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Kenya Power

LOW VOLTAGE PLASTIC FUSE CHANNEL — 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
Electronic copy (pdf) on Kenya Power server (http://172.16.1.40/dms/browse.php?fFolderId=23)	

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.

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	2017-07-12	New issue	Stephen Nguli Rotich Benard	Dr. Eng. P. Kimemia

FOREWORD

This specification has been prepared by the Standards Department of the Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for Low Voltage Plastic Fuse Channel.

In the history of the company, the wooden LV fuse bar made of wood from the "muiri" tree (Prunus africana) has been in use until the government banned the harvesting of hard woods in the forests after they were classified as endangered species due to rapid depletion. Various alternative solutions have been explored but none could meet the requirements especially of safety. It is thus expected that this Low Voltage Plastic Fuse Channel will now address this shortcoming.

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

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

Name	Department
Stephen Nguli	Standards
Rotich Benard	Standards

1. SCOPE

This specification specifies the minimum requirements for low voltage plastic fuse channel. This is intended to be used as transformer fuse channel for supporting fuse carriers on the low voltage side. This specification outlines minimum manufacturing requirements for Polyvinyl Chloride (PVC) U channels

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.

ASTM D6263: Standard Specification for Extruded Rods and Bars.

ASTM D1784: Standard Specification for Rigid PVC Compounds and Chlorinated Poly-compounds.

BS 2484-1985: Specification for Impact Strength Requirements for Plastic Blocks

3. DEFINITIONS AND ABREVIATION

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

4. REQUIREMENTS

4.1. Service conditions

The Low Voltage Plastic Fuse Channel 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

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,

d) 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.

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

4.2. Materials and Construction

4.2.1. The Low Voltage Plastic Fuse Channel shall be manufactured in accordance with the requirements of ASTM D1784, ASTM D6263 and this specification.

4.2.2. The material used in the manufacture of the plastic fuse channel shall be rigid, unfilled, general-purpose-grade polyvinyl chloride (PVC) having Cell Classification of 12454 (formerly known as Type I Grade I PVC or PVC 1120) as per ASTM D1784.

4.2.3. The materials used to manufacture the plastic fuse channel shall offer excellent chemical and corrosion resistance, mechanical strength, and good thermal and electrical properties.

4.2.4. The materials used shall offer high resistance to ultraviolet radiation.

4.2.5. They shall be none contaminating for purity applications, and have excellent flammability characteristics. They shall be resistant to acids, bases, salts, aliphatic solutions, oxidants, and halogens.

4.2.6. Standard methods for machining, joining, and fabricating PVC thermoplastics shall be applicable to this product including: drilling, threading, turning, solvent cementing, and thermal welding techniques.

4.2.7. The fuse channel shall be manufactured in strict compliance to ASTM D6263 consistently meeting or exceeding the quality assurance test requirements of this standard regarding material, physical properties, degree of fusion, dimensions, dimensional stability, lengthwise camber, workmanship, finish and appearance.

4.2.8. All PVC channel shall be porosity free, and shall be tested for internal stress levels

4.2.9. Each production run of channel shall be subjected to, and meet, the test requirements established for material, workmanship, extrusion quality, and internal stress.

4.2.10. All finished product shall be homogenous throughout, and shall be free of voids and foreign contamination.

4.2.11. Both ends of the plastic fuse channel shall be free from steps and any knots and shall be square to within five degrees (5°). The edges and sharp ends shall be chamfered and/or rounded off to make them safe for handling by hand.

4.2.12. The plastic fuse channel shall be 2290mm in length and 100mm in height and 50 mm wide. The side thickness shall be ≥10mm. Holes shall be drilled at site as required. Two slots shall be provided as shown in the drawings in appendix E with a diameter of 22mm and a tolerance of ±1mm

5. TESTS AND ACCEPTANCE REQUIREMENTS

5.1. Finished product dimensions shall be monitored continuously for compliance to ASTM D6263 standards and tolerances.

5.2. **Voids** - all products shall be porosity free, and shall not contain foreign inclusions or contamination

5.3. **Stress** - Internal stress levels throughout the product profile shall be measured, monitored, and kept to a minimum

6. MARKING AND PACKING

6.1. The following marks and words shall be permanently engraved on the profiled side (both side) of each fuse channel, the side that has no holes:

a) Name and trademark of manufacturer
b) The standard to which the plastic fuse channel complies
c) Year of manufacture
d) Property of KPLC

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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 normally performed on Plastic Low Voltage Fuse Channel.

A.2. On receipt of the Low Voltage Plastic Fuse Channel, Kenya Power shall inspect them and may perform or have performed any of the relevant tests to verify compliance with the specification. The supplier shall replace without charge to Kenya Power, items which upon examination, test or use fail to meet any 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 fuse channels, workmanship, tests, service capability, etc. 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 reference 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 fuse channels, manufacturer's monthly and annual production capacity and experience in the production of the items. A detailed list and contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for the fuse channels sold in the last five years together with reference letters from four of the customers shall be submitted with the tender for evaluation.

APPENDIX C: TECHNICAL DOCUMENTATION (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 (GTPs) - Appendix D - stamped and signed by the manufacturer.

b) Copies of the Manufacturer's drawings and technical data;

c) Test certificates (issued by recognized testing body) confirming compliance of the plastic U fuse channel to the requirements of ASTM D6263.

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

e) Sales records for previous five years and reference letters from at least four of the customers;

f) Manufacturer's letter of authorization, copy of the manufacturer's ISO 9001:2008 certificate and other technical documents required in the tender

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 (GTPs) stamped and signed by the manufacturer **(these are not the ones submitted with the tender)**;

b) Drawings and technical data of the fuse channels, complete with legend, manufacturer name, logo, model number, revision/drawing number and key; stamped and signed by the manufacturer's authorised personnel.

c) Marking and packaging details.

d) Manufacturer's undertaking to ensure adequacy of the design, adherence to applicable regulations, standards and specification, ensure good workmanship and good engineering practice in the manufacture of the fuse channels for The Kenya Power and Lighting Company Limited;

NOTE: *The drawings to be submitted by the supplier/manufacturer to KPLC for approval before manufacture shall be in standard format clearly indicating drawing number, parts list with material details and quantities, standards of manufacture, dimensions, ratings, approval details and identity of the manufacturer (as per manufacturer's authorization submitted during tendering).*

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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.....

Description	Bidder's offer
1. Manufacturer's Name & Country of manufacture	State
2. Name of item to be supplied	State
3. Size being supplied (Length X Width X Breadth)	Specify

Clause	Description	Bidders offer*
1.1	Scope	State
4.1	Service conditions	Specify
4.2.1	Standards of manufacture	State
4.2.2	Specific material name, Type, Grade & Classification	State
4.2.3	Material properties	State
4.2.4	UV protection	State
4.2.5	Applicability of the materials to purity applications	Specify
4.2.6	Compliance to standard methods of machining	State
4.2.7	Fuse Channel manufacturing standard	State
4.2.8	Fuse Channel offered is porosity free	State values
4.2.9	Production run meeting requirements	State
4.2.10	Homogeneity of the finished product	Specify
4.2.11	Fuse channel ends and edges finish	Specify
4.2.12	Fuse channel dimensions and tolerances	Specify
5	Fuse channel test requirements that shall be complied with as per the specification and ASTM D6263.	State
6.1	Marking on the fuse channel	State
A1	Tests to be performed	State
A2	Supplier shall replace without charge to KPLC items that don't meet requirements	State

Clause	Description	Bidders offer*
B1	QAP and ISO 9001:2008 /2015	State
B2	Copies of quality management certifications attached	State
B3	Delivery time, Production capacity & experience of the manufacturer	State
C1	Technical documents to be submitted with tender documents	
	a. Fully-filled clause by clause Guaranteed Technical Particulars (GTPs) - Appendix D - stamped and signed by the manufacturer.	
	b. Manufacturer's drawings and technical data;	state
	c. Test certificates	Specify
	d. Details of manufacturing capacity	State
	e. Sales records for previous five years and reference letters from at least four of the customers	State
C2	Documents to be submitted for approval before manufacture	
	a. Fully filled clause by clause Guaranteed Technical Particulars (GTPs)	State
	b. Drawings and technical data of the fuse channel	State
	c. Marking and packaging details	State
	d. Manufacturer's undertaking	State

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

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Manufacturer's Name, Signature, Stamp and Date

APPENDIX E: LOW VOLTAGE FUSE CHANNEL DRAWINGS