

Guardrail

ENGINEERING LTD.



HANDRAIL STANDARDS
HANDRAILS
AXESS LADDER SYSTEM
KICK FLAT SYSTEM
OPEN FLOORING



Member of PF Group

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Guardrail Engineering Limited.

Guardrail is a member of the PF group of Companies. It first traded in 1983 and was incorporated as a Limited Company in 1985.

Our Industrial Hand-railing (including "ball" type handrail posts), Vertical Access Ladder system "AXESS", Open Flooring & Kick Flat System is supplied to Structural & Coastal Engineers, Architects & Consultants, Fabricators and General Industry alike. We can manufacture in Aluminium and Mild or Stainless Steel with a range of protective finishes that suit various applications.

We fully understand the need to meet Health & Safety requirements and our products conform to the latest British Standards where applicable.



Guardrail

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HANDRAIL STANDARDS



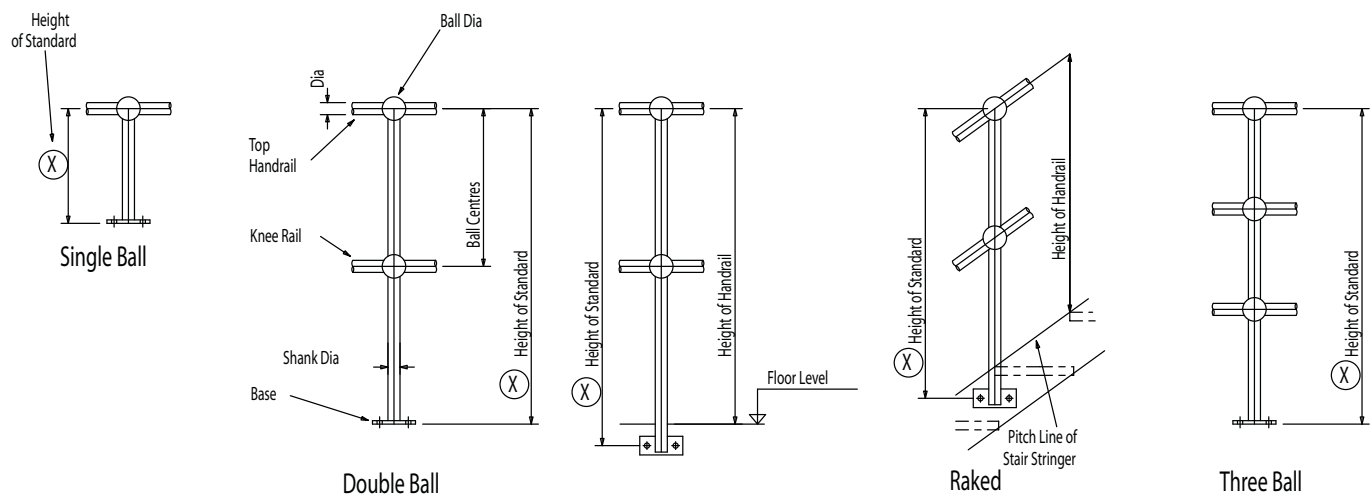
Load Table:

The table below shows the spacing of various type of 1100 mm high handrail standards to achieve required loadings for various codes of practice.

Handrail Standard	Handrail	Horizontal Design Load				
		0.22 kN/m	0.36 kN/m	0.50 kN/m	0.74 kN/m	1.00 kN/m
Tubular						
33.7 mm o.d. x 3.0 mm	33.7 mm o.d.	1650 mm	1075 mm	750 mm	-	-
42.4 mm o.d. x 3.0 mm	33.7 mm o.d.	2000 mm	1850 mm	1450 mm	1050 mm	-
42.4 mm o.d. x 3.0 mm	42.4 mm o.d.	2000 mm	1900 mm	1500 mm	1100 mm	-
48.3 mm o.d. x 3.0 mm	42.4 mm o.d.	2000 mm	2000 mm	2000 mm	1500 mm	1200 mm
48.3 mm o.d. x 4.0 mm	42.4 mm o.d.	2000 mm	2000 mm	2000 mm	1700 mm	1400 mm
60.3 mm o.d. x 4.0 mm	48.3 mm o.d.	2000 mm	2000 mm	2000 mm	2000 mm	1800 mm
Solid						
32 mm o.d.	33.7 mm o.d.	2000 mm	1350 mm	1100 mm	-	-
38 mm o.d.	42.4 mm o.d.	2000 mm	2000 mm	1800 mm	1400 mm	1100 mm
40 mm o.d.	42.4 mm o.d.	2000 mm	2000 mm	2000 mm	1650 mm	1250 mm

Loads are unfactored - please contact our technical department should safety factored loading be required.

Types of standard:



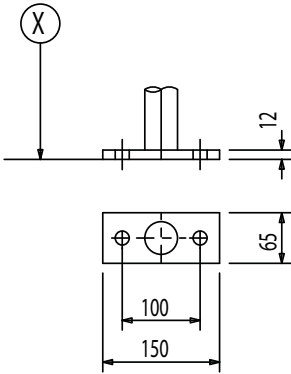
Handrail Standards

Guardrail Handrail standards can be manufactured in tubular or solid materials with varying outside diameters, tube wall thickness, ball sizes, ball types in a multiple of material grades in Mild Steel, Stainless Steel and Aluminium.

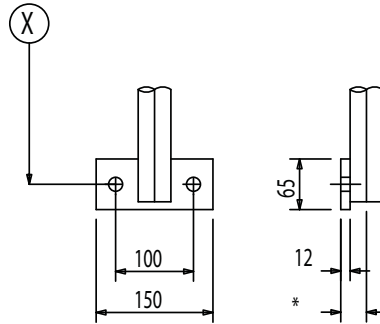
Many different heights, ball centres and tail lengths can be accommodated but to meet current regulations we would recommend a ball centre of 500mm.

Base details:

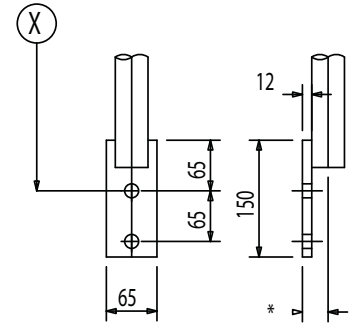
Alternative base thickness 10 mm, 15 mm and 20 mm. All dimensions are in millimetres.



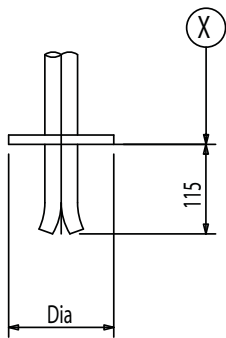
Type: GS1



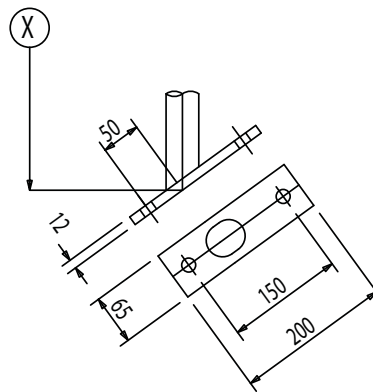
Type: GS2



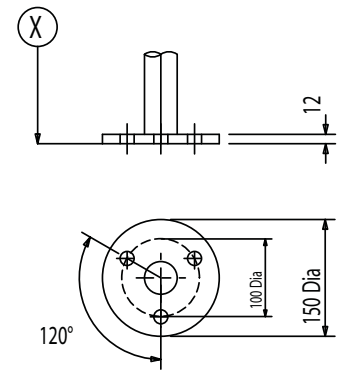
Type: GS3



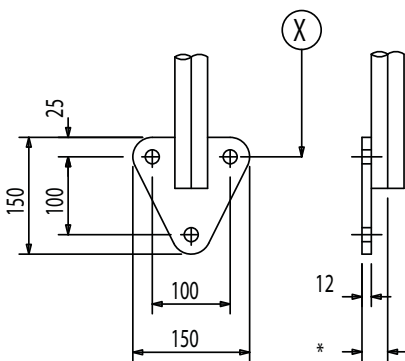
Type: GS5



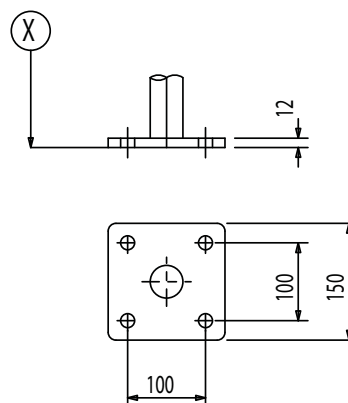
Type: GS4



Type: GS6

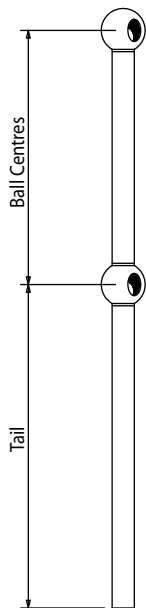


Type: GS7

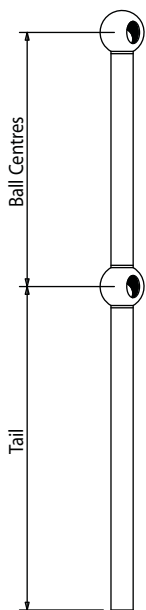


Type: GS8

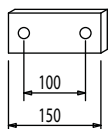
Hole Diameter in bases as requested (standard 18 mm). Other types available on request along with steel to steel or steel to concrete fixing bolts.



Tubular Sticks



Solid Fabricated Sticks



Loose Base plate

Standard industrial handrail components:

Tubular sticks:

Finish: Self colour (vented)
Special and raked sticks on request
Usually available ex-stock

Ball size	Rail size Outside diameter	Shank Outside Diameter
63	34	34
63	34	42
82	42	42
82	48	48
95	48	48

Solid fabricated sticks:

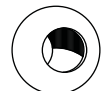
i.e. solid forged balls welded to solid bar shank
Finish: Self colour
Special and raked sticks on request
Usually available ex-stock

Ball size	Rail size Outside diameter	Shank Outside Diameter
64	34	32
70	34	38
77	42	38

Tubular Ball fittings (Mild steel):

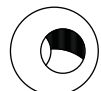
Also available in Gr 316 stainless steel and aluminium

Theoretical Size Outside Diameter	Actual size Outside diameter	Rail Size Outside Diameter
65	63	34
75	82	42
75/90	82	48
90	95	48



Solid forged balls (Mild steel):

Size Outside Diameter	Rail Size Outside Diameter
64	34
70	34
77	42



Loose Base plates:

65 x 12 Flat, 2 x 18 dia. holes.
Others on request



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HANDRAILS



Industrial Handrail System:

Guardrail's industrial handrail system consists of "Ball" type handrail posts and individually fabricated handrails which once passed through the ball in the post are locked into position by way of a grub-screw to form a complete handrail.

Different post diameters, wall thickness and spacing coupled with a variety of base types mean that the majority of loading requirements are met whilst it's aesthetic qualities are usually preferred to clamp and other types of handrail systems.

The system is easily erected/dismantled in small sections and can be "tailored" to suit many applications.

All products are available in mild, stainless steel and aluminium.

Industrial Handrail Systems

Current regulations require "All platforms and walkways to have protective barriers on all open sides, consisting of a handrail, knee or intermediate rail, toe-plate and Handrail Standards".

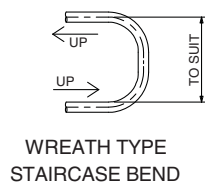
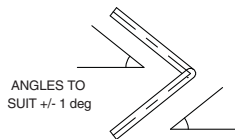
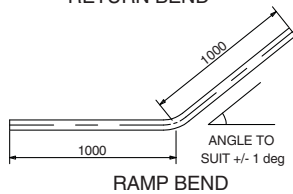
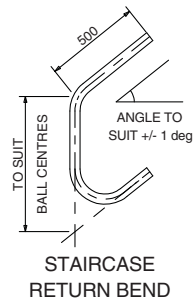
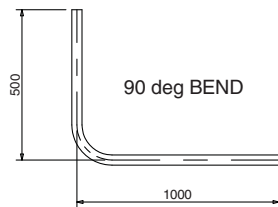
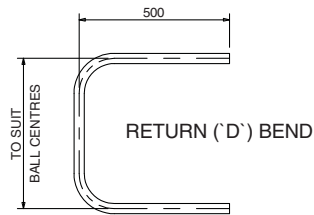
The distance between two rails, or between the lower rail and the top of an up-stand shall be no more than 500mm.



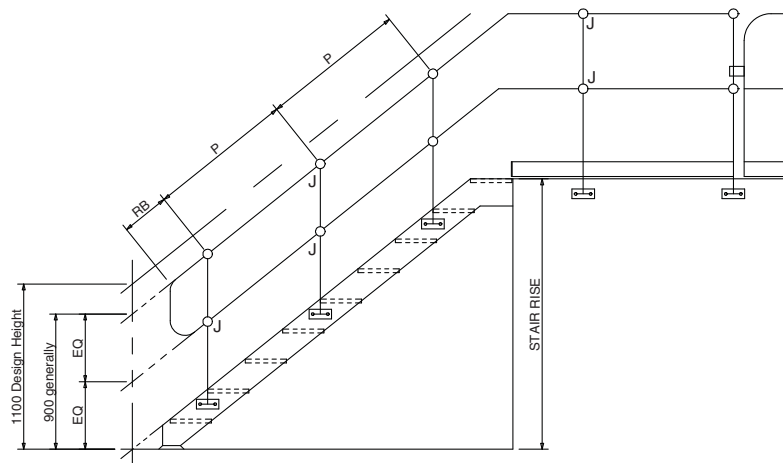
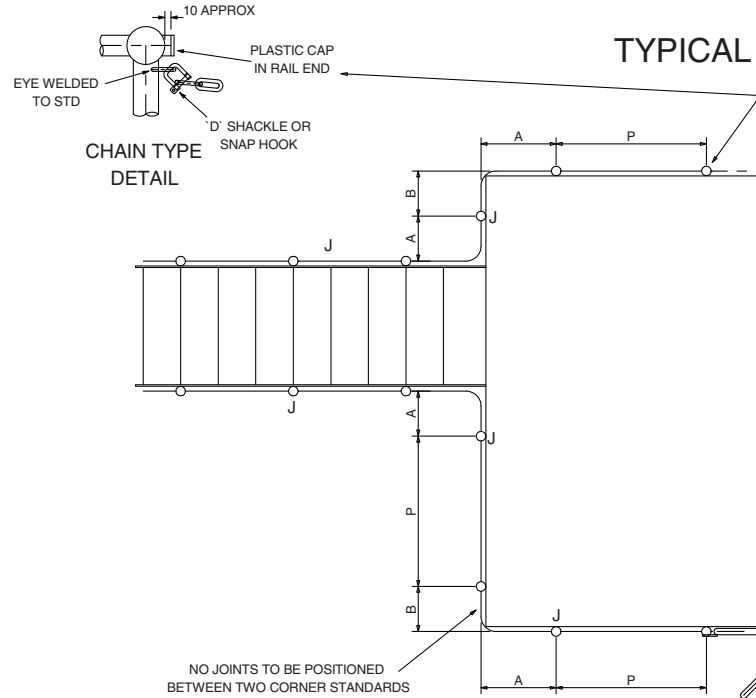
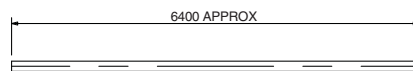


**WORK SHOP FABRICATED BENDS
USUALLY SUPPLIED PLAIN ENDS
(SOME AVAILABLE EX-STOCK)**

HANDRAIL TUBE SIZES AVAILABLE:-
25 N.B TUBE (33.7 O/D)
32 N.B TUBE (42.4 O/D)
40 N.B TUBE (48.3 O/D)

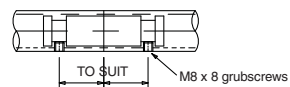


NOTE!
In some instances weld-elbows are used to achieve required sizes if machine bends are not possible.



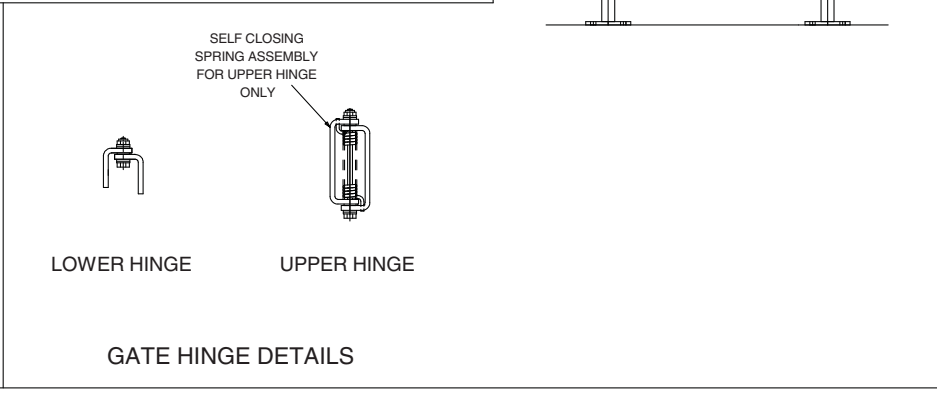
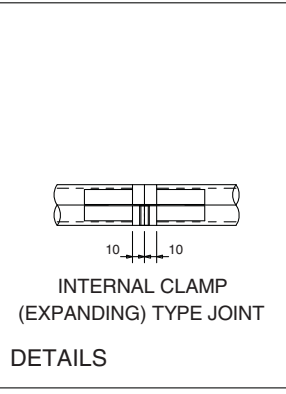
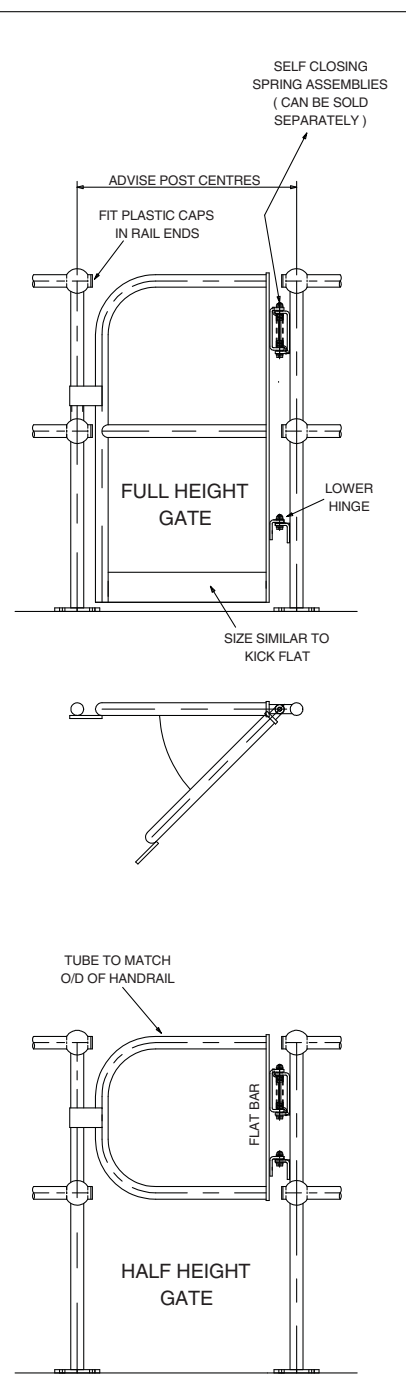
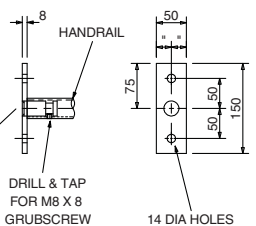
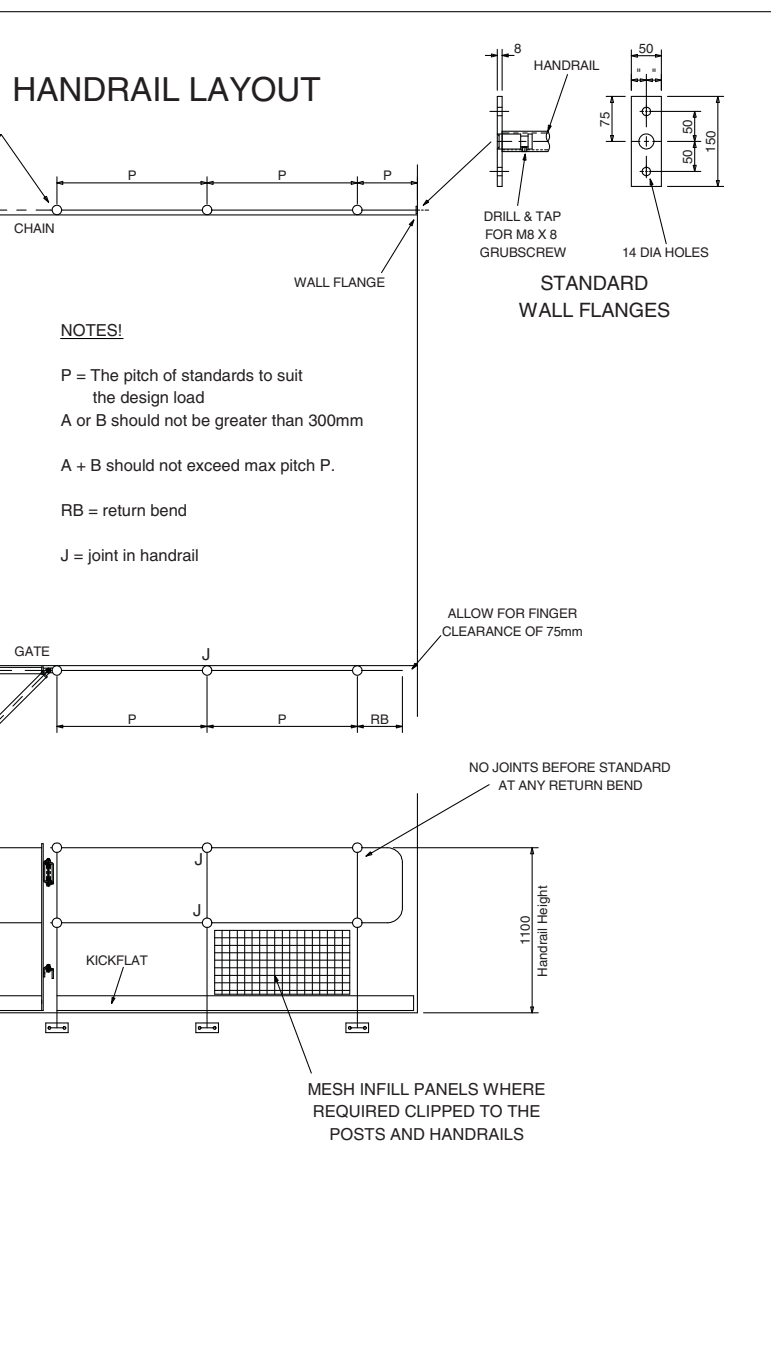
NOTE!

Joints to be positioned 150 max from centre of a standard or preferably on centre of standard. ie; within the ball. There should be no joints between two corner standards.



INTERNAL GRUB SCREW TYPE JOINT

JOINT





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AXESS LADDER SYSTEMS



AXESS Vertical Ladder System Self Assembly:

Guardrail's "AXESS" vertical permanent ladder system is of a safe, simple modular design offering individual parts which bolt together to form a complete ladder.

Parts are usually kept in stock for quick delivery or can be supplied as a complete ladder once the floor to floor dimension is given. This system tries to eliminate the need for expensive site surveys and the preparation of detail drawings which adds to delivery time.

Health & Safety:

The unique design and production of AXESS components are generally BS compatible for the health and safety conscious.

Flexible

AXESS is usually available "off the shelf" and is so flexible it will solve virtually any access problem.

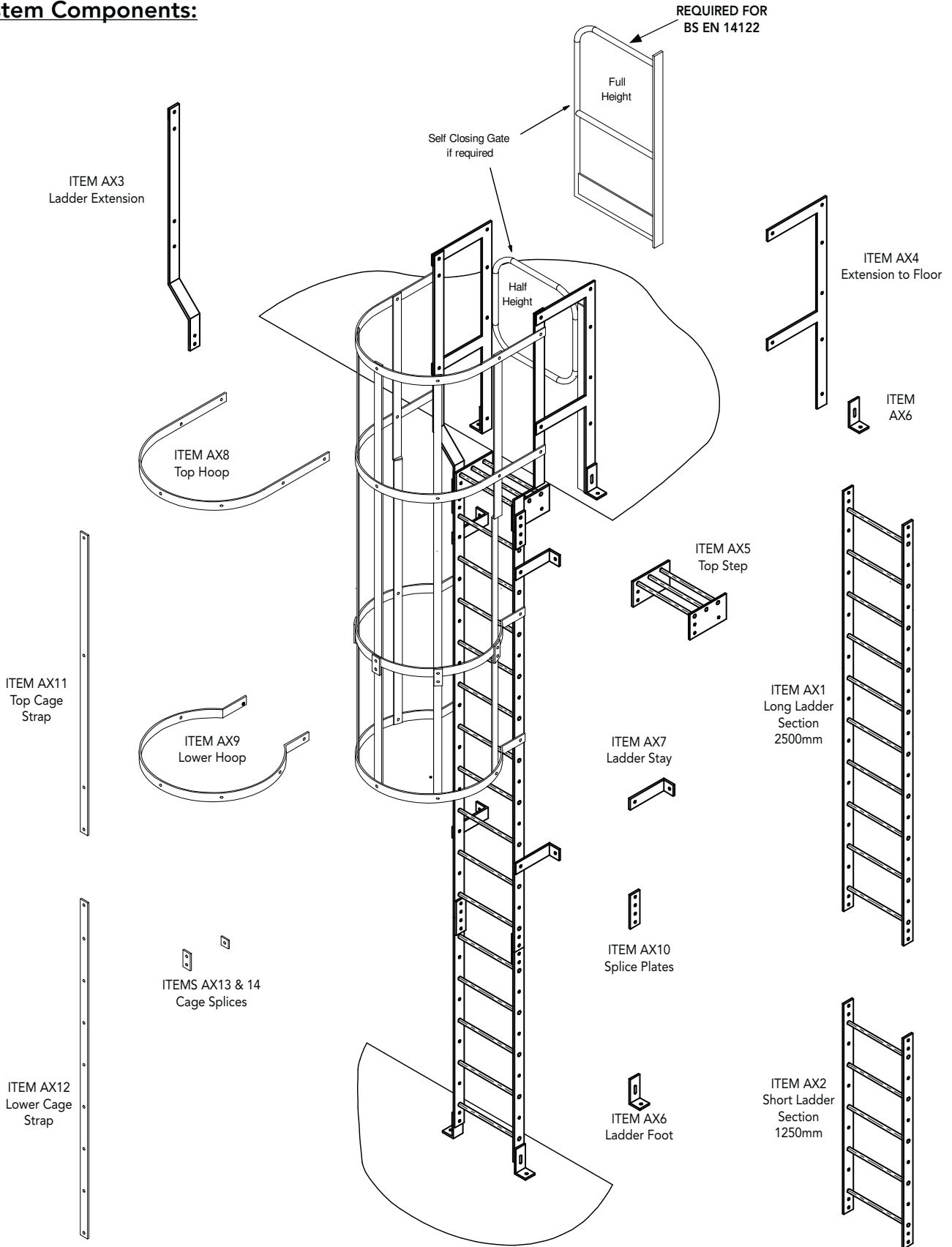
Easy to install

AXESS is straightforward to install.

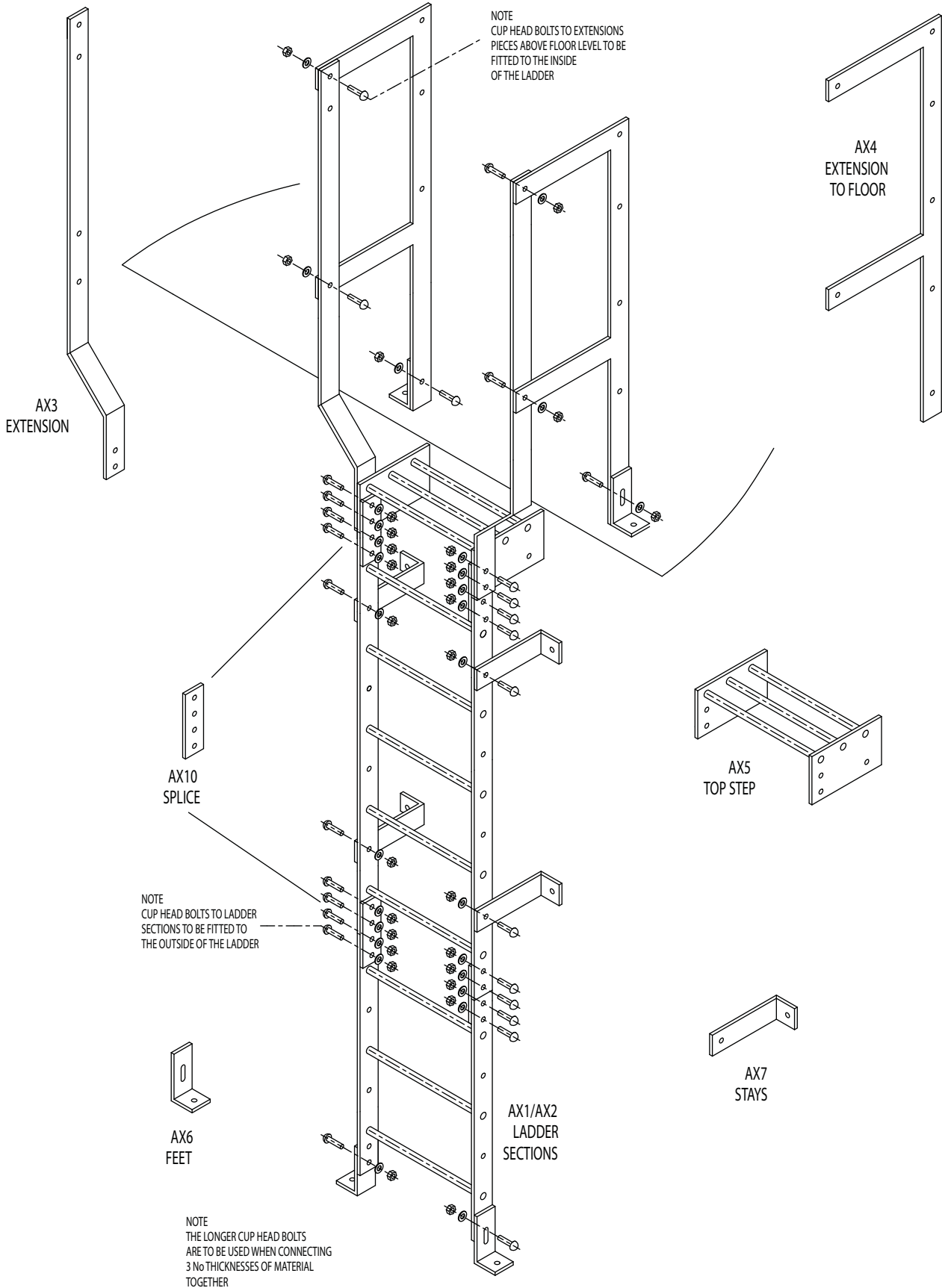
Supplied in "flat-pack" form for ease of transportation thus lending itself to export projects



System Components:

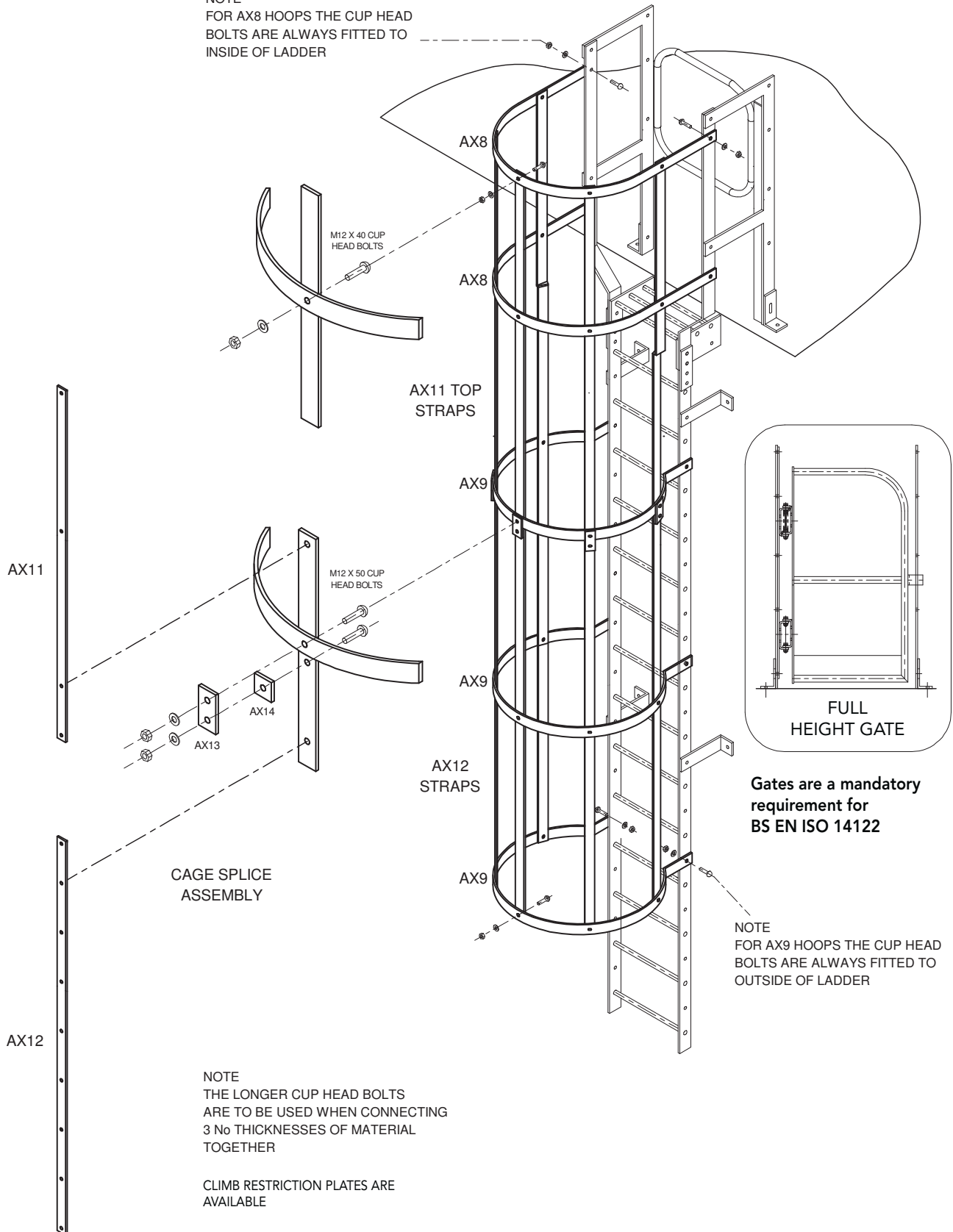


Ladder Assembly Detail:

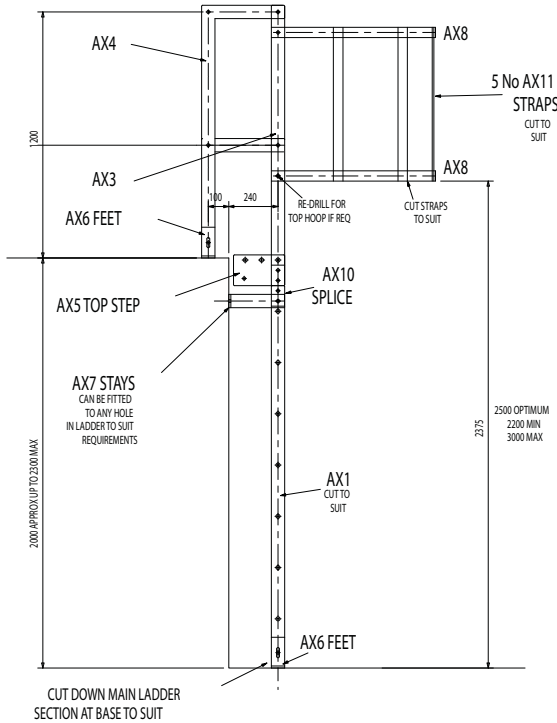


Cage Assembly Detail:

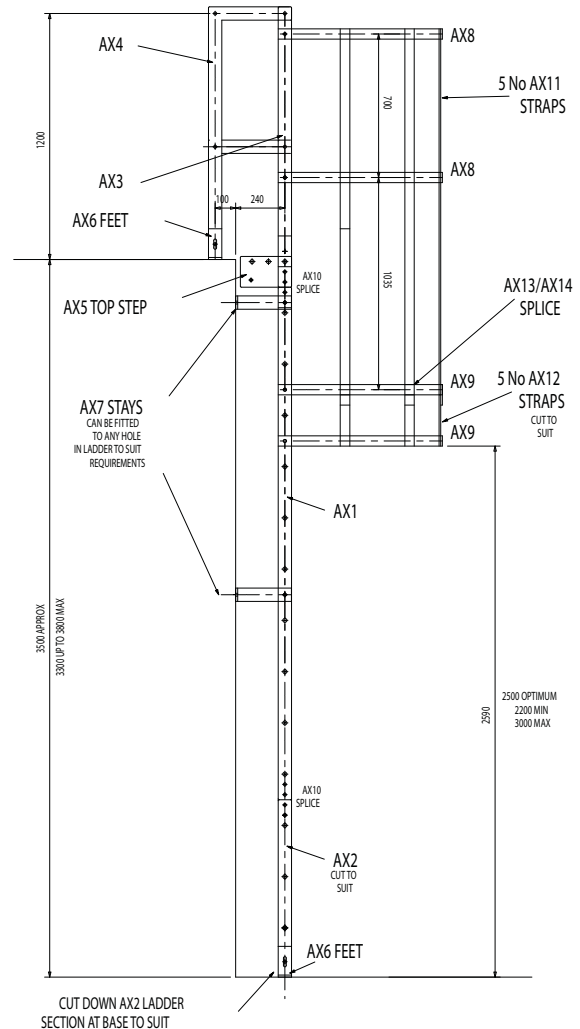
NOTE
FOR AX8 HOOPS THE CUP HEAD
BOLTS ARE ALWAYS FITTED TO
INSIDE OF LADDER



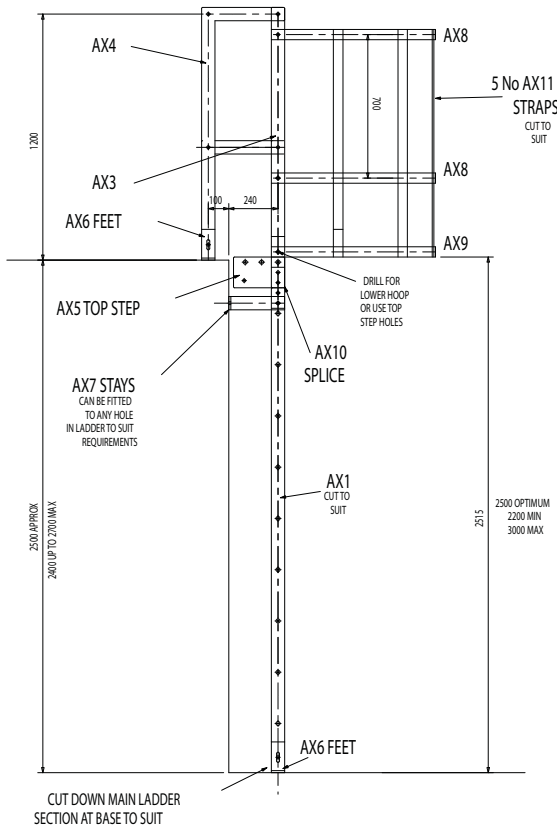
Typical examples - for approx 2000, 2500 or 3500 mm rises:



CUT DOWN MAIN LADDER SECTION AT BASE TO SUIT
TYPICAL EXAMPLE FOR APPROX 2000mm RISE
 (2000 TO 2300 mm)



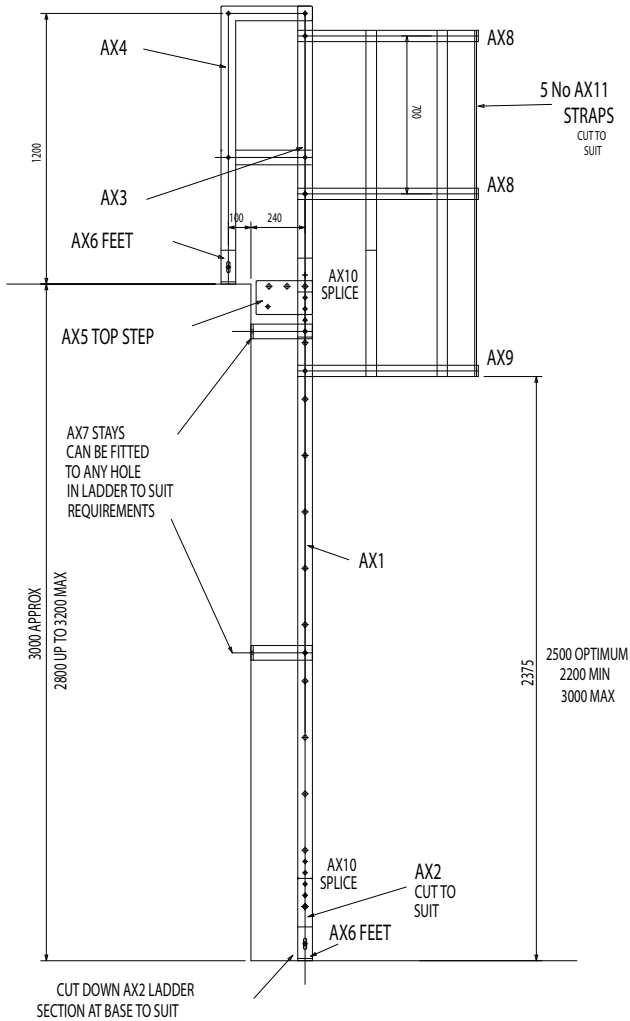
CUT DOWN AX2 LADDER SECTION AT BASE TO SUIT
TYPICAL EXAMPLE FOR APPROX 3500mm RISE
 (3300 TO 3800 mm)



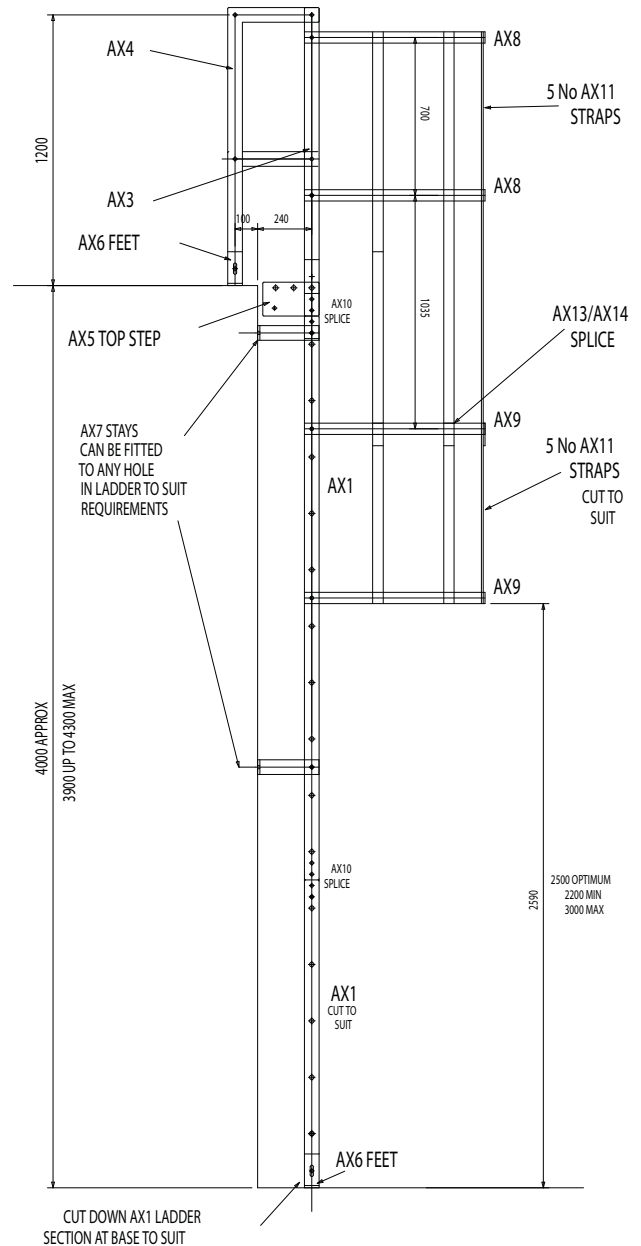
CUT DOWN MAIN LADDER SECTION AT BASE TO SUIT
TYPICAL EXAMPLE FOR APPROX 2500mm RISE
 (2400 TO 2700 mm)



Typical examples - for approx 3000 & 4000 mm rises:



TYPICAL EXAMPLE FOR APPROX 3000mm RISE
(2800 TO 3200 mm)



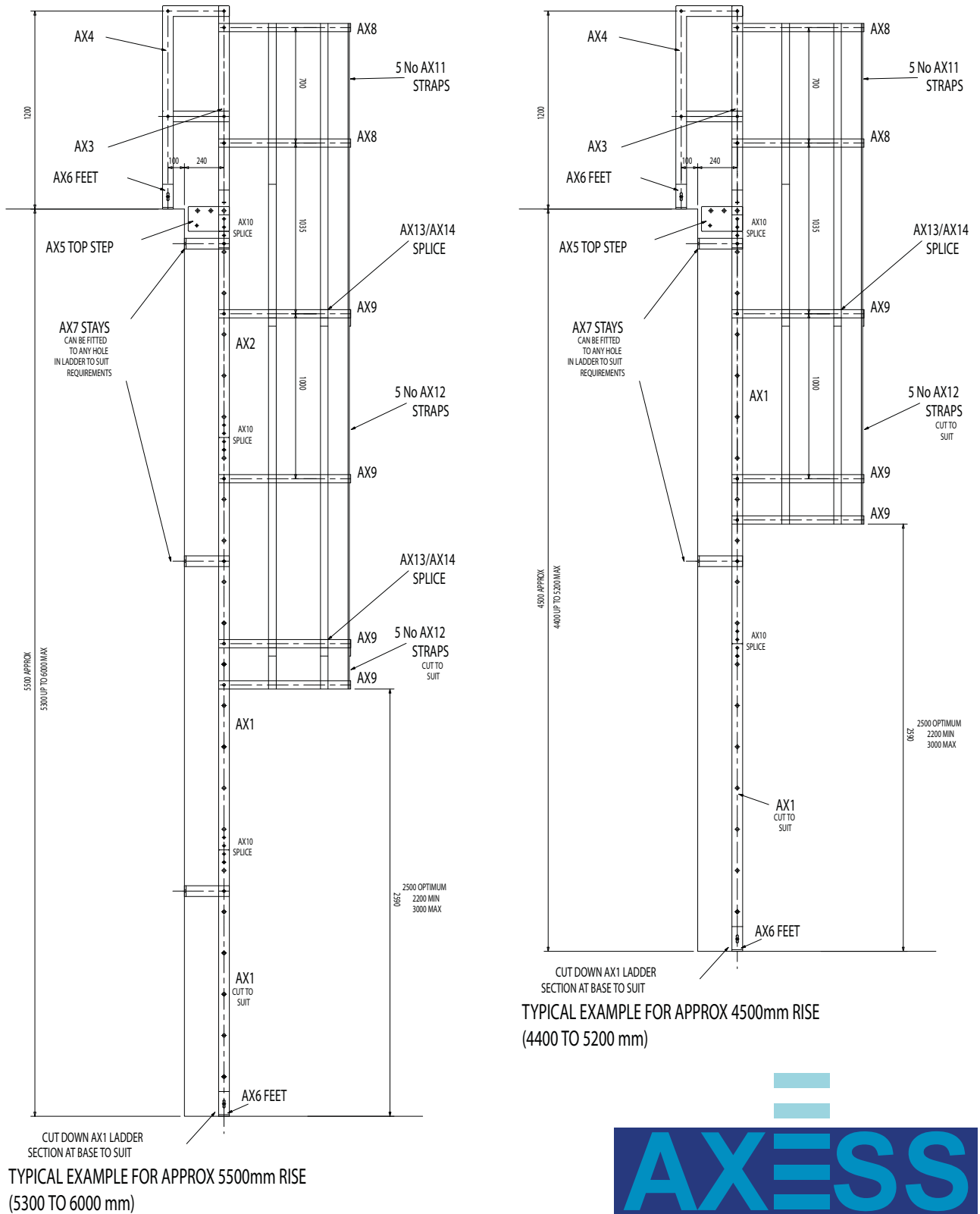
TYPICAL EXAMPLE FOR APPROX 4000mm RISE
(3900 TO 4300 mm)



Self Assembly Ladder System



Typical examples - for approx 4500 & 5500 mm rises:



For rises above 6000 mm rest platforms are recommended, please contact our Sales Department for details.





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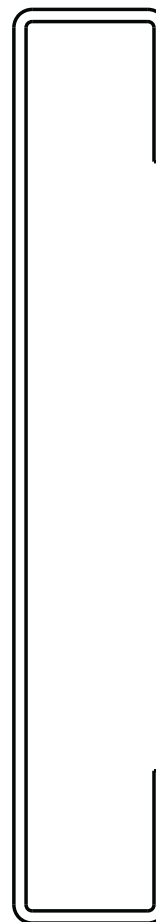


KICK FLAT SYSTEM



**KICK
FLAT 'C'
SECTION**
150mm high
giving high strength
to weight ratio

POST CONNECTIONS





END CAP

HINGE DETAIL

APPROX 57.0°

APPROX 57.0°

ROTATIONAL ANGLES ACHIEVABLE FOR CORNERS

CANTILEVER

Guardrail "C" Section Kick Flat System is usually available ex-stock in approximately 3000mm or 6000mm random lengths that can either be cut on site or shop fabricated to suit customer requirements.

These coupled with 'U' type post connections give a flexible and easy to fit product that can be part of a new installation or retro fitted to bring existing areas up to the requirements of the latest regulations.

The Standard recommended method of connection does not show any fixings on the pedestrian side of walkways and as such gives platforms a tidy, clean and linear "look". As this product lends itself to being easy to line / level / fix installation times are short.



Guardrail

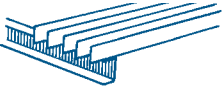
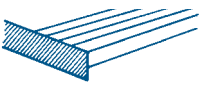
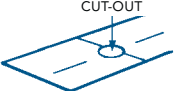
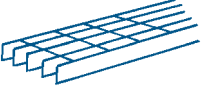


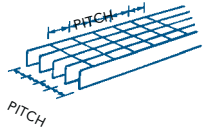
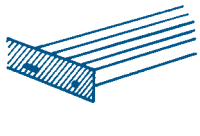

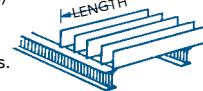
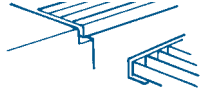
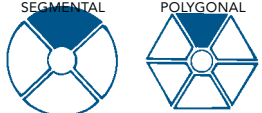
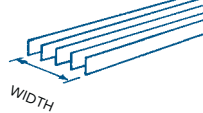
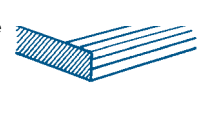
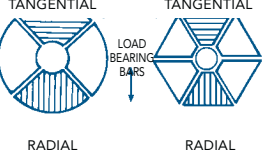
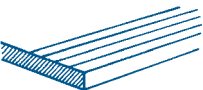
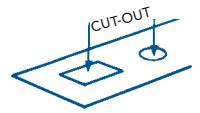
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OPEN FLOORING



RECTANGULAR PATTERN OPEN FLOORING

GLOSSARY of terms		Guardrail open steel flooring consists of flat bars on edge restrained by twisted square or indented round bars forge welded at right angles to give a grating mesh that offers high strength to weight ratio.	
		Panels can be finished: Self Colour, Galvanised or others on request.	
Load-Bearing Bar A load-bearing member spanning between supports. 	Deep Binding Bar A bar or section fixed to the edge of a flooring panel flush and projecting below the underside. 	Cut-out An area of flooring removed to permit pipes, columns, etc., to pass through or to clear obstructions. 	
Transverse Bar A member fixed at right angles to the load-bearing bars to provide lateral restraint. 	Front Edging Bar A member attached to the front of a stair tread or to a flooring panel. 	Straight Shaping The part of a cut-out which is straight. 	
Pitch The distance centre-to-centre of load-bearing bars or centres between points of lateral support to load-bearing bars. 	End Plate A plate fixed to a stair or ladder tread for attaching to the stringer. 	Curved Shaping The part of a cut-out which is curved. 	
Length (Direction of Span) The overall dimension of a flooring panel parallel with the load-bearing bars. 	Curb Angle A member fixed to concrete or supporting steelwork at the perimeter of a flooring area. 	Segmental or Polygonal Types of flooring panels used for platform construction. 	
Width The overall dimension of a flooring panel measured at right angles to the load-bearing bars. 	Kicking Plate (Toe Plate) A flat bar around the edge of a flooring panel and projecting above the top of the load-bearing bars. 	Tangential or Radial The direction of span in segmental or polygonal flooring panels. 	
Binding Bar A bar or section fixed to the edge of a flooring panel flush with the top of the load-bearing bar. 	Net Area The actual area of flooring excluding cut-out areas. Gross Area The total area of flooring including cut-out areas. 		

Flooring, Treads & Handrails for Industrial use

Aperture requirements BS 4592 "Flooring, Treads & Handrails for Industrial use".

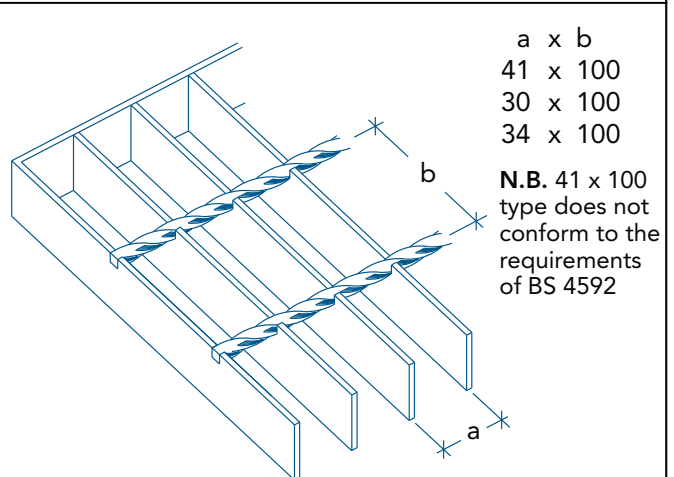
The opening should prevent the passage of a 35mm diameter sphere except where the grating is above a place where people are working as opposed to occasionally passing, then the openings should prevent a 20mm diameter sphere.

Aperture requirements BS EN ISO 14122 "Safety of machinery" - "Permanent means of access to machinery"

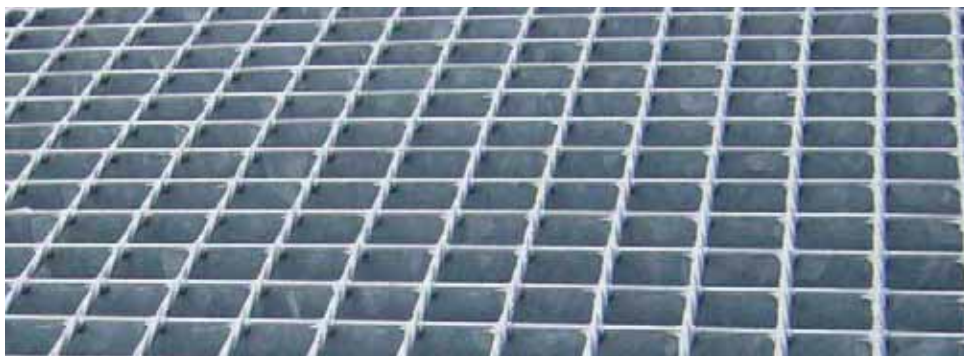
Openings should prevent a 35mm sphere for occasional passage underneath and a 20mm diameter sphere for spaces more regularly worked, please contact our sales department for specialist advice should any Guardrail product be required for this standard.

Please contact our Technical Department for information on Open Flooring load capabilities.

MESH TYPES



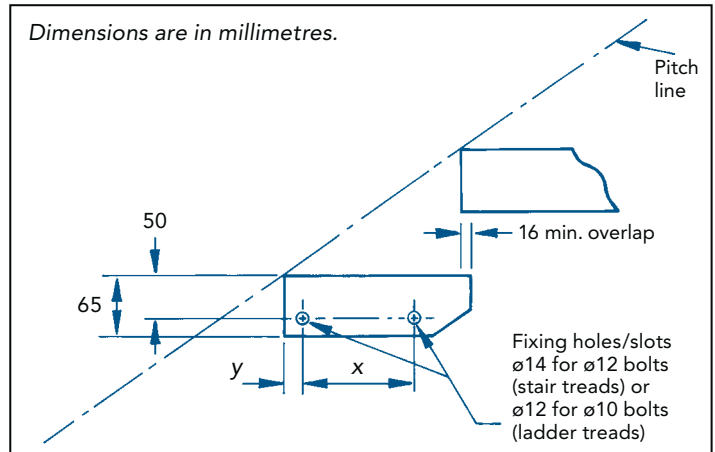
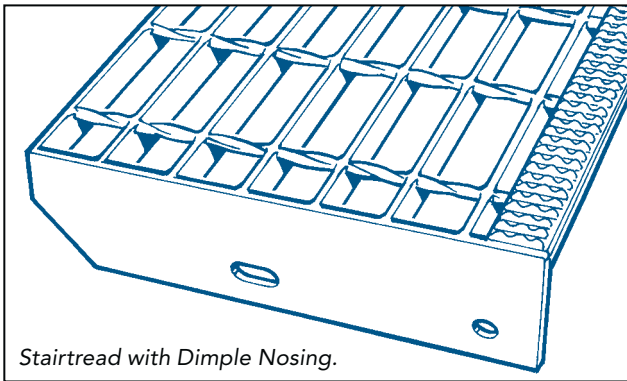
Other mesh types available on request.



STAIR TREADS

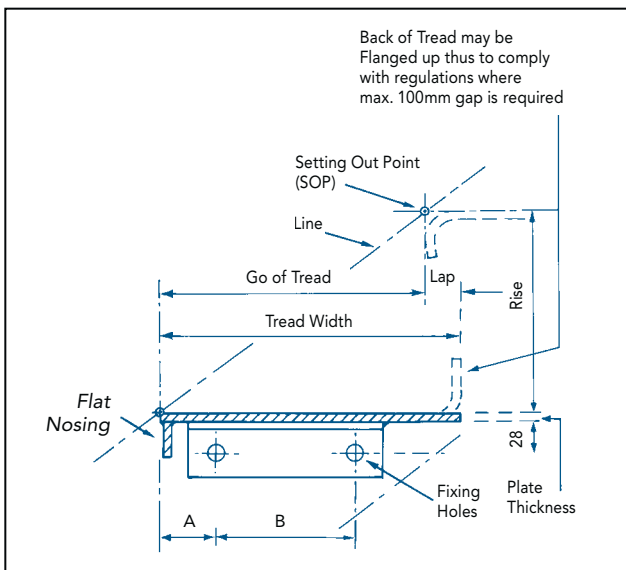
OPEN TYPE

Fixing dimensions for bolted end plates



Width of tread in mm	Dimension x in mm	Dimension y in mm
Up to 100	32	16
101 to 149	40	(ladder treads)
150 to 175	75	30
176 to 249	100	(stair treads)
250 to 290	125	
291 & over	175	

CHEQUERPLATE




Width of tread in mm	Hole centres in mm		Hole diameter in mm
	A	B	
100	30	45	12
150	40	75	14
200	50	100	14
250	50	100	14
300	50	125	14



Chequerplate stairtread with Flat Nosing.





Please contact our Sales Department for specialist advice should any 'Guardrail' product be required to conform to BS EN ISO 14122, BS 4592, BS 13374, BS 6180 and The Work at Height Regulations.

Guardrail



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