

TEST REPORT

Lucideon Reference: UK243504 (QT-76357/1/KNA)/Ref. 1

Project Title: Testing to BS EN 6180:2011 of OnLevel Ltd's TL-6620 Top Mounted Balustrade System

Client: OnLevel Ltd
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Ashton Commercial Park
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For the Attention of: Mr Frank Verhey

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Report Date: 28 February, 2025

Purchase Order No.: 05712400796



Miss Joanne Booth
Testing Team
Reviewer



Mr Kaleem Zar
Testing Team
Project Manager

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1 INTRODUCTION

Lucideon Limited were commissioned by the client, OnLevel Ltd, to carry out load testing in accordance with BS 6180:2011 Barriers In and About Buildings, of OnLevel Ltd's TL-6620 Top Mounted Balustrade System.

The testing was carried out at Lucideon's test facilities in Queens Road, Penkhull, Stoke-on-Trent on 2 December 2024.

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

2 TEST SAMPLES

The aluminium channel tested was designated as System TL-6620.

The channel was installed by OnLevel Ltd's Personnel.

3 TEST EQUIPMENT

Identification Number	Type of Equipment
TRD028	Linear Voltage Displacement Transducer
FOR023	Load Cell
DAQ031	Data Logger

4 TEST PROGRAMME

A horizontal line load was carried out on the TL-6620 system with the following glass panels installed:

- EVA 8/8/4 (17.52) Laminated Tempered Glass panel – size (w x h x t): 1000 mm x 1200 mm x 17.52 mm.
- 15 mm Monolithic Glass panel – size (w x h x t): 1000 mm x 1200 mm x 15 mm.
- 19 mm Monolithic Glass panel – size (w x h x t): 1000 mm x 1200 mm x 19 mm.
- EVA 10/10/4 (21.52 mm) Laminated Tempered Glass panel – size (w x h x t): 1000 mm x 1200 mm x 21.52 mm.
- 21.5 mm Sentry Glass panel – size (w x h x t): 1000 mm x 1200 mm x 21.5 mm.

5 TEST METHOD

The channel was bolted to the top of a C25 concrete block, having nominal dimensions of 500 mm x 600 mm x 3000 mm (w x h x l).

The concrete block was fixed to the floor of the test facility using M32 bolts. A 1000 mm length of the TL-6620 channel was bolted to the block, using Fischer Faz II 12 anchors through the channel flange, at 100 mm from the end and then 200 mm centres thereafter.

Each Glass panel type was fitted into the channel using three 'Nylon 6/6 PA.10 Gf'fixing clips per metre at nominal 312.5 mm centres. The clips were installed such that the plastic clip was to the outside face of the glass.

A horizontal imposed line load was applied to the glass at a height of 1100 mm measured from the top of the channel.

The deflection was measured at the horizontal centre of the panel 1100 mm above the top of the channel.

The load was applied via a hydraulic ram and the deflection was measured using a Linear Voltage Displacement Transducers (LVDT), see Plate 1 and Figure 2.

6 RESULTS

The test was carried out in accordance with the guidance given in BS 6180:2011 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 6180:2011 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.

The loads achieved by the OnLevel glazing system, tested under horizontal imposed line load to the maximum deflection of 25 mm, are given in Table 1.

All figures quoted in Table 1 contain no safety factors and are direct loads as achieved by the system under test conditions.

Table 2 summarises the suitability of the tested systems in accordance with Table 2 of BS 6180:2011.

TABLES

Table 1 – Summary of Performance of OnLevel Balustrade System Tested under Horizontal Imposed Line Load

Base	Glass	Height of Applied Load (mm)	Imposed Line Load at 25 mm Deflection (kN/m)	Working Line Load for System (kN/m)	Deflection at Working Line Load for System (mm)
System TL-6620	8/8/4 EVA (17.52) Laminated Tempered Glass Panel	1100	0.79	0.74	23.63
	15 mm Monolithic	1100	N/A	0.74	23.29
	19 mm Monolithic	1100	1.73	1.50	20.79
	EVA 10/10/4 (21.52 mm) Laminated Tempered	1100	1.58	1.50	23.74
	21.5 mm Sentry Glass panel	1100	1.73	1.50	20.79

Table 2 – Summary of Suitability of OnLevel Balustrade 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)	TL-6620 Top Mount
			8/8/4 EVA Laminated Tempered Glass Panel
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	✓
	(x) footways or pavements less than 3 m wide adjacent to sunken areas	1.50	X
Areas susceptible to overcrowding	(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)	-
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	1.50 (Note 2)	X
	(xv) horizontal loads imposed by vehicles	(Note 2)	-

Note 1 – See requirements of the appropriate certifying authority

Note 2 – Clause 8.1.1 of BS 6180:2011 states that “glass should not be used for vehicle protection barriers”

Table 3 – Summary of Suitability of OnLevel Balustrade 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)	TL-6620 Top Mount
			15 mm Monolithic Glass Panel
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	✓
	(x) footways or pavements less than 3 m wide adjacent to sunken areas	1.50	X
Areas susceptible to overcrowding	(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)	-
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	1.50 (Note 2)	X
	(xv) horizontal loads imposed by vehicles	(Note 2)	-

Note 1 – See requirements of the appropriate certifying authority

Note 2 – Clause 8.1.1 of BS 6180:2011 states that “glass should not be used for vehicle protection barriers”

Table 4 – Summary of Suitability of OnLevel Balustrade 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)	TL-6620 Top Mount
			19 mm Monolithic Glass Panel
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	✓
Areas with tables or fixed seating	(vii) restaurants and bars	1.50	✓
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	✓
	(x) footways or pavements less than 3 m wide adjacent to sunken areas	1.50	✓
Areas susceptible to overcrowding	(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)	-
Retail areas	(xiii) all retail areas including public areas of banks/building societies or betting shops	1.50	✓
Vehicular	(xiv) pedestrian areas in car parks, including stairs, landings, ramps, edges of internal floors, footways, edges of roofs	1.50 (Note 2)	✓
	(xv) horizontal loads imposed by vehicles	(Note 2)	-

Note 1 – See requirements of the appropriate certifying authority

Note 2 – Clause 8.1.1 of BS 6180:2011 states that “glass should not be used for vehicle protection barriers”

Table 5 – Summary of Suitability of OnLevel Balustrade 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)	TL-6620 Top Mount
			EVA 10/10/4 (21.52 mm) Laminated Tempered Glass Panel
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	✓
Areas with tables or fixed seating	(vii) restaurants and bars	1.50	✓
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	✓
	(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)	-
Retail areas	(xiii) all retail areas including public areas of banks/building societies or betting shops	1.50	✓
Vehicular	(xiv) pedestrian areas in car parks, including stairs, landings, ramps, edges of internal floors, footways, edges of roofs	1.50 (Note 2)	✓
	(xv) horizontal loads imposed by vehicles	(Note 2)	-

Note 1 – See requirements of the appropriate certifying authority

Note 2 – Clause 8.1.1 of BS 6180:2011 states that “glass should not be used for vehicle protection barriers”

Table 6 – Summary of Suitability of OnLevel Balustrade 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)	TL-6620 Top Mount
			21.5 mm Sentry Glass Panel
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	✓
Areas with tables or fixed seating	(vii) restaurants and bars	1.50	✓
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	✓
	(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)	-
Retail areas	(xiii) all retail areas including public areas of banks/building societies or betting shops	1.50	✓
Vehicular	(xiv) pedestrian areas in car parks, including stairs, landings, ramps, edges of internal floors, footways, edges of roofs	1.50 (Note 2)	✓
	(xv) horizontal loads imposed by vehicles	(Note 2)	-

Note 1 – See requirements of the appropriate certifying authority

Note 2 – Clause 8.1.1 of BS 6180:2011 states that “glass should not be used for vehicle protection barriers”

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

END OF REPORT

PLATE



Plate 1 – Generic Test Arrangement

Chart 1 - Load Versus Deflection Curve for OnLevel TL-6620 Top Mounted Balustrade System Horizontal Line Load

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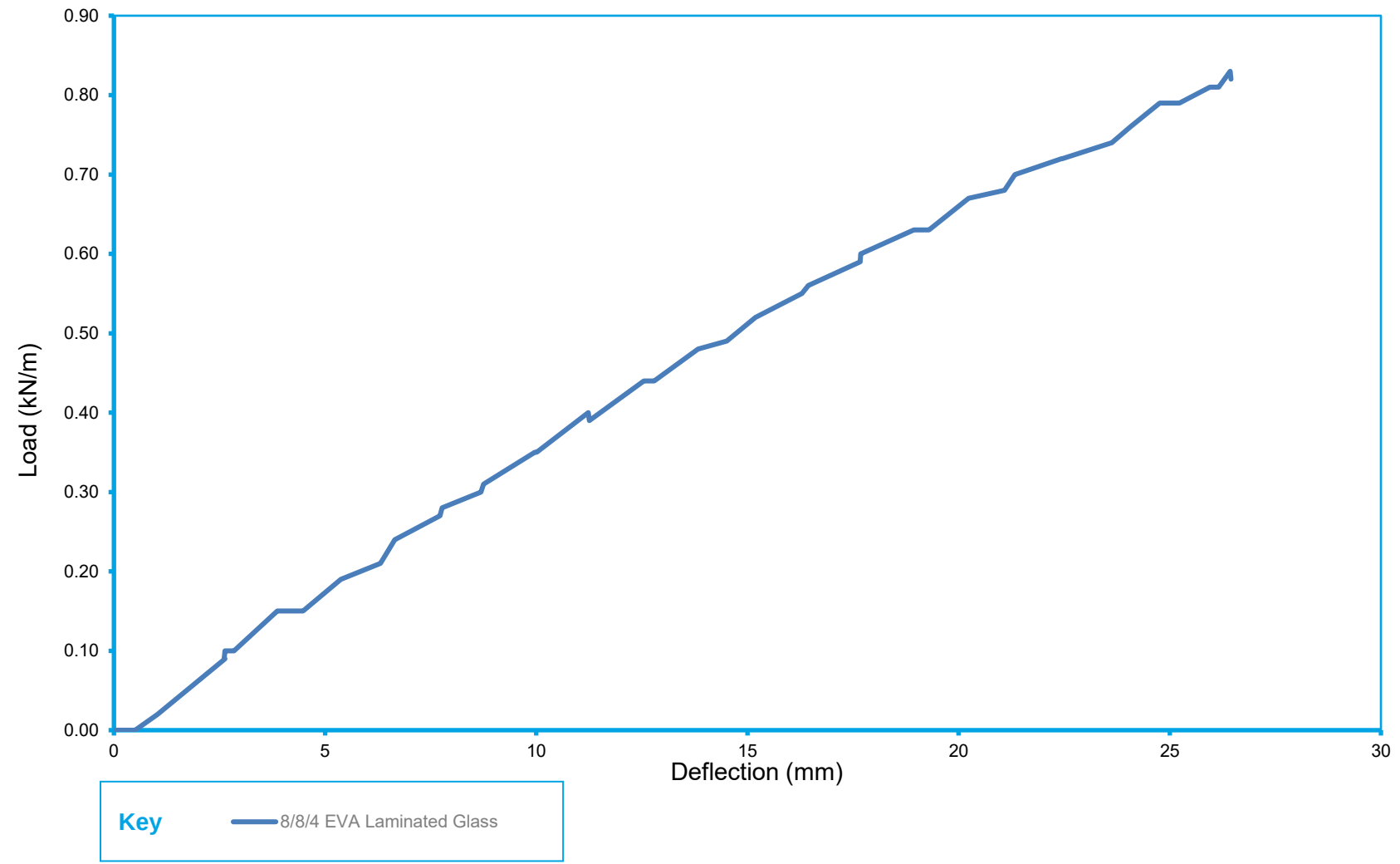


Chart 2 - Load Versus Deflection Curve for OnLevel TL-6620 Top Mounted Balustrade System Horizontal Line Load

Test Report: UK243504/Ref. 1

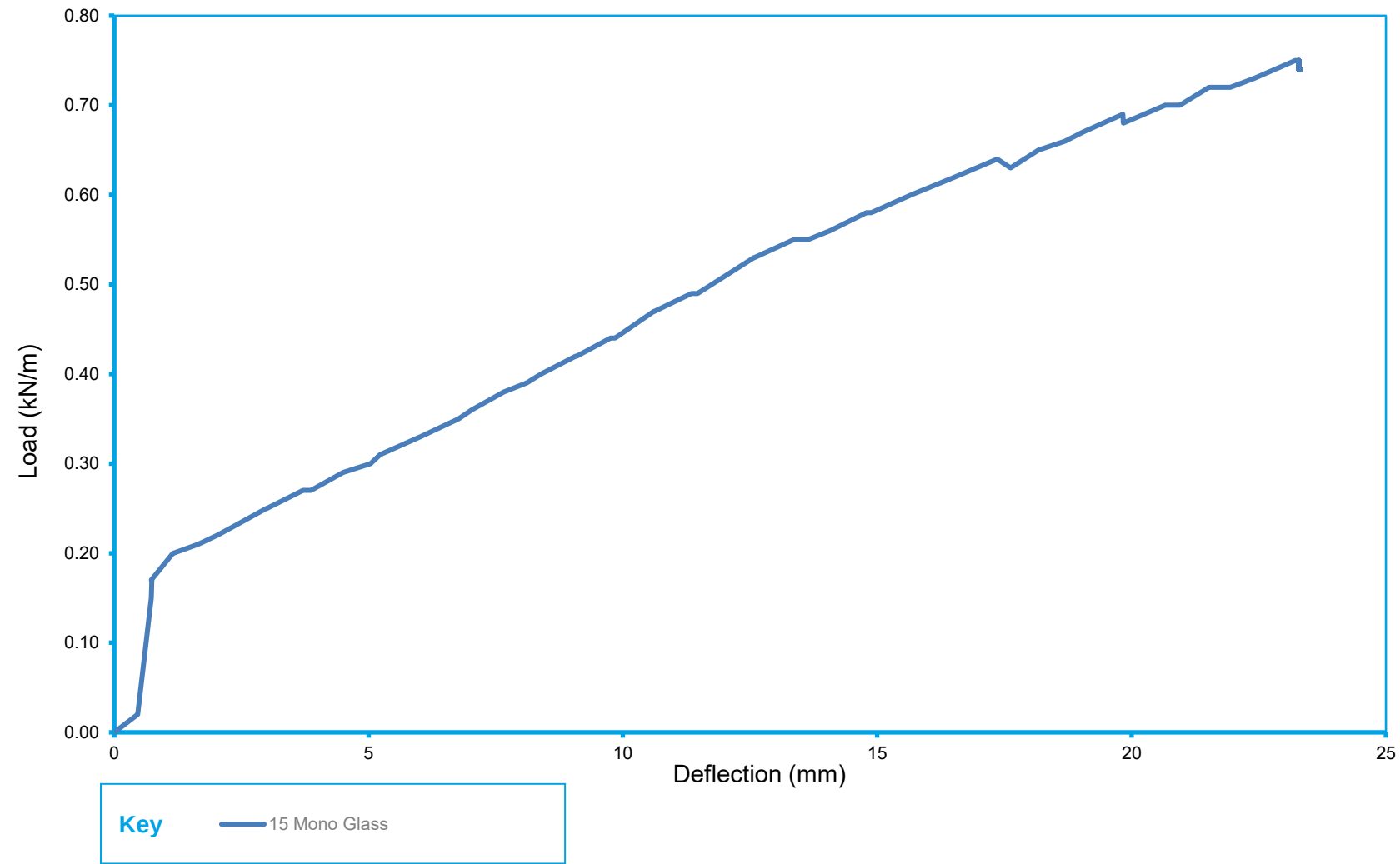


Chart 3 - Load Versus Deflection Curve for OnLevel TL-6620 Top Mounted Balustrade System Horizontal Line Load

Test Report: UK243504/Ref. 1

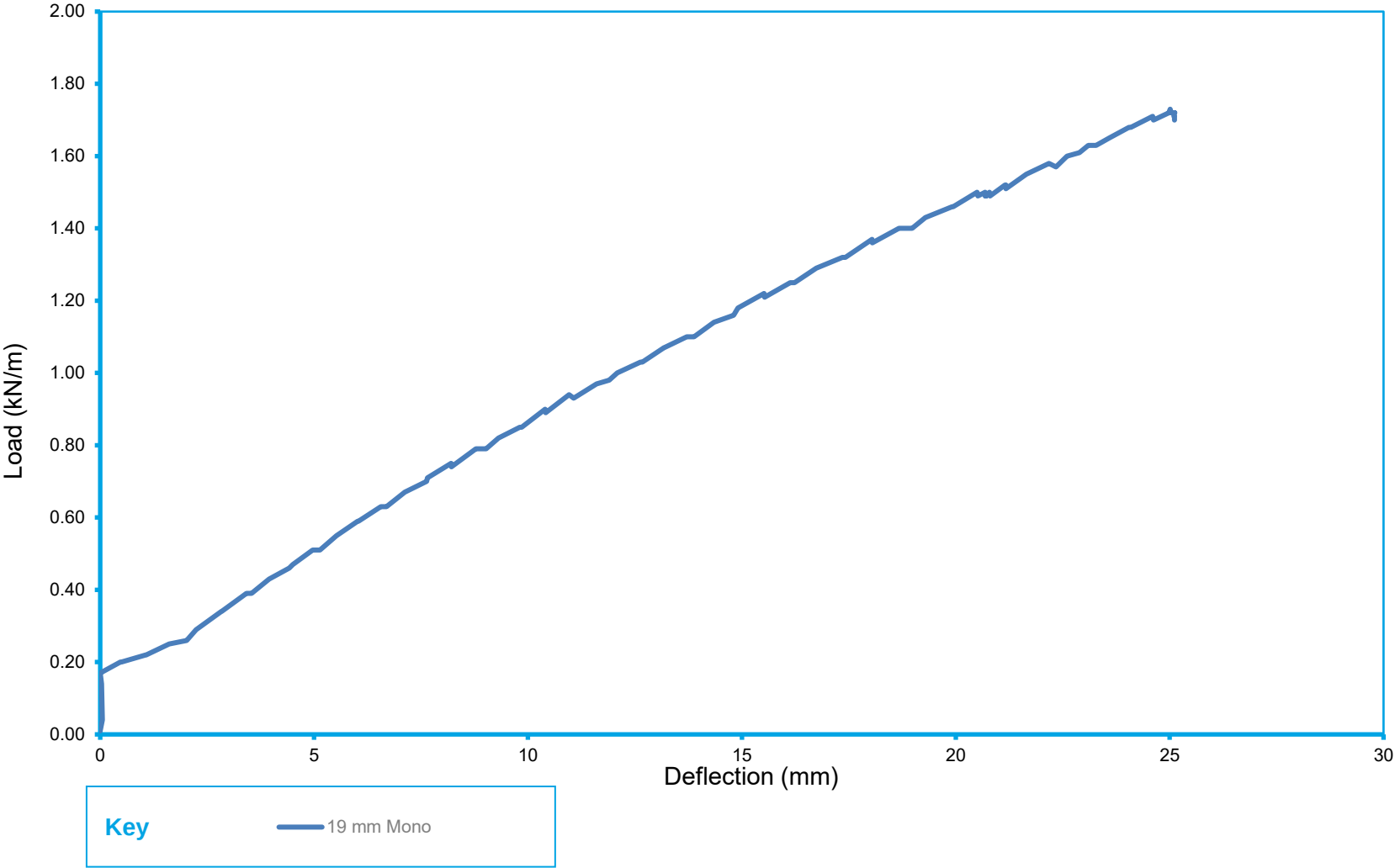


Chart 4 - Load Versus Deflection Curve for OnLevel TL-6620 Top Mounted Balustrade System Horizontal Line Load

Test Report: UK243504/Ref. 1

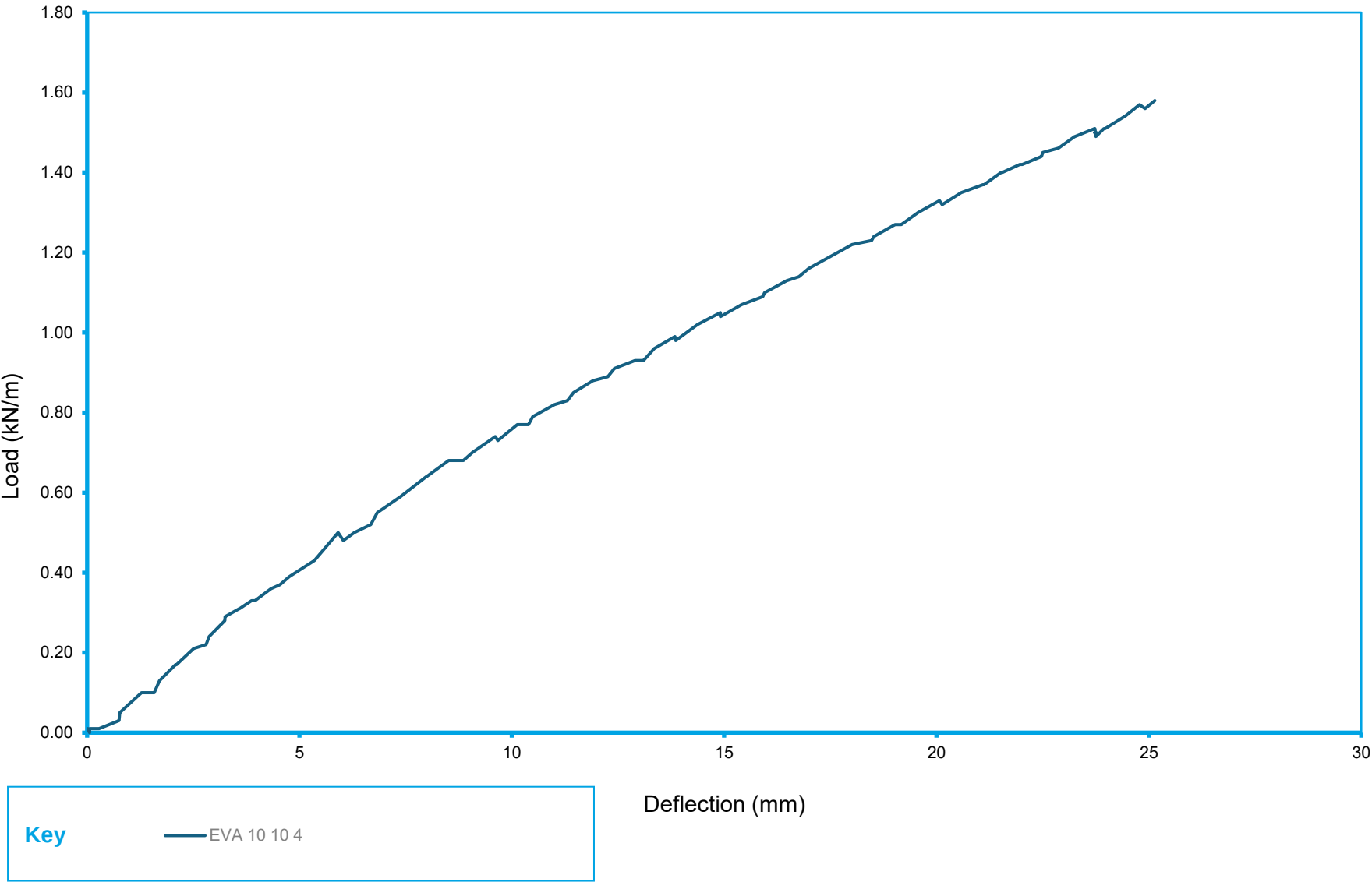
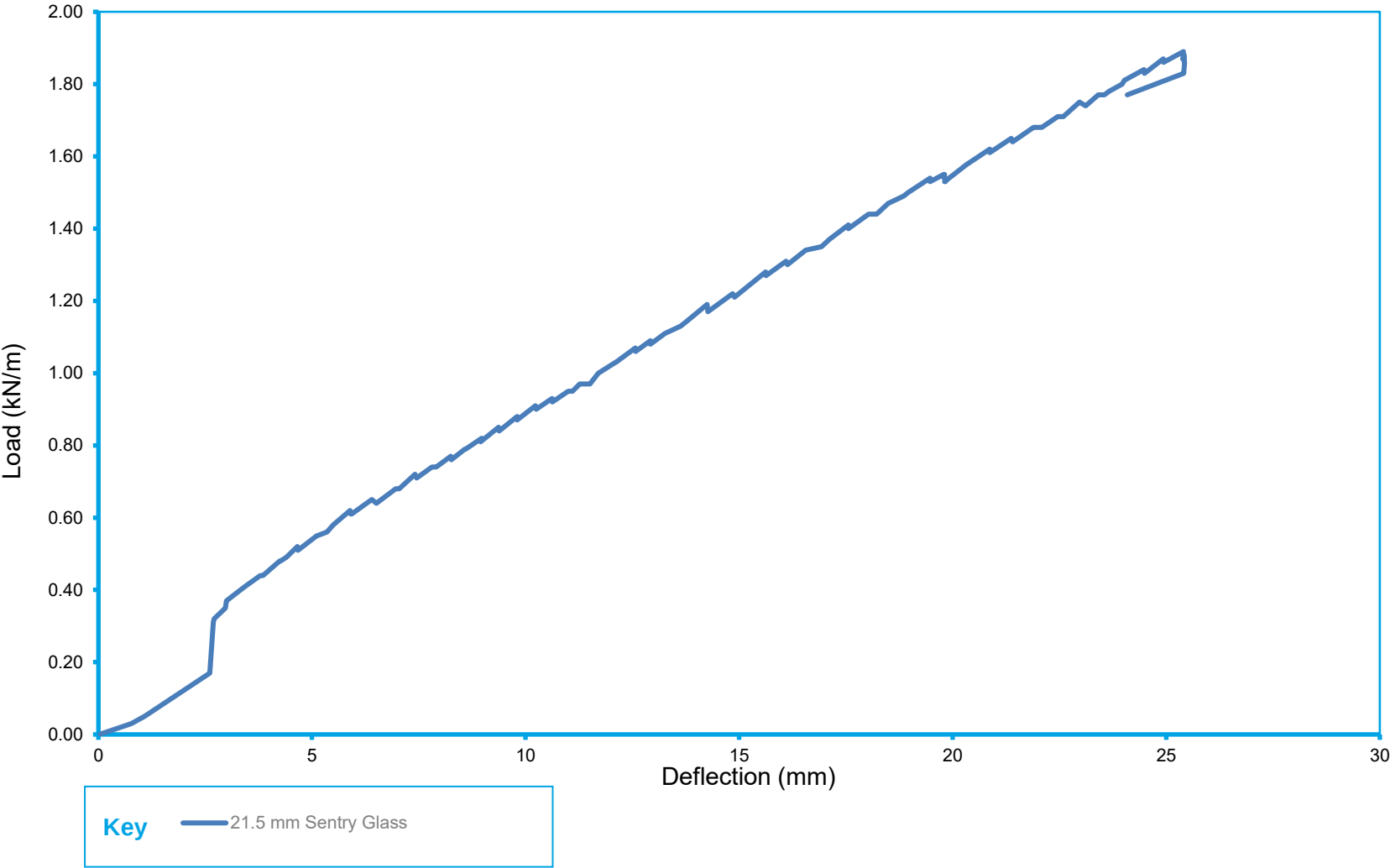
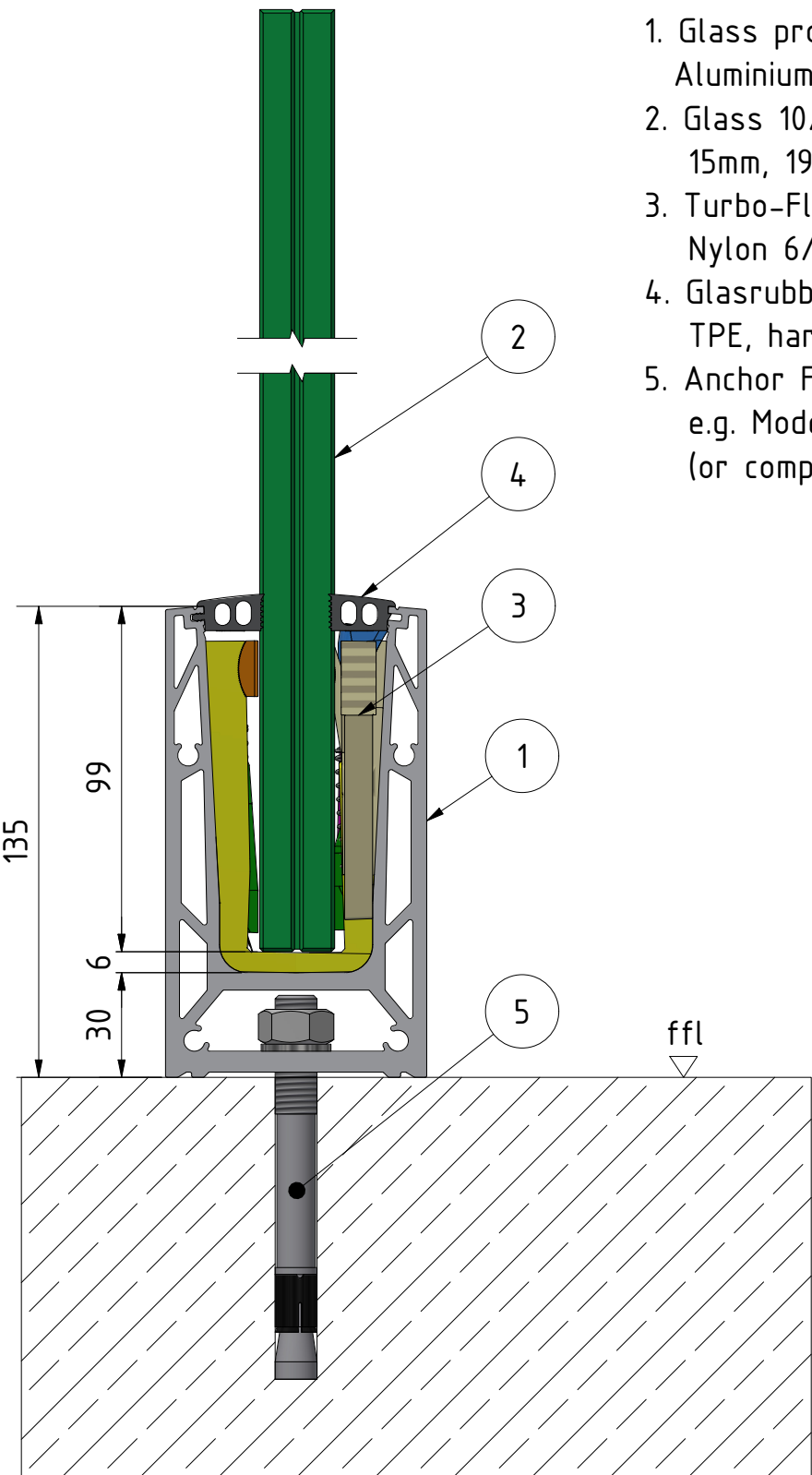


Chart 5 - Load Versus Deflection Curve for OnLevel TL-6620 Top Mounted Balustrade System Horizontal Line Load

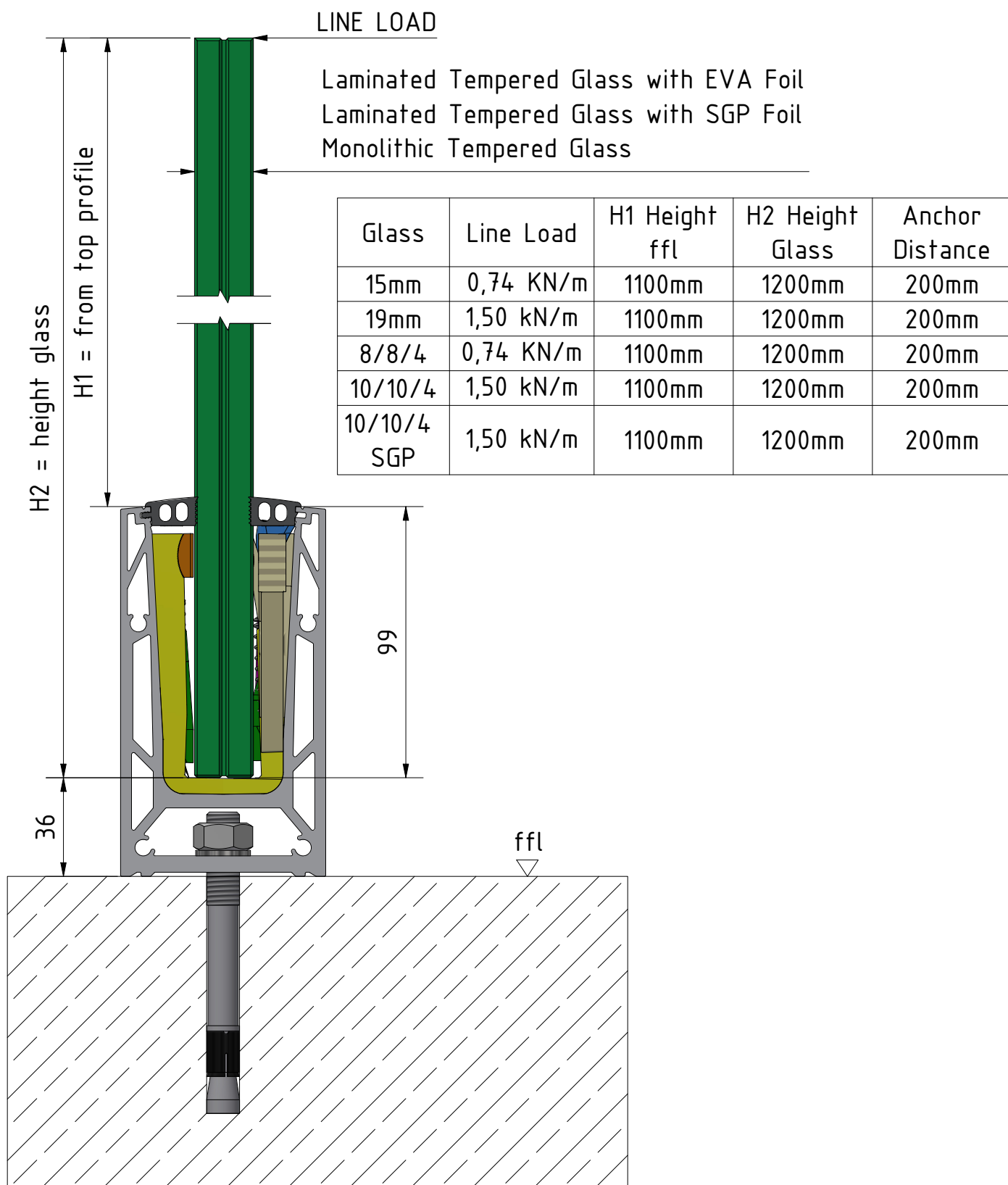
Test Report: UK243504/Ref. 1



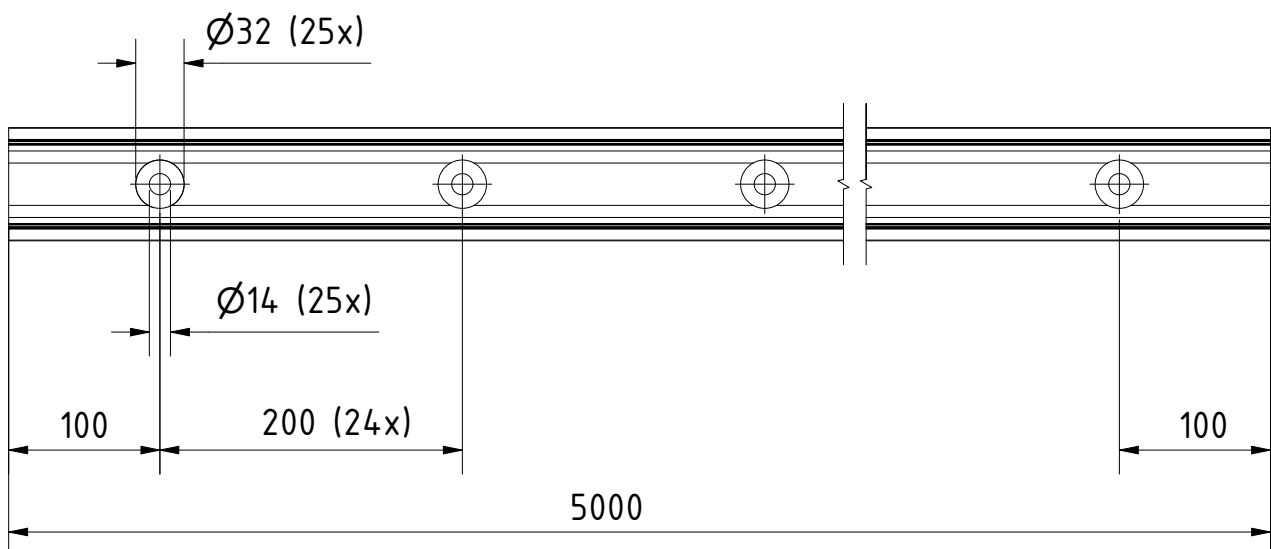
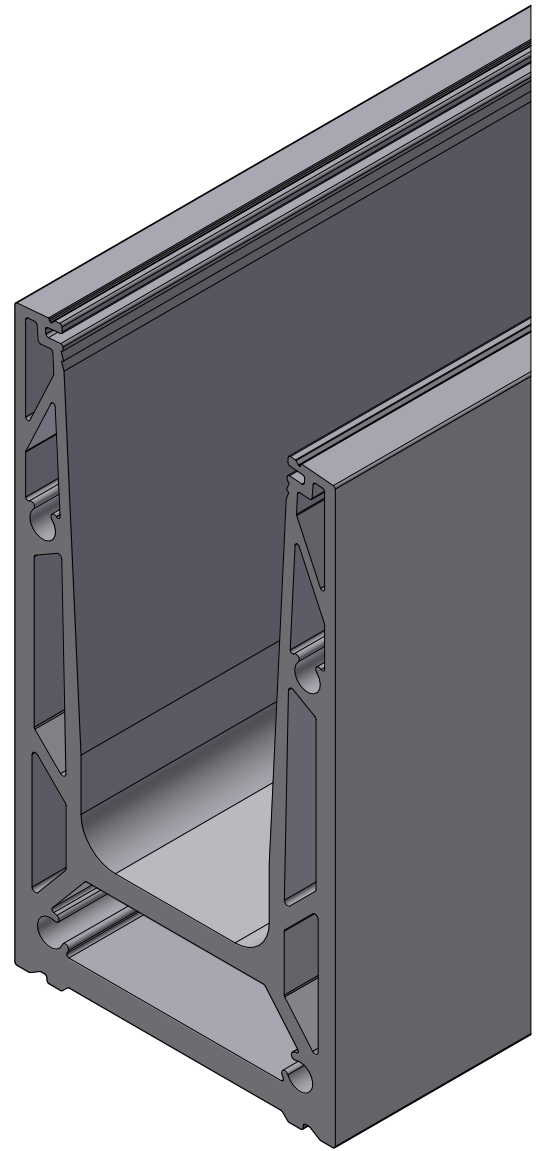
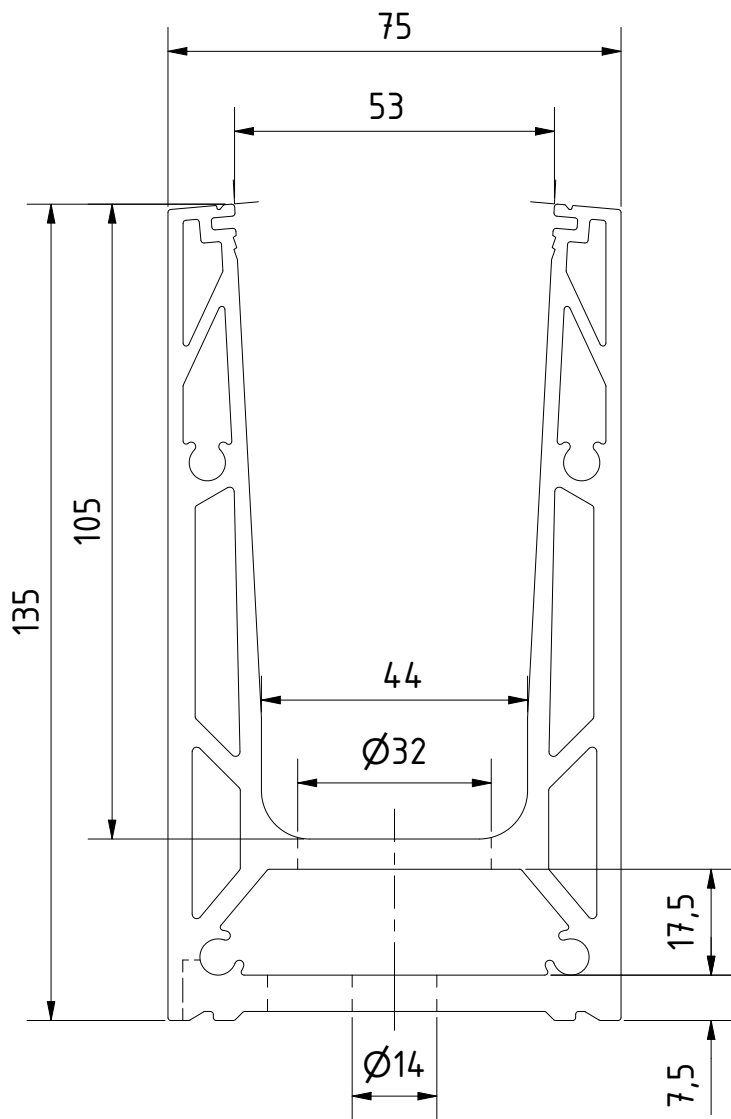


- 1. Glass profile TL-6620, top mount
Aluminium 6063-T6
- 2. Glass 10/10/4 (21,52mm), 8/8/4 (17,52mm),
15mm, 19mm
- 3. Turbo-Flex glass fixation set
Nylon 6/6 PA. 10 Gf.
- 4. Glasrubber
TPE, hardness 60°,shore A
- 5. Anchor Fischer FAZ II 12
e.g. Model 91.3501.210.81/ 91.3501.210.30
(or comparable anchor)

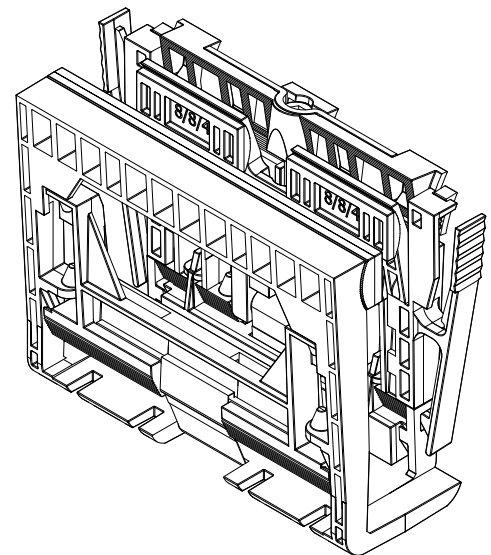
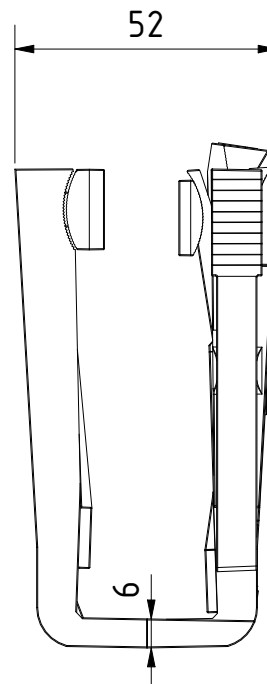
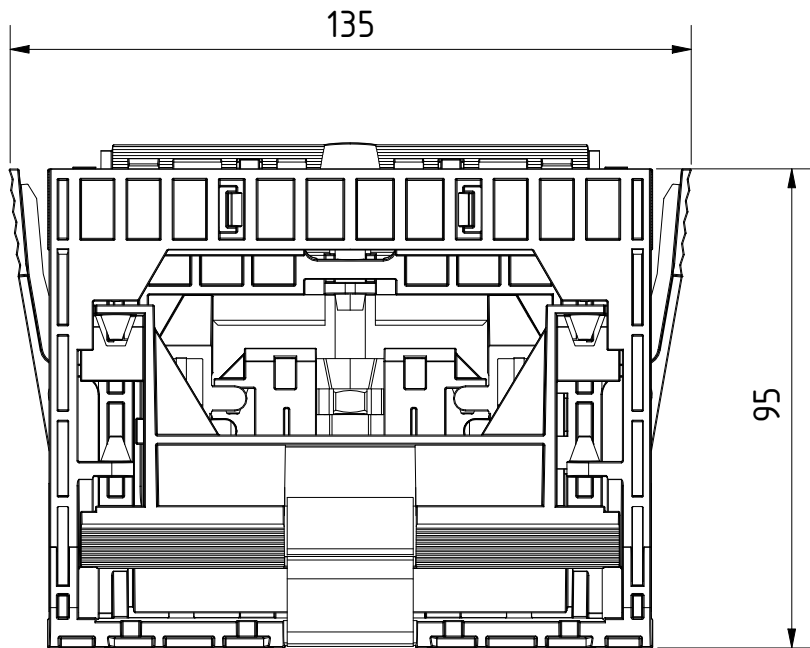
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		Detail:Figure 1			
		Article number TL-6620 (top mount)		Size A4	Scale 1:2



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		Article number TL-6620 (top mount)	Size A4 Scale 1:2

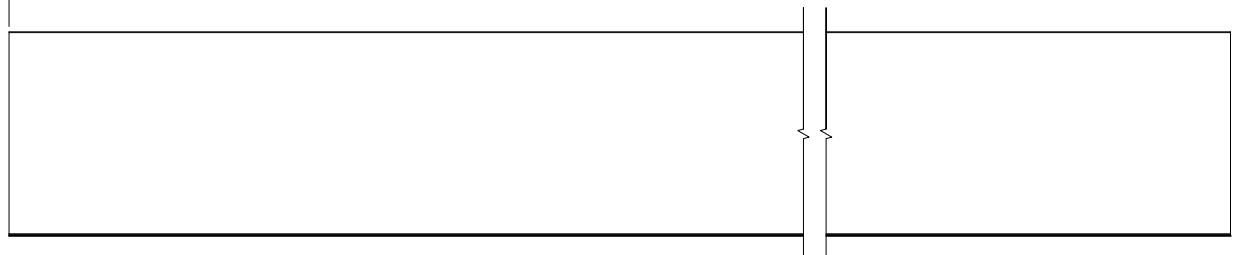
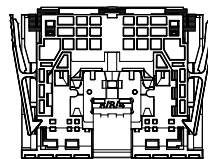
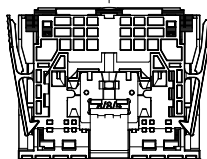
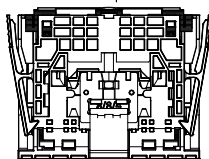


Designed by FV	Created 30.01.2025	Modified	Comment	
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		Article number TL-6620 (top mount)		Size A4

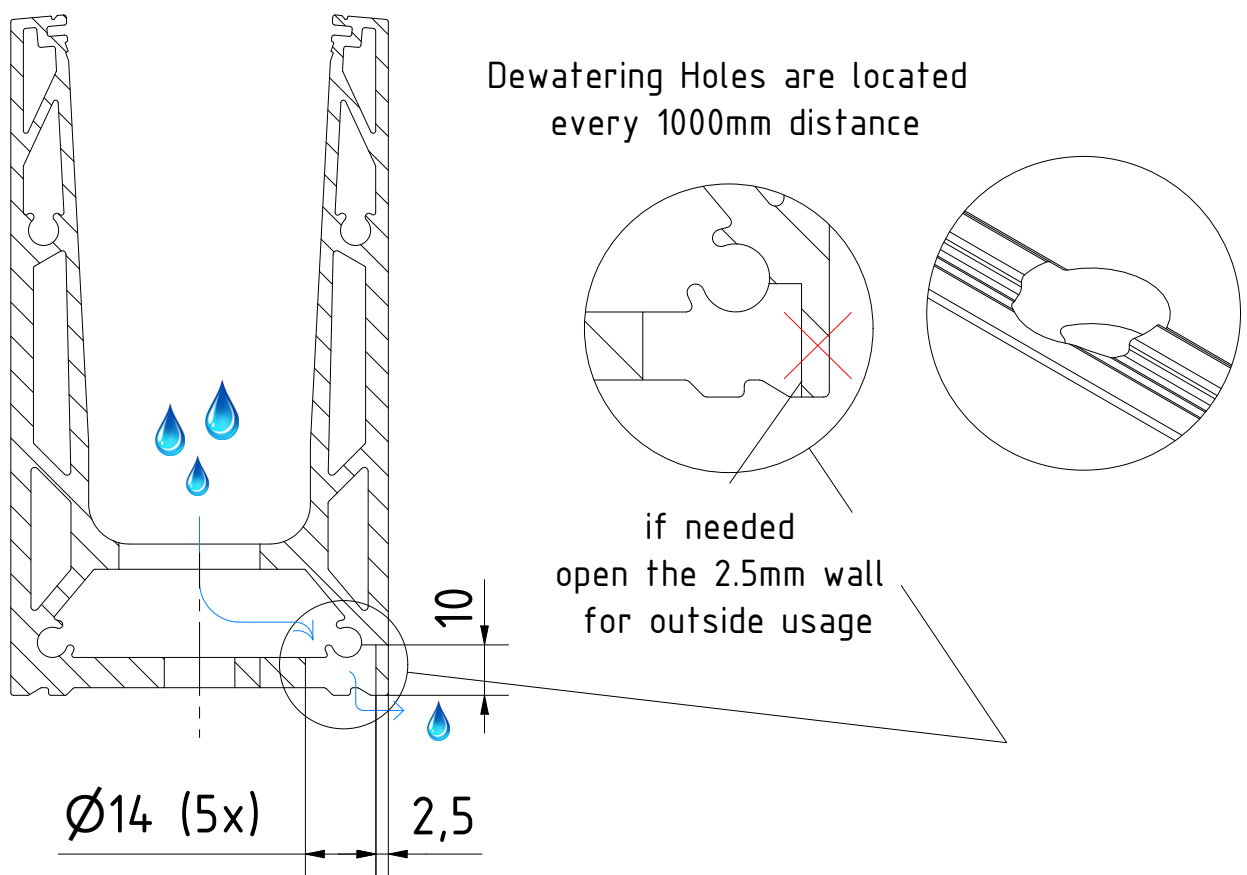


Distance Turbo-Flex glass fixation set:

156 312,5 (15x5000mm)



Designed by FV	Created 30.01.2025	Modified	Comment	
		Description Turbo-Flex (dimension, quantity, distance)		
		Article number TL-6620 (top mount)		Size A4



Designed by FV	Created 30.01.2025	Modified	Comment
		Description Dewatering holes	
		Article number TL-6620 (top mount)	Size A4 Scale -