



NATIONAL TEST REPORT
(BS 6180 : 2011)

EASY GLASS[®] MOD 6400

BASE GLASS CLAMP

TEST REPORT

Lucideon Reference: 154237 (QT38060/1/SL)/Ref. 1/Supp1

Project Title: Testing of Easy Glass Model 6400 System in Accordance with BS 6180:2011 Barriers In and About Buildings

Client: Q-railing Europe GmbH & Co.KG
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Work Location: Lucideon UK

This report supersedes the report issued on 12.11.15.



Mr Dave Dix
**Consultancy Team
Reviewer**



Miss Lisa Cobden
**Consultancy Team
Project Manager**



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16.12.15

1 INTRODUCTION

Lucideon were commissioned by the client, Q-railing Europe GmbH and Co KG, to carry out load testing in accordance with BS 6180:2011 Barriers in and about buildings, to allow their balustrade system to be classified for use in accordance with the Code of Practice included within the standard.

The testing was carried out at Q-railing Europe GmbH and Co KG's facilities at 8-14 Marie-Curie Straße 46446 Emmerich am Rhein Germany.

This report summarises the test results obtained during the test programme and does not provide interpretation of those results.

2 TEST SAMPLES

The system tested was designated as Easy Glass Clamp System base adaptor Model 6400. The system incorporated either two or three adaptors at differing centres. The system is shown in the Figures included in the Appendix.

The system and glass was installed by Q-railing personnel.

3 TEST PROGRAMME

A horizontal line load was applied to system with the adaptors set at the following centres using a range of glass types as follows:

- Two adapters set at 500 mm centres:
 - 15 mm Tempered Monolithic Glass;
 - 19 mm Tempered Monolithic Glass;
 - 20.76 mm Laminated Toughened;
 - 16.76 mm Sentry Glass Laminated Tempered;
 - 16.76 mm PVB Glass Laminated Tempered;
 - 21.78 mm Sentry Glass Laminated Tempered.
- Three adapters set at 500 mm centres:
 - 20.76 mm Laminated Toughened.

4 TEST METHOD

The Easy Glass Model 6400 adapters were bolted to the top of the concrete block, which was fixed to the floor of the test facility. Either two or three adapters were fixed at 500 mm centres by the client using the appropriate fixings. A glass panel of appropriate width and thickness was fitted into the adapters using Easy Glass Mod 6400 wedges and inlays (see Plate 2 and Figure 4)

A horizontal imposed line load was applied to the glass at a height of 1.1 m above the datum level of the floor and the deflection measured at the top central point of the panel



1.1 m above the datum level of the floor. The load was applied via a hydraulic ram and the deflection measured using a digital electronic displacement transducer (see Plate 1).

5 RESULTS

The tests were carried out in accordance with the guidance given in BS 6180 Barriers in and about buildings – Code of Practice. The standard states that the maximum allowable deflection for a free standing glass protective barrier panel is 25 mm.

Table 2 of BS 6180 Barriers in and about buildings – Code of Practice categorises parapets, barriers and balustrades for areas of use depending on the loads they have achieved under testing.

Load versus deflection curves for the balustrades are given in Charts 1 and 2.

The loads achieved by the Q-railing Europe GmbH and Co KG Easy Glass Clamp System model 6400 tested under horizontal imposed line load to the maximum deflection of 25 mm are given in Table 1.

All figures quoted in the Tables contain no safety factors and are direct loads as achieved by the system under test conditions.

Tables 2 to 3 summarise the suitability of the tested systems in accordance with Table 2 of BS 6180:2011.

NOTE: The results given in this report apply only to the samples that have been tested.

END OF REPORT

Table 1 - Summary of Performance of Q-railing Europe GmbH and Co. KG Easy Glass Model 6400 System Tested under Horizontal Imposed Line Load

Number of Adapters and Centres	Glass Span (mm)	Glass Type	Imposed Line Load at 25 mm Deflection (kN/m)	Working Line Load for System (kN/m)	Deflection at Working Line Load for System (mm)
Two adapters set at 500 mm centres	1000	15 mm Tempered Monolithic	1.05	0.74	16.38
Two adapters set at 500 mm centres	1000	19 mm Tempered Monolithic	1.6	1.5	23.21
Two adapters set at 500 mm centres	1000	20.76 mm Laminated Toughened	1.17	0.74	12.5
Two adapters set at 500 mm centres	1000	16.76 mm Sentry Glass	0.82	0.74	23.00
Two adapters set at 500 mm centres	1000	16.76 mm PVB Glass	0.62	0.36	17.15
Two adapters set at 500 mm centres	1000	Sentry Glass 21.78 mm	1.1	0.74	15.91
Three adapters at 500 mm centre	1200	20.76 mm Laminated Toughened	1.27	0.74	14.73

Note: The load deflection characteristics for the Easy Glass Clamp System model 6400 using 16.76 mm glass panels (2 x 8 mm glass 0.76 mm foil) over a range of spans met a series of working line load values in accordance with BS 6180:2011. Therefore panels having the same thickness glass with a thicker foil of 1.52 mm should perform in comparable way to those incorporating a 0.76 mm foil. This applies similarly to panels having 2 x 10 mm glass panels with differing foil thicknesses.

Table 2 - Summary of Suitability of Q-railing Europe Systems in Accordance with Table 2 of BS 6180:2011

Type of Occupancy for Part of the Building	Examples of Specific Use	Horizontal Uniformly Distributed Line Load (kN/m)	Easy Glass Model 6400 Two Adapters 500 mm Centres					
			15 mm Monolithic	19 mm Monolithic	20.76 mm Laminated	16.76 mm Sentry Glass	16.76 mm PVB Glass	21.78 mm Sentry Glass
Domestic and residential activities	(i) all areas within or serving exclusively one single family dwelling including stairs, landings, etc but excluding external balconies and edges of roofs	0.36	✓	✓	✓	✓	✓	✓
	(ii) other residential, i.e. houses of multiple occupancy and balconies, including Juliette balconies and edges of roofs in single family dwellings	0.74	✓	✓	✓	✓	X	✓
Offices and work areas not included elsewhere, including storage areas	(iii) light access stairs and gangways not more than 600 mm wide	0.36	✓	✓	✓	✓	✓	✓
	(iv) light pedestrian traffic routes in industrial and storage buildings except designated escape routes	0.36	✓	✓	✓	✓	✓	✓
	(v) areas not susceptible to overcrowding in office and institutional buildings, also industrial and storage buildings except as given above	0.74	✓	✓	✓	✓	X	✓
Areas where people might congregate	(vi) areas having fixed seating within 530 mm of the barrier, balustrade or parapet	1.50	X	✓	X	X	X	X
Areas with tables or fixed seating	(vii) restaurants and bars	1.50	X	✓	X	X	X	X

Table 2 - Summary of Suitability of Q-railing Europe Systems in Accordance with Table 2 of BS 6180:2011 - Continued

Type of Occupancy for Part of the Building	Examples of Specific Use	Horizontal Uniformly Distributed Line Load (kN/m)	Easy Glass Model 6400 Two Adapters 500 mm Centres					
			15 mm Monolithic	19 mm Monolithic	20.76 mm Laminated	16.76 mm Sentry Glass	16.76 mm PVB Glass	21.78 mm Sentry Glass
Areas without obstacles for moving people and not susceptible to overcrowding	(viii) stairs, landings corridors ramps	0.74	✓	✓	✓	✓	X	✓
	(ix) external balconies including Juliette balconies and edges of roofs; footways and pavements within building cartilage adjacent to basement/sunken areas	0.74	✓	✓	✓	✓	X	✓
Areas susceptible to overcrowding	(x) footways or pavements less than 3 m wide adjacent to sunken areas	1.50	X	✓	X	X	X	X
	(xi) theatres, cinemas, discotheques, bars, auditoria, shopping malls, assembly areas, studios; footways or pavements greater than 3 m wide adjacent to sunken areas	3.00	X	X	X	X	X	X
	(xii) grandstands and stadia	(Note 1)	-	-	-	-	-	-
Retail areas	(xiii) all retail areas including public areas of banks/building societies or betting shops	1.50	X	✓	X	X	X	X
Vehicular	(xiv) pedestrian areas in car parks, including stairs, landings, ramps, edges of internal floors, footways, edges of roofs	(Note 2)	X	X	X	X	X	X
	(xv) horizontal loads imposed by vehicles	(Note 2)	-	-	-	-	-	-

Table 3 - Summary of Suitability of Q-railing Europe Systems in Accordance with Table 2 of BS 6180:2011

Type of Occupancy for Part of the Building	Examples of Specific Use	Horizontal Uniformly Distributed Line Load (kN/m)	Easy Glass Model 6400 Three Adapters 500 mm centres
			20.76 mm laminated
Domestic and residential activities	(i) all areas within or serving exclusively one single family dwelling including stairs, landings, etc but excluding external balconies and edges of roofs	0.36	✓
	(ii) other residential, i.e. houses of multiple occupancy and balconies, including Juliette balconies and edges of roofs in single family dwellings	0.74	✓
Offices and work areas not included elsewhere, including storage areas	(iii) light access stairs and gangways not more than 600 mm wide	0.22	✓
	(iv) light pedestrian traffic routes in industrial and storage buildings except designated escape routes	0.36	✓
	(v) areas not susceptible to overcrowding in office and institutional buildings, also industrial and storage buildings except as given above	0.74	✓
Areas where people might congregate	(vi) areas having fixed seating within 530 mm of the barrier, balustrade or parapet	1.50	X
Areas with tables or fixed seating	(vii) restaurants and bars	1.50	X
Areas without obstacles for moving people and not susceptible to overcrowding	(viii) stairs, landings corridors ramps	0.74	✓
	(ix) external balconies including Juliette balconies and edges of roofs; footways and pavements within building cartilage adjacent to basement/sunken areas	0.74	✓
Areas susceptible to overcrowding	(x) footways or pavements less than 3 m wide adjacent to sunken areas	1.50	X



Type of Occupancy for Part of the Building	Examples of Specific Use	Horizontal Uniformly Distributed Line Load (kN/m)	Easy Glass Model 6400 Three Adapters 500 mm centres
			20.76 mm laminated
	(xi) theatres, cinemas, discotheques, bars, auditoria, shopping malls, assembly areas, studios; footways or pavements greater than 3 m wide adjacent to sunken areas	3.00	X
	(xii) grandstands and stadia	(Note 1)	X
Retail areas	(xiii) all retail areas including public areas of banks/building societies or betting shops	1.50	X
Vehicular	(xiv) pedestrian areas in car parks, including stairs, landings, ramps, edges of internal floors, footways, edges of roofs	(Note 2)	-
	(xv) horizontal loads imposed by vehicles	(Note 2)	-



Plate 1 - Generic Test Arrangement Line Load



Plate 2 – Model 6400 Adapter

Chart 1 - Load Deflection Curve for Q-railing Linear Line Load Model 6400 with Two Adapters at 500 mm Centres



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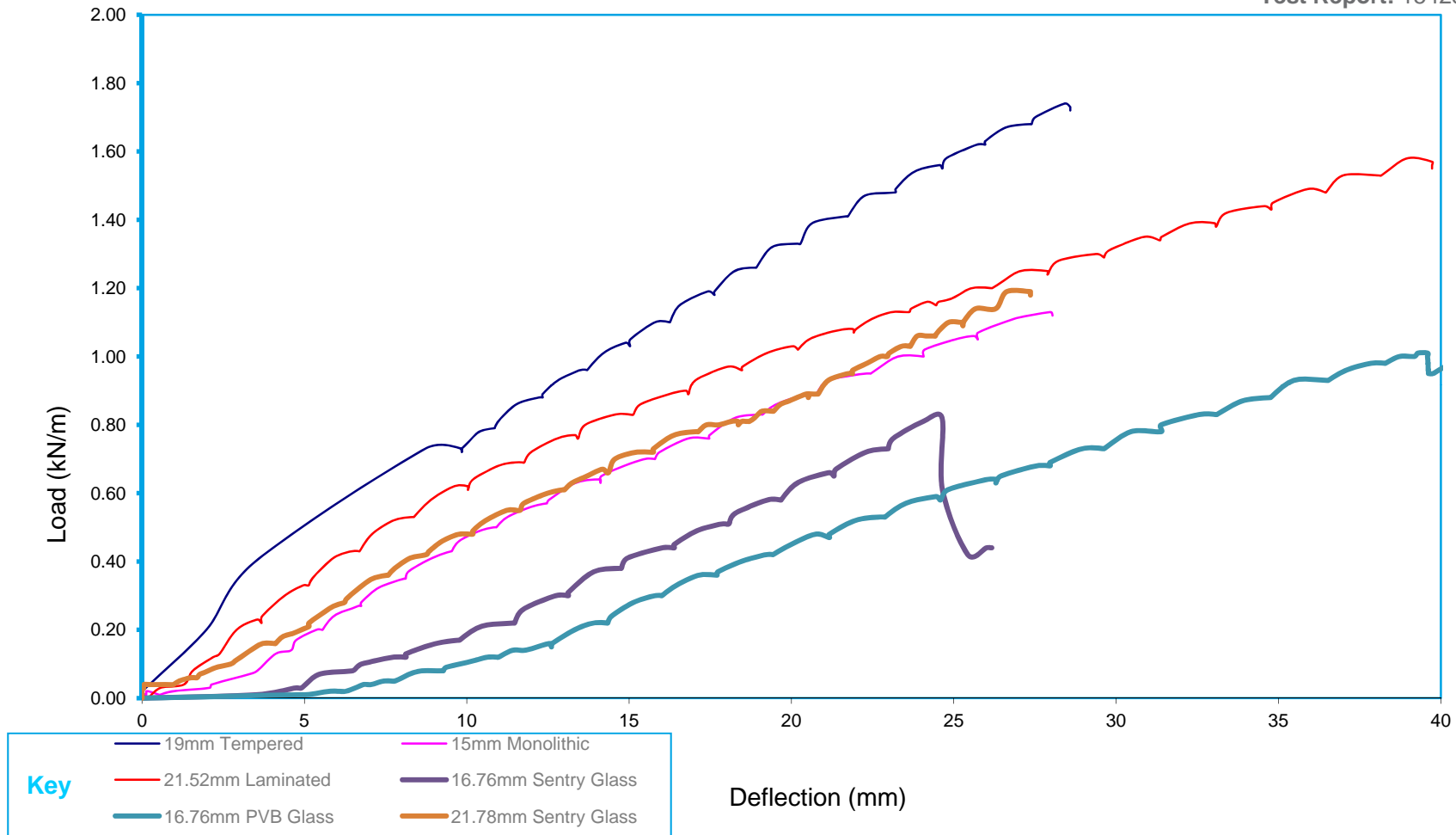
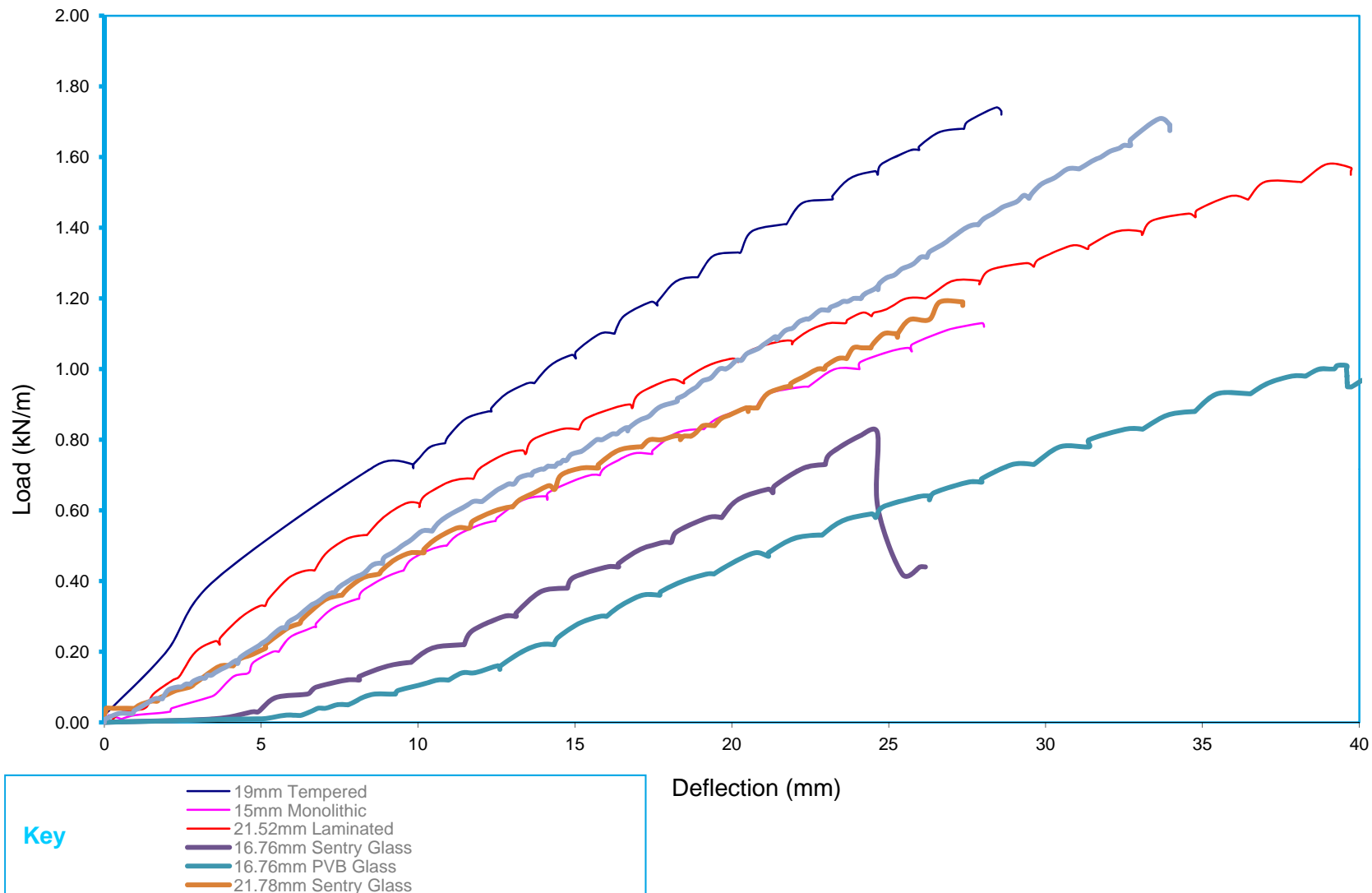
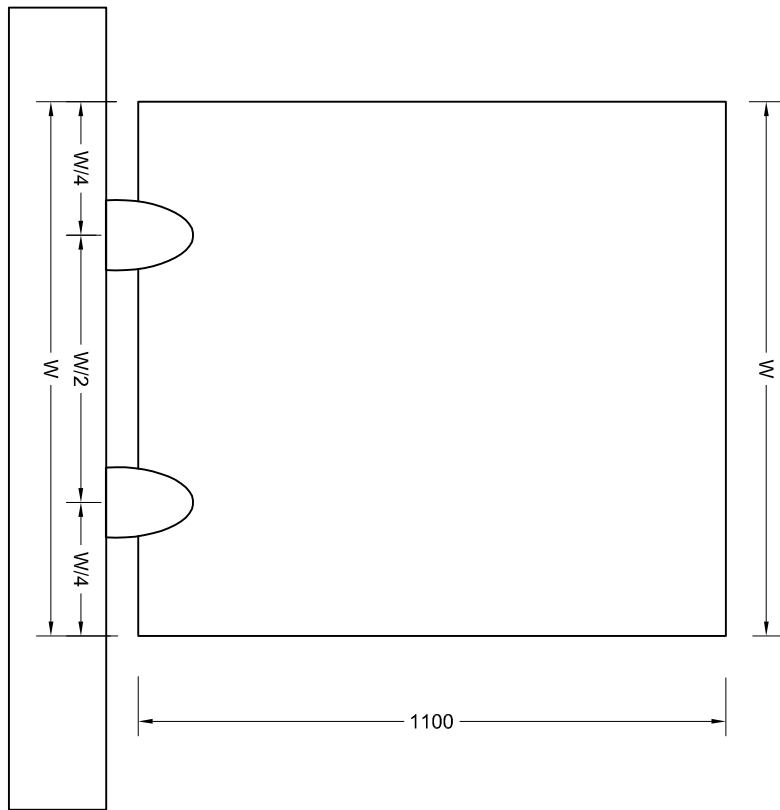
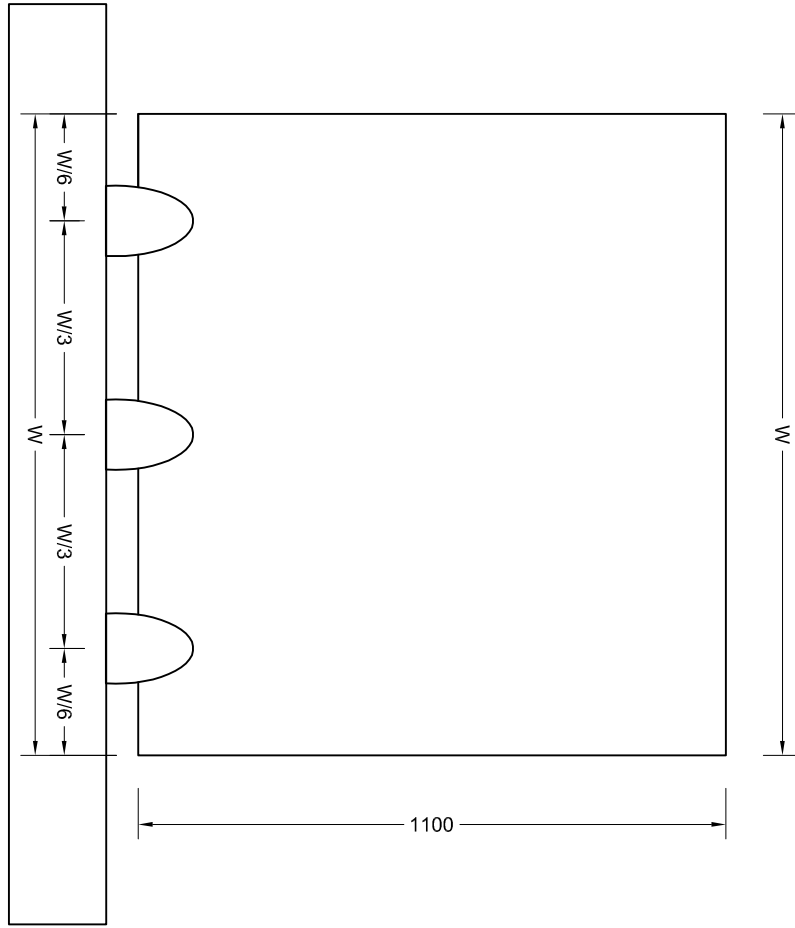


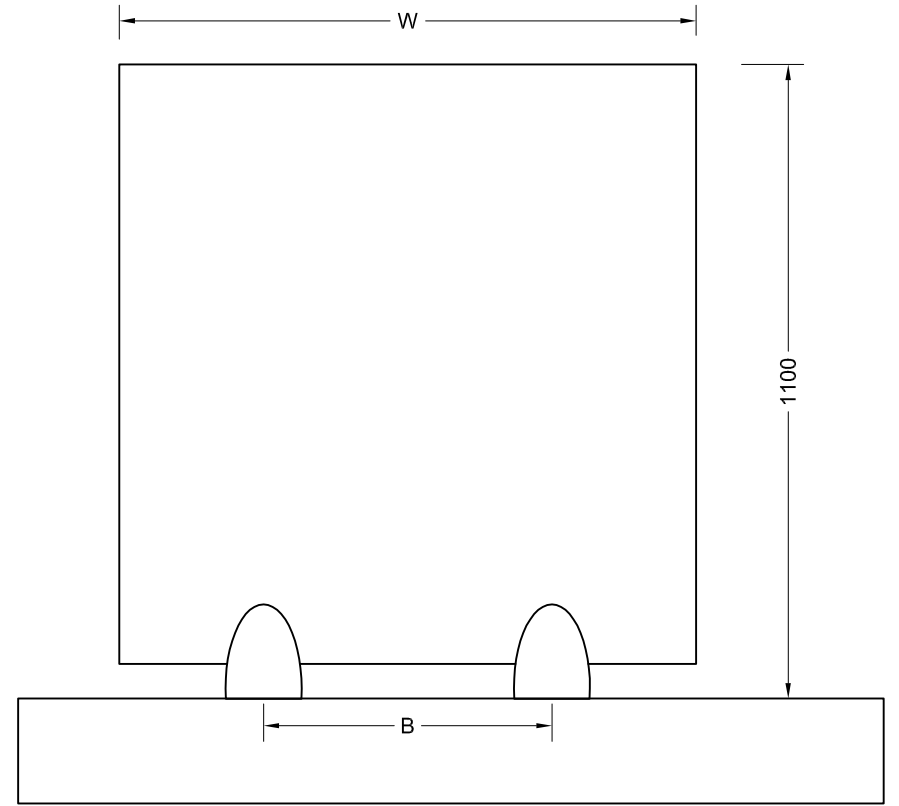
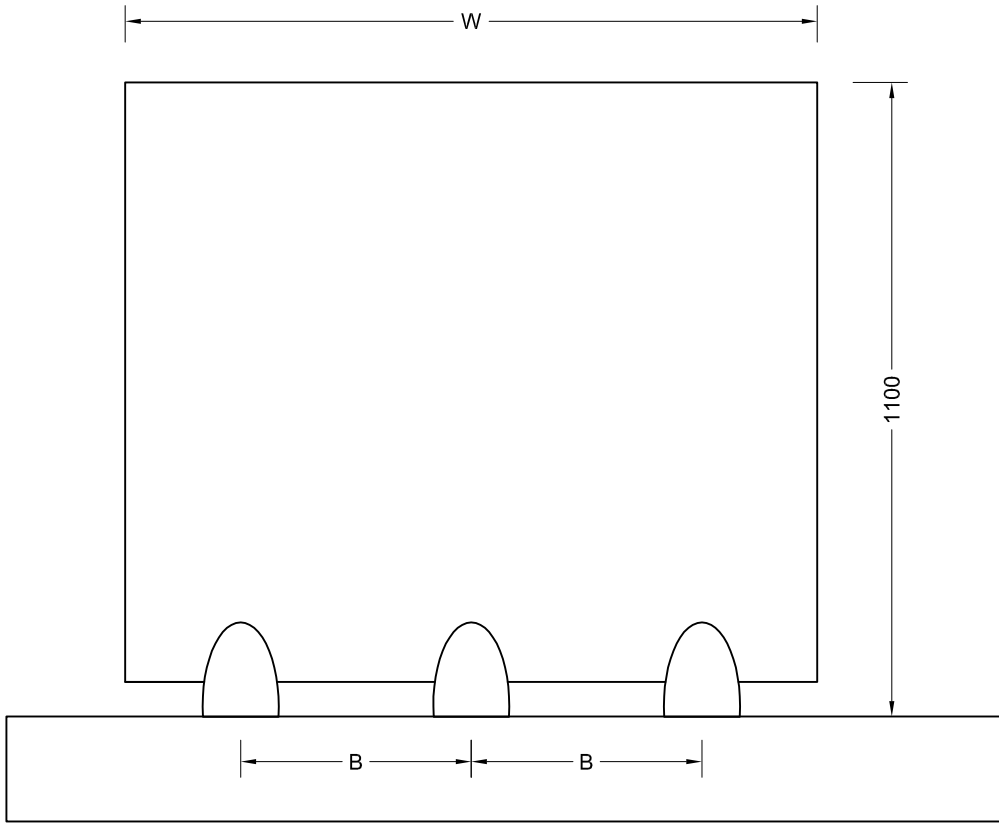


Chart 2 - Load Deflection Curve for Q-railing Linear Line Load Model 6400 with Three Adapters at 500 mm Centres

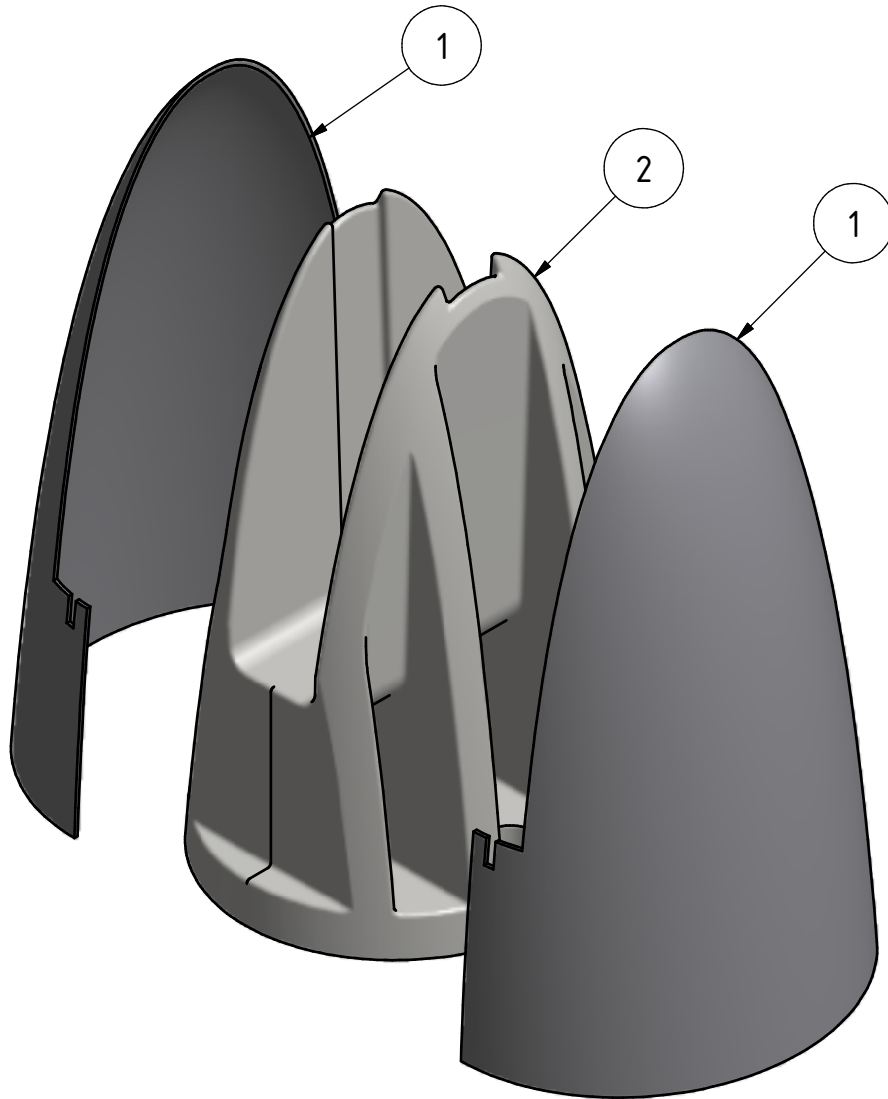
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Exploded view



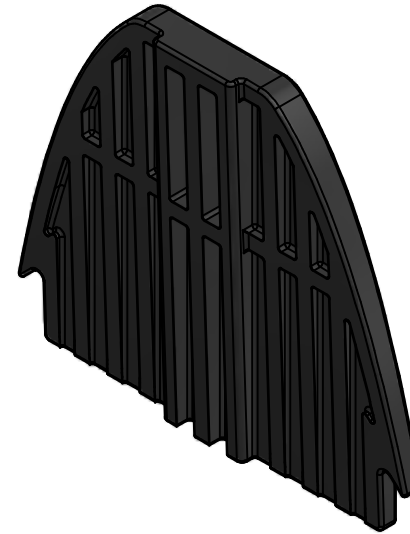
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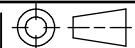
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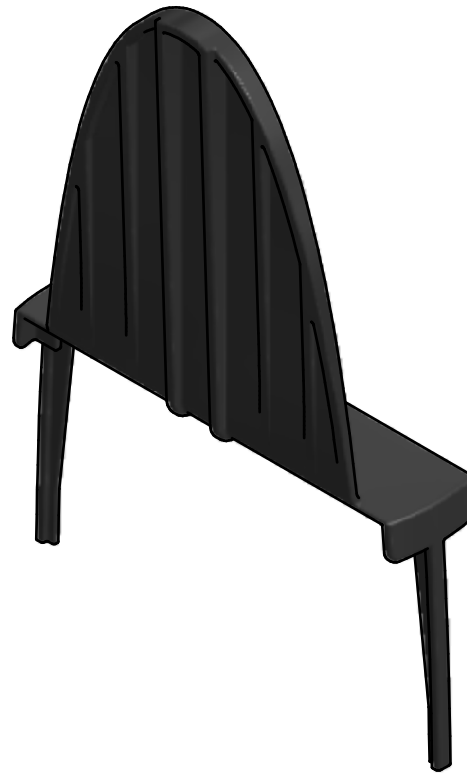



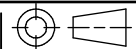
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<small>THIS DRAWING IS PROPERTY OF Q-RAILING EUROPE GmbH & Co KG ALL RIGHTS RESERVED. It may not be submitted for perusal to third parties, either whole nor partly, unless granted. It is not permitted to alter this drawing unauthorised, in any way.</small>		Material:			
		Finish:			
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		Description: Mod. 6400			
Drawn	Date	Name			
Checked	1-10-2014	GMK			
	1-10-2014	MVN			
General tolerance according		Drawing no.:		Sheet: 1 / 1	
				A4	

REV	DESCRIPTION	DRAWN	DATE
1	Changed article number of item 1		
0	First release		



			Scale: 1 : 1	Weight: N/A		Rev.No.: 2
			Material: ABS			Finish: color Black RAL 9004
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			Description: Mod. 6400			
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Drawn	23-9-2014	MSR				
Checked	11-9-2015	MPS				
General tolerance according DIN 16742 - TG6			Drawing no.:		Project: 06-2015-P	
					Sheet: 1 / 1	
					A4	



			Scale: 1 : 2	Weight: 27 g		Rev.No.: 2
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Checked	11-9-2015	MPS				
General tolerance according DIN 16742 - TG6			Project: 06-2015-P		Sheet: 1 / 1	
					A4	



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