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Kenya Power

PIPE BENDING MACHINE - PART 1 - SPECIFICATION

A Document of the Kenya Power & Lighting Co. Ltd
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0.1 CIRCULATION LIST

COPY NO.	COPY HOLDER
1	Manager, Standards
2	Electronic copy (pdf) on Kenya Power server (http://172.16.1.40/dms/browse.php?fFolderId=23)

REVISION OF KPLC STANDARDS

In order 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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Issued by: Head of Section, Standards Development	Authorized by: Head of Department, Standards
Signed:	Signed:
Date: 2019-09-27	Date: 2019-09-27

0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Issue 1 Rev 0	2019-09-27	New Issue	John Ng'ang'a	Dr. Eng. Peter Kimemia

FOREWORD

This specification has been prepared by the Standards Department in collaboration with the Street lighting division, both of The Kenya Power and Lighting Company Limited (KPLC) and lays down requirements for a hand operated hydraulic Pipe Bending Machine.

The hydraulic Pipe Bending Machine will be used for bending street light tubes to achieve the required lighting angle on a road surface.

This is the first specification in this series.

This specification stipulates the minimum requirements for the items acceptable for use in the company and it shall be the responsibility of the supplier and manufacturer to ensure that the offered design is of the highest quality and guarantees excellent service to KPLC, and exhibits good workmanship and good engineering practice in the manufacture.

Users of Kenya Power specifications are responsible for their correct interpretation and application.

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

Name	Division
Kenneth Mwongera	Street Lighting
John Ngángá	Infrastructure Development

1. SCOPE

1.1. This specification is for a hydraulic hand operated Pipe Bending Machine. It shall be used in bending pipes up-to 90° and for a tube diameter range of 22mm to 60mm.

1.2. The specification stipulates minimum requirements, inspection and tests of the Pipe Bending Machine and accessories as well as schedule of Guaranteed Technical Particulars.

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 will apply; for undated editions the latest edition of the referenced document shall apply.

ISO 12100:2010	Safety of machinery — General principles for design — Risk assessment and risk reduction
ISO 16092-3:2017	Machine tools safety — Presses — Part 3: Safety requirements for hydraulic presses
ISO 4413:2010	Hydraulic fluid power — General rules and safety requirements for systems and their components
ISO 9001:2015	Quality management systems – Requirements
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories

3. DEFINITIONS

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

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

The Pipe Bending Machine shall be suitable for use outdoors in tropical areas and harsh climatic conditions including areas exposed to:

a) Altitudes of up to 2200m above sea level and humidity of up to 95%,

b) Average ambient temperature of +30ºC with a minimum of -1ºC and a maximum of +40ºC, in direct sunlight,

c) Pollution: Design pollution level to be taken as "Heavy" (Pollution level III) for inland and "Very Heavy" (Pollution level IV) for coastal applications in accordance with IEC 60815.

d) Isokeraunic levels of up to 180 thunderstorm days per year.

4.2. DESIGN AND CONSTRUCTION

4.2.1 The Pipe Bending Machine shall be a hydraulic hand operated machine.

4.2.2 It shall be manufactured and tested in accordance with ISO 12100:2010, ISO 16092-3:2017 and ISO 4413:2010 and other applicable national and international standards.

4.2.3 The Equipment shall be portable and easy to use.

4.2.4 It shall rest on wheels.

4.2.5 The moving parts shall be made of stainless steel.

4.2.6 The material of manufacture of the body and handle shall be mild steel and shall be galvanized before application of paint.

4.2.7 The handle shall have a rubber handle grip.

4.2.8 The Equipment shall be supplied together with a full range of dies (mould configuration) capable of bending the pipes from 0° to 90° and 22mm to 60mm, supplied together with a weatherproof canvas carrying bag.

4.2.9 The Equipment shall come complete and ready to use except the separate full range of mould configurations

4.2.10 The Equipment shall meet the requirements in table 1 and as per typical illustration in fig 1.

Table 1: 4" Hydraulic Pipe Bending Machine

PRODUCT SPECIFICATION		
1	Machine type	Hydraulic Bender 4''
2	Operation mode	Manual
3	Bending angle range	0º-90º
4	Minimum Bend Radius	1/2"
5	Maximum Bend Radius	4"
6	Minimum Tube Dia Capacity	22mm
7	Maximum Tube Dia Capacity	60mm
8	Tube thickness range	2.75-4.5mm
9	Number of bend dies	6
10	Mould configuration	22/28/34/42/48/60mm (22- 60mm)
11	Maximum stroke (mm)	320
12	Color	Customized
13	Driven Type	Hydraulic
14	Maximum working pressure	50MPa
15	Approx Gross Weight (Kilogram)	50 Kg
16	Material	Mildsteel

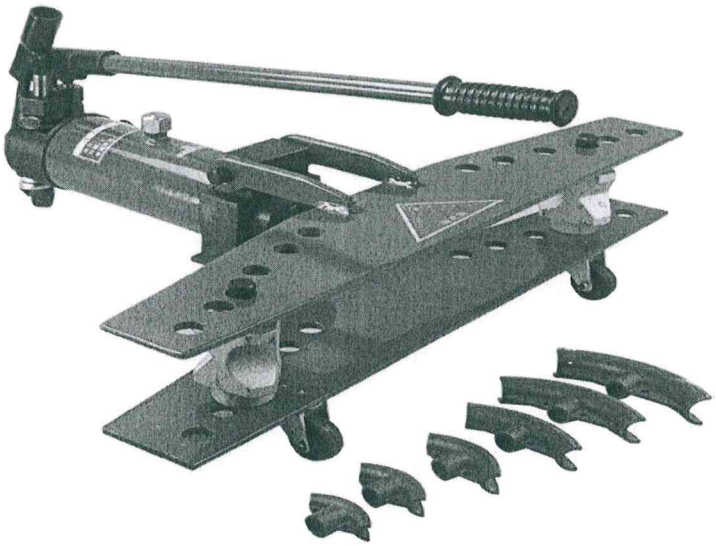

Fig 1: Typical hydraulic Pipe Bending Machine

5. TESTS REQUIREMENTS

The Pipe Bending Machine shall be inspected and tested in accordance with the requirements of ISO 12100:2010, ISO 16092-3: 2017 and ISO 4413:2010 standards and this specification.

6. MARKING AND PACKING

6.1. Marking

The Pipe Bending Machine shall be marked legibly and indelibly with the following information:

a) Name and trade mark of the manufacturer;

b) Country of origin;

c) Standards of manufacture ;

d) Manufacturers type designation and year of manufacture;

e) The instructions for handling and use (in English language);

f) The words "**Property of KPLC**"

6.2. Packaging

6.2.1 The Pipe Bending Machine shall be packed in a standard-size case. The case shall be suitable for storage and transportation.

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APPENDICES

A. TESTS AND INSPECTION (Normative)

A.1 It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified in the manufacturing standard and other tests performed at the factory.

A.2 Copies of Type Test Certificates and Type Test 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. A copy of the accreditation certificate to ISO/IEC 17025 for the testing laboratory shall also be submitted. Any translations of certificates and test reports into English language shall be signed and stamped by the Testing Laboratory that carried out the tests.

A.3 The Equipment shall be subject to acceptance tests at the manufacturer's works before dispatch. Acceptance tests may be witnessed by two Engineers appointed by The Kenya Power and Lighting Company Limited (KPLC).

A.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 items which upon examination, test or use, fail to meet any of the requirements in the specification.

B. QUALITY MANAGEMENT SYSTEM (Normative)

B.1 The bidder shall submit a quality assurance plan (QAP) that will be used to ensure that the items 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 9001:2015

B.2 The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001:2015 certificate shall be submitted with the tender for evaluation.

B.3 The bidder shall indicate the delivery time of the Equipment, manufacturer's monthly and annual production capacity and experience in the production of the Equipment. A detailed list and contact addresses (including e-mail) of the manufacturer's previous customers both inside and outside (at least three) the country of manufacture for exact or similar equipment sold in the last five years shall be submitted with the tender for evaluation.

C. DOCUMENTATION (Normative)

C.1 The bidder shall submit its tender complete with technical documents required by Appendix E (Guaranteed Technical Particulars) for tender evaluation. The documents to be submitted (all in English language) for tender evaluation shall include the following:

a) Fully filled clause by clause Guaranteed Technical Particulars (GTP) signed by the manufacturer,

b) Copies of the manufacturer's catalogues, brochures, drawings and manuals,

c) Sales records for the last five years and at least four customer reference letters, three outside the country of manufacture,

d) Details of manufacturing capacity and the manufacturer's experience.

e) Copies of required type test certificates and 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) Manufacturer's warranty and guarantee;

h) Manufacturer's letter of authorization where applicable, copy of the manufacturer's ISO 9001:2015 certificate, ISO 17025(2005) certificate.

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

a) Fully filled clause by clause Guaranteed Technical Particulars (GTP) signed by the manufacturer,

b) Design drawings,

c) Operation manuals and brochures shall be submitted,

d) 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. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001:2015,

e) Detailed test program to be used during factory testing,

f) Marking details and method to be used in marking the items,

g) 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 Equipment for The Kenya Power & Lighting Company Ltd,

h) Packaging details (including packaging materials and marking and identification of batches).

D. GUARANTEED TECHNICAL PARTICULARS (Normative)

To be filled 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 type test certificates and test reports for tender evaluation, all in English Language)

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.	**Scope**	Specify
	Item on offer	Specify
1.1-1.2		
2.	Applicable Standards	Specify
3.	Terms & Definitions	Specify
4.	**Requirements**	
4.1	Operating Conditions	Specify
4.2	**Design and construction**	
4.2.1	Shall be a hydraulic hand operated machine	Specify
4.2.2	Shall be manufactured and tested in accordance with ISO 12100:2010, ISO 16092-3:2017 and ISO 4413:2010 safety requirements	Specify
4.2.3	The Equipment shall be portable and easy to use.	Specify
4.2.4	It shall rest on wheels.	Specify
4.2.5	The moving parts shall be made of stainless steel.	Specify
4.2.6	The material of manufacture of the body and handle shall be mild steel and shall be galvanized before application of paint.	Specify
4.2.7	The handle shall have a rubber handle grip.	Specify
4.2.8	The Equipment shall be supplied together with a full range of dies (mould configuration) capable of bending the pipes from 0o to 90o and 22mm to 60mm, supplied together with a canvas carrying bag.	Specify
4.2.9	The Equipment shall come complete and ready to use except the separate full range of mould configurations	Specify
	Machine type / Hydraulic Bender 4''	

Clause number	KPLC requirement		Bidder's offer
	Operation mode	Manual	Specify
	Bending angle range	0º-90º	Specify
	Minimum Bend Radius	1/2"	Specify
	Maximum Bend Radius	4"	Specify
	Minimum Tube Dia Capacity	22mm	Specify
	Maximum Tube Dia Capacity	60mm	Specify
	Tube thickness range	2.75-4.5mm	Specify
	Number of bend dies	6	Specify
	Mould configuration	22/28/34/42/48/60mm (22-60mm)	Specify
	Maximum stroke (mm)	320	Specify
	Color	Customized	Specify
	Driven Type	Hydraulic	Specify
	Maximum working pressure	50MPa	Specify
	Approx Gross Weight (Kilogram)	50 Kg	Specify
	Material	Mildsteel	Specify
5	**Test Requirements**		State
6	**Marking and Packing**		
6.1	Marking		Provide with drawing
6.2.1	The Pipe Bending Machine shall be packed in a standard-size case. The case shall be suitable for storage and transportation.		State
A	**Tests and Inspection**		
A.1	Responsibility of carrying out tests		State
A.2	Copies of Type Test Reports submitted with tender		State
A.3	Acceptance tests to be witnessed by KPLC at factory before shipment		State
A.4	Inspection at the stores and replacement of rejected items		State compliance
B	**Quality Management System**		
B.1	Quality Assurance Plan		Provide
B.2	Copy of ISO 9001:2008 Certificate		Provide
B.3	Manufacturer's experience		Provide
	Manufacturing Capacity (units per month)		Provide
	List of previous customers		Provide
	Customer reference letters		Provide

Clause number	KPLC requirement	Bidder's offer
C	**Documentation and demonstration**	
C.1	Documents submitted with tender	Provide
C.2	Documents to be submitted by supplier to KPLC for approval before manufacture	Provide
	Statement of compliance to specification	Provide

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Manufacturer's Name, Signature, Stamp and Date