



CD/K/027:2008  
ICS 43.040.65; 81.040.30

## **EAST AFRICAN STANDARD**

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**Toughened safety glass for motor vehicles — Specification**

**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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## Toughened safety glass for motor vehicles — Specification

### 1 Scope

This specification covers toughened safety glass for use in vehicles.

### 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/026:2008, *Laminated safety glass for motor vehicles — Specification*

### 3 Definitions

For the purposes of this specification the relevant definitions given in CD/K/026:2008 and the following definitions shall apply:

#### 3.1

##### **elongated particle**

a particle of which the length exceeds four times the width

#### 3.2

##### **non-uniform wide zone**

a zone extending across the greater part of the windscreen in which the stresses in the glass so vary in intensity that, if the glass is fractured, alternate areas break into fine and coarse particles respectively

#### 3.2

##### **toughened safety glass**

a single layer of glass which has been subjected to special treatment to increase its mechanical strength and to condition fragmentation when broken

#### 3.3

##### **toughened safety glass for windscreens**

safety glass, the margin of which (of a width not less than 60 mm) disintegrates upon fracture into small pieces, and having a zone (at least 400 mm x 150 mm) of modified heat treatment in which the fragmentation, if the glass is fractured, comprises sufficient pieces of larger size than elsewhere to afford better vision through the zone than through the remainder of the glass

NOTE The dimensions and location of the zone may be agreed upon between the vehicle manufacturer and the manufacturer of the safety glass, but the minimum dimensions of 400 mm x 150 mm for the size of the zone must be complied with.

#### 3.4

##### **uniform small zone**

a zone in a windscreen in front of the driver in which the stresses in the glass are substantially even throughout the zone

#### 3.5

##### **uniform wide zone**

a zone extending across the greater part of the windscreen in which the stresses in the glass are substantially even throughout the zone

### 4 Requirements

#### 4.1 Optical requirements

##### 4.1.1 General

The requirements of CD/K/026:2008 shall apply.

**4.1.2 Luminous transmittance**

When a safety glass is tested in accordance with 6.3 of CD/K/026:2008, its direct luminous transmittance (excluding that of shade bands, obscuration bands, and glass for special applications) shall be not less than 70 % for glass used for the primary field of vision of the driver and not less than 35 % for glass not used for the primary field of vision of the driver.

In the case of thick glass such as for armoured vehicles, the direct luminous transmittance shall be not less than 60 %. Shade bands on windscreens shall not extend into the principal field of vision of the driver.

**4.1.3 Secondary image**

The requirements of CD/K/026:2008 shall apply.

**4.1.4 Distortion of vision**

The requirements of CD/K/026:2008 shall apply.

**4.2 Physical requirements**

**4.2.1 Thickness of glass for windscreens**

The thickness D of the glass for windscreens shall be within the limits given in column 2 of Table 1.

**Table 1 — Thickness limits**

1	2
Nominal thickness mm	Thickness D, mm
5	$4.8 \leq D \leq 5.5$
6	$5.5 \leq D \leq 6.2$

**4.2.2 Fragmentation**

**4.2.2.1 Uniform small zone windscreen**

When tested in accordance with 7.1, there shall be

- a)
  - 1) not less than 80 and not more than 160 particles in area A for glass of nominal thickness 6 mm;
  - 2) not less than 80 and not more than 200 particles in area A for glass of nominal thickness 5 mm;
- b) not less than 40 particles in area B;
- c) not less than 60 particles in area C;
- d) no elongated particle exceeding 75 mm in length; and
- e) no particle of area exceeding 2 000 mm<sup>2</sup>.

#### 4.2.2.2 Uniform wide zone windscreen

When tested in accordance with 7.1, there shall be

- a)
  - 1) not less than 125 and not more than 250 particles in either of the circles of area A for glass of nominal thickness 6 mm;
  - 2) not less than 125 and not more than 300 particles in either of the circles of area A for glass of nominal thickness 5 mm;
- b) not less than 40 particles in area B;
- c) not less than 60 particles in area C;
- d) no elongated particle exceeding 75 mm in length outside a circle of radius 75 mm centred on the point of impact; and
- e) no particle of area exceeding 2 000 mm<sup>2</sup>.

#### 4.2.2.3 Non-uniform wide zone windscreen

When tested in accordance with 6.1, there shall be

- a) not less than 125 and not more than 400 particles in either of the circles of area A;
- b) a sufficient number of large particles in each of the circles of area A for not less than 8 discs of diameter 12.5 mm to be placed on the particles without overlapping each other or the edges of the particles (not more than 2 discs may be placed on any one particle);
- c) not less than 40 particles in area B;
- d) not less than 60 particles in area C;
- e) no elongated particle exceeding 75 mm in length outside a circle of radius 75 mm centred on the point of impact; and
- f) no particle of area exceeding 2 000 mm<sup>2</sup>.

#### 4.2.2.4 Glass other than windscreens

When tested in accordance with 7.1, there shall be

- a) not less than 40 particles in area A; and
- b) either
  - 1) not less than 60 particles in area B; or
  - 2) not less than 40 particles in area B and not less than 240 particles in area C.

## 5 Marking

5.1 Each toughened safety glass product shall be distinctly and durably marked with the following information:

- a) manufacturer's name or registered trade name or registered trade mark or any of these;
- b) the word "Toughened" or "Tempered";

- c) the letter "W" in the case of safety glass for windscreens;
- d) the letters "LHD" in the case of a windscreen having a zone situated such that it is only intended for use in a left-hand drive vehicle.

## 6 Sampling and compliance with the specification

6.1 The requirements of CD/K/026:2008 shall apply.

## 7 Method of test

### 7.1 Fragmentation test

#### 7.1.1 Apparatus

- a) A punch having a spherical tip of radius  $0.2 \pm 0.05$  mm with which to cause fragmentation;
- b) Photographic paper and a light source suitable for making a contact print of the fractured glass; and
- c) A polariscope to determine the position of the zone.

#### 7.1.2 Test specimen

A safety glass product selected from the manufacturer's production.

#### 7.1.3 Points of impact

- a) **Small zone windscreen.** The point that is 13 mm from the edge of the glass furthest from the zone and that lies on the line that passes through the geometrical centre of the zone and that is parallel to the longitudinal edge of the windscreen nearer the zone.
- b) **Wide zone windscreen (uniform and non-uniform).** At the centre of the zone.
- c) **Glass other than windscreens.** At the midpoint of the longest side of the glass and 13 mm from the edge.

#### 7.1.4 Areas of assessment (see figure 1)

##### 7.1.4.1 Uniform small zone windscreens

- a) **Area A.** A square of side 100 mm in the region of coarsest fragmentation in the zone.
- b) **Area B.** A square of side 50 mm in the region of coarsest fragmentation in the two segments S. The segments S of radius 75 mm are centred one on each of the two long sides of the windscreen in the regions of coarsest fragmentation.
- c) **Area C.** A square of side 50 mm in the region of coarsest fragmentation outside the zone, but excluding a segment of radius 75 mm centred on the point of impact and extending to the edge of the glass, and also excluding the two segments S.

##### 7.1.4.2 Wide zone windscreen (uniform and non-uniform)

- a) **Area A.** Two circles of radius 71 mm centred within 25 mm of points 230 mm from and on either side of the point of impact and at the midheight of the zone. (For windscreens with zones of length less than 760 mm but not less than 580 mm, the circles are positioned not less than 75 mm from the ends of the zone or from the point of impact.)

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- b) **Area B.** A square of side 50 mm in the region of coarsest fragmentation in the six segments S. The segments S of radius 60 mm are centred, three on the top edge and three on the bottom edge of the glass opposite to, and on either side of, the point of impact.
- c) **Area C.** A square of side 50 mm situated in the region of coarsest fragmentation along the periphery of the glass, but not in any of the six segments S.

#### 7.1.4.3 Glass other than windscreens

- a) **Area A.** A square of side 50 mm in the region of coarsest fragmentation in two segments S. The segments S of radius 75 mm are centred on the edge of the glass opposite to, and on either side of, the point of impact.
- b) **Area B.** A square of side 50 mm in the region of coarsest fragmentation excluding a segment of radius 75 mm centred on the point of impact and also excluding the two segments S.
- c) **Area C.** A square of side 100 mm in the region of coarsest fragmentation totally including area B and excluding a segment of radius 75 mm centred on the point of impact and also excluding the two segments S.

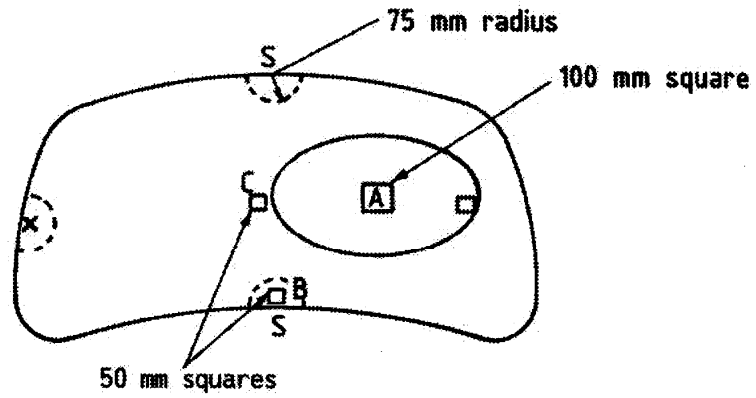
NOTE If the squares of areas B and C encroach upon the periphery of the glass or any of the segments, the counts are made in rectangles of equivalent areas.

#### 7.1.5 Procedure

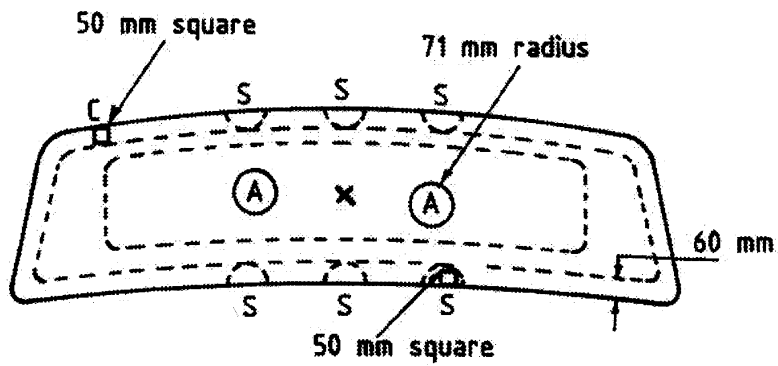
Place a piece of photographic paper between the test specimen and an identical piece of glass. Tape the two glasses together all round the edges by means of adhesive tape. Break the test specimen by punching it with the punch at the prescribed point of impact. Make a contact print of the fragmented test specimen beginning exposure within 10s and terminating not more than 3 min after impact.

Take into consideration only the darkest lines on the contact print, representing the initial fragmentation. Check the fragmentation for compliance with the relevant requirements of 4.2.2.

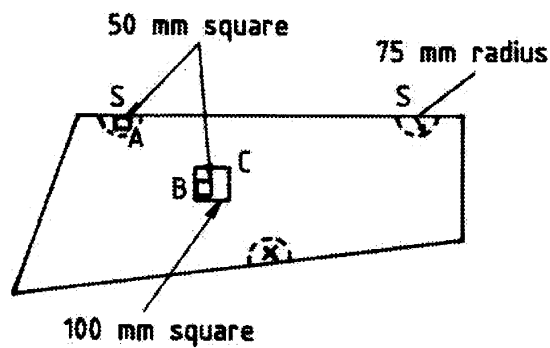
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Uniform small zone windscreen



Wide zone windscreen (uniform and non-uniform)



Glass other than windscreens

NOTE This figure should be read in conjunction with 7.1.4.

Figure 1 — Areas of assessment

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