www.marshalls.co.uk/pas68

Uniclass L811			EPIC Q12
CI/Sfb			
	(90.7)	X	

Protective Street Furniture PAS 68 / IWA 14

Marshalls

Creating Better Spaces

Representative Sweden:

Output Talltitegatan 12 23538 Vellinge +46 700 600 644 info@outputexterior.se

Contents

Protective Street Furniture 03

Our Portfolio 04

Future Spaces 07

RhinoGuard™ 15/30 Protective Bollard 09

RhinoGuard™ 25/40 Protective Bollard 10

RhinoGuard™ 75/40 Protective Bollard 11

RhinoGuard™ 72/50 Protective Bollard 12

RhinoGuard™ 75/50 Protective Bollard 13

RhinoGuard™ 75/30 Protective Bollard 14

Igneo 75/40 Protective Seat 15

EOS 75/30 Protective Seat 16

RhinoBlok™ 72/40 Protective Seat 17

GEO Coordinated Range 18

Protective Planters with RhinoGuard™ Integrated Technology 19

Case Study: BAM Construction 21

Case Study: Land Securities 22

Marshalls Bespoke Product Solutions 23

Marshalls 360 – Designed around you 24

Marshalls has been manufacturing hard landscaping materials for over 120 years and has become the leading supplier of the products that create our urban environment.

Marshalls products are used nationwide by customers who are seeking reliable, high quality goods and services. Whether it's innovative paving, sustainable drainage systems or street furniture, Marshalls is a brand that businesses can trust.

Indeed Marshalls has earned the status of Superbrand for seven consecutive years, an award bestowed only upon the most reputable, most influential brands in their field.

We believe it is all a consequence of our passion to create better, safer spaces.

PAS 68

IWA 14

Our Protective Street Furniture products are manufactured in line with PAS / IWA legislation

UK Superbrands 2016 · UK Superbrands 2015 · UK Superbrands 2014 · UK Superbrands 2013 · UK Superbrands 2012 · UK Superbrands 2011 · UK Superbrands 2010

Protective Street Furniture is not traditionally viewed as a product to enhance the landscape, more as a necessary evil to ensure our people, places and infrastructure are kept safe from threat. In most cases, crash-tested products are developed with minimal consideration given to the design.

Marshalls has flipped this on its head and taken a range of aesthetically designed street furniture products and incorporated protective RhinoGuard technology within. Through a selection of product types, materials and finishes, the specification of protective street furniture is made more inclusive for all parties.

Protective Street Furniture no longer needs to be limited to a line of bollards or heavy blocks, instead a space can be protected with lighting, seating, cycle parking or even a litter bin.

The usage and requirements for protective street furniture products can be broken down into three key areas:

1. HOSTILE VEHICLE MITIGATION

The primary objective of Hostile Vehicle Mitigation (HVM) is to remove or reduce the threat from hostile vehicles, through a variety of methods and techniques. The concept involves the careful consideration of a number of factors, including; the effects of blast loading, assessments of vehicle dynamics and potential vehicle approach routes, solutions for vehicle exclusion and traffic calming. Marshalls has technical experts available who can advise on such considerations on a specific project basis.

2. RAM RAIDING

Ram-raiding is a variation on burglary in which a vehicle is driven at a location with the intention for perpetrators to breach physical security and to loot it. Commercial properties, shop fronts and ATMs are constantly under threat of attack from ram-raiders if not sufficiently protected. Intelligent application of protective street furniture can effectively secure a location from vehicle-borne threats without hindering the aesthetics.

3. VEHICLE RESTRAINT

As more vehicles frequent the country's roads, the threat of accidental collision increases significantly. Effective vehicle restraint must be integrated into the design of of urban spaces to protect people from vehicle collision in accident blackspots. This could be in a busy commercial office space, a major transport hub or even a mixed use residential area prone to the effects of harsh winter weather.

Protective Street Furniture

See our products in action at
www.marshalls.co.uk/commercial/videos

RhinoGuard™ 15/30

RhinoGuard™ 75/40 Igneo Seat

RhinoGuard™ 75/50 Giove Planter

LEGISLATION EXPLAINED

PAS 68

At the heart of the concept of Hostile Vehicle Mitigation is the BSI PAS 68 standard. PAS 68 specifies a performance classification for vehicle security barriers and their foundations when subjected to a horizontal impact.

Whilst it is only through specifying products successfully tested in accordance with PAS 68 that protective security can truly be assured, this does not necessarily mean that the highest specifications of PAS 68 protection are always required.

PAS 69

BSI PAS 68 is complemented by the PAS 69 document, which provides guidance on the selection, installation, foundations and use of PAS 68 tested security products, taking into account site specific conditions.

PAS 69 suggests a maximum gap of 1.2m between the installed, upright faces of successive security products, to ensure that vehicles are prevented from encroaching freely between the barriers.

IWA

IWA is an international standard for counter terrorism impact testing agreements which incorporates PAS 68, PAS 69, CEN Workshop Agreement and, eventually, the PAS 170 standards. Hence, no matter where you are based or where you want to create a safe and beautiful space, the IWA workshop agreement standardises all counter terrorism impact testing agreements and models and combines them into one, making the testing and specification of products easier and clearer for all specifiers.

Vehicle Speed km/h (mph)	Vehicle Mass (kg)				
	1500	2500	3500	7500	30000
16 (10)	15kJ	25kJ	35kJ	74kJ	296kJ
32 (20)	59kJ	99kJ	138kJ	296kJ	1185kJ
48 (30)	133kJ	222kJ	311kJ	667kJ	2667kJ
64 (40)	237kJ	395kJ	553kJ	1185kJ	4741kJ
80 (50)	370kJ	617kJ	864kJ	1852kJ	7407kJ
96 (60)	533kJ	889kJ	1244kJ		
112 (70)	726kJ	1210kJ			

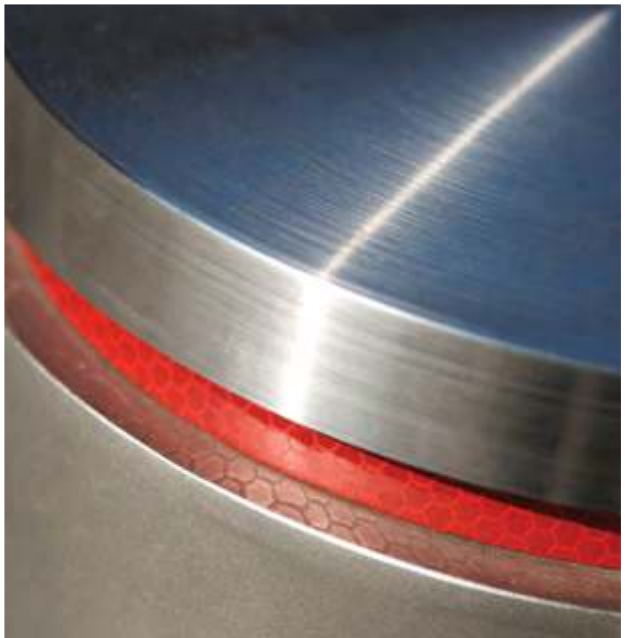
The table above provides the kinetic energy values (in kj) created on impact, for each of the vehicle types and speeds used in BSI PAS 68 and CWA 16221 impact testing.

JUST BECAUSE THE AREA HAS TO BE SAFE...

...DOESN'T MEAN THE DESIGN DOES TOO.

Marshalls

Creating Better Spaces



LET'S CREATE THE **GREATER OUTDOORS**

Our integrated street furniture ranges have everything you need to create spaces that people flock to. Places they can meet up, unwind and relax.

Our protective street furniture has been successfully crash tested in accordance with PAS 68. Whatever you're looking for, whether it's a specific product or a certain theme, you'll find everything you need to create the greater outdoors.

Discover more at marshalls.co.uk/greateroutdoors

Whilst the main objective of Protective Street Furniture is to ensure that they provide the required levels of security to sites at potential risk, Marshalls believes that it is also vital that landscapes remain functional, attractive and appreciated by the communities that use them.

The growing demand for less complicated and more cost effective ways to protect people, places and infrastructure without compromising any aesthetics is becoming the preferred choice for clients, when it comes to specifying PAS products.

To address this, Marshalls has assembled a highly specialised team of designers and engineers to develop innovative, design-led solutions including bollards, lighting, seating, planters, litter bins, post & rail and cycle stands, creating better and safer spaces for users to enjoy.

MATERIALS

Solutions to fit almost any surrounding, the Protective Street Furniture range utilises materials including:

- Concrete
- Ferrocast (Polyurethane)
- Precious Stone
- Stainless Steel
- Steel
- Timber

Our Portfolio

Visit **www.marshalls.co.uk/commercial** for a comprehensive list of complementary paving and drainage products under each category.

Choose the right Protective Product for your specification

STAGE 1
CHOOSE YOUR RATING

Once the appropriate speed rating has been determined, relevant products can be sourced.

STAGE 2
CHOOSE YOUR PRODUCT TYPE

Choose the type of street furniture you would like to specify in your design, i.e. bollards, seats, planters, litter bins, etc.

STAGE 3
CHOOSE YOUR AESTHETIC

Select from a wide range of materials and finishes to complement the architectural surrounding.

Furniture Selection Matrix

		Average Road Speed	Marshalls Protective Product
Bollards	Standard	Up to 30mph	RhinoGuard™ 15/30 Protective Core
		30-40 mph	RhinoGuard™ 25/40 Protective Core RhinoGuard™ 75/40 Protective Core
		40-50mph	RhinoGuard™ 75/50 Slimline Protective Core RhinoGuard™ 75/50 Protective Core
	Shallow Mount	Up to 30mph	RhinoGuard™ 75/30 Shallow Mount Protective Core
		30-40 mph	RhinoGuard™ 25/40 Shallow Mount Protective Core RhinoGuard™ 75/40 Shallow Mount Protective Core RhinoGuard™ 72/50 Shallow Mount Protective Core
Seating		Up to 30mph	EOS 75/30 Protective Seat
		30-40 mph	RhinoBlok™ 72/40 Protective Seat Igneo 75/40 Protective Seat
Planters		Up to 40mph	75/40 Protective Planters
		40-50mph	75/50 Protective Planters
Litter Bins		Up to 30mph	GEO Litter bin
		30-40 mph	GEO Litter bin
		40-50mph	GEO Litter bin
Cycle Stands		Up to 30mph	Cycle Stand
		30-40 mph	Cycle Stand
		40-50mph	Cycle Stand

Bollards Selection Matrix

SLEEVE OPTIONS

Standard sleeve designs are available in steel and stainless steel and can be specified with reflective banding for increased visibility and safety. Bespoke design commissions for other styles and finishes can also be accommodated on request.

FINISH OPTIONS

Stainless Steel
Stainless steel sleeves are manufactured from a carefully selected Grade 316L (1.4401). Exceptionally strong and requiring very low maintenance, the material provides higher resistance to corrosion, pitting and staining compared to other grades. Stainless steel sleeves are provided with a brushed satin finish as standard. A bright polished finish is also available on request.

Steel (Powder coated)
Steel sleeves are treated with the Akzo Nobel, Interpon PZ 770 system, being first treated with a zinc primer for enhanced corrosion protection and finished with a polyester powder topcoat. Bollards are supplied in Black RAL 9005 as standard; however a full range of Matt & Gloss RAL colours is also available upon request.

Geo Stainless Steel
The GEO bollard features a bead blasted grade 316 stainless steel body, and is finished with a contemporary machine finished stainless steel cap. Exceptionally strong and requiring very low maintenance, the material provides higher resistance to corrosion, pitting and staining compared to other grades.

Ferrocast
Ferrocast is a low maintenance solution that provides an exceptionally strong non-ferrous exterior which is completely resistant to the effects of rust and corrosion. The material contains colour pigments throughout meaning in the event of any exterior damage, the appearance of scratches are minimized. Bollards are supplied in black RAL 9005 as standard, however a full range of Matt & Gloss RAL colours is also available upon request.

RhinoGuard™ bollard cores have been developed and tested so that they can be specified with cosmetic sleeves in various materials, to complement any surrounding area.

STAINLESS STEEL - SLEEK STYLING

	Diameter (mm)			Height above ground (mm)***	Foundation Depth		Finish Option	Banding Options			Top Options	
BOLLARD TYPE	Core	Steel Sleeves	Stainless Steel Sleeves		Standard Depth ****	Shallow Mount (SM)*****	Stainless Steel	No Band	One Band	Two Bands	Flat Top	Mitre Top
RATING**												
15/30	114	168	129	1000	☒		☒	☒	☒	☒	☒	☒
25/40	168	194	204	1000	☒		☒	☒	☒	☒	☒	☒
25/40 SM	168	194	204	1000		☒	☒	☒	☒	☒	☒	☒
75/30 SM	194	204	204	1000		☒	☒	☒	☒	☒	☒	☒
75/40	168	194	204	1000	☒		☒	☒	☒	☒	☒	☒
75/40 SM	244	273	254/273	1000		☒	☒	☒	☒	☒	☒	☒
72/50 SM	244	273	254/273	1000		☒	☒	☒	☒	☒	☒	☒
75/50	244	273	254/273	1000	☒		☒	☒	☒	☒	☒	☒
75/50 Slimline*	194	204	204	1000	☒		☒	☒	☒	☒	☒	☒

GEO – DEFINED BY UNDERSTATED ELEGANCE

	Diameter (mm)			Height above ground (mm)***	Foundation Depth		Finish Option
BOLLARD TYPE	Core	Steel Sleeves	Stainless Steel Sleeves		Standard Depth ****	Shallow Mount (SM)*****	GEO
RATING**							
15/30	114	168	129	1000	☒		☒
25/40	168	194	204	1000	☒		☒
25/40 SM	168	194	204	1000		☒	☒
75/30 SM	194	204	204	1000		☒	☒
75/40	168	194	204	1000	☒		☒
75/40 SM	244	273	254/273	1000		☒	
72/50 SM	244	273	254/273	1000		☒	
75/50	244	273	254/273	1000	☒		
75/50 Slimline*	194	204	204	1000	☒		☒

Geo Stainless Steel

The full Geo range with integrated RhinoGuard can be found on page 18.

STEEL (POWDER COATED) - CLASSIC STYLING

	Diameter (mm)			Height above ground (mm)***	Foundation Depth		Finish Option	Banding Options			Top Options	
BOLLARD TYPE	Core	Steel Sleeves	Stainless Steel Sleeves		Standard Depth ****	Shallow Mount (SM)*****	Power Coated Steel	No Band	One Band	Two Bands	Flat Top	Mitre Top
RATING**												Certain sizes upon request.
15/30	114	168	129	1000	☒		☒	☒	☒	☒	☒	
25/40	168	194	204	1000	☒		☒	☒	☒	☒	☒	
25/40 SM	168	194	204	1000		☒	☒	☒	☒	☒	☒	
75/30 SM	194	204	204	1000		☒	☒	☒	☒	☒	☒	
75/40	168	194	204	1000	☒		☒	☒	☒	☒	☒	
75/40 SM	244	273	254/273	1000		☒	☒	☒	☒	☒	☒	
72/50 SM	244	273	254/273	1000		☒	☒	☒	☒	☒	☒	
75/50	244	273	254/273	1000	☒		☒	☒	☒	☒	☒	
75/50 Slimline*	194	204	204	1000	☒		☒	☒	☒	☒	☒	

FERROCAST – DESIGNED AROUND YOU!

	Diameter (mm)			Height above ground (mm)***	Foundation Depth		Finish Option
BOLLARD TYPE	Core	Steel Sleeves	Stainless Steel Sleeves		Standard Depth ****	Shallow Mount (SM)*****	Ferrocast
RATING**							
15/30	114	168	129	1000	☒		☒
25/40	168	194	204	1000	☒		☒
25/40 SM	168	194	204	1000		☒	☒
75/30 SM	194	204	204	1000		☒	☒
75/40	168	194	204	1000	☒		☒
75/40 SM	244	273	254/273	1000		☒	☒
72/50 SM	244	273	254/273	1000		☒	☒
75/50	244	273	254/273	1000	☒		☒
75/50 Slimline*	194	204	204	1000	☒		☒

Ferrocast

Ferrocast is an engineering grade polyurethane which can be cast into almost any preferred shape required, around a steel core.

* Slimline: 204mm slimline sleeve provides a more subtle appearance.
**Rating: For example 15/30 = 1.5 tonne vehicle @ 30mph
*** Height Above Ground: The height the bollard stands above ground level.

**** Shallow Mount: Up to 75% less excavation required compared to some standard PAS68 systems, meaning a more cost effective installation
***** Standard Depth: Typical excavation required could be upto 1000mm compared to upto 250mm for shallow mount bollards.

Enhancing and protecting future spaces

FUT URE
SPA CES

MARSHALLS BELIEVES IN CREATING BETTER SPACES AND AS THE UK'S LEADING LANDSCAPE MATERIALS BRAND WE BELIEVE THAT IT'S IMPORTANT TO THINK AHEAD.

Future spaces is our ambition to foresee how the commercial public space we help design, build and share might adapt and evolve over the next ten years.

We set out to predict how changing lifestyles, technology and ecommerce conditions might dictate the look, feel, colour, shape, textures and materials used to create those spaces.

Future spaces is the result of our own intensive research including interviews with academics, industry commentators, journalists, architects, landscape designers, material specialists, engineers and futurologists.

Marshalls has identified four unstoppable global mega-trends driving 12 emerging themes that will most certainly change the nature of our built environment, both subtly and dramatically. To find out more visit **www.marshalls.co.uk/futurespaces**

We decided to put these findings to the test and worked with our technical design specialists to provide 3D future visualisations incorporating our range of protective street furniture to denote that safe spaces can be beautiful spaces. We believe protective street furniture shouldn't clutter but enhance whilst also protecting our shared spaces. Three key scapes have been identified requiring protective street furniture products:

- **Mixed Use Space**
- **Commercial Space**
- **Transport Space**

The blurring of public / private spaces and the need for environments to be designed to serve multiple functions for different types of users will mean spaces will have to work harder and be as flexible as possible whilst encouraging placemaking and social interaction.

As global urbanisation accelerates, cities need to be able to continue to function properly under increasing, multiple stresses. To do that, cities must be consciously designed to resist the impacts of natural, social, political and economic events.

3D sketch up models, mood boards and visualisations are available upon request for all your protective street furniture project requirements. Visit www.sketchup.com and search Marshalls Protective Street Furniture or speak to your sales representative.

Future Spaces

Mixed Use Spaces

Commercial Spaces

Transport Spaces

Providing effective protection of critical infrastructure, people and places, Marshalls introduces the 15/30 Protective Bollard, providing proven levels of performance at a distinct level of protection and budget.

Our successfully crash tested RhinoGuard™ technology is built into the core, with a sleeve being placed over it to provide a more attractive finish in all locations where aesthetics and safety are key.

The core diameter is Ø114mm with three sleeve options: steel, stainless steel and Ferrocast .

The system has been designed and tested showing it meets the requirements of PAS 68 and achieved a successful certificated rating.

RhinoGuard™ 15/30

Protective Bollard

Product Name	Excavation depth (mm)	Core Diameter (mm)	Height Above Ground (mm)(FGL)	Core Weight (Kg)	Sleeve diameter	Finish
RhinoGuard™ 15/30 Protective Bollard	500	Ø114	1000	90	Ø168	Steel/ Powder Coated
	500	Ø114	1000	90	Ø129	Stainless Steel
	500	Ø114	1000	90	Various	Ferrocast

* Cap and Core finish also available. For further information, please contact our sales office on 0370 600 2425.
* Bolt down version also available

Vehicle: Unladen 1.5 tonne saloon car
Vehicle Speed: 30mph (48km/h)
PAS 68 Classification Code: Standard Bollard
PAS 68:2007:V/1500(M1)48/90:1.3/0.0

For sleeve style options please see page 6.

Typical protective PAS 68 bollard foundations consist of a combination of concrete and steel reinforcement, with some product available requiring up to 1000mm of depth below ground. However, for many sites requiring safety and protection, the existence of underground utilities and cramped building foundations can prohibit this level of excavation without serious disruption.

Marshalls helps tackle the shallow excavation problem with the RhinoGuard™ 25/40 Shallow Mount Protective Bollard, requiring up to 75% less excavation than some standard PAS 68 systems, resulting in a cost effective installation and less time spent on site. Our successfully crash tested RhinoGuard™ technology is built into the core, with a sleeve being placed over it to provide a more attractive finish in all locations where aesthetics and safety are key.

If the application requires protective bollards of standard depth and of a 25/40 PAS 68 rating, Marshalls is able to provide you with the version of the RhinoGuard™ 25/40 Protective Bollard.

The difference is only visible under the ground, meaning the installation will not compromise aesthetics at any cost. It is a perfect solution for sites where medium-sized vehicles can be viewed travelling at average speeds up to 40mph.

For sleeve style options please see page 6.

RhinoGuard™ 25/40

Protective Bollard

Product Name	Excavation depth (mm)	Core Diameter (mm)	Height Above Ground (mm)(FGL)	Core Weight (Kg)	Sleeve diameter	Finish
RhinoGuard™ 25/40 Protective Bollard	600	Ø168	1000	180	Ø194, Ø204	Steel/ Powder Coated
	600	Ø168	1000	180	Ø204	Stainless Steel
	600	Ø168	1000	180	Various	Ferrocast
RhinoGuard™ 25/40 Shallow Mount Protective Bollard	152	Ø168	1000	340 to360	Ø194	Steel/ Powder Coated
	152	Ø168	1000	340 to360	Ø204	Stainless Steel
	152	Ø168	1000	340 to360	Various	Ferrocast

*Cap and Core finish also available. For further information, please contact our sales office on 0370 600 2425.

Test 1
Vehicle: Unladen 2.5 tonne 4x4 utility vehicle
Vehicle Speed: 40mph (64km/h)

PAS 68 Classification Code: Standard Bollard
PAS 68:2007:V/2500(M2)/64/90:0.0/0.0

PAS 68 Classification Code: Shallow Mount
PAS 68:2010:V/2500(M2)/64/90:2.3/0.0

Typical protective PAS 68 bollard foundations consist of a combination of concrete and steel reinforcement, with some product available requiring up to 1000mm of depth below ground. However, for many sites requiring safety and protection, the existence of underground utilities and cramped building foundations can prohibit this level of excavation without serious disruption.

Marshalls helps tackle the shallow excavation problem with the RhinoGuard™ 75/40 Shallow Mount Protective Bollard, requiring up to 75% less excavation than some standard PAS 68 systems, resulting in a cost effective installation and less time spent on site. Our successfully crash tested RhinoGuard™ technology is built into the core, with a sleeve being placed over it to provide a more attractive finish in all locations where aesthetics and safety are key.

If the application requires protective bollards of standard depth and of a 75/40 PAS 68 rating, Marshalls is able to provide you with the standard version of the RhinoGuard™ 75/40 Protective Bollard.

The difference is only visible under the ground, meaning the installation will not compromise aesthetics at any cost. It is a perfect solution for sites where medium-sized vehicles can be viewed travelling at average speeds up to 40mph.

The system has been designed and tested showing it meets the requirements of PAS 68 and achieved a successful certificated rating.

Vehicle: Fully laden 7.5 tonne two axle rigid N2 lorry
Vehicle Speed: 40mph (64km/h)

PAS 68 Classification Code: Shallow Mount:
PAS 68:2013:V/7500(N2)/64/90:1.8/0.0

PAS 68 Classification Code: Standard Bollard:
PAS 68:2010:V/7500(N2)/64/90:8.7/0.0

Product Name	Excavation depth (mm)	Core Diameter (mm)	Height Above Ground (mm)(FGL)	Core Weight (Kg)	Sleeve diameter	Finish
RhinoGuard™ 75/40 Protective Bollard	600	Ø168	1100	210	Ø194	Steel Powder Coated
	600	Ø168	1100	210	Ø204	Stainless Steel
	600	Ø168	1100	210	Various	Ferrocast

Product Name	Excavation depth (mm)	Core Diameter (mm)	Height Above Ground (mm)(FGL)	Core & Frame weight (kg)	Sleeve diameter	Finish
RhinoGuard™ 75/40 Shallow Mount Bollard	154	Ø244	1000	560	Ø273	Steel Powder Coated
	154	Ø244	1000	560	Ø254mm, Ø273mm	Stainless Steel
	154	Ø244	1000	560	Vatious	Ferrocast

*Cap and Core finish also available. For further information, please contact our sales office on 0370 600 2425.

RhinoGuard™ 75/40

Protective Bollard

For sleeve style options please see page 6.

RhinoGuard™ 72/50

Protective Bollard

Providing effective protection of critical infrastructure, people and places, Marshalls introduces the RhinoGuard™ 72/50 Shallow Mount Protective Bollard, providing proven levels of performance at a distinct level of protection and budget.

Our successfully crash tested RhinoGuard™ technology is built into the core, with a sleeve being placed over it to provide a more attractive finish in all locations where aesthetics and safety are key. The core diameter is Ø244mm with three sleeve options: steel, stainless steel and Ferrocast .The system has been designed and tested showing it meets the requirements of PAS 68 and achieved a successful certificated rating.

For sleeve style options please see page 6.

Product Name	Excavation depth (mm)	Core Diameter (mm)	Height Above Ground (mm)(FGL)	Core Weight (Kg)	Sleeve diameter	Finish
RhinoGuard 72/50 Shallow Mount	175	Ø244	1000	644	Ø273	Steel/ Powder Coated
	175	Ø244	1000	644	Ø256, Ø273	Stainless Steel
	175	Ø244	1000	644	Various	Ferrocast

Vehicle: 7.2 tonne two axle rigid N2 lorry
Vehicle Speed: 50mph (80km/h)
Classification Code: IWA 14-1:2013 Bollard V/7200[N2A]/80/90:5.7

Product Name	Excavation depth (mm)	Core Diameter (mm)	Core Weight (Kg)	Height Above Ground (mm)	Sleeve diameter	Finish
RhinoGuard 75/50 Protective Bollard	750	Ø244	303	1000	Ø273	Steel Powder Coated
	750	Ø244	303	1000	Ø254, Ø273	Stainless Steel
	750	Ø244	303	1000	Various	Ferrocast
RhinoGuard 75/50 Slimline Protective Bollard	750	Ø194	260	1000	Ø204	Steel Powder Coated
	750	Ø194	260	1000	Ø204	Stainless Steel
	750	Ø194	260	1000	Various	Ferrocast

*Cap and Core finish also available. For further information, please contact our sales office on 0370 600 2425.

Vehicle: Unladen 7.5 tonne two axle rigid N3 lorry
Vehicle Speed: 50mph (80km/h)

PAS 68 Classification Code: Standard Bollard
PAS 68:2013:V/7500(N3)/80/90:5.4/0.0

PAS 68 Classification Code: Slimline Standard Bollard
PAS 68:2010:V/7500(N3)/80/90:12.5/21.8

RhinoGuard™ 75/50

Protective Bollard

Providing effective protection of critical infrastructure, people and places, Marshalls introduces the 75/50 Protective Bollard, providing proven levels of performance at a distinct level of protection and budget.

The RhinoGuard 75/50 protective bollard has a Ø244mm core as standard but is also available as a slimline product that can accommodate the Ø204mm sleeve for a more subtle appearance.

Our successfully crash tested RhinoGuard™ technology is built into the core, with a sleeve being placed over it to provide a more attractive finish in all locations where aesthetics and safety are key.

Both the cores are available with three sleeve options; steel, stainless steel and Ferrocast.

The system has been designed and tested showing it meets the requirements of PAS 68 and achieved a successful certificated rating.

For sleeve style options please see page 6.

RhinoGuard™ 75/30

Protective Bollard

Product Name	Excavation depth (mm)	Core Diameter (mm)	Height Above Ground (mm)(FGL)	Core Weight (Kg)	Sleeve diameter	Finish
RhinoGuard™ 75/30 Shallow Mount Protective Bollard	152	Ø194	1000	370 to 390	Ø204	Steel Powder Coated
	152	Ø194	1000	370 to 390	Ø204	Stainless Steel
	152	Ø194	1000	370 to 390	Various	Ferrocast

*Cap and Core finish also available. For further information, please contact our sales office on 0370 600 2425.

Typical protective PAS 68 bollard foundations consist of a combination of concrete and steel reinforcement, with some product available requiring up to 1000mm of depth below ground. However, for many sites requiring safety and protection, the existence of underground utilities and cramped building foundations can prohibit this level of excavation without serious disruption.

Marshalls helps tackle the shallow excavation problem with the RhinoGuard™ 75/30 Shallow Mount Protective Bollard, requiring up to 75% less excavation than some standard PAS 68 systems, resulting in a cost effective installation and less time spent on site. Our successfully crash tested RhinoGuard™ technology is built into the core, with a sleeve being placed over it to provide a more attractive finish in all locations where aesthetics and safety are key. The core diameter is Ø168mm, supplied with a shallow frame and has three sleeve options: steel, stainless steel and Ferrocast.

The system has been designed and tested showing it meets the requirements of PAS 68 and achieved a successful certificated rating.

Vehicle: Fully laden 7.5 tonne two axle rigid N2 lorry
Vehicle Speed: 30mph (48km/h)
PAS 68 Classification Code: Shallow Mount
PAS 68:2010:V/7500(N2)/48/90:1.5/0.0

For sleeve style options please see page 6.

The introduction of appropriate physical security measures into crowded places and the critical national infrastructure is essential in ensuring that the UK is protected from vehicle borne threats. It is vital that landscapes remain safe and functional yet attractive, in order to be appreciated by the communities that use them.

Igneo is a modular seating system that offers unique contemporary styling, combined with functionality and exceptional impact performance. It can be specified to any length, using any number of modules, dependant on location and the amount of seating places required. Armrests can be installed between seating sections in most RAL colours available to match individual requirements. The seat is available in two colours as standard, coordinating with Marshalls paving.

- Successfully tested based on Government PAS Standards
- Manufactured from Marshalls' fibre reinforced precast concrete, which makes the seat an extremely durable solution, requiring minimal maintenance
- Supplied with anti-graffiti coating as standard
- Armrests made from Ferrocast for a longer life span and minimal maintenance (optional)

To create a co-ordinated result, Igneo Litter Bin, Chair and Appia Bollard complement the seat, together with the Giove Protective Planter and our stainless steel and Ferrocast sleeved bollards.

Igneo 75/40

Protective Seat

Product Name	Seat Span (mm)	Seat Height (mm)(FGL)	Finish
Igneo 75/40 Protective Seat - centre section	1102	474	Concrete
Igneo 75/40 Protective Seat - left/right section	1037	474	Concrete

* Please note, the installed spacing between Igneo seating and the outer face of the next successive security measure should be a maximum of 900mm

Vehicle: Fully laden 7.5 tonne two axle rigid N2 lorry
Vehicle Speed: 40mph (64km/h)
PAS 68 Classification Code:
Test 1: Centre: PAS 68:2010:V/7500(N2)/64/90:3.7/0.0
Test 2: Off Centre: V/7500(N2)/64/90:3.5/0.0

EOS 75/30

Protective Seat

Product Name	Seat Span (mm)	Height Above Ground (mm)(FGL)	Finish
EOS 75/30 Protective Seat	1800	875	Ferrocast and Timber

*Please note, the installed spacing between the 75/30 Seat Frame and the outer face of the next successive security measure should be a maximum of 900mm

Vehicle: Fully laden 7.5 tonne two axle rigid N2 lorry
Vehicle Speed: 30mph (48km/h)
PAS 68 Classification Code:
Test 1: Front Facing (Centre): PAS68:2010:V/7500(N2)/48/90:0.0/0.0
Test 2: Back facing (Centre): V/7500(N2)/48/90:3.1/0.0
Test 3: Back facing (Off Centre): V/7500(N2)/48/90:2.7/0.0

Introducing adequate seating facilities is an essential aspect of public realm design. Seating provides people with areas to rest and enjoy their surroundings, and can contribute towards the overall character and identity of an outdoor space.

Marshalls has developed and impact tested an innovative frame structure, designed to fit seamlessly inside an array of seating styles, providing the ultimate in integrated security solutions. This highly engineered RhinoGuard™ technology signals a remarkable breakthrough in the security industry, enabling exceptional levels of protection to be incorporated into the natural street scene, whilst enhancing both the functionality and design of our public spaces. The structure has been developed to enable seating styles in various materials to be designed around it to coordinate with any environment, and is supplied shrouded with the elegant 'EOS' design as standard.

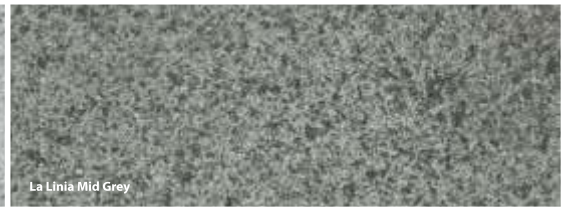
The seat ends are manufactured using our durable Ferrocast polyurethane material, and can be supplied in a wide selection of RAL colours to coordinate with the surrounding environment. Seating slats are manufactured from FSC sourced Iroko hardwood timber, whilst a perforated steel front panel adds to the contemporary design. Utilising the experience and knowledge of our team of design engineers, we can develop bespoke seating styles in many materials, to disguise the crash tested structure and meet the requirements of any project.

To create a co-ordinated result, our Giove Protective Planter and our stainless steel and Ferrocast sleeved bollards are a great choice.

RhinoBlok™ 72/40

Protective Seat

Conservation Silver Grey


La Linia Mid Grey

Saxon Buff

Protecting people, places and existing infrastructure is very important in all spaces, from traditional to commercial and urban environments. However, keeping spaces and their people safe does not have to compromise the aesthetics of the surrounding areas.

Marshalls introduces the RhinoBlok™ 72/40 Protective Seat, a seat which has inner strength, outer beauty and protects people, places and infrastructure without compromising the appearance of the space.

RhinoBlok™ is made from concrete and comes in a variety of finishes: plain smooth grey, stone effect finish to integrate with existing paving or you can add a timber cladded top for a natural look. RhinoBlok™ can also be utilised as the basis of a timber planter, making it harder to be detected while keeping the aesthetics of the surrounding space.

The seat has been designed and tested showing it meets the requirements of IWA14-1:2013 and achieved a successful certificated rating.

Vehicle: 7.2 tonne N2A lorry
Vehicle Speed: 40mph (64km/h)
IWA14-1:2013 Classification Code: Blok V/7200[N2A]/64/90:19.3

Product Name	Length (mm)	Width (mm)	Height Above Ground (mm)(FGL)--	Weight (Kg)	Finishes	Order Code
RhinoBlok™ 72/40 Protective Seat	1600	1000	580	2500	Plain (smooth grey)	CQUP9070100
	1600	1000	580	2500	Plain with timber top	CQFM4500100
	1600	1000	580	2500	La Linia Mid Grey Stone Effect	CQFM4502100
	1600	1000	580	2500	Saxon Buff Stone Effect	CQFM4502200
	1600	1000	580	2500	Conservation Silver Grey Stone Effect	CQFM4502300
	1600	1000	580	2500	La Linia Mid Grey with Timber Top	CQFM1502150
	1600	1000	580	2500	Saxon Buff with Timber Top	CQFM4502250
	1600	1000	580	2500	Conservation Silver Grey with Timber Top	CQFM4502350

Litter Bin | Cycle Stand | Living Green Wall | Fingerpost | Lighting Solution | Lightstack | Bollard | Illuminated Bollard | Marker Bollard | Monolith

GEO

Coordinated Range

The coordinated GEO range with integrated RhinoGuard™ Protective Technology reflects the best of modern urban design: simplicity, sustainability and robust materials in a low profile form.

The GEO "shadow gap" design theme continues throughout the product range to enhance the sense of place and identity. This enables a consistent project signature to be established and helps minimise visual clutter.

The range consists of a bollard, lightstack, living wall, fingerpost, litter bin and lamppost, all with the possibility of integration.

The GEO Living Wall with integrated protective technology combines natural landscaping with the requirement to protect and secure a public space. The 1m high unit features three upright PAS 68 certified GEO bollards with an integrated steel frame to encourage extensive plant growth throughout the product. The product utilises winter hard ivy to ensure dense growth all year round with limited maintenance.

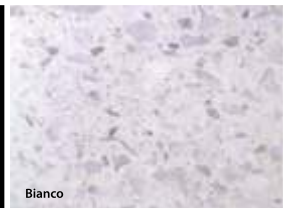
BEFORE

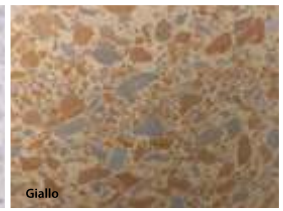
AFTER

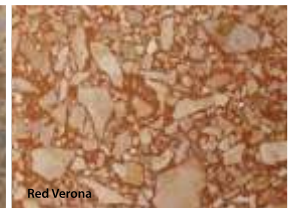
For more information, please contact our sales office on 0370 6002425.

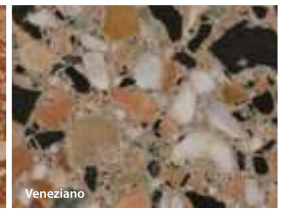
Protective Planters

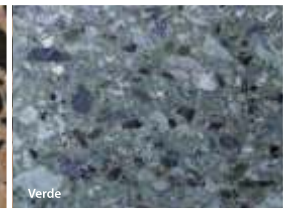
Integrated RhinoGuard™ Technology

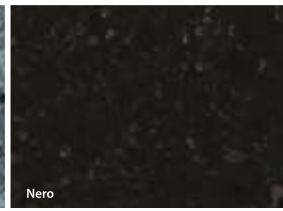

Bianco


Giallo


Red Verona


Veneziano


Verde


Nero

Introducing trees and planting into urban landscapes provides numerous benefits, with research showing positive effects on social and environmental well-being, evoking a sense of pride of place within communities.

To facilitate the integration of attractive planting into our public spaces whilst also mitigating the threat of vehicle-borne attacks, Marshalls has developed and impact tested a high strength steel frame, designed to fit inside a range of planters.

The RhinoGuard™ 75/50 Planter Frame provides architects and designers with an ideal alternative to the more traditional methods of hostile vehicle mitigation, offering exceptional levels of security along with the benefits of introducing planting to urban spaces.

The design of the RhinoGuard™ frame allows for the root ball of a medium sized tree to be contained inside the planter, providing landscape architects with the freedom they require to introduce creative planting solutions into the built environment. The high strength frame is designed to fit seamlessly inside a range of cosmetic planter styles in various materials, providing a design-led, high performance security solution that can both aesthetically enhance and protect any scheme.

Planters are available in both traditional and contemporary designs, with a variety of material options, including concrete, timber and steel. For larger schemes, the frame also provides an ideal opportunity for completely bespoke solutions.

Sineu Graff
Rendezvous Planter

Sineu Graff
Roots Planter

Sineu Graff
Bespoke Design Planter

Protective Planters

Integrated RhinoGuard™ Technology

Sineu Graff
Marquise Planter

Sineu Graff
Optima Planter

Sineu Graff
Domino Planter

Product Name	Excavation depth (mm)	Height Above Ground (mm)(FGL)	Width (mm)	Finish
RhinoGuard™ 75/50 Protective Planter Frame	950	955	952	Powder Coated
RhinoGuard™ 75/50 Protective Planter Frame with Giove Planter	950	1090	2000	Precious Stone

Test 1 (frame)
Vehicle: Fully laden 7.5 tonne two axle rigid N2 lorry
Vehicle Speed: 40mph (64km/h)
PAS 68 Classification Code: PAS 68:2010:V/7500(N2)/64/90:0.0/0.0

Test 2 (frame)
Vehicle: Unladen 7.5 tonne two axle rigid N3 lorry (empty 18 tonner)
Vehicle Speed: 50mph (80km/h)
PAS 68 Classification Code: PAS 68:2010:V/7500(N3)/80/90:1.7/0.0

Test 3 (frame with Giove planter)
Vehicle: Unladen 7.5 tonne two axle rigid N3 lorry (empty 18 tonner)
Vehicle Speed: 50mph (80km/h)
PAS 68 Classification Code: PAS 68:2010:V/7500(N3)/80/90:3.8/35.5

BAM Construction

A Large Leisure & Shopping Park located in the South East of England

Problem

The client BAM Construction was seeking a solution to protect the glass frontage of the shops and restaurants located at this leisure park. A depth restriction of 200mm was placed on any installed products.

The client was seeking protective products which complemented the modern surroundings of the leisure park.

The client also required a range of other street furniture products, such as cycle and motorcycle stands.

Solution

Marshalls worked with the client to find the best solutions for this project. Because of the depth restriction placed on installation in certain areas, 5 No RhinoGuard™ 25/40 Protective Bollards and 25 No 25/40 Shallow Mount Protective Bollards were chosen. The client opted for Stainless Steel Sleeves, which offer a sleek and modern aesthetic to the products. All of the chosen products are PAS 68 rated classified, reassuring clients and space users of the safeguarding of the space, people and infrastructure.

To avoid delays, Marshalls worked closely with BAM to ensure that they could excavate foundations prior to the products being delivered to site to enable them to move on to other areas of the project.

A range of other street furniture products were also supplied by Marshalls, such as standard stainless steel and steel powder coated bollards, Cycle Stands and Motorcycle Stands.

Benefit

Marshalls worked with the client to seek the best possible solutions for this project. The chosen bollards offer the required level of protection whilst also allowing for shallow installation and enhancing the aesthetics of the project.

Marshalls was also able to offer a range of highly durable, functional and aesthetically pleasing street furniture solutions for this project.

Problem

The client Land Securities completed a large outlet village in the South East of England. As a key part of the public realm section of the project, the client sought protective street furniture solutions which would not only offer the required level of protection but would also complement the surroundings of the shopping centre.

The client approached Marshalls to seek advice on what solutions would work best bearing in mind that the development sits on top of a major road tunnel and therefore only products which require shallow installation would be appropriate.

The client was also seeking solutions which would suit the modern aesthetic of the development and which would enhance the surroundings.

Solution

The client opted to use a range of different types of protective street furniture solutions on this project.

Marshalls recommended the use of RhinoGuard™ 75/30 Shallow Mount Protective bollards, as well as Igneo seating and Giove Protective Planters with integrated Rhinoguard™ technology to break up the line of the bollards.

The RhinoGuard™ 75/30 Shallow Mount Protective bollards only require a depth of 152mm for installation; they have been successfully crash tested in accordance with the BSI PAS 68 Standard, creating effective hostile vehicle mitigation measures and protecting people, places and existing infrastructure.

The large Giove Protective Planter features a large capacity which is designed to accommodate the root ball of a tree.

The Igneo modular seating system offers unique styling, combined with functionality and exceptional impact performance. The Igneo seat has been successfully crash tested in accordance with PAS 68 Standards as set by the Government and it is manufactured from Marshalls' fibre reinforced precast concrete.

Benefit

The chosen products offer the required level of protection, however they do not look like protective items, instead they are attractive additions to the shopping centre. The large Giove Planters house mature trees which not only attract biodiversity but also offer shade and a pleasing aesthetic. The protective seating, ultra modern in design, is highly durable and offers areas for shoppers to rest.

Land Securities

A large outlet shopping village in the South East of England

Lighting Columns, Exhibition Road, London

Bespoke Lighting Columns, Canary Wharf

Bespoke Handrail System, The Sage, Gateshead Quays, Newcastle

Marshalls Bespoke Product Solutions Service

Bespoke Product Solutions Service

Marshalls Street Furniture promises to bring your vision to life through our bespoke product solutions service.

Our design experience and production expertise are your guarantee of success. We strive to offer a unique service that supports you from your first concept sketches right through to installation of the finished product.

Bespoke LED illuminated balustrade/parapet, Manor Road, Coventry

Cycle Parking, Canary Wharf

Marshalls 360 brings together our design, technical, engineering and consultancy expertise to offer you a support programme like no other. With a full suite of services, all designed around you, Marshalls 360 helps you add certainty to each and every project – **all for no additional cost.**

Design and Technical Services

Enjoy comprehensive support with a range of services including pre-construction appraisals, product sampling and CAD facilities. And because it's Marshalls, you can be sure it's all backed by a seamless after-sales service.

Construction Services

Discover the UK's leading traffic planning software, with real-time tracking and priority delivery scheduling. With 12 strategically positioned distribution centres across the UK, our expert construction detailing team is always on hand to make sure your project goes smoothly from start to finish.

Skills Services

We're dedicated to helping you maintain the highest standards. With RIBA-accredited CPD seminars, bespoke Machine Lay training and in-depth toolbox talks, Marshalls 360 skills services ensure your skill set stays up to date.

Marshalls 360

Designed Around You

Maintenance Services

Give your projects the longevity they deserve with post-construction cleaning regime and a full selection of O&M Manuals. Plus, improve your working practices with our reinstatement and repair advice.

Accreditation Services

Take a holistic approach to sustainability with specification data and certification alongside our wide-ranging advice on environmental, economic and social issues. Benefit from a business model that provides you with an ever-increasing range of sustainable products.

To find out how your project could benefit from Marshalls 360, visit marshalls.co.uk/360 or speak to a member of our team today.

GEO Signage & Fingerpost Combination, Blackpool

Motis Shelter, Birmingham

Ollerton Sheffield Cycle Stands, Cleveleys

GEO Indirect Parklight, Coventry

GEO Illuminated Bollard, Camden

Signage, London

Illuminated Handrail, Glasgow

Saturn Shelter, Wellington Academy

Escofet Equal Seat, Olympic Village

Protective Giove Planter, Cleveleys

Igneo Seat and Litter Bin, Seaton

GEO Pennant Cycle Stands, Kings College

For our full range of street furniture please visit:
www.marshalls.co.uk/street-furniture

© MARSHALLS 2016

Marshalls
Creating Better Spaces

Representative Sweden:

Output
Talltitegatan 12
23538 Vellinge
+46 700 600 644
info@outputexterior.se

DMD_37335