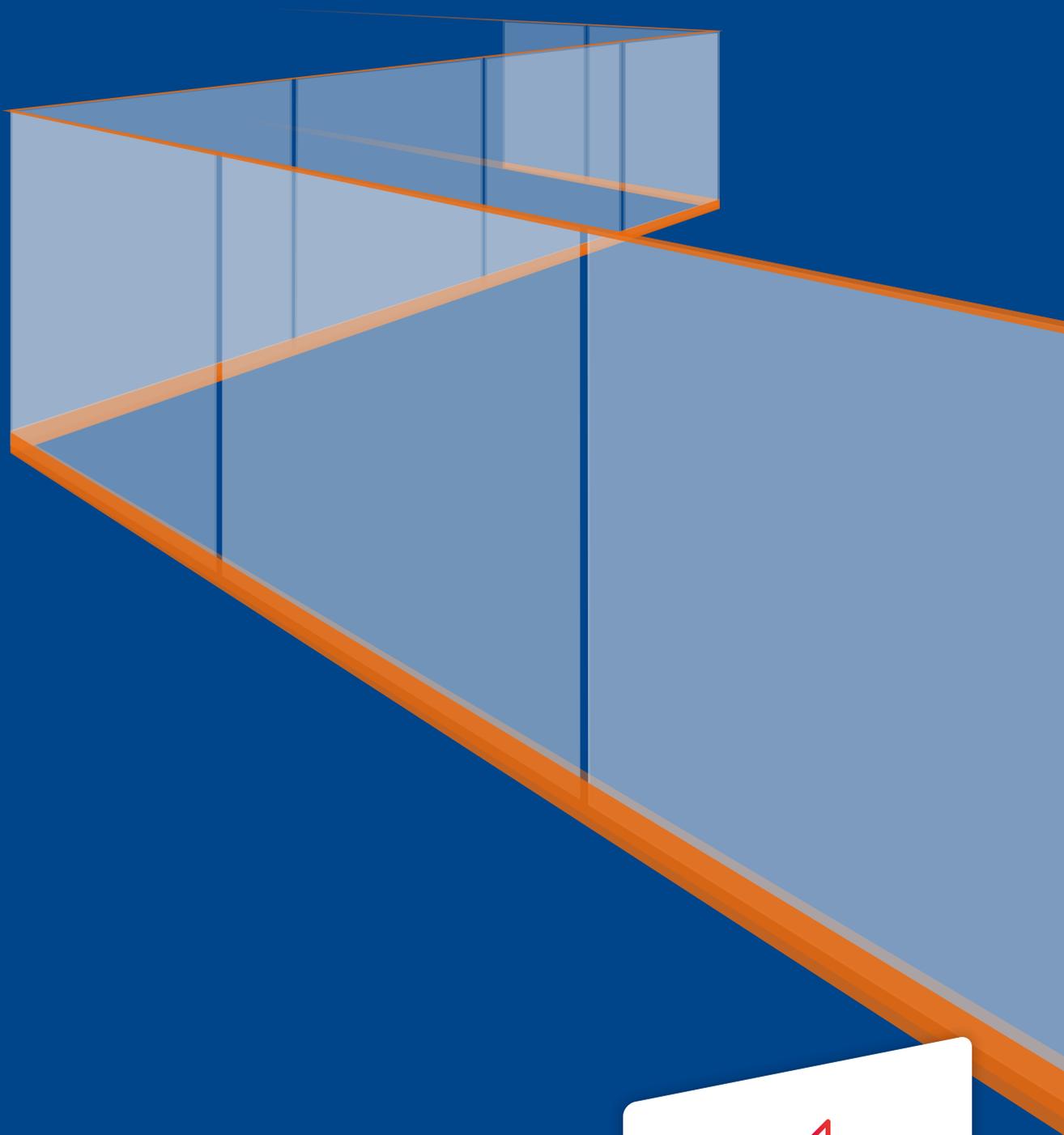


DEFENDER

Products and solutions
for glass parapets

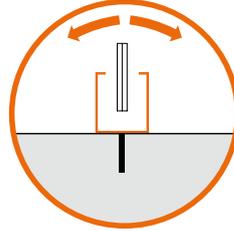
Tables for use in the UK



DEFENDER

A COMPLETE RANGE OF PRODUCTS FOR ANY REQUIREMENT

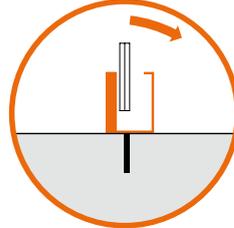
highly engineered patented systems



DEFENDER^{XP} Small and adjustable

- ✓ dimensions 62 x 75 mm (BxH) for 6+6 or 8+8 glass
- ✓ 2 sides installation
- ✓ easy installation
- ✓ adjustable $\pm 2^\circ$

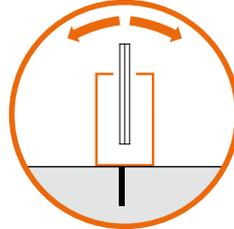
Materials and finishes of the highest quality for exceptional durability



DEFENDER^{pico} Small and strong

- ✓ dimensions 62 x 75 mm (BxH) for 6+6 or 8+8 glass
- ✓ easy installation
- ✓ ultra-fast
- ✓ 1 side installation

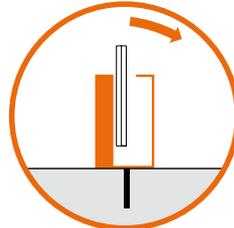
Developed and tested for the fastest installation ever



DEFENDER^{LM} Flexible et reliable

- ✓ dimensions 72 x 120 mm (BxH) for 8+8 glass
- ✓ dimensions 80 x 120 mm (BxH) for 10+10 or 12+12 glass
- ✓ symmetrical installation and performances
- ✓ 2 sides installation
- ✓ adjustable $\pm 2^\circ$

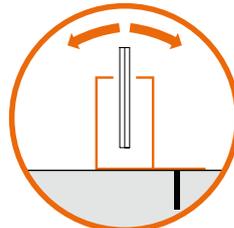
Customizable in size and finishes according to design requirements



DEFENDER^{MS} Robust and smart

- ✓ dimensions 72 x 120 mm (BxH) for 8+8 glass
- ✓ dimensions 80 x 120 mm (BxH) for 10+10 or 12+12 glass
- ✓ easy installation
- ✓ ultra-fast
- ✓ 1 side installation

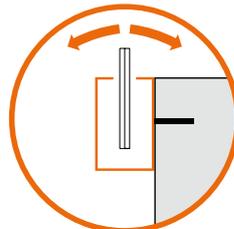
All systems are designed to allow for LED strip installation under the glass... light-up your glass balustrades!



DEFENDER^{DK} Firm and sturdy

- ✓ dimensions 132 x 120 mm (BxH) for 8+8 glass
- ✓ dimensions 140 x 120 mm (BxH) for 10+10 or 12+12
- ✓ allows for optimal placement of top anchors
- ✓ 2 sides installation
- ✓ adjustable $\pm 2^\circ$

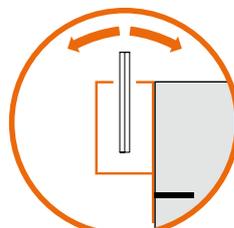
Compatible with a wide range of accessories and handrails



DEFENDER^{FR} Versatile and attractive

- ✓ dimensions 72 x 120 mm (BxH) for 8+8 glass
- ✓ dimensions 80 x 120 mm (BxH) for 10+10 or 12+12 glass
- ✓ symmetrical installation and performances
- ✓ 2 sides installation
- ✓ adjustable $\pm 2^\circ$

extract as much resistance from the glass with engineered clamps and gaskets



DEFENDER^{SP} The largest of them all

- ✓ dimensions 80 x 194 mm (BxH) for 10+10 or 12+12 glass
- ✓ allows for optimal placement of lateral anchors
- ✓ 2 sides installation
- ✓ adjustable $\pm 2^\circ$

Choosing your system

Logli Massimo Saint-Gobain has developed a full range of DEFENDER railings. To choose the most suitable for your installation, a careful evaluation of the site requirements and type of application is essential.

The table and the information presented below are a guideline to the selection the most appropriate solution, based on the requirements contained in the Technical Standards. Essential information is presented in a simple and concise manner, but does not exempt the installer from referring to the full text of the Standards and of the technical documentation for all necessary and in-depth information. The responsibility for the assessment of the conformity of the system with the general safety requirements of the site lies with the technician in charge the installation, who will be able to check the applicability of the results to the actual site conditions (loads on the system, characteristics of the support, effects of temperature, specifics of the anchors, etc.).

Tables for use in the UK according to BS6180

Mounting	Glass thickness [mm]	System	Max. system height [cm]	Max. anchors spacing [cm] ⁽¹⁾	Glass Composition		Suitability per type of occupancy depending on uniformly distributed line load [kN/m] ⁽²⁾				
					Interlayer ⁽⁴⁾	Glass Type	0.22	0.36	0.74	1.5	3.0
Top mount	6+6	DF66PICO	60	25	PVB	tempered	✓	✓	✓	✓	
					EVA	tempered	✓	✓	✓		
	8+8	DF88XP	80	12,5	PVB	tempered	✓	✓	✓		
					PVB	tempered	✓	✓	✓		
		DF88LM	110	40	PVB	tempered	✓	✓	✓		
					SG	tempered	✓	✓	✓		
	DF88MS	110	40	40	PVB	tempered	✓	✓	✓		
					PVB	float or tempered	✓	✓	✓	✓	
	10+10	DF1010LM	120	40	PVB	tempered	✓	✓	✓		
					SG	tempered	✓	✓	✓	✓	
					EVA	tempered	✓	✓	✓		
	12+12	DF1212LM	110	10	DG41	float or tempered	✓	✓	✓	✓	
SG					tempered	✓	✓	✓	✓	✓	
PVB					float or tempered	✓	✓	✓			
Top mount side anchors	8+8	DF88DK	120	40	PVB	tempered	✓	✓	✓		
					PVB	tempered	✓	✓	✓		
	10+10	DF1010DK	60	PVB	tempered	✓	✓	✓			
				EVA	tempered	✓	✓	✓			
Lateral mount	8+8	DF88FR	110	20	SG	tempered	✓	✓	✓		
					PVB	tempered	✓	✓	✓		
	10+10	DF1010FR	20	SG	tempered	✓	✓	✓	✓		
Lateral mount lower anchor	10+10	DF1010SP	20	PVB	tempered	✓	✓	✓			
				EVA	tempered	✓	✓	✓			

⁽¹⁾ Maximum distance between the consecutive anchors for the correct operation of the system (Note: verification of the anchoring system must always be carried out on a case by case scenario, according to the specifics of the site, support and anchors)

⁽²⁾ Examples of specific use are detailed in accordance to guidance from British Standard BS6180, few examples of interest are listed below:

- 0.22 kN/m for light access stairs and gangways not more than 600 mm wide in offices and work areas
- 0.36 kN/m residential areas serving one family dwelling including stairs and landings but excluding balconies and edges of roofs
- 0.74 kN/m balconies and edges of roof for residential buildings and office/work areas not susceptible to overcrowding
- 1.50 kN/m all retail areas or places with tables or fixed seating where people might congregate, restaurants and bars
- 3.00 kN/m theatres, cinemas, discotheques, bars, auditoria, shopping malls or similar assembly areas.

⁽³⁾ Custom machining of the profiles and increased clamps density are necessary for this configuration.

⁽⁴⁾ Refer to the details for the technical documentation for information about interlayer products tested.

Established performance

DEFENDER systems have been tested by independent experts at LUCIDEON UK Ltd. and POLITECNICO DI MILANO institutes, in accordance with BS 6180 Barriers in and about Buildings – Code of Practice, to allow for these systems to be classified for use in accordance with the Code of Practice.

Test Reports are available providing full details about the experimental assessment procedure and results obtained.

• TEST REPORT •
Politecnico di Milano

**British
Standard**
BS 6180:2011

Key design elements

Performance of DEFENDER systems is subject to compliance with all elements of the installation guidelines, along with the conditions of testing described in the reports. Furthermore, few relevant aspects for an informed design are worth noting:

- In accordance with BS 6180, the maximum allowable deflection for a glass protective barrier panel is 25 mm, when a horizontal line load is applied at the minimum value between the design height and 1.1 m.
- Barriers should have no sharp edges or projections that could cause injury or damage.
- The effectiveness of barriers might be reduced if these are installed on top of low parapet walls: if the latter could constitute a step, the height of the barrier should be measured from the top of the parapet and not at walk level.
- Barriers should be designed to resist to crowd and wind loads acting separately.
- Inspection and maintenance programs are essential to sustain levels of safety and performance.
- Consideration should be given in the design of the barrier to the possibility of tampering or vandalism.

Handrails

Performance of DEFENDER systems is assessed for fully glazed barriers: no handrail is needed.

Besides, the addition of a handrail is beneficial from both safety and durability perspectives. In the absence of a handrail for outdoor installation, the likelihood of delamination on the upper edge of laminated glass elements is increased and should not be excluded. Whenever such aesthetic deterioration is limited to the upper edge, the performance of the barrier is not affected.

In case of very high systems used both as barriers and windshields, a scrupulous analysis of the actual installation conditions is advised, along with the recommendation to use a handrail for a more efficient connection of the panels.



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