



NATIONAL TEST REPORT
(BS 6180 : 2011)

EASY GLASS[®] HYBRID POST TOP MOUNT

TESTED GLASS: 8 MM MONOLOTTIC AND 8,76 MM LAMINATED GLASS

TOTAL RAILING HEIGHT 1.100 MM

TEST REPORT

Lucideon Reference: 151599 (QT35930/1/SL)/Ref. 2/Supp2

Project Title: Testing of Easy Glass Hybrid System Top Mount in Accordance with BS 6180:2011 Barriers in and about Buildings

Client: Q-railing Europe GmbH & Co.KG
Marie-Curie-Strasse 8-14
Emmerich am Rhein
D-46446
Germany

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Report Date: 20 August, 2015

Purchase Order No.: N/A

Work Location: Lucideon UK

This report supersedes the report issued on 03.07.15.



Mr Dave Boon
Consultancy Team
Reviewer



Miss Lisa Cobden
Consultancy Team
Project Manager



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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 post and infill system tested was designated as Easy Glass Hybrid System Top Mount. The system incorporated two Cap rails of differing dimensions. The system is shown in the Figures included in the Appendix.

The channel was installed by Q-railing personnel.

3 TEST PROGRAMME

A horizontal line load was applied to the infill system with the span between posts set at the following distances:

- Top Mount Incorporating 65 mm x 40 mm Hand rail;
 - 1.7 m span between posts.
 - 2.0 m span between posts.
 - 2.5 m span between posts.
 - 3.0 m span between posts.

- Top Mount Incorporating 33 mm x 39 mm Hand rail;
 - 1.5 m span between posts.
 - 1.8 m span between posts.
 - 2.0 m span between posts.
 - 2.5 m span between posts.
 - 3.0 m span between posts.

4 TEST METHOD

The channel was bolted to the top of a concrete block, which was fixed to the floor of the test facility. The channel was bolted to the block at appropriate centres by the client and the posts were bolted to the top of the concrete block at the correct specified spans using the appropriate fixings.

An 8 mm monolithic glass panel of appropriate length was fitted into the channel using an inlay and rubber seals. (Fixing details for the systems are shown in the Figures).

A horizontal imposed line load was applied to the infill system 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 measured using a calibrated load cell. Deflection was measured using a linear voltage displacement transducer (Plate 1 shows the general test set up).

In addition a point load was applied to the centre point of the glass infill, as this was deemed the worst case scenario, via a hydraulic ram and 100 mm by 100 mm spreader plate. For the point load the linear voltage displacement transducer measured the deflection from the centre of the glass infill panel.

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.

The loads achieved by the Q-railing Europe GmbH and Co KG post and infill system tested under horizontal imposed line load to the maximum deflection of 25 mm are given in Tables 1 and 2.

The loads achieved by the Q-railing Europe GmbH and Co KG post and infill system tested under point load are given in Table 3

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

Tables 4 to 7 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 Balustrade System Tested under Horizontal Imposed Line Load

| Cap Rail | Glass Span | Imposed Line Load at 25 mm Deflection (kN/m) | Working Line Load for System (kN/m) | Deflection at Working Line Load for System (mm) |
|-------------------------|------------|--|-------------------------------------|---|
| 33 mm x 39 mm Hand Rail | 1.5 m | 3.94 | 3.00 | 18.44 |
| | 1.8 m | 1.69 | 1.50 | 22.06 |
| | 2.0 m | 1.32 | 0.74 | 12.46 |
| | 2.5 m | 0.58 | 0.36 | 13.81 |
| | 3.0 m | 0.37 | 0.36 | 24.41 |

Table 2 - Summary of Performance of Q-railing Europe GmbH and Co. KG Balustrade System Tested under Horizontal Imposed Line Load

| Cap Rail | Glass Span | Imposed Line Load at 25 mm Deflection (kN/m) | Working Line Load for System (kN/m) | Deflection at Working Line Load for System (mm) |
|-------------------------|------------|--|-------------------------------------|---|
| 65 mm x 40 mm Hand Rail | 1.7 m | 3.26 | 3.00 | 22.93 |
| | 2.0 m | 1.93 | 1.50 | 18.49 |
| | 2.5 m | 0.90 | 0.74 | 19.79 |
| | 3.0 m | 0.49 | 0.36 | 18.67 |

Table 3 - Summary of Performance of Q-railing Europe GmbH and Co. KG Post and Infill System Tested under Point Loads

| System | Description | Working Point Load for System (kN) | Deflection at Working Point Load for System (mm) |
|----------------|--|------------------------------------|--|
| 65 mm Cap Rail | 500 mm span 8 mm Monolithic Glass | 1.5 | 14.49 |
| | 900 mm span 8 mm Monolithic Glass | 1.5 | 12.14 |
| 65 mm Cap Rail | 500 mm span 8.76 mm Tempered Laminated Glass | 1.5 | 15.13 |
| | 750 mm span 8.76 mm Tempered Laminated Glass | 1.5 | 11.13 |
| 33 mm Cap Rail | 500 mm span 8.76 mm Tempered Laminated Glass | 1.5 | 16.57 |

Table 4 - 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 Top 33 mm Hand Rail | | | | |
|---|--|---|--------------------------------|-------|-------|-------|-------|
| | | | 1.5 m | 1.8 m | 2.0 m | 2.5 m | 3.0 m |
| 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 | X |
| 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 | ✓ | ✓ | ✓ | X | 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 |
| Areas with tables or fixed seating | (vii) restaurants and bars | 1.50 | ✓ | ✓ | X | X | X |
| Areas without obstacles for moving people and not susceptible to overcrowding | (viii) stairs, landings corridors ramps | 0.74 | ✓ | ✓ | ✓ | X | X |
| | (ix) external balconies including Juliette balconies and edges of roofs; footways and pavements within | 0.74 | ✓ | ✓ | ✓ | X | X |

| Type of Occupancy for Part of the Building | Examples of Specific Use | Horizontal Uniformly Distributed Line Load (kN/m) | Easy Glass Top 33 mm Hand Rail | | | | |
|--|--|---|--------------------------------|-------|-------|-------|-------|
| | | | 1.5 m | 1.8 m | 2.0 m | 2.5 m | 3.0 m |
| | building cartilage adjacent to basement/sunken areas | | | | | | |
| Areas susceptible to overcrowding | (x) footways or pavements less than 3 m wide adjacent to sunken areas | 1.50 | ✓ | ✓ | 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 |
| | (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 |
| 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 |
| | (xv) horizontal loads imposed by vehicles | (Note 2) | - | - | - | - | - |

Table 5 - 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 Top 66 mm Hand Rail | | | |
|--|--|---|--------------------------------|-------|-------|-------|
| | | | 1.7 m | 2.0 m | 2.5 m | 3.0 m |
| 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 | ✓ | ✓ | ✓ | ✓ |



| Type of Occupancy for Part of the Building | Examples of Specific Use | Horizontal Uniformly Distributed Line Load (kN/m) | Easy Glass Top 66 mm Hand Rail | | | |
|---|--|---|--------------------------------|-------|-------|-------|
| | | | 1.7 m | 2.0 m | 2.5 m | 3.0 m |
| | (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 | 0.22 | ✓ | ✓ | ✓ | ✓ |
| | (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 | ✓ | ✓ | ✓ | X |
| 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 | ✓ | ✓ | ✓ | 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 |
| | (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 |

| Type of Occupancy for Part of the Building | Examples of Specific Use | Horizontal Uniformly Distributed Line Load (kN/m) | Easy Glass Top 66 mm Hand Rail | | | |
|--|--|---|--------------------------------|-------|-------|-------|
| | | | 1.7 m | 2.0 m | 2.5 m | 3.0 m |
| | (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 | (Note 2) | X | | X | X |
| | (xv) horizontal loads imposed by vehicles | (Note 2) | X | | X | X |

Table 6 - 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 | A Point Load Applied to Part of the Infill (kN) | Easy Glass Hybrid Top Mount 65 mm Cap Rail | |
|--|--|---|--|-----------------------------------|
| | | | 500 mm Span 8 mm Monolithic Glass | 900 mm Span 8 mm Monolithic 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 | 0.25 | ✓ | ✓ |
| | (ii) other residential, i.e. houses of multiple occupancy and balconies, including Juliette balconies and edges of roofs in single family dwellings | 0.50 | ✓ | ✓ |
| Offices and work areas not included elsewhere, including storage areas | (iii) light access stairs and gangways not more than 600 mm wide | 0.25 | ✓ | ✓ |
| | (iv) light pedestrian traffic routes in industrial and storage buildings except designated escape routes | 0.25 | ✓ | ✓ |



| Type of Occupancy for Part of the Building | Examples of Specific Use | A Point Load Applied to Part of the Infill (kN) | Easy Glass Hybrid Top Mount 65 mm Cap Rail | |
|---|--|---|--|-----------------------------------|
| | | | 500 mm Span 8 mm Monolithic Glass | 900 mm Span 8 mm Monolithic Glass |
| | (v) areas not susceptible to overcrowding in office and institutional buildings, also industrial and storage buildings except as given above | 0.50 | ✓ | ✓ |
| 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 | 0.50 | ✓ | ✓ |
| | (ix) external balconies including Juliette balconies and edges of roofs; footways and pavements within building cartilage adjacent to basement/sunken areas | 0.50 | ✓ | ✓ |
| 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 | 1.50 | ✓ | ✓ |
| | (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 | (Note 2) | X | X |
| | (xv) horizontal loads imposed by vehicles | (Note 2) | X | X |

Table 7 - 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 | A Point Load Applied to Part of the Infill (kN) | Easy Glass Hybrid Top Mount | | |
|--|--|---|--|--|--|
| | | | 65 mm Cap Rail | | 33 mm Cap Rail |
| | | | 500 mm Span 8.76 mm Tempered Laminated Glass | 750 mm span 8.76 mm Tempered Laminated Glass | 500 mm Span 8.76 mm Tempered Laminated 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 | 0.25 | ✓ | ✓ | ✓ |
| | (ii) other residential, i.e. houses of multiple occupancy and balconies, including Juliette balconies and edges of roofs in single family dwellings | 0.50 | ✓ | ✓ | ✓ |
| Offices and work areas not included elsewhere, including storage areas | (iii) light access stairs and gangways not more than 600 mm wide | - | - | - | - |
| | (iv) light pedestrian traffic routes in industrial and storage buildings except designated escape routes | 0.25 | ✓ | ✓ | ✓ |
| | (v) areas not susceptible to overcrowding in office and institutional buildings, also industrial and storage buildings except as given above | 0.50 | ✓ | ✓ | ✓ |
| Areas where people might congregate | (vi) areas having fixed seating within 530 mm of the barrier, balustrade or parapet | 1.50 | ✓ | ✓ | ✓ |



| Type of Occupancy for Part of the Building | Examples of Specific Use | A Point Load Applied to Part of the Infill (kN) | Easy Glass Hybrid Top Mount | | |
|---|--|---|---|---|---|
| | | | 65 mm Cap Rail | | 33 mm Cap Rail |
| | | | 500 mm Span 8.76 mm Tempered Laminated Glass | 750 mm span 8.76 mm Tempered Laminated Glass | 500 mm Span 8.76 mm Tempered Laminated Glass |
| 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 | 0.50 | ✓ | ✓ | ✓ |
| | (ix) external balconies including Juliette balconies and edges of roofs; footways and pavements within building cartilage adjacent to basement/sunken areas | 0.50 | ✓ | ✓ | ✓ |
| 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 | 1.50 | ✓ | ✓ | ✓ |
| | (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, | (Note 2) | X | X | X |



| Type of Occupancy for Part of the Building | Examples of Specific Use | A Point Load Applied to Part of the Infill (kN) | Easy Glass Hybrid Top Mount | | |
|--|---|---|---|---|---|
| | | | 65 mm Cap Rail | | 33 mm Cap Rail |
| | | | 500 mm Span 8.76 mm Tempered Laminated Glass | 750 mm span 8.76 mm Tempered Laminated Glass | 500 mm Span 8.76 mm Tempered Laminated Glass |
| | edges of roofs | | | | |
| | (xv) horizontal loads imposed by vehicles | (Note 2) | X | X | X |

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 1 - Generic Test Arrangement Line Load

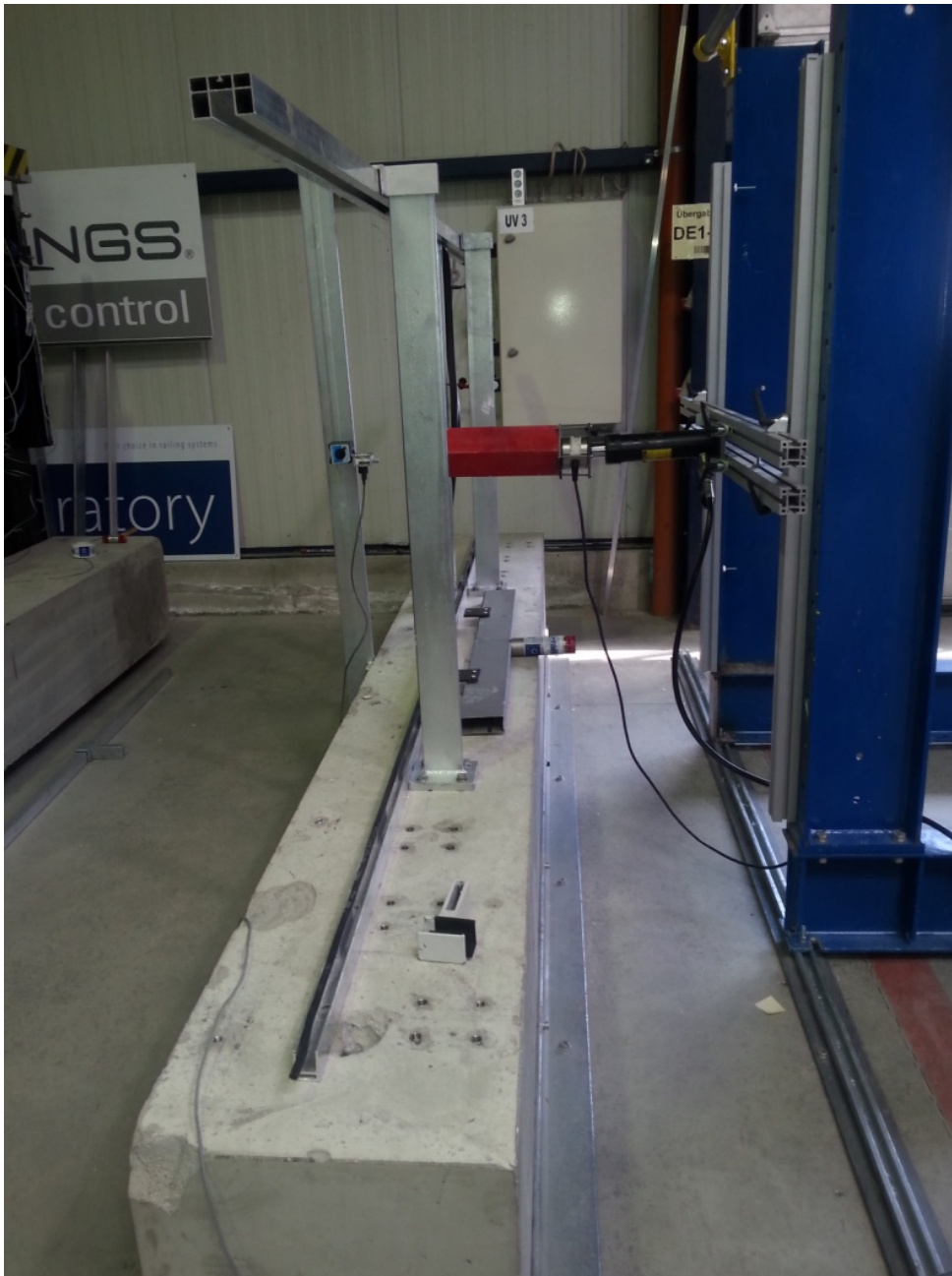
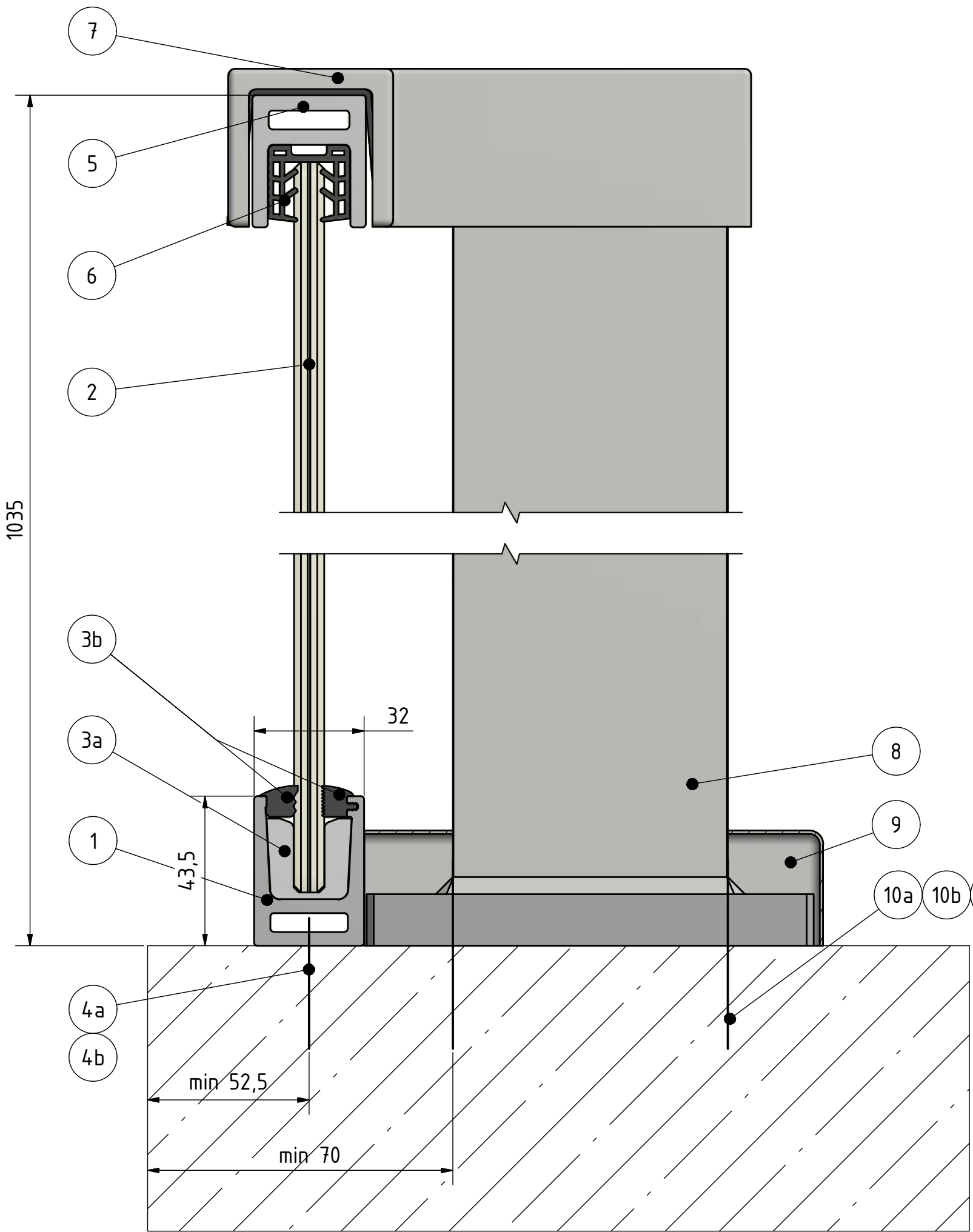


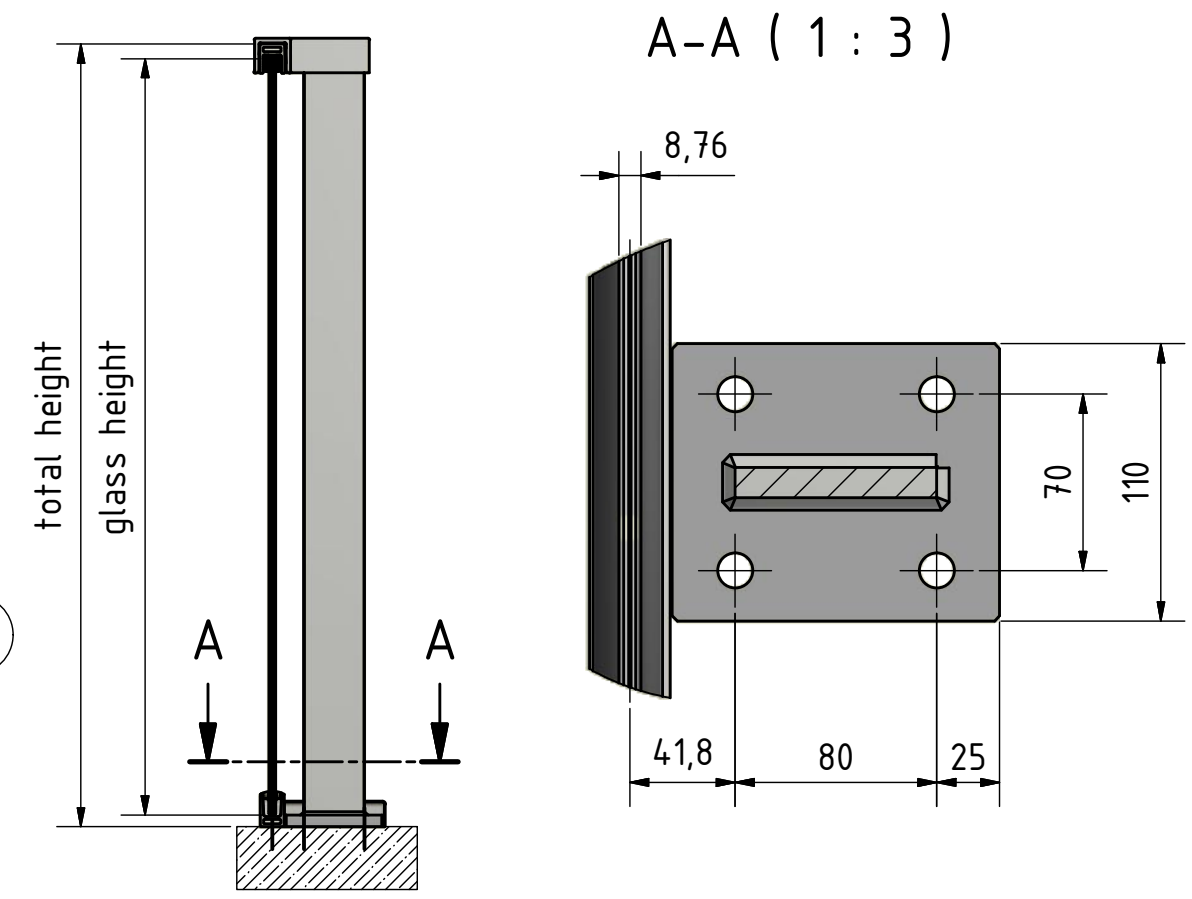
Plate 2 - Generic Test Arrangement Point Load



Plate 3 - Easy Glass Hybrid System Top Mount



| PARTS LIST | | | | |
|------------|-----|-------------|------|--|
| ITEM | QTY | PART NUMBER | REV. | DESCRIPTION |
| 1 | 1 | 16691950008 | 0 | base shoe |
| 2 | 1 | Q-Glass | 0 | glass 8mm - 8.76mm |
| 3a | 1 | 19313000800 | 1 | inlay for 8.00-8.76 glass (rubber-set) |
| 3b | 1 | 19301790800 | 0 | rubber (rubber-set) |
| 4a | 1 | 93084106000 | 0 | plug (anchor) |
| 4b | 1 | 93471006014 | 0 | bolt (anchor) |
| 5 | 1 | 166920339xx | 0 | caprail, small 33 x 39mm |
| 6 | 1 | 19504200800 | 6 | rubber MOD 50 |
| 7 | 1 | 110860339xx | 4 | connector MOD 0860 |
| 8 | 1 | 11054708034 | 2 | post MOD 0547 |
| 9 | 1 | 119013080xx | 0 | cover cap MOD 9013 |
| 10c | 1 | 19451223014 | 0 | steelplug (anchor) |
| 10b | 1 | 93030122414 | 0 | ring (anchor) |
| 10a | 1 | 93066123514 | 0 | bolt (anchor) |



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| | | | |
|---------|------------|------|-----|
| Drawn | 13.05.2015 | Name | MPS |
| Checked | | | |

General tolerance according

Scale: 1 : - | Weight: | Rev.No.: 0

Material:

Finish:

Product line: **Easy Glass Hybrid**

Description: **with top mount, 33mm caprail**

Drawing no.: **Easy Glass Hybrid** | Sheet: 1 / 1 | A3

| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|-------|------|
| 0 | | | |

GOOD LUCK WITH
YOUR INSTALLATION!

VIEL ERFOLG MIT
IHRER MONTAGE!

SUCCES MET
DE INSTALLATIE!