensional checks
  - d) Functional tests
  - e) Verification of markings

**6.0. MARKING AND PACKING**

**6.1. PACKING**

- 6.1.1. The meter seal plate and seal wire shall be varnished or coated with mineral jelly reduced with turpentine oil to protect them from corrosion before packing.

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- 6.1.2. The meter seal plates shall be packaged in cardboard boxes of 5,000 seal plates each whereas the sealing wire shall be in spools of approximately 0.5kg wrapped in a nylon/polythene bags and a cardboard boxes.
- 6.1.3. The meter seals and sealing wire shall be protected from all normal transportation hazards.
- 6.1.4. The meter seal plate and sealing wire shall have a warranty against any defects, which may develop due to faulty material, manufacturing, transportation, etc. for a period of eighteen months from the date of delivery. All defective meter seals and sealing wire shall be replaced at the supplier's cost.

**6.2. MARKING**

- 6.2.1. The meter seal plate shall be clearly and legibly stamped with the name KPLC, manufacturer's initials and/or recognized trade-mark and year of manufacture.
- 6.2.2. The cardboard box for the meter seal plate shall be marked with the following information:
- a) Manufacturer's name, initials and/or recognized trade-mark
  - b) Year of manufacture
  - c) The nominal size of seal plate;
  - d) The cast number of steel;
  - e) The steel grade;
  - f) The identification number;
  - g) The tensile level (plate).
- 6.2.3. Each meter seal wire spool shall have a label marked with the following; the labels shall withstand normal handling; they shall show the information listed below:
- a) Designation of the wire;
  - b) The name of the manufacturer;
  - c) The nominal size;
  - d) The cast number;
  - e) The steel grade;
  - f) The manufacturing condition of the wire;
  - g) The identification number;
  - h) The tensile level (for hard-drawn wire).

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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 manufacturing capacity and the manufacturer's experience;
  - Copies of required type test reports by a third party testing laboratory accredited to ISO/IEC 17025;
  - Copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;
  - Manufacturers letter of authorization, copies of quality management certifications and other technical documents required in the tender.
- 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 meter seal plates and sealing wire 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 fulfill the requirements stated in the contract documents, standards, specifications and regulations.
  - Detailed test program to be used during factory testing;
  - All documentation necessary for safety of the equipment.
  - 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 meter sealing tool (pliers) 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 meter seal plates and sealing wire to KPLC stores

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**ANNEX A:** *Guaranteed Technical Particulars (to be filled and signed by the supplier and submitted together with copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records and copies of test certificates for tender evaluation)*

**Tender No** ..... **Bidder's Name & Address** .....

	Description	Bidder's Offer
1	Name of the manufacturer and country of origin	Specify
2	<b>Reference Standards</b>	Specify
3	<b>Terms and Definitions</b>	Specify
4	Requirements	
4.1	Service conditions	Specify
4.2	<b>Design and Construction</b>	
4.2.1	Materials	
	4.2.1.1 – 4.2.1.3	Specify
4.2.2	<b>Seal plate</b>	
	4.2.2.1 – 4.2.2.6	Specify
4.2.3	<b>Seal wire</b>	
	4.2.3.1 – 4.2.3.5	Specify
4.3	Drawing and manuals	Provide
4.4	<b>Quality Management System</b>	
	4.6.1 – 4.6.3	Specify
5.0	<b>Tests and Inspection</b>	
	5.1 – 5.6	Specify
6.0	<b>Marking and packing</b>	
6.1	Packing	Specify
	6.1.1 – 6.1.4	
6.2	Marking 6.2.1 – 6.2.3	Specify
7.0	<b>Documentation</b>	
	7.1 – 7.2	Specify
8.0	Manufacturer's Guarantee and Warranty	Specify
9.0	List catalogues, brochures, technical data and drawings submitted to support the offer.	Specify
10.0	List customer sales records submitted to support the offer.	Specify
11.0	List Test Certificates submitted with tender	Specify
12.0	List test & calibration reports to be submitted to KPLC for approval before shipment	Specify
13.0	Statement of compliance to specification (indicate deviations if any & supporting documents)	Specify

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

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