

## FORZA DOORS

### The Correct Glass & Timber Screen for the Correct Application

Forza glazed timber frame screens not only provide the correct level of fire resistance (integrity and insulation) and acoustic performance for a designated area but also ensure the correct structural guidelines are adhered to as recommended in Building Control Regulations and British Standards.

The following notes, extracts, diagrams and tests indicate how Forza screens comply with the relevant UK standards and Building control.

British Standard: **Barriers in and about Buildings, Code of Practice. BS 6180 -2011**

**Definition of a barrier;** "element of building or structure, permanent or temporary, intended to prevent persons from falling and to retain, stop or guide persons".

**Types of barrier incorporating glass:** Full height barrier: "Where glass forms part or whole of a wall element, the barrier should be designed in accordance with BS 6180 if any part of the glass comes below the minimum barrier height" (h. Other positions 1100mm).

#### Minimum horizontal imposed loads for parapets, barriers and balustrades

Type of occupancy for part of the building / structure	Example of specific use	Horizontal uniformly distributed line load (kN/m)	Uniformly distributed load applied to the infill (kN/m <sup>2</sup> )	A point load applied to part of the infill
Offices and work areas not included elsewhere, includes storage areas	(v) Areas not susceptible to overcrowding in office and institutional buildings, also industrial & storage buildings	0.74	1	0.5
Areas where people might congregate	(vi) Areas having fixed seating within 530mm of the barrier balustrade or parapet	1.5	1.5	1.5
Areas with tables or fixed seating	(vii) Restaurants and bars	1.5	1.5	1.5
Areas without obstacles for moving people not susceptible to overcrowding	(viii) Stairs, landings, corridors, ramps	1.5	1.5	1.5

Areas susceptible to overcrowding	(x) Footways or pavements less than 3m wide adjacent to sunken areas	1.5	1.5	1.5
	(xi) Theatres, cinemas, discos, bars, auditoria, shopping mall assembly areas, studio, footways / pavements greater than 3m adjacent to sunken areas	3	1.5	1.5
Retail areas	(xiii) All retail areas including public areas of banks / building societies or betting shops	1.5	1.5	1.5

Barriers for the protection of people should be of adequate strength and stiffness to sustain the applied loads given in the above table. In addition a barrier that is structurally safe should not possess sufficient flexibility to alarm building users when subject to normal service conditions. Therefore, for serviceability considerations, the limiting condition for deflection appropriate for a barrier for the protection of people is that the total horizontal displacement of the barrier at any point from its unloaded position should not exceed 25mm. Where the infill of a barrier is subjected to the imposed loads given in the above table, the displacement of any point of the barrier should not exceed 25mm.

Forza have carried out CAD FEA (Finite Element Analysis) imposed load simulation tests on a number of standard elevations containing our preferred range of fire, acoustic and standard glasses fitted within our timber screens, the results of which (+15% margin adjusted) indicate the screen performance for the imposed load to be within the above maximum displacement requirement (Drawing FZD0509/5).

In addition to reviewing horizontal imposed loads to screens Forza have also carried out computer simulated structural analysis with regard to transoms supporting glass (Drawing FZD0488/1). The results attained indicate the values of deflection of the transom to be within the guidelines notated in **BS EN 1995-1-1 2004**.

#### **FREE PATH within a building**

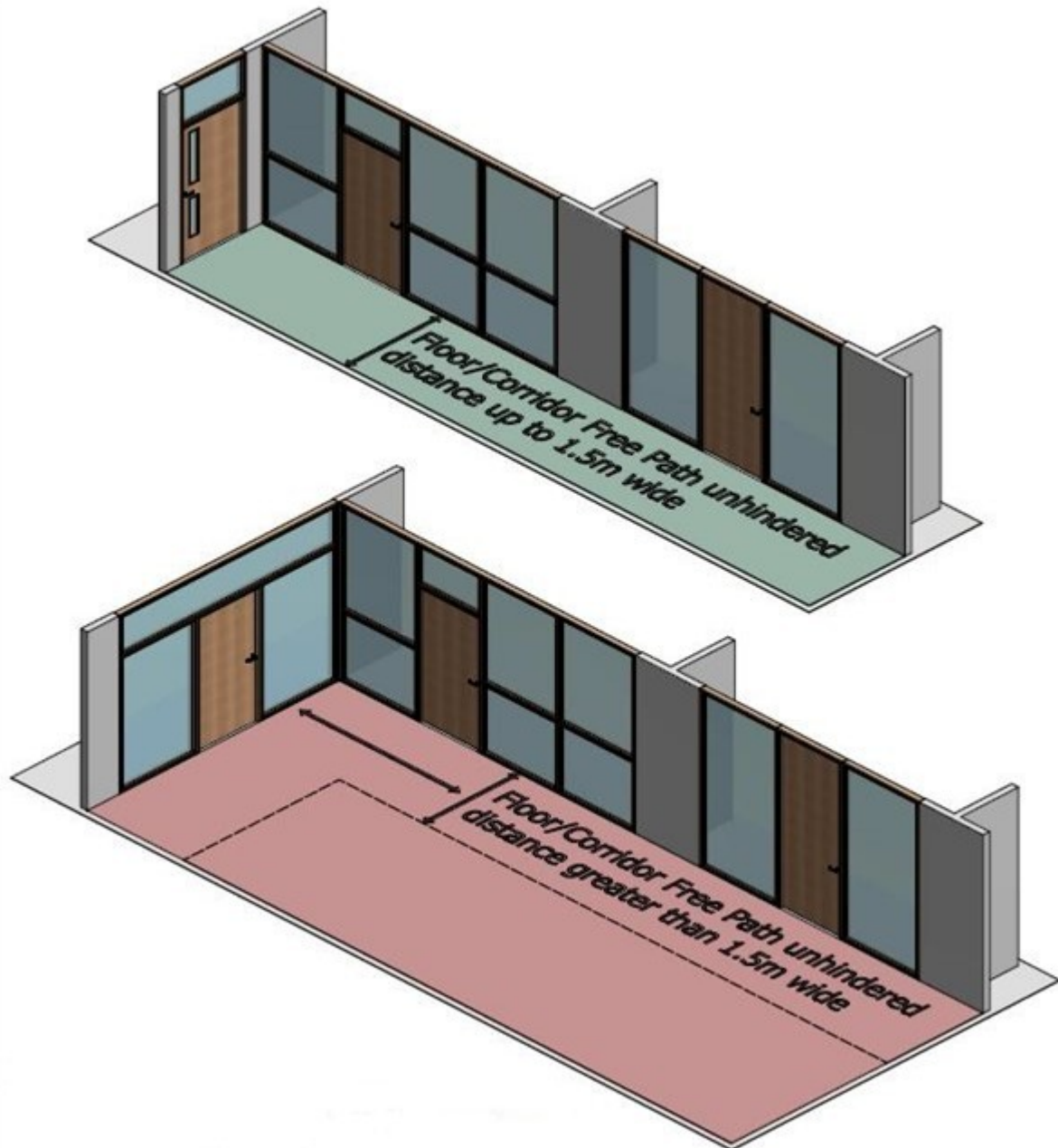
The energy level of an impact varies according to the position of the barrier within a building relative to the unhindered distance a body can travel in a direction perpendicular to the surface of the protective barrier otherwise known as the 'Free Path'.

The glass impact classes for toughened glass so that it provides containment [e.g. it will not break] recommended in **BS 6180-2011** for a particular 'Free Path' are:

A) for a free path up to 1500mm [min 6mm thick] minimum class 3 to **BS EN 12600**

B) for a free path greater than 1500mm [min 10mm thick] minimum class 1 to **BS EN 12600**.

The glass impact classes for laminate glass relating to 'Free Path' are not recommended within BS 6180 leaving guidance to be sought from the glass manufacturer. Forza has been recommended by the supplier of laminate fire glass that the same classes as for toughened are required.



### **SAFETY GLASS IMPACT CLASS**

The performance classification of a glass product tested for impact in accordance with **BS EN 12600** contains its Class, Type and Class again [breaking in accord with clause 4a] e.g. a laminate may be 2B2. The class taken from the following **test drop height class**:

**CLASS 3** conforms to clause 4a/b [test clause 5] of BS EN12600 at drop ht. 190mm (BS6206-1981 Class C)

**CLASS 2** conforms to clause 4a/b [test clause 5] of BS EN12600 at drop hts. 190/450mm (BS6206-1981 Class B)

**CLASS 1** conforms to clause 4a/b [test clause 5] of BS EN12600 at drop hts.190/450/1200 mm (BS6206-1981 Class A)

### **Mode of breakage**

At the appropriate drop height the mode of breakage shall be described as follows:

**TYPE A** [Typical of **annealed glass**] numerous cracks appear forming separate fragments with sharp edges,

some of which are large.

**TYPE B** [Typical of **laminated glass**] numerous cracks appear, but fragments hold together and do not separate.

**TYPE C** [Typical of **toughened glass**] disintegration occurs, leading to a large number of small particles that are relatively harmless.

Forza range of fire, acoustic and standard glasses have the following Impact Performance classes as designated by BS EN 12600:

Fire Glass		Acoustic Glass		Standard Glass	
Forza Code	Impact Glass to BS EN12600	Forza Code	Impact Glass to BS EN12600	Forza Code	Impact Glass to BS EN12600
GFP7-30/0	3B3	GS6.8A36	1B1	SGL6.4	2B2
GFP12-60/0	2B2	GS8.8A37	1B1	SGL6.8	1B1
GFP13-30/0	2B2	GS10.8A39	1B1	SGL8.8	1B1
GFP16-60/30	2B2	GS12.8A40	1B1	SGL10.8	1B1
GFP20-60/30	1B1	GS16.8A41	1B1	SGL12.8	1B1
GFP25-60/60	1B1			SGT6	3C3
GFS6-60/0	1C1			SGT8	C
GFS12-60/0	1C1			SGT10	1C1
				SGT12	1C1

**British Standard BS 5234-2 1992 Partitions Part 2 Specification for the Performance requirements for strength and robustness including method of test.**

Forza timber framed fire and acoustic screens have undergone a series of tests at a UKAS approved test centre to demonstrate compliance with specific performance requirements for strength and robustness as detailed in BS 5234-2.

**Partition grades by categories of duty**

Grade	Category of duty	Examples
Light Duty (LD)	Adjacent space only accessible to persons with high incentive to exercise care. Small chance of accident occurring or of misuse.	Domestic Accommodation
Medium Duty (MD)	Adjacent space moderately used primarily by persons with some incentive to exercise care. Some chance of accident occurring and of misuse.	Office Accommodation

Heavy Duty (HD)	Adjacent space frequently used by the public and others with little incentive to exercise care. Chances of accident occurring and of misuse.	Public circulation and industrial areas
Severe Duty (SD)	Adjacent spaces intensively used by public and others with little incentive to exercise care. Prone to vandalism and abnormally rough use.	Major circulation and heavy industrial areas

The scope of the tests covered:

## 1.6 Criteria for acceptance

### 1.6.1 Stiffness (Annex A)

When tested in the prescribed manner there shall be no damage or detachment, loosening or dislodgement of a partitions parts or fixings. The maximum deflection and residual deformation shall not exceed the limits for the grade tested given in the following table.

Grade	Applied Load (n)	Maximum Deflection (mm)	Max Residual Deformation (mm)
LD	500	25	5
MD	500	20	3
HD	500	15	2
SD	500	10	1

### 1.6.3 Resistance to damage by impact from a large soft body (Annex C)

When tested in the prescribed manner the partition shall be capable of withstanding the impact energies for the grade being tested given in the following table without sustaining either permanent deformation in excess of 2mm.

Grade	Impact Energy (n m)
LD	20
MD	20
HD	40
SD	100

### 1.6.5 Resistance to structural damage by impact from a large soft body. (Annex E)

When tested in the prescribed manner the partition shall be capable of withstanding the impact energies for the grade being tested as given in the following table, without collapsing or dislocating the partition or any of its fixings.

Grade	Impact Energy (n m)
LD	60
MD	60
HD	120
SD	120

#### 1.6.6 Door slamming (Annex F)

When tested in the prescribed manner the partition shall not be damaged, nor shall door frame fittings and architraves become detached or loose after the door leaf has been slammed. The number of slams and the mass of the door leaf for the grade being tested as given in the following table.

Grade	Test Door Leaf Mass Kg	No. of Slams
LD	35+/-0.5	20
MD	35+/-0.5	20
HD	60+/-0.5	100
SD	60+/-0.5	100

#### 1.6.7 Crowd Pressure (Annex G)

When tested in the prescribed manner there shall be no collapse or damage that would render the partition dangerous, due to any of its parts becoming dislodged or shattered, in a manner that could cause injury. The Sustained load applied, for 2 minutes, to the timber beam shall be 0.75kN/m, 1.5kN/m or 3.0kN/m.

**Forza Timber Framed Screens tested in accordance with BS5234-2 (Methods - Annex A/C/E/F) achieved performance levels summarised as grade requirement Severe Duty and is documented in certificate reference FTS.12/01 (Drawing FZD0514/2).**

#### **British Standard BS 6262-4:2005 Glazing for buildings - Part 4. Code of practice for safety related to human impact.**

Part 4 of this standard gives safety recommendations for the vertical [true vertical within a tolerance of 15 degrees] use of glass in critical locations [in and around doors particularly in side panels which might be mistaken for doors and walls /partitions at low levels] most likely to be subject to accidental human impact. The recommendations are intended to reduce impact related injuries and in particular the risk of cutting and piercing injuries.

Critical locations are further described as follows with the respective class [BS EN12600] of glass recommended:

#### **Doors**

For glazing wholly or partly within 1500mm from floor or ground level

Minor dimension of pane greater than 900mm - Class 2

Minor dimension of pane equal or less than 900mm - Class 3

### Door Side panels

For glazing wholly or partly within 300mm from the edge of a door and wholly or partly within 1500mm from floor or ground level

- Minor dimension of pane greater than 900mm - Class 2
- Minor dimension of pane equal or less than 900mm - Class 3

### Low Level Glazed Area

For glazing wholly or partly within 800mm from floor or ground level not covered in 1 or 2  
Irrespective of pane dimension - Minimum Class 3

The second and third characters of glass classification in BS EN 12600 are not utilised in the classification of glass in BS 6262.

In all three instances above if the smaller dimension of the pane is 250mm or less and its area is 0.5m<sup>2</sup> or less then glass not classified within BS EN 12600 may be used provide its nominal thickness is not less than 6mm. This note specifically relates to Forza Fire Glass G90/1 and G120/1 used in vision panels in Forza FD90 and FD120 doors.

Approved Document K (requirement K4: Protection against impact with glazing) details the above as complying with the requirement from Part K of schedule 1 to the Building Regulations 2010 (Drawing FZD0518/3).

Glass classifications noted in Approved Document K4 (Section 5.4) referring to BS 6206 are superseded by BS EN 12600.

### FIRE PROPERTIES OF GLASS EXCLUDING FIRE RESISTANCE as noted in BS 6262-3:2005

GLASS TYPE	NON COMBUSTIBILITY TESTED IN ACCORDANCE WITH BS 476-4:1984	FIRE PROPAGATION INDEX TESTED IN ACCORDANCE WITH BS 476-6:1989	SURFACE SPREAD OF FLAME TESTED
			IN ACCORDANCE WITH BS 476-7: 1987
ANNEALED	Non-combustible	$I < 12$ and $i(1) < 6$	CLASS 1
WIRED	Non-combustible	$I < 12$ and $i(1) < 6$	CLASS 1
TOUGHENED	Non-combustible	$I < 12$ and $i(1) < 6$	CLASS 1
LAMINATE		$I < 12$ and $i(1) < 6$	CLASS 1
-FIRE	Non-combustible	$I < 12$ and $i(1) < 6$	CLASS 1
-ACOUSTIC	Interlayer combustible	$I < 12$ and $i(1) < 6$	CLASS 1