TABLE OF CONTENTS

0.1 Circulation List

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

0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Rev 0	2014-03-31	Issue No. 2, cancels and replaces issue no. 1.	Michael Apudo	Eng. Simon Kimitei
Rev. 1	2014-09-29	Introduced Danger-Live Apparatus Plate and Caution Notice Plate	Michael Apudo	Eng. Simon Kimitei
Rev. 2	2016-03-11	Changed the Danger Hatari Plate drawing, Fig 3, to one with clear dimensions. The Guaranteed Technical particulars Annex A was also changed. Updated Environmental Operating Conditions	Nancy Wairimu John Ng'ang'a Bernard Rotich	Dr. Eng. Peter 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 Safety Pole Signs and Accessories. It is intended for use by KPLC in procurement of the items.

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

1. SCOPE

1.1 This specification is for Safety Pole Signs and Accessories for use on overhead power lines, substations and switching rooms.

1.2 The specification covers the following items:

a) Protective Multiple Earthing Plate
b) Pole Number Plate
c) DANGER HATARI Plate for Power Poles
d) DANGER HATARI Plates for Substations
e) Substation Number Plate
f) Danger Voltage Plates
g) Danger Plate for Live Apparatus
h) Caution Notice Plates

1.3 The specification stipulates the minimum requirements for Safety Pole Signs and Accessories, for use in the company and it shall be the responsibility of the supplier 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 items for The Kenya Power & Lighting Company.

1.4 The specification does not purport to include all the necessary provisions of a contract.

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.

HSE L64:	The Health and Safety (Safety Signs and Signals) Guidance on Regulations 2009
ENA TS 43-90 Issue 5 -2008:	Anti Climbing Measures and Safety Signs for High Voltage Overhead Lines
ESQCR: 2009:	The Electricity Safety, Quality and Continuity Regulations 2009
ISO 1461:	Hot dip galvanized coatings on fabricated iron and steel articles -- Specifications and test methods
ASTM C538-83:	Standard test method for color retention of red, orange, and yellow porcelain enamels
BS 381C:	Specification for colours for identification, coding and special purposes.

3. TERMS AND DEFINITIONS

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

4. REQUIREMENTS

4.1. Environmental Operating Conditions for Signs

The safety pole signs and accessories shall be suitable for continuous use outdoors in the following tropical operating conditions:-

a) Altitude up to 2,200m above sea level;
b) Temperature: average of +30°C with a min of -1 °C and max +40°C;
c) Humidity: up to 95%;
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 level: 180 thunderstorm days per year;

4.2. Design and Construction

4.2.1. The products described within this specification shall comply with the latest versions of the relevant International Standards, and ENATS 43-90 Issue 5-2008.

4.2.2. All safety pole signs and plates shall be manufactured from suitable materials to provide colour fastness for a minimum period of 10 years in direct sunlight.

4.2.3. **Material and finish**

4.2.3.1. Protective Multiple Earth Plate, Pole Number Plate and Substation Number Plate shall be made of 1.5mm thick Aluminium, vitreous enameled in colours indicated. The back of the plates shall be enameled black at works.

4.2.3.2. The DANGER HATARI Plates and Voltage Plates, shall be made from mild steel sheet of at least 1.6 mm thick and vitreous enameled white, with letters, figures and the conventional skull and cross-bones in post office red colour (refer BS 381C) on the front side. The rear side of the plate shall also be enameled white.

4.2.3.3. Danger-Live Apparatus Notice Plates and Caution Notice Plates shall be made from mild steel sheet of at least 1.6 mm thick and vitreous enameled in the colours indicated in Fig. 6 & 7.

4.2.3.4. The mild steel sheet shall be protected against corrosion by hot dip galvanizing to ISO 1461 with a minimum coating thickness of 55 µm or average coating mass 390 g/m^3. The galvanization shall be carried out before enameling.

4.2.3.5. Colours for symbols shall be to the following numbers as per BS 381C:

a) RED: Colour No. 538, Post Office Red

b) YELLOW: Colour No. 355, Lemon

4.2.4. **Dimensions**

4.2.4.1. Protective Multiple Earth Plate and Pole Number Plate design drawings shall be equivalent to those in Fig. 1 and 2. Dimensions shall be as per the drawings attached (all dimensions in mm).

4.2.4.2. The substation number plate shall be similar to pole number plate in design but of adequate width to accommodate four figures e.g. 0012 as per Fig. 2. In Annex B.

4.2.4.3. DANGER HATARI Plate design drawings and dimensions shall be given as per Fig. 3 in Annex B.

4.2.4.4. The two sizes of Danger Voltage Plates recommended shall be as follows:

a) For display at 400 V installations - 200x150mm as per Fig. 5a in Annex B.
b) For display at 11 kV (or higher voltages) installations - 250x200mm as per Fig. 5b in Annex B.

The corners of the plate shall be rounded off.

4.2.4.5. The location of fixing holes as shown in Figs. 1 to 5 a & b are provisional and can be modified to suit the requirements of KPLC.

4.2.4.6. Danger – Live Apparatus and Caution Notice Plates dimensions of 200 x 150 mm as per Fig. 6 & 7 in Annex B with holes for securing the plates

4.2.5. Lettering

4.2.5.1. All letterings shall be centrally spaced. The dimensions of the letters, figures and their respective position shall be as shown in Figs. 1 to 5. The size of letters in the words in each language and spacing between them shall be so chosen that these are uniformly written in the space earmarked for them.

4.2.5.2. Pole number plates shall be supplied in single digits from 0 to 9 as per tender requirement whereas the series of numbers required for substation number plates shall be given with the order.

4.2.5.3. The lettering, signs and background of the various plates shall be as Table 1:

Table 1: Lettering backgrounds

Item	Signs and Letters	Background
DANGER HATARI Plate/ Danger Voltage Plates	RED	WHITE
Pole Number Plate	BLACK	WHITE
Substation Number Plate	BLACK	WHITE
Protective Multiple Earthing (PME) Plate	RED	YELLOW
Danger – Live Apparatus Plate	RED	WHITE
Caution Notice Plate	BLACK	YELLOW

4.2.6. Languages

4.2.6.1. All the safety signs shall be clearly written in English language and if required in "Kiswahili" language as shall be advised by the purchaser (KPLC) during tender.

4.2.6.2. Adequate space shall be provided in the specimen danger voltage plates for having the letterings in "Kiswahili" language for the equivalent of ' **Danger**',' **400**' '**11,000**' and '**Volts**'.

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 safety pole signs and accessories physical properties, tests and documentations, will fulfill the requirements stated in the contract documents, standards, specifications and regulations.

4.3.2. The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications shall be submitted with the tender for evaluation.

4.3.3. The bidder shall indicate the delivery time of the items, manufacturer's monthly and annual production capacity and experience in the production of the type and size of items being offered. A detailed list and contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the safety pole signs and accessories 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.

5. TESTS AND INSPECTION

5.1 The safety pole signs and accessories shall be inspected and tested in accordance with the requirements of this specification. It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified.

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. A copy of the accreditation certificate to ISO/IEC 17025 for the same third party testing laboratory used shall also be submitted with the tender document (all in English Language)

5.3 The safety pole signs and accessories shall be subject to acceptance tests at the suppliers' works before dispatch. Acceptance tests shall be witnessed by two Engineers appointed by Kenya Power and Lighting Company Limited (KPLC).

5.4 Routine and sample test reports for the safety pole signs and accessories to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods.

5.5 Tests to be witnessed by KPLC Engineers at the factory before shipment shall be in accordance with the International Standards and this specification and shall include the following:

a) Visual examinations;
b) Dimensional checks;
c) Test for weatherproof ness as per ASTM C538-83 (or its latest version)

5.6 On receipt of the goods, 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 safety pole signs and accessories, which upon examination, test or use; fail to meet any of the requirements in the specification.

6. MARKING ANG PACKING

6.1 Marking

In addition to markings required elsewhere in the specification, each item shall be marked with the following information:

a) Name of manufacturer
b) Type/Model reference number
c) Batch number
d) The letters '**Property of KPLC**'.

Note:
Maker's name and trade mark and the purchaser's name shall be marked in such a manner and position on the plates that it does not interfere with the other information.

6.2 Packing

The safety pole signs and accessories shall be packed in reinforced wooden crates suitable for rough handling and acceptable for rail/road transport.

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 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, 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 safety pole signs and accessories 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.
d) Detailed test program to be used during factory testing;
e) 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 safety pole signs and accessories for The Kenya Power & Lighting Company;
f) 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 safety pole signs and accessories to KPLC stores

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ANNEX A: Guaranteed Technical Particulars *(to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, four customer reference letters, details of manufacturing capacity, the manufacturer's experience and copies of test reports for tender evaluation, all in English Language)*

Tender No. .....

Clause number	KPLC requirement		Bidder's offer (indicate full details of the values offered)
	Manufacturer's Name and address		Specify
	Country of Manufacture		Specify
	Bidder's Name and address		Specify
1	**Scope**		Specify
	1.1-1.4		
2	Applicable Standards		Specify
3	Terms & Definitions		Specify
4	**Requirements**		Specify
4.1	Environmental conditions		Specify
4.2.1	Complies with the latest relevant standards		Specify
4.2.2	Minimum provided colour fastness		Specify
4.2.3.1	Protective Multiple Earth Plate, Pole Number plate and substation Number plate	Aluminium , vitreous enameled with indicated colours	Specify
		Thickness of the aluminium	Specify
		Back of plate enameled black at works	Specify
4.2.3.2	Danger Hatari plate and Voltage plates	Made from mild steel sheet	Specify
		Thickness of mild steel sheet	Specify
		Vitreous enameled white with letters, figures, skull and cross-bones in post office red colour	Specify
		Rear side vitreous enameled white	Specify
4.2.3.3	Danger Live apparatus Notice plates and Caution plates	Made from mild steel sheets	Specify
		Thickness of sheets	Specify
		Vitreous enameled in indicated colours	Specify
4.2.3.4	Mild steel sheets	Hot dip galvanized	Specify
		Thickness of coating	Specify
		Average coating mass	Specify

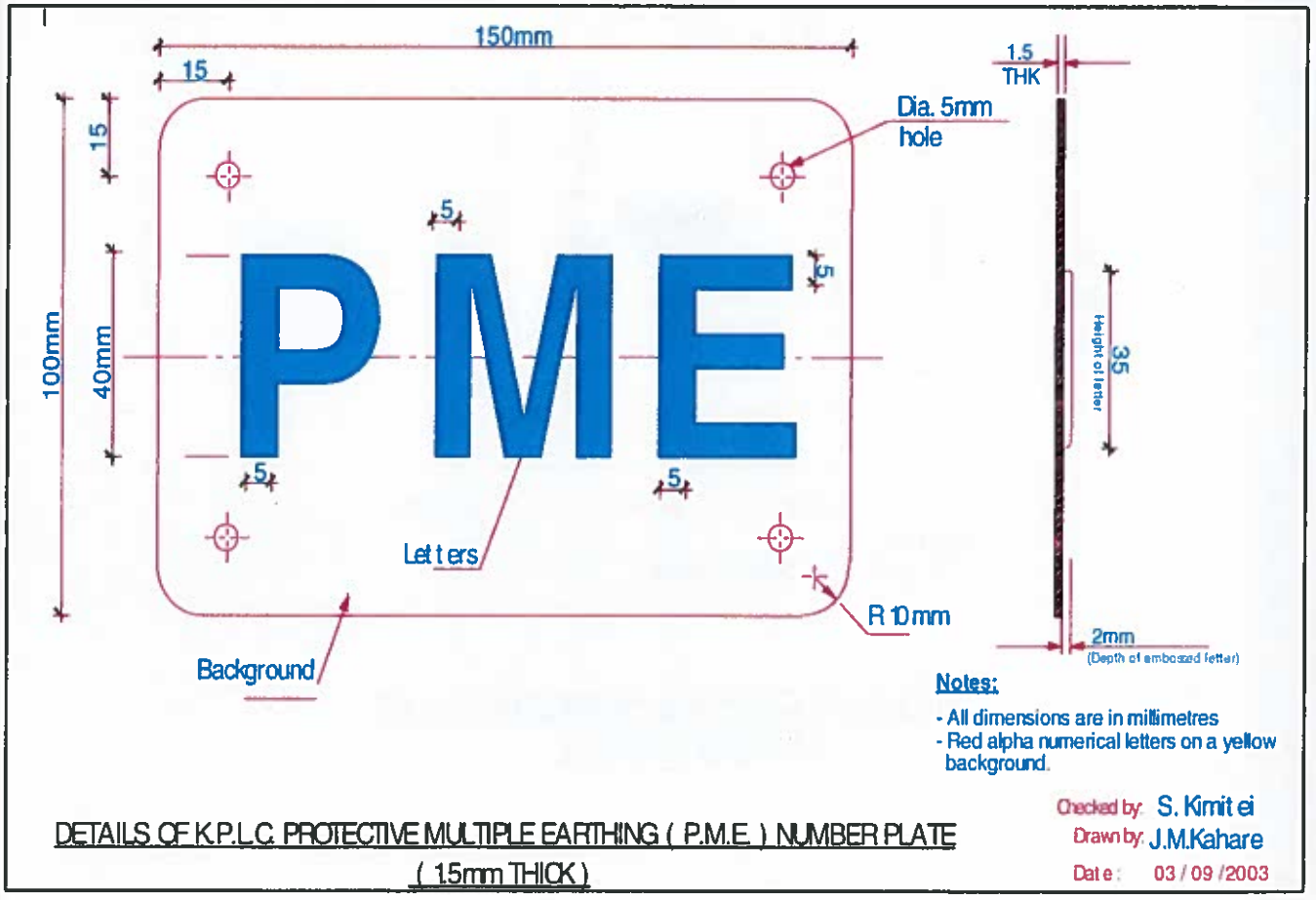
Clause number	KPLC requirement		Bidder's offer (indicate full details of the values offered)
		Galvanization done before enameling	Specify
4.2.3.5	Colours as per BS 381C	RED: Colour No. 538 Post Office red	Specify
		Yellow: Colour No. 355, Lemon	Specify
4.2.4.1	Protective Multiple Earth Plate and Pole Number plate design and dimensions		Provide drawings
4.2.4.2	Substation Number plate, accommodating four figures, design and dimensions		Provide drawings
4.2.4.3	Danger Hatari Plate design drawing and dimensions		Provide drawing
4.2.4.4	Danger Voltage plates	400V	Provide drawing
		11KV or higher	Provide drawing
4.2.4.5	Fixing holes provided on plates		Specify
4.2.4.6	Danger Live apparatus and caution Notice plates		Provide drawings
4.2.5.1	Letters centrally placed. Dimensions and positions as per Figs 1 to 5. Letters well-spaced		Specify
4.2.5.2	Pole Number plates supplied in single digits from 0 to 9. Series of numbers for substation number plates given with order		Specify
4.2.5.3	Danger Hatari Plate/ Danger Voltage Plates		For each specify background colour and colour of signs and letters
	Pole Number Plate		
	Substation Number plate		
	Protective Multiple Earthing (PME) plate		
	Danger – Live Apparatus plate		
	Caution Notice plate		
4.2.6	Safety signs in English or Kiswahili if required by KPLC		Specify
	Spacing done adequately		Specify
4.3	Quality Management System		Provide
	Quality Assurance Plan		Provide
	Copy of ISO 9001:2008 Certificate		Provide
	Manufacturer's experience		Provide
	Manufacturing Capacity (Units per month)		Provide
	List of previous customers		Provide
	Customer reference letters		Provide
5.1	Test standards and responsibility of carrying out tests		Provide
5.2	Copies of Type Test reports submitted with Tender		Provide
5.3	Acceptance tests to be witnessed by KPLC at factory for approval before shipment		Provide
5.4	Test reports to be submitted by supplier to KPLC for approval before shipment		Provide

Clause number	KPLC requirement	Bidder's offer (indicate full details of the values offered)
5.5	Tests comply with international standards	Specify
5.6	Replacement of rejected safety pole signs and accessories	Provide
6.1	Markings	Provide
6.2	Packing	Provide
7.1	Documents submitted with tender	Provide
7.2	Documents to be submitted by supplier to KPLC for approval before manufacture	Provide
7.3	Recommendations for use care storage and routine inspection	Provide
13.0	Statement of compliance to specification (indicate deviations if any & supporting documents)	Provide

.....

Manufacturer's Name, Signature, Stamp and Date

ANNEX B: Drawings



DETAILS OF K.P.L.C. PROTECTIVE MULTIPLE EARTHING (P.M.E.) NUMBER PLATE
(1.5mm THICK)

Fig. 1: PME Plate

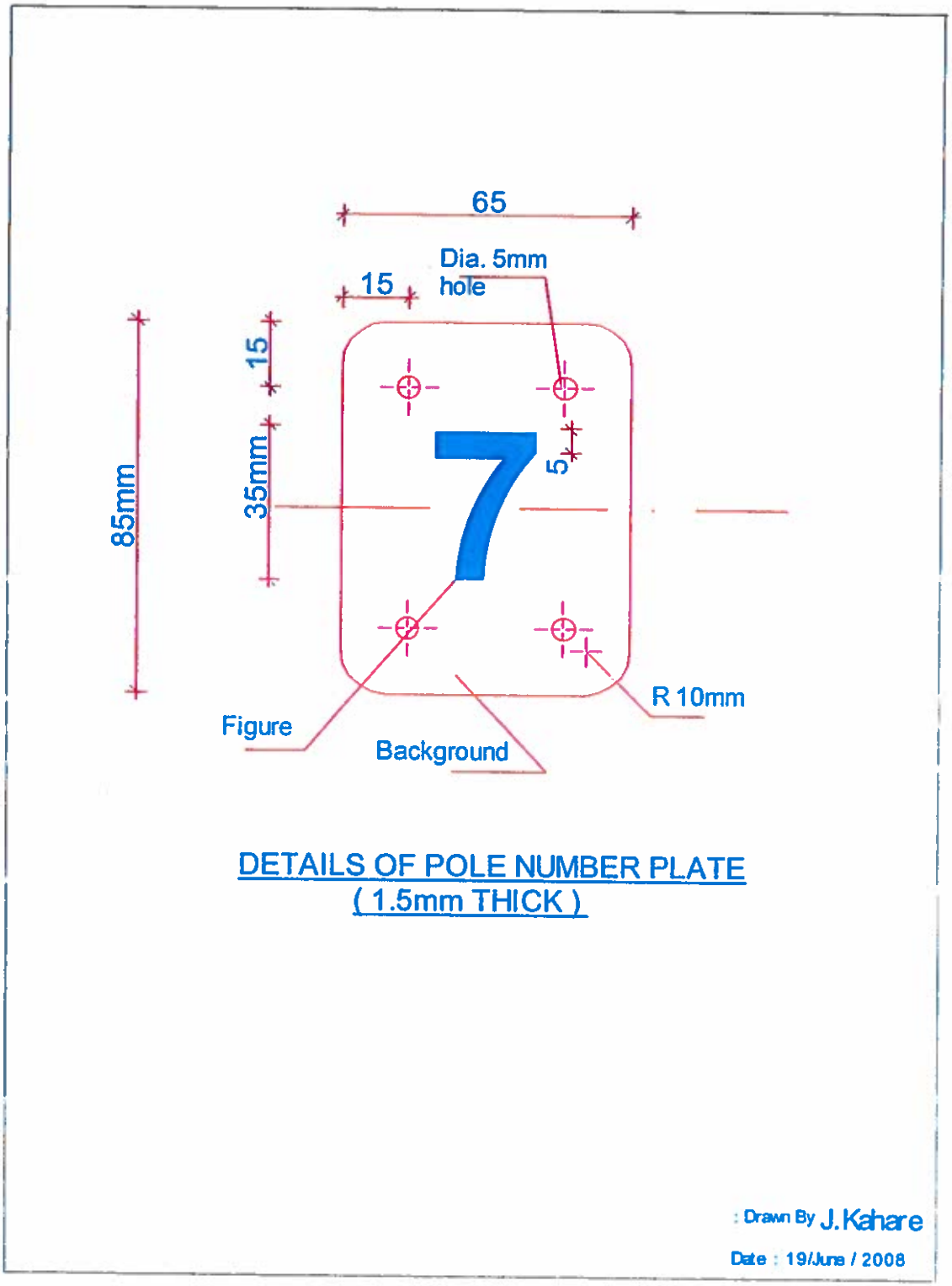


Fig. 2: Pole Number Plate

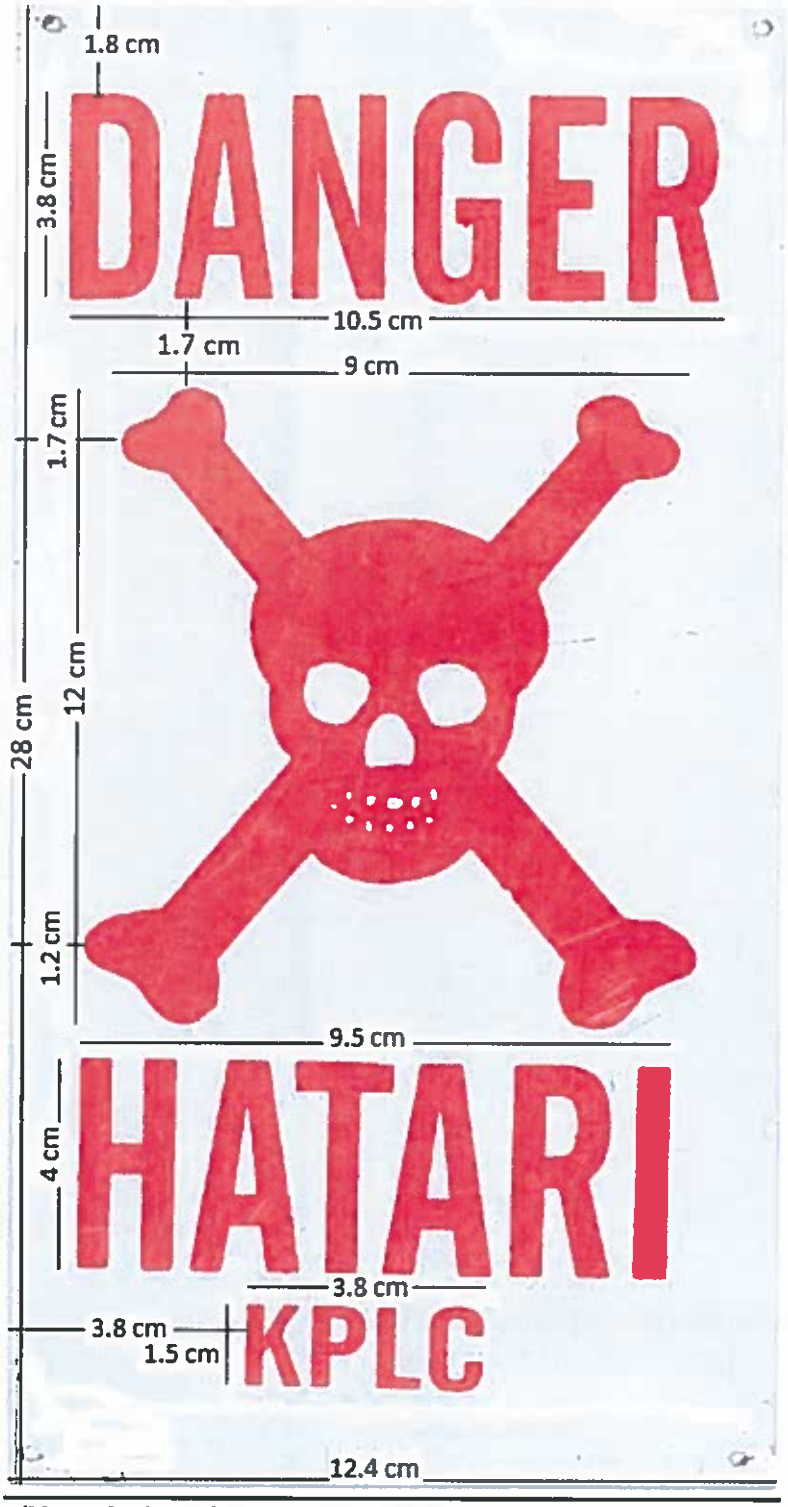


Fig. 3: Danger/Hatari plate for power lines

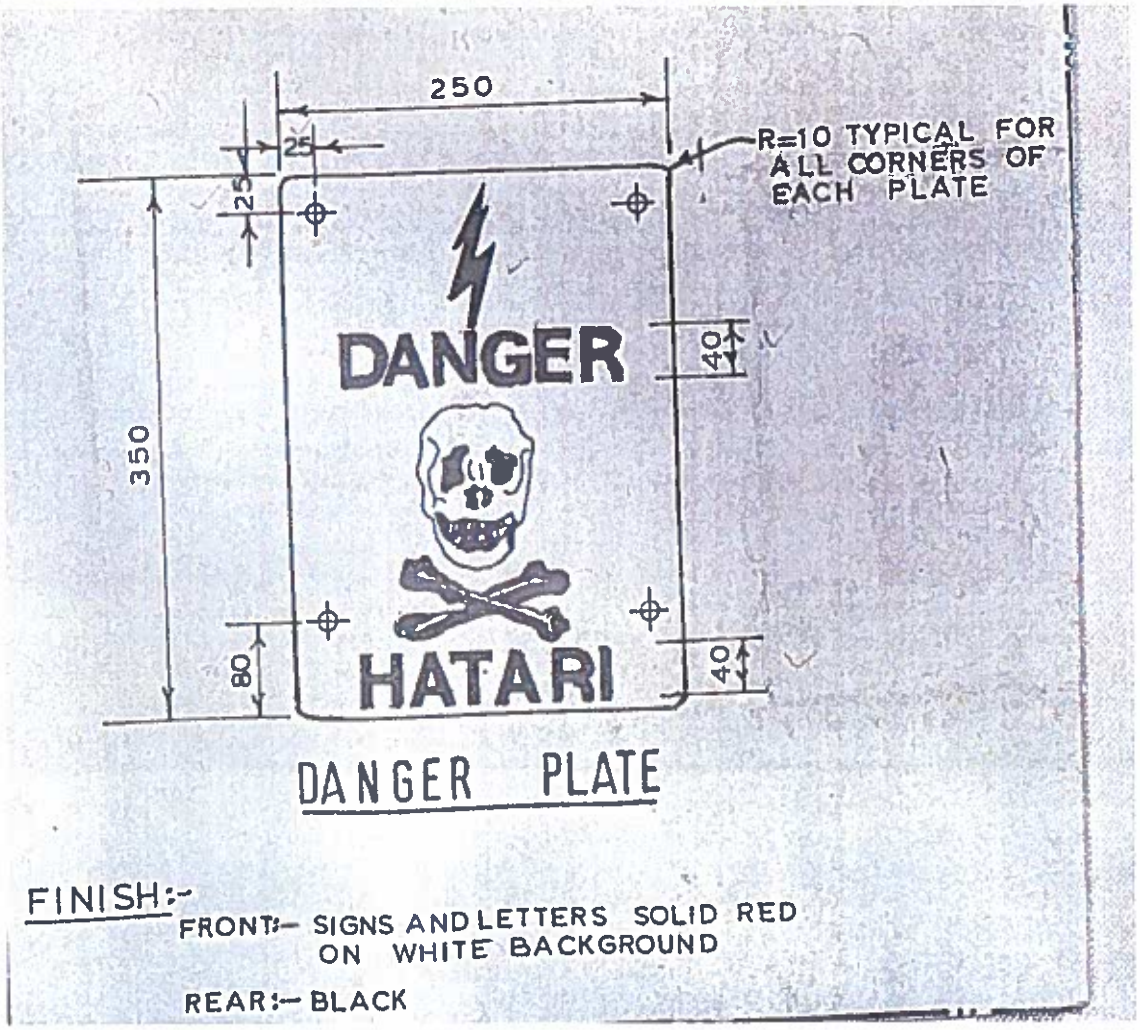


Fig. 4: Danger Hatari Plates for Substations – type 1

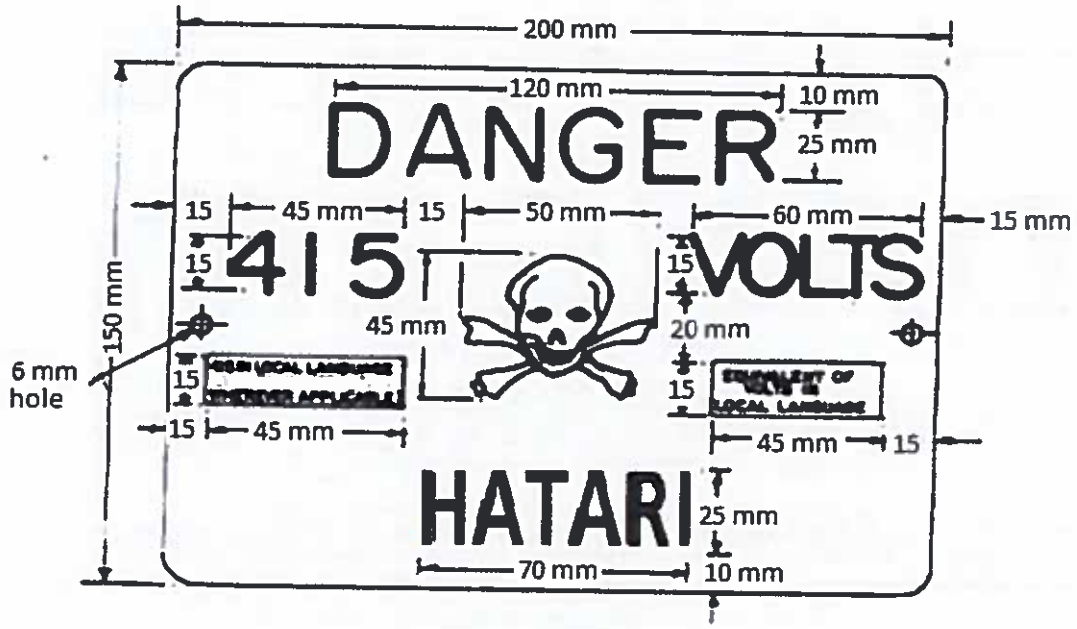


Fig. 5a: Voltage Plates for 415 Volts

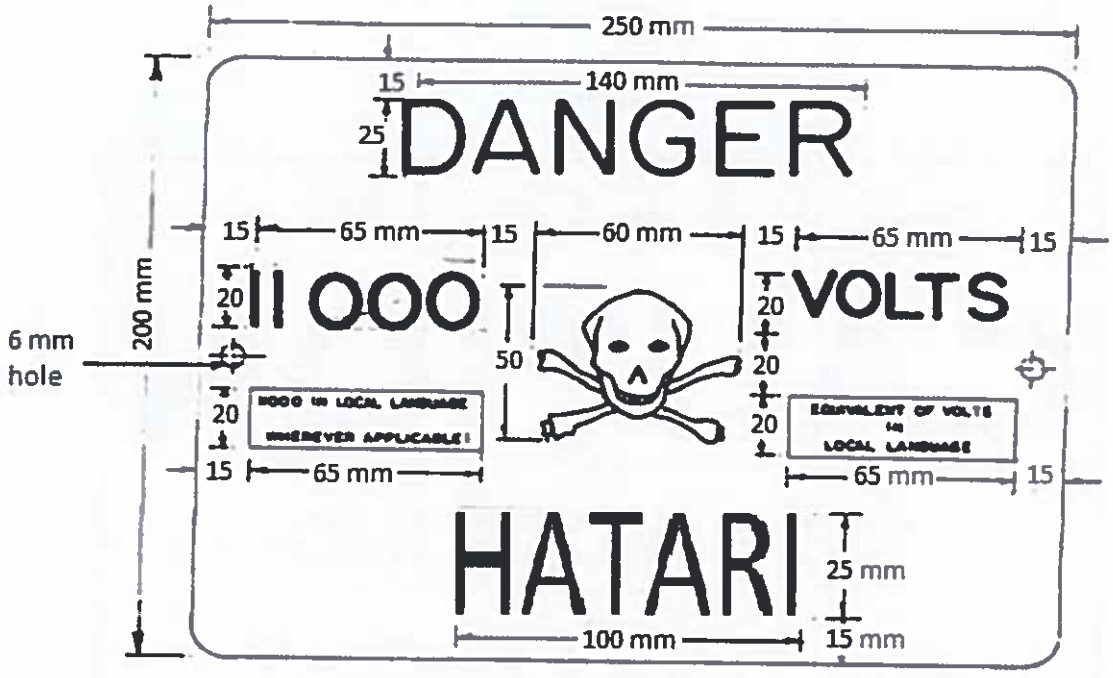


Fig. 5b: Voltage Plates for higher voltages

NOTE: The **415** shall be replaced with **400**; **11,000** shall be replaced by **33,000**, **66 000** etc. as required. All dimensions in mm

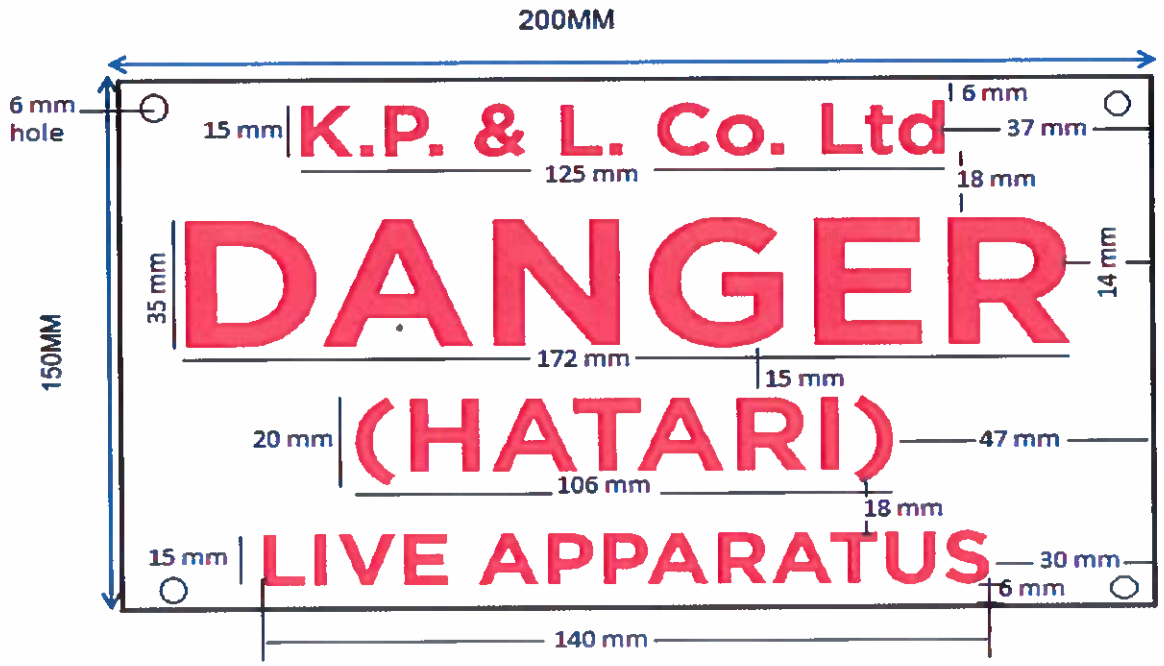


Fig. 6: Danger - Live Apparatus Notice Plate

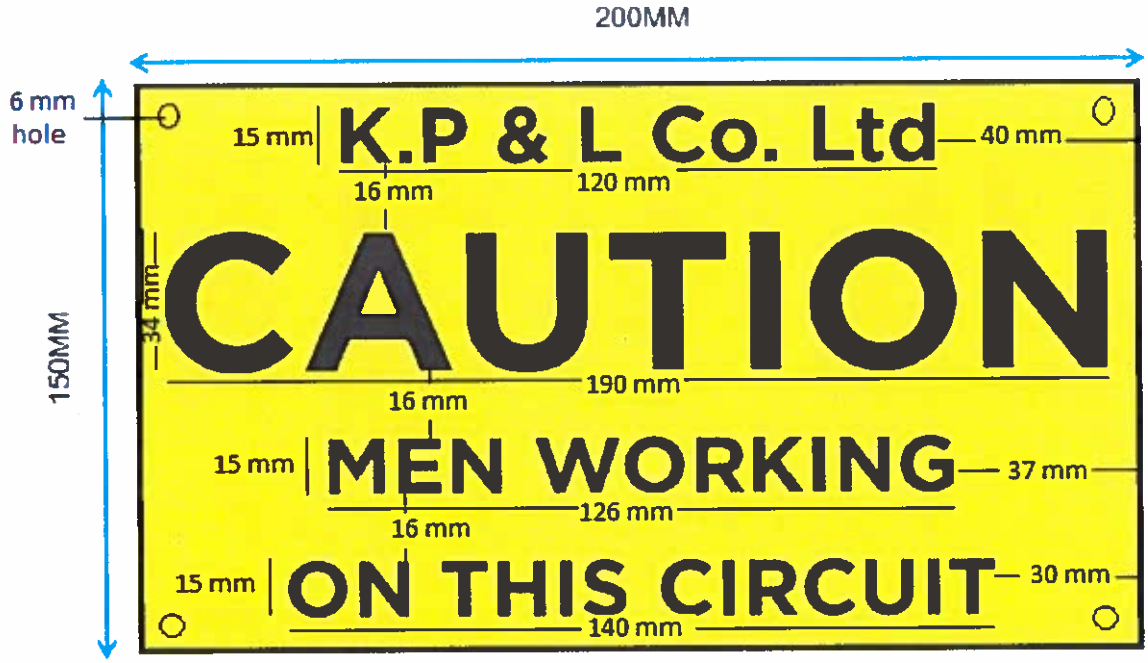


Fig. 7: Caution Notice Plate