



TITLE: 58  
**ASSEMBLY TOOLS FOR  
BOLTS & NUTS**  
Part 1: Pliers and Nippers

Doc. No.	KP1/3CB/TSP/09/057-1
Issue No.	1
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**0.1 Circulation List**

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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 Distribution Division, both of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for tools and equipment (Assembly tools for bolts & nuts) for use on power lines. It is intended for use by KPLC in purchasing the tools.

It shall be the responsibility of the manufacturer to ensure adequacy of the design and good engineering practice in the manufacture of the tools and equipment for KPLC. The supplier shall also submit information which confirms satisfactory service experience of the manufacturer with products which fall within the scope of this specification.

**1. SCOPE**

This specification is for tools and equipment - assembly tools for bolts & nuts for use on power lines.

It is the responsibility of the supplier/bidder to ensure that the offered tools are of the highest quality and guarantees excellent service to KPLC.

The assembly tools for bolts & nuts and associated hardware equipment covered in this specification shall include:

- a) Heavy Duty Lines-man's Pliers
- b) Heavy Duty Linesman Pincers

**2. 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 5743: Pliers and nippers - General technical requirements
- ISO 5744: Pliers and nippers - Methods of tests
- ISO 5746: Pliers and nippers -- Engineer's and "Lineman's" pliers -- Dimensions and test values
- ISO 9242: Pliers and nippers — Construction worker's pincers — Dimensions and test values

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- ISO 9717: Metallic and other inorganic coatings -- Phosphate conversion coating of metals
- ISO 4957: Tool steels
- ISO 2082: Metallic and other inorganic coatings -- Electroplated coatings of cadmium with supplementary treatments on iron or steel

### 3. TERMS AND DEFINITIONS

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

### 4. REQUIREMENTS

#### 4.1. SERVICE CONDITIONS

The assembly tools for bolts & nuts shall be tropicalized, designed and constructed for continuous outdoor operation in tropical areas and harsh climatic conditions including areas exposed to

- a) Sea spray (along the coast),
- b) Humidity of up to 95% and
- c) Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C.

#### 4.2. PARTICULAR REQUIREMENTS

##### 4.2.1. Heavy Duty Lines-man's Pliers

###### 4.2.1.1. Construction

- 4.2.1.1.1. The material, manufacture, workmanship and finish, test, preservation, and packing and sampling of lineman's pliers shall conform to ISO 5746, ISO 5744 and ISO 5743.
- 4.2.1.1.2. The lineman's pliers shall be made with a joint cutter. The jaws shall have cutting edge on one side near the joint end. The cutting edges shall extend approximately one-half the length of the jaws. The remaining portion of the jaws shall have straight surfaces, scored with a straight or uniform diamond-shaped pattern.
- 4.2.1.1.3. With the pliers in a closed position, the cutting edges shall contact each other throughout the entire length. There shall be a recess in the jaws behind the side cutters to provide satisfactory cutting clearance.

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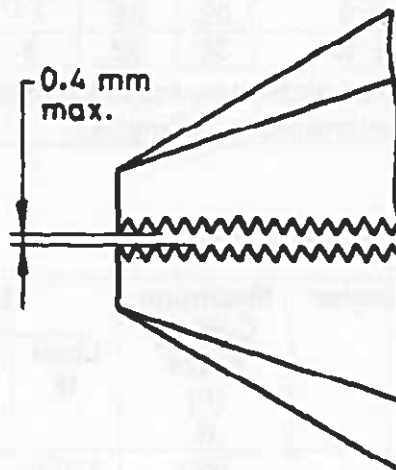
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- 4.2.1.1.4. The handles at the joint end shall be suitable for crushing wire insulation. The handles shall be so shaped as to afford a comfortable grip and shall be free from rough edges and sharp corners.
- 4.2.1.1.5. Inner handle surfaces adjacent to the joint shall be well rounded or bevelled so as to prevent accidental pinching of the fingers. Ends of the handles shall not touch when the jaws are in the closed position. Outer hand gripping surfaces of handle shall be smooth, knurled or impressed.
- 4.2.1.1.6. The pliers shall be provided with rubber or plastic insulation. The insulation shall successfully withstand the tests as per ISO 5744. The pliers may be supplied without insulation subject to agreement between the purchaser (KPLC) and the manufacturer.
- 4.2.1.1.7. With the pliers closed, the ends of the jaws shall not touch, but shall leave a maximum clearance of 0.4 mm as per Fig. 1a and the shape and dimensions of the pliers shall be as per Fig. 1b, and Table 1a & 1b.

**4.2.1.2. Materials**

The linesman pliers shall be made from high-carbon, high-chromium, cold-work steels, grade AISI - D2 equivalent to ISO 4957:2000, steel designation X153CrMOV12 (1.2379) with approximate tempered hardness, HRC of 61–54, and annealed hardness, BHN of 255.



**Fig. 1a: Pliers Jaws**

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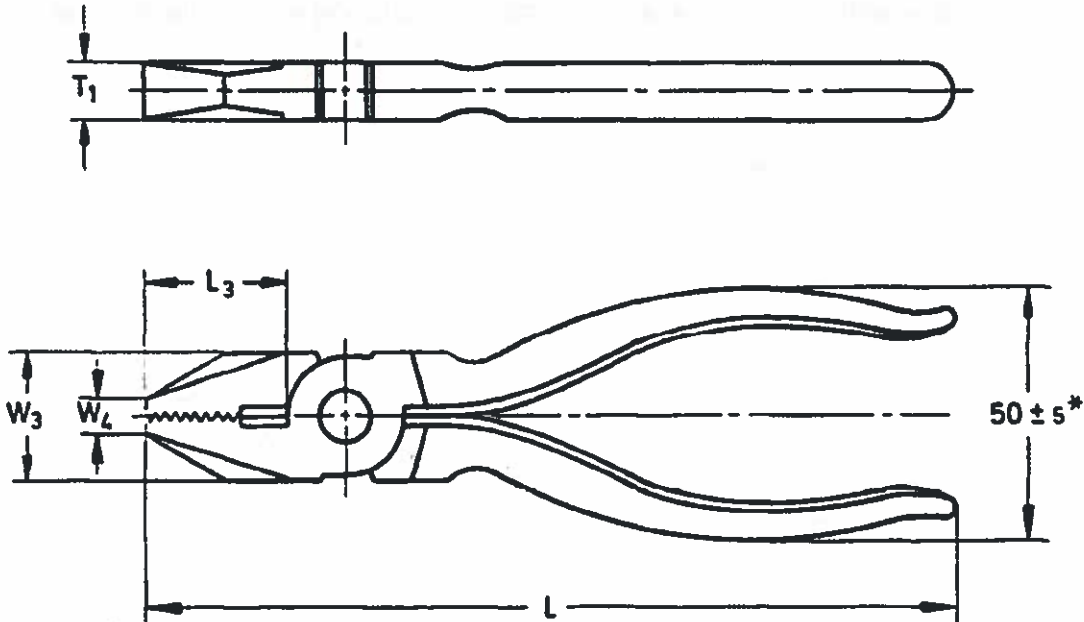
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**Fig. 1b: Linesman Pliers**

**Table 1a: Pliers Dimensions**

Nominal size	L	Tolerance on L	L <sub>3</sub> ±4	W <sub>3</sub> max	W <sub>4</sub> max	T <sub>1</sub> max	Jaw Opening min
160	160	± 8	28	25	6.3	11	16
180	180	± 9	32	28	7.1	12	19
200	200	± 10	36	32	8	14	22

\* 3 mm additional tolerance shall be allowed for insulation in case on insulated pliers  
 All dimensions in millimetres

**Table 1b: Test requirements for Linesman Pliers**

Nominal Size L mm	Test Wire Diameter mm	Maximum Cutting Force (F) N	Load Test	
			Load N	Permanent Set Max mm
160	1.6	580	1,120	1
180	1.6	580	1,263	1
200	1.6	580	1,400	1

Note: For characteristics of hard test wire, reference shall be made to ISO 5746

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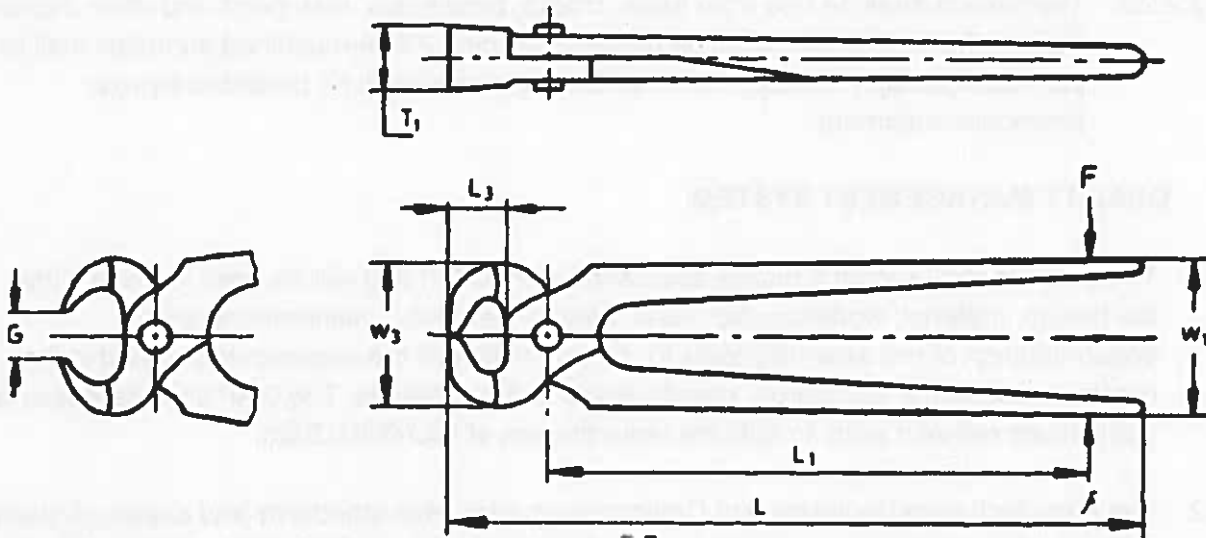
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#### 4.2.2. Heavy Duty Linesman Pincers

##### 4.2.2.1. Construction

4.2.2.1.1. The material, manufacture, workmanship and finish, test, preservation, and packing and sampling of pincers shall conform to ISO 9242.

4.2.2.1.2. The dimensions and shape of pincers shall be as given in Fig. 4 and Table 6



**Fig. 4: Linesman Pincers**

**Table 6: Dimensions and Load Requirements of Pincers**

L mm	L <sub>3</sub> Min mm	W <sub>3</sub> Min mm	T <sub>1</sub> Min mm	W <sub>1</sub> Max mm	G Min mm	L <sub>1</sub> mm	Load Test	
							Load F	Maximum Permanent Set, S Max
160±8	11.2	32	16	45	12.5	106	710	1.2
180±9	12.5	36	18	45	14	118	710	1.4
200±10	14	40	20	45	16	132	800	1.6
224±10	16	45	22	48	18	150	900	1.8
250±10	18	50	25	50	20	170	1000	2
280±10	20	56	28	53	22	190	1120	2.2

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**4.2.2.2. Materials of components**

4.2.2.2.1. For the manufacture of pincers, suitable carbon or alloy steels meeting the requirements laid down in Table 6 and the hardness requirements below shall be used:

- a) Cutting Edges - 510 to 700 HV ( = 50 to 60 HRC )
- b) Rest of Tool - 350 to 510 HV ( = 35 to 50 HRC )

4.2.2.2.2. The pincers shall be free from flaws, cracks, blow holes, rust, burrs and other injurious defects. Moveable jaws shall be properly finished. All un-machined surfaces shall be painted or suitably treated. The machined surfaces shall be protected by rust preventive treatment.

**4.3. QUALITY MANAGEMENT SYSTEM**

4.3.1. 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 assembly tools for bolts & nuts 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.

4.3.2. The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001: 2008 certificate shall be submitted with the tender for evaluation.

4.3.3. The bidder shall indicate the delivery time of the assembly tools for bolts & nuts, 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 assembly tools for bolts & nuts shall be inspected and tested in accordance with the requirements of the standards and all the provisions of this specification. It shall be the responsibility of the 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

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laboratory used shall also be submitted with the tender document (all in English Language).  
The type tests shall include:

- a) Hardness test for the tool steel
- b) Chemical analysis of the tools component parts
- c) Torque/Torsional tests

5.3. The assembly tools for bolts & nuts shall be subject to acceptance tests at the manufacturer's works before dispatch. Acceptance tests shall be witnessed by two Engineers appointed by The Kenya Power and Lighting Company Limited (KPLC). Routine and Sample Test Reports for the assembly tools for bolts & nuts to be supplied shall be submitted to KPLC for approval before delivery of the goods. The tests to be witnessed shall include;

- a) Shock tests
- b) Handle load tests
- c) Tube gripping tests
- d) Torsional tests
- e) Insulation tests (for insulated handles)
- f) Dimensional tests
- g) Functional tests

5.4. On receipt of the product, 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 assembly tools for bolts & nuts which upon examination, test or use; fail to meet any of the requirements in the specification.

**6.0. MARKING AND PACKING**

**6.1. MARKINGS**

All assembly tools for bolts & nuts shall indelibly be marked / stamped on the frame in English Language the following.

- a) Standard of manufacture
- b) Identity of the manufacturer
- c) Nominal width across flat(s) on the respective ends for wrenches (spanners)
- d) Nominal size and length for pliers and nippers.
- e) Standardization Mark from the country of manufacture.
- f) Words "PROPERTY OF KPLC"

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**6.2. PACKAGING**

- 6.2.1. The assembly tools for bolts & nuts shall be varnished or coated with a suitable anticorrosive paint or with mineral jelly reduced with turpentine oil in order to protect them from corrosion.
- 6.2.2. Each tool shall be wrapped in Kraft or waxed paper and then suitably packed in cardboard carton bearing the designation and nominal size of the tool and the manufacturer's name, initials and trade-mark.
- 6.2.3. The following information shall be printed on a suitable label firmly attached to each packaging:
  - a) Purchase order number/tender
  - b) Manufacturer's name
  - c) Year of manufacture
  - d) Assembly tools for bolts & nuts catalog number
  - e) The words, "**PROPERTY OF KENYA POWER & LIGHTING CO.**"

**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:

- a) Guaranteed Technical Particulars signed by the manufacturer;
- b) Copies of the Manufacturer's catalogues, brochures, drawings and technical data;
- c) Sales records for the last five years and at least four customer reference letters;
- d) Details of manufacturing capacity and the manufacturer's experience;
- e) Copies of required type test reports by a third party testing laboratory accredited to ISO/IEC 17025;
- f) Copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;
- g) Manufacturers letter of authorization, ISO 9001:2008 certificate 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:

- a) Guaranteed Technical Particulars signed by the manufacturer;
- b) Design Drawings with details of ladders to be manufactured for KPLC.
- c) 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.

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The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001:2008

- d) Detailed test program to be used during factory testing;
- e) Marking details and method to be used in marking the assembly tools for bolts & nuts;
- f) 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 ladders for The Kenya Power & Lighting Company;
- g) 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 assembly tools for bolts & nuts to KPLC stores.

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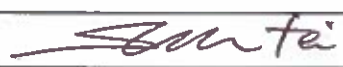
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**ANNEX A: Guaranteed Technical Particulars** (to be filled and signed by the Supplier and submitted together with copies of manufacturer's catalogues, brochures, drawings, technical data, sales records, customer reference letters and copies of certificates/test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

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

<b>Clause number</b>	<b>Bidder's offer</b> (indicate full details of the offered item for each requirement of the tender & specification)
Bidder's Name	
Manufacturer's Name, address and country	
Type reference/model number of item(s) offered	
Scope: 1.1	
1.2 Assembly tools for bolts & nuts	
a) Heavy duty linesman's pliers	
b) Heavy duty pipe wrench	
c) Heavy duty linesman's pincers	
2.0 Applicable Standards (References)	
3.0 Terms & definitions	
4.0 Requirements	
4.1 Service conditions	
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4.2.1 Heavy duty linesman's pliers	
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7.1 Completed tender document	
7.2 Catalogues, brochures, drawings & technical data submitted with offer	
8.0. Manufacturer's Guarantee and Warranty	
9.0 List catalogues, brochures, technical data and drawings submitted to support the offer.	
10.0 List customer sales records and reference letters submitted to support the offer.	
11.0 List Test Certificates submitted with tender	
12.0 List test reports of pliers and nippers to be submitted to KPLC for approval before shipment	
13.0 Statement of compliance to specification (indicate deviations if any & supporting documents)	

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

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