

EUROPEAN STANDARD

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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.



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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 33 "Doors, windows, shutters and building hardware", the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by April 1999, and conflicting national standards shall be withdrawn at the latest by April 1999.

This standard includes an Informative Annex giving criteria for testing the bullet resistance of Windows, doors, shutters and blinds with some calibres of ammunition other than those shown in tables 1 and 2 of this Standard.

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.

## 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 behavior 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.<sup>1)</sup>

## 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.

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<sup>1)</sup> 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.

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.

**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 <sup>(1)</sup> /RN/SC	8,0 ± 0,1	5 ± 0,5	400 ± 10
FB3	hand gun	357 Mag.	FJ <sup>(1)</sup> /CB/SC	10,2 ± 0,1	5 ± 0,5	430 ± 10
FB4	hand gun	357 Mag.	FJ <sup>(1)</sup> /CB/SC	10,2 ± 0,1	5 ± 0,5	430 ± 10
	hand gun (see note)	44 Rem. Mag.	FJ <sup>(2)</sup> /FN/SC	15,6 ± 0,1	5 ± 0,5	440 ± 10
FB5	rifle	5,56 x 45*	FJ <sup>(2)</sup> /PB/SCP1	4,0 ± 0,1	10 ± 0,5	950 ± 10
FB6	rifle	5,56 x 45*	FJ <sup>(2)</sup> /PB/SCP1	4,0 ± 0,1	10 ± 0,5	950 ± 10
	rifle (see note)	7,62 x 51	FJ <sup>(1)</sup> /PB/SC	9,5 ± 0,1	10 ± 0,5	830 ± 10
FB7	rifle	7,62 x 51**	FJ <sup>(2)</sup> /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 63 HRC PB pointed bullet RN round nose bullet SC soft core (lead) SCP1 soft core (lead) with steel penetrator (type SS109)			FJ <sup>(1)</sup> = full steel jacket (plated) FJ <sup>(2)</sup> = full copper alloy jacket			
* To achieve the stated values for [5.56 x 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 <sup>3)</sup>	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

## **Annex A (informative)**

### **Some types and calibres of ammunition other than those shown in tables 1 and 2**

Tables 1 and 2 indicate the most common ammunition available in the European market. For this reason, these types and calibres have been chosen for the tests which form the basis for this European Standard for the classification of bullet resistance.

Countries may have threats from ammunition of other types and calibres and may require tests to be carried out with these. Table A.1 indicates some of these types and calibres of ammunition, together with criteria for interpreting the test results.

Any such test should be conducted in accordance with EN 1523 but classification in accordance with this European Standard is not permitted.

The results of such tests should not be compared with classes FB1 to FB7 and FSG.



**Table A.1 : Criteria for testing with ammunition of some types and calibres other than those shown in Tables 1 and 2**

Type of weapon	Calibre	Bullet		Test condition	
		Type	Mass g	Test range m	Bullet velocity m/s
shotgun	12/70	SP <sup>(4)</sup> /FS	17,9 ± 0,1	10 ± 0,5	605 ± 30
rifle	5,56 x 45	FJ <sup>(2)</sup> /PB/HC2	3,45 ± 0,1	10 ± 0,5	980 ± 10
rifle	8 x 68 S	FJ <sup>(1)</sup> /RN/SC	12,7 ± 0,1	10 ± 0,5	880 ± 10
rifle	5,56 x 45	FJ <sup>(1)</sup> /PB/SC	4,1 ± 0,1	10 ± 0,5	905 ± 10
rifle	7,5 x 55	FJ <sup>(1)</sup> /PB/SC	11,3 ± 0,1	10 ± 0,5	760 ± 10
rifle	7,62 x 39	FJ <sup>(1)</sup> /PB/SC	8,0 ± 0,1	10 ± 0,5	700 ± 10
rifle	5,45 x 39	FJ <sup>(1)</sup> /PB/SCP2	3,45 ± 0,1	10 ± 0,5	910 ± 10
rifle	7,62 x 51	FJ <sup>(1)</sup> /PB/HC3	8,45 ± 0,1	10 ± 0,5	960 ± 20
rifle	7,62 x 51	FJ <sup>(2)</sup> /PB/HC4	9,5 ± 0,1	10 ± 0,5	870 ± 10
rifle	5,56 x 45	FJ <sup>(2)</sup> /PB/HC5	4,0 ± 0,1	10 ± 0,5	970 ± 10
FJ		full metal jacket bullet		FJ <sup>(1)</sup> = full steel jacket (plated)	
FS		full steel		FJ <sup>(2)</sup> = full copper alloy jacket	
HC2		steel hard core, mass (1,17 ± 0,1) g hardness more than 63 HRC		SP <sup>(4)</sup> = spherical ball	
HC3		steel hard core, mass (6,0 ± 0,1) g hardness more than 63 HRC			
HC4		steel hard core, mass (4,3 ± 0,04) g hardness more than 63 HRC			
HC5		steel hard core, mass (0,61 ± 0,02) g hardness more than 63 HRC			
PB		pointed bullet			
RN		round nose			
SC		soft core (lead)			
SCP2		soft core (lead) with steel penetrator			