TEST REPORT

Lucideon Reference:	UK203875 (QT-61621/1/JB)/Ref. 5
Project Title:	Line Load Testing of OnLevel GmbH's TL-5010 System in Accordance with BS 6180:2011 Barriers in and about Buildings - Code of Practice
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1 INTRODUCTION

Lucideon Limited were commissioned by OnLevel GmbH 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 Standard.

The testing was carried out at Lucideon Limited's Structures laboratory from 6 September until 9 September 2021.

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 referred to as System TL-5010. The system can be seen in Appendix A.

Representatives from OnLevel GmbH installed the systems.

3 TEST PROGRAMME

Table 1 shows the test programme carried out:

Table 1 – Test Programme

Profile	Test	Glass Reference	Type of Glass	Glass Panel Height (mm)	Test Position (mm)
TL-5010	Line load	8/8/4 PVB	Laminated tempered glass	1200	1100
		10/10/4 PVB		1200	

4 TEST METHOD

The channel was bolted to the top of a concrete block, nominally 0.5 m x 0.5 m x 3.5 m, which was fixed to the floor of the test facility. The 1.0 m length of the channel was bolted to the block at 250 mm in a latitudinal direction and 833 mm in a longitudinal direction.

The appropriate thickness glass panel was fitted into the channel using 'Flex Fit' fixing clips at nominally 312.5 mm centres 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 above the datum level of the floor.

The deflection was measured at the top central point of the 1100 mm above the datum level of the floor.

The load was applied via a hydraulic ram and the deflection measured using a linear voltage displacement transducer (LVDT).

A general view of the set-up can be seen in Plate 1.

5 RESULTS

The test was 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.

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 2 contain no safety factors and are direct loads as achieved by the system under test conditions.

Table 3 summarises 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

TABLES

Table 2 – 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)
TL-5010	8/8/4 PVB laminated tampered glass	1100	0.91	0.74	16.76
	10/10/4 PVB laminated tampered glass	1100	1.36	0.74	11.83

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-5010	
			8/8/4 PVB	10/10/4 PVB
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	✓	✓

Type of Occupancy for Part of the Building	Examples of Specific Use	Horizontal Uniformly Distributed Line Load (kN/m)	TL-5010	
			8/8/4 PVB	10/10/4 PVB
Areas where people might congregate	(vi) areas having fixed seating within 530 mm of the barrier, balustrade or parapet	1.50	x	x
Areas with tables or fixed seating	(vii) restaurants and bars	1.50	x	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	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
	(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
Vehicular	(xiv) pedestrian areas in car parks, including stairs, landings, ramps, edges of internal floors, footways, edges of roofs	1.50 (Note 2)	x	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"

PLATE

Plate 1 – Generic Test Arrangement

Chart 1 - Load Deflection Curve for Line Load Testing Carried out on TL-5010 Balustrade System

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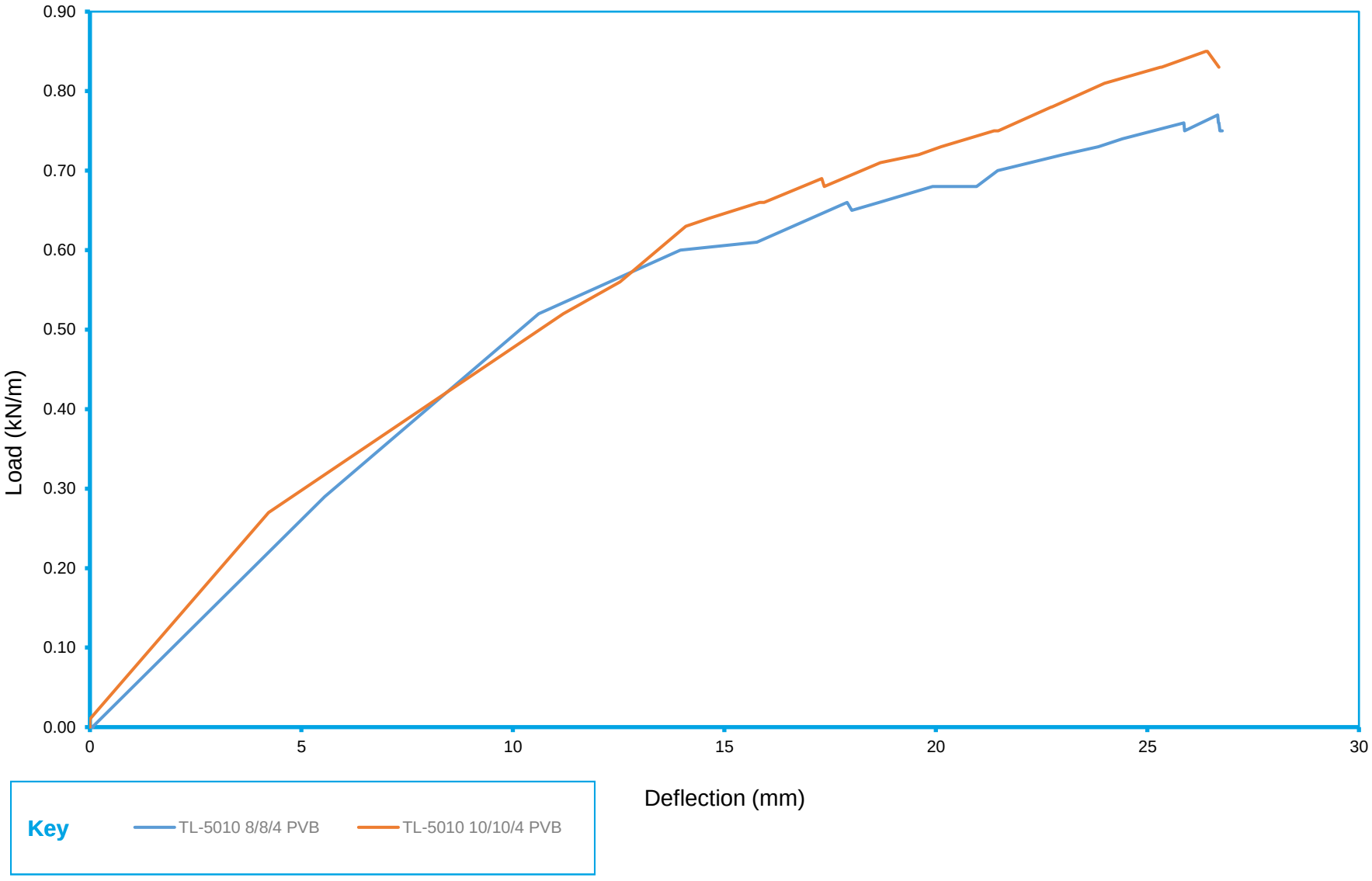
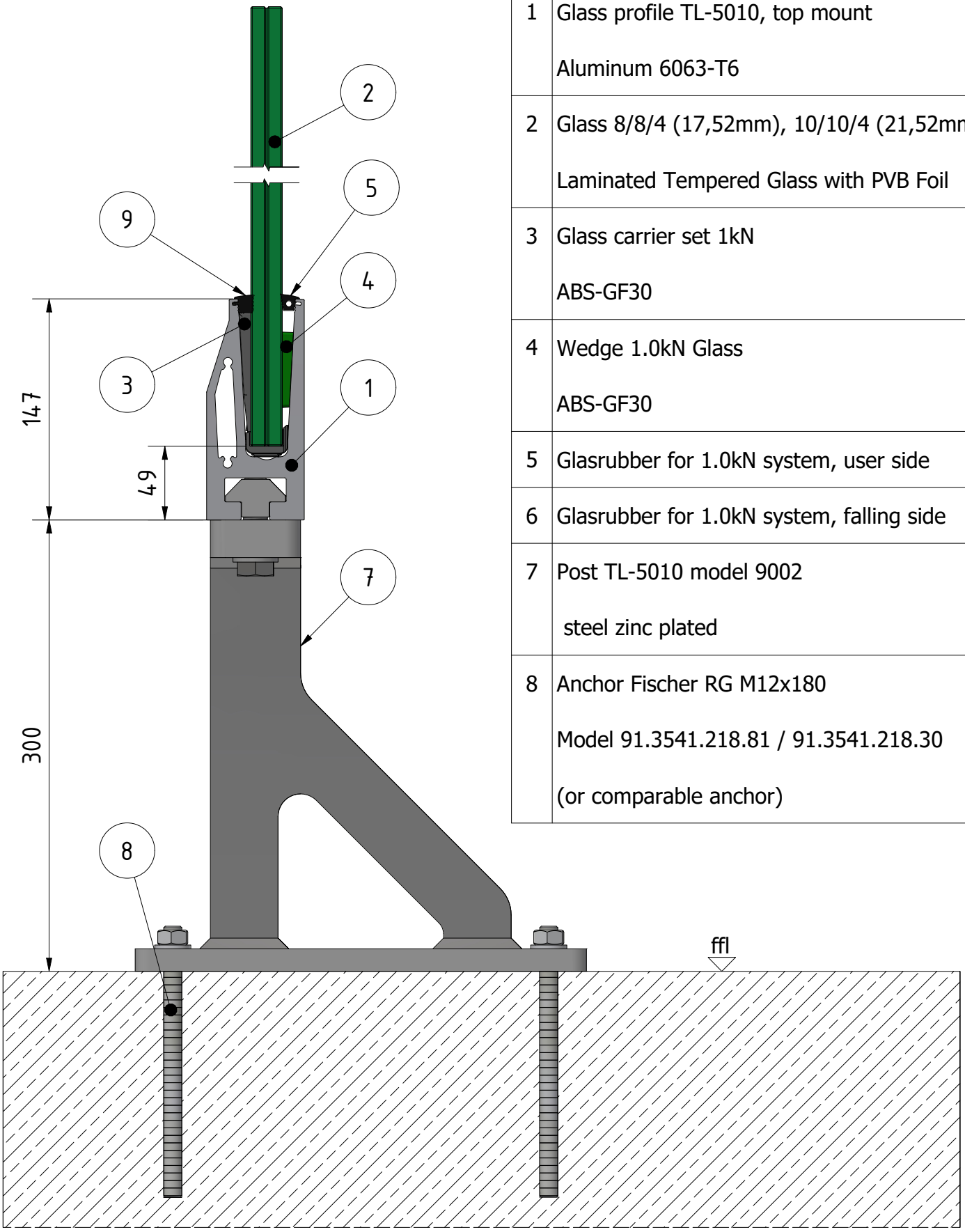


APPENDIX A - Figures



1	Glass profile TL-5010, top mount Aluminum 6063-T6
2	Glass 8/8/4 (17,52mm), 10/10/4 (21,52mm) Laminated Tempered Glass with PVB Foil
3	Glass carrier set 1kN ABS-GF30
4	Wedge 1.0kN Glass ABS-GF30
5	Glasrubber for 1.0kN system, user side
6	Glasrubber for 1.0kN system, falling side
7	Post TL-5010 model 9002 steel zinc plated
8	Anchor Fischer RG M12x180 Model 91.3541.218.81 / 91.3541.218.30 (or comparable anchor)

Designed by	Created	Modificated	Comment
FV	27.09.2021		

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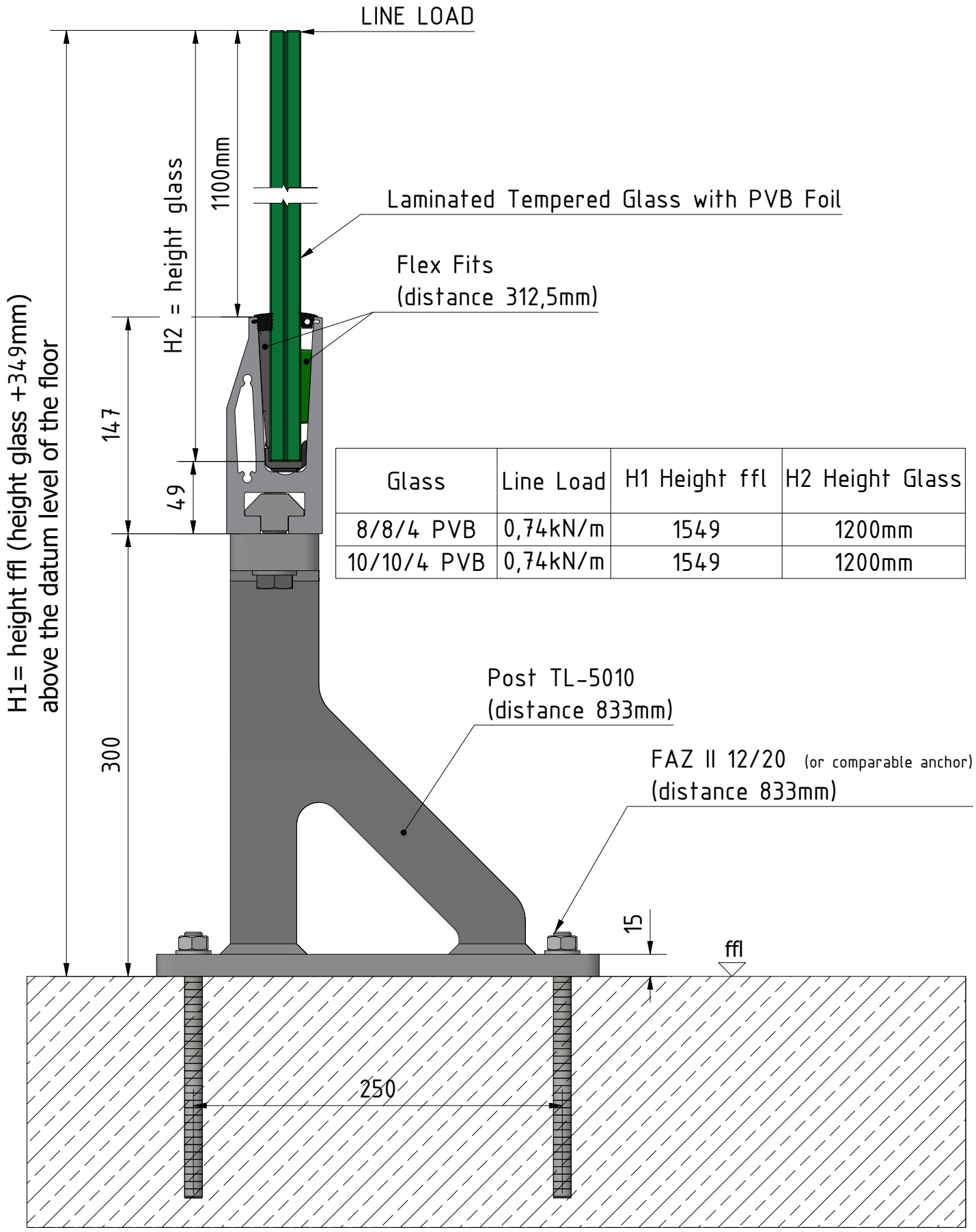
Description: Detail Figure 1

Article number	Size	Scale
TL-5010 (top mount)	A4	1 : 2



Glass	Line Load	H1 Height ffl	H2 Height Glass
8/8/4 PVB	0,74kN/m	1549	1200mm
10/10/4 PVB	0,74kN/m	1549	1200mm

Designed by	Created	Modificated	Comment
FV	27.09.2021		

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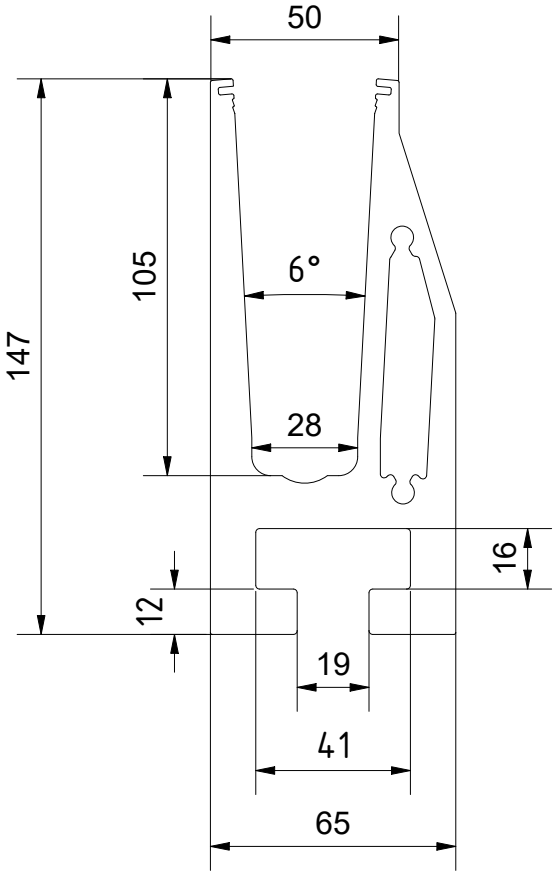
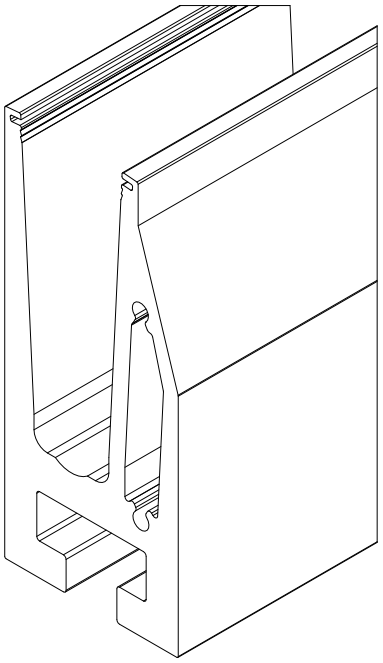
Description

Detail Figure 2 (Line Louds/ Glass Heights)

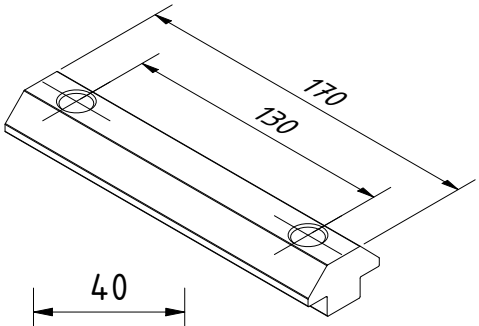
Article number	Size	Scale
TL-5010 (top mount)	A4	1 : 2

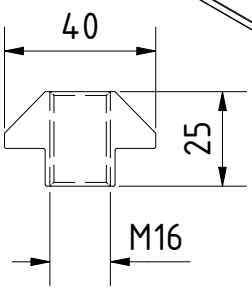


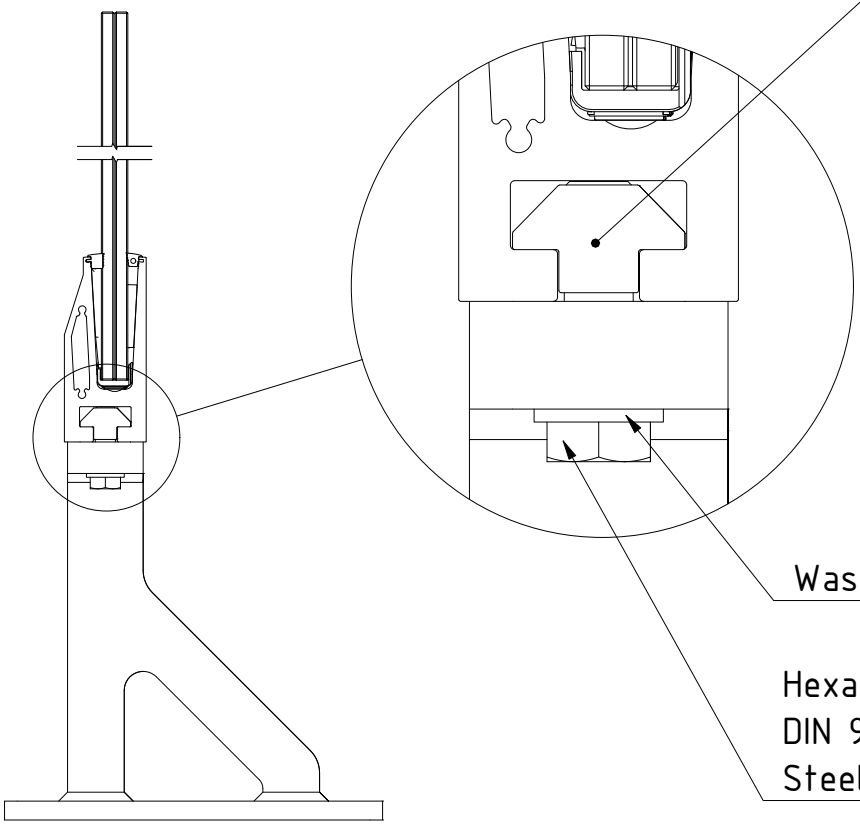


Material: Aluminum 6063-T6

Mounting bar TL-5010
Aluminium anodised
Modell 7004







Washer DIN 125-A17

Hexagon head screw
DIN 933-M16x55-8.8
Steel zinc plated

Designed by	Created	Modificated	Comment
FV	27.09.2021		

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Description: Figure 3 mounting details

Article number	Size	Scale
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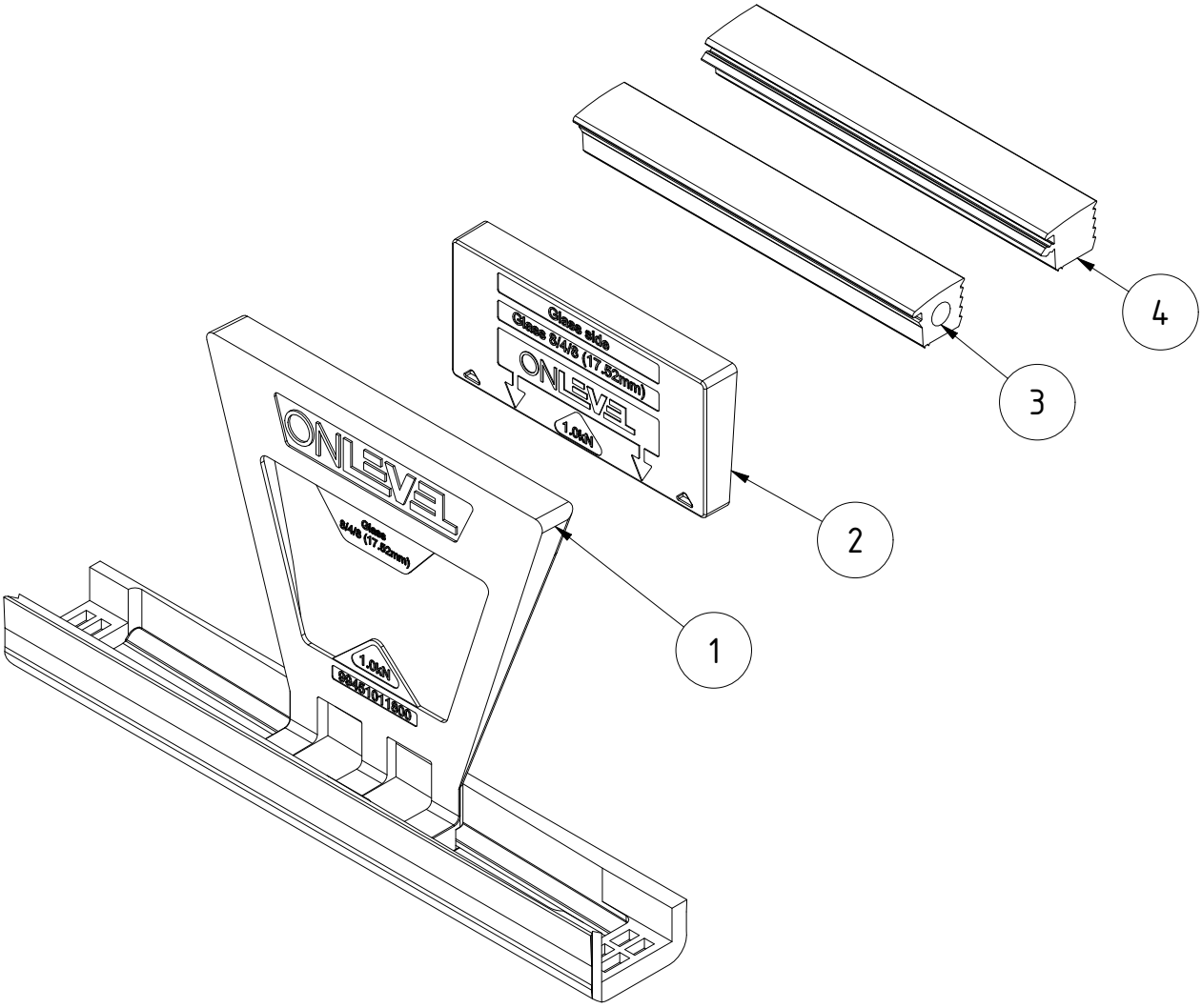
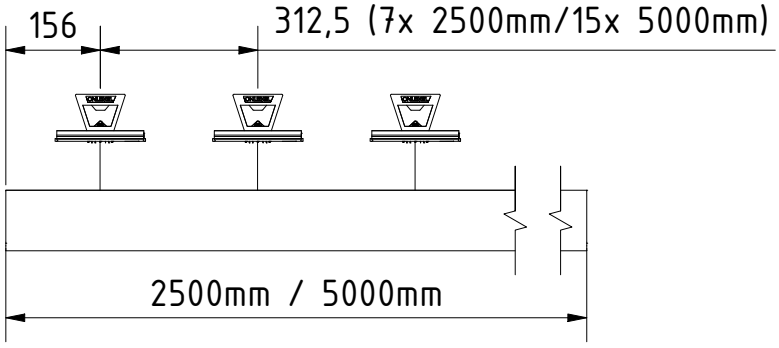


ITEM	PCS (L=2500mm)	PCS (L=5000mm)	Description
1	8	16	Glass carrier set 1kN
2	8	16	Wedge 1.0kN
3	1 (L=2500mm)	1 (L=5000mm)	Rubber userside 1.0kN
4	1 (L=2500mm)	1 (L=5000mm)	Rubber fallingside 1.0kN

Distance Glass Carrier / Glass Wedges :



Designed by	Created	Modificated	Comment
FV	27.09.2021		

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Description: Flex-Fit sets (quantity and distance)

Article number	Size	Scale
TL-5010 (top mount)	A4	-