ENDURAL
Balustrade System

Technical Manual

July 2024 | ISSUE D

alspec® EVERYTHING ALUMINIUM & HARDWARE

EndurAl
Balustrade System

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EndurAl
Balustrade System

Contents

1. Technical Manual Release Notes

This page is intended to record all changes to the **ENDURAL Balustrade System** technical manual pages.

Changes or additions to this manual will be itemised with a brief description and date when the amendments were made.

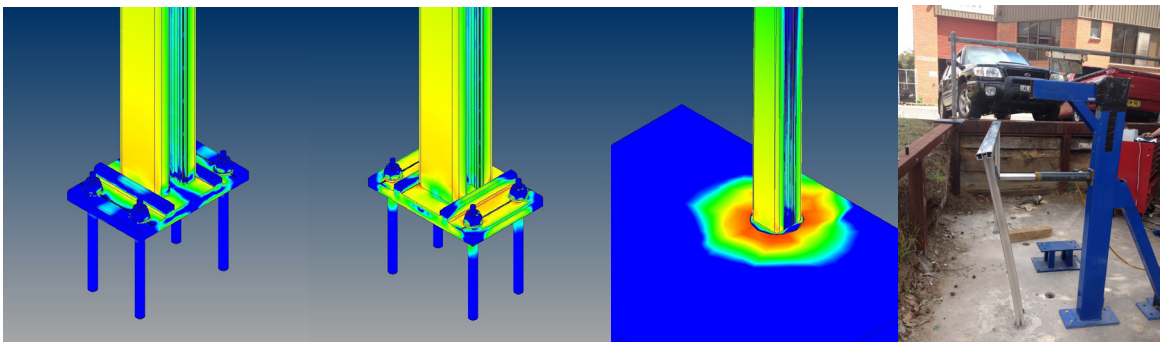
ISSUE	DATE	Amendment Description	Refer to Tech Memo #
A	10/2016	Technical Manual Initial Release	
B	07/2019	Technical Manual Re-Release	344
C	03/2021	Removed fixing and accessories from Hardware section, updated Typical Details and Assembly Details with fixing specification on page 8.8, 8.9 & 11.1	449
D	04/2021	Included Post Testing and Infill Testing in Test Summary	454

ALUMINIUM
- All structural elements in the ENDURAL Balustrade System have been extruded in structural grade alloy for enhanced strength and performance.

GLAZING
- 19mm wide glazing pocket allowing glass up to 12mm thick
- 2, 3 or 4 side support glazing options

MOUNTING SOLUTIONS
- The ENDURAL Balustrade System offers flexible mounting solutions to cater for a variety of applications and strength requirements.
- Heavy duty base plates manufactured from structural grade alloy and core drilled solutions have been engineered and tested to AS1657 in accordance with the loads specified in AS1170.1.

TESTED AND ENGINEERED
- The ENDURAL Balustrade System is the product of many hours of design, development and testing. The result is a high performance balustrade system capable of resisting the highest wind loads and crowd loads, whilst maintaining ease of fabrication and installation.



All products are available from ALSPEC (A.B.N. 63 001 252 259) as detailed in the "ALSPEC" catalogue or on the Internet at www.alspec.com.au. All such framing is to be constructed, assembled and fixed to meet the requirement of AS2047 (windows in buildings), AS1170 (loading code). All glass, glazing rubbers, seals and gaskets shall be applied in accordance with the requirements of AS1288 (glass in buildings - selection and installation).

Fabricators of the ENDURAL Balustrade System system should seek certification by a consultant structural engineer as to the framing being acceptable for the design wind pressure and deflection characteristics required of the site.

Loading Table Guide

The following pages contain loading tables that may be used as a guide to the suitability of the ENDURAL Balustrade System for various wind loads and live loads.

The classification of a building is determined by the purpose for which it is designed, constructed or adapted for use. The determination of the buildings end use is essential in calculating the balustrade rating and performance requirements.

AS1170.1 classifies balustrades into different classes depending on their application.

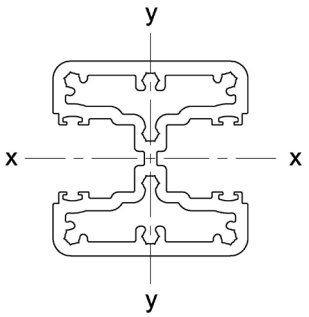
This technical manual groups these into 3 main classes, residential (C3), commercial (C1), and areas susceptible to overcrowding (C5) for more information refer AS1170.1

1. Residential (C3), Residential balconies, landings, roof edges, etc
2. Commercial (C1) Retail, public areas, restaurants, banks, etc
3. Overcrowding (C5) Areas susceptible to overcrowding and or, grandstands, theatres, clubs, etc

3. Loading Tables

Loading Table - HR500 55mm 2 Way Post

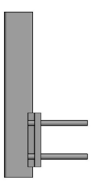
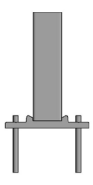
Alloy: 6106 T6 **Ultimate Limit State:** 210 MPa **Minimum Live Load:** 1500 N/m



All sizes in the below table exceed the live load limits for both C1 and C3 balustrade classifications.

**** Denotes suitability for C5 balustrade classifications**

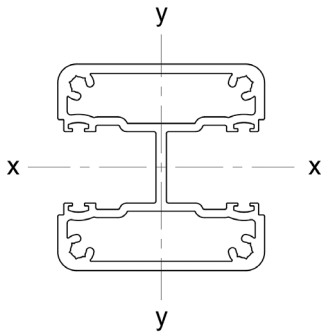
POST HEIGHT	MOUNTING OPTIONS	ULTIMATE WIND PRESSURE (Pa)								
1200	CORE 120	*5400*	4800	4320	3930	3600	3320	3090	2880	2700
	CORE 100	5300	4800	4320	3930	3600	3320	3090	2880	2700
	SIDE PLATE	3618	3216	2894	2633	2412	2224	2070	1930	1809
	BASE PLATE	3240	3120	2808	2555	2340	2158	2009	1872	1755
1150	CORE 120	*5880*	*5230*	4710	4280	3920	3620	3360	3140	2940
	CORE 100	5300	4800	4710	4280	3920	3620	3360	3140	2940
	SIDE PLATE	3940	3504	3156	2868	2626	2425	2251	2104	1970
	BASE PLATE	3822	3400	3062	2782	2548	2353	2184	2041	1911
1100	CORE 120	*6430*	*5720*	5140	4680	4290	3960	3670	3430	3210
	CORE 100	5300	5300	5140	4680	4290	3960	3670	3430	3210
	SIDE PLATE	4308	3832	3444	3136	2874	2653	2459	2298	2151
	BASE PLATE	4180	3718	3341	3042	2789	2574	2386	2230	2087
1050	CORE 120	*7060*	*6270*	5650	5130	4700	4340	4030	3760	3530
	CORE 100	5300	5300	5300	5130	4700	4340	4030	3760	3530
	SIDE PLATE	4730	4201	3786	3437	3149	2908	2700	2519	2365
	BASE PLATE	4589	4076	3673	3335	3055	2821	2620	2444	2295
1000	CORE 120	*7780*	*6920*	*6230*	*5660*	5190	4790	4450	4150	3890
	CORE 100	5300	5300	5300	5300	5190	4790	4450	4150	3890
	SIDE PLATE	5213	4636	4174	3792	3477	3209	2982	2781	2606
	BASE PLATE	5057	4498	4050	3679	3374	3114	2893	2698	2529
POST CENTRES		800	900	1000	1100	1200	1300	1400	1500	1600

MOUNTING OPTIONS		
CORE DRILLED	SIDED PLATE	BASE PLATE
		
120mm Embedment Depth 100mm Embedment Depth	Alspec Base Plate	Alspec Base Plate

3. Loading Tables

Loading Table - HR520 55mm 2 Way Medium Duty Post

Alloy: 6106 T6 **Ultimate Limit State:** 210 MPa **Minimum Live Load:** 1500 N/m

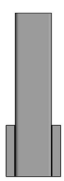


All sizes in the below table exceed the live load limits for both C1 and C3 balustrade classifications.

Medium duty posts are not suitable for welded base plate applications

POST HEIGHT	MOUNTING OPTIONS	ULTIMATE WIND PRESSURE (Pa)								
1200	CORE 120	-	-	-	-	-	-	-	-	-
	CORE 100	3980	3540	3190	2900	2650	2450	2270	2120	1990
	SIDE PLATE	-	-	-	-	-	-	-	-	-
	BASE PLATE	-	-	-	-	-	-	-	-	-
1150	CORE 120	-	-	-	-	-	-	-	-	-
	CORE 100	4340	3850	3470	3150	2890	2670	2480	2310	2170
	SIDE PLATE	-	-	-	-	-	-	-	-	-
	BASE PLATE	-	-	-	-	-	-	-	-	-
1100	CORE 120	-	-	-	-	-	-	-	-	-
	CORE 100	4740	4210	3790	3450	3160	2920	2710	2530	2370
	SIDE PLATE	-	-	-	-	-	-	-	-	-
	BASE PLATE	-	-	-	-	-	-	-	-	-
1050	CORE 120	-	-	-	-	-	-	-	-	-
	CORE 100	5200	4620	4160	3780	3470	3200	2970	2770	2600
	SIDE PLATE	-	-	-	-	-	-	-	-	-
	BASE PLATE	-	-	-	-	-	-	-	-	-
1000	CORE 120	-	-	-	-	-	-	-	-	-
	CORE 100	5300	5100	4590	4170	3820	3530	3280	3060	2870
	SIDE PLATE	-	-	-	-	-	-	-	-	-
	BASE PLATE	-	-	-	-	-	-	-	-	-
POST CENTRES		800	900	1000	1100	1200	1300	1400	1500	1600

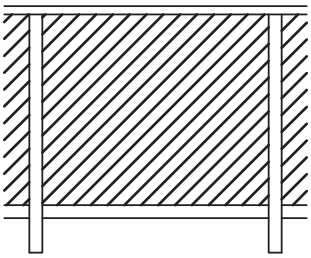
CORE DRILL APPLICATION ONLY



100mm Embedment Depth

3. Loading Tables

Glass Selection - Four Edge Support



RESIDENTIAL, BALCONIES, LANDINGS, ROOF EDGES, etc (Referred to as C3, B, E in AS1170.1)										
POST HEIGHT	**GLASS INFILL SELECTION TABLE**									
1200	**MIN GLASS THICKNESS**	8	8	8	10	10	10	10	10	10
1150		8	8	8	10	10	10	10	10	10
1100		8	8	8	10	10	10	10	10	10
1050		8	8	8	8	8	8	8	8	8
1000		8	8	8	8	8	8	8	8	8
Post Ctrs		**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**	**1600**

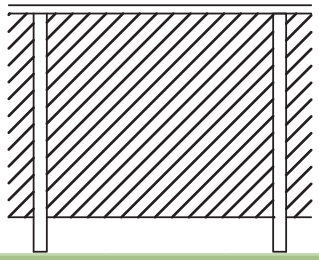
RETAIL, PUBLIC AREAS, RESTURANTS, BANKS, etc (Referred to as C1, C2, D in AS1170.1)										
POST HEIGHT	**GLASS INFILL SELECTION TABLE**									
1200	**MIN GLASS THICKNESS**	12	12	12						
1150		12	12	12						
1100		12	12	12	15	15				
1050		12	12	12	12	12	12	12	12	12
1000		12	12	12	12	12	12	12	12	12
Post Ctrs		**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**	**1600**

AREAS SUSCEPTIBLE TO OVERCROWDING, GRANDSTANDS, THEATERS, CLUBS, etc (Referred to as C5 in AS1170.1)										
POST HEIGHT	**GLASS INFILL SELECTION TABLE**									
1200	**MIN GLASS THICKNESS**	12								
1150		12	12							
1100		12	12	12						
1050		12	12	12	12					
1000		12	12	12	12	12				
Post Ctrs		**800**	**850**	**900**	**950**	**1000**	**1050**	**1100**	**1150**	**1200**

NOTE:
- All glass specified is toughened safety glass.
- The above glass selections have been based on AS1288-2006 section 7. In some cases, wind loads may exceed the infill design load and thicker glass may be required.
- Whilst every effort has been made to ensure the corect Interpretation of standards or codes, responsibilty for code compliance remains with the user of this manual.

3. Loading Tables

Glass Selection - Two Edge Vertical Support



RESIDENTIAL, BALCONIES, LANDINGS, ROOF EDGES, etc (Referred to as C3, B, E in AS1170.1)										
POST HEIGHT	**GLASS INFILL SELECTION TABLE**									
1200	**MIN GLASS THICKNESS**	8	8	8	10	10	10	10	10	10
1150		8	8	8	10	10	10	10	10	10
1100		8	8	8	10	10	10	10	10	10
1050		8	8	8	10	10	10	10	10	10
1000		8	8	8	10	10	10	10	10	10
Post Ctrs		**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**	**1600**

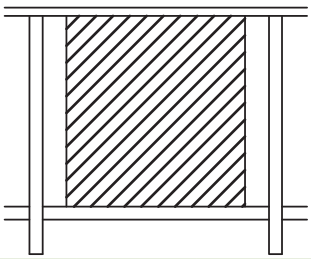
RETAIL, PUBLIC AREAS, RESTURANTS, BANKS, etc (Referred to as C1, C2, D in AS1170.1)									
POST HEIGHT	**GLASS INFILL SELECTION TABLE**								
1200	**MIN GLASS THICKNESS**	12	12	12					
1150		12	12	12					
1100		12	12	12					
1050		12	12	12					
1000		12	12	12					
Post Ctrs		**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**	**1600**

AREAS SUSCEPTIBLE TO OVERCROWDING, GRANDSTANDS, THEATERS, CLUBS, etc (Referred to as C5 in AS1170.1)										
POST HEIGHT	**GLASS INFILL SELECTION TABLE**									
1200	**MIN GLASS THICKNESS**	12								
1150		12	12							
1100		12	12	12						
1050		12	12	12	12					
1000		12	12	12	12	12				
Post Ctrs		**800**	**850**	**900**	**950**	**1000**	**1050**	**1100**	**1150**	**1200**

NOTE:
- All glass specified is toughened safety glass.
- The above glass selections have been based on AS1288-2006 section 7. In some cases, wind loads may exceed the infill design load and thicker glass may be required.
- Whilst every effort has been made to ensure the corect Interpretation of standards or codes, responsibilty for code compliance remains with the user of this manual.

3. Loading Tables

Glass Selection - Two Edge Horizontal Support



RESIDENTIAL, BALCONIES, LANDINGS, ROOF EDGES, etc (Referred to as C3, B, E in AS1170.1)										
POST HEIGHT		**GLASS INFILL SELECTION TABLE**								
1200	**MIN GLASS THICKNESS**	10	10	10	10	10	10	10	10	10
1150		10	10	10	10	10	10	10	10	10
1100		8	8	8	8	8	8	8	8	8
1050		8	8	8	8	8	8	8	8	8
1000		8	8	8	8	8	8	8	8	8
Post Ctrs		**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**	**1600**

RETAIL, PUBLIC AREAS, RESTURANTS, BANKS, etc (Referred to as C1, C2, D in AS1170.1)										
POST HEIGHT		**GLASS INFILL SELECTION TABLE**								
1100	**MIN GLASS THICKNESS**	12	12	12	12	12	12	12	12	12
1050		12	12	12	12	12	12	12	12	12
1000		12	12	12	12	12	12	12	12	12
Post Ctrs		**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**	**1600**

AREAS SUSCEPTIBLE TO OVERCROWDING, GRANDSTANDS, THEATERS, CLUBS, etc (Referred to as C5 in AS1170.1)										
POST HEIGHT		**GLASS INFILL SELECTION TABLE**								
1100	**MIN GLASS THICKNESS**	12	12	12						
1050		12	12	12	12					
1000		12	12	12	12	12				
Post Ctrs		**800**	**850**	**900**	**950**	**1000**	**1050**	**1100**	**1150**	**1200**

NOTE:
- All glass specified is toughened safety glass.
- The above glass selections have been based on AS1288-2006 section 7. In some cases, wind loads may exceed the infill design load and thicker glass may be required.
- Whilst every effort has been made to ensure the corect Interpretation of standards or codes, responsibilty for code compliance remains with the user of this manual.

4. Test Summary

Post Testing

TEST REPORT	PRODUCT DESCRIPTION	BASE CONNECTION	POST	POST TEST LOAD	HAND RAIL TEST LOAD
AZT0332.14	1000 Post Length x 1500 Post Ctrs	Core Drilled	HR500	4.0 - 7.0kN	0.6kN
AZT0334.14	1000 Post Length	Welded Base Plate - 90 Deg	HR500	3.32kN	-
AZT0335.14	1000 Post Length	Welded Base Plate - Inline	HR500	3.49kN	-
AZT0339.14	1000 Post Length	Welded Base Plate - Side Mount	HR500	4.52kN	-
AZT0079.18	1200 Post Length	Core Drilled	HR520	3.74kN	-

4. Test Summary

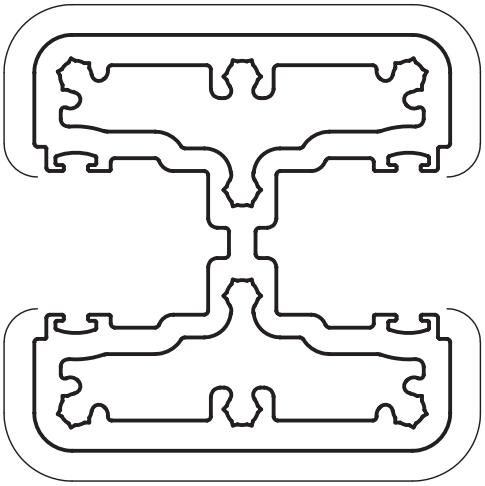
Infill Testing

TEST REPORT	PRODUCT DESCRIPTION	BASE CONNECTION	POST	POST TEST LOAD	HAND RAIL TEST LOAD
AZT0073.18	1035 x 1600 Invisi 0.8mm Mesh Infill Panel	Core Drilled	HR520	-	0.6kN
AZT0597.19	2734 x 1095 Two Balustrade Infill Panel with 3 Aluminium Posts *	Core Drilled	HR520	1314N	0.6kN
AZT596.19	2734 x 1095 Two Balustrade Infill Panel with 3 Aluminium Posts *	Core Drilled	HR520	Infill Point Load 1500N Ultimate 3285N	0.6kN
AZT0601.19	2734 x 1095 Two Balustrade Infill Panel with 3 Aluminium Posts *	Welded Base Plate	HR500	Infill Point Load 1095N Ultimate 2628N	0.6kN
AZT598.19	2734 x 1095 Two Balustrade Infill Panel with 3 Aluminium Posts *	Core Drilled	HR500 Heavy	Infill Point Load 3285N Ultimate 3942N	0.6kN
AZT600.19	2734 x 1095 Two Balustrade Infill Panel with 3 Aluminium Posts *	Core Drilled	HR520 Split Core	Infill Point Load 1095N Ultimate 2628N	0.6kN
AZT0599.19	2734 x 1095 Two Balustrade Infill Panel with 3 Aluminium Posts *	Core Drilled	HR500 Heavy	Infill Point Load 1500N Ultimate 3285N	0.6kN

These have been tested to C3 Crowd Loading as per AS1170.1
* Infill Panel: Heat Soaked Toughened, 12mm Thickness, 970mm x 1300mm

Framing

VISIBLE SURFACES

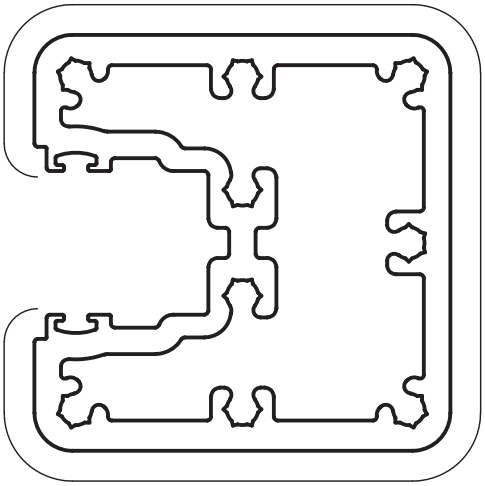


HR500
55mm 2 WAY POST
6106 T6

Mass. 2.973 Kg/m
Anod. Per. 349
Paint Per. 167

Ixx = 407.8 x 10^3 mm^4

VISIBLE SURFACES

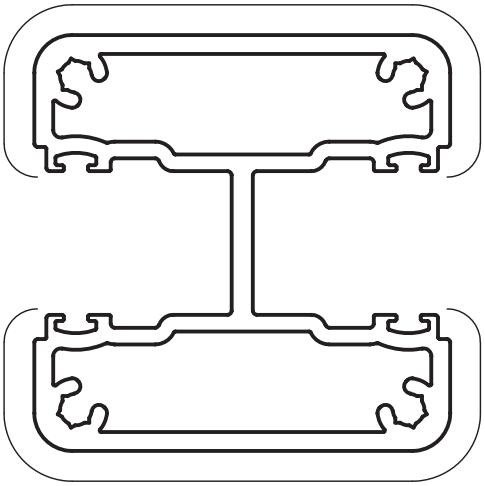


HR506
55mm ONE WAY POST
6106 T6

Mass. 2.813 Kg/m
Anod. Per. 280
Paint Per. 189

Ixx = 386.8 x 10^3 mm^4

VISIBLE SURFACES

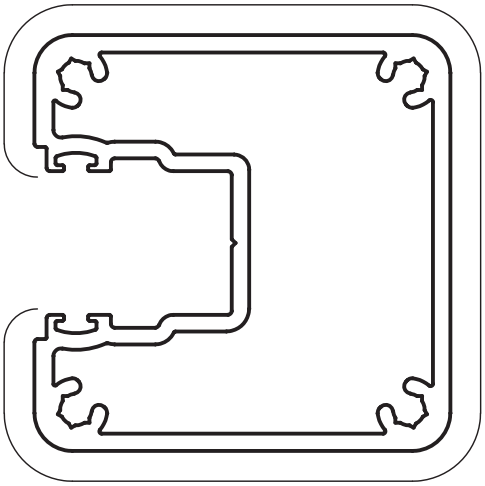


HR520
55mm 2 WAY MED DUTY
CORE DRILL POST 6106 T6

Mass. 2.118 Kg/m
Anod. Per. 353
Paint Per. 162

Ixx = 300.8 x 10^3 mm^4

VISIBLE SURFACES

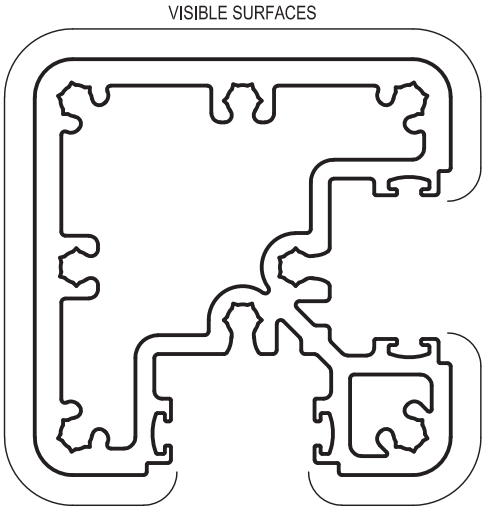


HR526
55mm 1 WAY MED DUTY
CORE DRILL POST 6106 T6

Mass. 1.848 Kg/m
Anod. Per. 283
Paint Per. 187

Ixx = 275.7 x 10^3 mm^4

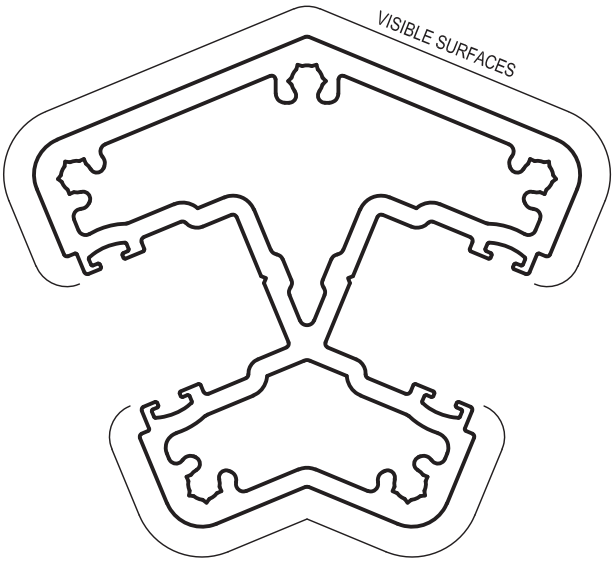
Framing



HR501
55mm 90 DEG POST
6106 T6

Mass. 2.540 Kg/m
Anod. Per. 358
Paint Per. 167

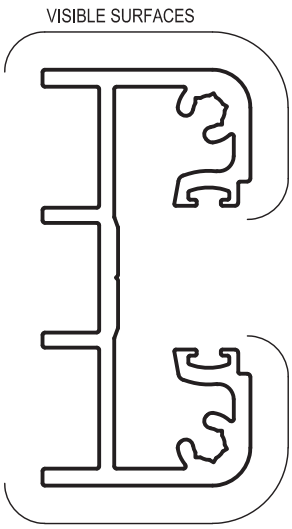
Ixx = 319.7 x 10^3 mm^4



HR503
55mm 135 DEG POST
6106 T6

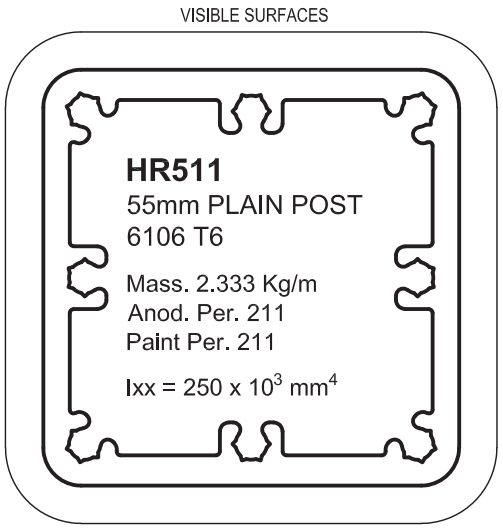
Mass. 2.499 Kg/m
Anod. Per. 349
Paint Per. 174

Ixx = 342.7 x 10^3 mm^4



HR521
55mm HALF POST
6106 T6

Mass. 1.108 Kg/m
Anod. Per. 366
Paint Per. 100

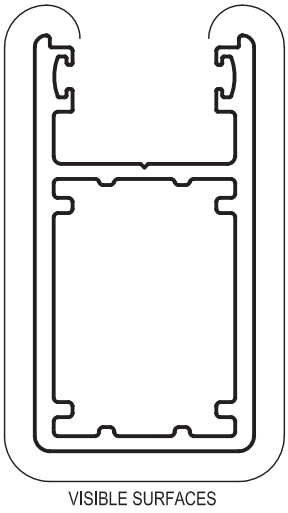


HR511
55mm PLAIN POST
6106 T6

Mass. 2.333 Kg/m
Anod. Per. 211
Paint Per. 211

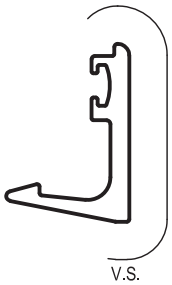
Ixx = 250 x 10^3 mm^4

Framing



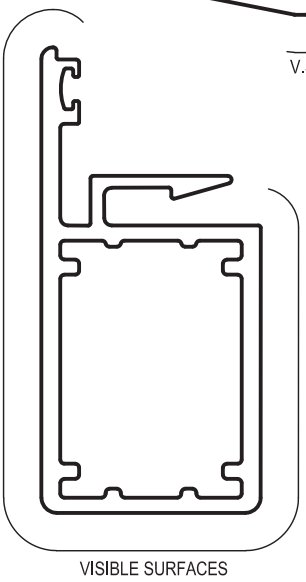
HR502
55mm BOTTOM RAIL

Mass. 1.129 Kg/m
Anod. Per. 223
Paint Per. 143



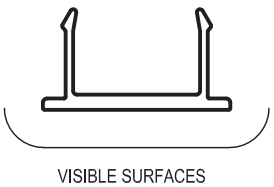
HR513
BEAD FOR HR512

Mass. 0.266 Kg/m
Anod. Per. 100
Paint Per. 100



HR512
62mm ENDURAL
BOTTOM RAIL

Mass. 1.147 Kg/m
Anod. Per. 237
Paint Per. 128

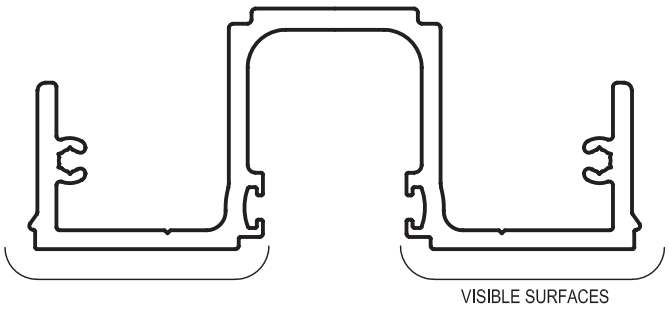


ME8
POCKET FILLER

Mass. 0.181 Kg/m
Anod. Per. 100
Paint Per. 100

HR507
HAND RAIL BASE
6106 T6

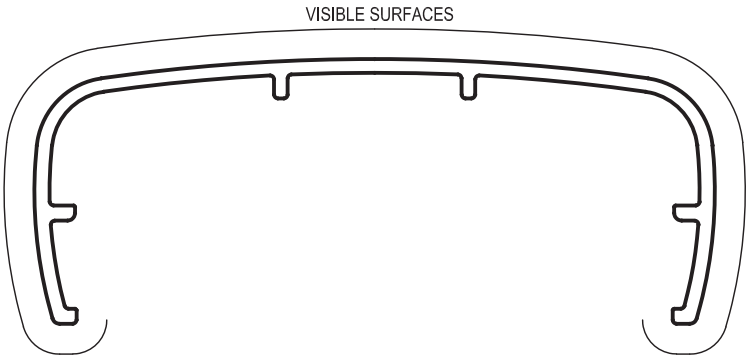
Mass. 1.332 Kg/m
Anod. Per. 399
Paint Per. 100



Framing

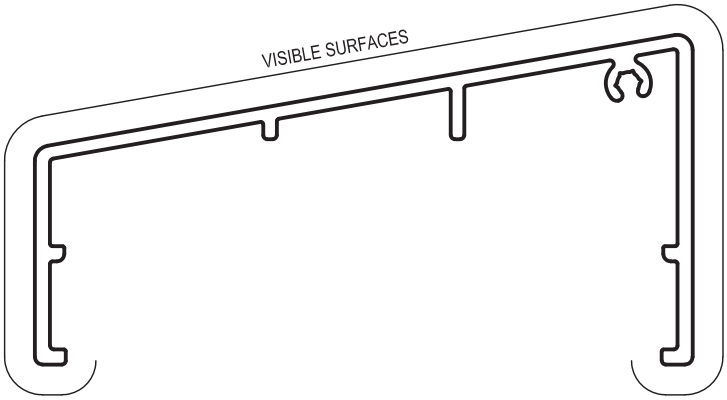
HR505
BULL NOSE TOP RAIL

Mass. 0.811 Kg/m
Anod. Per. 317
Paint Per. 156



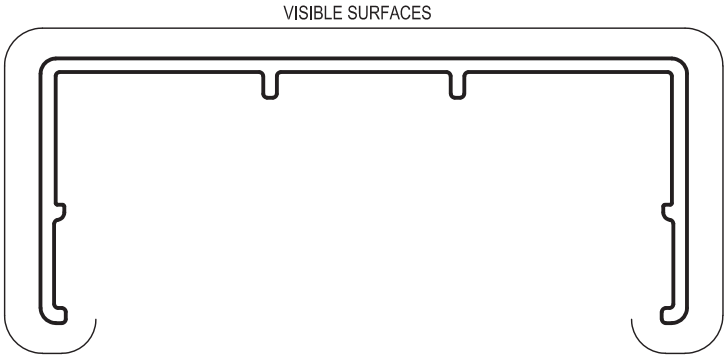
HR508
TAPERED TOP RAIL

Mass. 0.935 Kg/m
Anod. Per. 366
Paint Per. 165



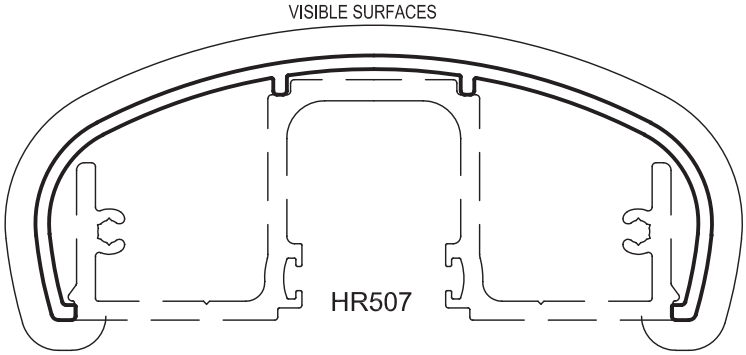
HR509
SQUARE TOP RAIL

Mass. 0.814 Kg/m
Anod. Per. 323
Paint Per. 159

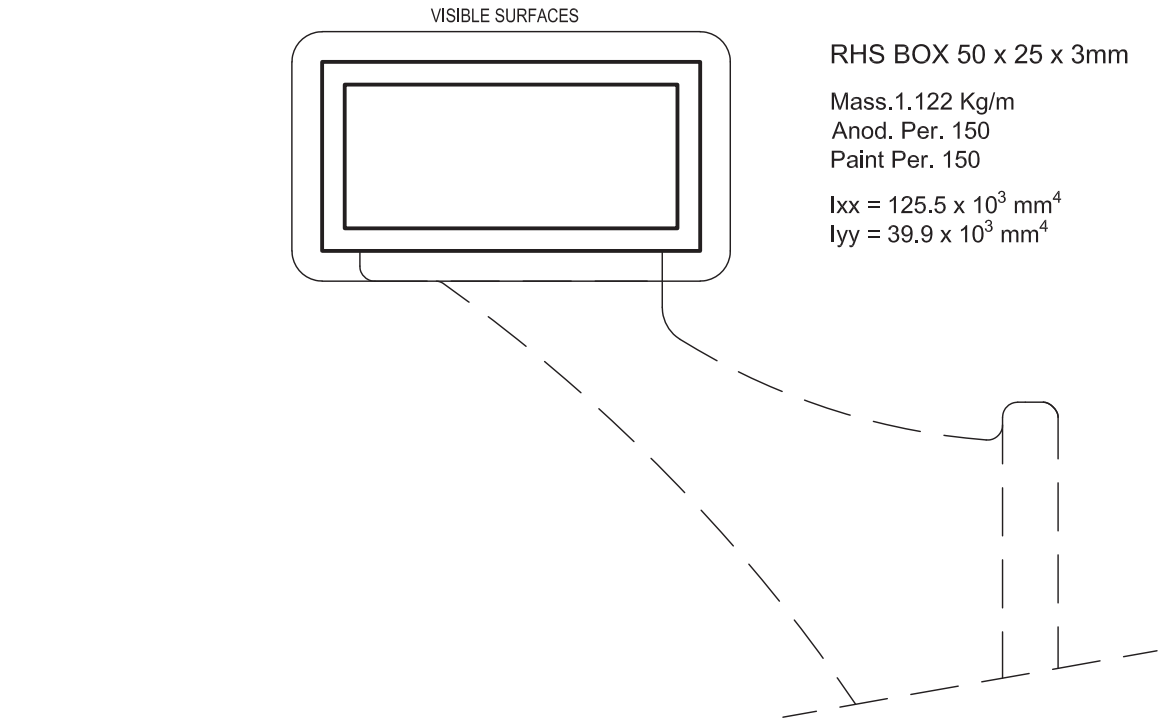


HR510
ELLIPTICAL TOP RAIL

Mass. 0.683 Kg/m
Anod. Per. 280
Paint Per. 141



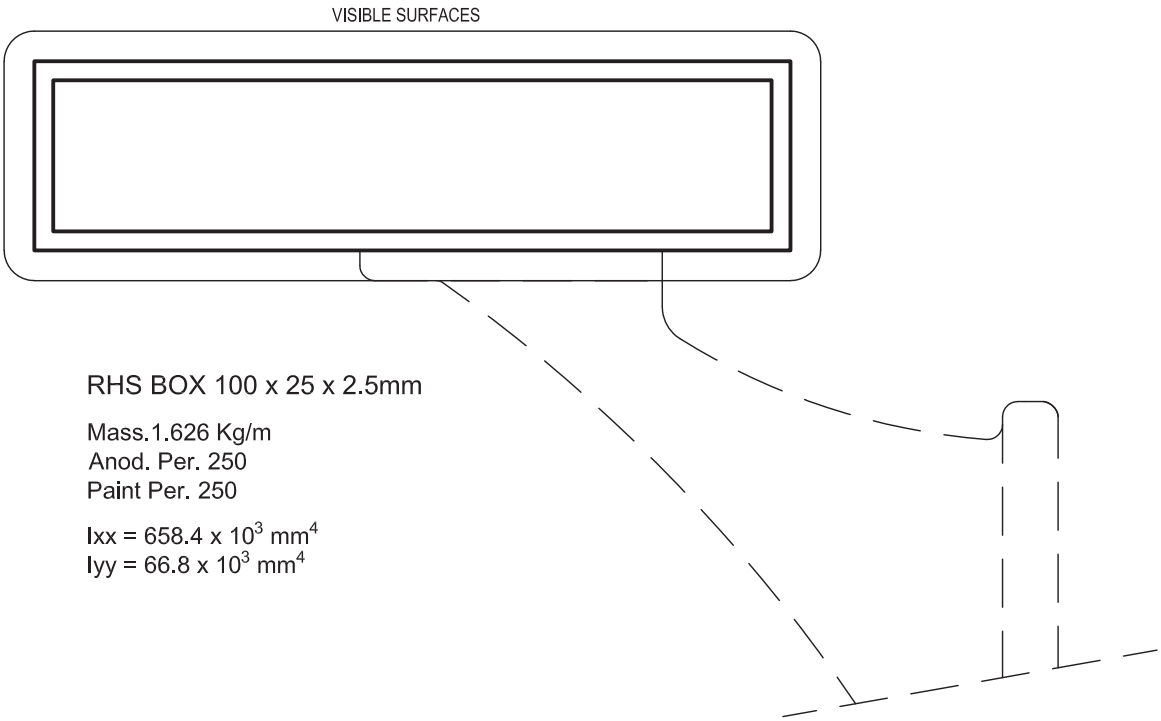
Stand Off Hand Rail Options



RHS BOX 50 x 25 x 3mm

Mass.1.122 Kg/m
Anod. Per. 150
Paint Per. 150

Ixx = 125.5 x 10^3 mm^4
Iyy = 39.9 x 10^3 mm^4



RHS BOX 100 x 25 x 2.5mm

Mass.1.626 Kg/m
Anod. Per. 250
Paint Per. 250

Ixx = 658.4 x 10^3 mm^4
Iyy = 66.8 x 10^3 mm^4

Glazing Wedges

IMAGE	TO SUIT GAP	MATERIAL	PART #	DESCRIPTION
	2mm	PVC	1376132	GR32 GLAZING WEDGE (2mm GAP) x 200m ROLL
	3mm	PVC	1313055	GR43 GLAZING WEDGE (BROWN) (3mm GAP) PVC x 200m ROLL
		S/PRENE	1313063	GR43S GLAZING WEDGE (BROWN) (3mm GAP) S/PRENE x 200m ROLL
	4mm	PVC	1313056	GR44 GLAZING WEDGE (WHITE) (4mm GAP) PVC x 200m ROLL
		S/PRENE	1313064	GR44S GLAZING WEDGE (WHITE) (4mm GAP) S/PRENE x 200m ROLL
	5mm	PVC	1313057	GR45 GLAZING WEDGE (BLUE) (5mm GAP) PVC x 150m ROLL
		S/PRENE	1313065	GR45S GLAZING WEDGE (BLUE) (5mm GAP) S/PRENE x 150m ROLL
	6mm	PVC	1313058	GR46 GLAZING WEDGE (YELLOW) (6mm GAP) PVC x 150m ROLL
		S/PRENE	1313066	GR46S GLAZING WEDGE (YELLOW) (6mm GAP) S/PRENE x 150m ROLL
	7mm	PVC	1313059	GR47 GLAZING WEDGE (RED) (7mm GAP) PVC x 150m ROLL
		S/PRENE	1313062	GR47S GLAZING WEDGE (RED) (7mm GAP) S/PRENE x 150m ROLL

Backing Gaskets

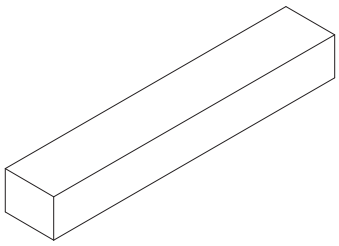
IMAGE	TO SUIT GAP	MATERIAL	PART #	DESCRIPTION
	2mm	PVC	1313079	CE36 CO-EXT BACKING GASKET (2mm GAP) PVC x 100m ROLL
		S/PRENE	1313080	CE36S CO-EXT BACKING GASKET (2mm GAP) S/PRENE x 100m ROLL
	4mm	PVC	1313081	CE37 CO-EXT BACKING GASKET (4mm GAP) PVC x 100m ROLL
		S/PRENE	1313082	CE37S CO-EXT BACKING GASKET (4mm GAP) S/PRENE x 100m ROLL

6. Hardware & Components

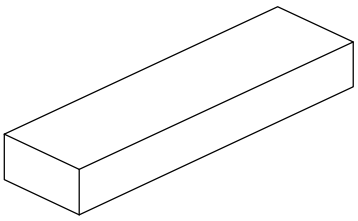
Fasteners

SCREWS			
PART #	HEAD	DESCRIPTION	LOCATION
1382088	PHILLIPS #2	10g x 1/2 (13mm) SS PHILLIPS PAN SELF TAPPING x 1000	Spigot to Frame
1382054	PHILLIPS #2	10g x 1 (25mm) SS PHIL PAN S/TAP SCREW x 500	Frame Screws
1382668	SQUARE #1	10g x 5/8 (16mm) 304SS SQ #1 CSK S/TAP SCREW x 1000	Hand Rail to Frame
1382002	PHILLIPS #2	6g x 1/2 (13mm) SS PHIL CSK S/TAP SCREW x 1000	End Cap to Frame

Accessories

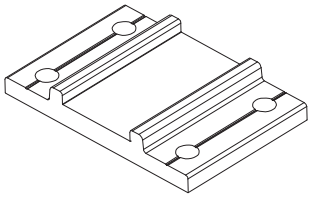


SETTING BLOCK 10 x 13 x 75mm BAG OF 50	
PART	1376762
FINISH	BLACK (034)
QTY	BAG OF 50

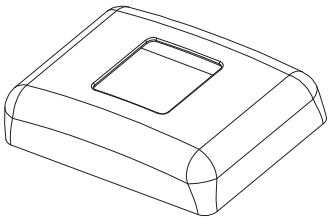


SETTING BLOCK 10 x 6 x 75mm BAG OF 100	
PART	1376775
FINISH	BLACK (034)
QTY	BAG OF 50

HRA1 ENDURAL GLASS SUPPORT BLOCK	
PART	1331110
FINISH	BLACK (034)
QTY	EACH

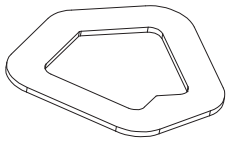


HRA4 ENDURAL BASE PLATE	
PART	1331151
FINISH	MILL (001)
QTY	EACH

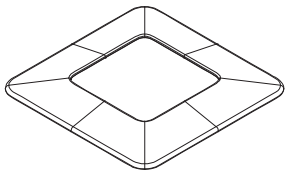


HRA5 ENDURAL BASE PLATE COVER	
PART	1331152
FINISH	MILL (001)
QTY	EACH

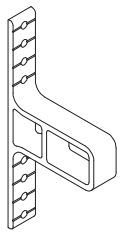
Accessories



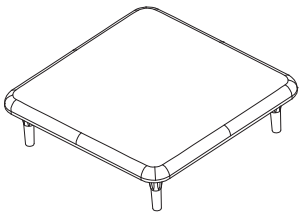
HRA19 ENDURAL 135 DEG DRESS RING	
PART	1331140
FINISH	MILL (001)
QTY	EACH



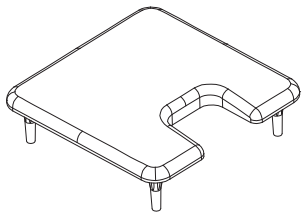
HRA2 ENDURAL SQUARE DRESS RING	
PART	1331111
FINISH	MILL (001)
QTY	EACH



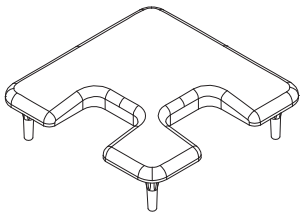
HRA3 ENDURAL BOTTOM RAIL SPIGOT	
PART	1331150
FINISH	MILL (001)
QTY	EACH



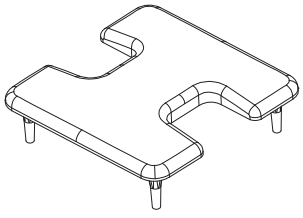
HRA13 ENDURAL POST END CAP - SQUARE	
PART	1331132
FINISH	MILL (001)
QTY	EACH



HRA14 ENDURAL POST END CAP - ONE WAY	
PART	1331133
FINISH	MILL (001)
QTY	EACH

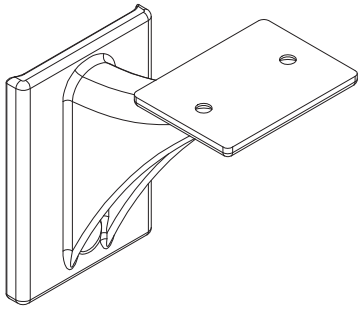


HRA15 ENDURAL POST END CAP - 90 DEG	
PART	1331134
FINISH	MILL (001)
QTY	EACH

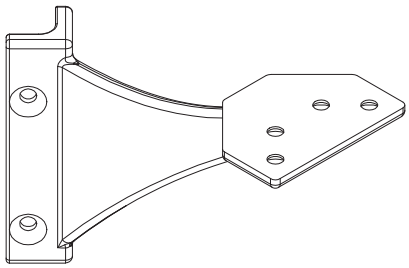


HRA16 ENDURAL POST END CAP - 2 WAY	
PART	1331135
FINISH	MILL (001)
QTY	EACH

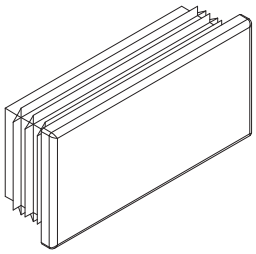
Accessories



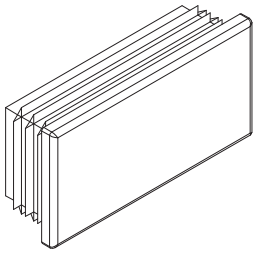
HRA17 ENDURAL STAND OFF HANDRAIL BRACKET	
PART	1331136
FINISH	MILL (001)
QTY	EACH



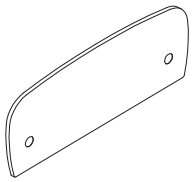
HRA18 ENDURAL CORNER STAND OFF HANDRAIL BRACKET	
PART	1331137
FINISH	MILL (001)
QTY	EACH



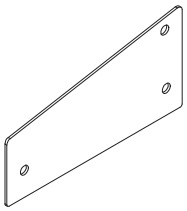
RECTANGLE END CAP PLASTIC 100 x 25mm 1.5-3mm WALL PEC10025	
PART	1331108
FINISH	BLACK (034)
QTY	EACH



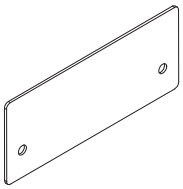
RECTANGLE END CAP PLASTIC 50 x 25mm 0.8-3mm WALL PEC5025	
PART	1331104
FINISH	BLACK (034)
QTY	EACH



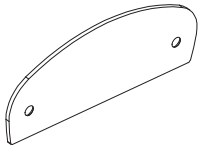
HR505C BULL NOSE END CAP	
PART	1331119
FINISH	MILL (001)
QTY	EACH



HR508C TAPERED TOP RAIL END CAP	
PART	1331138
FINISH	MILL (001)
QTY	EACH

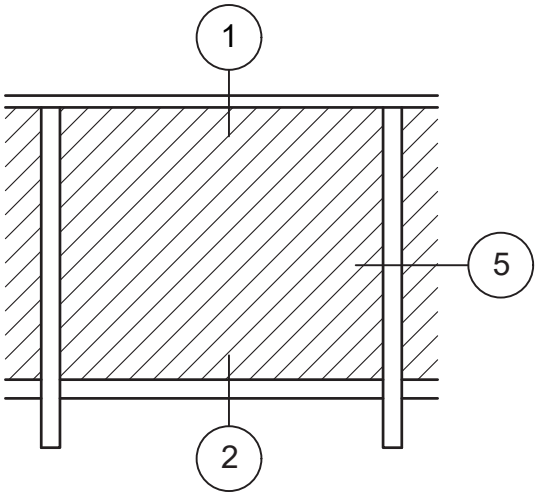


HR509C SQUARE TOP RAIL END CAP	
PART	1331123
FINISH	MILL (001)
QTY	EACH

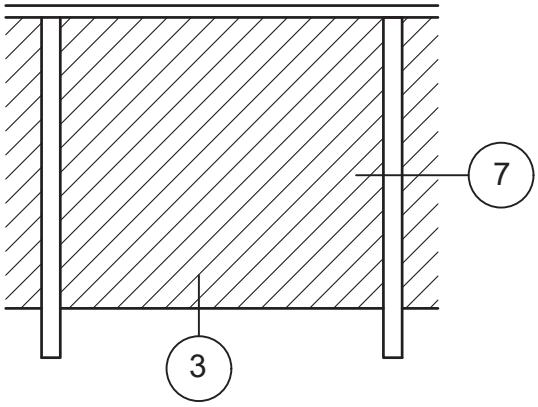


HR510C ELLIPTICAL TOP RAIL END CAP	
PART	1331139
FINISH	MILL (001)
QTY	EACH

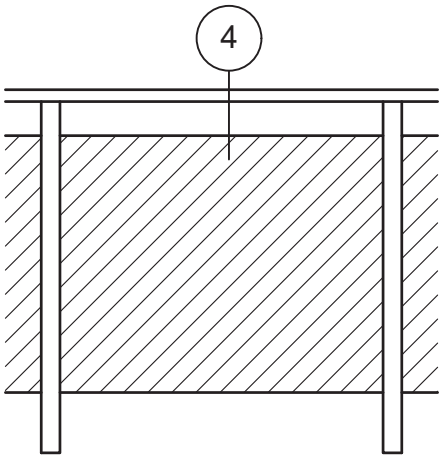
7. Typical Elevation



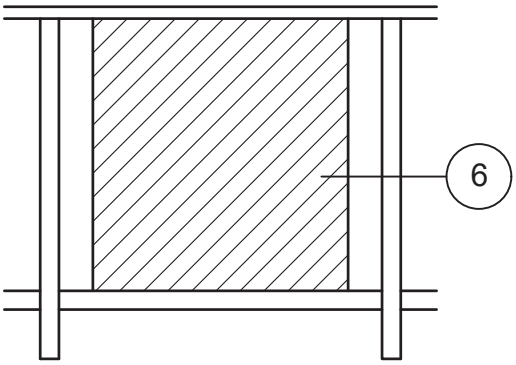
4 SIDE SUPPORT



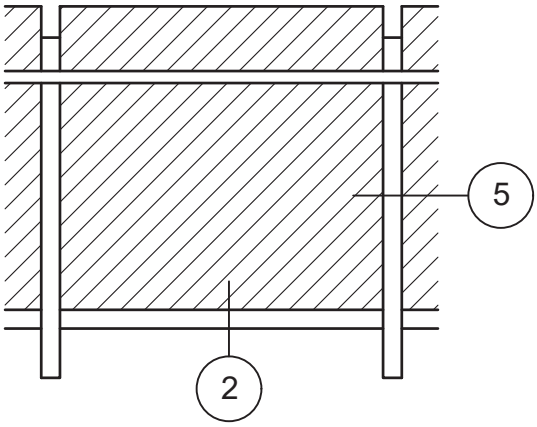
3 SIDE SUPPORT



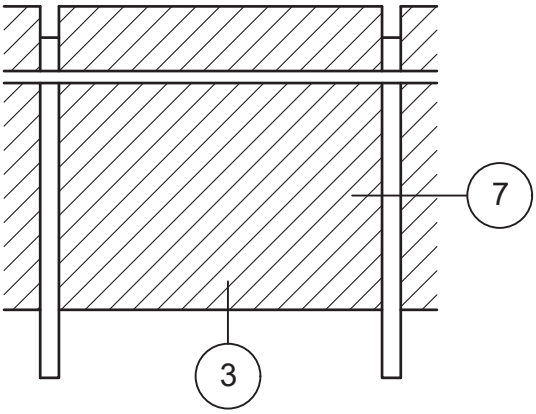
2 SIDE VERTICAL SUPPORT



2 SIDE HORIZONTAL SUPPORT



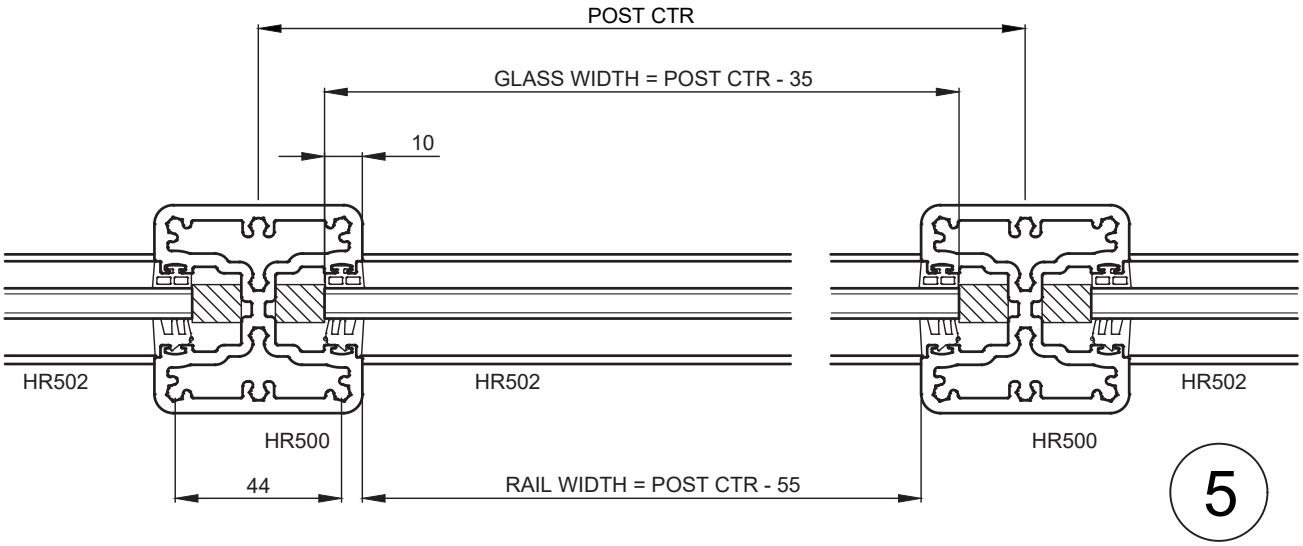
STAND OFF HANDRAIL

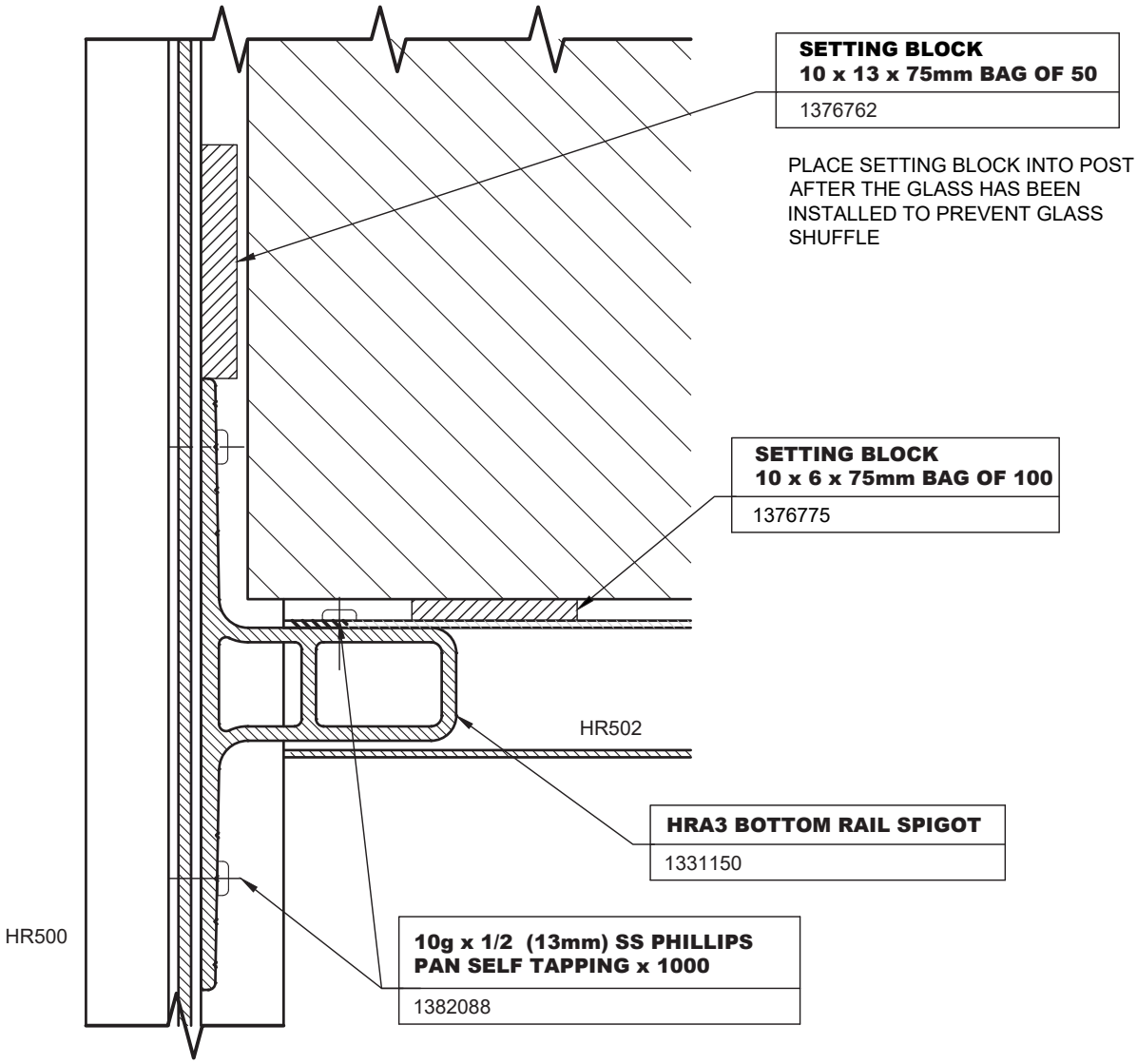


STAND OFF HANDRAIL - NO BOTTOM RAIL

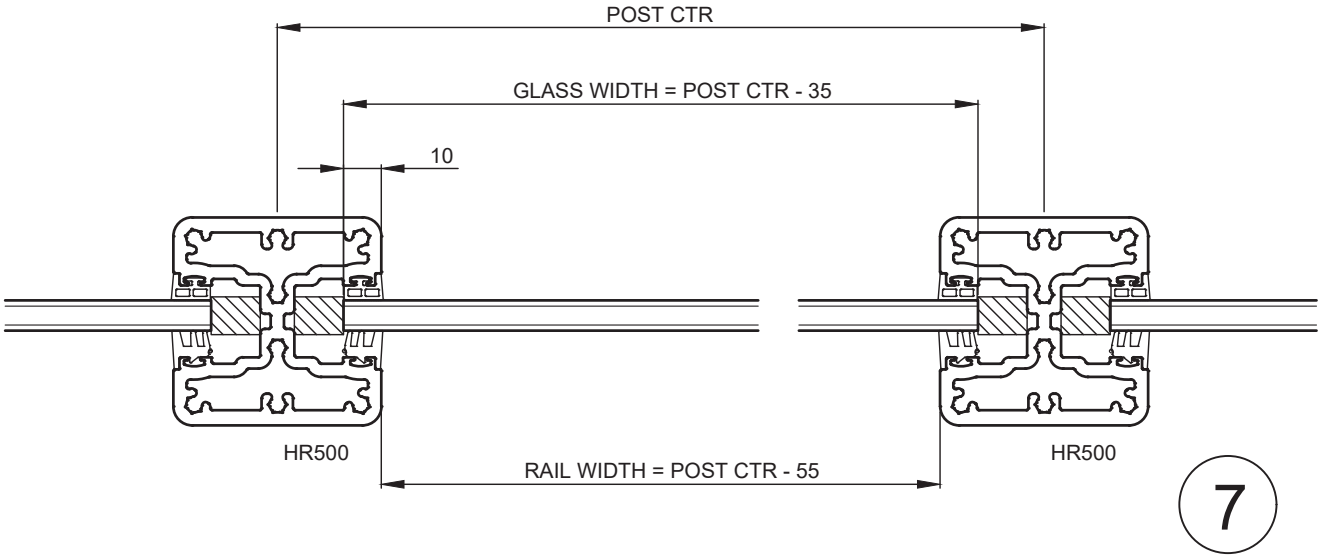
- Please contact Alspec for assistance if the balustrade design or configuration differs from the above typical elevations.
- A hand rail must be used when protecting a difference in floor level greater than 1 metre.

Balustrade Detail - Four Side Support

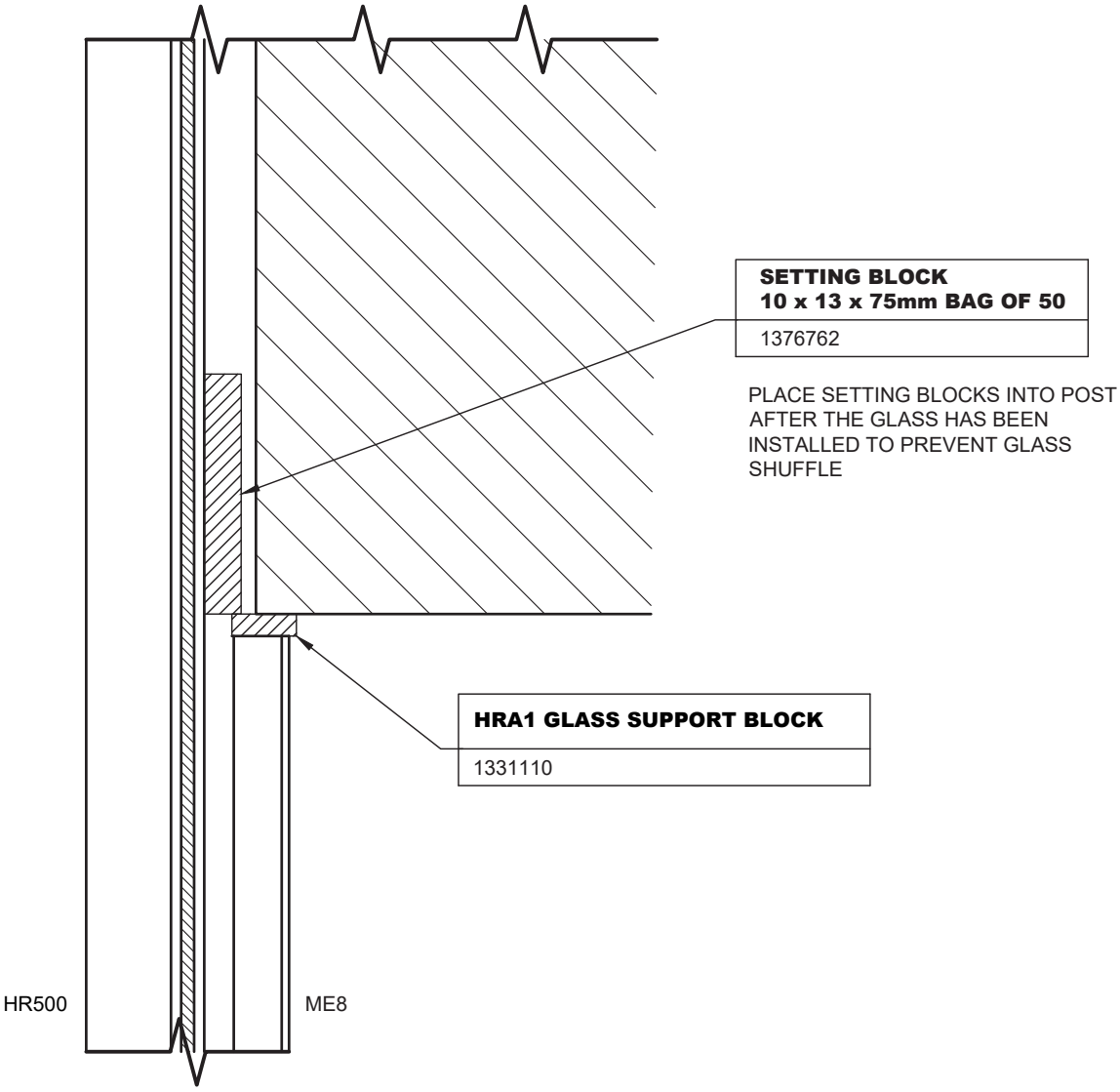




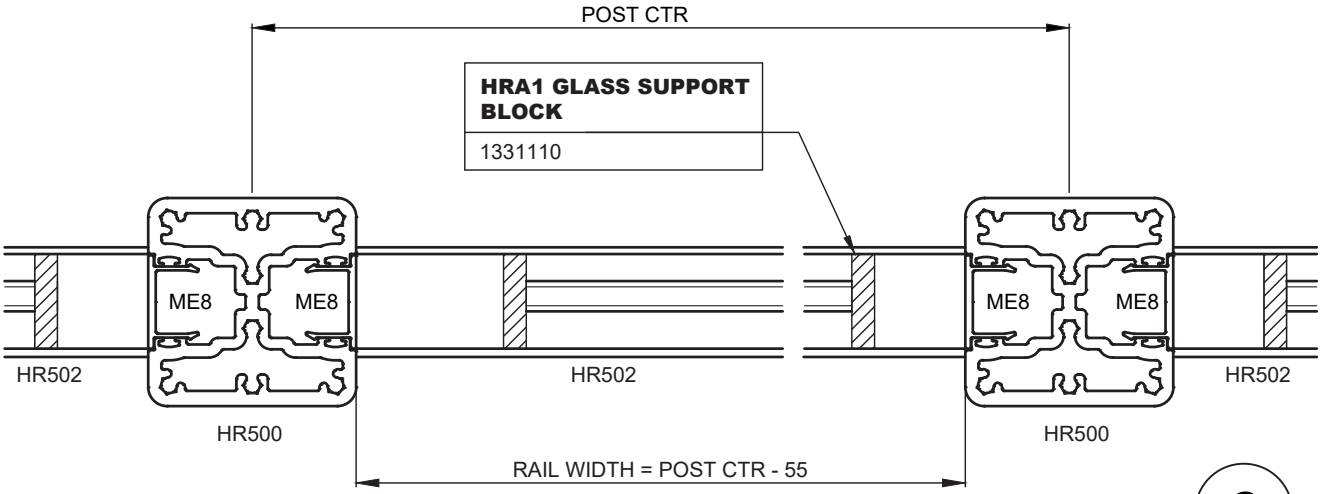
Balustrade Detail - Two or Three Side Support



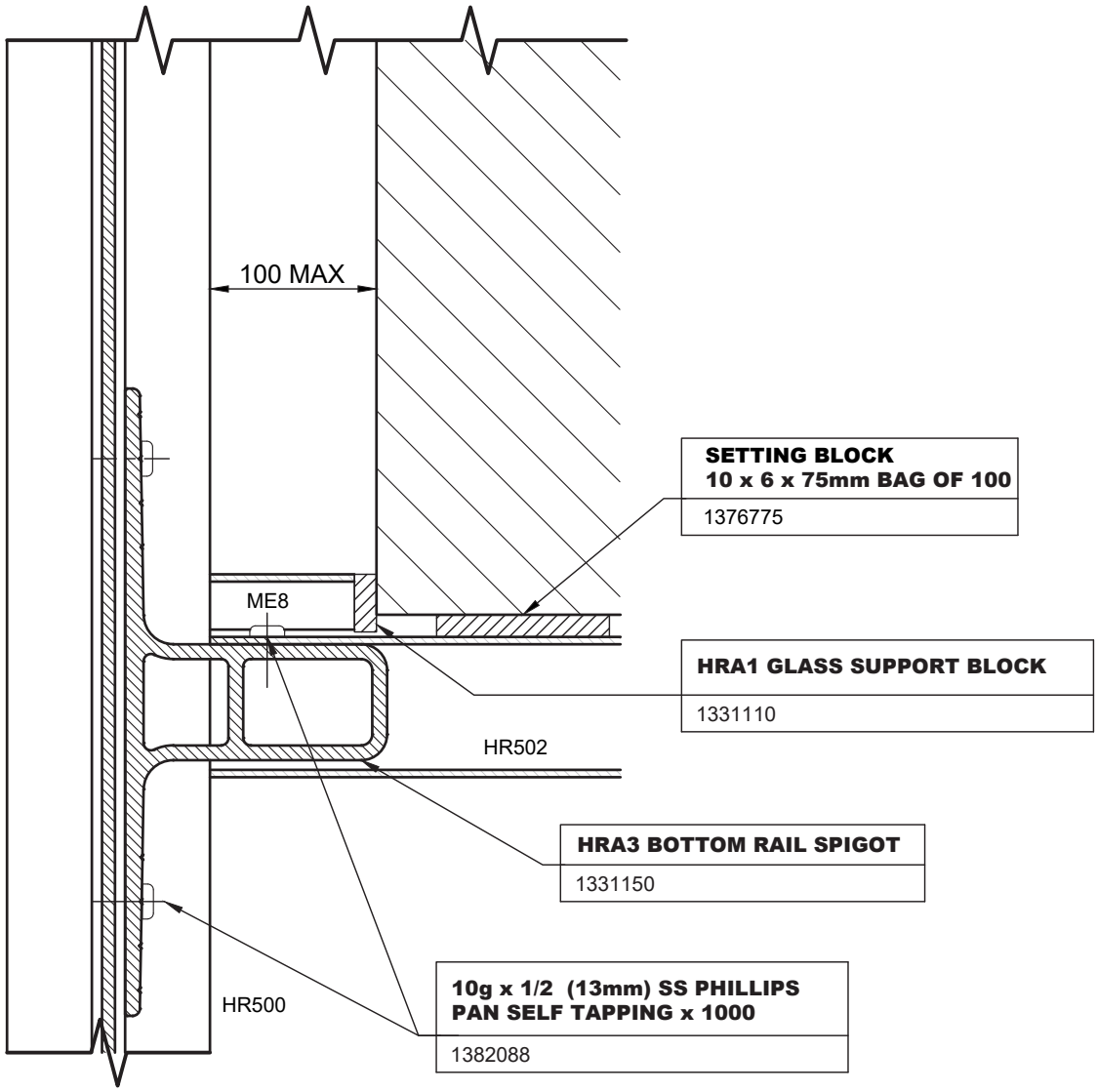
7



Balustrade Detail - Two Side Support

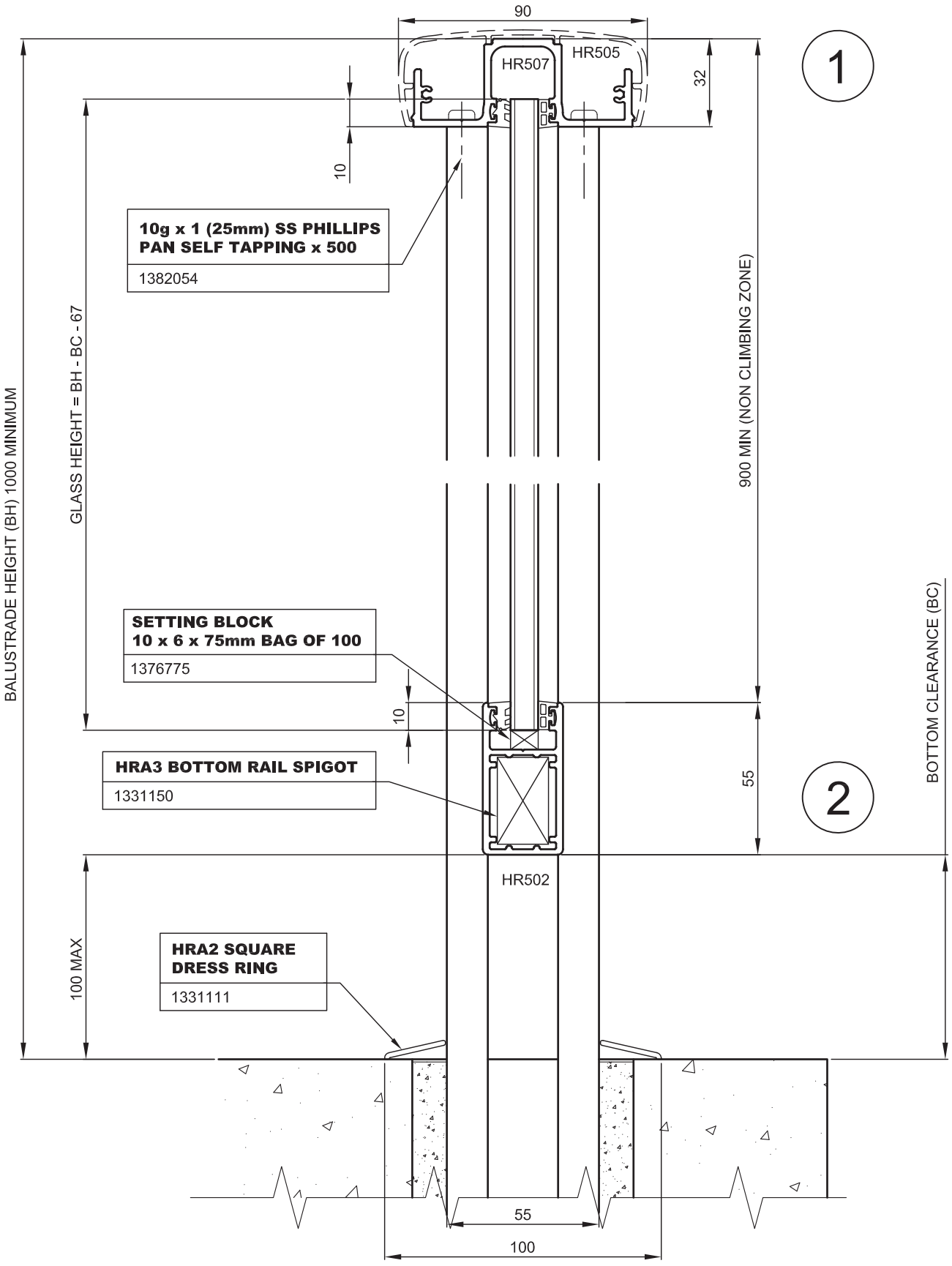


6



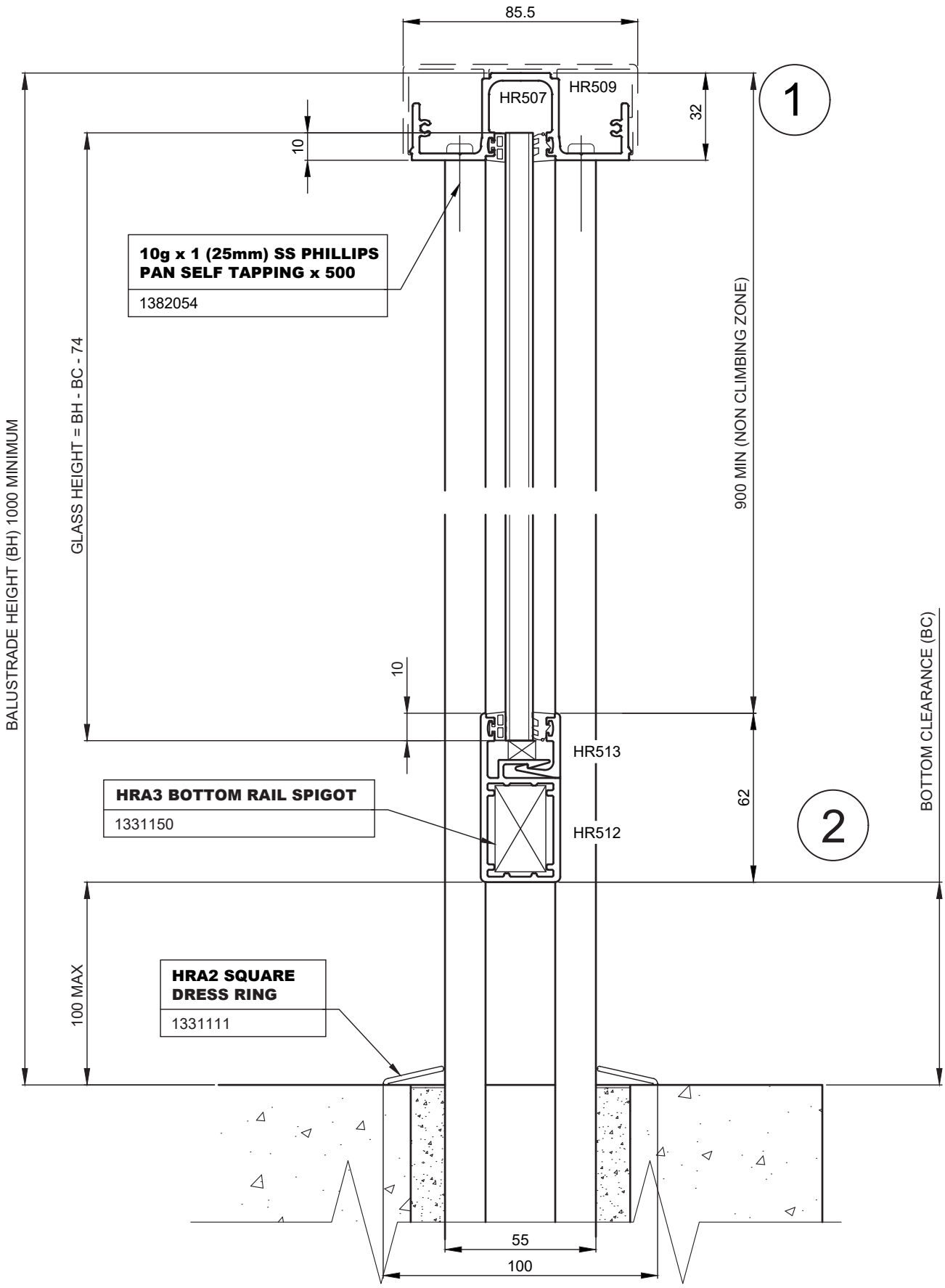
8. Typical Details

Vertical Detail - Two & Four Side Support



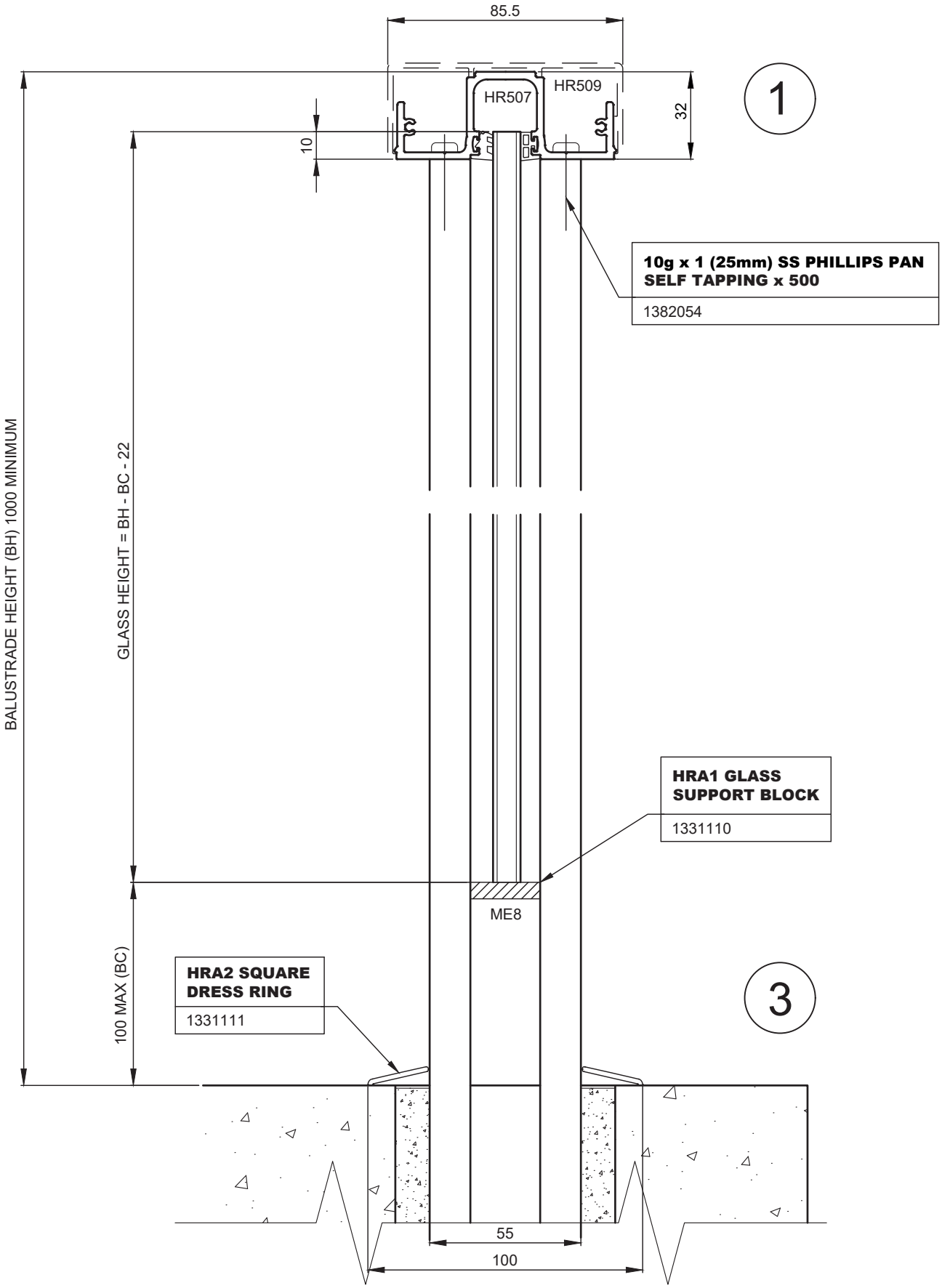
8. Typical Details

Vertical Detail - Beaded Rail - Two & Four Side Support



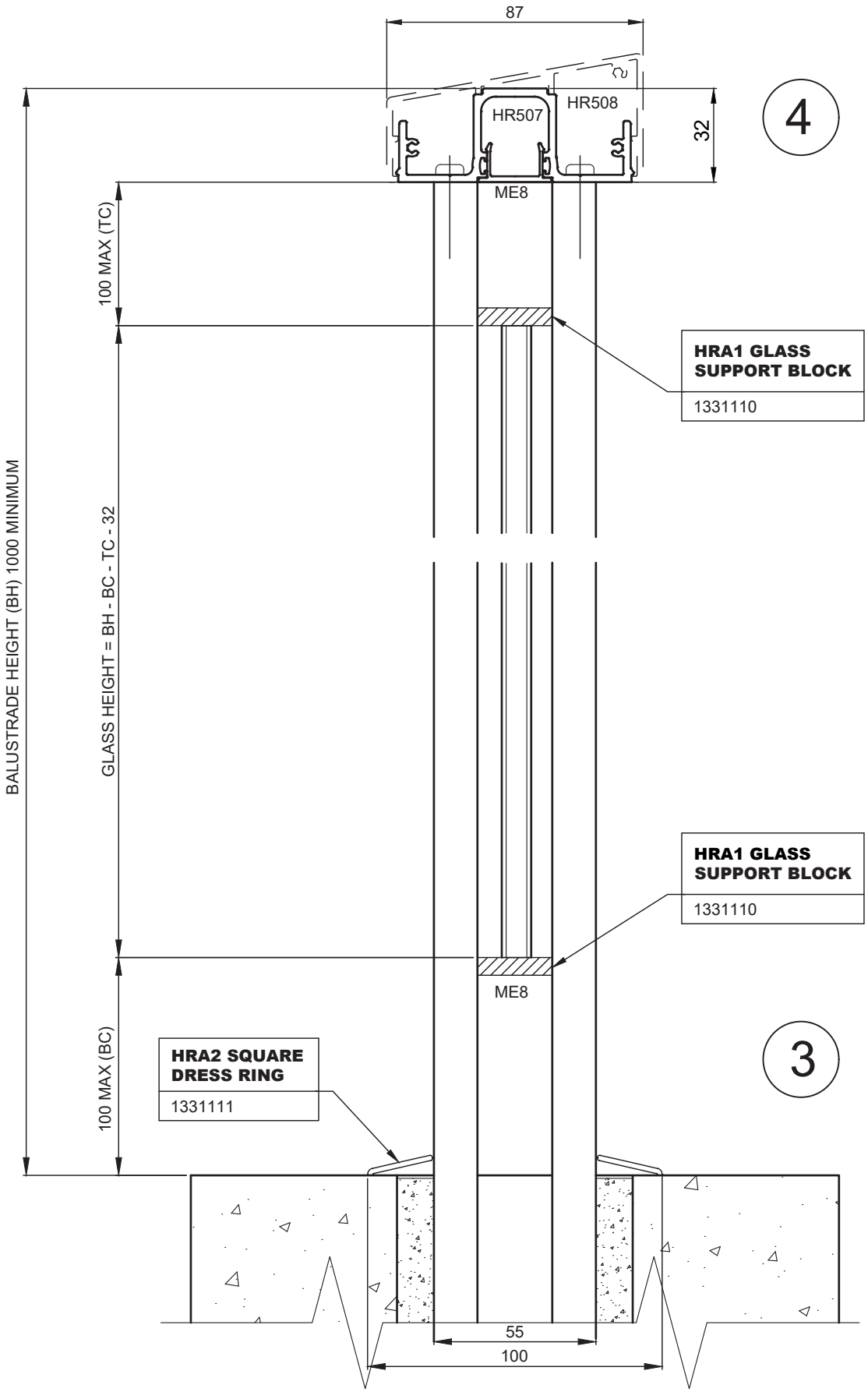
8. Typical Details

Vertical Detail - Three Side Support (No Bottom Rail)



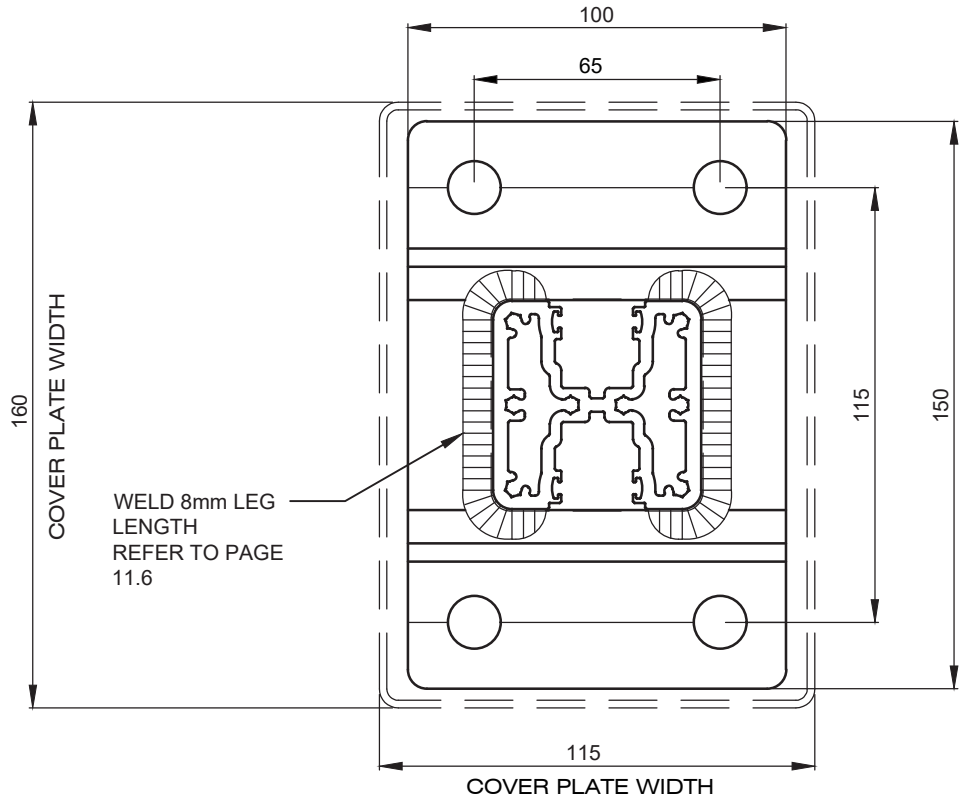
8. Typical Details

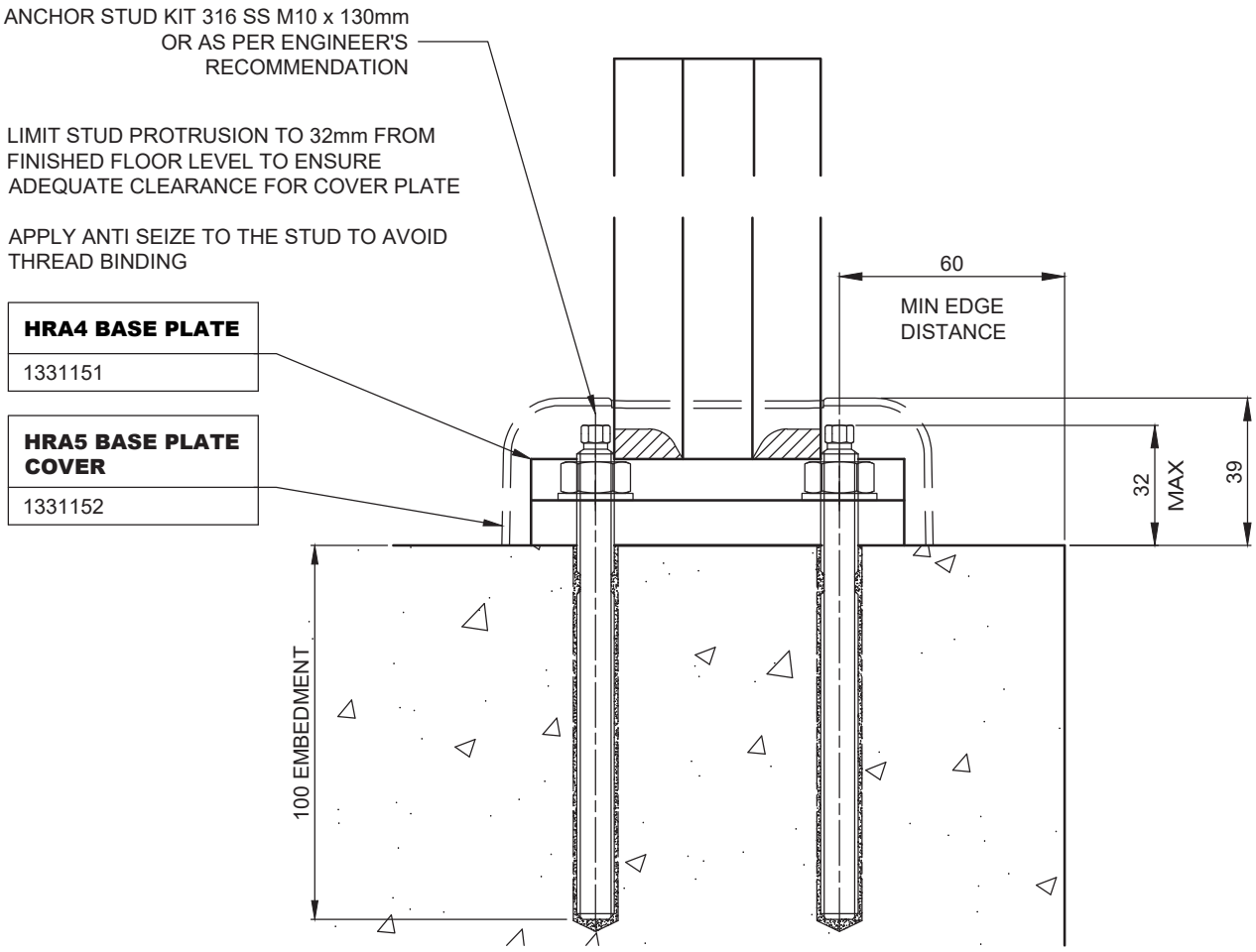
Vertical Detail - Two Side Support (Posts Only)



8. Typical Details

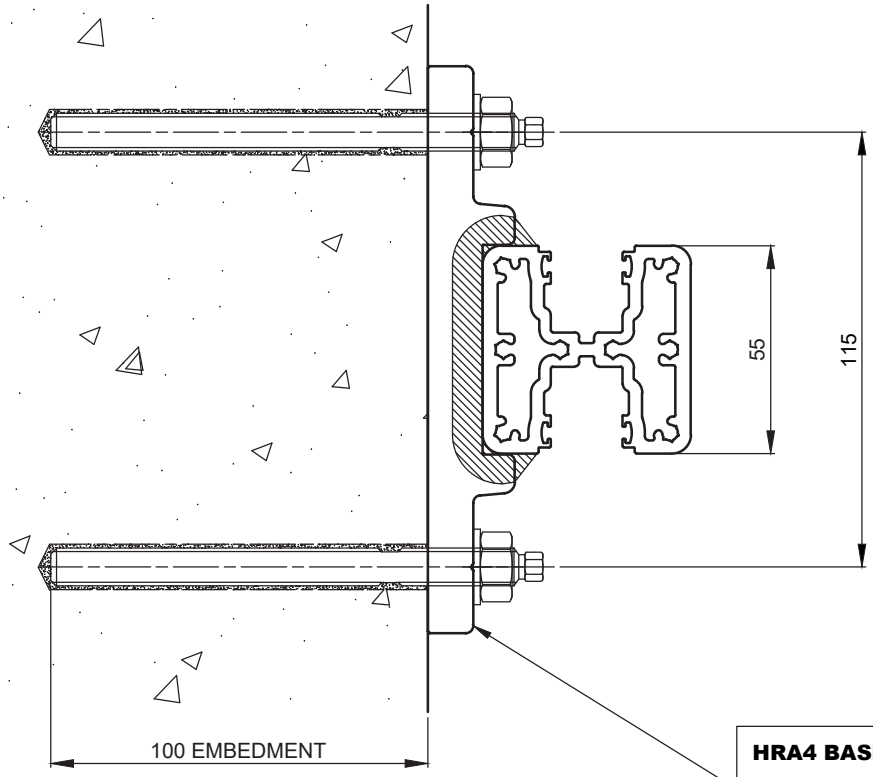
Base Plate Details

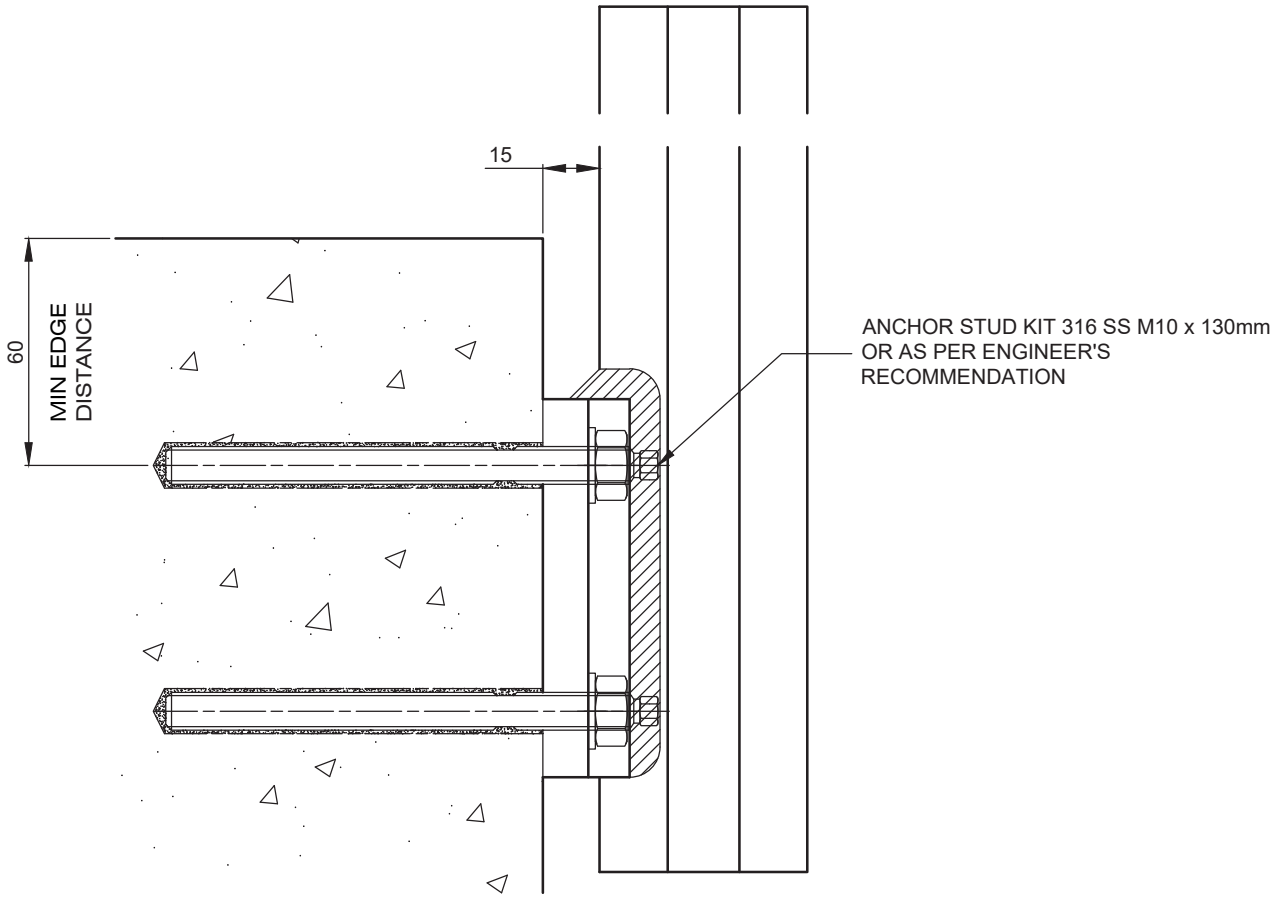




8. Typical Details

Base Plate Details - Side Mount

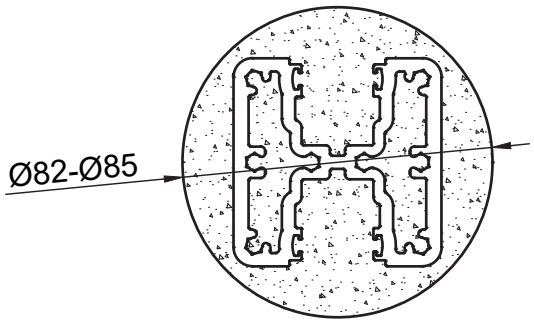




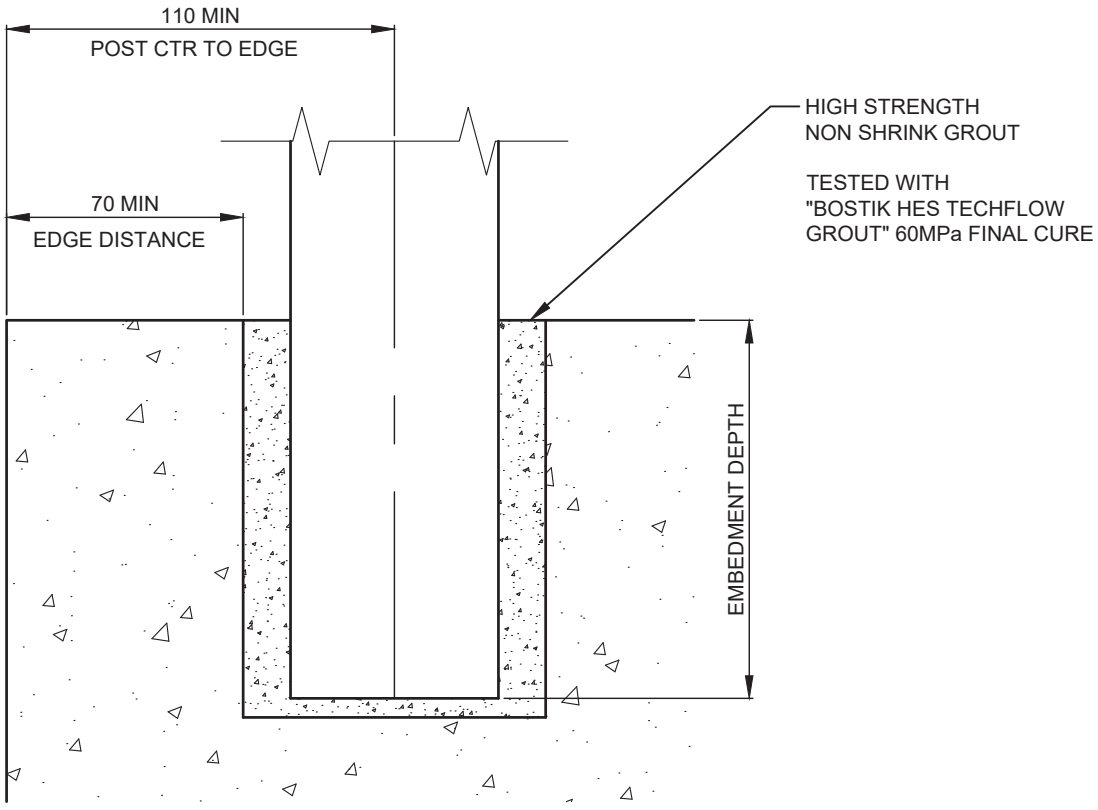
8. Typical Details

Core Drill Guide

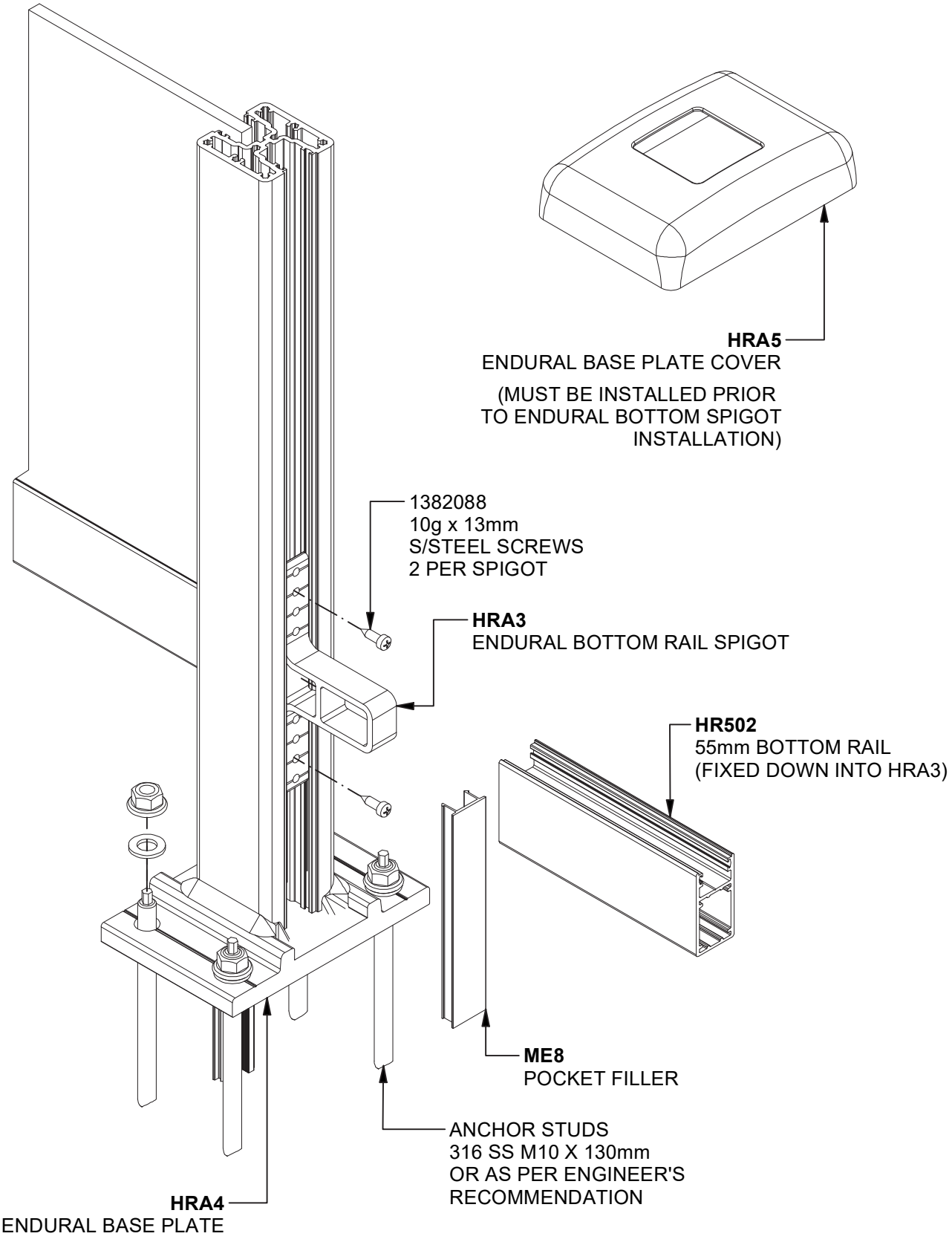
APPLICATION	EMBEDMENT DEPTH
C3, B, E BALCONIES, ROOF TOPS, ETC (IF THE AREA IS SUSCEPTIBLE TO OVER CROWDING REFER C5)	100mm
C1, C2, C3, D & C5 COMMERCIAL, RETAIL, PUBLIC SPACES AND AREAS SUSCEPTIBLE TO OVER CROWDING	120mm
HIGH WIND REGIONS ULTIMATE PRESSURES ABOVE 4kPa N6,C3,C4	120mm



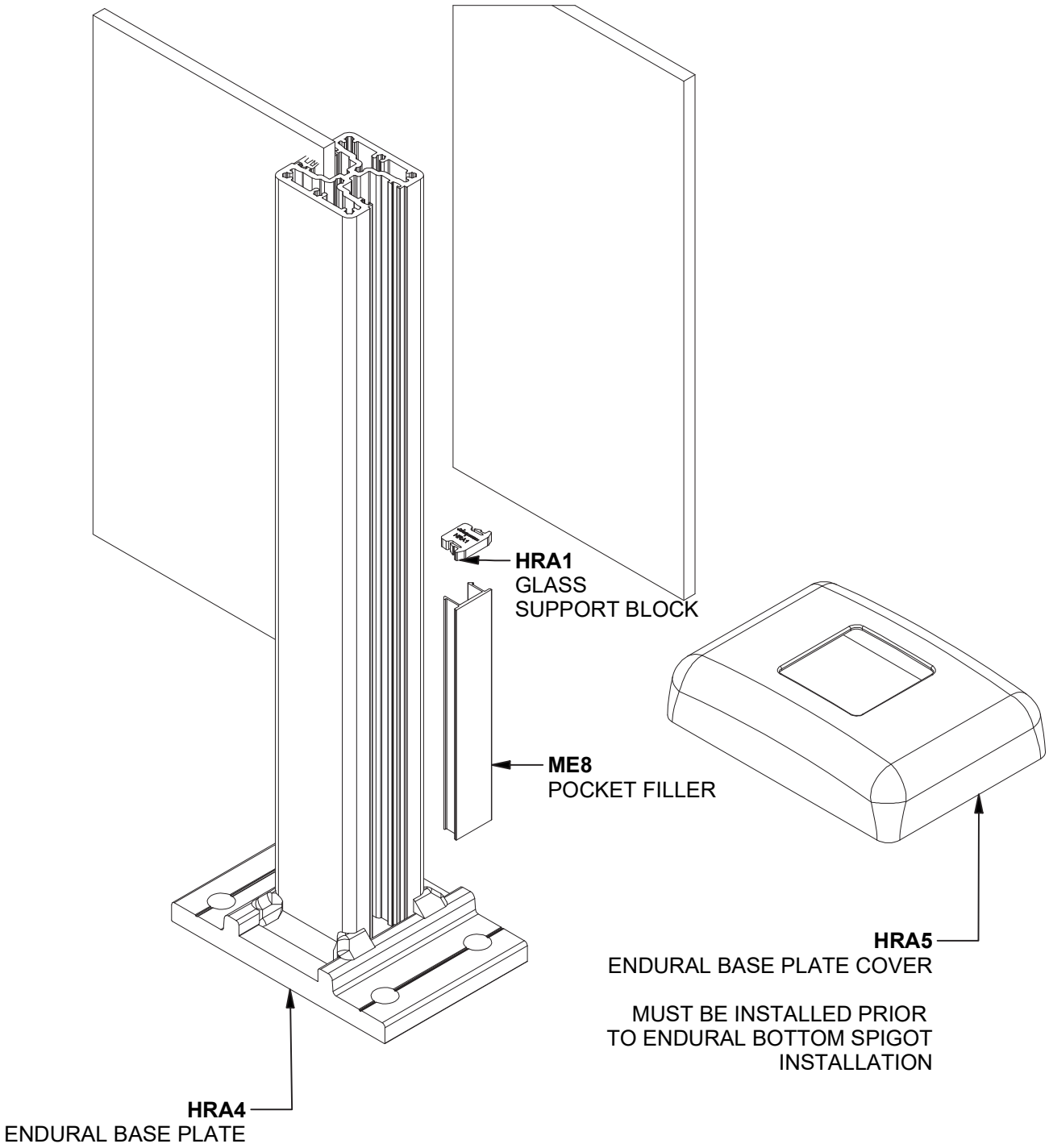
CORE DEPTH	APPROX GROUT VOLUME (Ø82 CORE)
100mm	420 ml
120mm	500 ml



Welded Plate & Bottom Rail Assembly

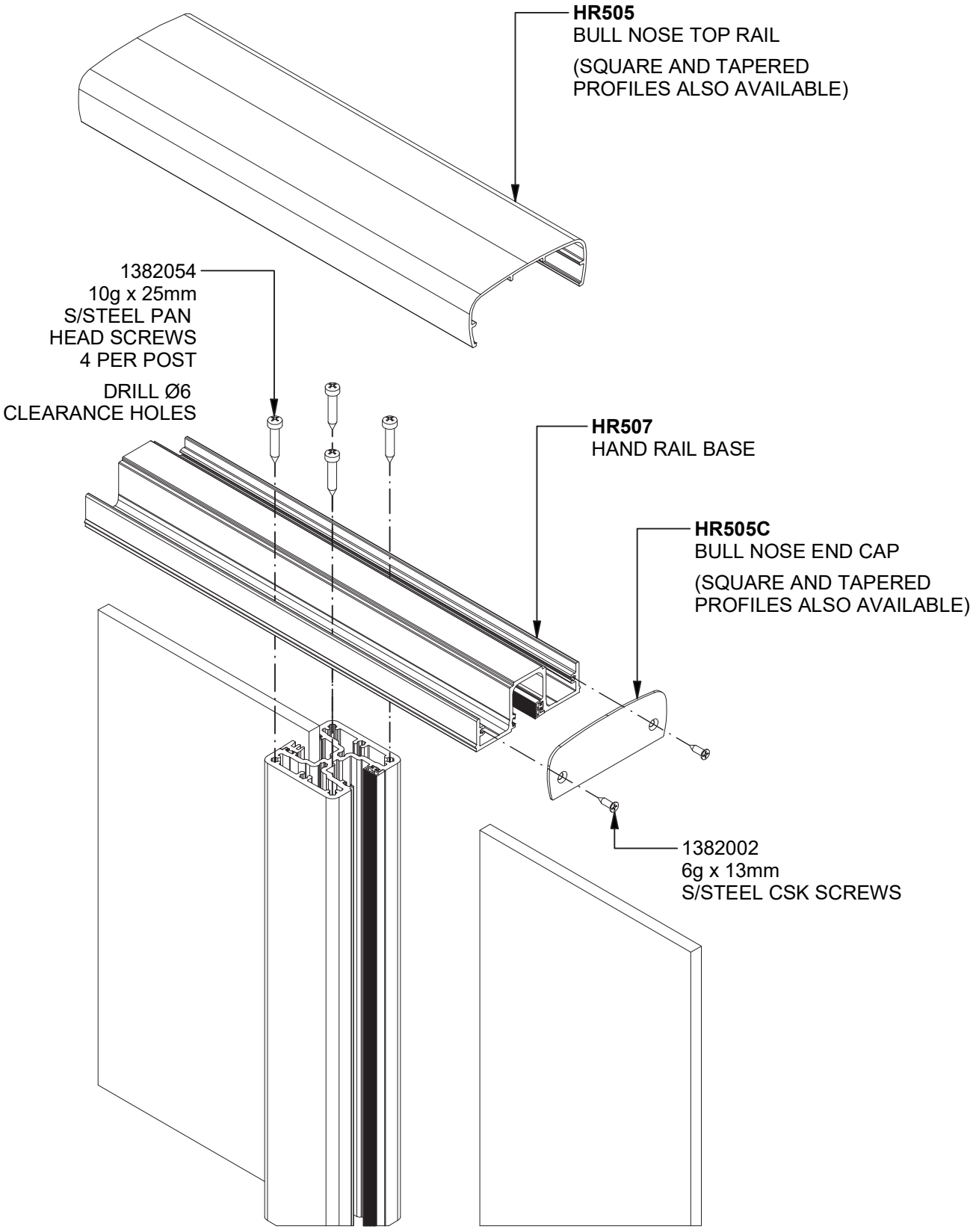


Post Assembly (No Bottom Rail)



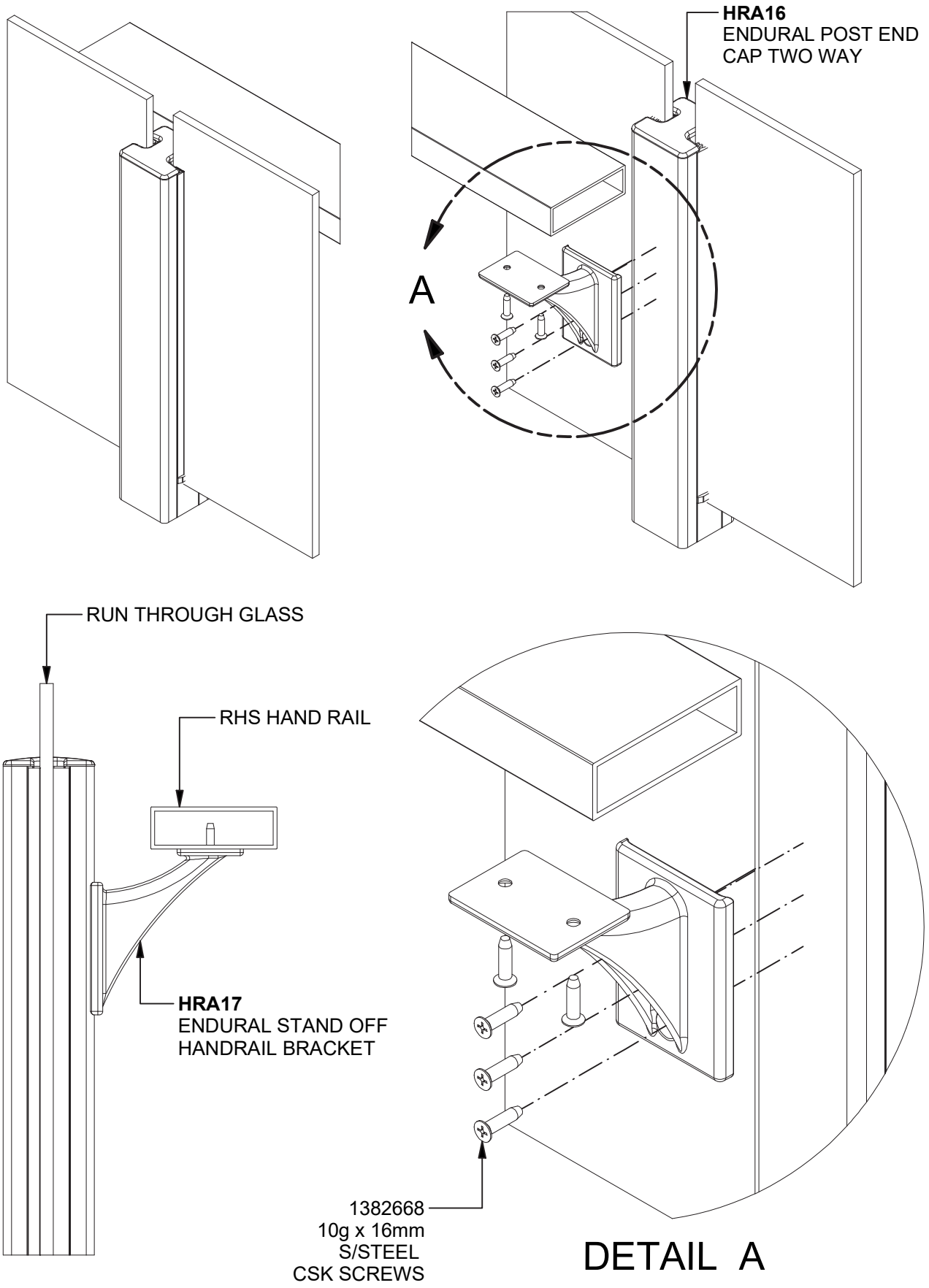
11. Assembly Details

Top Rail Assembly



11. Assembly Details

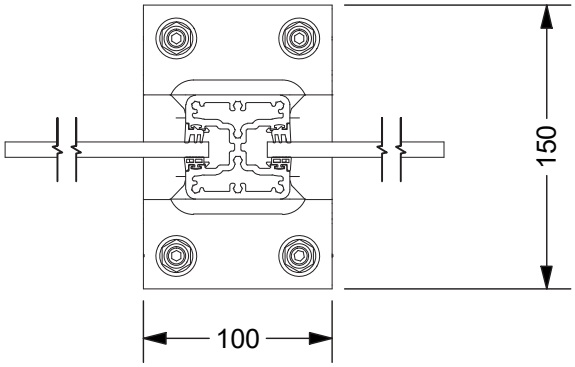
Stand Off Hand Rail Assembly



Base Plate Mounting Options

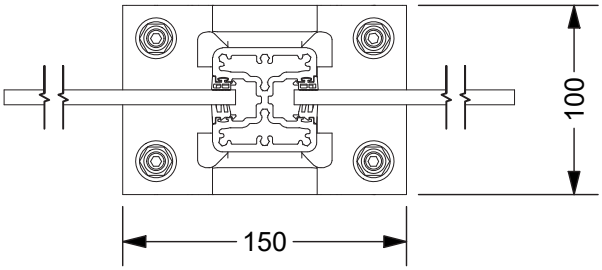
The HRA4 base plate has been specifically engineered to be equally as strong when mounted in any of the below configurations.

Refer loading charts for base plate application and size matrix.
Not suitable for C5 balustrade application.



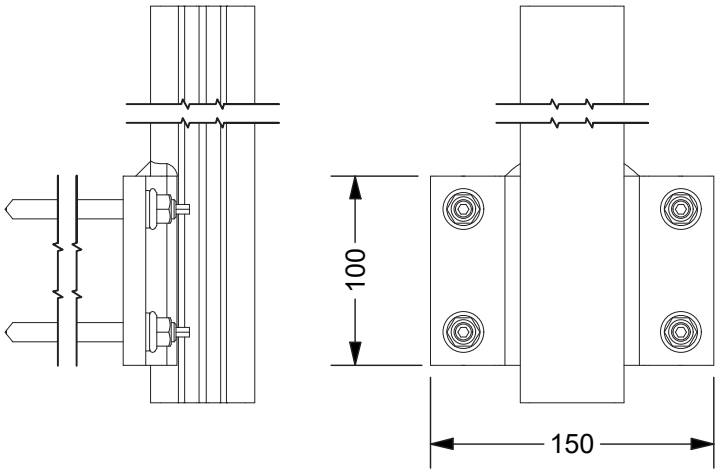
MOUNTED 90° TO GLASS

Refer to page 8.8 for fixing details and guidelines



MOUNTED INLINE WITH GLASS

Refer to page 8.8 for fixing details and guidelines



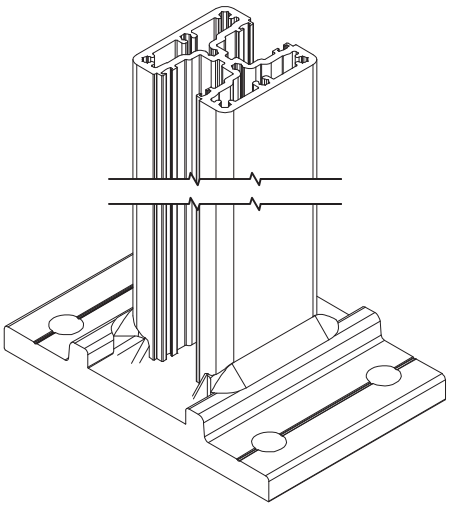
SIDE MOUNTED

Refer to page 8.9 for fixing details and guidelines

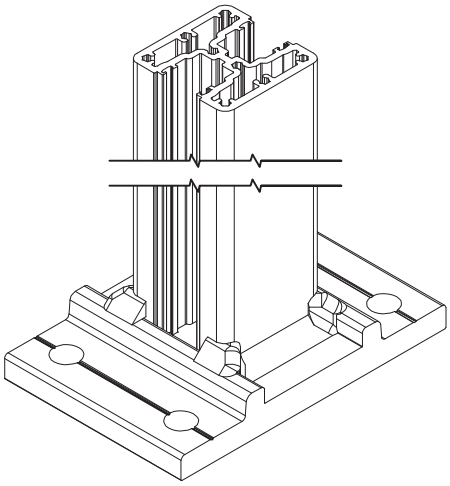
No base plate cover is available in this application.

Base Plate Welding Details

Refer below for fillet weld locations. All welds to have an 8mm minimum leg length and should not encroach on the glazing pocket. Recommended filler wire 4043 or 5356

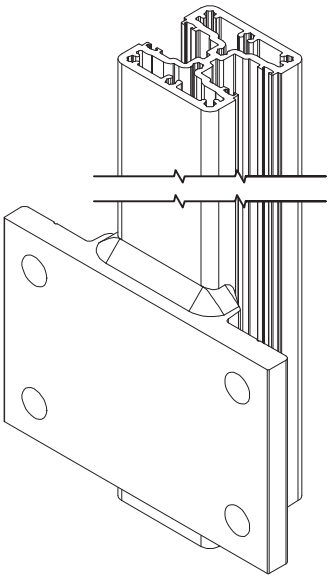


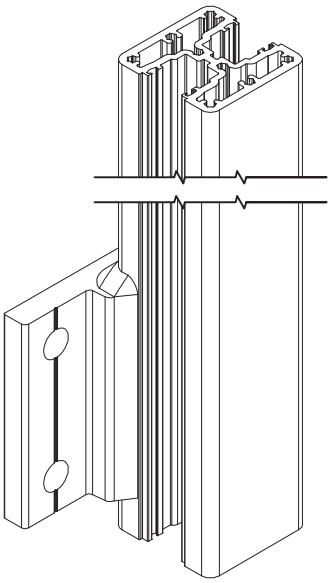
MOUNTED 90˚ TO GLASS



MOUNTED INLINE WITH GLASS

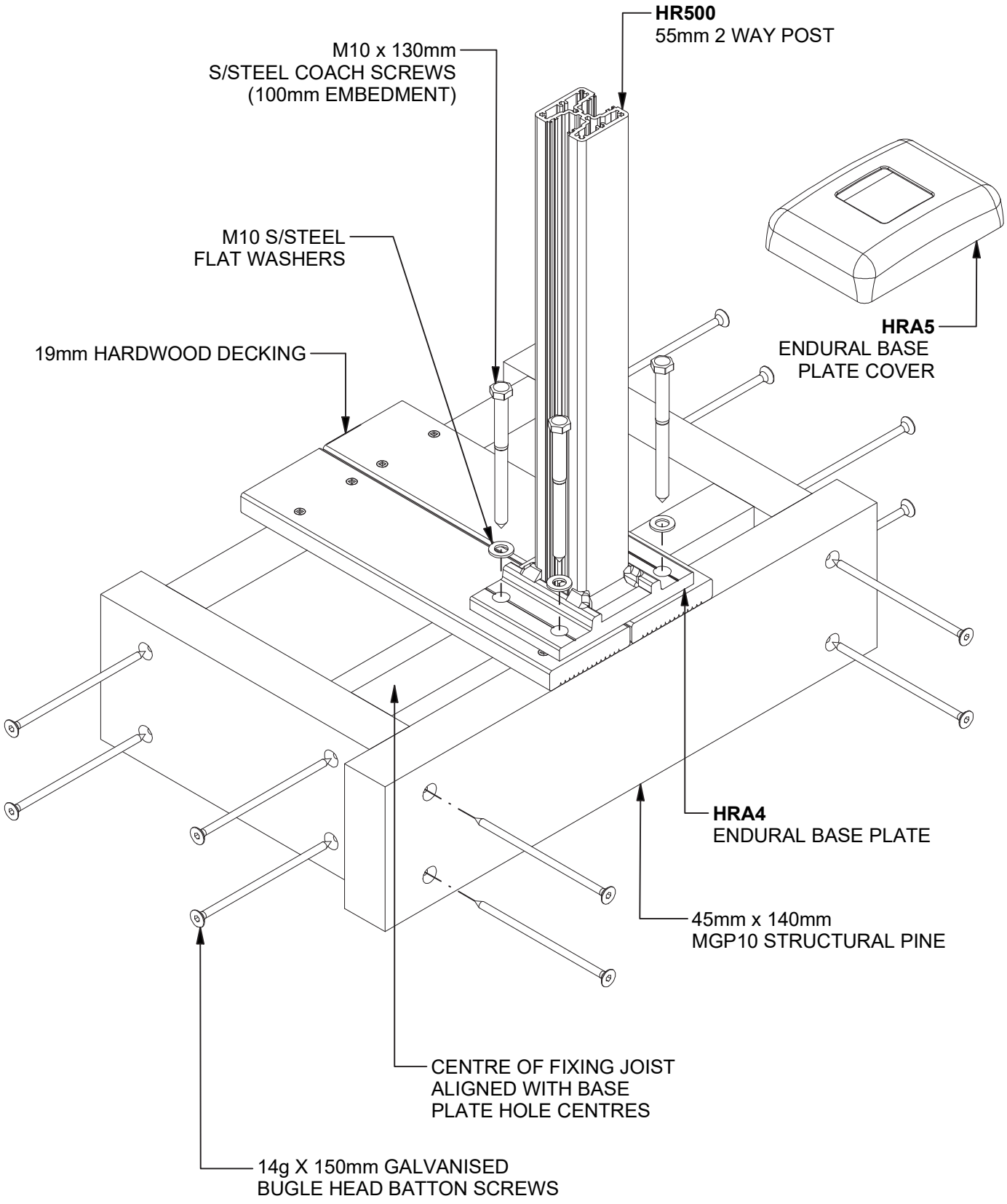
SIDE MOUNTED BASE PLATE





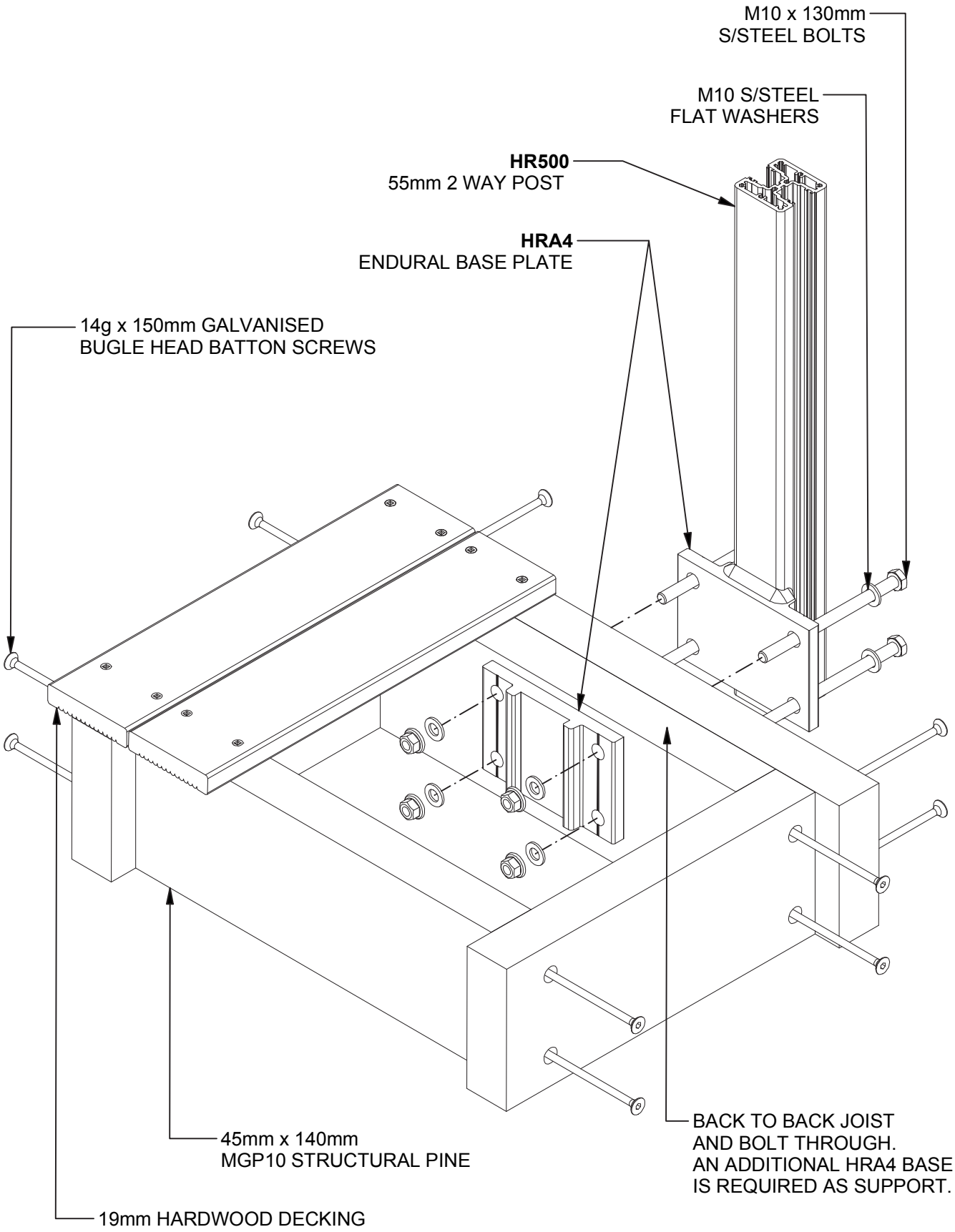
11. Assembly Details

Top Mount - Timber Deck

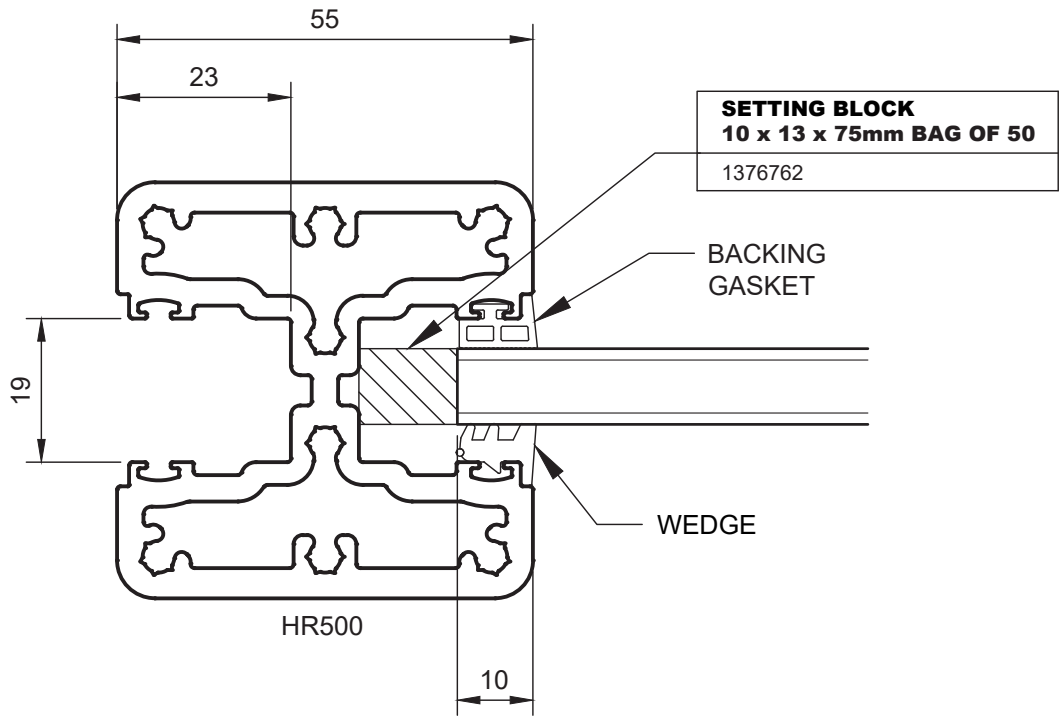


11. Assembly Details

Side Mount - Timber Deck



12. Glazing Details



	WEDGE		CO-EXTRUDED BACKING GASKET	GLASS WEIGHT
GLASS THICKNESS	ID COLOUR	REF.	REF. (GAP)	
8mm THICK	RED	GR47	CE37 (4mm)	21kg/m²
10mm THICK	WHITE	GR44	CE37 (4mm)	26kg/m²
12mm THICK	WHITE	GR44	CE36 (2mm)	31kg/m²

FRAMING

Your new **ENDURAL Balustrade System** frames have been manufactured using the highest quality materials available to the Architectural industry. Constructed from Architectural grade aluminium, these products are highly corrosion resistant and exceptionally strong. With a moderate amount of maintenance, the **ENDURAL Balustrade System** frame will retain it's good looks and resist the elements for years to come.

The **ENDURAL Balustrade System** frames are the product of extensive research and development and designed to resist corrosion and rusting, but as with all external elements on the building require some maintenance to keep them looking good and performing well. Depending on how harsh the environment elements are, the maintenance period will vary. Refer to recommended maintenance table below.

Your **ENDURAL Balustrade System** frames should only ever need to be washed down with a soft bristled brush using warm water and mild detergent. Rinse well with fresh water and remove any detergent residue. Strong detergents and abrasive cleaners should never be used to clean the **ENDURAL Balustrade System** frames as they may scratch or damage the surface finish.

MAINTENANCE PERIOD TABLE

ENVIRONMENT	RECOMMENDED MAXIMUM MAINTENANCE INTERVAL
Mild	Six Months
Moderate	Three Months
Tropical/Severe	One Month

Environmental Definitions:

Mild – Being rural, away from the coast and remote from industry and urban activity.

Moderate – Being mainly urban, inland and away from heavy industry.

Tropical – Being coastal/marine, subject to salt deposition and within 15km of the Eastern coast or 10km of the Western coast of Australia.

EVERYTHING ALUMINIUM & HARDWARE

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