Security Bollards

Leda is Australia's largest manufacturer of security bollards widely used to provide physical protection to most of the country's landmarks, government buildings and utilities, defence sites, critical infrastructure and many sites that cannot be identified for security reasons.

This has not always been the case as Leda's origins are based in perimeter security protection against ram raids and preventing motor vehicles from illegally entering or leaving an area or building. Over 250,000 of the highly recognisable ***Securapost*** security bollards having been installed across Australia.

This knowledge and experience has been applied to developing a range of high security bollards where security levels have been increased to accommodate and prevent possible terrorist attacks.

Security Bollard Solutions

- Car space protection
- Access control
- Perimeter security
- Ram raid protection
- Terrorist proofing of buildings

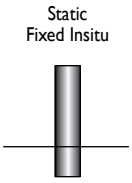
Leda has prepared impact ratings for all standard security bollards – higher security is achieved by a combination of varying bollard diameters, wall thickness and embedments.

> *Refer to the table on p73 for an overview of the relative strengths of Leda security bollards.*

As stressed in other sections of this Handbook, it is most important to select the appropriate bollard for a project, particularly in security applications.

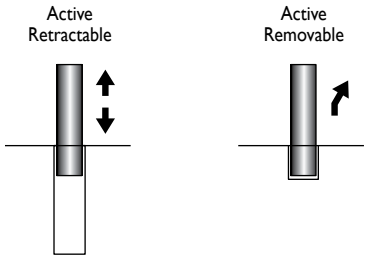
The information on the following pages will help in identifying the impact resistance required, and the correct selection of the bollard solution.

Bollards used in security applications are typically deployed as either Static Bollards or Active Bollards.



Static or Fixed Bollards

Static Bollards forming part of a passive security barrier are used mainly to enforce a stand-off measure while complementing and enhancing an urban landscape. They may also be used to define a secure perimeter zone.



Active Bollards

Active Bollards, sometimes called 'Automatic Bollards' (while not always the case), are automated or manual retractables or removable bollards. Active Bollards are mainly deployed at vehicle access control points, or emergency access points.

Ative Bollards may be operated as follows:

a) Automatic. Featuring a drive mechanism (pneumatic or hydraulic) which allows the bollard to rise or lower through instructions relayed through a Programmable Logic Controller (PLC).

b) Manual. This typically involves an operator lifting or lowering a retractable bollard by hand or using an electric power drill to wind the bollard up or down. A subset of this version includes a gas-assisted type bollard which greatly reduces the effort required by the operator to raise or lower the bollard.

c) Removable. An embedded bollard secured in position by a mechanical lock, and removed by hand.or for heavier bollards, by lifting trolley.

Bollard Configurations

Single line of bollards

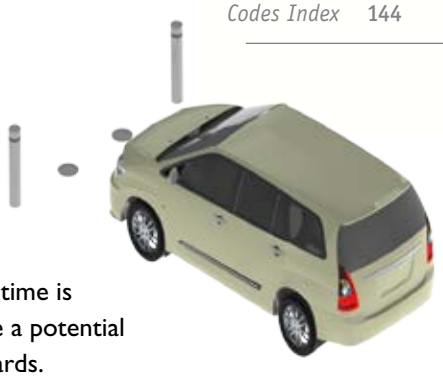
Represents the most common method of deploying bollards, which in turn act as an enforceable stand-off line. This is typically the most cost effective configuration to deploy.

Vehicle Sally Port or Interlocking Bollards

Used to create a containment arrangement with inner and outer active barriers into which vehicles must drive through. PLCs are used to prevent both sets of bollards remaining open simultaneously. This solution offers a much higher degree of security but reduces vehicular flow.

Final Denial Bollards

This bollard configuration (with or without an access control barrier) is usually left in the open position so as not to hamper the flow of traffic. Used in locations where available room and standoff are not an issue but where traffic flow and ease of movement is. It relies on the proviso that adequate time is available for a guard force to engage a potential hostile vehicle and to raise the bollards.



Modern day threats have seen rapid development of vehicle barrier systems capable of resisting impacts from vehicles of different sizes, speeds and attack methodologies, resulting in a further split of bollards into the following categories and security levels.

1. Access Control Bollards

Typically used to allow consensual access into a secure area but are not designed to sustain impact from a vehicle driven with hostile or criminal intent.

2. Anti-ram Bollards

Typically used on sites where there is a need to control consensual vehicles but to also deter and prevent unauthorised access. These bollards tend to be physically robust in appearance but may be an engineered solution option and not necessarily have been formally tested against vehicle impact. They are used widely across most commercial applications such as shopping centres, retail outlets and car yards.

3. Counter-terrorist Bollards

Bollards which are typically designed for the stopping and retention of hostile vehicles to mitigate threats from vehicle-borne improvised explosive devices (VBIED). Such bollards are mainly used to secure high security sites – sensitive government installations, airports, embassies and the like – and are typically subject to vehicle crash tests in compliance with independent government-administered standards such as PAS68 (UK)* or ASTM (USA). *Refer p66.*

Alternatively, there is the option of engineering solutions to meet the anticipated threat. Both have control protocols embedded as part of any project delivery initiative to ensure they are installed in compliance with the test parameters.

The following information is intended as a guide to establishing the impact rating of the bollard solution by determining the likely weight and speed of a vehicle threat.

a) Definition of a threat vehicle and method of attack

It would be prudent during a threat assessment to determine a potential type of vehicle likely to attack the site. Typical benchmarks such as access into the site, speed and orientation will usually have significant bearing towards building a threat profile. For example, a shopping centre with ATMs located on a floor with direct vehicle access can potentially expect a smaller vehicle capable of ramming an ATM at speeds unlikely to injure or kill its driver, while obstacles such as restricted overhead clearance, planters and courtesy benches will typically form obstructions against larger vehicles.

Once a potential attack vehicle profile is established, an assessment may be made on the vehicle's estimated weight to determine the bollard required.

b) Vehicle dynamics assessment to establish vehicle mass and impact speed.

Speed and vehicle mass form a critical area when assessing the type of bollard and its corresponding footing to deploy. The transfer of force in the form of kinetic energy (KE) when a vehicle engages with a bollard is a key determinant dictating the type, size, wall thickness and footing design of any proposed bollard. A simplified but somewhat imperfect description of KE, measured by kilojoules (kJ) in the following table provides a rough view of energy loads which need to be considered.

Impact Speed (km/h)	Vehicle Mass (kg)				
	1500	2500	3500	7500	30000
	Impact Energy (kJ)				
16	15	25	35	74	296
32	59	99	138	295	1185
48	133	222	311	667	2667
64	237	395	553	1185	4741
80	370	617	864	1852	7407

Kinetic energy can be determined with the following:

$KE = 0.5\ mv^2$

Where: KE = kinetic energy
m = mass in kilograms
v = velocity in metres per second

Example: A 2500kg vehicle travelling at 40km/h will have a kinetic energy of 154kJ.

$KE = 0.5 \times 2500 \times (40{,}000 \div (60 \times 60))^2$
$= 0.5 \times 2500 \times 123.432$
$= 154{,}290J$ or 154kJ

c) Identification of an enforceable perimeter to determine bollard location.

Locating bollards in a suitable and appropriate manner is a necessary condition in getting maximum benefit from your proposed installation.

Suitably-located bollards can enhance a streetscape, allow pedestrian access and establish a clear demarcation line. Inappropriately located bollards may impede both vehicular and/or pedestrian flow.

Impact Testing

Leda has been actively involved in designing and testing its physical security products for more than fifteen years. Testing programs have been conducted both in Australia and in the United Kingdom providing invaluable data for Leda's engineers and project managers. During this time, Leda has developed the largest range of engineered and vehicle impact tested high security bollards available in Australia.

Leda is able to offer two levels of certified security ratings for high security bollards where vehicle weight and speed are part of the equipment specification.

There are two widely recognised standards:

1) BSI. PAS68 & PAS69 – from the UK.

PAS68 TESTED

PAS68 2010 evolved to address the needs of governments, security consultants and organisations in the UK who wished to have the assurance that vehicle security barriers or bollards will provide the level of security sought.

Published by BSI (UK), the standard was developed to set out the test criteria for hostile vehicle mitigation products and caters for the wide range of products and systems that are considered for use as vehicle security barriers.

It is a rating system designed to accommodate many different products by recording through testing:

- Vehicle size and weight
- Vehicle speed
- Penetration
- Debris dispersal
- Performance of the installation and post impact condition.

PAS69: 2006 provides guidance for installing the barriers or bollards.

2) ASTM – from the USA (K4-12 DOS standard).

Trucks designed and manufactured in the US and tested under the ASTM standard are not readily available in Australia and the behaviour of the vehicle during impact testing is significantly different to vehicles manufactured in Europe and ASIA.

So while there is no problem with USA vehicles the predominant test standard used in Australia is the PAS68 from the UK. Both standards are still evolving and we believe in time may converge, but for now the PAS68 standard is preferred by Australian security consultants and government departments.

Securapost Bollards tested to PAS 68 Standard

In what is believed to be a world first in the application of barrier materials technology in bollards, Leda Security has successfully impact-tested their 150NB fixed bollards at the Transport Research Laboratory (TRL) in the United Kingdom.

Testing was carried out by TRL in compliance with Publicly Available Specification 68 (BSI PAS 68). One key objective was for the creation of a new generation of physically smaller bollards capable of providing enhanced impact protection against terrorist-instigated hostile vehicle attacks.

The tests each involved a single-sized 150NB stainless steel fixed bollard filled with a Leda-designed barrier mix to strengthen it under impact and to enhance its cutting resistance.

> Refer this section for further information on Barrier-infill bollards p87.

With the bollards mounted in a shallow rigid foundation, two successful tests were conducted at 48km/h using firstly a 2500kg 4x4 SUV vehicle and then a 3500kg van. A third test with a shallow embedment bollard proved ineffective in restraining the impacting vehicle, highlighting the critical importance of footing design.

The final successful test was with a 7500kg truck travelling at 32km/h.

Leda gratefully acknowledges the support provided by the government of the United Kingdom in the course of this testing.

Above, 2500kg, 3500kg and 7500kg vehicle crash tests. Leda is the only Australian bollard manufacturer to have undertaken government-endorsed impact testing using different vehicle weights at various speeds.

Engineered Solutions

There are potentially two options:

- Alterations to a PAS68 product due to site or requirements, or
- Designing site specific bollard systems (to meet vehicle impact weight, speed and specifications). These bollards are engineered and not impact tested.

In a perfect world, we should impact test every security bollard design and then install it identically on site. More often than not however, site considerations dictate changes that can be due to variations such as soil conditions, road camber, underground services, width or height changes, aesthetic requirements or cost considerations.

The PAS68 standard itself allows for engineered solutions under certain circumstances and in these instances, Leda uses UK-based Civil Engineering firms actively engaged in the CPNI Hostile Vehicle Mitigation (HVM) program and who have specific experience in designing foundation footings for high security bollards and the installation of PAS68 products. This knowledge and experience is critical and needs to be emphasised.

Cost Considerations

"We like PAS68 equipment but are not sure if our Budget is sufficient to cover the cost."

Leda appreciates and understands the problem and has staff with extensive experience in meeting budget restraints – a fact of life, even on government projects.

While most clients considering impact rated equipment would love to magically click their fingers and use PAS68 tested equipment, there are cost considerations that cannot be ignored. Each impact test costs between $50,000 and $100,000 and these costs need to be recouped in the product price. This makes the tested product more expensive than non-tested engineered solutions. It does however provide the certainty that the product (if installed correctly) will meet certain impact specifications.

Each year, innovations in engineering and materials technology are providing stronger, lighter weight materials, together with more cost-effective installation methods.

Quite often if it's a new site or threat, then a security budget / capital expenditure may not have been initially planned for. Engineered solutions are quite common and unlike PAS68 tested equipment, poorly installed products and installations are commonly found. This is often a 'grey area' with security that can attract unscrupulous operators taking advantage of loose specifications and using inexperienced engineers that, while well-intentioned, may not have the required expertise in this specification area.

Selecting a Security Bollard Supplier

Leda recommends the following be considered in your decision making process for engineered solutions.

The bollard supplier must be able to demonstrate greater than two years' experience in PAS68 certified bollards and their installation. They should provide references of successfully completed projects of both tested and engineered sites in your city:

- The engineering firms engaged by the equipment supplier to design the footings must have greater than two years' experience in PAS68 and engineered solutions so as to demonstrate an understanding of dynamic loads required in this field.
- If using security consultants then CPNI training in the UK or Australia for vehicle borne threats is highly recommended.
- Impact rating – vehicle weight and speed, must be clearly defined by the client.
- If you are cautious and diligent in considering various product proposals then engineered solutions done properly can be a common and cost-effective option.

Summary

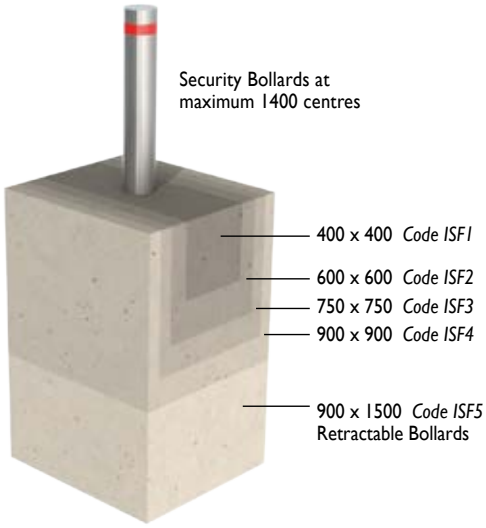
As explained, PAS68 certified bollards and engineered solutions are more expensive than possible similar 'off the shelf' bollards. There is simply no point in specifying and installing PAS68 or engineered bollards unless you can be sure that the costs are justified, otherwise money can be saved by installing a standard Leda bollard.

Reinforced Concrete Footings

In security applications, it is essential that footings are designed to meet the impact resistance and performance required by the bollards – and to meet the proposed threat.

Leda's engineering division has vast experience in the design and installation of footings for perimeter security systems and can assist through all phases of planning and design.

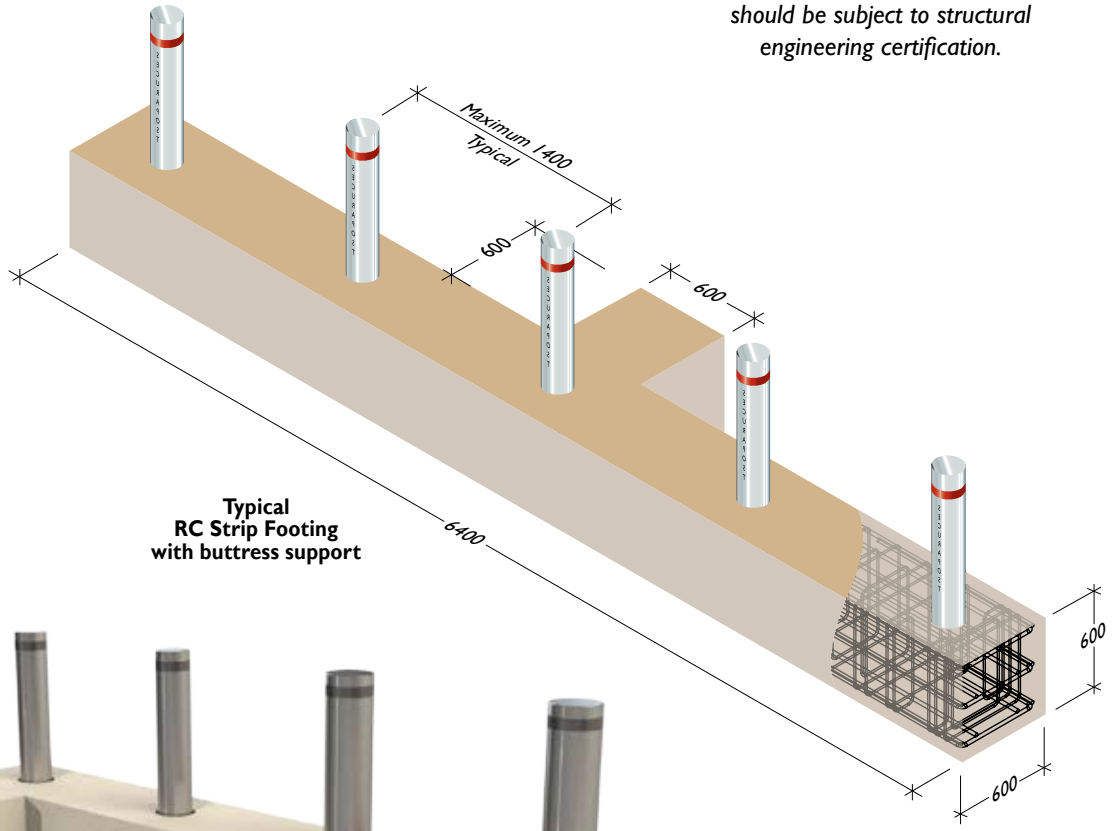
If the bollards deployed are used in security applications, they must be installed into a reinforced beam (strip footing) that distributes the impact load. A well-designed tortionally-reinforced continuous concrete beam footing has demonstrated that actual rotation and displacement of foundations are minimal.



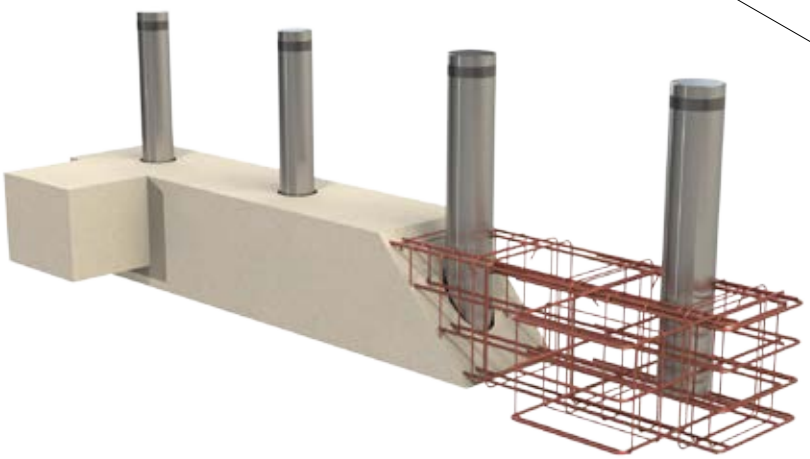
Indicative strip footing sizes

To simplify designs, dimensions will normally fall within the sizes illustrated.

Note: All footing designs should be subject to structural engineering certification.



Typical RC Strip Footing with buttress support



Shallow Mount Bollard Footings

The growing demand to install physical security on existing sites often means encountering sub-pavement services which may need to be relocated to accommodate conventional concrete footings. In many instances it may be impossible to obtain the required depth of footing or be able to excavate around existing services.

In designing a solution, Leda engineers have developed a cost effective alternative to conventional reinforced concrete strip footings.

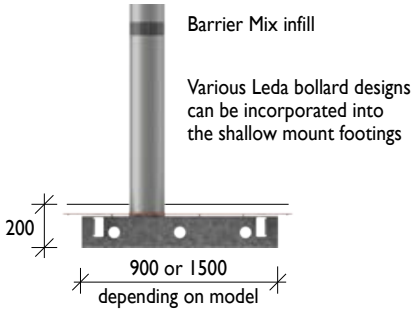
Leda's shallow mount technology allows the installation of impact rated security bollards in footings just 200mm deep.

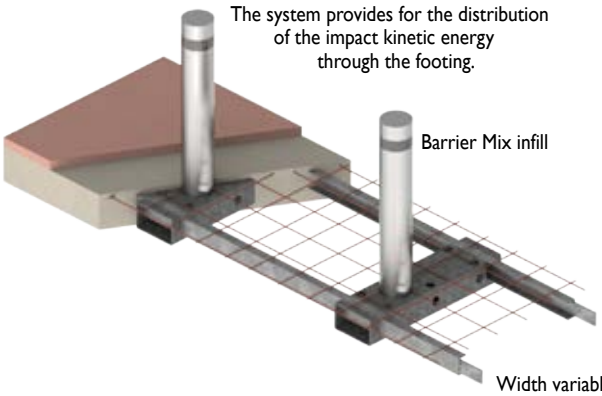
The Leda shallow mount footing design can cater for a wide variety of applications and bollard types. Currently, there are two certified systems with the following impact ratings:

SMF1425 2500kg vehicles @ 40km/h

SMF1435 3500kg vehicles @ 40km/h

Typical Section

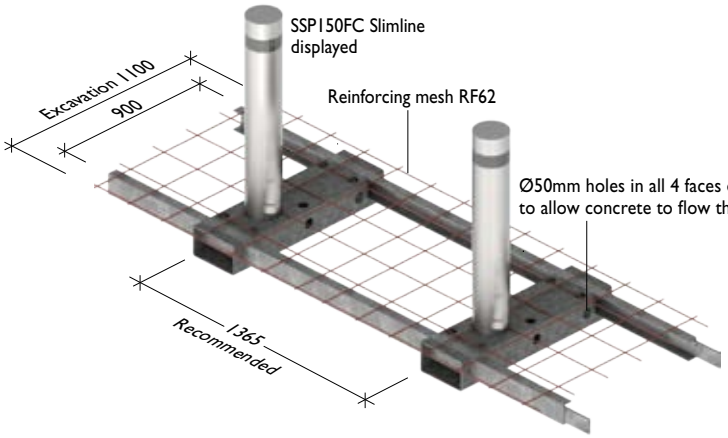


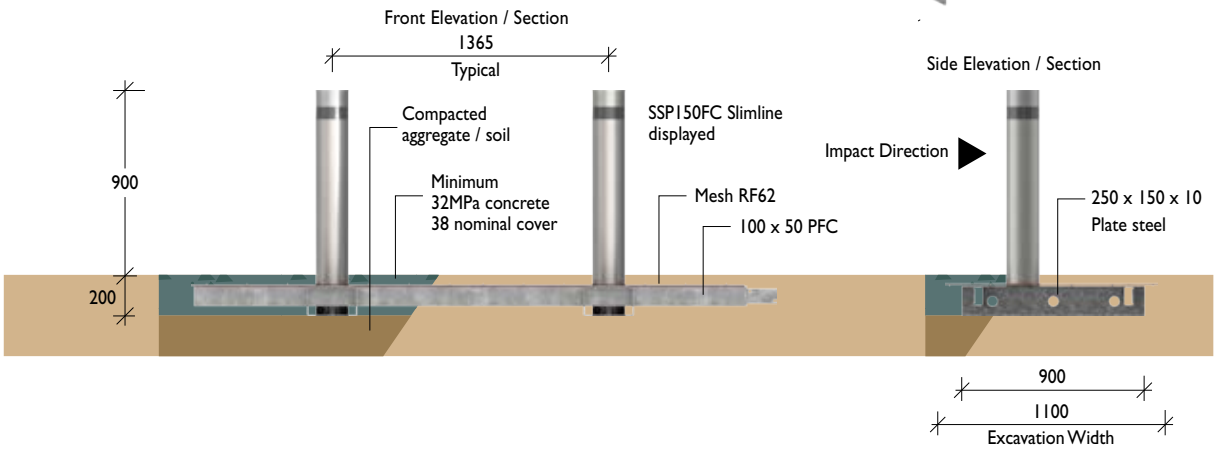


Shallow Mount
SMF1425

Bollard Options
IBR150FC Flat Top Steel
SSP150FC Slimline Stainless Steel
SSP150FC Regal Stainless Steel

Stainless Steel Sleeves
are also available

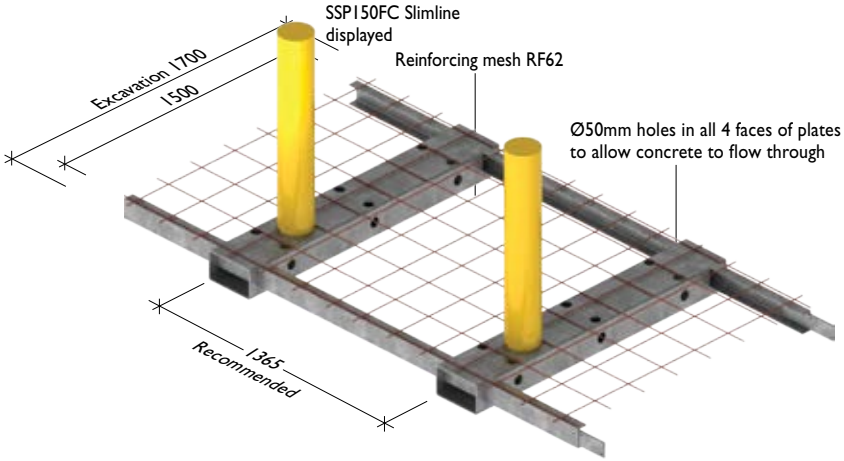


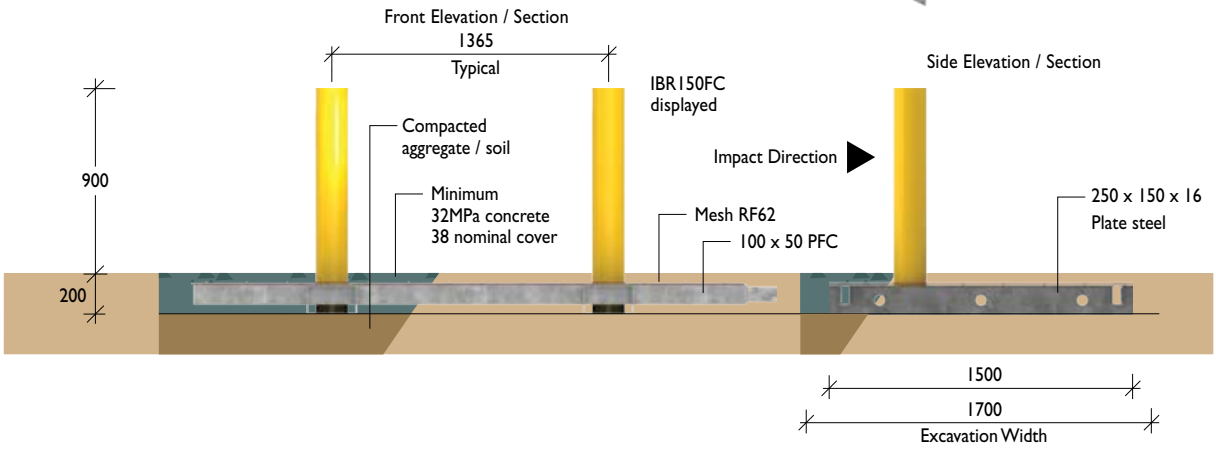


Shallow Mount
SMF1435

Bollard Options
IBR150FC Flat Top Steel
SSP150FC Slimline Stainless Steel

Stainless Steel Sleeves
are also available

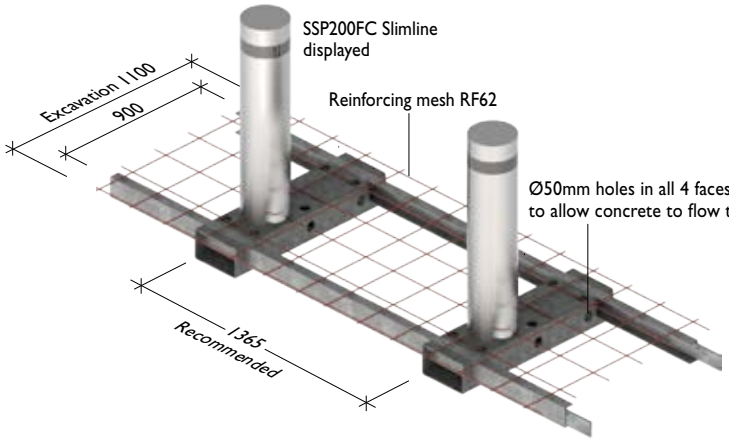


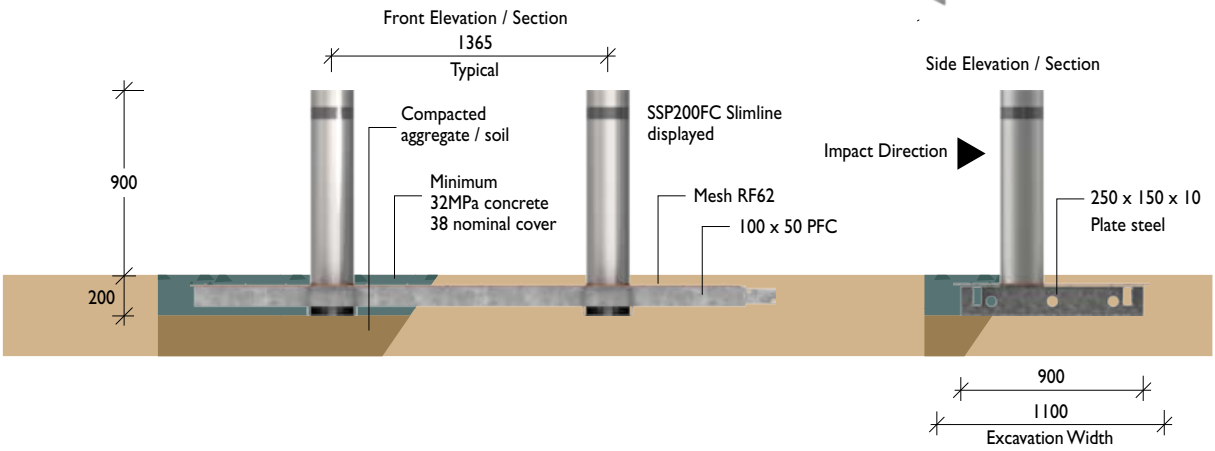


Shallow Mount
SMF2025

Bollard Options
IBR200FC Flat Top Steel
SSP200FC Slimline Stainless Steel
SSP200FC Regal Stainless Steel

Stainless Steel Sleeves
are also available

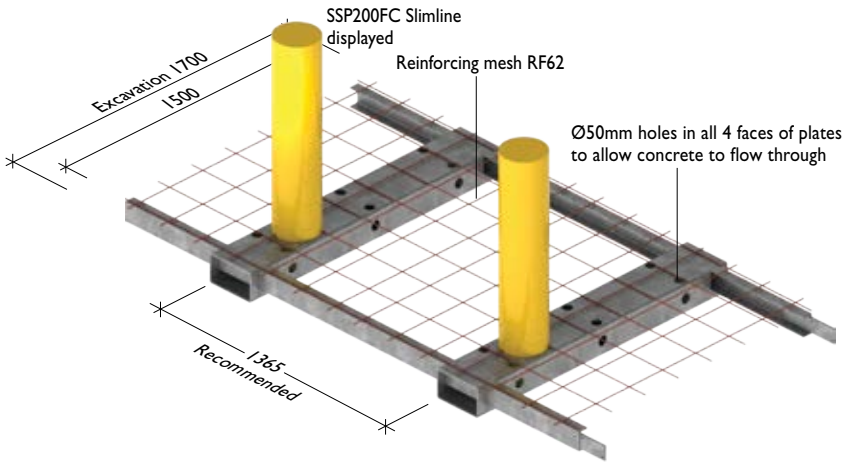


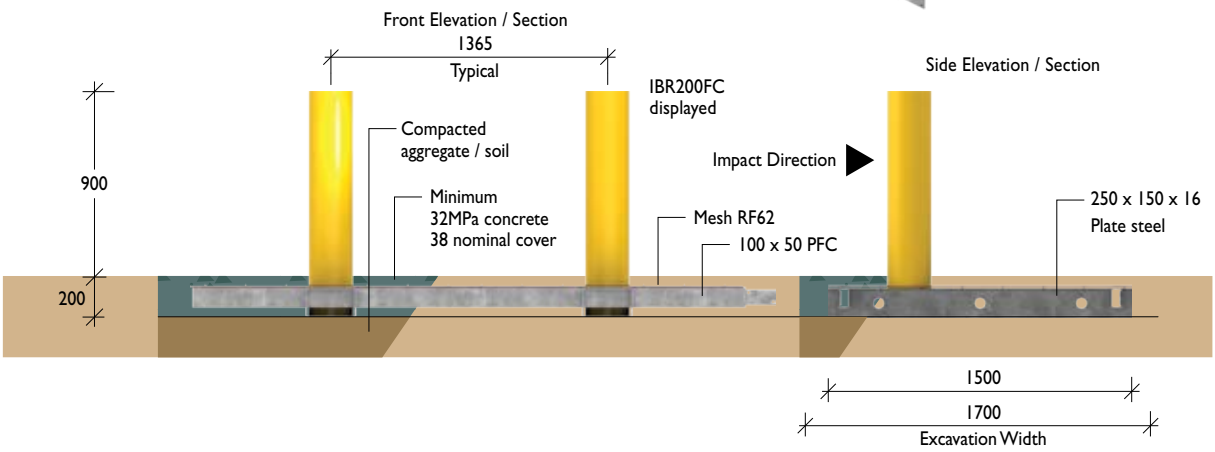


Shallow Mount
SMF2035

Bollard Options
IBR200FC Flat Top Steel
SSP200FC Slimline Stainless Steel

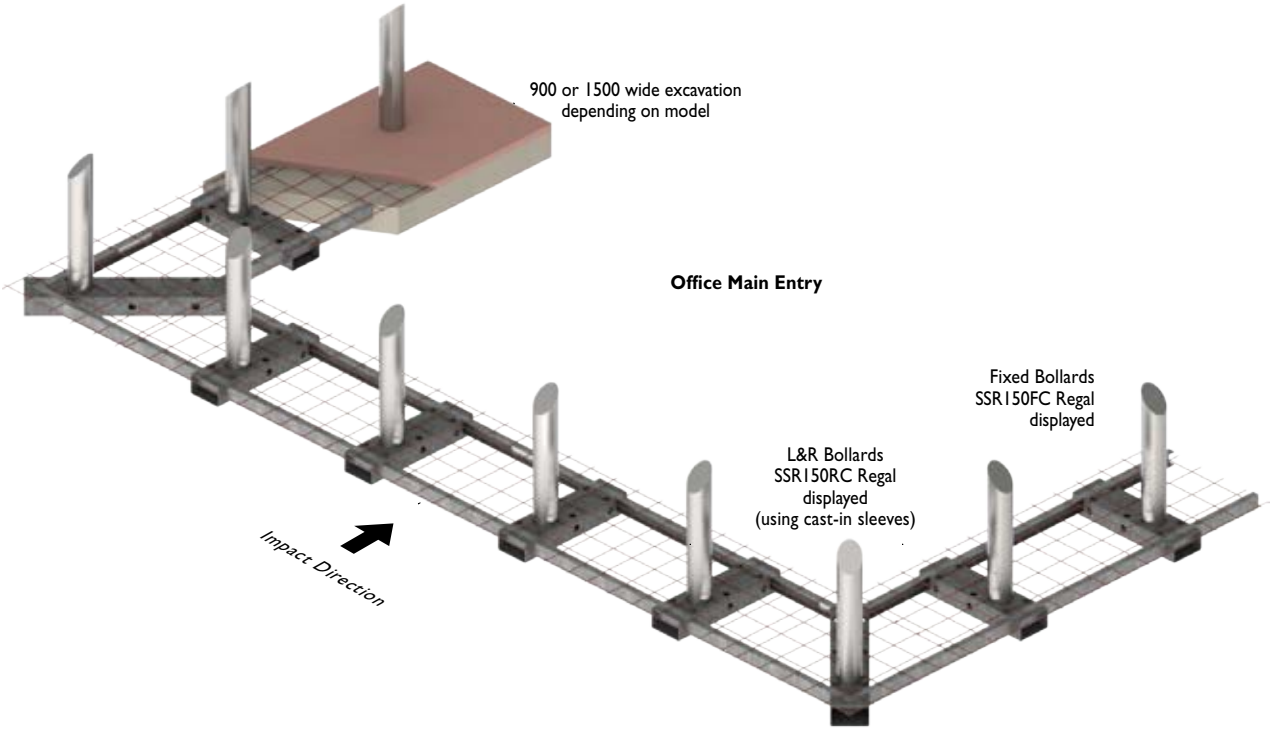
Stainless Steel Sleeves
are also available

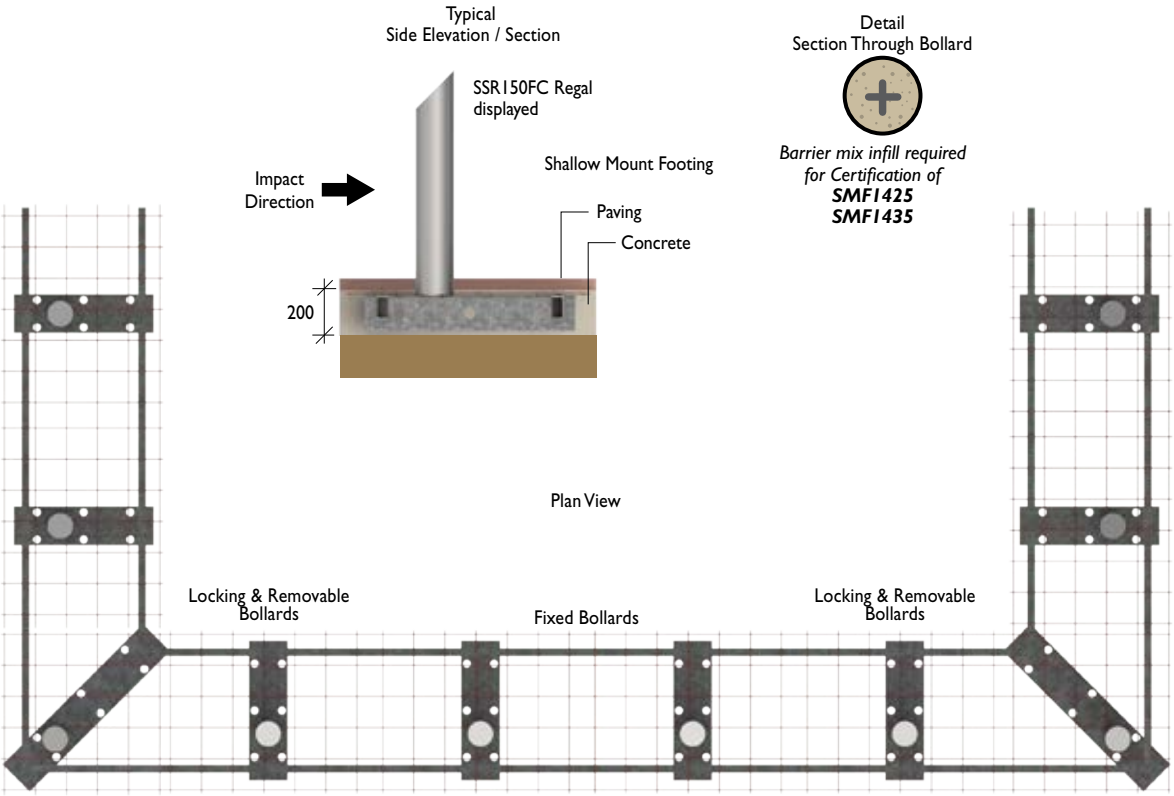




Shallow Mount
Typical Application

Installing the shallow mount system is both quick and efficient and requires minimal excavation or disruption of existing services.





Leda will provide all reinforcement details and working drawings prior to installation.

The *Impact Ratings Table* below is intended as a quick reference guide to the relative impact resistance provided by various Leda security bollards. Impact ratings have been sub-divided into 3 Classes.

3 **Class 3 – High level protection**
Government and high profile buildings, defence sites, anti-terrorist protection.

2 **Class 2 – Medium level protection**
Used where vehicle speed is limited and other security protection provided.

1 **Class 1 – Low level protection**
Ram raid protection or where lower vehicle mass and speed are involved.

While the Table identifies specific standard models, many can be strengthened by infilling with Leda's barrier mix (*refer p86*) or re-engineered to improve their impact resistance.

Impact ratings shown are also dependant on the bollards being installed in accordance with Leda's engineered footing details.

PAS68 TESTED PAS 68 certified bollards have been tested using vehicles of various weights travelling at specific speeds. Details of their certification and impact resistance will be found on the specification pages related to these products.

Impact Ratings Table – Engineered Solutions

km/h	kJ	Static Bollards				Retractable Bollards		
		Stainless Steel		Steel		Manual	Semi Automatic	Automatic
		L&R	Fixed	L&R	Fixed	[Lift Handle]	[Gas Strut]	
80	630				*p96* SP1010 SP1020 *p89* IBR250FB68A IBR250FB68B IBR200FB68A IBR200FB68B *p84* IBS250FB *p82* IRB300F C IRB300F B IRB200F C IRB200F B			*p96* SP1040 *p93* SPTT
70						*p95* SP430		*p95* SP440
60			*p95* SP410 SP420 *p19* SSP300F C SSP300F B SSP200F C	*p84* HIG200R C HIG200R B				*p94* SP100
50	310	*p87* IBR200RSC IBR150RSC SSP150RSC	*p87* IBR200FSC IBR150FSC SSP150FSC		*p85* PR441F B RPR441F B			*p106* ARB200 C SARB200 C
40		*p18* SSP150R C SSP150R B	*p19* SSP300F A SSP200F B SSP200F A *p18* SSP150TC SSP150TB SSP150F C SSP150F B	*p84* HIG150R C *p78* SP150R C *p44* AE150R B	*p84* IBS250BB *p82* IRB150F C IRB150F B *p78* SP150F C *p44* AE150F B		*p105* MRB150GS C SMRB150GS C	*p106* ARB200 B SARB200 B ARB200 A SARB200 A ARB150 C SARB150 C
30	100							
20		*p87* SSP125RSC *p18* SSP150R A *p17* SSP125R A	*p18* SSP150F A SSP150T A SSB150F A SSB150BAWW *p87* SSP125FSC *p17* SSP125F A SSP100F A	*p84* HIG150R B *p44* AE150R A *p79* XP90R XP90RGG	*p85* PR441F A RPR441F A *p44* AE150F A *p79* XP90F XP90FGG	*p104* MRB150 B SMRB150 B MRB150 A SMRB150 A SMRB90 C	*p105* MRB150GS B SMRB150GS B *p105* MRB150GS A SMRB150GS A	*p106* ARB150 B SARB150 B ARB150 A SARB150 A
10		*p16* SSP80R C SSP80R B SSP80R A SSP80R AS	*p16* SSP80F C SSP80F B SSP80F A SSB80F A	*p78* SP150R A SP90R	*p78* SP150F A SP90F	MRB90 B SMRB90 B MRB90 A SMRB90 A	*Slimline models only referenced, Regal equivalents refer p20-22*	*Slimline models only referenced, Regal equivalents refer p20-22*
0	0							

Products

The security bollard range provides a multitude of designs and systems catering for the straightforward protection of shopfronts and pedestrian plazas through to high security anti-terrorist applications for critical sites and buildings.

Leda's engineers have been at the forefront of product technologies through ongoing research and development and vehicle impact testing. Leda has also been working with other high security bollard manufacturers and is the Australian distributor for ATG Access (UK and the USA) with access to additional PAS 68 and ASTM certified bollards.

Features

- Impact tested and rated
- High impact and anti-cutting models
- Provide protection from ram raids to vehicular-borne terrorist attacks
- Available in –
  Locking &
  Removable
  Fixed Insitu
  Retractable

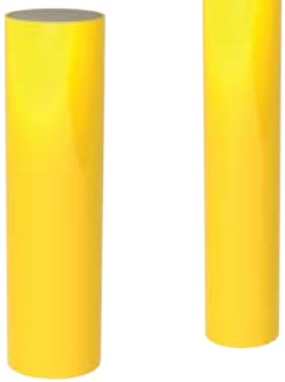
Applications

- Shopping centres
- ATM protection
- Commercial and industrial projects
- Public areas and squares
- High risk sites
- Public utilities
- Airports and military bases
- Embassies and government buildings

Sentinel

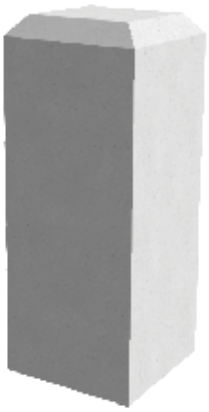
Super XP

ATM Protection



PAS68 Static IBR

Barrier Infill



Russell Square

Russell Round

IRB Series
(Concrete filled)

PAS68
Shallow Mount Technology

PAS68 Telescopic

PAS68 Retractable

For security reasons, high security and anti-terrorist certified bollards are not fully detailed. For further information on PAS 68 and ASTM certified bollards and applications, please contact your nearest Leda sales office where your enquiry will be dealt with by an appropriately qualified consultant.

Traditional Security Bollards

The Securapost branding has been the most widely recognised security bollard with over 200,000 successful installations as testament to the level of security they provide.

Protect

- Glass frontages, shop doors, retail outlets
- ATMs from ram raids
- Buildings and structures from vehicular damage

Secure

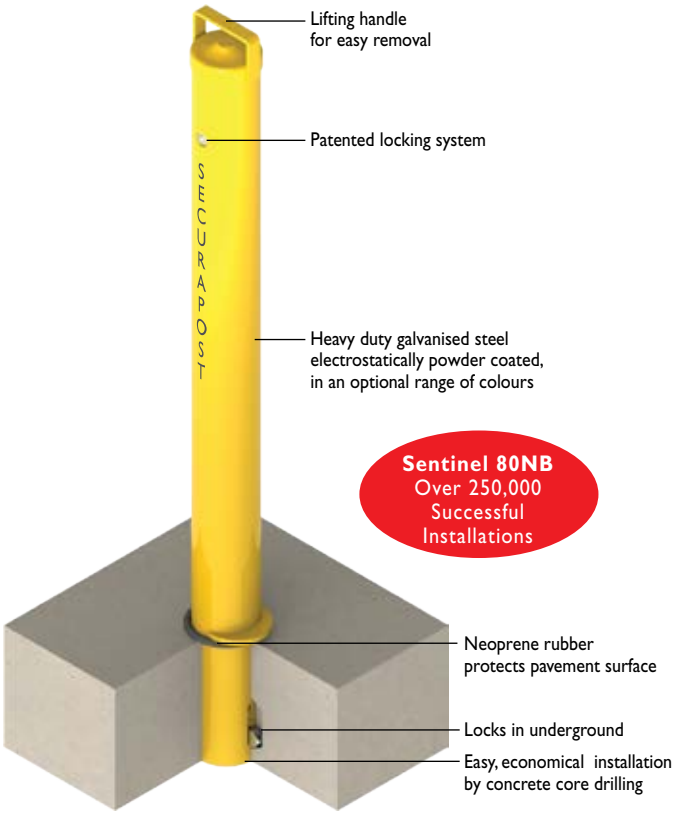
- Gateways and vehicular entrances
- Roller doors in factories and warehouses
- Property perimeters – with visual deterrents

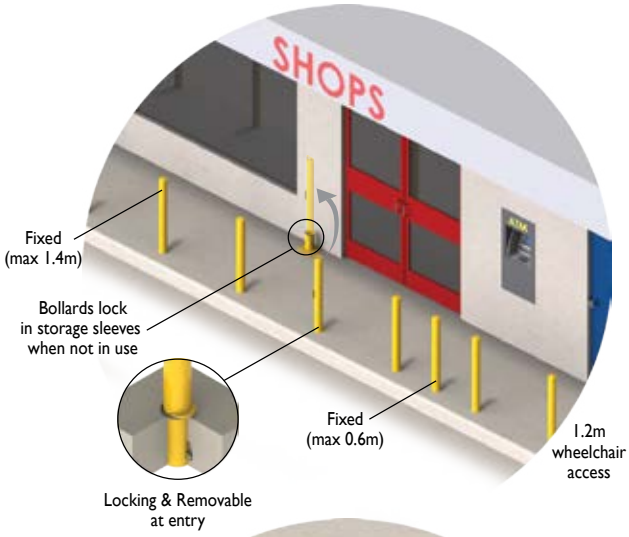
Prevent

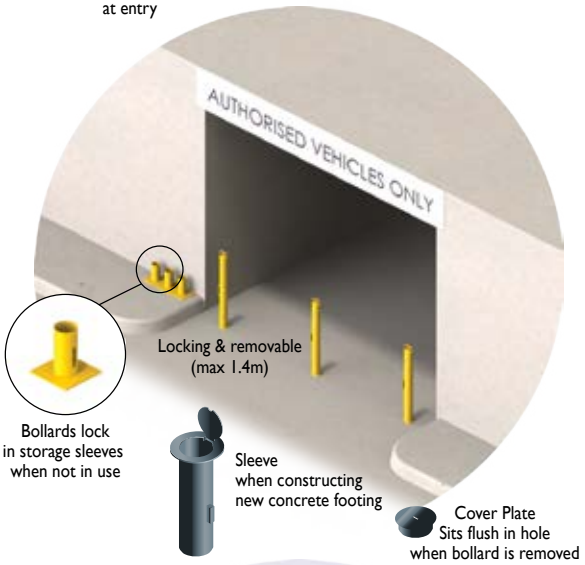
- Disruption caused by break-ins
- Vehicle theft
- Obstruction to driveways and emergency exits
- Unauthorised parking

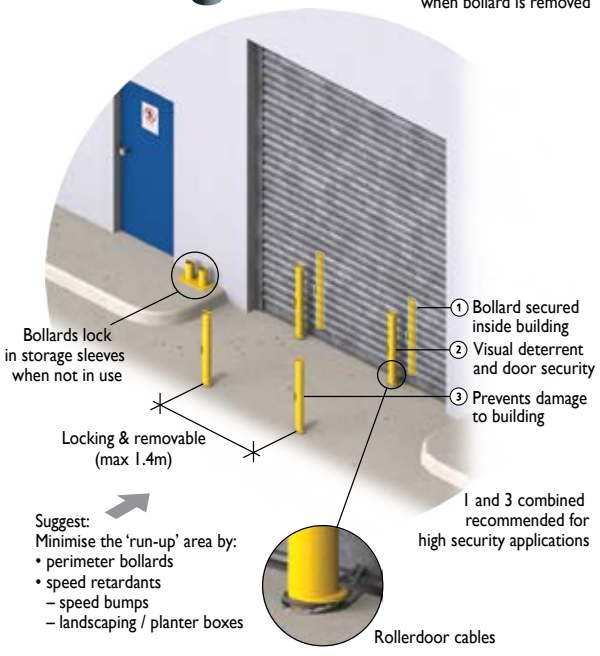
Define

- Access ways
- Pathways and cycleways
- Areas – vehicle or pedestrian paths









Ram raiding has become the most common method of illegal intrusion into retail and industrial properties.

Technical 'Know-How'

Leda security bollards have been designed and engineered based on intensive market research in conjunction with:

- Law enforcement agencies
- Security companies
- Insurance and risk management experts.

Leda has the technical 'know-how' and offers free site audits using trained and experienced staff to advise and recommend the best methods and products to protect your assets.

Installations are carried out by Leda's professional team and where required, project managed by Leda engineers. Leda offers an unconditional guarantee of replacement should a bollard's security ever be breached. Service technicians are available to supply same-day service and replacement bollards in the event of accidental damage.

Ram Raiding

Leda security bollards provide the first line of defence in preventing ram raids and illegal enforced entry. In many instances, the visual deterrent is all that is needed – however, when relied upon, Leda bollards are designed to physically stop vehicles from entering or leaving an area or building.

Leda bollards are impact rated, allowing selection of the appropriate bollard for the perceived threat and to meet OH&S concerns.

Security Range > Products > Ram Raid Protection

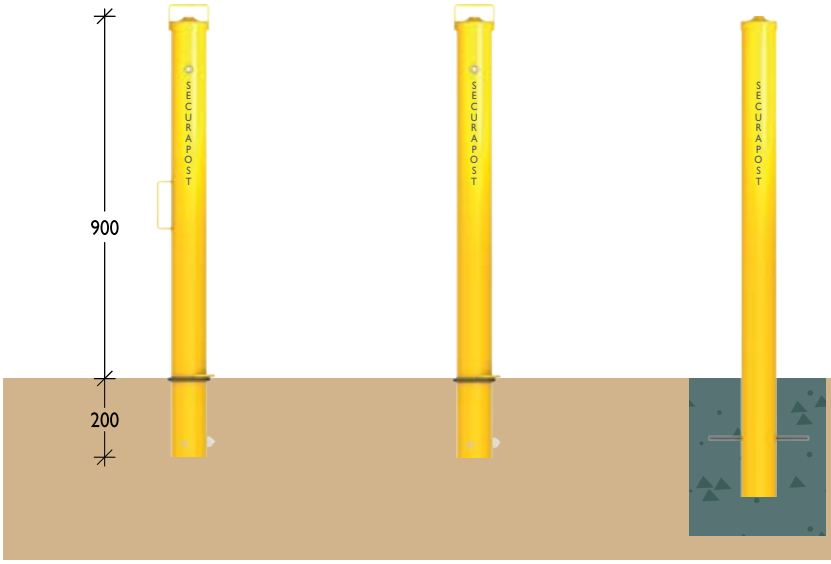
Sentinel 80NB

Material 80NB (88.9) x 3.0mm medium duty galvanised pipe
80NB (88.9) x 5.9mm extra heavy duty galvanised pipe
Finish Electrostatically powder coated in black or industrial yellow.
Optional range of colours available on request.

Locking & Removable
SP90RWW
Lightweight (12kg)

Locking & Removable
SP90R 1
(13.5kg)

Fixed Insitu
SP90F 1



ISF1 Strip Footing, see p68 for details.

Over 250,000 Successful Installations

Sentinel 150NB

Material 150NB (165.1) x 5.4mm HD galvanised or 11.0mm structural pipe
Finish Electrostatically powder coated in black or industrial yellow.
Optional range of colours available on request.

Locking & Removable
SP150R A 5.4 1
SP150R C11.0 2

Fixed Insitu
SP150F A 5.4 1
SP150F C 11.0 2

Double lock option. Ideal where two parties require access without compromising security. Refer *Accessories* section.

Lifting Trolley available for easy removal of heavier L&R bollards. Refer *Accessories* section.

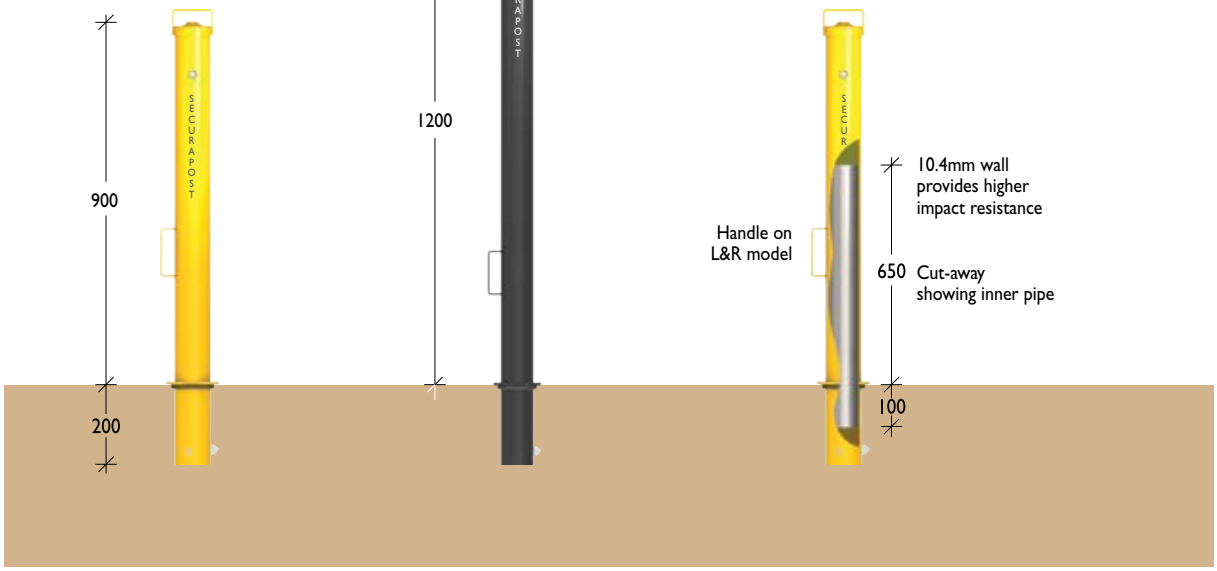
ISF1 Strip Footing, see p68 for details.

Super XP

Material 80NB (88.9) x 10.4mm extra heavy duty galvanised pipe
Finish Electrostatically powder coated in black or industrial yellow. Optional range of colours available on request.

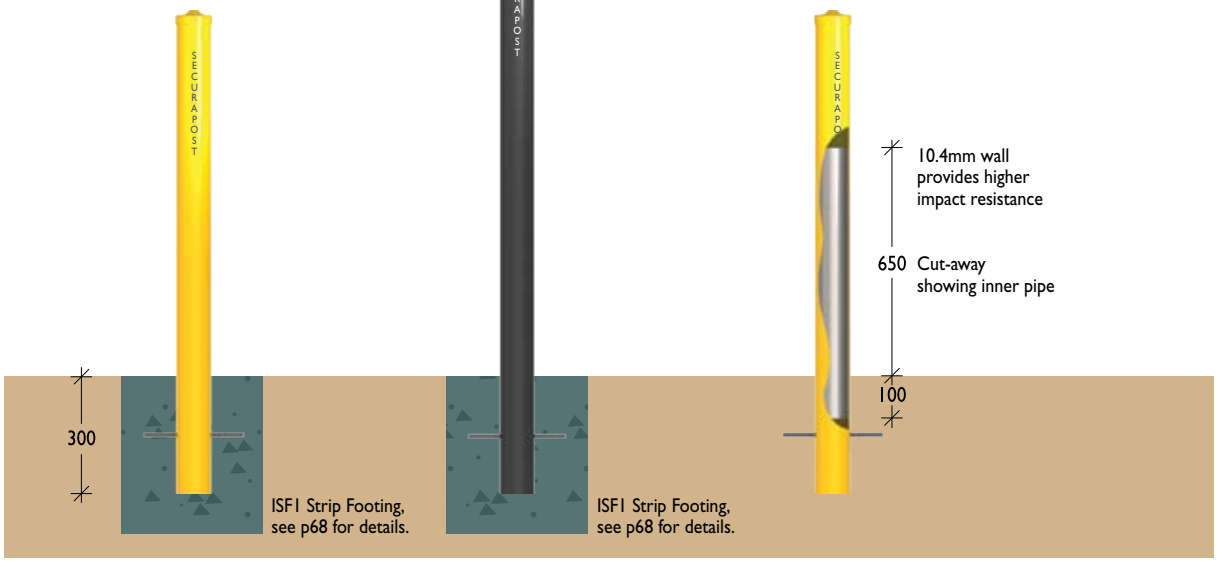
Locking & Removable
XP90R I
(19.5kg)

Locking & Removable
XP90RGG I



Fixed Insitu
XP90F I

Fixed Insitu
XP90FGG I



Prior to the design and testing of these new ATM security devices, Leda consulted with ATM manufacturers and service providers, major banks, retail outlets and insurance companies, to determine the products and devices needed to deter and slow down ATM attacks.

The security products developed as a result of our research and development program are not directed at one specific application and should never be used in isolation. Instead, they add to a range of options that can be used to collectively provide greater ATM security.

The objective for all ATM owners and the property managers is to make it more difficult to attack so that:

- Thieves look elsewhere for an easier target.
- Thieves face 'layered' security away from the target.
- Time required to steal the ATM is extended, increasing detection with collateral damage eliminated or reduced.

ATMs fall into 2 major categories:

- Through-the-wall ATMs (larger ATMs common with banks and credit unions).
- Lobby ATMs (fastest growing segment of the ATM industry – with applications from hotels and malls, to service stations).

ATM Barriers

- *Visual deterrent*
- *Disrupts lassoing or lifting*
- *Moderate impact resistance*

ATM Bollards

- *Visual deterrent*
- *High impact resistance*
- *Highly resistant against cutting tools, oxyacetylene torch and force attacks, or a combination of all three*

Fixed insitu security bollards max 0.6m centres

Wheelchair access 1.2m

ATM Protection

Material Heavy duty galvanised pipe / galvanised RHS
Finish Electrostatically powder coated in a range of colours

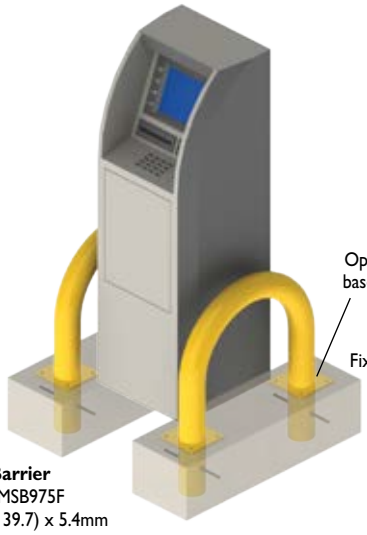
16mm anchors

Barrier
ATM65B
65NB (76.1) x 4.5mm
ATM80B
80NB (88.9) x 5.9mm

Optional fixed insitu

16mm anchors

Barrier
ATM100B
100 x 100x 6.0mm RHS



Optional baseplate

Fixed insitu

Barrier
ATMSB975F
125NB (139.7) x 5.4mm

XP90F Fixed Bollards

XP90 Bollards
ATM804R
80NB (88.9) x 5.9mm
65NB (76.1) x 4.5mm insert

XP90R L&R Bollards

ATM Anchor
ATMAL328
12mm Plate Steel
Powder coat Black

Supplied with 2.0MT x 10mm galvanised steel chain

'D' Bolt
6 x 12 x 100mm masonry anchors

Security Range > Products > High Security

IRB Series

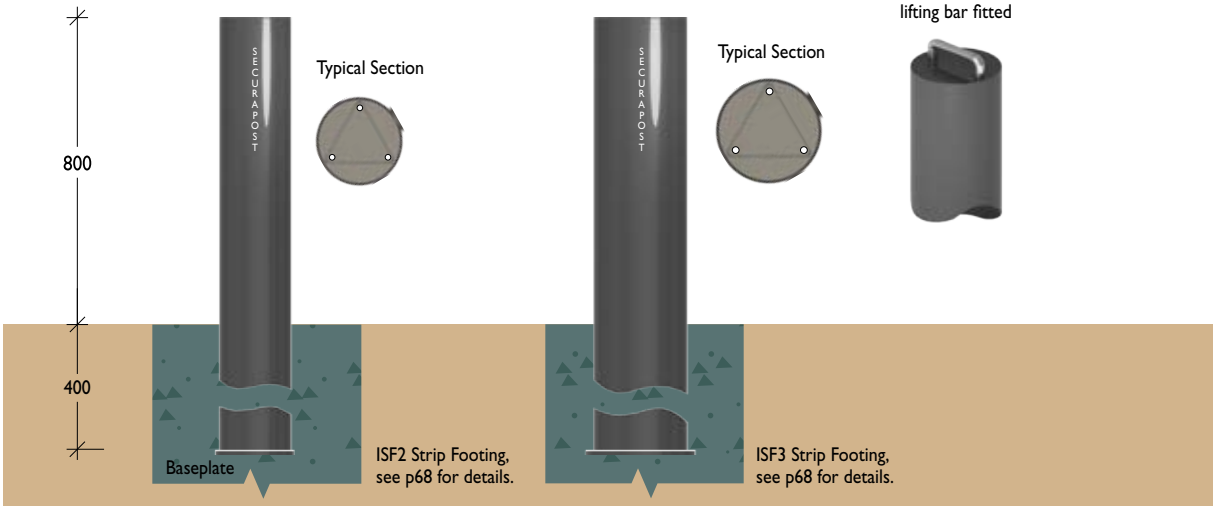
Material 150NB (168.3) x 7.11 / 11.0mm extra heavy duty pipe
200NB (219.1) x 8.2 / 12.5mm extra heavy duty pipe
300NB (323.9) x 9.5 / 12.7mm extra heavy duty pipe

Finish Electrostatically powder coated in black or industrial yellow. Optional plastic sleeve suit 150NB (range of colours) or stainless steel sleeve suit 150 / 200 / 300NB.

Note. These bollards are designed for concrete infilling on site.
Caps or reinforcement are not included

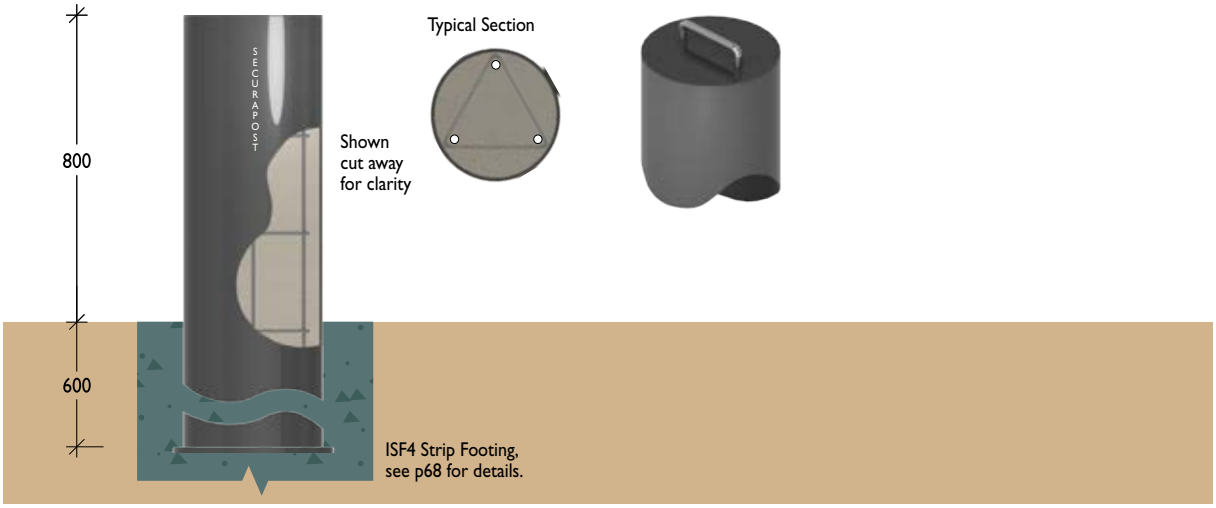
150NB
IRB150F B 7.11 2
IRB150F C 11.0 2

200NB
IRB200F B 8.2 3
IRB200F C 12.5 3



Note. These bollards are designed for concrete infilling on site.
Caps or reinforcement are not included

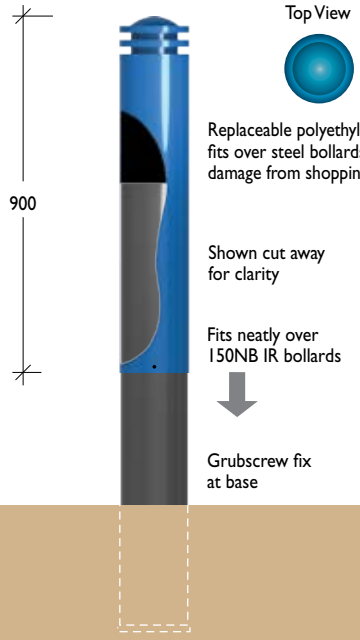
300NB
IRB300F B 9.5 3
IRB300F C 12.7 3



IRB Series
Polyethylene Sleeves

Material Polyethylene (extra heavy duty steel pipe.)
Finish Polyethylene, choice of colours

Ambassador Profile
Polyethylene Sleeve
PAS150F



Top View

Replaceable polyethylene sleeve fits over steel bollards – minimises damage from shopping trolleys.

Shown cut away for clarity

Fits neatly over 150NB IR bollards

Grubscrew fix at base

Low Cost Solutions

For use in medium to high security applications providing a cost-effective alternative to using thick-wall stainless steel. or Ambassador profile bollards.
Also ideal for use in high accident prone applications, like supermarkets, where it may be necessary to replace bollards damaged by shopping trolleys.

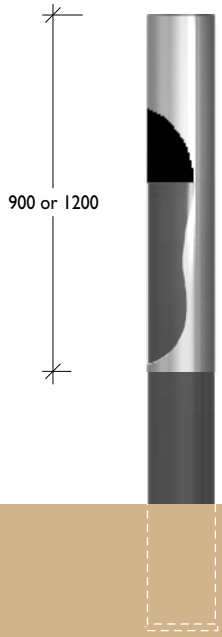
Can be fitted to new or existing bollard installations.

IRB Series
Stainless Sleeves

Material Stainless steel tube Ø172 (extra heavy duty steel pipe.)
Finish Linished or electro-polished

Can be fitted to new or existing bollard installations.

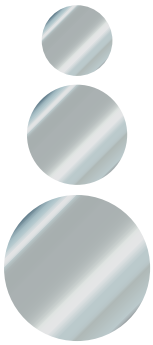
Slimline Profile
Stainless Steel Sleeve



SSS150F A 900h
SSS150F B 1200h
SSS200F A 900h
SSS200F B 1200h
SSS300F A 900h
SSS300F B 1200h

Shown cut away for clarity

Typical Top Views



Fits neatly over 150NB / 200NB / 300NB steel bollards

Grubscrew fix at base

Regal Profile
Stainless Steel Sleeve

SSSR150F A 900h
SSSR150F B 1200h
SSSR200F A 900h
SSSR200F B 1200h
SSSR300F A 900h
SSSR300F B 1200h

Fits neatly over 150NB / 200NB / 300NB steel bollards

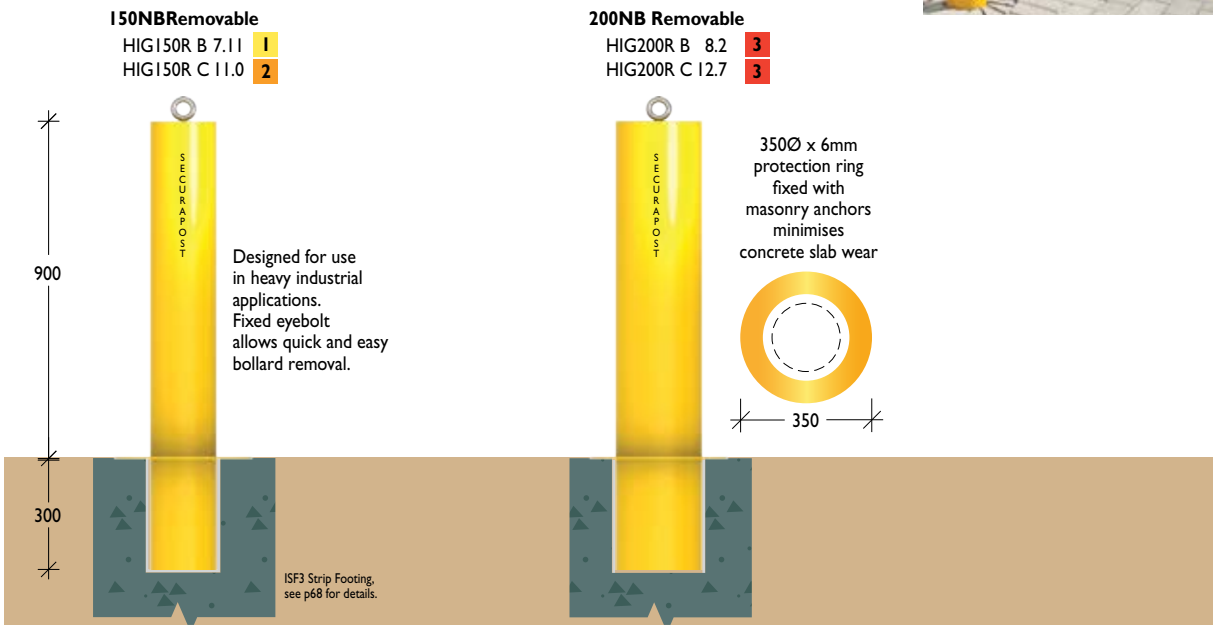
Grubscrew fix at base

Security Range > Products > High Security

HD Industrial
Fixed Insitu

Material 150NB (168.3) x 7.11 x 11.0mm galvanised steel pipe
200NB (219.1) x 8.2 / 12.7mm galvanised steel pipe
250 x 250 x 9.5mm SHS, concrete filled
Finish Electrostatically powder coated in black or industrial yellow.

HD Industrial
Removable

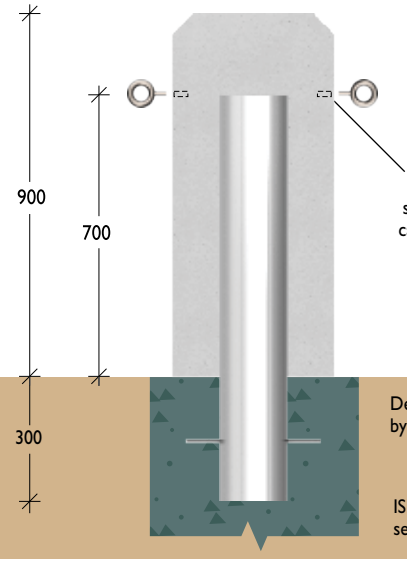


Pre-cast Concrete
Russel Square

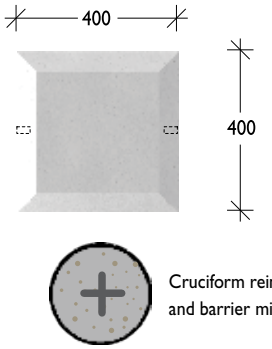
Material 30MPa concrete
150NB (168.3) x 7.11 / 11.0mm linepipe
Finish Off-white, lightly sand blasted

Fixed Insitu
150NB Insert
PR441FA 7.11 1
PR441F B 11.0 2

Section



Top View



Cruciform reinforcement
and barrier mix infill also available,

Depth of pipe insertion is determined
by impact rating requirements

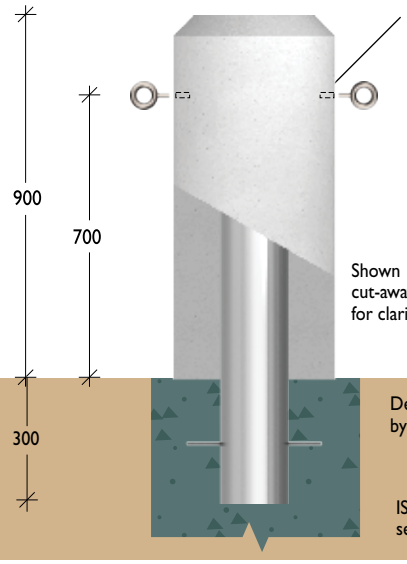
ISF2 Strip Footings,
see p68 for details.

Pre-cast Concrete
Russel Round

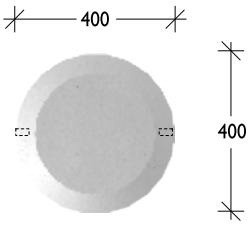
Material 30MPa concrete
150NB (168.3) x 7.11 / 11.0mm linepipe
Finish Off-white, lightly sand blasted

Fixed Insitu
150NB Insert
RPR441FA 7.11 1
RPR441F B 11.0 2

Section / Elevation



Top View



Cruciform reinforcement
and barrier mix infill also available,

Depth of pipe insertion is determined
by impact rating requirements

ISF2 Strip Footing,
see p68 for details.

Barrier Infill Bollards

Leda's Barrier Infill Bollards have been developed to impede and prevent vehicular ram raids as well as attacks on ATMs within retail outlets and shopping centres, while still allowing easy pedestrian access.

These high security bollards are also designed to protect property, avoiding the costly building repairs and disruption that can follow a ram raid attempt.

The bollards were developed in consultation with ATM manufacturers, major banks, shopping centre owners and insurance companies.

They have proved to be the largest physical deterrent in minimising ram raid attacks on ATMs and are often used in other high security applications due to their combination of high impact and anti-cutting characteristics.

During the research and testing program various types of cutting equipment was used to determine the cutting resistance of different bollard infills.

The successful results came to the notice of Australian and British security organisations who conducted further vehicle impact testing at the Transport Research Laboratories outside London.

The bollards were impact-tested at various speeds using 2.5t, 3.5t and 7.5t commercial vehicles, and the impressive results has led to the barrier-infill bollards being approved and certified under PAS 68 (UK).

While the results of these impact tests are confidential, Leda is the only Australian bollard manufacturer with the knowledge to assist in specifying the appropriate high security bollards for your application as well as providing the engineering details for concrete footings needed to absorb the impact energy.

Cutting Resistance

Impact resistance is normally a key issue with the majority of bollard installations, however in security applications, cutting resistance may be equally important. The bollards incorporate internal (cruciform) reinforcement and barrier mix infill that significantly increases the bollard's impact resistance while also providing maximum cutting impediment.

Typical section through the bollard showing the cruciform reinforcement and barrier mix infill

Crash Testing
Impact-tested at various speeds using 2.5t, 3.5t and 7.5t commercial vehicles.

Various types of cutting equipment were used to determine the cutting resistance of different bollard infills.

SSP Barrier Infill
Stainless Steel

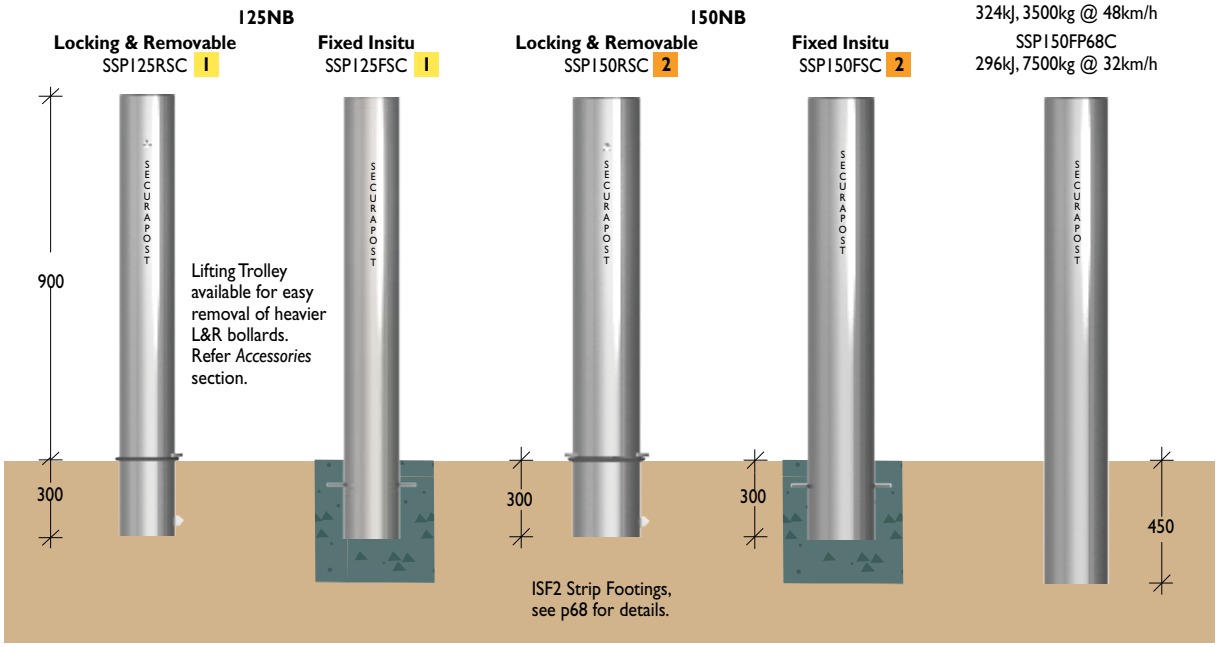
Material 125NB (141.3) x 3.4 stainless steel pipe
150NB (165.1) x 5.4 mild steel pipe
150NB (168.3) x 3.4mm stainless steel pipe
Finish Stainless steel. Linished or electro-polished

PAS68 TESTED

150NB
Fixed Insitu
Embedment and footing design critical.
SSP150FP68A
231kJ, 2500kg @ 48km/h
SSP150FP68B
324kJ, 3500kg @ 48km/h
SSP150FP68C
296kJ, 7500kg @ 32km/h

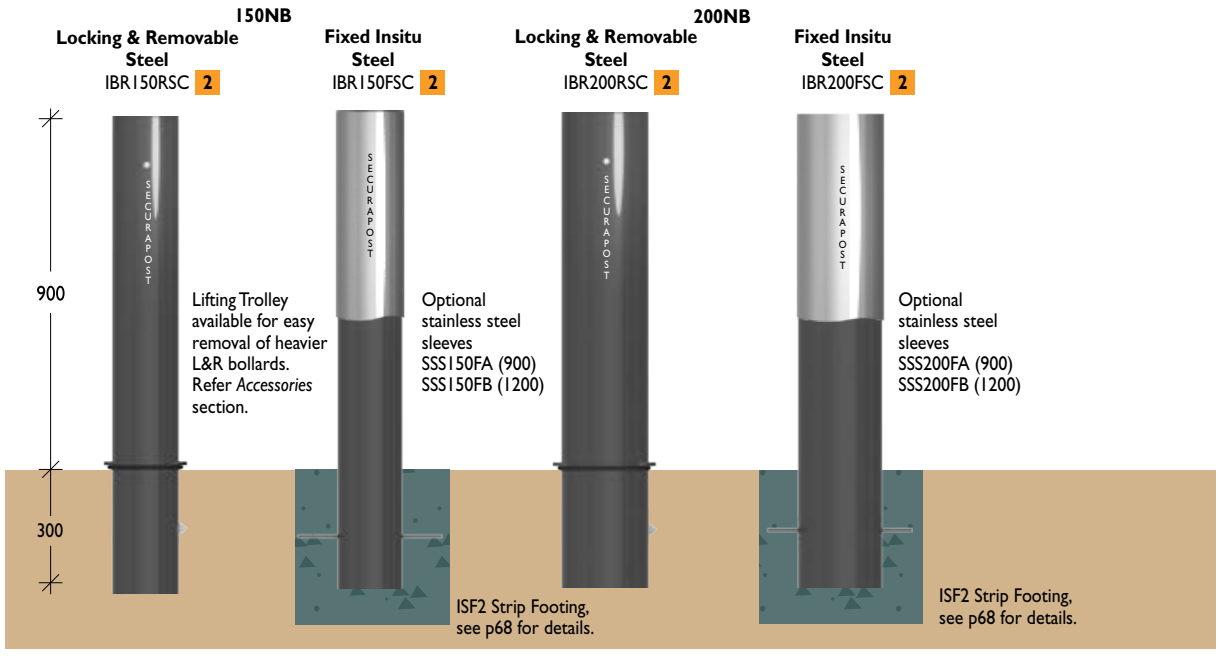
Typical Section

Barrier mix infill is also available on all Leda Slimline and Regal stainless steel bollards.



IBR Barrier Infill
Steel / SS Sleeve

Material 150NB (168.3) x 4.8 / 7.11 / 11.0mm extra heavy duty pipe
200NB (219.1) x 4.8 / 8.2 / 12.5mm extra heavy duty pipe
Finish Steel. Electrostatically powder coated in black or industrial yellow.
Stainless steel sleeve to suit



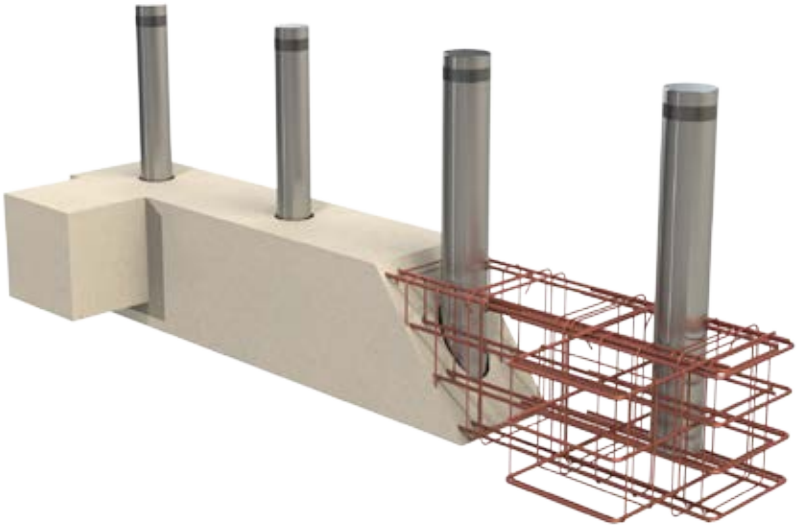
Static Bollards

Leda has a range of PAS 68 Tested and Certified static generic bollards. They are available in two diameters and various wall thicknesses that provide varying levels of impact resistance.

All tests were conducted at TRL Test Agency in Wokingham, Berkshire UK.

Model No	Size Ø mm	Wall mm	Test No	Weight kg	Speed km/h
IBR200FB68A	219	10	B4125	7500	48
IBR200FB68B	219	16	B3945	7500	64
IBR250FB68A	273	10	B4240	7500	64
IBR250FB68B	273	16	B4310	7500	90

Generic bollard footings drawings specific to the PAS 68 rated bollards will be supplied after contracts have been signed. Certification for site specific installations can be arranged, at additional cost, by Leda's independent UK-based consulting engineers.



PAS 68 Certification provides the assurance that the bollards have been impact tested to the performance specifications of their certificate.

Static IBR 200

Material Ø219 x 10mm / 16mm seamless steel pipe

Finish Electrostatically powder coated in black or industrial yellow.

PAS68 TESTED

Test B4310 COMMERCIAL IN CONFIDENCE TRL PROPRIETARY INFORMATION Test date: 4 June 2010

Test procedure:
PAS 68:2010 Test Type 7500/80/90

Ø273x16mm wall generic tube: IBR250FP68B

Customer:

Supplier of 273/16 IBR250FP68B

Test Date:
4 June 2010

Test Number:
B4310

Authors:
Tim Pearce & Dean Bucton

Report Issue Date:
13 March 2013

For questions relating to this test please contact the Author at TRL

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Approvals

Author Tim Pearce & Dean Buxton

Technical reviewer Gavin Williams

CPR777 v13 2 of 16 Customer: CPNI

IBR200FB68A 3
Ø219 x 10mm

IBR200FB68B 3
Ø219 x 16mm

IBR200FB68RA
Ø219 x 10mm

IBR200FB68RB
Ø219 x 16mm

Stainless Steel Sleeves
(Sleeve only)

SSS200FB

SSSR200FB

Footings.
Specification details to be supplied after contracts have been signed.

Static IBR 250

Material Ø273 x 10mm / 16mm seamless steel pipe

Finish Electrostatically powder coated in black or industrial yellow.

PAS68 TESTED

IBR250FB68A 3
Ø273 x 10mm

IBR250FB68B 3
Ø273 x 16mm

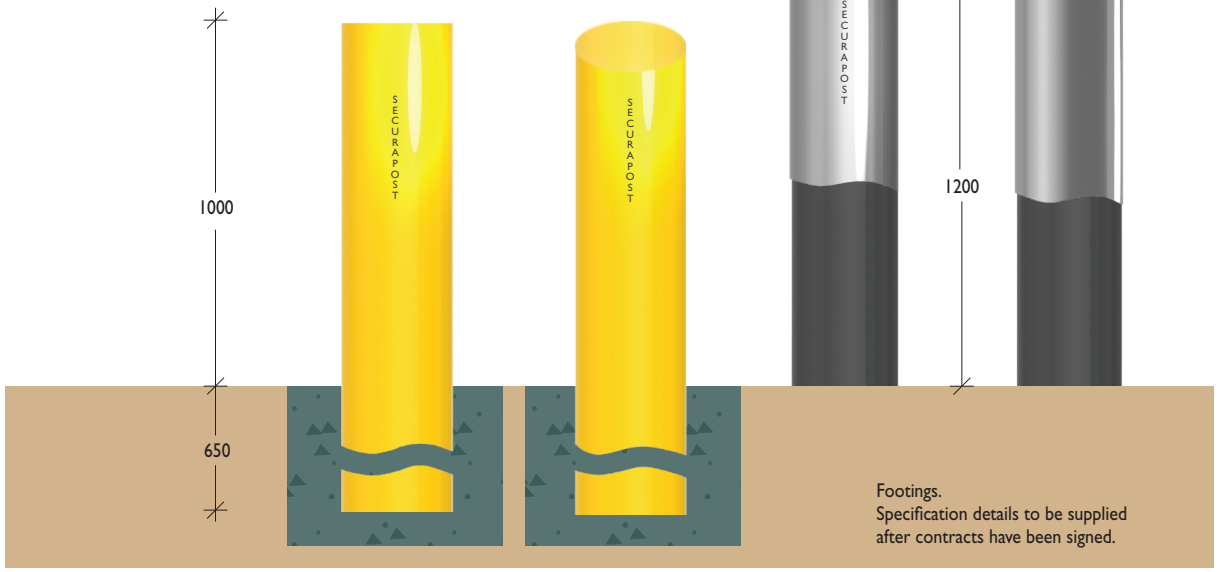
IBR250FB68RA
Ø273 x 10mm

IBR250FB68RB
Ø273 x 16mm

Stainless Steel Sleeves
(Sleeve only)

SSS250FB

SSSR250FB



Footings.
Specification details to be supplied after contracts have been signed.

ATG Access

Leda is the Australian Distributor for ATG Access, a UK company recognised as the indisputable industry leader in the design and manufacture of high security bollards.

This comprehensive range of PAS 68 certified products and systems provide security consultants, government agencies and industry specifiers with the assurance that the products selected will meet their specification and/or security threat protection.

ATG were the pioneers of shallow mount technology and their bollard systems have been successfully installed in hundreds of high security projects around the world.

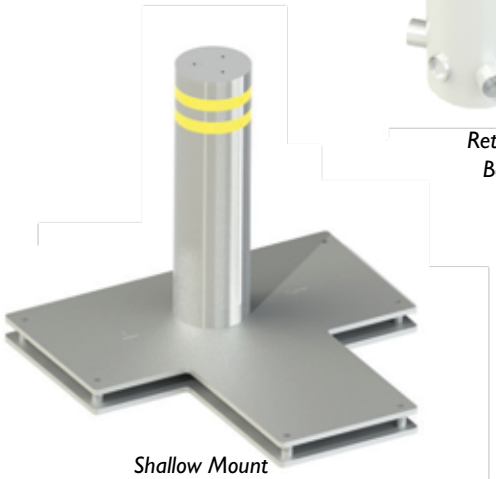
When coupled with Leda's acknowledged project management and installation experience, a successful project is guaranteed.

Telescopic Bollards

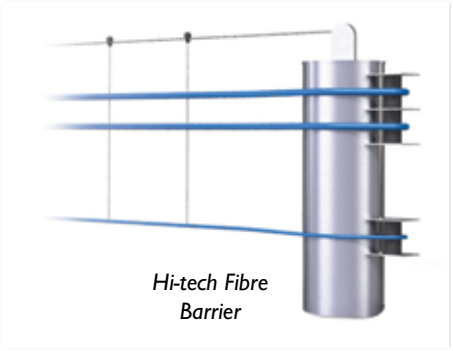
PAS68 TESTED

Fixed Bollards

Retractable Bollards



Shallow Mount Technology



Hi-tech Fibre Barrier

ATG Shallow Mount Technology

ATG Access prides itself on innovative engineering and has successfully designed and launched a shallow mount system for their SP400 and SP1000 bollards. These bollards not only offer PAS 68 rated protection, they also provides customers with a 'green solution' to their perimeter security needs.

Originally designed to combat the problematic fitting of traditional bollards which require deep footings and which can expose a range of services, prohibiting installation.

Greener solution

During installation disruption of habitats and tree roots is also kept to a minimum, and with less machinery required on site, pollution and noise is also reduced. Fundamentally the 'greener solution' uses a smaller amount of concrete – less than 25% of the concrete that's used in a traditional footing, and greatly reducing CO2 emissions.

Working with a variety of trade partners like Leda Security, ATG Access's shallow mount bollards have been frequently chosen for prestigious projects like banks, airport terminals, railway stations, government buildings, embassies and sports stadiums, which have identified the benefit of selecting this technology.

Impact Ratings

The shallow mount system has been tested to stop vehicles at various speeds.

Underground services that prohibit the installation of traditional deep footings.

Shallow mount footings require minimal excavation and concrete.

Benefits

- Comparatively low quantities of concrete
- Installation period substantially lower (between 1-2 hours per bollard)
- Less on-site duration – reduced preliminaries
- Reduction in time needed for setting out
- No formwork required
- No need for reinforcing bars in concrete sub-base
- Reduction in service disruption and ground works.

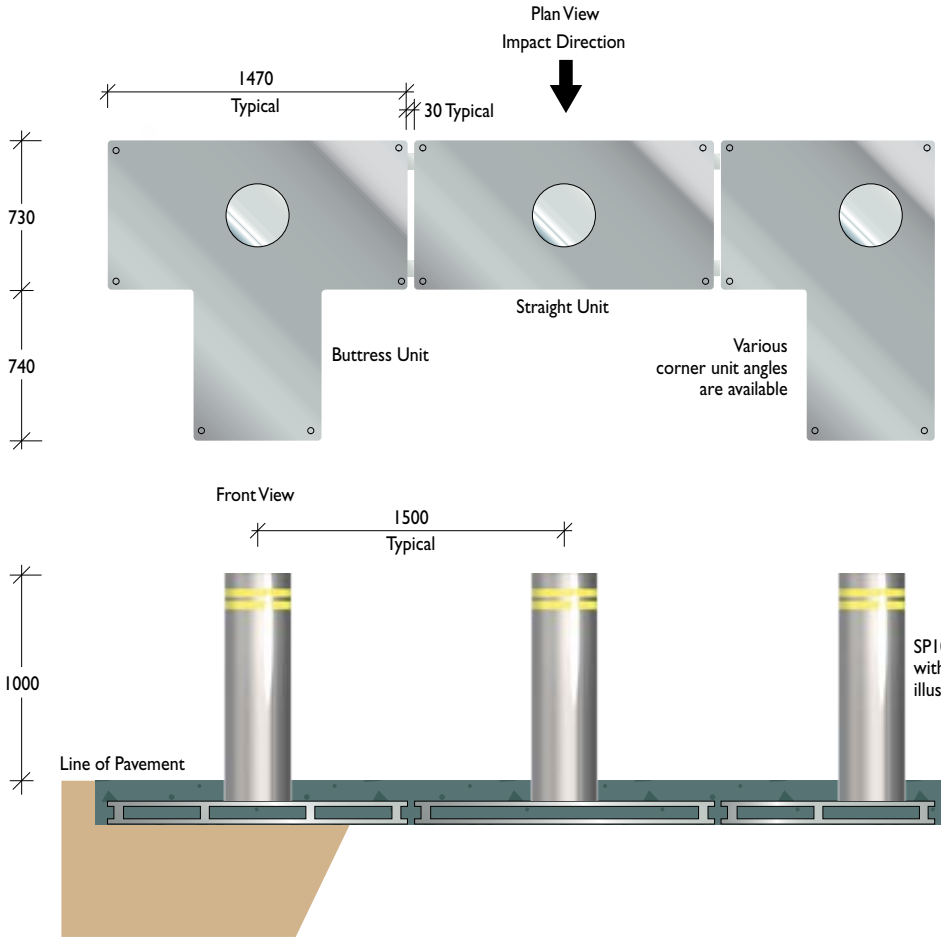
Shallow Mount
Fixed

Material Ø209 or Ø305 extra heavy duty mild steel pipe sections
Finish Hot dipped galvanised

PAS68 TESTED

Plan ATG's shallow mount caters for two different bollards:
SP420 Ø209mm / 217mm sleeved
SP1020 Ø305mm / 323mm sleeved

These shallow mount bollards can stop vehicles travelling at 48.64 or 80 km/h.



SPTT
Telescopic

Material Top Ø209 / Bottom Ø280 steel
Finish Black sheradised

PAS68 TESTED

SPTT 3
V7500 (N2) 64/90 : 0.5/6.1

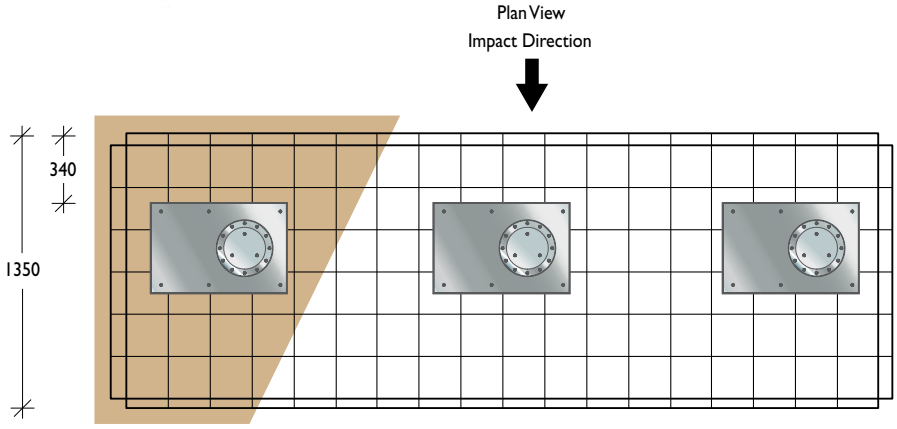
- Double retractable
- Shallow mount
- Automatic

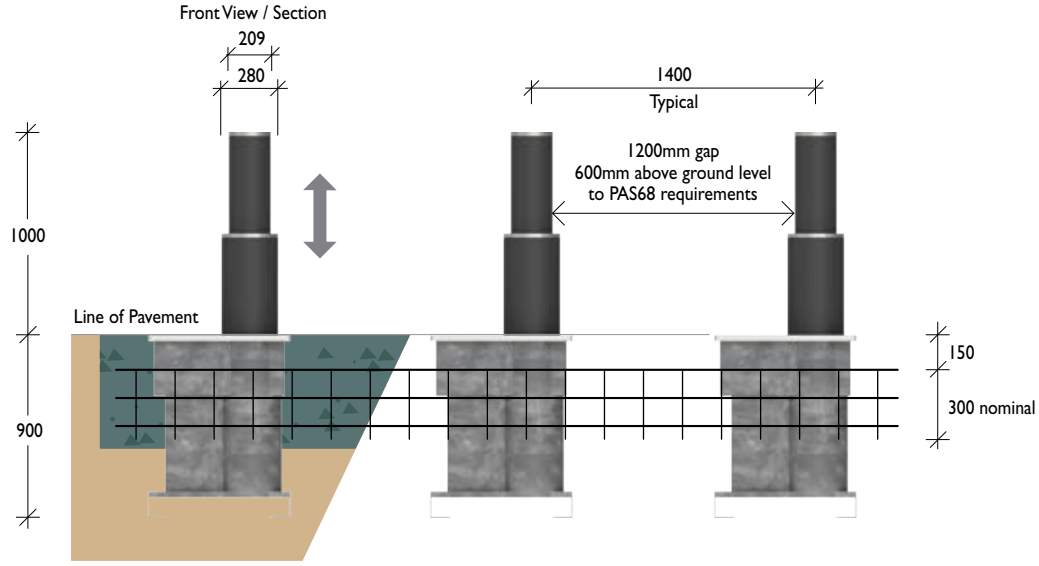
The ATG Telescopic bollard has a unique double action retractable design which ensures smooth operation and acts as a depth saving feature. It has been successfully impact tested in accordance with BSI PAS 68:2010, arresting a 7,500kg truck at 64km/h and with less than 1m penetration.

This latest innovation in technology allows the use of automatic bollards for high security solutions to be installed in areas where underground services or lack of space for excavation may cause a problem.

The Shallow TT fits into the existing range of high security systems to ensure that there is a solution to meet any of a customer's requirements. The bollard stands one metre tall yet only requires 900mm footing, significantly less than usual high security retractable bollards.

It is the strongest reduced-depth automatic bollard on the market.





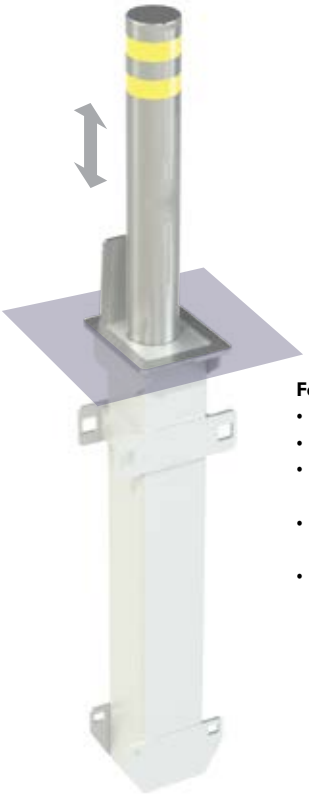
SP100
Retractable

Material Ø127 mild steel pipe
Ø141 stainless steel pipe
Finish Steel. Hot dipped galvanised or a range of RAL colours
Stainless Steel. Linished

PAS68 TESTED

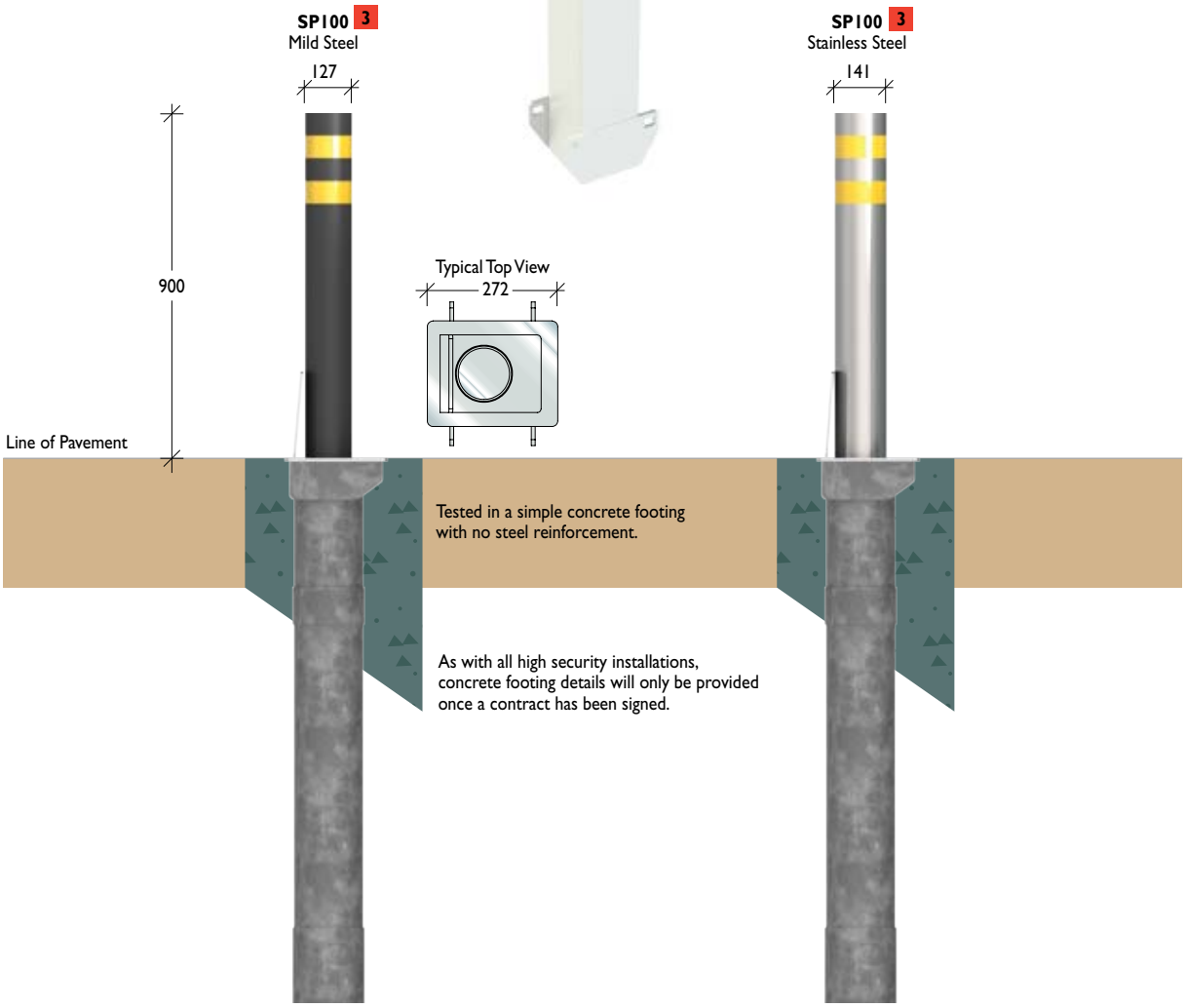
Security Rating
V3500 (N1) 48/90 : 2.8/0.0

The most economical high security retractable bollard with PAS68 Certification. It is ideally suited where budget is a primary restraint and where there are minimum traffic movements.



Features

- Semi-automatic operation
- No external power required
- Ideal for miniumum traffic areas and where budget is the primary restraint
- Stand alone installation, does not require strip fottings
- Quick and economical to instal.

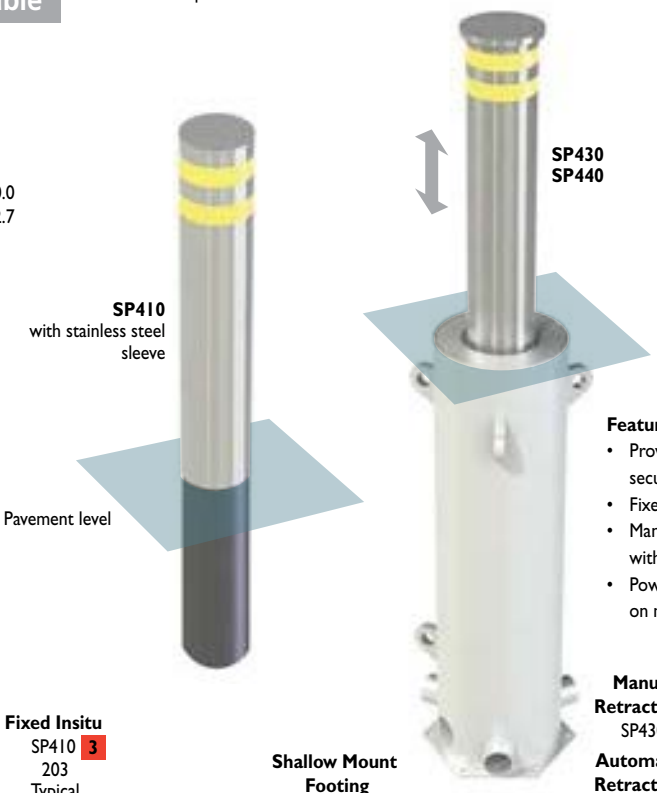


SP400
Fixed & Retractable

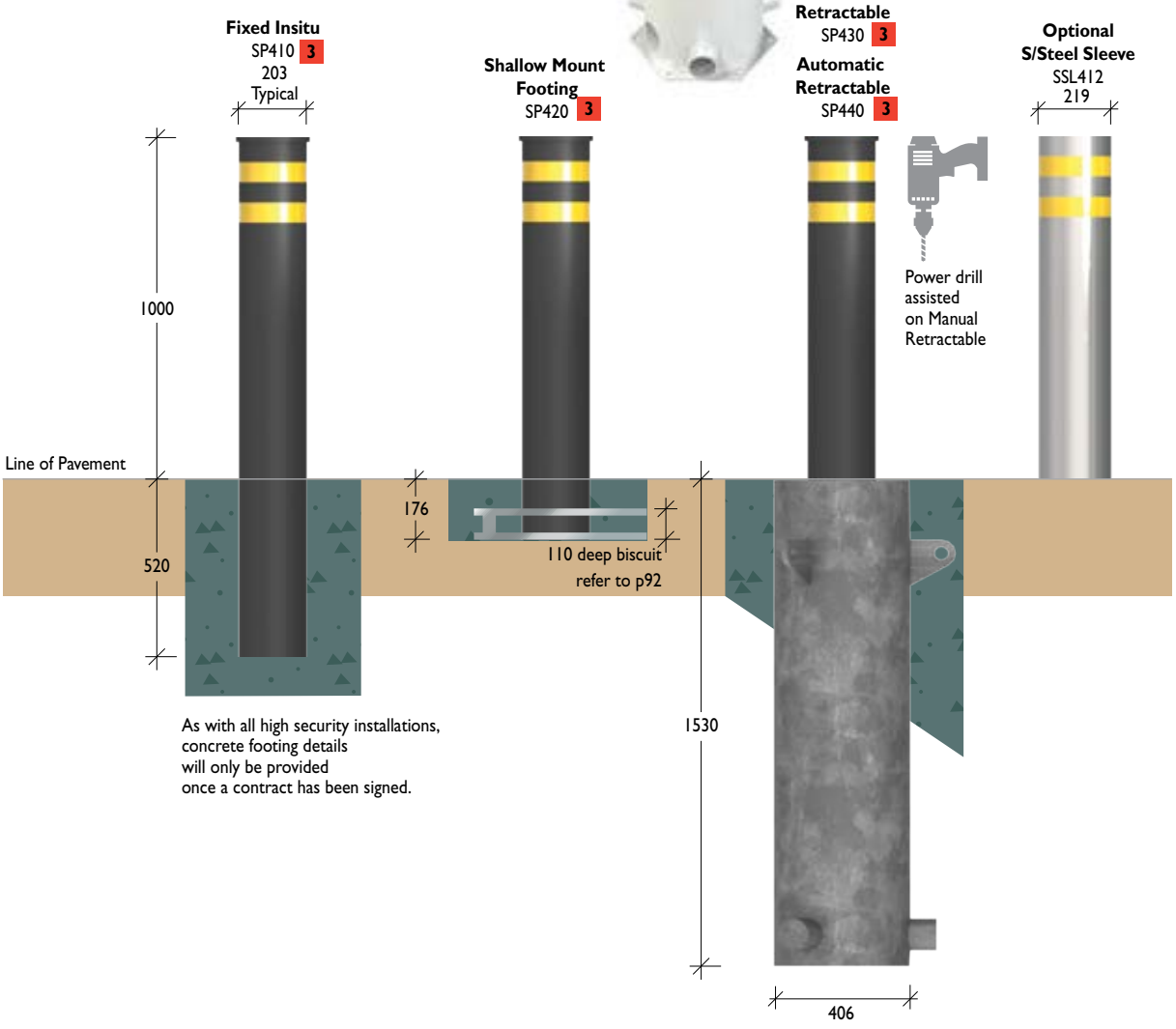
Material Ø203 extra heavy duty mild steel pipe
Finish Hot dipped galvanised or a range of RAL colours
Optional stainless steel sleeve

PAS68 TESTED

Security Rating
V7500 (N2) 48/90 : 0.0/0.0
V7500 (N2) 64/90 : 2.3/2.7



Features
- Provides a vast range of security requirements
- Fixed insitu or shallow mount
- Manual and automatic retractable with internal pneumatic assistance
- Power drill assisted on manual retractable



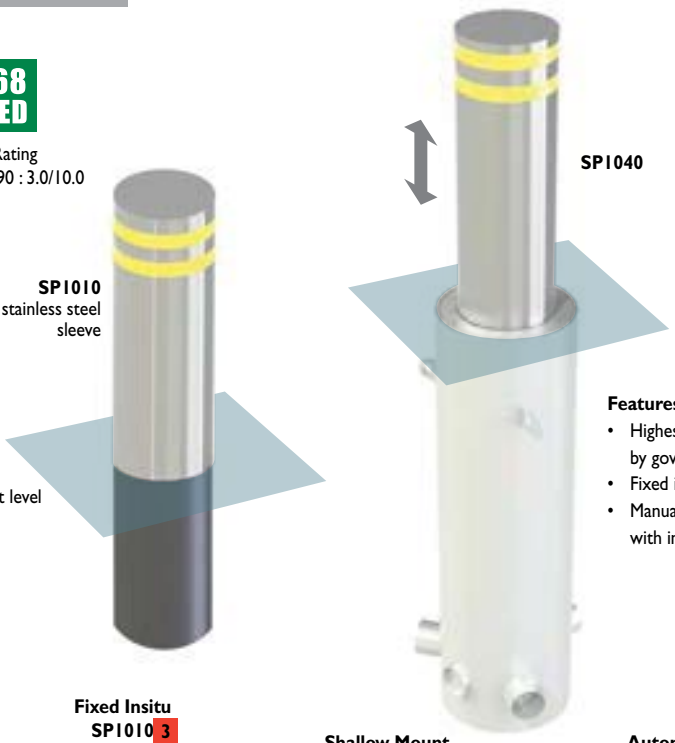
As with all high security installations, concrete footing details will only be provided once a contract has been signed.

SP1000
Fixed & Retractable

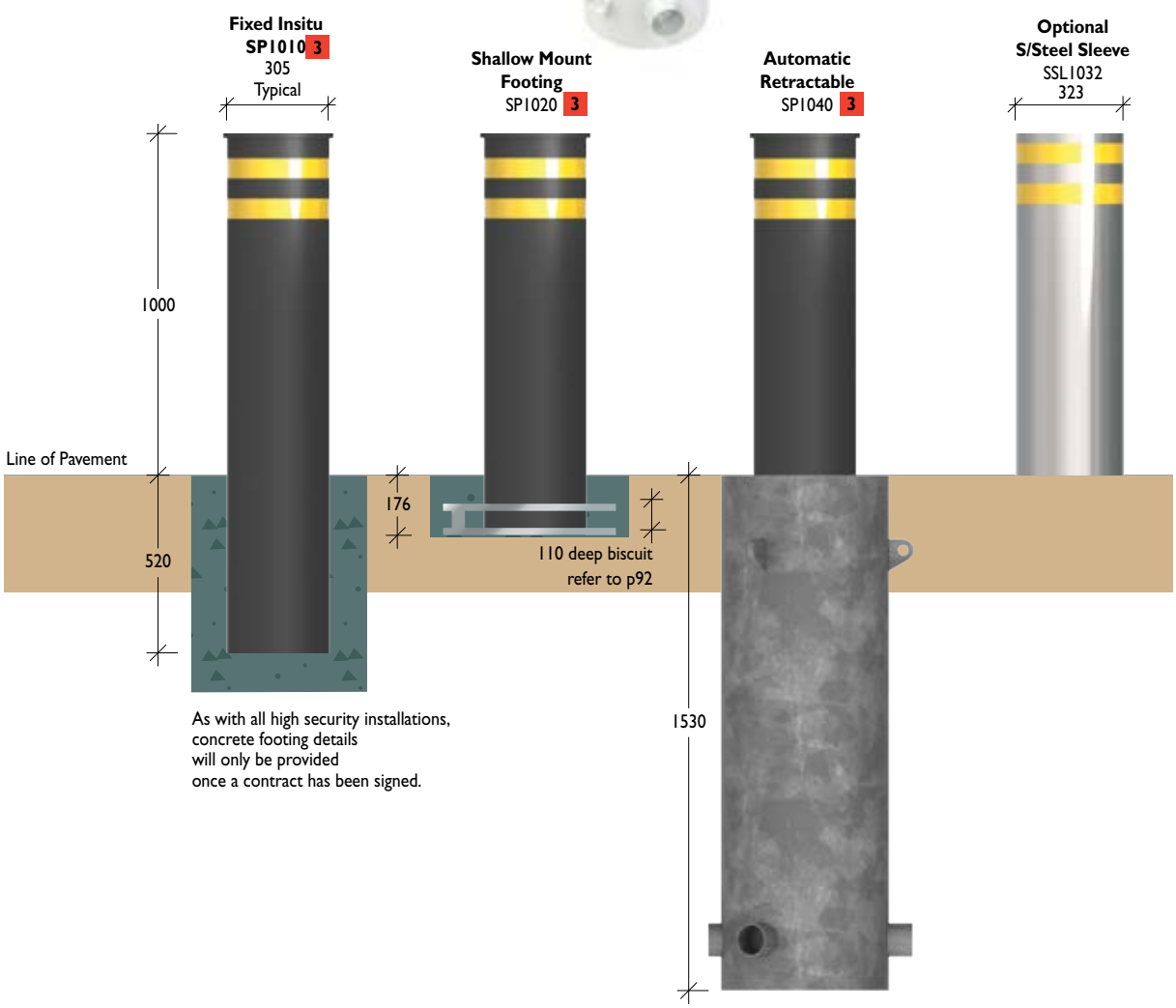
Material Ø305 extra heavy duty mild steel pipe
Finish Hot dipped galvanised or a range of RAL colours
Optional stainless steel sleeve

PAS68 TESTED

Security Rating
V7500 (N2) 80/90 : 3.0/10.0



Features
- Highest security level required by government departments
- Fixed insitu or shallow mount
- Manual and automatic retractable with internal pneumatic assistance



As with all high security installations, concrete footing details will only be provided once a contract has been signed.

ERB
Electro Mechanical

Material Ø254 x 10/11.2mm wall Steel or Stainless steel
Finish Powder coated or Electopolished

Note wall mounted control panels

Saves space
Plug and play

IWA14-1 TESTED

Vehicle impact tested to 2500kg at 64km/h (411KJ).
Simple electromechanical operation.

- Lights included
- 240V powered IP68 rated
- Motor supply 24Vdc
- 10 seconds Rise/Lower
- Upto 600 cycles per day
- Additional steel cage required for impact rated models
- Fail safe
- Obstacle detection
- Cables with IP69 connection

Options:
Solar power
Fail secure with UPS