



CD/K/024-1:2008
ICS 43.040.60

EAST AFRICAN STANDARD

**Retro-reflective registration plates for motor vehicles —
Specification — Part 1: Blanks (metal)**

EAST AFRICAN COMMUNITY

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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Retro-reflective registration plates for motor vehicles — Specification — Part 1: Blanks (metal)

1 Scope

1.1 This part of CD/K/024 specifies requirements for two types of blanks intended for use in the production of the embossed registration plates that are covered by CD/K/024-2:2008.

1.2 Except under the certification mark scheme, special agreement between the manufacturer and the purchaser is required for assessment of compliance with the requirements of CD/K/024 of those blanks on which the retro-reflective material is applied during the process of embossing the registration number.

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.

CIE Publication 15 (E.1.3.1), *Colorimetry*

CIE Publication 54, *Retro-reflection — Definitions and measurement*

CD/K/024-2:2008, *Retro-reflective registration plates for motor vehicles — Part 2: Registration plates (metal)*

3 Definitions

For the purposes of this part of CD/K/024, the following definitions apply:

3.1

blank

A flat metal plate that has, on one side, an embossed border and at least the area within this border covered with retro-reflective material, the material being supplied as a loose sheet if it is intended to be subsequently applied as part of the embossing process of the registration number.

3.2

category L motor vehicles

A motor vehicle that has fewer than four wheels.

3.3

embossing

A process by which a raised border is embossed onto a plate (to form a blank) or by which characters are so embossed onto a blank that they stand out in relief on the retro-reflective surface of a registration plate.

3.4

illuminants A and D65

Illuminants A and D65 as defined by the International Commission on Illumination (CIE) in Publication 15 (E.1.3.1).

3.5

luminance factor (at a point on the surface of a non-self-radiating body, in a given direction, and under specific conditions of illumination)

The ratio of the luminance of the material to that of a perfect reflecting diffuser identically illuminated.

3.6

registration mark; registration number

A combination of letters and numerals as prescribed by the Traffic Act.

3.7

registration plate; plate

A plate that displays the registration mark of a motor vehicle or trailer (see Figures 1 and 4 of CD/K/024-2:2008).

3.8

retro-reflection

Reflection in which light is reflected in directions close to the direction of incidence, irrespective of the angle of incidence at the reflecting surface.

4 Requirements



4.1 Type

A blank shall be of one of the following types:

- a) **Type A:** a blank
 - 1) the front face of which, other than the embossed border, is covered with retro-reflective material (this material may be supplied as a loose sheet if it is intended to be subsequently applied as part of the embossing process of the registration number),
 - 2) that has a substrate of a polymer film below the retro-reflective material, and
 - 3) that is intended for use in an embossing process that obviates the need for painting the raised surfaces of the characters; and
- b) **Type B:** a blank the front face of which is completely covered with retro-reflective material, and that is intended for use in an embossing process in which the raised surfaces of the characters and the embossed border are coated.

4.2 Materials

4.2.1 Metal

The metal base of a blank shall be one of the following materials and shall be suitable for the embossing process:

- a) aluminium sheet of thickness at least 0.9 mm; or
- b) mild steel of thickness at least 0.5 mm.

4.2.2 Retro-reflective material

4.2.2.1 Colour and luminance factor

4.2.2.1.1 When determined in accordance with 5.8, the colour of the retro-reflective material shall be yellow or white and the chromaticity co-ordinates shall be within the area on a chromaticity diagram defined by the points of the appropriate values given in Table 1.

4.2.2.1.2 When determined in accordance with 5.8, the luminance factor of the material shall be at least the appropriate value given in Table 1.

Table 1 — Chromaticity co-ordinates and luminance factors

1	2	3	4	5	6	7
Colour	Co-ordinate	Value of co-ordinate				Luminance factor min.
		1	2	3	4	
Yellow	X	0.545	0.487	0.427	0.465	0.27
	y	0.454	0.423	0.483	0.534	
White	X	0.355	0.305	0.285	0.335	0.35
	y	0.355	0.305	0.325	0.375	

NOTE For legislation regarding the colour of registration plates, see the Road Traffic Act, 1989 (Act 29 of 1989), and Regulation

4.2.2.2 Coefficients of retro-reflection

When the coefficients of retro-reflection of the material are determined in accordance with 5.9, they shall be at least the relevant values given in table 2.

Table 2 — Coefficients of retro-reflection

1	2	3	4
Observation angle degrees	Entrance angle degrees	Coefficient of retro-reflection when measured with Standard Illuminant A cd/(lx.m ²) min.	
		Yellow	White
0.33 ¹⁾	5 ¹⁾	35	50
2	30	1.5	2.5

¹⁾ The coefficient of retro-reflection at an angle of observation and an entrance angle of 0.33° and 5° respectively, shall not exceed 100 cd/(lx.m²) for yellow material and 160 cd/(lx.m²) for white material.

4.2.2.3 Flexibility

After a piece of retro-reflective material of size 200 mm x 100 mm, complete with protective lining for the adhesive backing, has been conditioned at 25 °C ± 2 °C for 4 h and then wrapped, reflecting surface outwards, lengthways around a mandrel of diameter 20 mm and length at least 250 mm (i.e. the retro-reflective material has been wrapped with its longer axis parallel to that of the mandrel), there shall be no evidence of cracking of the retro-reflective material.

4.2.2.4 Validation mark

The retro-reflective material shall be able to bear a validation mark that identifies the manufacturer of the material and it may also bear the date of manufacture or the manufacturer's batch number (or both).

4.3 Embossed border colour and luminance factor

4.3.1 Colour of embossed border

The colour of the embossed border shall be black, blue, red, green or brown.

4.3.2 Luminance factor

When the luminance factor of the colours blue, red, green and brown is determined in accordance with 5.8, it shall be less than 0.12.

4.4 Shape and dimensions

Blanks shall be rectangular and shall be of one of the following sizes:

- a) 440 mm × 120 mm ± 1 mm;
- b) 250 mm × 205 mm ± 1 mm;

- c) $520 \text{ mm} \times 110 \text{ mm} \begin{matrix} \pm 3 \\ -0 \end{matrix}$;
- d) $305 \text{ mm} \times 165 \text{ mm} \pm 1 \text{ mm}$; or
- e) $250 \text{ mm} \times 165 \text{ mm} \pm 1 \text{ mm}$ — permitted for category L motor vehicles only.

The corners of each blank shall be rounded to a radius of $15 \text{ mm} \pm 2 \text{ mm}$.

4.5 Preparation

4.5.1 Cleanness

The surface of the metal base to which the retro-reflective material is applied shall be dry and free from grease, oil, corrosion and any form of contamination before the retro-reflective material is applied (see 4.6) and, when relevant, before it is coated (see 4.5.2 and 4.5.3).

4.5.2 Coating of aluminium

4.5.2.1 Type A aluminium blanks

The front surface of each type A blank that has an aluminium base shall (before the application of the retro-reflective material (see 4.6)) be coated with

- a) an epoxy resin primer (of dry film thickness at least $5 \mu\text{m}$) followed by a coat (of dry film thickness at least $20 \mu\text{m}$) of a polyester resin, or
- b) an epoxy resin primer (of dry film thickness at least $3 \mu\text{m}$) followed by a coat (of dry film thickness at least $100 \mu\text{m}$) of a polyvinyl chloride plastisol.

4.5.2.2 Type B aluminium blanks

The surfaces of each type B blank that has an aluminium base and that are coated (before the application of the retro-reflective material (see 4.6)) shall be coated with

- a) a powder coating of dry film thickness at least $35 \mu\text{m}$, or
- b) a suitable surface-conversion coating, followed by a coat (of a dry film thickness at least $20 \mu\text{m}$) of a baking enamel.

4.5.3 Coating of steel

4.5.3.1 Type A steel blanks

The surfaces of each type A blank that has a steel base shall (before the application of the retro-reflective material (see 4.6)) be coated with zinc applied by a continuous process. The average surface density of the dry coating shall be at least 185 g/m^2 on both sides, no single spot measurement shall give a result of less than 152 g/m^2 , and the percentage of zinc on any one side of the blank shall be at least 40 % of the total.

The front face of each type A steel blank shall, after the application of the zinc coat, be coated with the coating described in 4.5.2.1 (a) or (b).

4.5.3.2 Type B steel blanks

The surfaces of each type B blank that has a steel base shall (before the application of the retro-reflective material (see 4.6)) be

- a) coated by the application of

- 1) a coat (of dry film thickness at least 25 μm) of a medium oil-based or semi-drying oil-based zinc chromate primer (that has a pigment volume concentration of 35 % to 40 % and that contains at least 300 g/kg of zinc chromate in the pigment), followed by a coat (of dry film thickness at least 25 μm) of baking enamel, or
 - 2) a powder coating of dry film thickness at least 35 μm , or
 - 3) a coat (of dry film thickness 2 μm to 3 μm) of a water-based composition of chromium compounds in solution, the composition containing sufficient metallic zinc in suspension to give a surface density in the dry coating of at least 3.5 g/m^2 , followed by a coat (of dry film thickness at least 13 μm) of a solvent-based coating, that contains sufficient metallic zinc dispersed in an epoxy resin to give a surface density of zinc in the dry coating of at least 55 g/m^2 , or
- b) subjected to an iron phosphate surface conversion process that produces a coating mass of at least 430 mg/m^2 , and shall then be so coated with an anti-corrosion epoxy resin baking primer followed by a baking enamel as to produce a paint coating that has a total dry film thickness of at least 25 μm , or
 - c) coated with zinc applied by a continuous process. The average surface density of the dry coating shall be at least 185 g/m^2 on both sides, no single spot measurement shall give a result of less than 152 g/m^2 , and the percentage of zinc on any one side of the blank shall be at least 40 % of the total.

4.6 Application of retro-reflective material

Blanks other than those on which the retro-reflective material is intended to be applied during the process of embossing the registration number shall have the material applied to the front surface. In all cases the retro-reflective material shall be of such a size that,

- a) in the case of a type A blank, the area inside the embossed border (see 4.7) is covered with retro-reflective material, or
- b) in the case of a type B blank, the retro-reflective material so covers the entire surface of the blank that at no part is the width of the retro-reflective material less than the width of the blank by more than 2 mm, and at no part is the distance between the edges of the retro-reflective material and the adjacent edges of the blank more than 1.3 mm.

4.7 Embossed border

The embossed border of a blank shall be of curved or flat cross-section, generally as given in figure 1. The embossing shall extend around the periphery of the blank and shall have an overall width of 8 mm \pm 1 mm and a height above the surface of the blank of,

- a) in the case of a type A blank, not less than 0.4 mm and not more than 1 mm, provided that in the case of a type A blank where the application of the retro-reflective material is part of the embossing process of the registration number, the embossing height of the border shall be not less than 1 mm and not more than 2 mm; or
- b) in the case of a type B blank, not less than 1 mm and not more than 2 mm.

The front face of the embossed border of a type A blank shall be matt black and the edges of the black area shall be straight and sharply defined. Subject to a tolerance of \pm 1.3 mm over the length of a blank, the border shall be parallel to the edges of the plate.

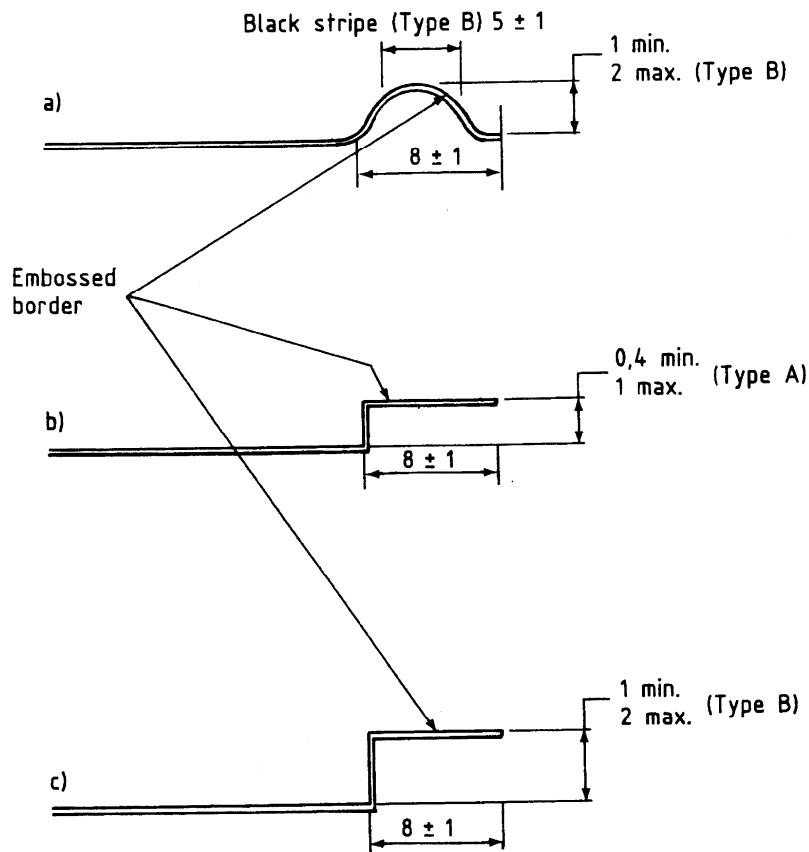


Figure 1 — Typical embossed borders

4.8 Workmanship

Blanks shall be free from creases, crevices and sharp or jagged edges, and retro-reflective and coated surfaces shall be free from creases, cracks, chips, blisters, discoloration and spots.

4.9 Performance

4.9.1 Resistance to weathering

When blanks are tested in accordance with 5.3,

- the chromaticity co-ordinates shall remain within the area on the appropriate chromaticity diagram as defined in 4.2.2.1,
- the coefficient of retro-reflection at an angle of observation and an entrance angle of 0.33° and 5° respectively, shall be at least 80 % of the minimum values given in Table 2,
- the retro-reflective material shall show no sign of cracking, blistering, or loss of adhesion, and
- when relevant, the painted or powder-coated surface shall show no sign of chalking or checking.

4.9.2 Resistance to impact

When blanks are tested in accordance with 5.4, the retro-reflective material and (when relevant) the painted or powder-coated surface shall show no cracking or separation from the substrate further than 5 mm from the impacted area.

4.9.3 Resistance to scratching

When blanks are tested in accordance with 5.5, the scratch produced

- a) on the retro-reflective surface shall not have penetrated the material surface, and
- b) (when relevant) on the painted or powder-coated surface, shall be free from jagged edges and shall not have penetrated through to the substrate.

4.9.4 Resistance to salt fog

When blanks are tested in accordance with 5.6, no surface shall show any sign of delamination, edge lifting or loss of adhesion. In the case of a retro-reflective surface, there shall be no sign of corrosion or blistering. In the case of a painted or powder-coated surface, any blister or creep (or both) or corrosion shall not extend further than 2 mm on each side of the scribe mark.

4.9.5 Resistance to bending

When blanks are tested in accordance with 5.7, there shall, after each bending operation, be no sign of cracking of the metal, or of cracking or loss of adhesion of the retro-reflective material or (when relevant) of the paint or powder coating.

5 Inspection and methods of test

In the case of blanks where the retro-reflective material is intended to be applied as part of the embossing process of the registration number, inspections and tests shall be carried out on test specimens on which the retro-reflective material has been permanently applied using the registration number embossing process but without a number having been embossed.

5.1 Inspection

Visually examine and measure each blank in the sample for compliance with all the appropriate requirements of this part of CD/K/024 for which tests to assess compliance are not given in 5.3 to 5.7 (inclusive).

5.2 Test specimens

From sample blanks, cut the following test specimens:

- a) **resistance to weathering:** one test specimen of width at least 70 mm and of length at least 150 mm, and that has not more than one cut edge;
- b) **resistance to impact:** one test specimen of any convenient size; the test may be carried out on an end of the specimen cut in terms of (e) below before it is subjected to bending;
- c) **resistance to scratching:** one test specimen of width at least 55 mm and of length at least 100 mm;
- d) **resistance to salt fog:** one test specimen in the case of a blank without any paint or powder coating on the rear surface, and two test specimens in other cases, each of width at least 100 mm and of length at least 100 mm and that have not more than two cut edges;
- e) **bending test:** one test specimen of width between 100 mm and 120 mm and of length at least 250 mm, and that has embossed on it one character of a registration mark that complies with the appropriate requirements of CD/K/024-2:2008, except that the character, in the case of a type B blank, shall be unpainted.

5.3 Resistance to weathering

5.3.1 Apparatus

A weathering unit, that has the following features:

- a) **Test chamber:** a test chamber constructed of corrosion-resistant materials enclosing eight fluorescent UV lamps, a heated water pan, test specimen racks that constitute the side walls of the chamber, and provisions for controlling and recording operating times and temperatures.
- b) **Lamps:** type UVB 313 fluorescent UV lamps or equivalent, the spectral energy distribution curve having a maximum at a wavelength of 313 nm with less than 1 % of the peak intensity at 280 nm. The lamps are of length 1 220 mm and of nominal rating 40 W when operated from a ballast that provides a controlled current of 430 mA at 102 V.
- c) **Lamp and test specimen arrangement:** the lamps are mounted in two banks of four lamps each to provide a uniform distribution of irradiance. The lamps in each bank are mounted parallel to each other at 70 mm centres. The test specimens are mounted in two stationary racks each of height 300 mm and of width 1154 mm, the test surface being in each case parallel to the plane of one bank of lamps and at a distance of 50 mm from the nearest surface of the lamps.
- d) **Condensation mechanism:** water vapour is generated by the heating of a water pan that extends under the entire specimen area and contains water of depth 25 mm. The back surface of each specimen is exposed to the cooling effect of the ambient room air. The resulting heat transfer causes water vapour, saturated with air, to condense on the test surface. The specimens are so arranged that condensate runs off the test surface by gravity and is replaced by fresh condensate in a continuous process. Vents along the bottom of the test chamber are provided to admit ambient air and so prevent oxygen depletion of the condensate.
- e) **Water supply:** the water supply has an automatic control to regulate the level in the water pan. Distilled, de-ionized, or potable tap water may be used.
- f) **Cycle timer:** a continuously operating cycle timer is provided to programme the selected cycle of UV radiation periods and condensation periods. An hour meter is provided to record total time of operation and total time of UV exposure.

5.3.2 Temperature measurement

5.3.2.1 The temperature is measured by means of a thermometer the bulb of which is inserted in a black aluminium panel of size 75 mm × 100 mm × 2.5 mm. The thermometer is accurate to 1 °C through a range of 30 °C to 80 °C. The indicator of the thermometer is located outside the test chamber.

5.3.2.2 The black aluminium panel and thermometer bulb are so positioned in the centre of the exposure rack that they are subjected to the same conditions as the specimens.

5.3.3 Temperature control

5.3.3.1 During UV exposure, the selected equilibrium temperature is maintained within 3 °C by the supply of heated air to the test chamber.

5.3.3.2 During condensation exposure, the selected equilibrium temperature is maintained within 3 °C by the heating of the water in the pan.

5.3.3.3 The UV and condensation temperature controls are independent of each other.

5.3.3.4 Doors are located on the room air side of the specimen rack, to act as insulation during the UV exposure and to minimize draughts. The doors do not interfere with the room air cooling of the specimen during the condensation exposure.

5.3.4 Procedure

5.3.4.1 Seal the cut edge of each specimen (see 5.2(a)).

5.3.4.2 Mount the test specimens in the specimen racks, with the test surfaces facing the lamps.

5.3.4.3 Select the following cycle conditions:

- a) 4 h UV exposure at 60 °C; and then
- b) 4 h condensation exposure at 50 °C.

5.3.4.4 Except for servicing the apparatus and inspecting the specimens, repeat the cycle continuously for 240 h.

5.3.4.5 At regular intervals during the specified exposure period, examine the specimens under 10x magnification.

5.3.4.6 Check for compliance with 4.9.1.

5.4 Resistance to impact

5.4.1 Apparatus

5.4.1.1 Striker: a steel ball of diameter 25 mm.

5.4.1.2 Base: a solid support base such as concrete or a steel plate of thickness 12,5 mm.

5.4.1.3 Freezer: the temperature of which can be maintained at $-20\text{ °C} \pm 2\text{ °C}$.

5.4.2 Procedure

5.4.2.1 Condition the specimen (see 5.2(b)) for 1 h in the freezer at $-20\text{ °C} \pm 2\text{ °C}$.

5.4.2.2 Remove the specimen from the freezer and immediately so place the specimen on the base that the striker will fall onto a part of a retro-reflective surface of the specimen.

5.4.2.3 Raise the striker to 2 m above the specimen and allow it to fall.

5.4.2.4 When relevant, repeat 5.4.2.1, 5.4.2.2 and 5.4.2.3, but with the point of impact being on a part of a painted or powder-coated surface.

5.4.2.5 Examine the specimen for compliance with 4.9.2.

5.5 Resistance to scratching

5.5.1 Apparatus

5.5.1.1 Needle and arm: a needle with a hardened steel hemispherical point of diameter 1mm, fixed vertically, point downwards, to the end of a counterpoised horizontal arm. The horizontal arm provides for the loading of masspieces above the needle direct, and it may be set in equilibrium on its fulcrum by adjustment of the countermass before masspieces are loaded above the needle.

5.5.1.2 Masspieces: a set of forty 50 g masspieces.

5.5.1.3 Base with sliding specimen holder: a sliding specimen holder that moves freely and automatically on its base under the loaded needle (which is perpendicular to the specimen holder).

5.5.1.4 Electric current supply and ammeter: The needle and specimen holder are so connected in series with an ammeter and an electric current supply that, when the painted or powder-coated surface of a specimen is penetrated, the needle makes electrical contact with the underlying metal, and this penetration is indicated by a flow of current through the ammeter.

5.5.2 Procedure

5.5.2.1 In the case of a retro-reflective surface, set the horizontal arm in equilibrium, with the electric current supply and ammeter not in use. Clamp the specimen (see 5.2(c)) to the specimen holder, with the material to

be tested facing upwards. Load the needle with masspieces of total mass 2000 g and lower the needle carefully onto the material surface while starting to slide the holder. Alternatively, so put the end of the needle on a razor blade on the material surface that the needle can slide off the sharp edge of the blade onto the surface. Slide the holder at a uniform speed of approximately 30 mm/s for a distance of about 90 mm.

5.5.2.2 Examine the edges of the groove under 10x magnification.

5.5.2.3 Check for compliance with the relevant requirements of 4.9.3.

5.5.2.4 Repeat 5.5.2.1 to 5.5.2.3 on two other parts of the material surface.

5.5.2.5 In the case of a painted or powder-coated surface, carry out the test as given in 5.5.2.1 to 5.5.2.4, but with the electric current supply and ammeter in use.

5.6 Resistance to salt fog

5.6.1 Apparatus

A fog cabinet, that has the following features:

- a) **Exposure chamber:** a chamber made from, or coated with, a corrosion-resistant material and, so constructed that the salt fog circulates freely and equally about all specimens, and that has baffles to prevent the salt fog from striking the specimens direct.
- b) **Racks for supporting the specimens:** removable racks made from, or coated with, a corrosion-resistant material and so constructed that the specimens are held without touching one another or any other metal and that salt solution will not drip from one specimen onto another.
- c) **Salt solution reservoir:** a reservoir of adequate size to produce the required quantity of salt fog and made from, or coated with, corrosion-resistant material. It is so constructed that there is no recirculation of the salt solution.
- d) **Atomizing nozzles:** plastics nozzles so designed that they will produce a finely divided salt solution fog.
- e) **Air supply:** a compressed air supply for the atomizing nozzles, filtered to remove all impurities. Means are provided to humidify and heat the compressed air as necessary. The air pressure is constant to within 700 Pa and sufficient to produce a finely divided salt solution fog.
- f) **Heating of chamber and temperature control:** the exposure chamber is heated and its temperature is controlled by means of a thermostat.

NOTE The use of an immersion heater is not permitted.

5.6.2 Salt solution

The salt solution is made up as follows:

- a) **Salt:** sodium chloride containing sodium iodide not exceeding 1 g/kg of salt, and total impurities not exceeding 3 g/kg of salt, calculated on the dry basis.
- b) **Water:** water that contains total solids not exceeding 200 mg/kg of water.
- c) **Preparation:** the salt solution is prepared by dissolving $5 \pm 0,5$ parts (by mass) of salt in 95 parts (by mass) of water and filtering the solution.

5.6.3 Conditions of test

5.6.3.1 Temperature

Maintain the temperature in the exposure zone at 33 °C to 36 °C.

5.6.3.2 Salt fog

Ensure that the degree of atomization of the salt solution is such that suitable fog collectors placed at any point in the exposure zone will collect, over an average running period of at least 16 h, 65 ml to 375 mL of solution per hour per square metre of horizontal collecting area. Ensure that the solution so collected has a pH value of 6.5 to 7.2 when measured electrometrically.

5.6.4 Procedure

5.6.4.1 In the case of specimens (see 5.2(d)) that have a paint or powder coating, use a suitable cutting tool and carefully make (with the cutting edge of the cutting tool held at an angle of about 30° to the surface and the plane of the blade perpendicular to that surface) a scribe mark of length about 75 mm, by cutting through the coating to the base.

5.6.4.2 Establish the test conditions in the exposure chamber. Mount the specimens on the supporting racks and insert the racks in the exposure chamber.

5.6.4.3 Close the exposure chamber and operate the cabinet continuously for 240 h.

5.6.4.4 After the test period, remove the specimens and rinse them thoroughly with distilled water. Examine the following for compliance with the applicable requirements of 4.9.4:

- a) when relevant, the paint or powder coating, immediately after removal of the specimens from the exposure chamber; and
- b) the retro-reflective material, after a 24 h recovery period has elapsed.

5.7 Bending test

So place the un laminated surface of the test specimen (see 5.2(e)) against a mandrel of diameter 50 mm \pm 1 mm that the line of maximum bending coincides with the vertical centre-line of the letter or numeral. Taking about 3s, bend the specimen through an angle of 90° \pm 2° over the mandrel, and then examine it for compliance with 4.9.5. Immediately following this procedure, and taking about 3s, so bend the specimen back through the same angle that it is in approximately its original alignment and again examine it for compliance with 4.9.5.

5.8 Colour and luminance factor test

Determine the chromaticity co-ordinates and luminance factors of the relevant areas of the specimen by means of a spectrophotometer or other equally suitable colour measuring device in accordance with CIE Publications 15 (E.1.3.1) and 54, using Standard Illuminant D65 and 45/0 geometry.

Check for compliance with 4.2.2.1.

5.9 Photometric test

Determine the coefficients of retro-reflection in accordance with CIE Publication 54, using the values of observation angle and entrance angle given in table 2. On each specimen, take the average of two readings at rotation angles (about the reference axis) that are 90° apart. Check for compliance with 4.2.2.2.

6 Packing and marking

6.1 Packing

The blanks and, when relevant, the retro-reflective material 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 the manufacturer's trade name or trade mark, in legible and indelible marking, on the surface not covered by the retro-reflective material.

Annex A
(informative)

Quality verification of metal blanks for retro-reflective registration plates

When a purchaser requires ongoing verification of the quality of metal 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)

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