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Kenya Power

HANDHELD XRF ALLOY ANALYZER- SPECIFICATION

A Document of the Kenya Power & Lighting Co. Ltd
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TITLE:
**HANDHELD XRF ALLOY
 ANALYZER - SPECIFICATION**

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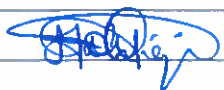

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0.1 Circulation List

COPY NO.	COPY HOLDER
1	Standard Manager
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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0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2016-09-22	New Issue	Nancy Wairimu	Dr. Eng. Peter Kimemia

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FOREWORD

This specification has been prepared by the Standards Department in collaboration with Quality Control Section (Logistics) both of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for Handheld XRF Alloy Analyzer.

The specification stipulates the minimum requirements for Handheld XRF Alloy Analyzer acceptable for use in the company.

References to brand names or catalogue numbers are intended to be descriptive only and not restrictive.

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

Name	Division
Simon Kimitei	Supply Chain and Logistics
Nancy Wairimu	Infrastructure Development

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1. SCOPE

- 1.1. This specification is for Handheld XRF Alloy Analyzer for use in compositional and grade ID analysis of metal based materials.
- 1.2. The specification also covers requirements, inspection and tests of the instruments and their accessories as well as schedule of Guaranteed Technical Particulars.

2. NORMATIVE REFERENCES

The following standards contain provision 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.

- IEC 60529: Degrees of protection provided by enclosures
- BS 3288-2: Insulator & Conductor Fittings for Overhead Power Lines
- BS 4190: ISO metric black hexagon bolts, screws and nuts – Specification

3. DEFINITIONS AND ABBREVIATIONS

For the purpose of this specification the abbreviations given in the reference standards shall apply in addition to the following:

3.1 ABBREVIATIONS

- KPLC- Kenya Power and Lighting Company Limited
- ISO – International Organization for Standardization
- IEC – International Electrotechnical Commission
- BS – British Standards
- XRF – X- ray fluorescence
- IP – Ingress protection

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4. REQUIREMENTS

4.1 SERVICE CONDITIONS

The Handheld XRF Alloy Analyzer shall be suitable for use outdoors in tropical areas with the following climatic conditions:

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

4.2. DESIGN AND CONSTRUCTION

4.2.1 The Handheld XRF Alloy Analyzer shall be manufactured to applicable ISO & IEC Standards, Kenya Standards and the requirements of this specification.

4.2.2 The Handheld XRF Alloy Analyzer shall be designed for heavy duty applications in the field.

4.2.3 It shall be of such a design as to make it possible to access and test areas with tight spaces.

4.2.4 It shall withstand tough testing conditions and analyse materials with speed and accuracy without erroneous readings.

4.2.5 It shall provide fast reliable compositional grade analysis of a wide range of metals such as steel, copper, aluminium and their alloys under varying conditions of testing and service.

4.2.6 The Handheld XRF Alloy Analyzer shall be suitable for determining composition and grades of conductor and cable wires, metal rods, steel bars and electrical equipment contacts for use in the transmission and distribution of electricity including:

- a) Copper conductors – wire diameters in the range 0.1mm to 10mm and copper bus-bar tubes of diameters in the range 25mm to 80mm
- b) Aluminium and aluminium conductors – wire diameters in the range 0.1mm to 25mm and aluminium bus-bar tubes of diameters in the range 25mm to 80mm.
- c) Steel conductors and stay wires – wire diameter in the range 0.1mm to 10mm.
- d) Steel structures – Angle sections, U-channel sections, Flat sections and Plates.
- e) Connectors, cable glands, cable lugs, cable joints and other power line items;
- f) Steel castings and forgings (insulator & conductor fittings for overhead power lines as per BS 3288-2)
- g) Copper clad steel earth rods and their connectors (earth rod clamps and earth rod couplers). The earth rods diameters are in the range 12mm to 25mm

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- h) Zinc used in hot dip galvanizing of steel items. This includes hot molten zinc (in zinc bath), zinc bars (raw materials in galvanizing plants) and zinc coating on steel items.
- i) Fasteners (bolts & nuts) to BS 4190.
- j) Current carrying components of switchgear and control gear including air break switches and circuit breakers

4.2.7 The Handheld XRF Alloy Analyzer shall be capable of high analytical speed and precision, able to identify alloys differing by small amounts of elements, and accurately quantify elemental contents in stainless steels, steel alloys, copper alloys and aluminium alloys.

4.2.8 It shall be programmable to allow grade matching and have capacity to store multiple libraries per work site. It shall have an active standard inspection grade library to allow for compositional positive material identification with grade addition and or editing.

4.2.9 It shall be suitable for welding inspection.

4.2.10 The Handheld XRF Alloy Analyzer shall be of the general arrangement shown in Figure 1.



Figure 1: General arrangement of Handheld XRF Alloy Analyzer

4.2.11 The Handheld XRF Alloy Analyzer shall also have the following features/properties:

Table 1: Features of a handheld XRF Alloy Analyzer

Property	Requirement
Type	Handheld X-Ray Fluorescence (XRF) Alloy Analyzer
Weight	< 2kg with battery
X-ray Tube	≥ 50 kV (for enhanced heavy elements analysis)
Filters	Multiple
Detector	SDD (Silicon Drift Detector)
Sample temperature	450 °C and be suitable for zinc bath used in galvanizing plants
Features	i)Programmable and compatible with a Windows 7 software; ii)Embedded data storage at least 4GB, micro SD slot for expandable storage iii)USB port and complete with USB cable iv)All writing in English

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Property	Requirement
Display	High contrast colour LCD with capacitive touch screen; English language
Protection	Better than IP 54 (to IEC 60529). Shall also have protection against detector window damage.
Battery	Complete with rechargeable battery (upto 8 hours) and one spare battery
Power supply	Complete with battery charger set suitable for connection at 50Hz, 230V AC
Carrying case	The Handheld XRF Alloy Analyzer shall be complete with sturdy carrying case
Compliance	CE marking, RoHS (restriction of the use of hazardous substances)
Calibration	Valid Calibration Certificate required with the equipment during delivery
Warranty	Required minimum warranty period of 3 years

5. TESTS REQUIREMENTS

The Handheld XRF Alloy Analyzer shall be inspected and tested in accordance with the requirements of relevant standards and provision of this specification.

6. MARKING AND PACKING

6.1 The following information shall be marked legibly and in a permanent manner on each Handheld XRF Alloy Analyzer:

- a) The manufacturer's identity;
- b) Model Number;
- c) The words "Property of KPLC".

6.2 Each Handheld XRF Alloy Analyzer shall be packed in a manner so as to protect it from damage during transportation, storage and use.

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APPENDICES

A: TESTS AND INSPECTION (NORMATIVE)

- A.1 It shall be the responsibility of the supplier to test or to have all the relevant tests performed.
- A.2 Copies of previous test certificates by a third party testing laboratory accredited to ISO/IEC 17025 shall be submitted with the offer for evaluation. A copy of the accreditation certificate for the testing laboratory shall also be submitted with the tender (all in English Language). Any translations of certificates and test reports into English language shall be signed and stamped by the Testing Authority.
- A.3 Test certificates and calibration certificates for the Handheld XRF Alloy Analyzer to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods.
- A.4 On receipt of the Handheld XRF Alloy Analyzer, 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, any Handheld XRF Alloy Analyzer which upon examination/inspection, test or use fail to meet any of the requirements in the specification.

B: QUALITY MANAGEMENT SYSTEM (NORMATIVE)

- B.1 The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the low voltage measurement instruments physical properties, tests 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 9001:2008.
- 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 certificate shall be submitted with the tender for evaluation.
- B.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 low voltage measurement instruments 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.

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C: DOCUMENTATION AND DEMONSTRATION (Normative)

C.1 The bidder shall submit its tender complete with technical documents for tender evaluation. The technical 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 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.
- h) Operating instructions:

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 with details of XRF alloy analyzer 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. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001.
- d) All documentation necessary for safety of the equipment.

C.3 The successful bidder shall demonstrate to KPLC Staff (in Nairobi) the use of the Handheld XRF Alloy Analyzer and explain the features that guarantee excellent service. This shall be done at the drawings approval stage.

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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	Item	Bidder's offer (indicate full details of the offered item for each requirement of the specification)	
	Item Name and Model Number	Specify	
	Manufacturer's Name and address	Specify	
	Country of Manufacture	Specify	
1.	Specify	State	
2.	Normative References	State	
3.	Definitions and Abbreviations	State	
4.	Requirements		
4.1	Service Conditions	State	
4.2	Design & Construction		
4.2.1	Applicable standards	State	
4.2.2	Designed for heavy duty applications in the field	State	
4.2.3	Designed to access and test areas with tight spaces	State	
4.2.4	Capable to withstand tough testing conditions and analyse materials with speed and accuracy without erroneous readings	State	
4.2.5	Capable to provide fast reliable compositional grade analysis of a wide range of metals	State	
4.2.6	Suitable for determining composition and grades of conductor and cable wires, metal rods, steel bars and electrical equipment contacts for use in the transmission and distribution of electricity	State	
4.2.7	Capable of high analytical speed and precision	State	
4.2.8	Programmable and have capacity to store multiple libraries per work site.	State	
4.2.9	suitable for welding inspection	State	
4.2.10	general arrangement	Provide drawing	
4.2.11	Features	Type	State
		Weight	State
		X-ray Tube	State
		Filters	State
		Detector	State
	Sample temperature	State	

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Clause number	Item	Bidder's offer (indicate full details of the offered item for each requirement of the specification)
	Features	State
	Display	State
	Protection	State
	Battery	State
	Power supply	State
	Carrying case	State
	Compliance	State
	Calibration	State
	Warranty	State
5	Tests Requirements	State
6	Marking and Packing	
6.1	Marking	State
6.2	Packing	State
A	Test and inspection	
A.1	Responsibility of carrying out tests	State
A.2	Copies of Type Test Reports submitted with tender	Provide
A.3	Test reports to be submitted by supplier to KPLC for approval before shipment	Provide
A.4	Inspection at the stores and replacement of rejected instruments	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)	
	List of previous customers	
	Customer reference letters	
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
C.3	Demonstration	State compliance
	Statement of compliance to specification	State compliance

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

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C: BIBLIOGRAPHY

The following standards may be read together with this specification for a greater understanding of the requirements.

- ISO 4993: Steel and iron castings - Radiographic inspection
- ISO 5579: Non-destructive testing - Radiographic examination of metallic materials by X- and gamma-rays - Basic rules
- ISO 10675-1: Non-destructive testing of welds - Acceptance levels for radiographic testing - Part 1: Steel, nickel, titanium and their alloys
- ISO 11699-1: Non-destructive testing - Industrial radiographic films - Part 1: Classification of film systems for industrial radiography
- ISO 11699-2: Non-destructive testing - Industrial radiographic films - Part 2: Control of film processing by means of reference values
- ISO 14096-1: Non-destructive testing - Qualification of radiographic film digitisation systems - Part 1: Definitions, quantitative measurements of image quality parameters, standard reference film and qualitative control
- ISO 14096-2: Non-destructive testing - Qualification of radiographic film digitisation systems - Part 2: Minimum requirements
- ISO 17636-1: Non-destructive testing of welds. Radiographic testing. X- and gamma-ray techniques with film
- ISO 17636-2: Non-destructive testing of welds. Radiographic testing. X- and gamma-ray techniques with digital detectors
- ISO 19232: Non-destructive testing - Image quality of radiographs

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