Uniclass L442	EPIC D411+D42
CI/SfB (34) X	

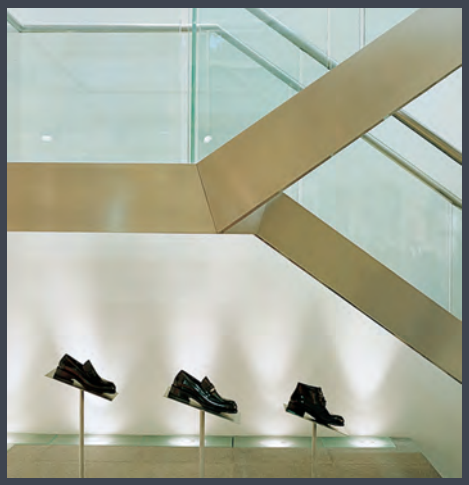
Architectural Handrail and Balustrade

VIEU®

Hugo Boss

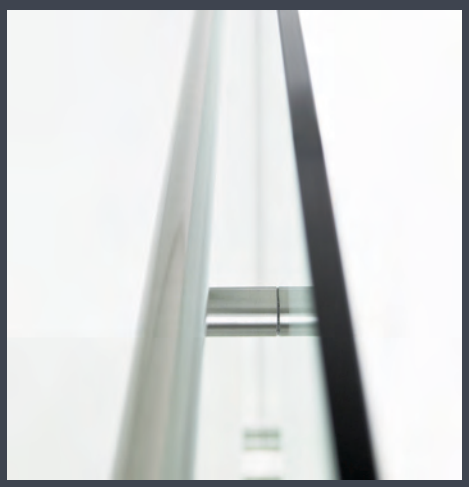
Project Title: Hugo Boss, Manchester
Client: Moss Bros Group Plc
Design Consultants: Dalziel & Pow
Consulting Engineers: Cameron Taylor Bedford
Principal Contractor: J.Quinn (Shopfittings) Ltd
icon Specification: S.4A.6D.CG.19

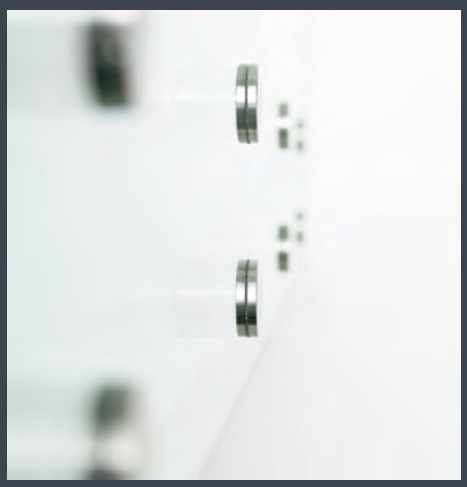
Photography by Marcus Hilton



Architects and Specifiers can now gain access to invaluable expertise in glass engineering through the introduction of a pioneering Architectural handrail and balustrade system. **icon VIEU**® is an intelligent system solution for structural glass balustrading based on a modular range of handrails and associated fittings. In a complex and predominantly bespoke marketplace, **icon VIEU**® offers logical predetermined specifications for high end structural glass requirements.

Technical Performance
icon VIEU® has been developed in accordance with the design criteria specified in BS6180:1999 and side loading requirements for all building-use categories can be accommodated including the 3 kN/m horizontal UDL designated for areas susceptible to overcrowding. Internal and external specifications are available as the Stainless Steel fittings can be supplied in 304 and 316 grade variants. Curved configurations can be considered and special adaptations of the system are often incorporated to suit the individual needs or preferences of each project.





Supplied, Installed
icon VIEU is available Internationally on a supply and installation basis as a specialist Architectural Handrail & Balustrade package procured directly by the Client, Developer or Principle Contractor.

icon on line
Subscribers can compile icon specifications within the **NBS Plus** software package or alternatively, standard specification templates can be obtained from the Internet; at **www.handraildesign.co.uk**. it is also possible to download AutoCAD drawings of the system components together with generic handrail and balustrade designs.

In Line Toprails

In Line Toprail Specification

Finish Options		Detail Options	Glass Options			
Toprail	Ref	Toprail Connection	Glass Fixing	Clear	Low Iron	Thickness
Hardwood	H	4A 4J	6B 6D 6F	CG	LI	12 15 19 25†
Stainless Steel	**S**	**4A** 4J	**6B** 6D 6F	**CG**	LI	12 **15** 19 25†

Example S.4A.6B.CG.15 see opposite.

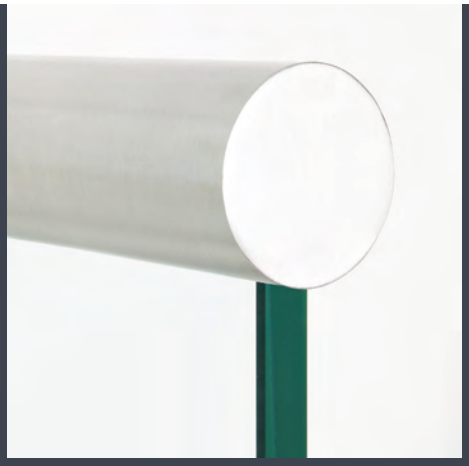
† Note: Low Iron glass currently unavailable in 25mm.

S.4A.6B.CG.15✳
Satin Polished Stainless Steel 50mm diameter toprail connected in line to 15mm toughened clear structural glass panels with flat arrissed and polished edges all round, 2-point side fixed at appropriate centres with Satin Polished Stainless Steel bosses.
✳ Transpose choice of glass thickness to suit application - see technical table on page 11.

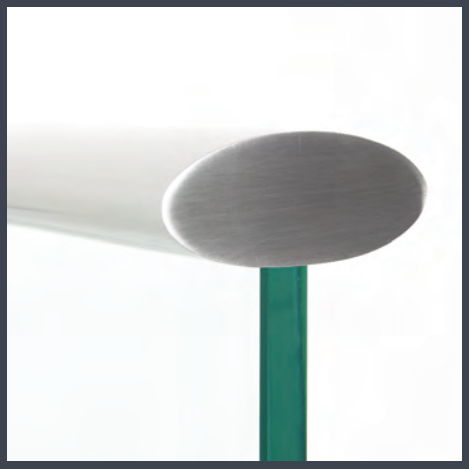
Clean Lines
icon VIEU® is primarily manufactured as a series of machined or cast fittings, mechanically connected together to create a highly engineered product with precise, clean lines between adjoining components. The system has a sharp, sophisticated appearance, unhindered by the presence of unsightly welds as can often be the case with fabricated alternatives.

Handrail Ends, Bends
Handrails and balustrade toprails generally have stopped or capped ends and mitres are used to change direction whether Stainless Steel or Hardwood is specified. For structural purposes a steel core rail is rebated into offset Hardwood balustrade toprails.

Concealed Fixings
icon endorses positive detailing and with such emphasis placed on precision it is complimentary for fixing screws and bolt heads to be discretely concealed wherever possible.
End caps, cover discs and rosettes feature in the design of all key components to provide a tidy and tamper proof solution, particularly appropriate for public and educational building applications.



S.4A
Satin Polished Stainless Steel in line 50mm diameter toprail with rebated and concealed connection to top edge of glazing.



S.4J
Satin Polished Stainless Steel in line elliptical toprail with rebated and concealed connection to top edge of glazing.

H.4J
Polished Maple Hardwood in line elliptical toprail with rebated and concealed connection to top edge of glazing.

Offset Toprail Specification

Finish Options		Detail Options	Glass Options			
Toprail	Ref	Toprail Connection	Glass Fixing	Clear	Low Iron	Thickness
Hardwood	H	4G 4K	6B 6D 6F	CG	LI	12 15 19 25†
Stainless Steel	**S**	**4G** 4K	**6B** 6D 6F	**CG**	LI	12 **15** 19 25†

Example S.4G.6B.CG.15 see page 9.

† Note: Low Iron glass currently unavailable in 25mm.

Handrail Specification

Finish Options		Detail Options		
Toprail	Bracket	Ref	Bracket	Ømm
Hardwood	Stainless Steel	HS	1C 1D	50 38
Stainless Steel	**Stainless Steel**	**SS**	**1C** 1D	50 **38**

Example SS.1C.38 see opposite.

H.4G
Polished Maple Hardwood 50mm diameter toprail with offset stem brackets bolted to glazing at appropriate centres.

S.4K
Satin Polished Stainless Steel 38mm diameter toprail with offset bend brackets bolted to glazing at appropriate centres.

S.4G
Satin Polished Stainless Steel 38mm diameter toprail with offset stem brackets bolted to Low Iron clear raised glass at appropriate centres.

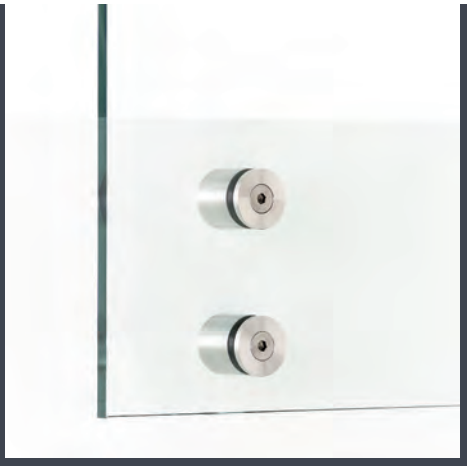
SS.1C.38
Satin Polished Stainless Steel handrail connected at maximum 1200mm centres to Stainless Steel stem brackets with concealed fixings.

HS.1C.50
Polished American Black Walnut† Hardwood handrail connected at maximum 1200mm centres to Stainless Steel stem brackets with concealed fixings.
† Special species to order.

SS.1D.50
Satin Polished Stainless Steel handrail connected at maximum 1200mm centres to Stainless Steel bend brackets with concealed fixings.

Positive Detailing
The **icon** Boss fixing is not only an elegantly engineered detail but a far simplified structural connection compared to the conventional method of containing glass within continuous steel tracks. The 2-point side fixings neatly resolve most interface issues, offer a more commercially attractive solution and facilitate ease of panel replacement without disturbing the surrounding finishes. Boss projections can be varied whilst vertical and horizontal centres are specified for each project.

S.4G.6B.CG.15✳
Satin Polished Stainless Steel 38mm diameter toprail with offset stem brackets bolted to 15mm toughened clear structural glass panels with flat arrissed and polished edges all round, 2-point side fixed at appropriate centres with Satin Polished Stainless Steel bosses.
✳ Transpose choice of glass thickness to suit application - see technical table on page 11.



6B/X Boss Fixing
Satin Polished Stainless Steel 50mm diameter bosses with exposed bolts clamping clear glass.

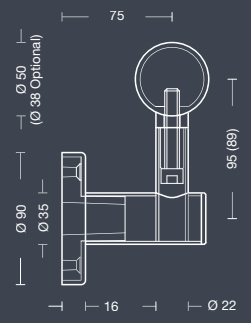
6B Boss Fixing
Satin Polished Stainless Steel 50mm diameter bosses with concealed bolts clamping clear glass.

6B Boss Fixing

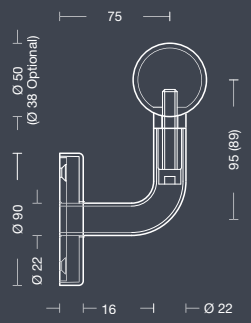
6B Boss Fixing
Satin Polished Stainless Steel 50mm diameter bosses with concealed bolts clamping dot matrix screen printed clear glass. Other screen printed options available upon request.

6B Boss Fixing
Satin Polished Stainless Steel 50mm diameter bosses with concealed bolts clamping Low Iron clear glass. Low Iron glass virtually eliminates the green tinge inherent in standard clear float glass.

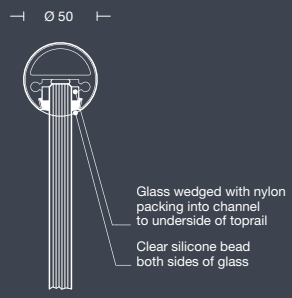
1C Stem Bracket with Concealed Fixings



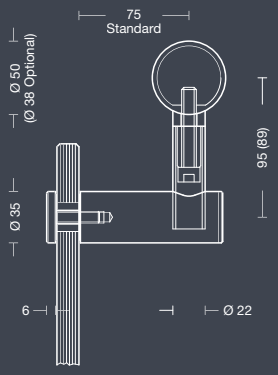
1D Bend Bracket with Concealed Fixings



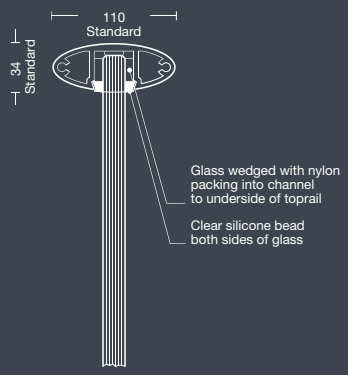
4A In Line Circular Toprail



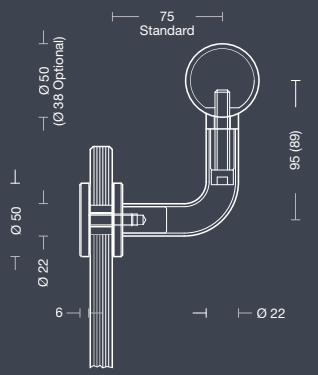
4G Offset Stem Toprail Connector



4J In Line Elliptical Toprail

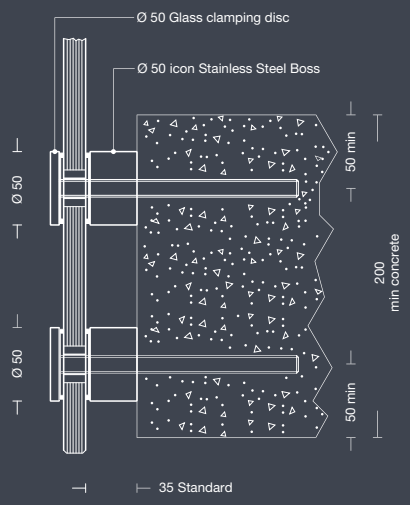


4K Offset Bend Toprail Connector



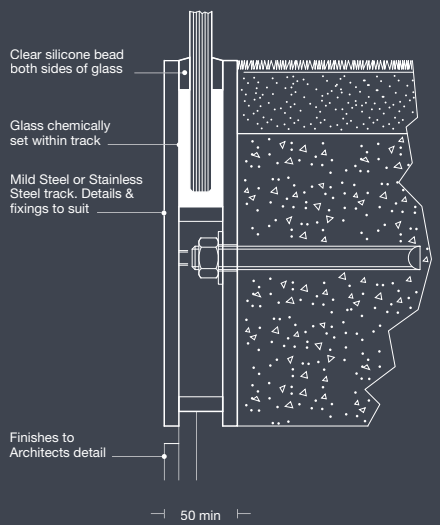
6B Boss Fixing

Also bolt fixings to Steel.



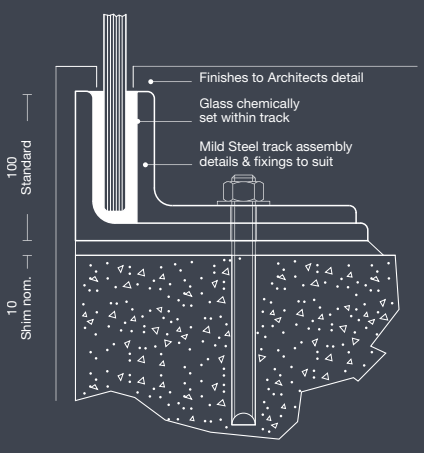
6D Special Track Side Fixing

Also bolt fixings to Steel.



6F Special Track Top Fixing

Also bolt fixings to Steel.



Technical Guidance

Based on BS 6180:1999 and BS 6399:Part 1:1996 the following table offers recommended glass thickness guidelines for general building use categories. Please refer to the relevant British Standards for the full criteria and overall project considerations.

Type of Occupancy	Horizontal Uniformly Distributed Line Load (kN/m)	Glass Thickness (mm)
Domestic	0.36	12
Office	0.74	15
Retail	1.5	19
Assembly	3.0	25

Glass Specification
12,15,19 or 25 thick toughened glass, each panel Kite mark badged in bottom left hand corner to BS 6206 Class A with square cut or nominal radiussed corners, flat arrissed and polished edges all round.

Toughened Glass
Toughened glass is created by heating annealed glass to a temperature of around 620ºC, the panels are then quickly ejected from the furnace and their surface blasted with jets of cooled air. Whilst the surface of the glass is instantly cooled the centre of the panel remains relatively hot, taking longer for the heat to be dispersed. As the centre gradually cools down it also contracts and pulls the outer surfaces inwards creating permanent compression while the centre remains under tension. It is these opposing forces which make toughened glass 4 - 5 times stronger than the same thickness annealed glass.

In the event of a breakage, toughened glass to BS 6206 Class A fragments into small relatively harmless pieces with dulled edges, minimising the risk of serious injury.

Low Iron Glass
Whilst structural glass balustrades are chosen for their minimalism and visual subtlety it is possible to reduce their presence even further. Standard clear float glass has an inherent green cast which is more prominent in the thicker glasses required for balustrading. A Low Iron glass is available which offers a noticeably clearer and almost colourless panel. Samples and prices are available upon request.

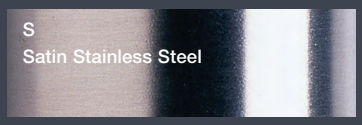
Heatsoaking
Nickel sulphide inclusions appear infrequently in toughened glass and although this does not usually present any problems, in remote circumstances they can cause a panel to shatter spontaneously. Nickel and sulphur impurities can exist within the raw materials used to make glass and if present in a toughened panel they change state when heated in the furnace to form nickel sulphide crystals. Even after the glass has cooled it can be several years before the crystals return to their original state but in doing so they grow by up to 4% and this increase in size can be sufficient to cause a stress failure if the inclusion happens to be in a critical location within the glass panel.

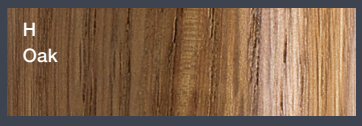
As a precaution the glass can be Heatsoaked which involves placing the panels in a special oven and over a period of several hours, subjecting the glass to a heat of 295ºC. This process accelerates the change in state of any nickel sulphide crystals and causes these panels to break in the oven with the remaining panels being less likely to fail in service. Glass used for **icon VIEU®** can be Heatsoaked and prices are available upon request.

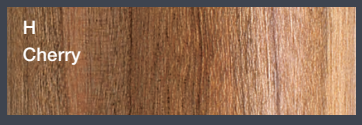
Silk Screen Printing
12 & 15mm thick glass can be decorated using ceramic paints to RAL or Pantone® colours. Standard manifestations or special designs are screen printed and then fired onto the panel surface during the toughening process - please ask for further details.

Stainless Steel
icon handrails and associated fittings are produced in 304 grade for internal use and 316 grade Stainless Steel for external applications. A refined, brushed satin finish is directionally applied to most components whereas tubular elements are radially polished.

Natural Hardwoods
icon offers a contemporary selection of factory polished and lacquered Hardwood handrails. Other species can be considered upon request and all Hardwoods used for **icon** handrails are supplied from sustainably managed sources.







Handrail Design

NBS Plus

Handrail Design Limited
Sail & Colour Loft Historic Dockyard Chatham Kent ME4 4TE
Tel: +44 (0)1634 817800 Fax: +44 (0)1634 817711
E-mail: info@handraildesign.co.uk
www.handraildesign.co.uk

Literature designed by **Grade Design Consultants,** London.
Photography by John Freeman with thanks to Alex Dow.
Additional photography by Marcus Hilton.
Printed in England by Gavin Martin Associates Ltd.

icon®