NATIONAL TEST REPORT
(BS 6180:2011)

EASY GLASS® PRIME

TOP MONTAGE F MOD.6962

Test Report 3119444
Part 1 of 2.
Q-Railing Europe GmbH & Co.KG

Introduction.

This report has been prepared by Gary Essam and relates to the activity detailed below:

Job/Registration Details		Client Details
Job number:	**3119444**	Q-Railing Europe GmbH & Co.KG Marie-Curie-Strasse 8-14 Emmerich am Rhein 46446 Germany
Job type:	Testing	
Start Date:	30/07/2019	
Test type:	Type	
Sample ID:	N/A	
Registration:	**KM 656489**	
Scheme:	BS 6180:2011	
Protocol:	PP937	
Scheme Manager:	Adam Pearce	
Quality system:	ISO 9001:2015	

The report has been approved for issue by Chris Rayment – Team Manager

Approved For Issue	
	Issue Date: 20 March 2020

Objectives.

Type testing for product certification

Product Scope.

Easy Glass Prime "F" Balustrade Systems

Report Summary.

The test samples met the requirements of those clauses of the Specification against which assessments were made

Description of Test Samples.

Sample Description
Aluminium channel with toughened glass panel balustrade systems

Test Requirements.

BS 6180:2011 Type testing + Results Tables - Barriers in and about buildings - Code of practice

Clause	Requirements	
6	**DESIGN CRITERIA**	
6.3	**Loading**	
6.3.1	**General**	N/As
6.4	**Deflection**	
6.4.1	**Barriers for the protection of people**	N/As
Results Tables	**Actual test results** *See Table A - BS 6180:2011*	

Summary of Test Comments.

Clause	Comments
6.3.1 & 6.4.1	BS 6180:2011 is a code of practice and the loaded deflections of barrier systems are given as recommendations only. The Structural Use of Glass in Buildings (Second Edition), February 2014, O'Regan, C., The Institution of Structural Engineers states "It must be noted that BS 6180 is a guideline and as such it is ultimately up to the designer to determine acceptable deflection limits on the balustrade under consideration." Further, the tables for summaries for suitability on pages 12 and 13 are given for indication only The testing was supervised at the Emmerich am Rhein, Germany site of Q-Railing on 26 and 27 November 2019

Glossary of Terms.

PASS: Complies. Tested by BSI engineers at BSI laboratories.

PASS1: Complies. Witnessed by BSI engineers in manufacturers laboratory.

PASS2: Complies. Tests carried out by third party lab; results accepted by BSI.

PASS*: Report resulted in uncertainty and states that Compliance is more probable than non-compliance.

FAIL: Non compliance – Product does not meet the requirements of this clause.

FAIL*: Report resulted in uncertainty and states that Non-compliance is more probable than compliance.

N/A: Not applicable to design under consideration.

N/As: Not assessed.

N/T: Not tested due to similarity to previously tested item; reference earlier test report.

Conditions of Issue.

This Test Report is issued subject to the conditions stated in current issue of 'BSI Terms of Service'. The results contained herein apply only to the particular sample(s) tested and to the specific tests carried out, as detailed in this Test Report. The issuing of this Test Report does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by BSI of any product. No extract, abridgement or abstraction from a Test Report may be published or used to advertise a product without the written consent of BSI, who reserve the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought.

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BSI
Kitemark House
Maylands Avenue
Hemel Hempstead
Hertfordshire
HP2 4SQ

Supporting Data – Test Results

Table A - BS 6180:2011

Test Results.

CLAUSE

6 DESIGN CRITERIA

6.3 Loading

6.3.1 General

Minimum horizontal imposed loads appropriate to the design of parapets, barriers, balustrades and other elements of structure intended to retain, stop or guide people, should be determined in accordance with Table 2 [of BS 6180:2011], which recommends a uniformly distributed line load for the barrier and a uniformly distributed and point load applied to the infill. These are not additive and should be considered as three separate load cases, all loads being determined according to the type of occupancy which reflects the possible in-service conditions.

Horizontal uniformly distributed line loads should be applied at the design height as presented in Table 1 [of BS 6180:2011] or at the design level 1100mm for barriers higher than the design height.

Uniformly distributed load should be applied at the area below the design height.

Point load should be applied at the most onerous point anywhere on the barrier structure.

6.4 Deflection

6.4.1 Barriers for the protection of people

Barriers for the protection of people should be of adequate strength and stiffness to sustain the applied loads given in Table 2 [of BS 6180:2011]. In addition, a barrier that is structurally safe should not possess sufficient flexibility to alarm building users when subject to normal service conditions. Therefore, for serviceability considerations, the limiting condition for deflection appropriate for a barrier for the protection of people is that the total horizontal displacement of the barrier at any point from its original unloaded position should not exceed the deflection limits determined from the relevant structural design code (where applicable) for the material used, or 25 mm, whichever is the smaller.

Where the infill of a barrier is subjected to imposed loads given in Table 2 [of BS 6180:2011], or if appropriate, other calculated design loads, the displacement of any point of the barrier should not exceed L/65 or 25 mm, whichever is the smaller where L is the given in **8.3**, **8.4** or defined in **8.5** [of BS 6180:2011]. A suitable fracture load, factored by a minimum partial safety factor of 4.0 (as recommended in BS 4592-0) should be obtained from the material manufacturer when considering glass barrier design.

Test Results (Continued).

Table 2 Minimum horizontal imposed loads for parapets, barriers and balustrades

Type of occupancy for part of the building or structure	Examples of specific use	Horizontal uniformly distributed line load (kN/m)	Uniformly distributed load applied to the infill (kN/m^2)	A point load applied to part of the infill (kN)
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	0.5	0.25
	(ii) Other residential, i.e. houses of multiple occupancy and balconies, including Juliette balconies and edges of roofs in single family dwellings	0.74	1.0	0.5
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	0.5	0.25
	(v) Areas not susceptible to overcrowding in office and institutional buildings, also industrial and storage buildings except as given above	0.74	1.0	0.5
Areas where people might congregate	(vi) Areas having fixed seating within 530 mm of the barrier, balustrade or parapet	1.5	1.5	1.5
Areas with tables or fixed seatings	(vii) Restaurants and bars	1.5	1.5	1.5

Test Results (Continued).

Table 2 Minimum horizontal imposed loads for parapets, barriers and balustrades (Continued)

Type of occupancy for part of the building or structure	Examples of specific use	Horizontal uniformly distributed line load (kN/m)	Uniformly distributed load applied to the infill (kN/m^2)	A point load applied to part of the infill (kN)
Areas without obstacles for moving people and not susceptible to overcrowding	(viii) Stairs, landings, corridors, ramps	0.74	1.0	0.5
	(ix) External balconies including Juliette balconies and edges of roofs. Footways and pavements within building curtilage adjacent to basement/sunken areas	0.74	1.0	0.5
Areas susceptible to overcrowding	(x) Footways or pavements less than 3 m wide adjacent to sunken areas	1.5	1.5	1.5
	(xi) Theatres, cinemas, discotheques, bars, auditoria, shopping malls, assembly areas, studio. Footways or pavements greater than 3 m wide adjacent to sunken areas.	3.0	1.5	1.5
	(xii) Grandstands and stadia [A)]	-	-	-
Retail areas	(xiii) All retail areas including public areas of banks/building societies or betting shops	1.5	1.5	1.5
Vehicular	(xiv) Pedestrian areas in car parks, including stairs, landings, ramps, edges or internal floors, footways, edges of roofs	1.5	1.5	1.5
	(xv) Horizontal loads imposed by vehicles [B)]	-	-	-

A) See requirements of the appropriate certifying authority
B) See BS 6180:2011 Annex A

Test Results (Continued).

TEST METHODS

A single section of each type of balustrade system was bolted to a steel structure 3000mm x 240mm x 240mm using M12 threaded bars in accordance with the manufacturer's instructions. The assembly was, in turn, fixed to the concrete floor of the testing facility.

The ambient temperature in the testing facility during the testing was measured at 20.5°C.

Horizontal uniformly distributed line load

The horizontal uniformly distributed line loads were applied to the upper edge of each system through a 1.1m long, rubber faced aluminium bar using a hand-operated pump and cylinder. The forces were measured using a calibrated load cell and display unit. The assemblies were tested without handrails.

The deflection measurements of the upper edge of the systems were taken from a fixed datum point at the same level as the application of load using a calibrated digital indicator.

Easy Glass Prime "F"
Typical arrangements for application of horizontal uniformly distributed line loading assembly

Uniformly distributed load applied to the infill

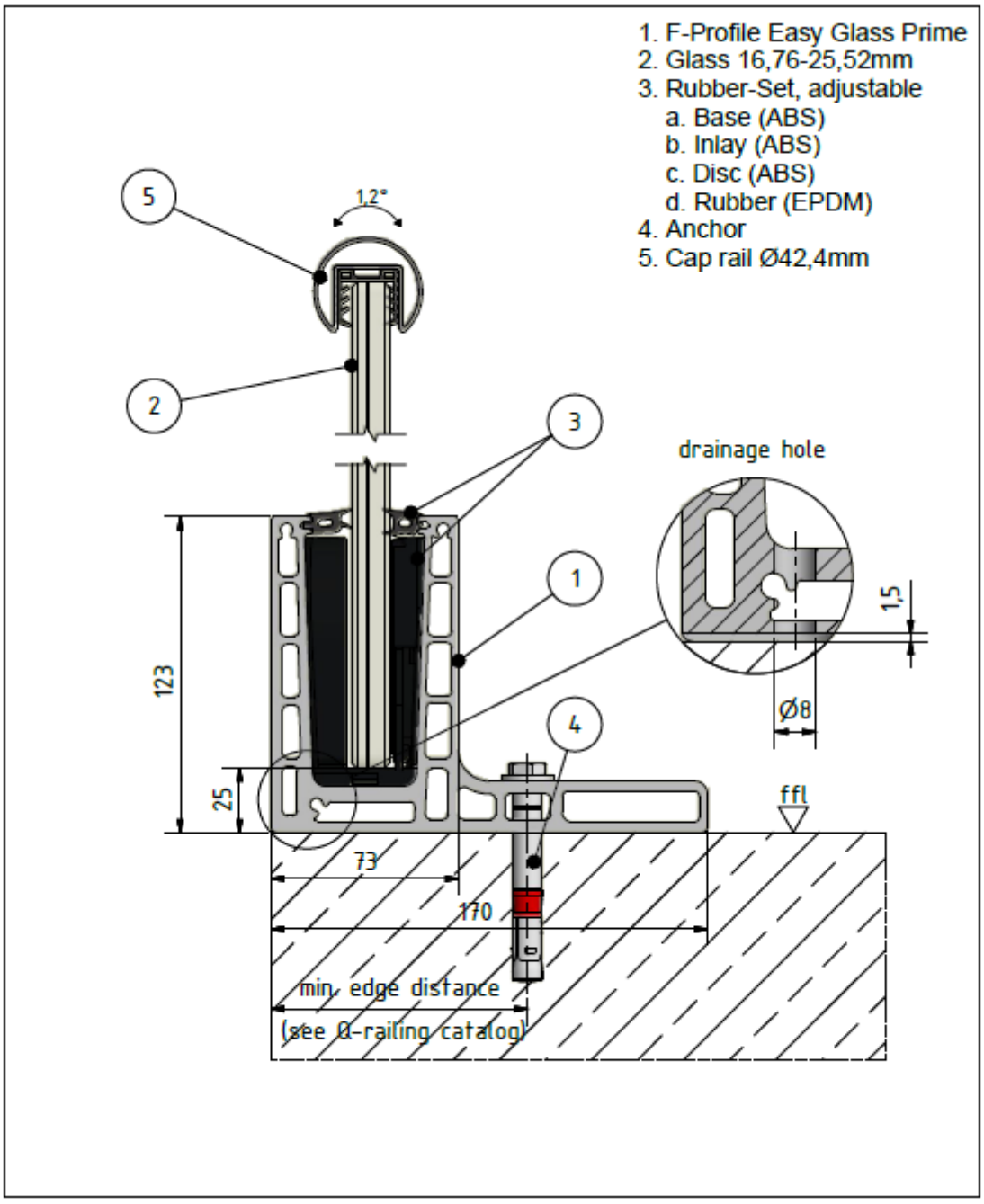
The uniformly distributed loads were not applied to the test samples as the glass panels were not considered to be infills.

Point load applied to part of the infill

The point loads were not applied to the test samples as the glass panels were not considered to be infills.

Test Results (Continued).

TEST METHODS (Continued)



Easy Glass Prime "F" assembly drawing (showing installation on concrete)

Test Results (Continued).

SUMMARY OF TESTING

Easy Glass Prime "F" Balustrade System

Horizontal uniformly distributed line load

Ref	Glass size (W x H) (mm x mm)	Glass type	Loading and deflection height (mm)	Number of discs used	0.36 kN/m line load deflection (mm)	0.74 kN/m line load deflection (mm)	1.5 kN/m line load deflection (mm)	25mm equivalent line load (kN/m)[1)]	Deflection at safety load (1.5 x max line load) (mm)[1)]	Comments
A	1000 x 1200	17.52mm PVB	1100 from top of profile	4	15.97	-	-	0.48	28.95	No structural failure
B	1000 x 1200	17.52mm Trosifol	1100 from top of profile	4	9.77	22.61	-	0.81	35.30	No structural failure
C	1000 x 1200	19mm mono	1100 from top of profile	4	9.60	20.64	-	0.90	30.72	No structural failure
D	1000 x 1200	21.52mm EVA	1100 from top of profile	4	10.10	22.53	-	0.81	34.99	No structural failure
E	1000 x 1200	21.52mm PVB	1100 from top of profile	5	10.96	24.48	-	0.74	37.60	No structural failure
F	1000 x 1200	25.52mm PVB	1100 from bottom of profile	4	6.40	15.40	-	1.12	25.00	No structural failure
G	1000 x 1200	21.52mm Trosifol	1100 from top of profile	4	8.31	18.90	-	0.97	28.60	No structural failure
H	1000 x 1300	21.52mm Sentry	1100 from top of profile	4	7.85	16.97	-	1.11	26.34	No structural failure
I	1000 x 1200	25.52mm Trosifol	1100 from bottom of profile	4	4.96	11.56	24.33	1.50	36.04	No structural failure

Note: 1) Recorded for information

Test Results (Continued).

SUMMARY OF SUITABILITY OF BARRIER SYSTEMS

Type of occupancy for part of the building or structure	Examples of specific use	Horizontal uniformly distributed line load (kN/m)	Reference								
			A	B	C	D	E	F	G	H	I
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	0.22	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(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	1.5	X	X	X	X	X	X	X	X	✓
Areas with tables or fixed seatings	(vii) Restaurants and bars	1.5	X	X	X	X	X	X	X	X	✓

Test Results (Continued).

SUMMARY OF SUITABILITY OF BARRIER SYSTEMS (Continued)

Type of occupancy for part of the building or structure	Examples of specific use	Horizontal uniformly distributed line load (kN/m)	Reference								
			A	B	C	D	E	F	G	H	I
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 curtilage 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	1.5	X	X	X	X	X	X	X	X	✓
	(xi) Theatres, cinemas, discotheques, bars, auditoria, shopping malls, assembly areas, studio. Footways or pavements greater than 3 m wide adjacent to sunken areas.	3.0	X	X	X	X	X	X	X	X	X
	(xii) Grandstands and stadia [A)]	-	-	-	-	-	-	-	-	-	-
Retail areas	(xiii) All retail areas including public areas of banks/building societies or betting shops	1.5	X	X	X	X	X	X	X	X	✓
Vehicular	(xiv) Pedestrian areas in car parks, including stairs, landings, ramps, edges or internal floors, footways, edges of roofs	1.5	X	X	X	X	X	X	X	X	✓
	(xv) Horizontal loads imposed by vehicles [B)]	-	-	-	-	-	-	-	-	-	-

A) See requirements of the appropriate certifying authority
B) See BS 6180:2011 Annex A

End of Report

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DE INSTALLATIE!