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0.1 Circulation List

COPY NO.	COPY HOLDER
1	Head of Department, Standards
2	Supply Chain Manager (Procurement)
Electronic copy (pdf) on Kenya Power server (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)
0	2015-01-12	New Issue	Michael Apudo	Dr. Eng. Peter Kimemia

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Date: 2015-01-12

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Date: 2015-01-12

FOREWORD

This specification has been prepared by the Standards Department in collaboration with Network Management Division, both of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for crow-bars and pick-axes for use during construction of overhead power lines. It is intended for use by KPLC in purchasing the items.

1. SCOPE

- 1.1. This specification lays down the requirements regarding material, shape and dimensions and construction of crow-bars and pick-axes for use during construction of power lines by the Network Management Division teams.
- 1.2. The specification also covers inspection and tests of the crow-bars and pick-axes as well as schedule of Guaranteed Technical Particulars to be fully filled, signed by the manufacturer and submitted for tender evaluation.
- 1.3. The specification stipulates the minimum requirements for crow-bars and pick-axes acceptable 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 crow-bars and pick-axes for The Kenya Power & Lighting Company.

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:

ISO 6507: Metallic materials -- Vickers hardness test -- Part 1: Test method

ISO 8062: Castings -- System of dimensional tolerances and machining allowances

ISO 3834: Quality requirements for fusion welding of metallic materials

PD 970: Wrought steels for mechanical and allied engineering purposes —
Requirements for carbon, carbon manganese and alloy hot worked or cold finished steels

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DIN 7287: Steel axes and hatchets; technical specifications.

KS 06-295: Kenya Standard Specification for Axes and Hatchets

KS 74: Specification for crow-bars and claw-bars

3. TERMS AND DEFINITIONS

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

4. REQUIREMENTS

4.1. Service Conditions

The crow-bars and pick-axes shall be tropicalized, designed and constructed for continuous outdoor operation in tropical areas and harsh climatic conditions including areas exposed to:

- a) Sea spray (along the coast),
- b) Humidity of up to 95% and
- c) Average ambient temperature of +30°C; with a minimum of -1°C and a maximum of +40°C.

4.2. Design and Construction

4.2.1. Crow Bar

4.2.1.1. General

The crow bar design and manufacture shall conform to the requirements of KS 74: 2001 standard requirements and those of this specification. The crow bar shall be round type (ordinary) with chisel and claw ends.

4.2.1.2. Shapes, Dimensions and Tolerances

4.2.1.2.1. Shapes and Dimensions - The general shapes and dimensions of different types of crow-bars shall be as shown in Table 1 and Fig. 1.

4.2.1.2.2. Tolerances - The permissible tolerances on width across flats and diameters of bars shall be ± 1 mm as specified in ISO 8062:1994. The tolerances on length shall be +50 mm / -25mm.

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4.2.1.3. Mass

The mass of the bars shall be as given in Table1.

4.2.1.4. Material

Suitable quality steel meeting the requirements as laid down in clauses 4.2.1.5 and 4.2.1.6 shall be used. The steel shall be rolled / forged or heat treated 1½% Nickel Chrome Moly Steel grade 817M40 with heat treatment reference symbol W in accordance with PD 970:2005 or AISI 4340

4.2.1.5. Hardness

The bars shall be heat treated to obtain a minimum hardness value of 320 HV and tensile strength of between 1,075 to 1,225 MPa. The test point shall be anywhere on the working end or on the straight portion nearest to the working end.

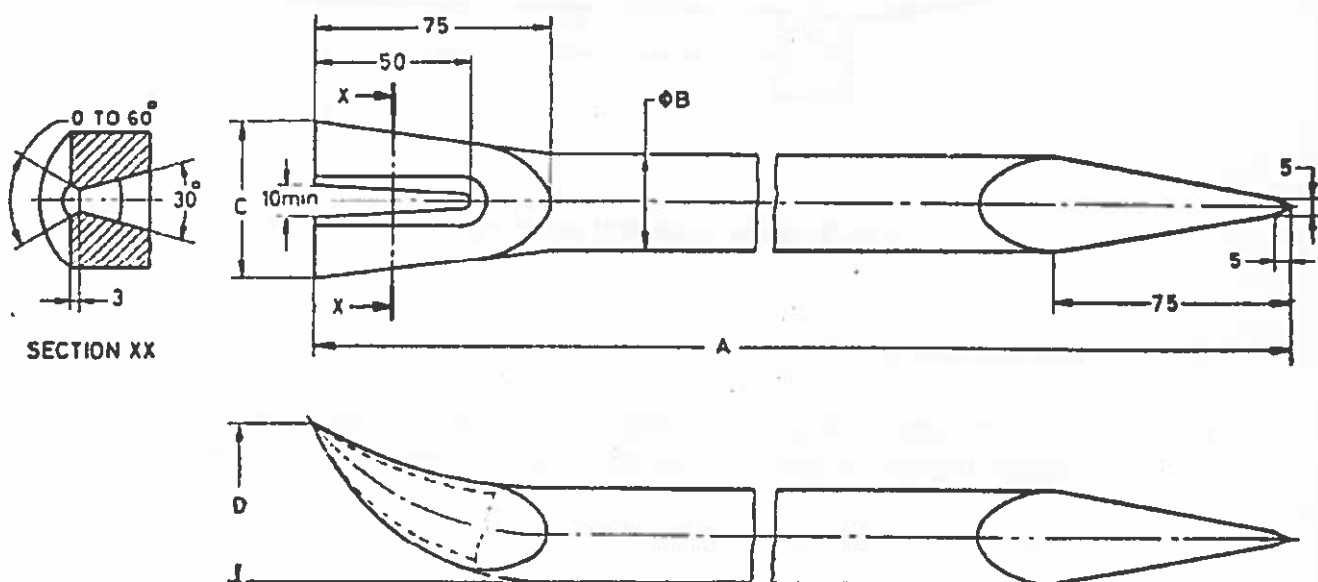


Fig. 1: Typical diagram of a Crow Bar.

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Table 1: Dimensions for fireman's crow-bars

Designation type	Nominal mass (approx.)	Length A	Diameter B	C	D	Static Load Test	
						Distance between grip and loading point, P*	Load W*
	Kg	mm	mm	mm	mm	mm	Kg
A	3.5	700	30	50	50	450	205
B	6.5	1,200	30	50	50	1,000	136
C	9.0	1,500	35	55	55	1,240	113
D	13.0	1,800	35	55	55	1,550	91

* See Fig. 2 below

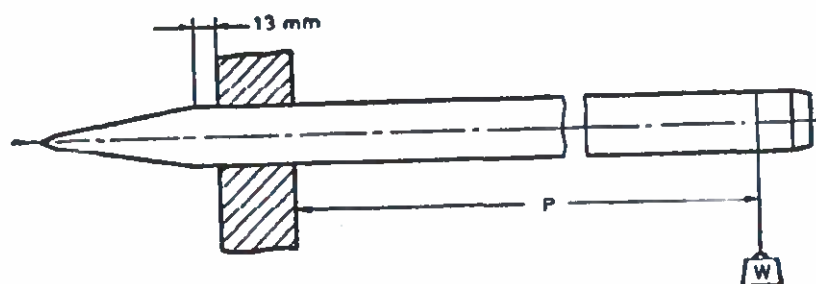


Fig. 2: Static load test arrangement

4.2.1.6. **Manufacture and Finish**

4.2.1.6.1. The bars shall be forged clean and in one piece from round bars. These shall be reasonably well shaped and free from flaws, seams or other defects.

4.2.1.6.2. Cutting ends of the bars shall be rounded off and finished ground.

4.2.1.7. **Preservative Treatment**

The crow bars shall be coated with a suitable anti-corrosive coating like varnish all over or dipping in double boiled linseed oil for protection before packaging.

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4.2.2. Pick Axe

4.2.2.1. General

4.2.2.1.1. The pick axe covered by this specification shall be manufactured in accordance with KS 06-295 and DIN 7287 standards

4.2.2.1.2. The axe shall be provided with rubber insulated steel handle tested dielectrically to 20 kV in one (1) minute and their use shall be limited to 1 kV to 2 kV with precautions. The fact that the handle is covered with the insulating material does not guarantee the user safe working against electric shock.

4.2.2.2. Material

4.2.2.2.1. Axe Head

Steel used in the forging of axe head shall comply with the following chemical requirements:

Constituent	Percent (%)
Carbon	0.75 to 0.85
Manganese	0.50 to 0.80
Phosphorus,	Max 0.050
Sulphur,	Max 0.050
Silicon,	Max 0.250

4.2.2.2.2. Axe Handle

Steel used for axe handle shall conform to any grade of steel with heat treatment reference symbol P in accordance with PD 970:2005.

4.2.2.2.3. Handle Insulation

The insulation used on the handle shall be of vulcanized rubber capable of withstanding an insulation test given in clause 4.2.2.1.2.

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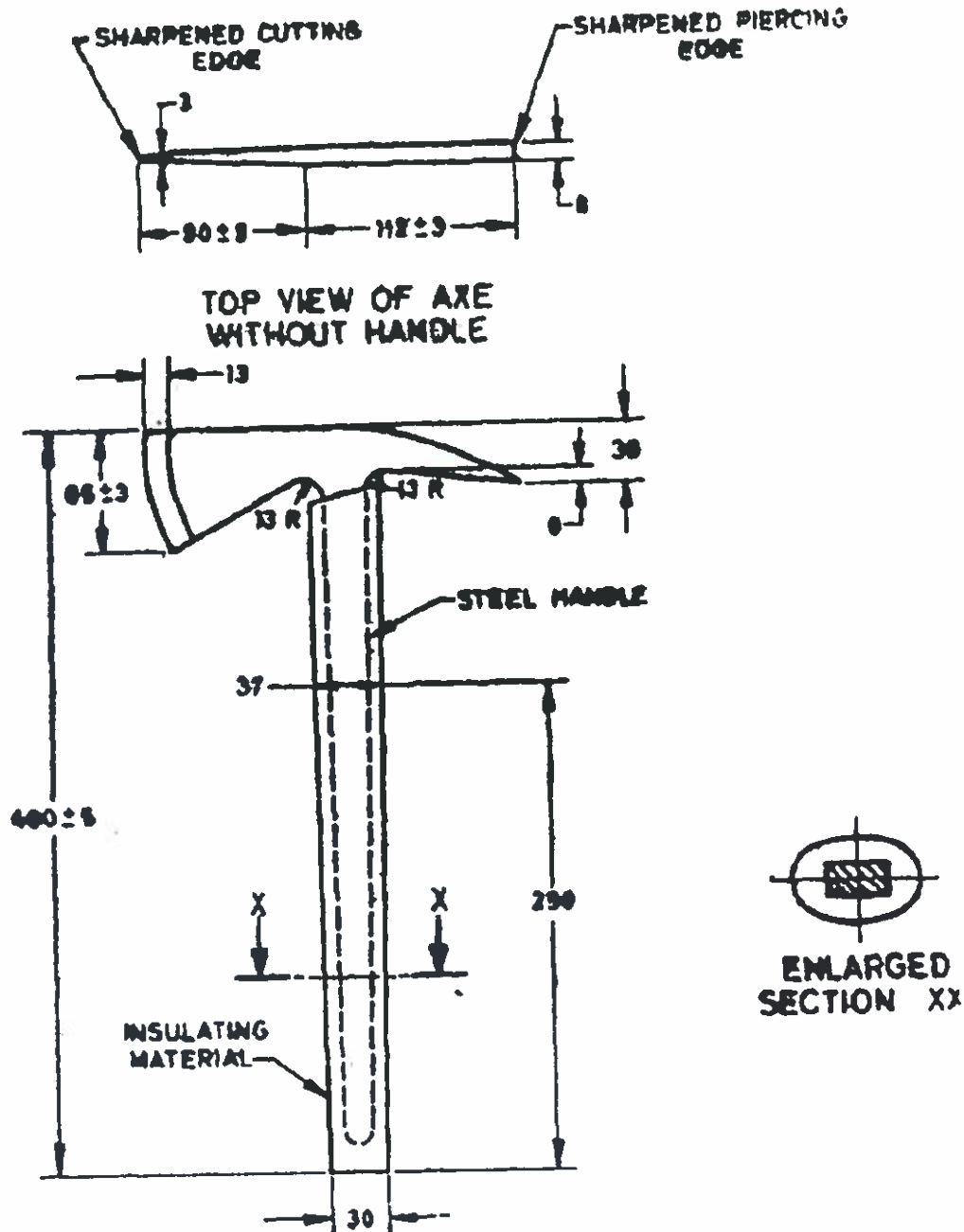


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NOTE - The insulating handle shall have chequered surface for providing a firm grip.
All dimensions in millimetres.

Fig. 3 - Pick Axe

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4.2.2.3. Shape, dimensions and construction

- 4.2.2.3.1. The shape and dimensions of a pick axe shall be as shown in Fig. 3. The axe head shall be soundly forged to shape as shown in Fig. 3 and the steel handle shall be welded to the head through fusion welding in accordance with ISO 3834:2005.
- 4.2.2.3.2. The pick and the blade shall be well and evenly hardened and tempered to a DPN of 500 to 575 HV which shall be measured within a distance of 3 mm from the cutting edge according to the method laid down in ISO 6507-1:1997.
- 4.2.2.3.3. Handle grip shall be of non-slippery type, that is, provided with a knurled surface.

4.2.2.4. Workmanship and finish

- 4.2.2.5. The forging shall be free from seams, cracks and surface defects. The edges shall be well-shaped as shown in Fig. 3 and finished smooth.
- 4.2.2.6. The metal surfaces of axe shall be bright finished.

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 design, material, workmanship, tests, service capability, maintenance and documentation of the crow bars and pick axes 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.
- 4.3.2. 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.

5.0. TESTS AND INSPECTION

- 5.1. The crow bars and pick axes shall be inspected and tested in accordance with the requirements of the standards listed in clause 2 and all the provisions of this specification. It shall be the responsibility of the supplier to perform or to have performed the tests specified and whatever other tests he normally performs at works.
- 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

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evaluation. 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 crow bar and pick axe shall be subject to acceptance tests at the manufacturer's works before dispatch. Acceptance tests shall be witnessed by two Engineers appointed by The Kenya Power and Lighting Company Limited (KPLC). Routine and Sample Test Reports for the crow bar and pick axe to be supplied shall be submitted to KPLC for approval before delivery of the goods.
- 5.4. On receipt of the crow bars and pick axes, KPLC will inspect them and will perform any of the tests specified in order to verify compliance with this specification. The supplier shall replace without charge to KPLC the crow bars and pick axes which upon examination, test or use; fail to meet any of the requirements in the specification.

6.0. MARKING AND PACKING

6.1. MARKINGS

Each crow bar and pick axe shall be clearly and legibly stamped or embossed with the following information in English Language:

6.1.1. Crow Bar

- The manufacturer's name
- Initials or recognised trade-mark.
- Year of manufacture.
- Certification Mark of the standards body from the country of manufacture.
- The words "PROPERTY OF KPLC"

6.1.2. Pick Axe

- Manufacturer's name or trade-mark;
- Tested to 20 000 volts; and
- Year of manufacture.
- The axes shall also be marked with the Certification Mark of the standards body from the country of manufacture.
- Words "PROPERTY OF KPLC"

6.2. PACKAGING

- 6.2.1. The crow bars and pick axes shall be securely packed in suitable packing wooden boxes of size convenient for handling in transit, or bundled and secured suitably with the wire bands.

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6.2.2. Each type and size of the crow bar and pick axes shall be kept separate and packed. No package shall contain more than one variety.

6.2.3. The following information shall be printed on a suitable label firmly attached to each packaging:

- a) Purchase order number/tender
- b) Manufacturer's name
- c) Year of manufacture
- d) Crow bars and the axes catalog or designation number
- e) The words, "PROPERTY OF KENYA POWER & LIGHTING CO.

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 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.

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 the crow bar and pick axe 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 9001:2008
- d) Detailed test program to be used during factory testing;
- e) Marking details and method to be used in marking the crow bar and pick axe;
- f) Manufacturer's undertaking to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as

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Kenya Power

TITLE:

**SPECIFICATION FOR
CROW BAR AND PICK AXE**

Doc. No.

KP1/3CB/TSP/09/071

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ensuring good workmanship in the manufacture of the crow bar and pick axe for The Kenya Power & Lighting Company;

g) 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 crow bar and pick axe 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 complete type test reports for tender evaluation, all in English Language)

Tender No.

Clause number	KPLC requirements	Bidder's offer (indicate full details of the offered crow bar and pick axe for each requirement of the specification)
1. Scope		Specify
1.1		Specify
1.2		Specify
1.3		Specify
2. Applicable Standards		Specify
3. Terms & Definitions		Specify
4. Requirements		
4.1 Service Conditions		Specify
4.2 Design and Construction		
4.2.1 Crow Bar		
Manufacturer's Name and address		Specify
Country of Manufacture		Specify
Bidder's Name and address		Specify
Standard of manufacture	KS 74: 2001	Specify
Type designation	Round type with chisel and claws	Specify
Shapes and dimensions	As per Fig. 1 and Table one.	Prove conformance by proving a well labeled drawing
Tolerances	+50mm/-25mm as per ISO 8062	Specify
Mass	As per table one	specify
Material	Rolled/forged or heat treated 1½% Nickel Chrome Moly Steel grade 817M40 with heat treatment reference symbol W in accordance with PD 970:2005 or AISI 4340	Provide test report
Hardness	320 HV	Provide test report
Tensile strength	1,075 to 1,225 MPa	
Manufacture and finish	Forged clean with rounded off cutting edges	Specify
Preservative treatment	Ant-corrosive coating like varnish	Specify

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Clause number		KPLC requirements	Bidder's offer (indicate full details of the offered crow bar and pick axe for each requirement of the specification)
		or linseed oil.	
4.2.2 Pick Axe			
Manufacturer's Name and address			
Country of Manufacture			
Bidder's Name and address			
Standard of manufacture		KS 06-295 and DIN 7287	
Type designation		Fireman's axe	State
Design		Forged head with rubber insulated steel handle dielectrically tested to 20 kV.	Provide test report
Material			
Axle head	Carbon	0.75 – 0.85 %	Provide a test report
	Manganese	0.50 – 0.80 %	
	Phosphorous	0.050 % max	
	Sulphur	0.050 % max	
	Silicon	0.250 % max	
Axle handle		Any grade of steel with heat treatment reference symbol P in accordance with PD 970:2005	
Shape and dimensions		As per Fig. 2	Provide drawing
Construction		Pick and blade evenly hardened to 500 to 575 HV and non-slippery type handle grip	Specify
Workmanship		Free from seams, cracks and surface defects and bright finished method.	
4.5	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 before shipment		provide
5.4	Test reports to be submitted by supplier to KPLC for approval before shipment		provide
5.5	Replacement of rejected crow bars and pick axes		specify

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Clause number	KPLC requirements	Bidder's offer (indicate full details of the offered crow bar and pick axe for each requirement of the specification)
6.1	Marking	specify
6.2	Packing	specify
7.1	Documents submitted with tender	provide
7.2	Documents to be submitted by supplier to KPLC for approval before manufacture	provide
	Statement of compliance to specification	provide

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

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