THE KENYA POWER AND LIGHTING CO. LTD.

SPECIFICATIONS
FOR LOW VOLTAGE SPLIT CORE TYPE MEASURING CURRENT TRANSFORMERS

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CONTENTS

Foreword

This standard specification has been prepared by the Meter Central Laboratory. and lays down requirement for Low voltage split core, clamp on, measuring current transformers.

This specification is intended for procurement of materials and does not include provision of contract.

This specification is based on IEC 60044-1. It is subject to revision as and when required.

This specification supersedes all specifications for Low voltage split core, clamp on, measuring current transformers, issued before the revision date.

Introduction

This specification was prepared to establish and promote uniform requirements for Low voltage split core, clamp on, measuring current transformers. The specification lays down the minimum requirements for equipment acceptable for evaluation. It is the responsibility of the Supplier to obtain copies of the standards referred herein.

1 **Scope**

This specification applies to newly manufactured Low voltage split core, clamp on, measuring current transformers for use with electrical measuring instruments at frequencies from 15 to 100 Hz. Unless otherwise specified; current transformers shall comply with IEC 60044-1.

2 **References**

The following documents were referred to during the preparation of this specification; in case of conflict, the requirements of this specification take precedence,

IEC 60044-1: Instrument Transformers- Part 1: Current Transformers and all the standards referred to in this standard.

3. Definitions

The definitions given in the reference standard apply.

KP: Kenya Power &Lighting Co.Ltd

4. REQUIREMENTS

4.1 Operating Conditions

4.1.1 The Low voltage split core, clamp on measuring current transformers shall be suitable for continuous outdoor operation in tropical areas with heavily polluted atmosphere and the following atmospheric conditions:

4.1.1.1 Humidity: High at Coast, up to 95 % and lower inland, up to 50%;

4.1.1.2 Solar radiation: To a level of 1000 $W/m^{2.}$

4.1.1.3 Temperature: Average ambient of +50°C with a minimum of -5°C and a maximum of +55°C, temperature category –5/55;

4.1.1.4 The Low voltage split core, clamp- on, measuring current transformers shall be operating on voltage range up to 600v or greater.

4.1.1.5 System earthing: Earthed neutral.

Other service conditions for outdoor current transformers shall be defined in the IEC60044-1 standard.

4.2 Design and construction

4.2.1 Dimensions

4.2.1.2 Measuring current transformers shall be split core, clamp on type, having a ring type core window of inside diameter ≥24mm to 40mm,Outside diameter 70mm by 50mm

4.2.1.3 Measuring current transformers shall be encapsulated for operation in outdoor tropical climatic conditions.

4.2.1.4 Measuring current transformers shall be protected from moisture, dirt and corona.

4.2.1.5 Measuring current transformers shall have no air gaps on the split core ends .shall have a secure locking hinge which shall have a facility for sealing.

4.2.1.6 Measuring current transformer secondary terminal output shall be marked as S1 and S2 and shall have output leads of length ≥3m

4.2.1.7 Measuring current transformers shall weigh not more than 200gms

4.2.1.8 Measuring current transformers shall have width from inside diameter ≤40mm

4.2.1.9 Measuring current transformer shall have a separate protection cover that fits the CT

4.2.1.10 Measuring current transformer cover shall have invisible outlets for S1 and S2.

4.2.3. Rated insulation levels

The rated insulation level of a primary winding shall be based on its highest voltage for equipment U_m.

4.2.4 For current transformer without primary winding and without primary insulation of its own,

the value U_m =0,72 kV is assumed.

For windings having U_m =0,72 kV or 1,2 kV. The rated insulation level is determined by the rated power- frequency withstands voltage, according to table 3 of the IEC 60044-1 Standard.

4. 2.5. Insulation requirements for secondary windings

The rated power frequency-withstand voltage for secondary winding insulation shall be not less than 3 kV (r.m.s.).

4.3 RATINGS

4.3.1 Standard values of rated primary current

The standard values of rated primary currents for this tender are:

10, 15, 20, 30, 50, 75 amperes

And their decimal multiples or fractions.

4.3.2 Standard values of rated secondary current

The rated secondary current for these current transformers shall be 5 A. while the primary values shall be 100,200,300.500,1000

4.3.3 The standard accuracy class:
The accuracy class for these current transformers shall be class ≤3

4.3.4 Limits of current error and phase displacement

The Limits of current error and phase displacement for measuring current transformers class ≤3 of clause 11.2 and Table 11 of the Standard shall apply.

4.3.5 ***A calibration certificate from a national metrology institute shall be required with a sample of the current transformers to be provided.***
Where test and / or calibration certificates/ reports are issued by a laboratory other than the International / National Test Certification Authority, **a copy of accreditation certificate from the International / National Testing Certification Authority shall be attached together with the tender documents.**

4.3.6 Rated continuous thermal current
Unless otherwise specified, the rated continuous thermal current shall be the rated primary current.

4.3.7 The value of rated output shall be ≥ 1VA

4.3.8 Short-time current ratings

Rated short-time thermal current (Ith)

A rated short-time thermal current shall be assigned to the transformer and shall comply with the type test specified in clause 7.1 of The Standard

4.3.9 Rated dynamic rating (I_{dyn})

The value of the rated dynamic current *(I_{dyn})* shall normally be 2.5 times the rated short-time thermal current *(I_{th})* and it shall be indicated on the rating plate when it is different from this value.

4.3.10 Extended current rating

Current Transformers of accuracy class ≤3 may be marked with extended current rating in compliance with the Standard.

Requirements of clause 4.2.3 to 4.3.4 shall form part of the type test approval to be issued by an international or the national (of country of manufacture) CT certifying body.

4.4 **Marking, Labeling and Packaging**

4.4.1 Terminal markings

The terminal markings shall identify:

a) The primary and secondary windings;

b) The winding sections, if any;

c) The relative polarities of windings and winding sections;

d) The intermediate tappings, if any.

4.4.1.1 Method of marking

4.4.1.2 The terminals shall be marked clearly and indelible, either on their surface or in their immediate vicinity.

4.4.1.3 The marking shall consist of letters followed, or preceded where necessary, by numbers. The letters shall be in block capitals.

4.4.1.4 Markings to be used

The markings of current transformers shall be as indicated in table 10 of the IEC 60044-1 Standard.

4.4.2 Rating plate markings

All current transformers shall carry at least the following markings:

a) the manufacturer's name or other mark by which it may be readily identified;

b) a serial number or a type designation, preferably both;

c) the rated primary and secondary current, i.e.:

Kn = Ipn / Isn A (e.g. Kn = 100 / 5 A)

d) the rated frequency (e.g. 50 Hz.);

e) the rated output and the corresponding accuracy class, together with additional information specified in later parts of these recommendations;

f) the highest voltage for equipment;

g) the rated insulation level;

Note-The two items f) and g) may be combined into one marking (e.g. 0,72/3 kV)

h) the accuracy class and instrument security factor following the indication of the corresponding rated output (e.g. 15 VA Class 0,5 FS 10);

i) Current transformers having an extended current rating shall have this rating indicated immediately following the class designation (e.g. 15 VA Class 0.5 ext. 150 %);

j) "THE PROPERTY OF K.P. CO. LTD."

All information shall be marked in an indelible manner on the current transformer itself or on a rating plate securely attached to the transformer.

In addition, other information shall be marked whenever space is available as per IEC 60044-1 Standard.

4.4.3 Packaging

Current transformers shall be packaged in such a manner as to minimize damage and entry of moisture during transportation and handling. Current transformers shall be packed in suitable groups and each group shall have consecutive serial numbers. Where a tender has been awarded, packaging shall be done only after inspection, sampling, testing of the current transformers has been finalized. In the absence of these consent to package and shipment shall be granted, in writing, by the Procurement manager, Kenya Power Company Ltd.

5. TEST METHODS

The tests specified in this standard are classified as type tests, routine tests, and special tests.

5.1 Type tests

Type tests shall be done on each transformer so as to comply with clauses 6.1 and 7 of the IEC 60044-1 Standard.

5.2 Routine tests shall be done so as to comply with clauses 6.2 and 8 of the IEC 60044-1 Standard.

6. OTHER REQUIREMENTS

6.1 Guarantee

Current transformers shall be guaranteed against any defects, which may develop due to faulty material calibration, transportation or workmanship for a twelve-month period from the date of delivery.

6.2. Product information

The following Drawings and Information shall be supplied with the tender.

(a) Drawing giving all relevant dimensions.

(b) Wiring diagram.

(c) Description leaflet of current transformers.

6.3 The tenderer shall show proof, by means of appropriate current certificates, of compliance to ISO 9001(2000) and / or ISO 14001 series of Standards.

6.4 A type test calibration certificate shall be provided together with the samples.

6.5 A statement of compliance or non-compliance with the above specifications shall be required. In case of non-compliance the affected requirements shall be indicated

7 REFERENCES

The following documents were referred to during the preparation of this specification, and may be referred to. Incase of conflict, the provision of this specification shall take precedence.

Unless otherwise specified, the latest revision, edition and amendments shall apply.

IEC 60044-1: Instrument transformers-Part 1: Current Transformers.

KPC: Code of Practice for Drafting and Presentation of Standards

APPENDIX A: **Statement of Compliance** *(to be filled by the Supplier for all clauses and Submitted for tender evaluation)*

Clause Number	Bidder's offer	Manufacturer's catalogue, drawing, technical data or tests certificate Reference Page to support the offer.
4.1Operating Conditions		
4.1.1 The Low voltage split core, clamp on, measuring current transformers shall be suitable for continuous outdoor operation in tropical areas with heavily polluted atmosphere and the following atmospheric conditions:		
4.1.1.1 Humidity: High at Coast, up to 95 % and lower inland, up to 50%;		
4.1.1.2 Solar radiation: To a level of 1000 W/m^2		

4.1.1.3 Temperature: Average ambient of +50°C with a minimum of -5°C and a maximum of +55°C, temperature category –5/55;		
4.1.1.4 The Low voltage split core, clamp on, measuring current transformers shall be operating on voltage range up to 600v or greater.		
4.1.1.5 System earthing: Earthed neutral.		
4.2 Design & Construction		
4.2.1 Dimensions		
4.2.1.2 Measuring current transformers of current shall be split core, clamp on type having a ring type core window of inside diameter ≥24mm to 40mm, Outside diameter 70mm by 50mm.		
4.2.1.3 Measuring current transformers shall be encapsulated for operation in outdoor tropical climatic conditions. .		
4.2.1.4 Measuring current transformers shall be protected from moisture, dirt and corona.		
4.2.1.5 Measuring current transformers shall have no air gaps on the split core ends. Shall have secure locking hinge which shall have facility for sealing.		
4.2.1.6 Measuring current transformer secondary terminal output shall be marked as S1 and S2.shall have output leads of length ≥3m		
4.2.1.7 Measuring current transformers shall weigh not more than 200gms		
4.2.1.8 Measuring current transformers shall have width ≤40mm		
4.2.1.9 Measuring current transformer shall have a separate protection cover that fits the CT.		
4.2.1.10 Measuring current transformer cover shall have invisible outlets for S1 and S2		
4.2.3 Rated Insulation Levels of a primary winding shall be based on its highest voltage for equipment Um		

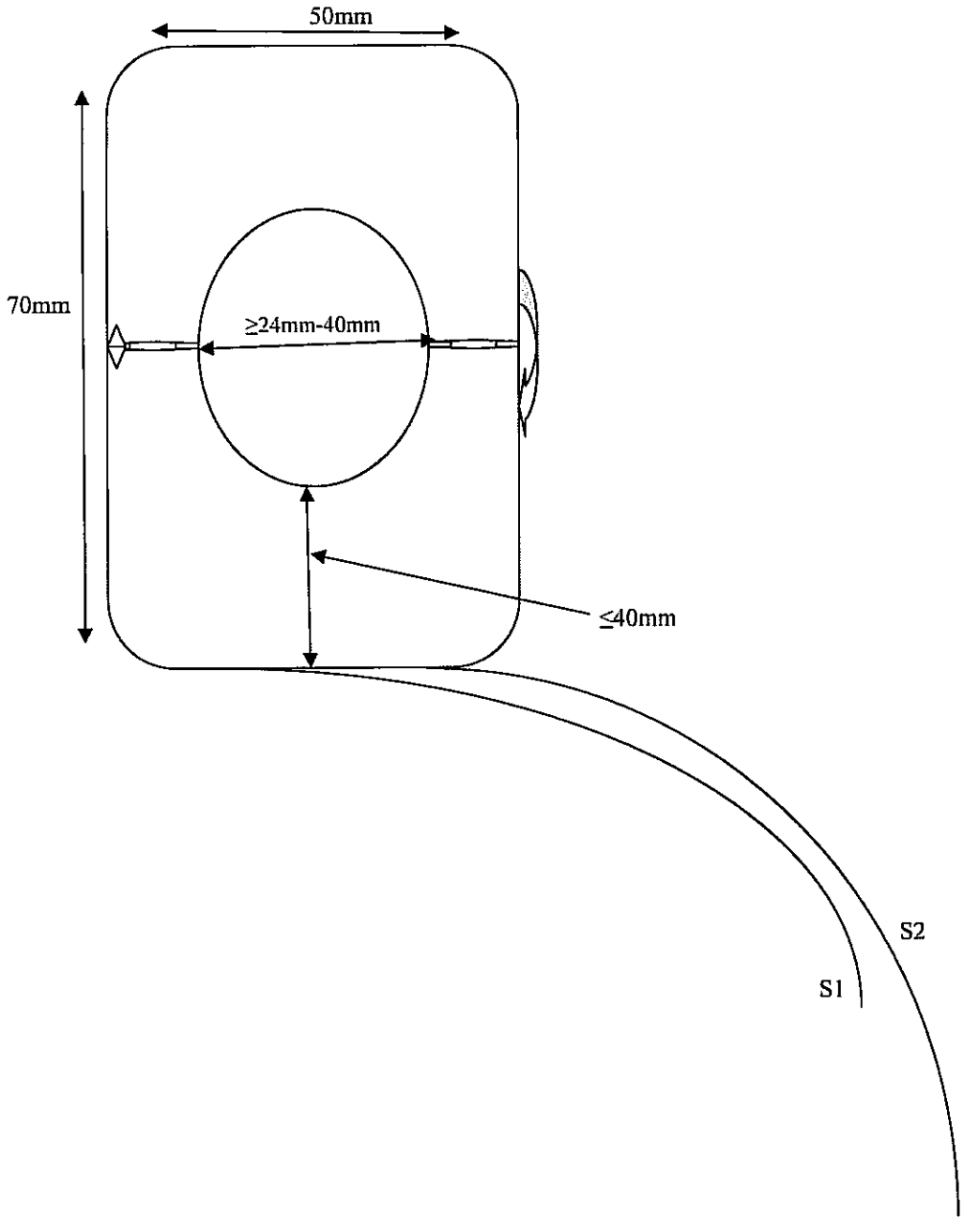
4.2.4 Current Transformer without primary winding and without primary insulation of its own Um = 0.72kV is assumed. For windings having U_m =0, 72 kV or 1, 2 kV. The rated insulation level is determined by the rated power- frequency withstands voltage, according to table 3 of the IEC 60044-1 Standard.		
4.2.5 Insulation requirements for secondary windings: The rated power frequency-withstand for secondary winding insulation shall not be less than 3kV(rms)		
4.3 RATINGS		
4.3.1 Standard rated primary currents shall be 10, 15, 20, 30, 50, 60, 75 Amperes and their decimal fractions		
4.3.2 Standard values of rated secondary current. The rated secondary current for these current transformers shall be 5 A. while the primary values shall be 100,200,300.500,1000		
4.3.3 The standard accuracy class: The accuracy class for these current transformers shall be class ≤3		
4.3.4 The Limits of current error and phase displacement for measuring current transformers class ≤3 of clause 11.2 and Table 11 of the Standard shall apply		
4.3.5 ***A calibration certificate from a national metrology institute shall be required with a sample of the current transformers to be provided.*** Where test and / or calibration certificates/ reports are issued by a laboratory other than the International / National Test Certification Authority, **a copy of accreditation certificate from the International / National Testing Certification Authority shall be attached together with the tender documents.**		
4.3.6 Rated continuous thermal current Unless otherwise specified, the rated continuous thermal current shall be the rated primary current.		
4.3.7 Rated continuous thermal current shall be the rated primary current. The value of rated output shall be ≥ 1 VA		
4.3.8 Short-time current ratings: Rated short-time thermal current (Ith) A rated short-time thermal current shall be assigned to the transformer and shall comply with the type test specified in clause 7.1 of The Standard		

4.3.9 Rated dynamic rating (I_{dyn}) The value of the rated dynamic current (I_{dyn}) shall normally be 2.5 times the rated short-time thermal current (I_{th}) and it shall be indicated on the rating plate when it is different from this value.		
4.3.10 Extended current rating Current Transformers of accuracy class ≤3 may be marked with extended current rating in compliance with the Standard. **Requirements of clause 4.2.3 to 4.3.4 shall form part of the type test approval to be issued by an international or the national (of country of manufacture) CT certifying body.**		

4.4 Marking Labeling & Packaging		
4.4.1 Terminal Markings shall identify:		
a) Primary and secondary windings		
b) Winding sections if any		
c) Relative Polarities of winding sections		
d) intermediate tappings if any		
4.4.1.1 Method of Marking		
4.4.1.2 Terminal shall be marked clearly and indelibly		
4.4.1.3 Markings shall consist of letters followed by numbers with letters in block capitals		
4.4.1.4 Markings shall be indicated as in table 10 of the IEC 600441-1 standard		
4.4.2 Rating plate markings shall carry at least the following markings:		
a) the manufacturer's name or other mark by which it may be readily identified.		
b) Serial number or type designation		
c) Rated primary & secondary current		
d) Rated frequency		
e) Rated output and corresponding accuracy class		
f) Highest voltage		
g) Rated insulation level		
h) The accuracy class and instrument security factor		
i) Extended current rating if applicable		
J THE PROPERTY OF K.P. CO. LTD All information shall be marked in an indelible manner on the current transformer itself or on a rating plate securely attached to the transformer. In addition, other information shall be marked whenever space is available as per IEC 60044-1 Standard		
4.4.3 Packaging shall be done to minimize damage and moisture entry. Packages shall be in groups with each group having consecutive serial numbers		
5 Test Methods		
5.1 Type tests shall be done so as to comply with the standard clauses 6.1 and 7 of IEC 60044-1 Standard.		

5.2 Routine tests shall be done so as to comply with clauses 6.2 and 8 of IEC 60044-1 Standard.		
6.0 Other requirements		
6.1 Guarantee Current transformers shall be guaranteed against any defects, which may develop due to faulty material calibration, transportation or workmanship for a twelve-month period from the date of delivery.		
6.2 Product information: The following information shall be supplied with the Tender. a)Drawing giving all relevant dimesions.		
b) Wiring Diagram		
c) Description leaflet of current transformers.		
6.3 The tenderer shall show proof, by means of appropriate current certificates, of compliance to ISO 9001(2000) and / or ISO 14001 series of Standards.		
6.4 A type test calibration certificate shall be provided together with the sample.		
6.5 A statement of compliance or non-compliance with the above specifications shall be required. In case of non-compliance the affected requirements shall be indicated		

8 APPENDIX I



9 APPENDIX 11

COVER TO FIT THE CURRENT TRANSFORMER