INTERNATIONAL STANDARD

ISO 3917

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Road vehicles — Safety glazing materials — Test methods for resistance to radiation, high temperature, humidity, fire and simulated weathering

Véhicules routiers — Vitrage de sécurité — Méthodes d'essai de résistance au rayonnement, aux températures élevées, à l'humidité, au feu et aux intempéries simulées

Reference number
ISO 3917:1992(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 3917 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Sub-Committee SC 11, *Safety glazing materials*.

This second edition cancels and replaces the first edition (ISO 3917:1976), of which it constitutes a technical revision.

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Road vehicles — Safety glazing materials — Test methods for resistance to radiation, high temperature, humidity, fire and simulated weathering

1 Scope

This International Standard specifies test methods for resistance to radiation, high temperature, humidity, fire and simulated weathering, relating to the safety requirements for all safety glazing materials in a road vehicle, whatever the type of glass or the material of which they are composed. Terms used are in conformity to ISO 3536.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3536:1992, *Road vehicles — Safety glazing materials — Vocabulary.*

ISO 3537:—[1], *Road vehicles — Safety glazing materials — Mechanical tests.*

ISO 3538:1978, *Road vehicles — Safety glasses — Test methods for optical properties.*

ISO 3795:1989, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials.*

ISO 4892:1981, *Plastics — Methods of exposure to laboratory light sources.*

ISO 4892-2:—[2], *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon arc sources.*

ISO 4892-4:—[2], *Plastics — Methods of exposure to laboratory light sources — Part 4: Open-flame carbon arc lamp.*

3 Test conditions

Unless otherwise specified, the tests shall be carried out under the following conditions:

Ambient temperature: 20 °C ± 5 °C

Atmospheric pressure: 86 kPa to 106 kPa (or 860 mbar to 1 060 mbar)

Relative humidity: (60 ± 20) %

4 Application of tests

For certain types of safety glazing material, it is not necessary to carry out all the tests specified in this International Standard when the results, according to the purpose of testing, can be predicted with certainty from knowledge of the properties of the safety material concerned.

5 Radiation test

5.1 Principle

Determination of whether exposure to radiation over an extended period of time produces any appreciable decrease in regular luminous transmittance or any pronounced discoloration of the safety glazing material.

1) To be published. (Revision of ISO 3537:1975)

2) To be published.

5.2 Apparatus

5.2.1 Radiation source consisting of a medium-pressure mercury arc lamp with a tubular quartz bulb of ozone-free type; the bulb axis shall be vertical. The nominal dimensions of the lamp shall be 360 mm in length by 9,5 mm in diameter. The arc length shall be 300 mm $\pm$ 14 mm. The lamp shall be operated at 750 W $\pm$ 50 W.

Any other source of radiation which produces the same effect as the lamp specified above may be used. To check that the effects of another source are the same, a comparison shall be made by measuring the amount of energy emitted within a wavelength range of 300 nm to 450 nm, all other wavelengths being removed by the use of suitable filters. The alternative source shall then be used with these filters.

In the case of safety glazing material for which there is no satisfactory correlation between this test and the conditions of use, it will be necessary to review the test conditions.

5.2.2 Power supply transformer and **capacitor** which shall be capable of supplying to the lamp (5.2.1) a starting peak voltage of 1 100 V minimum and an operating voltage of 500 V $\pm$ 50 V.

5.2.3 Device for mounting and rotating the test specimens at 1 r/min to 5 r/min about the centrally located radiation source in order to ensure even exposure.

5.3 Test specimen

The size of the test specimens shall be 76 mm × 300 mm.

5.4 Procedure

Measure the regular luminous transmittance, determined according to ISO 3538, of three test specimens before exposure. Protect a portion of each test specimen from the radiation, and then position the test specimen in the test apparatus 230 mm from, and with its 300 mm dimension parallel to, the lamp axis. Maintain the temperature of the test specimens at 45 °C $\pm$ 5 °C throughout the test.

The surface of each test specimen which would represent the outside face of the safety glazing material when mounted on the vehicle shall face the lamp. For the type of lamp specified in 5.2.1, the exposure time shall be 100 h.

After exposure, measure the luminous transmittance again on each test specimen in the exposed area.

5.5 Expression of results

The results of the luminous transmission measurement of the exposed test specimen shall be compared with the values obtained for unexposed test specimens of the same material. The deviation shall be expressed as a percentage.

Changes in colour shall be evaluated:

— either by examining the test specimens placed upon a white background and comparing the exposed area with the area which was protected from the radiation;

— or by measuring the trichromatic co-ordinates of the test specimen before and after ageing and by calculating the difference between two colours according to the CIE[3] prescriptions.

6 High temperature test

6.1 Principle

Determination of whether the safety glazing material will withstand exposure to high temperatures over an extended period of time without its appearance becoming substantially altered.

6.2 Procedure

Heat one or more test specimens of at least 300 mm × 300 mm to 100 °C $^{0}_{-2}$ °C. Maintain this temperature for a period of 2 h, then allow the test specimen(s) to cool to room temperature.

If the safety glazing material has both external surfaces of inorganic material, the test may be carried out by immersing the test specimen vertically in water boiling at 100 °C $^{0}_{-2}$ °C for the specified period of time, care being taken to avoid undue thermal shock.

If specimens are cut from windscreens, one edge of the test specimen shall be part of an edge of the windscreen.

6.3 Expression of results

The resistance of the safety glazing material to high temperatures shall be evaluated with reference to bubbles or other defects produced in the test specimen by the above test.

Any defects within 15 mm of an uncut edge, 25 mm from a cut edge or within 10 mm of any cracks which may develop shall be disregarded.

Any test specimen in which cracks develop to an extent which might confuse the results shall be dis-

3) International Commission on Illumination.