



CD/K/024-3:2008  
ICS 43.040.60

## **EAST AFRICAN STANDARD**

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**Retro-reflective registration plates for motor vehicles —  
Specification — Part 3: Blanks (plastic)**

**EAST AFRICAN COMMUNITY**

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## Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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**Contents**

1 Scope ..... 1

2 Normative references ..... 1

3 Definitions..... 1

4 Requirements ..... 1

5 Inspection and methods of test ..... 2

6 Packing and marking ..... 4

Annex A (informative) Quality verification of plastics blanks for retro-reflective registration plates ..... 5

Annex B (informative) Bibliography ..... 6

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# Retro-reflective registration plates for motor vehicles — Specification — Part 3: Blanks (plastic)

## 1 Scope

This part of CD/K/024 specifies requirements for plastics blanks intended for use in the production of the registration plates that are covered by CD/K/024-4:2008.

## 2 Normative references

The following referenced documents are indispensable for the application of this East African Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CD/K/024-1, *Retro-reflective registration plates for motor vehicles — Part 1: Blanks (metal)*

CD/K/024-4:2008, *Retro-reflective registration plates for motor vehicles — Part 4: Registration plates (plastics)*

ISO 2813, *Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20 degrees, 60 degrees and 85 degrees*

## 3 Definitions

For the purposes of this part of CD/K/024, the definitions given in CD/K/024-1 (other than the definition of "blank") and the following definition apply:

### **blank**

a flat plastics plate

## 4 Requirements

### 4.1 Forming

Each blank shall be formed by an injection moulding process.

### 4.2 Material

The material shall be such that the blank is UV stable, transparent, and has a surface specular gloss of at least 80 at 60° when measured in accordance with ISO 2813.

### 4.3 Shape and dimensions

The shape and overall dimensions of a blank shall comply with the requirements given in 4.4 of CD/K/024-1. The thickness of the blank shall be not less than 3 mm and not more than 4 mm. The edges of one face of each blank shall be rounded or bevelled at approximately 45°, over at least half the thickness of the blank (see Figure 1).

### 4.4 Workmanship

A blank shall be free from bubbles, creases, crevices and sharp or jagged edges, and shall be of such flatness that when the face of the blank is laid on a truly flat surface, no part of the face is more than 3 mm from the surface.

## 4.5 Performance

### 4.5.1 Resistance to weathering

When tested in accordance with 5.4, the blank shall show no sign of cracking, dulling or change of colour.

### 4.5.2 Resistance to impact

When tested in accordance with 5.5, the blank shall not crack.

### 4.5.3 Softening point

When a blank is tested in accordance with 5.6, the softening point shall be at least 80 °C in the case of a methyl methacrylate material and at least 140 °C in the case of polycarbonate.

### 4.5.4 Resistance to bending

When a blank is tested in accordance with 5.7, there shall, after each bending operation, be no sign of cracking.

## 5 Inspection and methods of test



### 5.1 Inspection

Visually examine and then measure each blank in the sample for compliance with all the relevant requirements of this part of CD/K/024 for which tests to assess compliance are not given in 5.4 to 5.6 (inclusive).

### 5.2 Test specimens

NOTE The test specimens given in (a) to (c) below may be prepared from a single blank.

From sample blanks, cut the following test specimens:

- a) **resistance to weathering:** one test specimen of length at least 150mm, of width at least 70 mm and that has not more than one cut edge;
- b) **resistance to impact:** one test specimen of length at least 300 mm and of width between 110 mm and 120 mm; and
- c) **softening point:** three test specimens, each of size approximately 10mm square and of thickness not less than 2.5 mm and not more than 3 mm. (The specified thickness may be obtained by machining the material on one side only.)
- d) **resistance to bending:** one test specimen of length at least 250 mm and of width between 100 mm and 120 mm.

### 5.3 Conditioning of specimens

Prior to testing, condition all specimens (except specimens for the resistance to weathering test) for a period of at least 16 h at a temperature of 23 °C ± 2 °C and a relative humidity of (50 ± 5)%.

### 5.4 Resistance to weathering

Use the method given in 5.3 of CD/K/024-1.

Check for compliance with 4.5.1.

## 5.5 Resistance to impact

Use the method given in 5.4 of CD/K/024-1, but ensure that the point of impact is on the centre of the specimen (see 5.2(b)).

## 5.6 Softening point

### 5.6.1 Apparatus

**5.6.1.1 Vicat softening point temperature apparatus**, that has the following components (see Figure 2):

- a) **Rod:** A rod made of an alloy that has a low thermal conductivity (to reduce its thermal expansion over the range of temperatures used in the test) and that has a carrying plate. The rod is so held in a rigid metal frame that it can freely move vertically.
- b) **Indenting tip:** An indenting tip, made of hardened steel, in the form of a cylinder of length approximately 3 mm, of cross-sectional area  $1.00 \text{ mm}^2 \pm 0.15 \text{ mm}^2$  and fixed to the bottom of the rod. The lower surface of the tip is plane, perpendicular to the axis of the rod and free from burrs.
- c) **Gauge:** A micrometer dial gauge (or other equivalent measuring instrument), graduated in divisions of 0.01 mm.
- d) **Masspieces:** Where necessary, enough masspieces such that, when they are placed on the carrying plate, the combined mass of the rod, indenting tip, carrying plate and masspieces exerts a force of  $50 \text{ N} \pm 0.5 \text{ N}$  on the test specimen. (The combined mass will be approximately 5 kg.)

**5.6.1.2 Bath**, that contains a suitable heating liquid into which the apparatus (see Figure 2) is placed, and of such size that the top of a test specimen mounted in the apparatus is at least 35 mm below the surface of the liquid. The bath is fitted with a stirrer and a heating control of such design as to allow the temperature of the liquid to be raised uniformly at a rate of  $50 \text{ }^\circ\text{C/h} \pm 5 \text{ }^\circ\text{C/h}$ .

**5.6.1.3 Thermometer**, suitable for measuring the temperature of the liquid in the bath to within  $0.5 \text{ }^\circ\text{C}$ .

### 5.6.2 Procedure

**5.6.2.1** Place the test specimen (see 5.2(c)) (horizontally) under and in contact with the indenting tip, ensuring that the distance of the indenting tip from the edges of the test specimen is at no point less than 3 mm. Ensure that the surface of the test specimen that is in contact with the base of the apparatus, is flat. Immerse the assembly (see Figure 2) in the bath and maintain the temperature of the liquid at at least  $50 \text{ }^\circ\text{C}$  below the expected softening point of the test specimen. Ensure that the bulb of the thermometer is at the same level as, and as close as possible to, the test specimen.

**5.6.2.2** After approximately 5 min, set the micrometer dial gauge to zero and ensure, by adding masspieces to the carrying plate if necessary, that the force applied to the test specimen is  $50 \text{ N} \pm 0.5 \text{ N}$ . Increase the temperature of the bath at a uniform rate of  $50 \text{ }^\circ\text{C/h} \pm 5 \text{ }^\circ\text{C/h}$  and ensure that the liquid is stirred continuously. When the indenting tip has penetrated the surface of the test specimen to a depth of  $1.0 \text{ mm} \pm 0.1 \text{ mm}$ , record the temperature of the bath.

**5.6.2.3** Repeat the above procedure on the other two test specimens and determine the softening point of the material by calculating the arithmetic mean of the temperatures recorded for the three test specimens. Check for compliance with 4.5.3.

**5.6.2.4** If the results of the individual tests differ by more than  $2 \text{ }^\circ\text{C}$ , discard the results and repeat the test on further sets of three test specimens until the results obtained for the three test specimens do not differ from one another by more than  $2 \text{ }^\circ\text{C}$ .

## 5.7 Resistance to bending

Use the method given in 5.7 of CD/K/024-1, but place the rear surface of the test specimen (see 5.2(d)) against a mandrel of diameter  $75 \text{ mm} \pm 1 \text{ mm}$ . Check for compliance with the requirements of 4.5.4.

## 6 Packing and marking

### 6.1 Packing

The blanks shall be so packed as to ensure that they are not damaged during normal handling, transportation and storage.

### 6.2 Marking

Each blank shall bear, on the front face and forming part of the moulding, the manufacturer's name or trade name or trade mark, in legible and indelible marking. The marking shall be located adjacent to the top right-hand corner of the blank and shall occupy a space of height approximately 5 mm and of length approximately 25 mm.

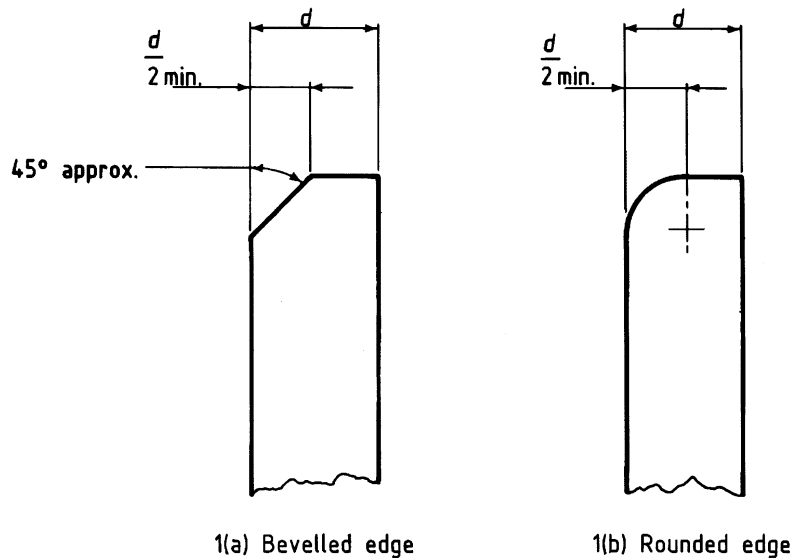


Figure 1 — Examples of shaped edge

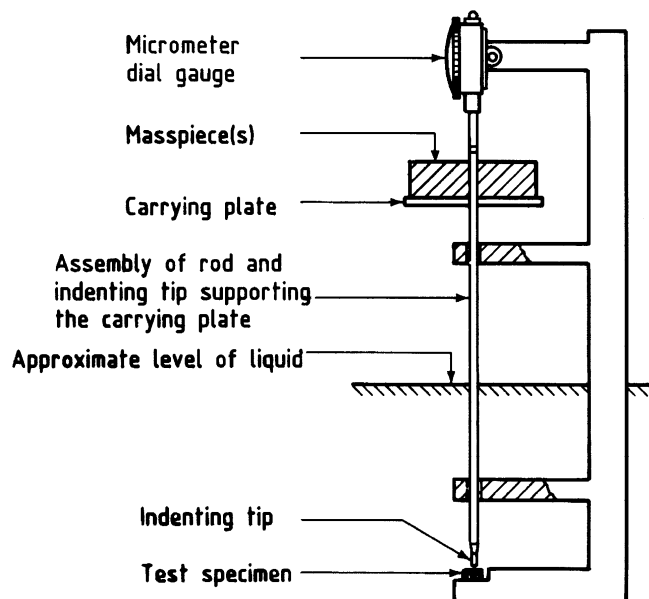


Figure 2 — Schematic arrangement of Vicat softening point apparatus

**Annex A**  
(informative)

**Quality verification of plastics blanks for retro-reflective registration plates**

When a purchaser requires ongoing verification of the quality of plastics blanks for retro-reflective registration plates, it is suggested that, instead of concentrating solely on evaluation of the final product, he also direct his attention to the manufacturer's quality system. In this connection it should be noted that ISO 9001 covers the provision of an integrated quality system.

*Draft for comments only — Not to be cited as East African Standard*

**Annex B**  
(informative)

**Bibliography**

SABS ISO 9001, *Quality management systems — Requirements*

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