

Glass in building — Security glazing — Testing and classification of resistance against manual attack

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National foreword

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The UK participation in its preparation was entrusted by Technical Committee B/520, Glass and glazing in building, to Subcommittee B/520/3, Security glazing, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This British Standard supersedes BS 5544:1978 immediately for the testing and classification of glass and glass/plastics composites. BS 5544 will however remain available for the testing and classification of plastics glazing sheet materials until a corresponding British Standard is published for these products.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 19 and a back cover.

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Glas im Bauwesen - Sicherheitssonderverglasung - Prüfverfahren und Klasseneinteilung des Widerstandes gegen manuellen Angriff

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 129, Glass in building, the Secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by May 2000, and conflicting national standards shall be withdrawn at the latest by May 2000.

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

Introduction

This European Standard assesses security glazing products that are more familiarly known as “anti-bandit” and “anti-vandal” glazing products. Because there is no single test that will cover the wide range of resistances to attack, two separate test methods are used to give a continuous range of categories of resistance. It is not intended that either test method be associated with the terms “anti-bandit” or “anti-vandal”, particularly since these terms can be only loosely defined and there is considerable overlap in their definition.

The test methods specified in this standard do not reproduce the conditions of real human attack, but are intended to give a classification of comparative resistance.

1 Scope

This European Standard specifies requirements and test methods for security glazing designed to resist actions of force by delaying access of objects and/or persons to a protected space for a short period of time. This standard classifies security glazing products into categories of resistance to actions of force.

In this European Standard, the categories of resistance have not been assigned to special applications. Selection of categories should be made by the user for every individual case, after consulting an expert if necessary.

NOTE 1: Security glazing products should be installed in a frame which can give appropriate resistance to attack and which also provides a suitable support for the security glazing product.

NOTE 2: Cut-outs and holes in security glazing products should be avoided where possible, as these can affect the resistance of the product.

This European Standard deals with mechanical resistance to attack only. Other properties can also be important, for which separate standards will be prepared.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

ISO 48:1994 Rubber, vulcanised or thermoplastic - Determination of hardness (hardness between 10 IRHD and 100 IRHD).

ISO 6508 Metallic materials - Hardness test - Rockwell test (scales A-B-C-D-E-F-G-H-K).

3 Definitions

For the purposes of this standard, the following definitions apply.

3.1 **security glazing product** a product based on glass with or without plastics with a single or multiple ply construction, where the individual plies are of uniform thickness over the whole area of the product

NOTE: A security glazing product is usually transparent or translucent, and provides a specific resistance to the actions of force.

3.2 **security glazing composition** a specific construction of a security glazing product

NOTE: A product is deemed to be of the same security glazing composition if

- individual plies are exchanged with others of a different colour, but without significant effect on the resistance to actions of force;

and/or

- additional glazing products are installed on either face of the security glazing product, laminated to it or with an air space;

and/or

- additional equipment such as alarm wires, heating wires, printing, or surface coatings (on part or all of the surface) are incorporated into the security glazing product, provided that this does not significantly affect the resistance to actions of force.

3.3 **protected space** the space protected against access by the completed installation

3.4 **action of force** a deliberate action on the part of a person made with the intention of creating a hole in the security glazing product by the use of manually held implements or by the use of thrown objects

3.5 **test piece** a specified piece of security glazing product submitted to a specified test procedure

3.6 **sample** a specified number of test pieces which together are representative of the security glazing product intended to comply with a particular category of resistance in this European Standard

3.7 **category of resistance** a classification of the capability of a security glazing product to resist actions of force

4 Symbols

α_i	angle of impact, measured between the surface of the test piece and the handle, see Figure 5
E_i	impact energy of the hammer or axe
n_1, n_2	number of axe strikes
r_1	radius of the blade of the axe head
v_i	impact velocity of the hammer or axe
x	length of slit in the security glazing product formed by the axe blade

5 Sampling

The sample submitted for type testing shall consist of three test pieces for each category for which testing is required.

NOTE: To ensure against invalid test results because of errors during the test, it is advisable to submit at least one extra test piece.

Each test piece shall be $(1\,100 \pm 5)$ mm long $\times$ (900 ± 5) mm wide. The edges shall be free from visible chips, cracks and flaws. Glass samples should be lightly abraded for ease of handling.

The surface to be impacted shall be marked on each test piece.

Each test piece shall be stored vertically and self-supporting at the test temperature, for at least 12 hours immediately prior to the test.

6 Apparatus

6.1 Hard body drop test

6.1.1 Impactor

The impactor (hard body) shall be a steel sphere with a diameter of $(100 \pm 0,2)$ mm and a mass of $(4,11 \pm 0,06)$ kg. The sphere shall be manufactured from polished steel with a hardness of 60 HRC to 65 HRC on the Rockwell C scale according to ISO 6508.

6.1.2 Impactor holding equipment

The equipment for holding the impactor shall enable adjustment of the drop height to the required tolerance (see Table 1). The equipment for holding the impactor and the mechanism for releasing the impactor shall not induce any momentum or rotation in the impactor, so that the impactor is accelerated only by gravitational forces and falls vertically.