



CD/K/028-2:2008
ICS 43.040.20

EAST AFRICAN STANDARD

**Retro-reflective and fluorescent warning signs for road vehicles —
Specification — Part 2: Abnormal load vehicle signs**

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.

© East African Community 2010 — All rights reserved
East African Community
P O Box 1096
Arusha
Tanzania

Tel: 255 27 2504253/8
Fax: 255-27-2504481/2504255
E-Mail: eac@eachq.org
Web: www.each.int

Contents

1	Scope	1
2	Normative references.....	1
3	Definitions.....	2
4	Requirements	2
4.1	Type.....	2
4.2	Material.....	2
4.3	Construction	3
4.4	Application of materials and of protective coatings to warning faces.....	5
4.5	Workmanship.....	5
5	Packing, marking and labeling	7
5.1	Packing.....	7
5.2	Marking.....	7
5.3	Labeling.....	7
6	Inspection and methods of test	8
6.1	Inspection	8
6.2	Test specimens.....	8
6.3	Rigidity test for stiffened signs	8
6.4	Reflected luminous intensity test.....	9
6.5	Colour and luminance factor test for fluorescent surfaces.....	9
6.6	Test for resistance to artificial weathering.....	9
6.7	Test for resistance to impact.....	11
6.8	Test for resistance of coatings to flaking (signs having a plastics substrate).....	11
6.9	Test for resistance of coatings to scratching.....	11
6.10	Test for resistance to salt fog.....	11
	Annex A (informative) Notes to purchasers	17
	Annex B (informative) Coatings for mild steel surfaces	18
	Annex C (informative) Quality evaluation of signs produced to the requirements laid down in this part of the specification.....	19

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

Retro-reflective and fluorescent warning signs for road vehicles — Specification — Part 2: Abnormal load vehicle signs

1 Scope

This part of the specification covers requirements for abnormal load signs that are retro-reflective and fluorescent, and that are intended for use on motor vehicles operating on public roads.

NOTE

- a) The signs covered by this part of the specification may be used to give advance warning to approaching traffic¹ of a vehicle that itself constitutes a load that is in excess of normal or is carrying a load that is in excess of normal and a vehicle that is acting as an escort to such a vehicle or load (see Figure 4).
- b) The standards referred to in this part of the specification are listed in Clause 2.
- c) Requirements that must be specified by the purchaser are listed in Annex A.
- d) Suggested coatings for mild steel surfaces are given in Annex B.
- e) Guidance on the verification of the quality of signs produced to this part of the specification is given in Annex C.

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.

ISO 105-A02, *Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

ISO 1518, *Paints and varnishes — Scratch test*

ISO 6745, *Zinc phosphate pigments for paints — Specifications and methods of test*

CIE 72, *Guide to the properties and uses of retroreflectors at night*

CIE 144, *Road surface and road marking reflection characteristics*

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

ISO 8781-3, *Pigments and extenders — Methods of assessment of dispersion characteristics — Part 3: Assessment from the change in gloss*

ISO 7724, *Paints and varnishes — Colorimetry*

CD/K/028-1:2008, *Retro-reflective and fluorescent warning signs for road vehicles — Part 1: Triangles*

EAS 293-1, *Road marking materials — Part 1: Physical properties*

EAS 293-2, *Road marking materials — Part 2: Road marking performance for road users*

ISO 3668, *Paints and varnishes — Visual comparison of the colour of paints*

EAS 85-13:2000, *Paints, varnishes, lacquers and enamels — Methods of test — Part 13: Falling weight test (Impact test)*

ISO 7253, *Paints and varnishes — Determination of resistance to neutral salt spray (fog)*

¹ To ensure correct use of these signs, the user should consult the relevant road traffic regulations.

3 Definitions

For the purposes of this part of the specification the following definitions shall apply:

3.1

abnormal load sign (indicator of abnormal load)

A warning sign that is intended to indicate the presence of a vehicle capable of carrying an abnormal load or the presence of an abnormal load on a vehicle.

3.2

fluorescence

The phenomenon that occurs when light of a certain wavelength is absorbed by a chemical substance in the surface of a material and part of the light energy is re-radiated as light of a longer wavelength.

3.3

retro-reflective surface

A surface from which light is reflected in directions close to the direction of incidence within a wide range of angles of incidence at the reflecting surface.

3.4

warning face

A surface of a warning sign that is intended to be displayed when the sign is in use.

4 Requirements

4.1 Type

A sign shall be an abnormal load sign of type F or type G (see Figure 2).

4.2 Material

4.2.1 Substrate material

The substrate material of a sign shall be such that

- a) when, at an ambient temperature of 20 ± 1 °C, a specimen of the substrate material of length and width approximately 150 mm and 70 mm respectively is placed on two parallel knife-edge supports that are each not more than 10 mm from an end of the specimen, and a force of 20^{+1}_{-0} is applied vertically downwards at the centre of the specimen and maintained for a period of at least 5 s,
 - 1) the deflection does not exceed 3.0 mm; and
 - 2) there is no permanent deflection after the force has been removed;
- b) in the case of a plastics material,² it is of the thermo-plastic type, has a high impact resistance, is water resistant and fuel resistant, contains ultraviolet light absorbers and anti-oxidants and, if required, contains a red fluorescent colorant; and
- c) the completed sign complies with the performance requirements given in 4.6.

² In the case of a sign that has retro-reflective material on the warning face, before specifying plastics material for the substrate material the purchaser should consult with the manufacturer or the supplier of the retro-reflective material regarding the compatibility of the retro-reflective material and the plastics material.

4.2.2 Retro-reflective materials

Retro-reflective material shall comply with the requirements for

- a) reflected luminous intensity given in 4.6.2; and
- b) the chromaticity co-ordinates given in 4.6.3;

and, in the case of a pressure-sensitive adhesive material, with the requirement for strength of adhesion given in EAS 293-1.

The colour of the retro-reflective material shall be red or white, as appropriate (see 4.3.4).

4.2.3 Retro-reflector units

The colour of the retro-reflective part of a retro-reflector unit shall be red and each retro-reflector shall comply with the relevant requirements for a retro-reflector given in CIE 72 for

- a) general construction;
- b) shape;
- c) colour;
- d) resistance to penetration by water, except that the CIL value of the retro-reflector shall be at least 90 % of the initial value or at least equal to the appropriate value given in CIE 72;
- e) adhesion of mirror coating;
- f) resistance to heat;
- g) resistance to motor fuel; and
- h) resistance to lubricating oil.

4.2.4 Fluorescent materials

Fluorescent material shall comply with the requirements for colour and for luminance factor given in 4.6.3. Fluorescent material shall be in the form of

- a) sheeting having a pre-coated adhesive backing and complying with the requirement for strength of adhesion given in EAS 293-1; or
- b) fluorescent paint;³ or
- c) in the case of a plastics substrate material and, when appropriate, a fluorescent colorant incorporated in the substrate material.

4.3 Construction

4.3.1 General

A sign shall be rectangular in shape and shall be generally in accordance with Figure 2. A sign shall be so constructed that it is suitable for attaching to a vehicle (see Figure 4). A sign may be stiffened and, if so, the stiffening shall form an integral part of the sign or shall be a separate structure attached to the sign⁴. The corners of a sign may be rounded.⁵

³ A suitably prepared surface shall have a final coat of fluorescent paint.

Draft

4.3.2 Dimensions

The dimensions of a sign shall, subject to the appropriate tolerances given in 4.3.3, conform to the applicable of the following values:

- a) Deleted by amendment No. 1.
- b) Abnormal load signs. An abnormal load sign shall have a height of 400 mm and a length of 2000 mm in the case of a type F sign and 1 200 mm in the case of a type G sign. The triangles on the warning face shall be equilateral and of vertical height (see Figure 2(c)) equal to the height of the sign. The width of the surface of each triangle on which the retro-reflective material or retro-reflectors, or both, are placed, shall be in the range 25-85 mm. The area of the fluorescent surface of each triangle shall be at least 0.012 m².

4.3.3 Tolerances

The dimensions shall, when relevant, be subject to the appropriate of the following tolerances:

Range of dimensions mm	Tolerance, ± mm
0 – 50	0.5
51 – 200	1
201 – 500	2
501 – 1 500	3
1 501 – 2 500	5

Draft

4.3.4 Warning face

A sign of type F or type G shall have at least one warning face. The background of the warning face of the sign shall be matt red.

Retro-reflection shall be provided by retro-reflective material or retro-reflectors, or both, and fluorescence shall be provided by fluorescent sheeting, fluorescent paint or, when appropriate, a fluorescent colorant incorporated in the substrate material. Where retro-reflectors are used to provide retro-reflectivity as shown in Figure 2, and the retro-reflector units cover less than 30 % of the surface intended to be retro-reflective, the rest of the said surface shall, to maintain the integrity of the sign, be covered with red retro-reflective material or a matt red coating of a shade that is a practical match to colour No. A11 "Signal red" of ISO 7724. The warning face shall be applied symmetrically to the surface of a sign and shall consist of the appropriate of the following:

- a) Deleted by amendment No. 1.
- b) Abnormal load signs. As shown in Figure 2,
 - 1) three triangles in the case of a sign of type F and two triangles in the case of a sign of type G, each comprising an outer triangle having a red retro-reflective surface, with another triangle inside the said surface which is fluorescent and, provided that the fluorescent triangle is large enough (see 3.3.2(b)), a central triangle that has a matt black coating;
 - 2) a matt red background of a shade that is a practical match to colour No. A11 of ISO 7724 covering the remainder of the warning face, the appropriate words in white retro-reflective lettering being superimposed on the red background in accordance with 4.3.5.

⁴ Stiffening should be specified when a sign is not rigidly supported over its whole area. In addition, suitable brackets should be fitted to a vehicle to accommodate this type of sign.

⁵ Rounded corners should be specified when a sign is to be clamped against a background that does not extend to the corners of the sign.

Draft for

4.3.5 Lettering⁶

The warning face of an abnormal load sign shall bear lettering complying with the following requirements:

a) Wording

- 1) In the case of a sign of type F, the sign shall bear the words "Abnormal Load".
- 2) In the case of a sign of type G, the sign shall bear the words "Abnormal Load Ahead".

b) **Shapes, dimensions and setting out of letters.** The shape and dimensions of each letter shall conform to those of the appropriate letter given in Figure 3. Each letter shall lie within a frame of height (see frame lines "c" and "d") 75 mm and of width equal to the distance between the frame lines "a" and "b" applicable to that letter. In addition, the location of each letter with reference to the frame lines "a" and "b" shall be as shown in Figure 3. Letters shall be so set out that the frame lines "a" and "b" of adjacent letters coincide.

c) **Layout of words.** The words shall be generally arranged as shown in Figure 2(a) or (b) as appropriate, and centrally located between the triangles. A word shall be separated from the word below it by a space (between frame lines) of 20 ± 0.5 mm.

d) **Application.** Lettering shall have been applied by a process such that the sign complies with the performance requirements of 4.6.

4.4 Application of materials and of protective coatings to warning faces

Before the application of any material to the warning face and, when relevant, to the reverse face, both surfaces of a sign shall have been cleaned of all grease, oil, corrosion products and other foreign matter and dried, and shall, in the case of signs having a substrate of mild steel and, if required, in other cases, have been so coated as to provide protection from corrosion.⁷ The edges of a sign shall be adequately protected from weathering.

4.5 Workmanship

The boundaries between the different areas and, when relevant, the edges of letters on the warning face of a sign shall be clearly defined. Surfaces covered with fluorescent and retro-reflective material and protective and other coatings shall be free from creases, cracks, blisters, discoloration and lack of adhesion. A sign shall be free from sharp and jagged edges and the edges of a sign that has a metal substrate shall be free from corrosion.

4.6 Performance

4.6.1 Rigidity of stiffened signs

When a sign that has been stiffened (see 4.3.1) is tested in accordance with 6.3,

- a) the deflection of the sign when loaded shall not exceed 2.5 % of the distance between the supports; and
- b) the residual deflection shall not exceed 20 % of the deflection under load.

⁶ Sets of diagrams containing full-size reproductions of the letters are obtainable from Standards South Africa (prices on request).

⁷ Suggested coatings for mild steel surfaces are given in Annex B. It is recommended that, in the case of signs made of metals other than mild steel and that are to be used in corrosive atmospheres, the purchaser discuss the relevance of added protection with the sign manufacturer or the paint supplier or both.

Draft

4.6.2 Reflected luminous intensity

- a) Deleted by amendment No. 1.
- b) Abnormal load signs. The reflected luminous intensity of each triangle on the warning face of an abnormal load sign, when determined in accordance with 6.4 for each observation angle and each angle of incidence given in Table 1, shall be at least equal to the appropriate of the values given in Table 1.

Table 1 — Reflected luminous intensities of the warning face of a triangle

1	2	3	4	5
	Reflected luminous intensity, min. cd per incident lux			
	Angle of incidence degrees			
Vertical	0	±20	0	0
Horizontal	*0	0	±30	±40
Observation angle: 20'	8.00	4.00	1.75	0.60
1° 30'	0.06	0.20	0.10	0.05
*± 5° in the case of retro-reflective material (see 4.2.2).				

4.6.3 Colour and luminance factor of fluorescent surfaces

When the fluorescent surface of a sign is tested in accordance with 6.5,

- a) the chromaticity co-ordinates of the surface shall, before artificial weathering, be within the area on the chromaticity diagram bounded by the limits given in Table 2; and
- b) the luminance factor shall, before artificial weathering, be not less than 30 % and, after weathering, be not more than 60 %.

Table 2 — Chromaticity co-ordinates of the points of intersection of the boundary lines of the limiting area on the chromaticity diagram — Before weathering

1	2	3	4	5
Co-ordinate	Value of co-ordinate			
x	0.690	0.595	0.569	0.655
y	0.310	0.315	0.341	0.345

4.6.4 Resistance to artificial weathering

When a sign is tested in accordance with 5.6,

- a) retro-reflective and fluorescent surfaces shall show no sign of cracking, blistering or lack of adhesion;
- b) each value of reflected luminous intensity of each retro-reflective surface shall be at least 50 % of the corresponding value given in 4.6.2 and the chromaticity co-ordinates shall comply with the requirements for the chromaticity co-ordinates after weathering given in EAS 293-1;
- c) the chromaticity co-ordinates of fluorescent surfaces shall be within the area on the chromaticity diagram bounded by the limits given in Table 3 and the luminance factor shall comply with the requirements of 4.6.3(b);
- d) protective and other coated surfaces shall show no sign of chalking, checking or a visual colour change rating lower than 4 (based on a figure of 5 for no colour change); and
- e) uncoated surfaces and edges shall show no sign of deterioration.

Draft

Table 3 — Chromaticity co-ordinates of the points of intersection of the boundary lines of the limiting area on the chromaticity diagram — After weathering

1	2	3	4	5
Co-ordinate	Value of co-ordinate			
x	0.690	0.595	0.535	0.610
y	0.310	0.315	0.375	0.390

Standard

4.6.5 Resistance to impact

When a sign is tested in accordance with 6.7, coatings on surfaces, including fluorescent coatings and coverings of retro-reflective material, shall show no evidence of cracking or loss of adhesion.

4.6.6 Resistance of coatings to flaking

When the warning face and other coated surfaces of a sign having a plastics substrate are tested in accordance with 6.8, coatings shall show no sign of flaking.

4.6.7 Resistance of coatings to scratching

When the warning face and other coated surfaces of a sign are tested in accordance with 6.9, the scratch produced shall be free from jagged edges and shall not have penetrated to the substrate.

4.6.8 Resistance to salt fog

When a sign is tested in accordance with 6.10,

- there shall be no sign of cracking, blistering or loss of adhesion on any fluorescent coating or retro-reflective material;
- there shall be no sign of corrosion or lack of adhesion on any retro-reflector or its fastener(s);
- in the case of other coated surfaces, there shall be no sign of corrosion of the substrate, except at the scribe mark where corrosion, creep or blisters (or any combination of these) shall not extend further than 2 mm on each side of the mark; and
- there shall be no sign of deterioration of surfaces or of edges.

5 Packing, marking and labeling

5.1 Packing

Signs shall be so packed that they are protected from damage during normal transportation and storage.

5.2 Marking

Each sign shall bear, in legible and indelible marking on the warning face, the manufacturer's name, trade name or trade mark. The space occupied by this marking shall be of height and length approximately 5 mm and 25 mm, respectively. The quality of the marking shall be such that, when the sign is tested in accordance with 6.6 and 6.10, there is no loss of integrity of the marking.

5.3 Labeling

Each sign shall bear, on the reverse face, a securely attached label that provides, in legible and indelible printing, at least the following information:

- a warning that the sign should not be fastened by any means that interferes with or diminishes its visibility or, when relevant, its legibility;

Draft

- b) in the case of a sign that has an aluminium alloy substrate, a warning that fasteners used for attaching the sign to a vehicle must on no account be made from copper, brass, bronze or unprotected mild steel;
- c) in the case of a sign that has a mild steel substrate, a warning of the danger that steel surfaces that become exposed during the fitting of a sign will corrode unless they are adequately protected from corrosion, e.g. by being coated with a zinc phosphate primer.

6 Inspection and methods of test

6.1 Inspection

Visually examine and measure each sign in the sample for compliance with all the relevant requirements of this part of the specification for which tests to assess compliance are not given in 6.3 — 6.10 (inclusive).

6.2 Test specimens

From the signs in the sample prepare the following test specimens:

- a) 1) Deleted by amendment No. 1.
2) **Types F and G.** A test specimen consisting of one leg of a triangle cut from the sign under test.
- b) **Colour and luminance factor of fluorescent surface.** A test specimen of size approximately 70 mm × 150 mm, the face of which is entirely covered by the fluorescent material.
- c) **Resistance to weathering.** A test specimen of size approximately 70 mm × 150 mm that includes as much of the retro-reflective and fluorescent surfaces and any other coating, edges, marking (see 5.2) and, when relevant, holes (for attachment) as is practicable. In the case of signs that have a mild steel substrate, seal the newly cut edges.
- d) **Resistance to impact.** A test specimen of any convenient size that, when relevant, includes no retro-reflector but, in the case of abnormal load signs, includes a letter.
- e) **Resistance of coating to flaking.** In the case of a sign that has a plastics substrate, a test specimen of size approximately 50 mm × 50 mm that includes as much of the retro-reflective and fluorescent material and any other coating as is practicable.
- f) **Resistance to scratching.** A test specimen of size approximately 55 mm × 100 mm that includes as much of the retro-reflective and fluorescent material and any other coating as is practicable.
- g) **Resistance to salt fog.** One test specimen in the case of a sign without any protective coating, and two specimens in other cases, each specimen being similar to the specimens described in (c) above, but of size approximately 100 mm × 150 mm.

6.3 Rigidity test for stiffened signs

So place the sign under test face up on two horizontal supports (each of length at least equal to the height of the sign) that the supports are parallel to the shorter edges (ends) of the sign, and that the distance from each support to the adjacent end of the sign is not more than 0.1 L, where L is the length of the sign. Using bags of shot or dry sand, apply to the sign a uniformly distributed load of approximately 1.5 N per square metre and measure the deflection at a point midway between the supports. Then remove the load and measure the residual deflection at the same point.

Check for compliance with 4.6.1.

6.4 Reflected luminous intensity test

6.4.1 Deleted by amendment No. 1.

6.4.2 Abnormal load signs

Use the relevant method given in CD/K/028-1:2008 to test the specimen (see 6.2(a)) and check for compliance with 4.6.2(b).

6.4.3 After weathering

Repeat the test given in 6.4.2, as applicable, after the specimen has been weathered in accordance with 6.6 and check for compliance with the requirements of 4.6.4(b).

6.5 Colour and luminance factor test for fluorescent surfaces ↘ ↙

Use a suitable colorimeter with illumination and viewing conditions as recommended by the International Commission of Illumination, i.e. angles of incidence and observation of 45° and 0° respectively. Illuminate the specimen (see 6.2(b)) with illuminant C and determine the chromaticity coordinates and the luminance factor of the light diffusely reflected from the surface. Check for compliance with the applicable requirements of 4.6.3.

NOTE If the colorimetric characteristics have been calculated in the XYZ system, determine the luminance factor by applying the ratio $Y:Y_0$ where Y is the tristimulus value of the sample and Y_0 is that of a perfect diffuser observed under the same conditions. The test report shall contain at least the following information:

- the type of instrument (spectrophotometer, tristimulus colorimeter, etc.),
- its designation (manufacturer and type),
- identification of the illuminant used, and
- lighting and viewing angles.

6.5.1 After weathering

Repeat the test after the specimen has been weathered in accordance with 6.6 and check for compliance with 4.6.4(c).

6.5.2 Painted surfaces

Test as described in 6.5 and check for compliance with the applicable requirements of 4.6.3 before weathering.

After the specimen has been weathered in accordance with 6.6, check for compliance with the requirements of 4.6.4(d).

NOTE Rating of the change in colour according to the grey scale described in ISO 105-A02 shall be detailed according to the method for visual comparison contained in ISO 3668.

6.6 Test for resistance to artificial weathering

6.6.1 Apparatus

A weathering unit consisting of a test chamber constructed of corrosion-resistant materials and enclosing eight fluorescent UV lamps, a heated water pan and test specimen racks, and providing means for controlling and recording operating times and temperatures. The essential features of the unit are as follows:

- a) **Lamps.** The lamps are of type FS 40 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 have a length of 1 220 mm and a nominal rating of 40 W when operated from a ballast providing a controlled current of 430 mA at 102 V.

The lamps are so mounted in two banks of four lamps each as to provide a uniform distribution of irradiance. The lamps in each bank are parallel and spaced at 70 mm centres.

- b) **Racks for test specimens.** Two racks for mounting the test specimens (see 6.2(c)) are provided in the chamber, each rack being of height 300 mm and width 1154 mm and so positioned that a surface of each test specimen is parallel to the plane of one bank of lamps and at a distance of 50 mm from the nearest surface of the lamps. The specimen racks and the test specimens themselves constitute the side walls of the chamber. The back surface of each test specimen is thus exposed to the ambient air.

The test specimens are so arranged that condensate forming on each test surface is caused by gravity to run off the test surface and is replaced by fresh condensate in a continuous process. Vents provided along the bottom of the test chamber admit ambient air and so prevent oxygen depletion of the condensate.

- c) **Water pan.** Water vapour is generated by the heating of water in a water pan extending under the entire specimen area and containing water to a depth of at least 25 mm.
- d) **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.)
- e) **Cycle timer.** The test chamber has a continuously operating cycle timer and a controller that controls the UV radiation periods and the condensation periods as selected. An hour meter records the total time of operation and the total time of UV exposure.
- f) **Thermometer.** The temperature in the test chamber is measured by means of a thermocouple, the junction of which is inserted in a black aluminium panel of size 75 mm x 100 mm x 2.5 mm. The thermometer measures a range of 30-80 °C and is accurate to within 1 °C. The indicator dial of the thermometer is located outside the test chamber. The aluminium panel and thermocouple junction are so positioned in the centre of the exposure rack that they are subjected to the same conditions as the specimens.
- g) **Temperature control**
- 1) During UV exposure, the selected equilibrium temperature is maintained to within 3 °C by the supply of heated air to the test chamber.
 - 2) During condensation exposure, the selected equilibrium temperature is maintained to within 3 °C by the heating of the water in the pan.
 - 3) The UV temperature and condensation temperature are controlled independently of each other.
 - 4) Doors are located on the ambient air side of the specimen rack to act as insulation during the UV exposure and to minimize draughts. The doors are so arranged that they do not interfere with the ambient air cooling of the specimens during the condensation exposure.

6.6.2 Procedure

- a) Seal the cut edge of each specimen (see 6.2(c)).
- b) Mount the test specimens in the specimen racks with the test surfaces facing the lamps.
- c) Select the following cycle conditions:
 - 1) 4 h of UV exposure at 60 °C;

- 2) 4 h of condensation exposure at 50 °C.
- d) Except for servicing the apparatus and inspecting the specimens, repeat the cycle continuously over a period of 240 h for fluorescent material and 800 h for retro-reflective material.
- e) At the end of the specified exposure period, examine the specimens under 10x magnification.
- f) Check for compliance with the applicable requirements of 4.6.4 and 5.2.

6.7 Test for resistance to impact

Use the apparatus and procedure described in EAS 85-13 to subject each coating and covering (see 4.6.5) of each test specimen (see 6.2(d)) to an impact energy of 2.25 J in the case of a sign having a steel substrate, 1.15 J in the case of a sign having an aluminium alloy substrate and an impact energy of a suitable value in the case of a sign having a substrate of another material.⁸ Check for compliance with 4.6.5.

6.8 Test for resistance of coatings to flaking (signs having a plastics substrate)

On the specimen (see 5.2(e)) make, with a razor blade, a series of parallel cuts 2 mm apart through the coating to the plastics substrate, then make a second similar series of cuts at right angles to the first, and check for compliance with 3.6.6. When relevant, repeat the test on the other coating(s) on the specimen.

6.9 Test for resistance of coatings to scratching

Use the apparatus and procedure described in ISO 1518, with the needle loaded with masspieces of total mass 2 000 g, to test the coating on each specimen (see 6.2(f)). Check for compliance with 4.6.7.

6.10 Test for resistance to salt fog

In the case of specimens that have one or more coated surfaces, make on each such surface (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 the surface), a scribe mark of length about 75 mm and that penetrates through the coating to the substrate.

Then, using the apparatus and method described in ISO 7253, subject the test specimen(s) (see 6.2(g)) to the test for a period of 240 h. After a 24 h recovery period, examine for compliance with the applicable requirements of 4.6.8 and 5.2.

⁸ In the case of a sign having a substrate of a material other than steel or aluminium alloy, the value of the impact energy to be applied should be obtained from a recognized testing authority.

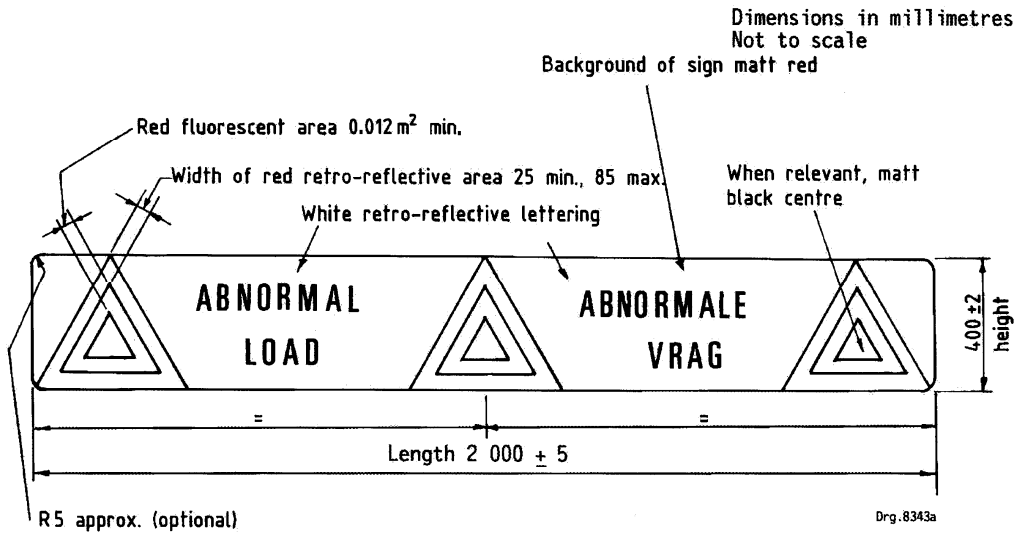


Figure 2(a) — Type F

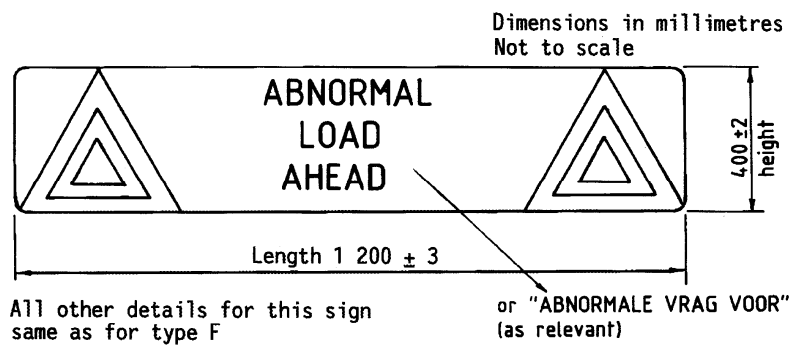
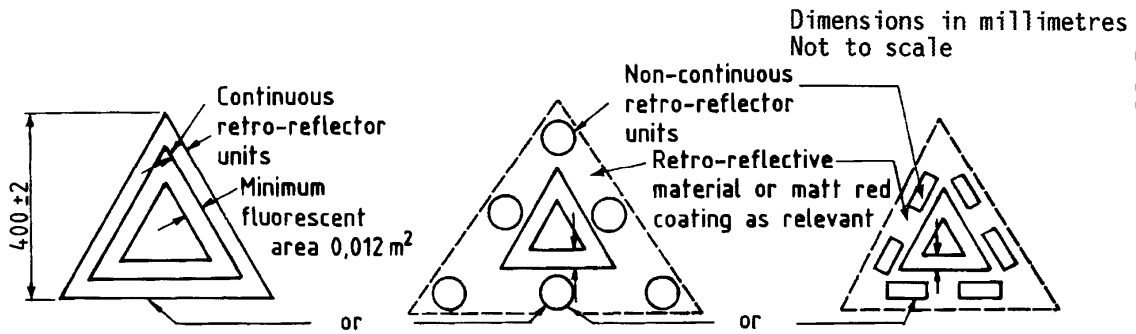


Figure 2(b) — Type G

Figure 2 — Abnormal load signs

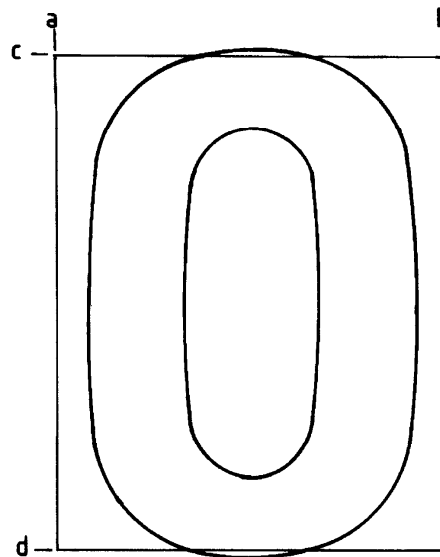
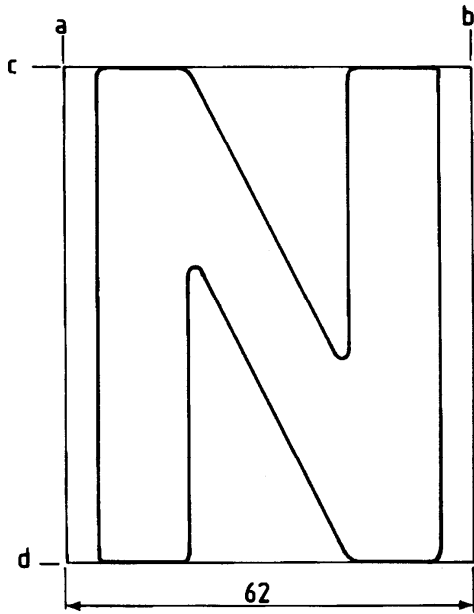
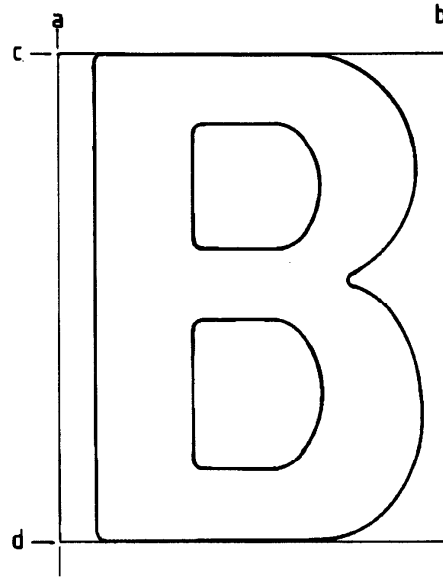
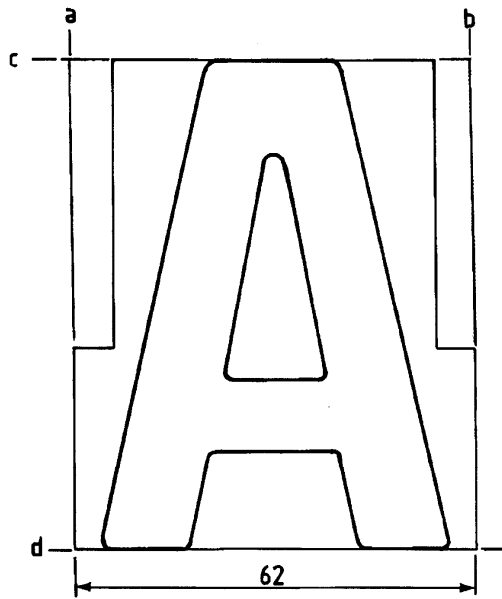


NOTE The drawings given in figure 2 are purely to identify parts and to specify dimensions. They are not intended as design guides.

Figure 2(c) — Typical layouts of retro-reflective surfaces incorporating retro-reflector units

Figure 2 — Abnormal load signs (concluded)

Draft for comments only — Not to be cited



NOTE

- 1) Dimensions in millimetres.
- 2) Dimensions between frame lines, except where otherwise shown, are as follows;
 - Width (between frame lines "a" and "b") 60 mm.
 - Height (between frame lines "c" and "d") 75 mm.
- 3) Dimensions subject to tolerance given in 4.3.3.
- 4) Scale approx. full size.

Figure 3 — Letters

Draft for

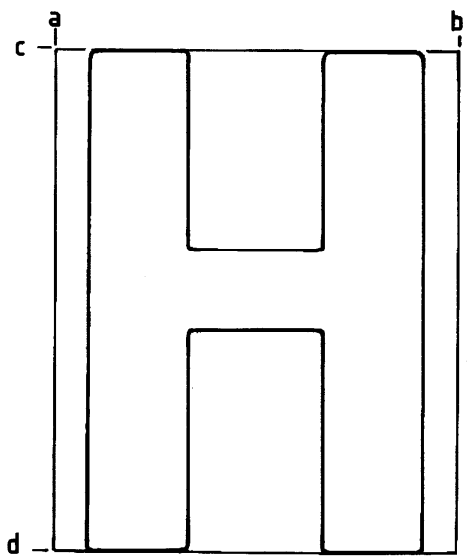
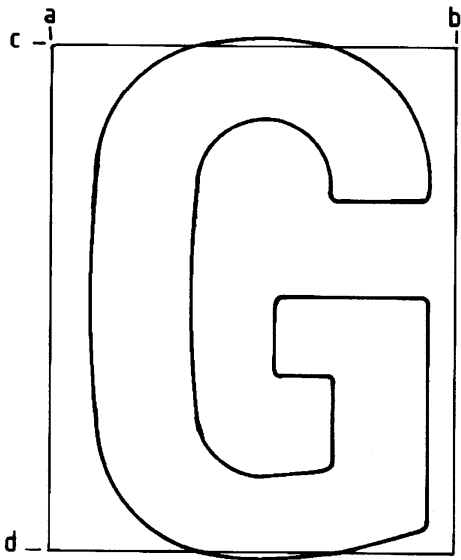
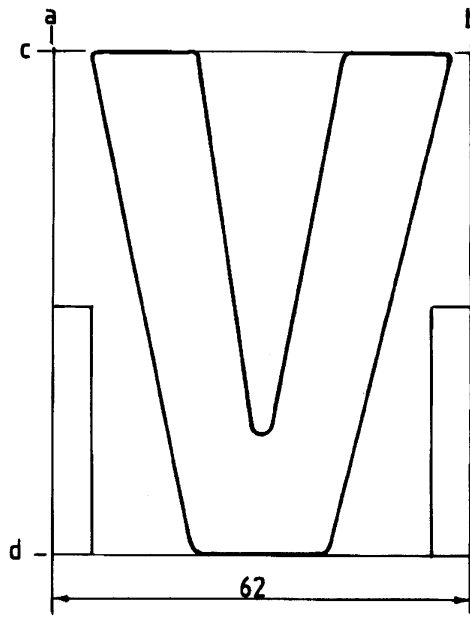
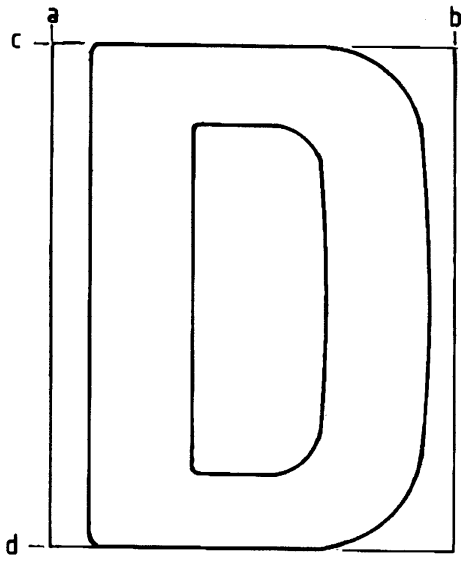


Figure 3 (continued)

Draft for comment

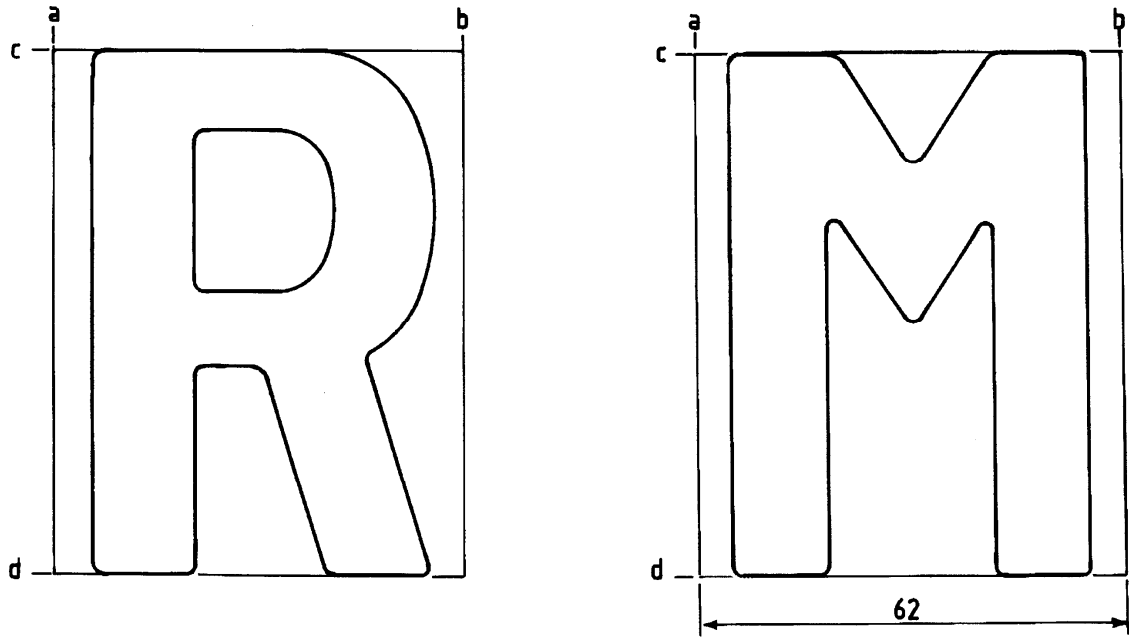
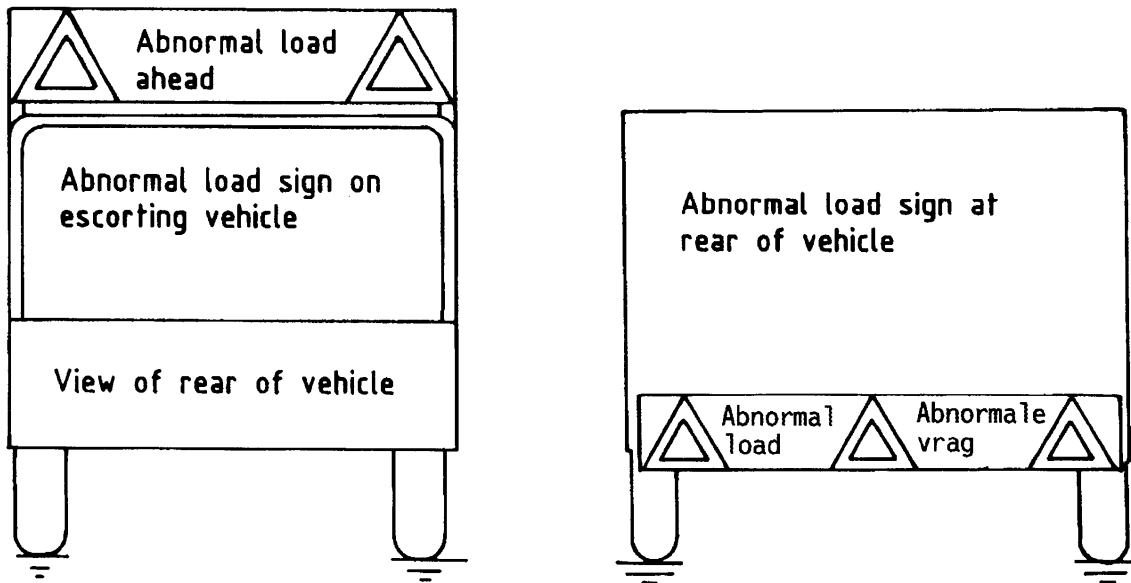


Figure 3 (concluded)

Figure 4(a) deleted by amendment No. 1.



NOTE To ensure correct mounting of these signs, the user should consult the relevant road traffic regulations.

Figure 4 — Typical locations of abnormal load signs

Draft for

**Annex A
(informative)****Notes to purchasers**

Standard

The following requirements must be specified in tender invitations and in each order or contract:

- a) the type of sign (see 4.1);
- b) the substrate material and, in the case of a plastics material, whether it is to contain a red fluorescent colorant (see 4.2.1);
- c) the material to be used for the retro-reflective and fluorescent surfaces (see 4.2.3 and 4.2.4 respectively);
- d) whether a sign is to be stiffened and whether the corners are to be rounded (see 4.3.1);
- e) the dimensions of the sign (see 4.3.2(b));
- f) the wording for an abnormal load sign (see 4.3.5);
- g) whether a sign having a substrate of material other than mild steel is to be given a protective coating (see 4.4).

Draft for comments only — Not to be

**Annex B
(informative)**

Coatings for mild steel surfaces

Standard

Mild steel surfaces should be prepared and cleaned in accordance with the relevant requirements of ISO 8502 immediately before the application of either

- a) a coat, of dry film thickness at least 25 μm , of a zinc phosphate primer that complies with the requirements of ISO 6745; or
- b) a powder-coating that has a dry film thickness of at least 75 μm and of a matt or satin finish; or
- c) a zinc/iron phosphate surface-conversion process that produces a coating mass of at least 1.0 g/m^2 , that is then immediately coated with an anti-corrosion epoxy resin primer that has a dry film thickness of at least 25 μm .

NOTE Primed coats as described in (a) and (c) above that are not further protected by the application of retro-reflective (see 4.2.2) or fluorescent materials (see 4.2.4) or matt red or black coatings (see 4.3.4) shall be top-coated with an additional coating.

Draft for comments only — Not to be cited

Annex C
(informative)**Quality evaluation of signs produced to the
requirements laid down in this part of the specification***Standard***C.1 Quality verification**

C.1.1 When a purchaser requires quality verification on an ongoing basis of signs produced to this part of the specification, it is suggested that, instead of concentrating solely on evaluation of the final product, he also direct his attention to the quality management system applied by the manufacturer. In this connection it should be noted that ISO 9001 covers the provisions of an integrated quality management system.

Draft for comments only — Not to be cited as East

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

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