



PLANET RANGE OF

TERRA BOLLARDS

Frontier Pitts manufacture a portfolio of IWA 14 & PAS 68 bollards, each proven to stop the different energy ratings of the HVM (Hostile Vehicle Mitigation) specification.

CLASS PAS 68 (Speed in mph)

EMBEDMENT

MODEL

Bollard diameter in mm

30
(48kph)

40
(64kph)

50
(80kph)

Shallow Mount
< 250mm

Ultra Shallow
< 300mm

Shallow
< 500mm

Standard
< 900mm

MODEL		30 (48kph)	40 (64kph)	50 (80kph)	Shallow Mount < 250mm	Ultra Shallow < 300mm	Shallow < 500mm	Standard < 900mm
TERRA UNIVERSAL 245mm	Automatic Rising (to compliment Venus & Jupiter)			●				●
TERRA QUANTUM 219mm	Rising (side folding)	●				●		
	Shallow Static	●				●		
TERRA VENUS 219mm	Shallow Static	●				●		
	Static	●					●	
	Removable Static	●					●	
TERRA MARS 219-245mm	Shallow Mount Static	●	●		●			
	Static	●	●				●	
	Removable Static		●				●	
TERRA JUPITER 273mm	Static			●			●	
	Removable Static			●			●	
TERRA NEPTUNE 273mm	Shallow Mount Static (Standalone)		●		●			
	Static		●				●	
	Removable Static		●				●	
TERRA SATURN 354mm	Automatic Rising			●				●
	Static			●				●

All IWA14 testing performed with 7.2t vehicle

All PAS68 testing performed with 7.5t vehicle

US rating: K12 / K8 / K4 L3



IMPACT TEST STANDARDS

Energy and Classification



INTERNATIONAL : IWA 14-1:2013

Vehicle security barriers - Part 1: Performance requirement, vehicle impact test method and performance rating

IWA 14-1:2013 is the International Workshop Agreement which specifies the essential impact performance requirement for a vehicle security barrier (VSB) and a test method for rating its performance when subjected to a single impact by a test vehicle not driven by a human being.



BRITISH : BSi PAS 68

BSi PAS 68 Impact Test Specifications for Vehicle Security Barriers

BSi PAS 68:2013 is the latest BSi's Publicly Available Specification for vehicle security barriers. It has become the UK's standard and the security industry's benchmark for HVM (Hostile Vehicle Mitigation) equipment, and is the specification against which perimeter security equipment is tested as part of the ongoing research to prevent VBIED (Vehicle Born Improvised Explosive Device) attacks. BSi PAS 69 complements this specification by providing guidance on the product installation.



IWA-14
2013 Edition



BSi PAS 68
2013 Edition

Type of Test	Vehicle	Vehicle
Product	Terra Bollard	Terra Bollard
Vehicle Weight	7500 N2A	7500 N2
Vehicle Speed	80 kph	80kph
Impact Angle	90°	90°
Vehicle Penetration	6.6	5.0
Debris	N/A	9.2



PLANET RANGE OF BOLLARDS

IWA 14 & PAS 68 Bollards

Bollards are a common physical perimeter security solution in certain locations, particular public realm and crowded places, as they mitigate criminal or terrorist vehicle borne threats whilst allowing free pedestrian movement.

Frontier Pitts Planet range of HVM (Hostile Vehicle Mitigation) includes a large range of options including static, automatic and semi-automatic rising bollard models. All bollard models have been successfully impact tested to the IWA 14 or PAS 68 specification, stopping a 7.2/7.5t vehicle travelling at various speeds (please see table on page 1).

In line with the IWA 14-2 & PAS 69:2013, all bollards must be installed with a maximum distance of 1200mm between upright bollard faces.

The choice of bollard depends on the threat level and the individual site requirements (landscaping and standoff):-

- Threat level :** What is the locations terrorist threat level?
What speed could a vehicle borne threat reach within the locations surrounding landscaping?
- Standoff :** What is the maximum standoff distance from potential bollard position and building?
- Access Point :** Is an access point required within the HVM (Hostile Vehicle Mitigation) line of Static Bollards? Are Rising/Retractable Bollards required?



tel: +44 (0)1293 422800
web: www.frontierpitts.com

BOLLARD FINISH

Once the bollard model has been ascertained, there is a choice of finish:



Standard:
Painted
Finish



Optional:
Stainless Steel
Sleeves

STAINLESS STEEL SLEEVE OPTIONS

First, choose the stainless steel finish:



Satin-polished
stainless steel finish



Bead-blasted
stainless steel finish

Secondly, choose the Bollard Topping



Flat

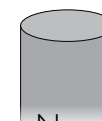


Mitre

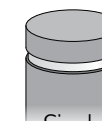


Dome

Finally, choose the Bandings



None



Single



Double

Additional
Personalised Engraving



UNIVERSAL BOLLARD

IWA 14 High Security HVM Rising Bollard

The Rising Terra Universal Bollard has been successfully impact tested stopping 7.2t @ 50mph. The HVM Bollard has a 360° impact face and is available with a range of sleeves.



Universal Bollard

BOLLARD DESIGN OPTIONS

Embedment Depth	1491mm
Lift Height	1000mm
Diameter	245mmØ
Finish	Stainless Steel Sleeve

TECHNICAL SPECIFICATIONS

Vehicle Test Weight (kg)	7200
Vehicle Class	N2A
Vehicle Speed	80
Vehicle Angle	90
Vehicle Penetration	6.3

CLASSIFICATIONS

IWA 14 Universal Bollard
7.2t @ 50mph (80kph)

Classification Codes:
V/7200[N2A]/80/90:6.3

IWA 14 Tested Height above
ground: **1000mm**



tel: +44 (0)1293 422800
web: www.frontierpitts.com



QUANTUM BOLLARD

PAS 68 Shallow Depth Side Folding Bollard

The Terra Quantum Bollard is a very unique side folding bollard twinned with a static. The shallow depth bollard has been successfully impact tested stopping 7.5t @ 30mph.



Quantum Bollards in the process of being lowered

BOLLARD DESIGN OPTIONS

Foundation Depth	300mm
Height above ground	925mm
Diameter	219mm
Finish	Painted Powder Coating
Optional	Stainless Steel Clad

TECHNICAL SPECIFICATIONS

Vehicle Test Weight (kg)	7500
Vehicle Class	N2
Vehicle Speed	48
Vehicle Angle	90
Vehicle Penetration	0.0
Dispersion	1.5

CLASSIFICATIONS

PAS 68 Terra Quantum Bollard
7.5t @ 30mph (48kph)

Classification Codes:
V/7500[N2]/48/90:0.0/1.5

PAS 68 Tested Height above ground: **925mm**



JUPITER STATIC BOLLARD

PAS 68 High Security HVM Static Bollard

The Terra Jupiter Bollard has been successfully impact tested stopping 7.5t @ 50mph and is available in a variety of sleeves including the satin-polished stainless steel finish pictured here.



BOLLARD DESIGN OPTIONS

Embedment	500mm
Height above ground	1080mm
Diameter	273mm \varnothing
Finish	Painted Powder Coating
Optional	Stainless Steel Sleeve Removable

TECHNICAL SPECIFICATIONS

Vehicle Test Weight (kg)	7500
Vehicle Class	N3
Vehicle Speed	80
Vehicle Angle	90
Vehicle Penetration	10.6
Dispersion	11.1

CLASSIFICATIONS

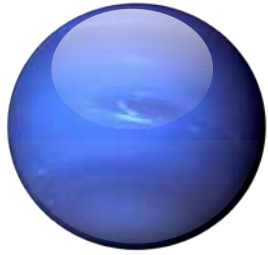
PAS 68 Static Terra Jupiter Bollards
7.5t @ 50mph (80kph)

Classification Codes:
V/7500[N3]/80/90:10.5/11.1

PAS 68 Tested Height above ground: **1080mm**



tel: +44 (0)1293 422800
web: www.frontierpitts.com



SINGLE SHALLOW DEPTH NEPTUNE STATIC BOLLARD

PAS 68 High Security HVM Static Bollard

The Shallow Depth Terra Neptune Bollard with an embedment depth of only 230mm has been successfully impact tested as a **single** bollard stopping 7.5t @ 40mph.



Neptune Crash Test

BOLLARD DESIGN OPTIONS

Embedment	230mm
Height above ground	1000mm
Diameter	273mmø
Finish	Painted Powder Coating
Optional	Stainless Steel Sleeve

TECHNICAL SPECIFICATIONS

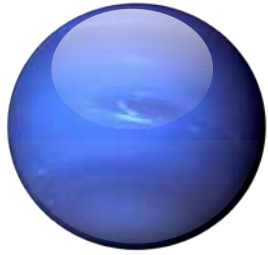
Vehicle Test Weight (kg)	7500
Vehicle Class	N2
Vehicle Speed	64
Vehicle Angle	90
Vehicle Penetration	0.0
Dispersion	0.0

CLASSIFICATIONS

PAS 68 Static Terra Neptune Bollards
7.5t @ 40mph (64kph)

Classification Codes:
V/7500[N2]/64/90:0.0/0.0

PAS 68 Tested Height above ground: **1000mm**



NEPTUNE STATIC BOLLARD

PAS 68 High Security HVM Static Bollard

The Terra Neptune Bollard has been successfully impact tested stopping 7.5t @ 40mph and is available as painted or with a variety of stainless steel sleeves.



Neptune Bollards

BOLLARD DESIGN OPTIONS

Embedment	500mm
Height above ground	1000mm
Diameter	273mmø
Finish	Painted Powder Coating
Optional	Stainless Steel Sleeve Removable

TECHNICAL SPECIFICATIONS

Vehicle Test Weight (kg)	7500
Vehicle Class	N2
Vehicle Speed	64
Vehicle Angle	90
Vehicle Penetration	3.3
Dispersion	0.0

CLASSIFICATIONS

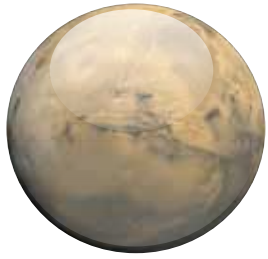
PAS 68 Static Terra Neptune Bollards
7.5t @ 40mph (64kph)

Classification Codes:
V/7500[N2]/64/90:3.3/0.0

PAS 68 Tested Height above ground: **1000mm**



tel: +44 (0)1293 422800
web: www.frontierpitts.com



SHALLOW DEPTH MARS STATIC BOLLARD

PAS 68 High Security HVM Static Bollard

The Shallow Depth Terra Mars Bollard with an embedment depth of only 230mm has been successfully impact tested stopping 7.5t @ 30mph & 40mph.



BOLLARD DESIGN OPTIONS

Embedment	230mm
Height above ground	1050mm
Diameter	245mm \varnothing
Finish	Painted Powder Coating
Optional	Stainless Steel Sleeve

TECHNICAL SPECIFICATIONS

Vehicle Test Weight (kg)	7500
Vehicle Class	N2
Vehicle Speed	48
Vehicle Angle	90
Vehicle Penetration	1.71
Dispersion	0.0

CLASSIFICATIONS

PAS 68 Static Terra Mars Bollards

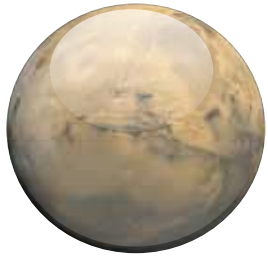
7.5t @ 30mph (48kph)

V/7500[N2]/48/90:1.71/0.0

7500kg @ 40mph (64kph)

V/7500[N2]/64/90: 20.8/7.6

PAS 68 Tested Height above ground: **1050mm**



MARS STATIC BOLLARD

PAS 68 High Security HVM Static Bollard

The Terra Mars Bollard has been successfully impact tested stopping 7.5t @ 40mph and is available as painted or with a variety of stainless steel sleeves.



BOLLARD DESIGN OPTIONS

Embedment	500mm
Height above ground	1000mm
Diameter	219mm \varnothing
Finish	Painted Powder Coating
Optional	Stainless Steel Sleeve Removable

TECHNICAL SPECIFICATIONS

Vehicle Test Weight (kg)	7500
Vehicle Class	N2
Vehicle Speed	64
Vehicle Angle	90
Vehicle Penetration	4.0
Dispersion	16.7

CLASSIFICATIONS

PAS 68 Static Terra Mars Bollards
7.5t @ 30mph (48kph)

Classification Codes:
V/7500[N2]/64/90:4.0/16.7

PAS 68 Tested Height above ground: **1000mm**



tel: +44 (0)1293 422800
web: www.frontierpitts.com



SHALLOW DEPTH VENUS STATIC BOLLARD

PAS 68 High Security HVM Static Bollard

The Shallow Depth Terra Venus Bollard with an embedment depth of only 300mm has been successfully impact tested stopping 7.5t @ 30mph.



BOLLARD DESIGN OPTIONS

Embedment	300mm
Height above ground	1000mm
Diameter	219mm \varnothing
Finish	Painted Powder Coating
Optional	Stainless Steel Sleeve

TECHNICAL SPECIFICATIONS

Vehicle Test Weight (kg)	7500
Vehicle Class	N2
Vehicle Speed	48
Vehicle Angle	90
Vehicle Penetration	3.3
Dispersion	0.0

CLASSIFICATIONS

PAS 68 Static Terra Venus Bollards
7.5t @ 30mph (48kph)

Classification Codes:
V/7500[N2]/48/90:3.3/0.0

PAS 68 Tested Height above ground: **1000mm**



VENUS STATIC BOLLARD

PAS 68 High Security HVM Static Bollard

The Terra Venus Bollard has been successfully impact tested stopping 7.5t @ 30mph and is available in a variety of sleeves including the Bead Blasted Stainless Steel finish pictured here.



BOLLARD DESIGN OPTIONS

Embedment	500mm
Height above ground	1000mm
Diameter	219mm \varnothing
Finish	Painted Powder Coating
Optional	Stainless Steel Sleeve Shallow & Removable

TECHNICAL SPECIFICATIONS

Vehicle Test Weight (kg)	7500
Vehicle Class	N2
Vehicle Speed	48
Vehicle Angle	90
Vehicle Penetration	0.0
Dispersion	0.0

CLASSIFICATIONS

PAS 68 Static Terra Venus Bollards
7.5t @ 30mph (48kph)

Classification Codes:
V/7500[N2]/48/90:0.0/0.0

PAS 68 Tested Height above ground: **1000mm**



tel: +44 (0)1293 422800
web: www.frontierpitts.com



SATURN RISING BOLLARD

PAS 68 High Security HVM Retractable Bollard

The Rising Terra Saturn Bollard has been successfully impact tested stopping 7.5t @ 50mph and is Stainless steel clad as standard.



Saturn Rising Bollards

BOLLARD DESIGN OPTIONS

Foundation Depth	1500mm
Lift Height	900mm
Diameter	356mm \varnothing
Finish	Stainless Steel Sleeve

TECHNICAL SPECIFICATIONS

Vehicle Test Weight (kg)	7500
Vehicle Class	N2
Vehicle Speed	80
Vehicle Angle	90
Vehicle Penetration	5.0
Dispersion	9.2

CLASSIFICATIONS

PAS 68 Rising Terra Saturn Bollards
7.5t @ 50mph (80kph)

Classification Codes:

V/7500[N2]/80/90:5.0/9.2

PAS 68 Tested Height above ground: **900mm**



SATURN STATIC BOLLARD

PAS 68 High Security HVM Retractable Bollard

Based on the Rising Terra Saturn Bollard, the Static Terra Saturn Bollard is designed to stop 7.5t @ 50mph.



BOLLARD DESIGN OPTIONS

Embedment	900mm
Height above ground	900mm
Diameter	356mm
Finish	Painted Powder Coating
Optional	Stainless Steel Sleeve

TECHNICAL SPECIFICATIONS

Vehicle Test Weight (kg)	7500
Vehicle Class	N2
Vehicle Speed	80
Vehicle Angle	90
Vehicle Penetration	5.0
Dispersion	9.2

CLASSIFICATIONS

PAS 68 Static Terra Saturn Bollards

7.5t @ 50mph (80kph)

Classification Codes:

V/7500[N2]/80/90:5.0/9.2

(Based on the Rising Terra Saturn Bollard impact test)

PAS 68 Tested Height above ground: **900mm**



tel: +44 (0)1293 422800
web: www.frontierpitts.com



STREETSCAPE

BSi PAS 68 in the urban environment

An illustration on the various ways PAS 68 Static Bollards can be integrated into the Streetscape.



Corner of building protection



PAS 68 Traffic light bollard



PAS 68 Terra planters and bollard



Building pillar protection



Frontier Pitts Ltd. Crompton House, Crompton Way, Crawley, RH10 9QZ
tel: +44 (0)1293 548301 web: www.frontierpitts.com

