



SLOVENSKI STANDARD
SIST EN 2155-19:2001
01-junij-2001

Aerospace series - Test methods for transparent materials for aircraft materials for aircraft glazing - Part 19: Determination of craze resistance

Aerospace series - Test methods for transparent materials for aircraft materials for aircraft glazing - Part 19: Determination of craze resistance

Luft- und Raumfahrt - Prüfverfahren für transparente Werkstoffe zur Verglasung von Luftfahrzeugen - Teil 19: Bestimmung der Spannungsrißbeständigkeit

Série aérospatiale - Méthodes d'essais pour matériaux transparents pour vitrages aéronautiques - Partie 19: Détermination de la résistance au fendillement "crazing"

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Ta slovenski standard je istoveten z: EN 2155-19:1996

ICS:

49.045 Konstrukcija in konstrukcijski elementi Structure and structure elements

SIST EN 2155-19:2001

en

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EUROPEAN STANDARD

EN 2155-19

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 1996

ICS 49.040.10

Descriptors: aircraft industry, glazing, translucent glasses, transparent plastic, test, determination, crack strength

English version

**Aerospace series - Test methods for transparent
materials for aircraft glazing - Part 19:
Determination of craze resistance**

Série aérospatiale - Méthodes d'essais pour
matériaux transparents pour vitrages
aéronautiques - Partie 19: Détermination de la
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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 1997, and conflicting national standards shall be withdrawn at the latest by February 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This standard specifies the test method to determine the resistance of transparent sheet to the effect of a solvent environment while subjected to a load. No method has been developed yet for specimens with a thickness < 6 mm ; for such material, a test method shall be agreed between the manufacturer and the purchaser.

2 Definition

For the purposes of this standard, the following definition applies :

The craze resistance is defined as the absence of crazing (micro-cracks) when propanol-2 (isopropyl alcohol) is applied under controlled conditions for a period of 30 min to the surface of a specimen experiencing a fibre stress as stated in the material standard.

3 Apparatus and materials

- 3.1 A cantilever loading arrangement as shown in figure 1
- 3.2 Suitable masses to be hung from the loading point to induce the required stress
- 3.3 Propanol-2 (isopropyl alcohol) of analytical quality
- 3.4 Filter paper

4 Specimens

- 4.1 The specimens shall be cut from a sheet and shall have a high polish and be free from surface damage.
- 4.2 Specimens shall be cut of dimensions $175 \text{ mm} \times (25 \pm 1) \text{ mm} \times (6 \pm 0,5) \text{ mm}$; the cut edges shall be machined smooth. Material with a thickness > 6 mm shall be machined on one face only to 6 mm thickness and the non-machined face shall be tested.
- 4.3 A hole of 6 mm diameter shall be drilled with its centre 15 mm from one end and on the centre line of the specimen to facilitate loading (see figure 1).

Dimensions in millimetres

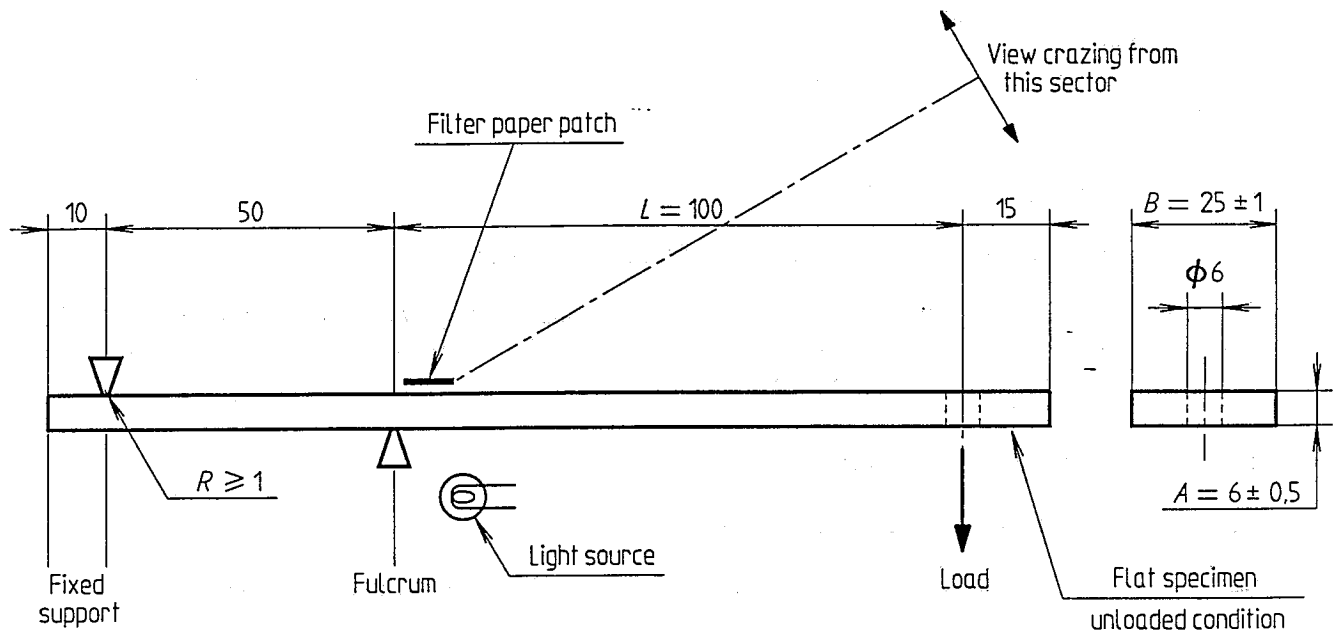


Figure 1 : Loading condition for flat sheet

5 Conditioning

5.1 The specimens shall be conditioned at $(23 \pm 2)^\circ\text{C}$, $(50 \pm 5)\%$ relative humidity for at least 48 h prior to testing under the same conditions.

5.2 The apparatus and solvent (in a suitably stoppered container) shall be pre-conditioned as for the specimens.

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6 Procedure

6.1 For unstretched material the test specimens shall be freely suspended in an air-circulating oven and maintained at a temperature of $(155 \pm 2)^\circ\text{C}$ for a period of 30 min. After allowing to cool to room temperature under draught-free conditions the specimens are annealed in an air-circulating oven to the manufacturer's instructions, then allowed to cool to room temperature under draught-free conditions. After annealing and cooling the width and thickness shall be measured at the position of the fulcrum with an accuracy of $\pm 0,02$ mm.

6.2 For stretched acrylic material the test specimens shall be freely suspended in an air-circulating oven and maintained at a temperature of $(75 \pm 2)^\circ\text{C}$ for a period of 16 h and then allowed to cool under draught-free conditions. Prior to testing the width and thickness shall be measured at the position of the fulcrum with an accuracy of $\pm 0,02$ mm.

6.3 The specimens shall be set up as cantilever beams and loaded with the specified outer fibre stress which is calculated from the following formula :

$$\text{load (newtons)} = \frac{\sigma B A^2}{6 L}$$

where :

- σ is the outer fibre stress, in megapascals;
- B is the specimen width measured, in millimetres;
- A is the specimen thickness measured, in millimetres;
- L is the distance from the fulcrum point to the load application point, in millimetres, measured to the nearest 0,1 mm.

6.4 After application of the load for 10 min and while still under load, propanol-2 (isopropyl alcohol) shall be applied to each specimen by means of a 20 mm x 20 mm filter paper patch placed on the upper surface and centered on the fulcrum and kept wet with the solvent.

6.5 The filter paper patch shall be removed after 30 min and the specimen examined for evidence of crazing.

6.6 There shall be no crazing (group of cracks) on the tested surface. Individual cracks shall be disregarded.

Unless the cracks are over 3 mm in length, edge crazing shall be disregarded.

7 Test report

The test report shall include the following:

- number of this standard;
- material type;
- batch number;
- stress applied;
- appearance of specimen after test;
- compliance/non-compliance with the requirements of 6.6.

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