

CycSafe® Cycleway Safety Fence System

System description	The fence system consists of a round safety 'bump' rail set out from the fence toward the riding surface. The bump rail is supported by brackets that are secured to the posts. Either a full barrier or partial barrier infill panel is fitted between the post and is connected to the posts with brackets and self-drilling screws (teks).
System function	To act as a physical barrier and prevent cyclists from leaving a bike path at speed and coming in to contact with adjacent hazards resulting injury to the cyclist or other pedestrians. The system allows the cyclist to brush against the bump rail at speed without getting their pedals or handle bars caught in the barrier.
Typical applications	Along cycleway paths and shared use paths where there are changes in directions in the path, or where there are hazards adjacent to the path such as steep batters, trees, water bodies, and roads.
Bump rail height	1350mm (Minimum 1200 – Maximum 1400mm) above the cycleway riding surface.
Bump rail	The bump rail is a Ø48.3 x 1.6mm round steel hollow tube x 2540mm long that is swaged (reduced in diameter) at one end, such that the swaged end can insert side an adjacent piece of bump rail. This design gives a smooth continuous finish to the bump rail. The bump rail is mild steel material that is hot dipped galvanised after fabrication.
Standard bump rail bracket (Reg.Des)	5mm gauge mild steel material, hot dipped galvanised after fabrication. The bracket has four fixing points to the post and two to the bump rail using a U-clip (see next item). This bracket supports the bump rail 150mm (nom.) off the post toward the riding surface.
U-clip (Reg.Des)	5mm gauge mild steel material, hot dipped galvanised after fabrication. The clip passes through a penetration in the end of the standard bracket and fixes to the underside of the bump rail with 2 x Ø5mm stainless steel rivets, thereby connecting the standard bracket to the bump rail.
Change of direction 'ball' bracket (Reg.Des)	5mm gauge mild steel material, hot dipped galvanised after fabrication. The bracket has four fixing points to the post and two to the bump rail (see next item). It acts like a universal joint and supports the bump rail at points of changes in direction and gradient in the bump rail.
Dome base (Reg.Des)	3mm gauge mild steel material, hot dipped galvanised after fabrication. The unit has two fixing points to the 'ball' bracket and two to the bump rail. This unit fits inside the bump rail and connects the 'ball bracket' to the bump rail.
End loop	Ø48.3 x 1.6mm round hollow tube in mild steel material, hot dipped galvanised after fabrication. The end loop creates a return from the bump rail to the final post in a run of fencing. It is designed to reduce harm to a cyclist if they collide with the start of the safety barrier.
In-fill options	Full barrier; or Partial barrier.
Partial barrier	40x40x1.6mm x 2400mm long SHS steel mid rail secured to the posts with brackets and fasteners. One rail per bay at 500mm (nom.) above ground level. The partial barrier is to suit locations where the likelihood of a cyclist leaving the path is low and/ or the hazard adjacent to path is low.
Full barrier height	1200mm panel (standard). The full barrier is to suit locations where the likelihood of a cyclist leaving the path is moderate-high and/ or the hazard adjacent to path is higher.
Post spacing	2480mm post centres or 2415mm gap between posts (standard)*. <i>*This assumes a 65x65mm post.</i>
Gap under fence	50-100mm on level ground. Recommended maximum of 150mm on sloped ground.
Panel configuration	The horizontal rails have a hole punched in one or both sides of the tube to suit the profile of the vertical picket. The picket is then inserted through/ into the rail and welded in place in the top and bottom rail.

Upright (picket)	25x25x1.2mm Square Hollow Section (SHS) steel.
Picket spacing	25mm square: 137mm centre-to-centre of each vertical picket**. <i>**A picket spacing of 87mm is recommended for applications where it is desirable for the fence to be child-safe and/ or a more severe hazard is being protected by the barrier.</i>
Picket top profile	Flat Top* (i.e. the top face of the panel is smooth and continuous the picket does not extend above the top rail). <i>*The Flat Top style is recommended for cycleway applications to minimise the potential hazard to cyclists if they collide with the fence.</i>
Rails of the infill panel	40x40x1.6mm SHS steel.
Panel brackets (Reg.Des)	Bluedog SmartaBracket®: 3mm gauge mild steel material, 1-piece heavy duty, security bracket (four brackets per panel). The bracket fits over the end of the 40x40mm rail of the panel and mounts on the non-attack side of a 65x65mm fence post. There are two fixing points to the post and one to the rail of the panel. This bracket centres the panel on the post along the fence alignment. The bracket is hot dip galvanised after fabrication.
Change of direction panel/ mid-rail brackets (Reg.Des)	Bluedog SmartaBracket®: 3mm gauge mild steel material, 1-piece heavy duty, security bracket. The bracket fits over the end of the 40x40mm rail of the panel and mounts in-line with the panel on the post. There are two fixing points through the bracket to the post and two through the bracket to the rail of the panel. The bracket neatly accommodates changes of direction in the fence without the need to cut or bend the bracket. The bracket is hot dip galvanised after fabrication.
Fasteners	12g x 25mm long tamper proof self drilling Tek screw in a Class 3 (minimum) corrosion finish (three screws per bracket). Requires a special setting tool that fits to a drill to install and remove the screw.
Post for in-ground footings	65x65x1.6mm SHS (1800mm long for 1200mm high system); or <i>Recommended alternative for heavier duty applications: 65x65x2.5mm post (1800mm long).</i>
In ground post footings	Fence posts Ø200mm x 6000mm deep using 20mpa concrete for 1200mm high fencing*.
Post with base flanges for hard surfaces	130x130x5mm square steel flange* with 4xØ13 holes (one at each corner) to suit M10 or M12 anchors. The flange has a cut out in the centre to accommodate a 65x65 post. The post inserts into the flange and is then welded in place. The base flanges are hot dip galvanised after fabrication (before welding to the post). <i>*adequacy subject to the fixing surface, fence height and potential loadings.</i>
Post cap	Bluedog pre-galvanised steel square cap (powder coated). The pressed steel cap is fitted on site (tap on with rubber mallet) and fits tightly over the top of the post and is not easily removed once installed.
Tubular pre-galvanised material	Orrcon Mild Steel Electric Resistance Welded (ERW) precision tubing with 135 grams/square metre zinc coating mass (minimum) for increased corrosion resistance.
Weld type	All welds are Silicon bronze*. <i>*This weld has superior corrosion resistance and powder coating film adhesion compared to a standard (lower cost) mild steel weld.</i>

Metal pretreatment process	All product undergoes a 7 stage chemical pretreatment process to clean, etch and prepare the metal surface for powder application. This process includes first submerging the product in two consecutive heated alkali degreasing baths, then a series of rinse baths and then a nanoceramic conversion coating bath that places a fine crystalline structure on the surface of the steel for the powder to 'key' into and prevent oxidation on the surface before powder coating. This facilitates improved powder film adhesion.
Powder coat process	All product is powder coated using an automated conveyorised powder coating line. Powder is applied to the metal surface using air pressure and an electrostatic charge. The product then passes through a heated curing oven. This causes the powder to gel (interlink) and then harden to a tough durable surface. The thickness and curing times are closely monitored as these variables influence the mechanical characteristics of the finished coating.
Powder coat for standard outdoor applications	For standard outdoor application D1000 Excel™ polyester powder is used as standard. All powders used are supplied by Interpon and formulated by Akzo Nobel. Interpon D1000 exhibits a tougher cured film which provides superior damage resistance to packaging materials. It is designed to give excellent long term exterior durability and colour retention and is available in a limited range of colours and in gloss, satin and matt finishes. Film thickness: ~80µm minimum.
Powder coat for higher corrosion environments	For applications that will be subject to higher corrosion, a zinc-rich epoxy primer can be applied under the top coat of polyester to give much greater corrosion resistance. The epoxy primer provides a non-porous barrier between the corrosive elements (salt, pollutants etc.) and the metal surface. Alternatively, the product can be hot dip galvanised after fabrication. This involves immersing the product in a bath of molten zinc. This applies a heavy coating of continuous protective zinc over all surfaces (internal and external).
Applicable Australian Standards & Guidelines	Austroads document AGRD06A 09 Guide to Road Design" Part 6A-Pedestrian and Cyclist Paths (2021). AS 1450 – Steel tubes for mechanical purposes - Product Designation AS 1450/C250/ERW. AS 1397 – Steel sheet and strip – Hot-dip zinc-coated or alu/zinc coated - Product Designation AS 1397/G2. AS 1163 – Structural steel hollow sections – Product Designation AS 1163 C350LO. AS/NZS 4680:2006 – Hot dip galvanized (zinc) coatings on fabricated ferrous articles. AS 4506.2005 Metal finishing - Thermoset powder coatings.
Bluedog reference material	Drawing set. Installation guide. Proforma product specification. Review of applicable standards and guidelines.