EN 1522

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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ICS 13.310; 91.060.50

Descriptors: windows, doors, closures, mechanical strength, shock resistance, fire arms, tests, specifications, classifications, testing conditions, accident prevention

English version

Windows, doors, shutters and blinds — Bullet resistance — Requirements and classification

Fenêtres, portes, fermetures et stores — Résistance aux balles — Prescriptions et classification

Fenster, Türen, Abschlüsse — Durchschußhemmung — Anforderungen und Klassifizierung

This European Standard was approved by CEN on 4 September 1998.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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

Ref. No. EN 1522:1998 E

1 Scope

This standard defines the requirements and classification that windows, doors, shutters and blinds must satisfy when tested in accordance with EN 1523.

This standard is applicable to attacks by hand guns, rifles and shotguns on windows, doors, shutters and blinds complete with their frames and infills, for use in both internal and external locations in buildings. Shutters and blinds must be tested separately and not in conjunction with a window or door, in order to achieve classification in terms of bullet resistance.

This standard gives no information on the behaviour of the test item when subjected to other types of stresses.

It gives no information on the bullet resistance of the junction between the frame and the wall or other surrounding structure.[1)]

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.

EN 1523:1998, *Windows, doors, shutters and blinds — Bullet resistance — Test method.*

prEN 1063, *Specification for security glazing — Bullet resistant glazing — Classification and test methods.*

prEN 12216, *Blind and shutters — Terminology*

prEN 12519, *Doors and windows — Terminology*

3 Definitions

For the purposes of this European Standard, the definitions given in prEN 12519 and prEN 12216 apply.

4 Requirements

Any glass infill in the test specimen shall be of bullet resisting glass conforming to the appropriate class of prEN 1063 in accordance with Tables 1 and 2. If the test specimen contains a higher class level of glass, this must be stated in the test report and test report summary.

After the test in accordance with EN 1523 the door leaf and/or any opening window casement, sash or curtain of a shutter or blind shall remain retained in the closed position, whether or not the opening mechanisms are still operable, and it shall not be possible to gain access from the attack face to any operating mechanism which remains in operable condition. It is not a requirement of the test that performance in other respects such as air permeability, watertightness, wind resistance etc. be maintained.

Resistance to perforation by weapons and ammunition listed in Tables 1 and 2 shall be classified in accordance with clause 5. To achieve a particular class of bullet resistance, the test specimen shall show no perforation when tested in accordance with EN 1523 using the ammunition appropriate to that class as shown in Table 1 or 2.

To obtain classes FB4 or FB6 the test specimen shall be tested with ammunition of both calibres indicated.

5 Classification

The classes FB1 to FB7 given in Table 1 are in order of increasing resistance to perforation. Class FB1 represents the lowest bullet resistance, and class FB7 the highest e.g. FB4 includes FB3, FB2, FB1 and where necessary the testing institute shall conduct additional tests in the lower classes to confirm this.

Test specimens which fail to meet class FB1 cannot be described as offering bullet resistance.

Results of the tests shall be qualified by the addition of an "S" or "NS" suffix according to the presence or absence of splinters.

EXAMPLE

FB1(S), FB1(NS), etc.

[1)] Care should be taken to ensure that all joints between the wall and the door, window, shutter or blind have bullet protection which is at least equal to that of the door, window, shutter or blind.

Table 1 — Classification and requirements for testing with hand guns and rifles

Class	Type of weapon	Calibre	Bullet		Test condition	
			Type	Mass g	Test range m	Bullet velocity m/s
FB1	rifle	22 LR	L/RN	2,6 ± 0,1	10 ± 0,5	360 ± 10
FB2	hand gun	9 mm Luger	FJ[1]/RN/SC	8,0 ± 0,1	5 ± 0,5	400 ± 10
FB3	hand gun	357 Mag.	FJ[1]/CB/SC	10,2 ± 0,1	5 ± 0,5	430 ± 10
FB4	hand gun	357 Mag.	FJ[1]/CB/SC	10,2 ± 0,1	5 ± 0,5	430 ± 10
	hand gun (see note)	44 Rem. Mag.	FJ[2]/FN/SC	15,6 ± 0,1	5 ± 0,5	440 ± 10
FB5	rifle	5,56 × 45*	FJ[2]/PB/SCP1	4,0 ± 0,1	10 ± 0,5	960 ± 10
FB6	rifle	5,56 × 45*	FJ[2]/PB/SCP1	4,0 ± 0,1	10 ± 0,5	960 ± 10
	rifle (see note)	7,62 × 51	FJ[1]/PB/SC	9,5 ± 0,1	10 ± 0,5	830 ± 10
FB7	rifle	7,62 × 51**	FJ[2]/PB/HC1	9,8 ± 0,1	10 ± 0,5	820 ± 10

L lead
CB coned bullet
FJ full metal jacket bullet
FN flat nose bullet
HC1 steel hard core, mass (3,7 ± 0,1) g
hardness more than 60 HRC
PB pointed bullet
RN round nose bullet
SC soft core (lead)
SCP1 soft core (lead) with steel penetrator (type SS109)

FJ[1] = full steel jacket (plated)
FJ[2] = full copper alloy jacket

* To achieve the stated values for (5,56 × 45), the recommended barrel twist length = (178 ± 10) mm.
** To achieve the stated values for class FB7, the recommended barrel twist length = (254 ± 10) mm.

NOTE 1 When a shot is to be fired at a single point the test range may be reduced to achieve the firing accuracy as defined in Section 6 of EN 1523:1998. In this case it may not be possible to measure the velocity of the bullet.

NOTE 2 To be classified FB4 or FB6 the specimen shall be tested with both calibres listed.

Table 2 — Classification and requirements for testing with shotguns

Class	Type of weapon	Calibre	Bullet		Test condition	
			Type	Mass g	Test range m	Bullet velocity m/s
FSG	shotgun	12/70	Solid lead slug[3]	31 ± 0,5	10 ± 0,5	420 ± 20

[3] = Brenneke.

Table 3 — Class for use in test

Class	Minimum class of glass to be used in test (in accordance with prEN 1063)
FB1	BR1
FB2	BR2
FB3	BR3
FB4	BR4
FB5	BR5
FB6	BR6
FB7	BR7
FSG	SG2

3 Definitions

For the purposes of this European Standard, the following definitions apply :

3.1 **bullet-resistant glazing:** A security glazing that affords a defined resistance against the firing of specified weapons and ammunition.

NOTE: The glass or plastics component of an unitary bullet-resistant panel may be separated by airspace.

3.2 **sample:** A number of nominally identical glazing units offered for type-testing for a certain class.

3.3 **test piece:** One member of the sample prepared for testing.

3.4 **witness foil:** Sheet of aluminium foil as specified in 7.1.3 behind the test piece in order to detect splinters ejected from the rear face of the test piece by the impact of the bullet and to determine the risks of injury due to the ejection of these splinters.

3.5 **attack face:** The face of a bullet-resistant glazing, marked by the manufacturer and/or supplier that is designed to face the attack.

3.6 **perforation:** Piercing of a test piece by a bullet or by bullet fragments, and/or creation of an opening from the attack face to the rear face.

3.7 **striking distance:** The distance between the centres of two strikes on a test piece.

3.8 **bullet velocity:** The velocity of the bullet measured within 2,5 m in front of the attack face of the test piece.

3.9 **test range:** The distance between the muzzle of the firearm and the attack face of the test piece.

4 Classification of the levels of bullet-resistance and test conditions

The bullet-resistance glazing intended to withstand certain levels of attack shall be classified as BR1, BR2, BR3, BR4, BR5, BR6, BR7 according to table 1 and SG1 and SG2 according to table 2.

Table 1: Classification and test requirements for testing the bullet resistance of glazing: hand guns and rifles

Class	Type of weapon	Calibre	Type	Mass g	Test conditions			
					test range m	bullet velocity m/s	nr. of strikes	striking distance mm
BR1	rifle	0.22 LR	L/RN	2,6 ±0,1	10,00 ±0,5	360 ±10	3	120 ±10
BR2	hand gun	9mm Luger	FJ[1]/RN/SC	8,0 ±0,1	5,00 ±0,5	400 ±10	3	120 ±10
BR3	hand gun	0.357 Magnum	FJ[1]/CB/SC	10,2 ±0,1	5,00 ±0,5	430 ±10	3	120 ±10
BR4	hand gun	0.44 Rem. Magnum	FJ[2]/FN/SC	15,6 ±0,1	5,00 ±0,5	440 ±10	3	120 ±10
BR5	rifle	5.56 x 45 *	FJ[2]/PB/SCP 1	4,0 ±0,1	10,00 ±0,5	950 ±10	3	120 ±10
BR6	rifle	7.62 x 51	FJ[1]/PB/SC	9,5 ±0,1	10,00 ±0,5	830 ±10	3	120 ±10
BR7	rifle	7.62 x 51 **	FJ[2]/PB/HC1	9,8 ±0,1	10,00 ±0,5	820 ±10	3	120 ±10

1) full steel jacket (plated)
2) full copper alloy jacket

* twist length 178 mm ± 10 mm
** twist length 254 mm ± 10 mm

L - lead
CB - coned bullet
FJ - full metal jacket bullet
FN - flat nose
HC1 - steel hard core, mass 3,7 g ± 0,1 g, hardness more than 63 HRC
PB - pointed bullet
RN - round nose
SC - soft core (lead)
SCP1 - soft core (lead) and steel penetrator (type SS109)

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.

The main requirement for bullet-resistant glazing is to prevent the passage of projectiles from various types of weapon. The classification of bullet-resistance of glazing in this standard is a technical classification, based on common weapons and ammunition, in order of attacking power. As the variety of weapons and ammunition does not allow them all to be taken into account, a selection had to be made that covers most weapons and ammunition. The choice of bullet-resistant glazing is established by the user for each individual case.

1 Scope

This standard specifies performance requirements and test methods for the classification of the bullet-resistance of glass (consisting of one or more layers of glass) and glass/plastic composites.

> NOTE 1: The term "bullet-resistant glazing" applies to products that have the obvious characteristics of glass, but it is understood to include also laminated products of glass and plastics.

This standard applies to:

-attack by handguns, rifles and shotguns;
-glazing in buildings, for interior and exterior use;

> NOTE 2: For interior use at a temperature of 18 ± 5 °C. For exterior use the influence of outside temperature and weathering should be considered. Any additional requirements should be agreed between the purchaser and the vendor.

-the glazing product itself, assuming proper fixing;

> NOTE 3: The protection provided by bullet-resistant glazing depends not only on the product itself, but also upon the design and fixing of the glass.

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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 amendment or revision. For undated reference, the latest edition of the publication refered to applies.

ISO 48 Vulcanized rubbers. Determination of hardness (Hardness between 30 and 85 IRHD)