

# Protecting people and property

Re-deployable hostile vehicle mitigation systems





## Our company

Hill & Smith Infrastructure Ltd is a leading provider of Hostile Vehicle Mitigation (HVM) and perimeter security systems, as well as Vehicle Restraint Systems (VRS).

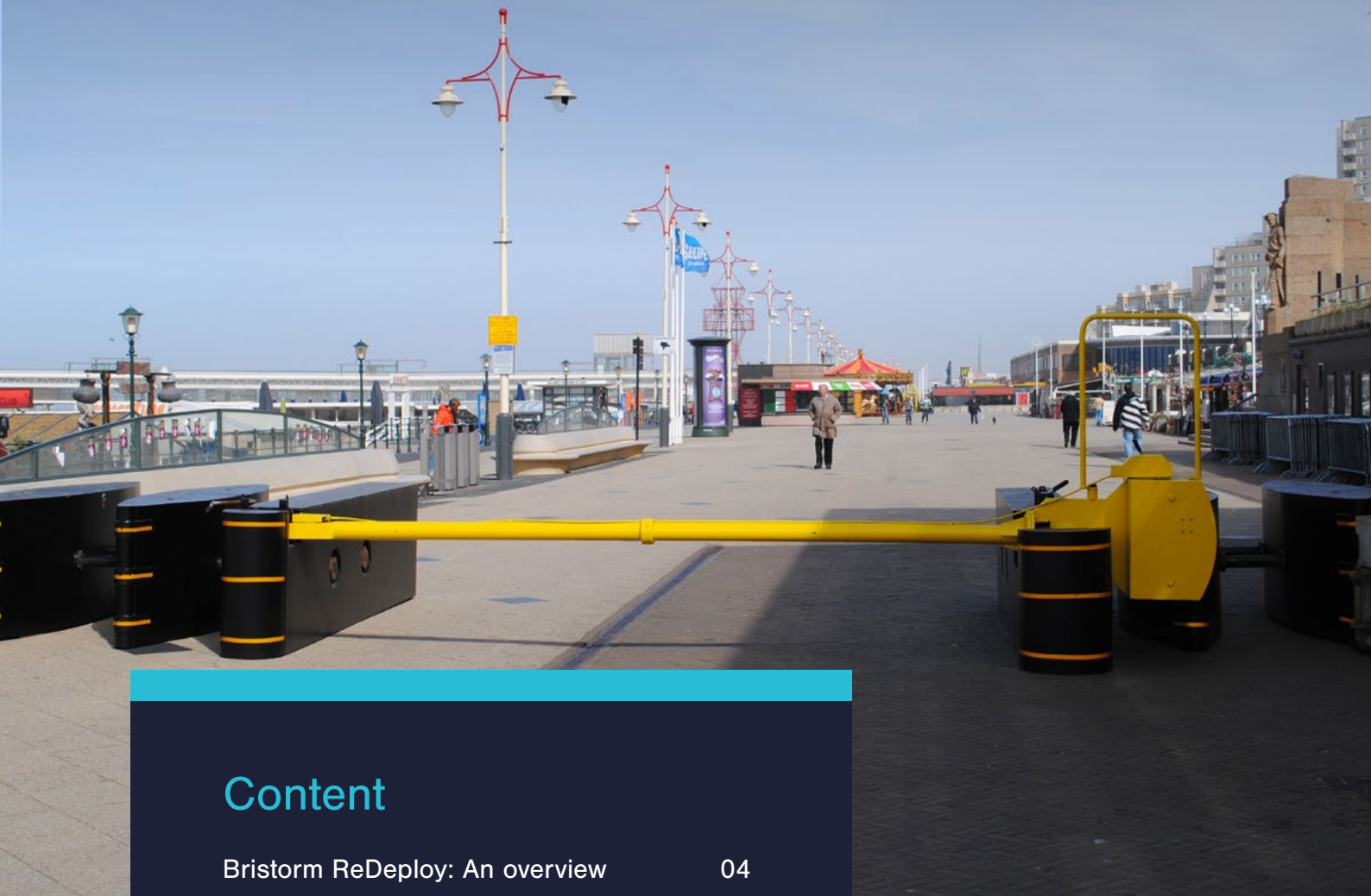
Founded in 1824, we have a long history of designing and manufacturing world-class safety and security solutions, including Bristorm permanent systems, which protect Critical National Infrastructure and secure perimeters across diverse sectors worldwide. Our comprehensive range includes fences, gates, and bollards rigorously tested to BSI PAS 68, BSI PAS 170, IWA 14-1 and ASTM F2656-15 standards.

With the introduction of Bristorm ReDeploy, our modular, re-deployable perimeter and stand-off protection solutions, we continue to expand our capabilities as a trusted leader in physical security systems. Bristorm ReDeploy systems are tested and rated to BSI PAS 68, IWA 14-1, ISO 22343 and NPSA's Vehicle Attack Delay Standards (VADS), ensuring superior protection.

Proven and reliable, our systems protect high-profile events, from music festivals and state ceremonies to major sporting events, infrastructures and public spaces worldwide.

## Bristorm ReDeploy

# A modular re-deployable perimeter and stand-off protection solution.



## Content

Bristorm ReDeploy: An overview	04
Security standards explained	06
Quick reference guide	08
Bristorm ReDeploy	
Barges	12
Pedestrian portal	14
Barriers	15
Gates	18
Bollards	22
Walling	26
Fencing	28



## Bristorm ReDeploy: An overview

The continued threat from terrorism through hostile vehicles remains real and credible. Our re-deployable HVM barrier products both deter and delay attack.

Enhanced building stand-off protection to deter attack and reduce consequential loss, particularly from hostile vehicles is increasingly specified for many vulnerable site perimeters. Re-deployable perimeter and stand-off protection solutions from Hill & Smith Infrastructure have been designed to deliver unrivalled protection for people and assets against vehicle borne attacks.

The systems can be deployed quickly with minimal disruption, typically on a short or medium term basis, providing an ideal solution for security sensitive locations or events. Some of our barrier systems are also capable of protecting against the additional threat of vehicle borne improvised explosive devices (VBIEDs).

# Barrier protection, security and delineation solutions

## Highly versatile and adaptable to changing needs

Re-deployable HVM systems have been installed at a variety of high profile locations and temporary venues. Many of these deployments provide operational continuity at each location. Allowing sites to adapt as changes occur to the threat or site operations. The system provides an effective and highly reliable solution to the client's individual operational requirements.

The system incorporates a variety of anti-attack vehicle barriers designed to control or prevent access to security sensitive locations.

The highly re-deployable nature of the system means it can be put into position quickly and then subsequently moved or reconfigured as the need arises, creating a legacy security solution that can be easily adapted to meet changing client requirements.

## System performance

Anti-attack vehicle barriers have been extensively tested and meet the requirements of the relevant agencies operating within the security and defence fields.

The system uses a composite construction method, comprising of two steel plates that are connected together to form panels by an array of welded transverse bars. The panels are filled with ready mixed concrete and the resulting composite offers unrivalled protection against explosive blast. The panel system has been successfully tested against a wide range of blast attacks.



## Benefits

- **Unrivalled protection**  
Against vehicular attack, unauthorised vehicle access and explosive blast.
- **Flexible configurations**  
Schemes can be designed to meet the needs of a wide range of site parameters.
- **Rapid deployment**  
Units are transported on flatbed trucks for quick and easy unloading.
- **Security that blends with the environment**  
Specific colour and traffic management options are available.
- **Impact and blast effect mitigation**  
The containment of concrete within the units prevents the formation of dangerous secondary projectiles.
- **Ballistics**  
Tested for BR7 for 7.62mm A.P and 12.7mm (0.5cal) A.P with no spall to BS EN 1063.

# Security standards overview

## The need for tests and performance standards

Protecting sites, assets, public spaces and people involves addressing a variety of threats posed by criminals and terrorists.

When designing a security plan to mitigate these risks, it is essential to ensure the effectiveness of the security equipment selected for the event or site to be protected.

This section offers an overview of key security standards and specifications our products have been tested against whether for vehicle impact or blast attacks. It provides an important guide when selecting products and creating a security plan—whether the goal is to defend against terrorism, intrusion, or criminal activity.

## Background to standards and specifications

### PAS 68, IWA-14-1 and ISO 22343

In the UK, the National Protective Security Authority (NPSA) formerly CPNI (Centre for Protection of National Infrastructure) in conjunction with other stakeholders developed the Publicly Available Specification PAS 68 classification (PAS 68).

It was created to address the needs of organisations who wish to have assurance that vehicle security barriers will provide the level of impact resistance that they seek.

The classification covers the mass, speed, angle and resulting penetration and dispersion values of an impact test relating to the specified product.

This was replaced by International Workshop Agreement (IWA) 14.1 in 2013, combining elements of both PAS 68 and the US classification ASTM2656-07. PAS 68 and IWA14.1 were superseded in September 2023 by the publication of ISO 22343 by the British Standards Institution (BSI). This is the new International Organisation for Standards (ISO) rating for all temporary re-deployable and permanent hostile vehicle mitigation.

## Vehicle Attack Delay Standard (VADS)

### Understanding Vehicle Attack Delay Standards (VADS)

The National Protective Security Authority (NPSA) has developed the Vehicle Attack Delay Standard (VADS) to evaluate the effectiveness of Vehicle Security Barriers (VSBs) against aggressive and repetitive vehicle impacts. VADS is designed to test barriers predominantly used at temporary events, providing a pragmatic, affordable, and achievable level of protection.

### Key features of VADS

- **Aggressive and Repetitive Impact Testing:** Unlike traditional standards that focus on single-impact scenarios, VADS assesses a barrier's resilience to multiple vehicle impacts, simulating real-world attack conditions.
- **Application for Temporary Events:** VADS rated barriers offer a flexible security solution for events requiring temporary protection, ensuring safety without the permanence of traditional installations.

### Integration with Other Standards

While VADS provides a specific testing methodology for temporary solutions, it complements existing standards like ISO 22343-1, PAS 68 and IWA 14-1. For comprehensive protection, especially against high-speed or large vehicle threats, integrating VADS-rated barriers with those meeting ISO 22343-1, PAS 68 and IWA 14-1 standards is recommended.

## Test rating explained:

### Test type V for Vehicle impact

# V/7500[N2]/64/90:2/0

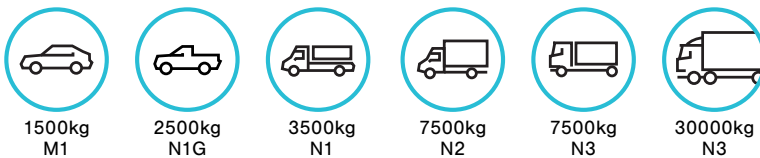


## Standards and specifications

### PAS 68

Pas 68 is a British Standards Institution (BSI) Publicly Available Specification (PAS) for impact testing and rating of hostile vehicle mitigation products, such as bollards, blockers, and barriers.

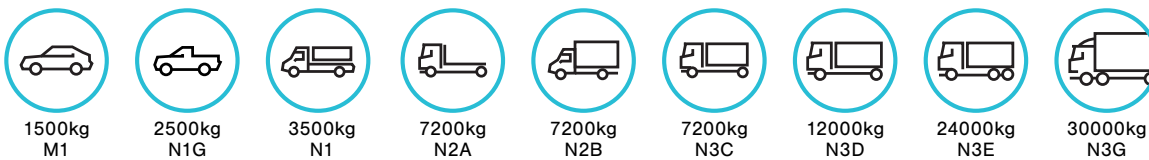
### PAS 68 Vehicle classification



### IWA 14-1

Introduced in 2013 with a view to harmonize the BSI PAS 68 specification and the American ASTM 2656 standard. IWA 14-1 is an international crash test standard for testing vehicle security barriers (VSB).

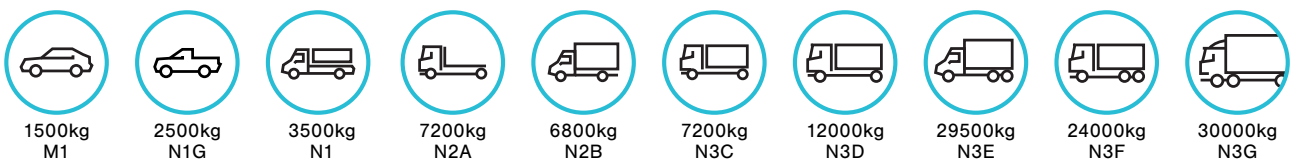
### IWA 14-1 Vehicle classification



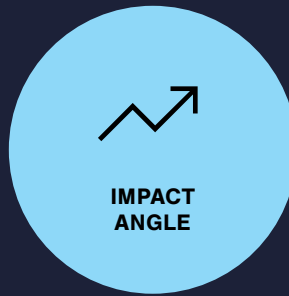
### ISO 22343

This is the latest physical security standard, released in 2023 and is split into two parts, part one defines how the product is tested and part two, gives guidance on the installation of the product.

### ISO 22343 Vehicle classification



# Quick reference guide



## Bristorm ReDeploy Barge Units

PAS68:2010 tested and rated

Vehicle Attack Delay Standards (VADS) tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration	Debris Dispersion
Barge	1,500	120	90	PAS 68	V1500[M1]/120/90:0.6/0	0.6m	0m
Barge	7,500	50	90	PAS 68	V7500[N2]/50/90:1.0/0	1m	0m
Barge	7,500	64	90	PAS 68	V7500[N2]/64/90:2/0	2m	0m
Barge	7,500	64	90	PAS 68	V7500[N3]/64/90:5.4/0	5.4m	0m

## Bristorm ReDeploy Barriers

PAS68:2010 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration	Debris Dispersion
Straight Barrier	7,500	64	30	PAS 68	V/7500[N2]/64/30:0/1.25	0m	1.25m
Curved Barrier	7,500	64	90	PAS 68	V7500[N2]/64/90:9.0/0	9m	0m

Bristorm ReDeploy

## Quicklink

PAS68:2010 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration	Debris Dispersion
Quicklink Lite Herringbone Layout	3,500	48	90	PAS 68	V/3500[N1]/48/90:2.9/0	2.9m	0m
Quicklink Lite Straight Layout	3,500	48	30	PAS 68	V/3500[N1]/48/30:0.3/0	0.3m	0m
Quicklink Heavy	7,500	64	30	PAS 68	V/7500[N2]/64/30:0.5/0	0.5m	0m

Bristorm ReDeploy

## Vertical Opening Gate

PAS68:2010 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration	Debris Dispersion
Vertical Opening Gate	7,500	48	90	PAS 68	V/7500[N2]/48/90:4.7/0	4.7m	0m

Bristorm ReDeploy

## Swing Gate

PAS68:2010 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration	Debris Dispersion
Swing Gate 4.5m opening	7,500	64	90	PAS 68	V/7500[N2]/64/90:4.9/0	4.9m	0m
Swing Gate 6.3m opening	7,500	64	90	PAS 68	V/7500[N2]/64/90:3.7/0	3.7m	0m
Double Swing Gate	7,500	64	90	PAS 68	V/7500[N2]/64/90:10.6/0	10.6m	0m

Bristorm ReDeploy

## Bollards

PAS68:2010 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration	Debris Dispersion
Surface Bollards	7,500	48	90	PAS 68	V/7500[N2]/48/90:1.7/0	1.7m	0m

## Bollard systems

PAS68:2010 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration	Debris Dispersion
Shallow Foundation	7,500	64	90	PAS 68	V/7500[N2]/64/90:0.66/4.5	0.66m	4.5m
Ultra Shallow Foundation	7,500	80	90	PAS 68	V/7500[N3]/80/90:21.7/19.6	21.7m	19.6m
Ultra Shallow Foundation	7,500	64	90	PAS 68	V/7500[N2]/64/90:3.1/4.4	3.1m	4.4m

## Wall systems

PAS68:2010 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration	Debris Dispersion
Low Wall System	7,500	80	90	PAS 68	V/7500[N3]/80/90:3.8/17.5	3.8m	17.5m
Low Wall System	7,500	64	60	PAS 68	V/7500[N3]/64/60:0/8.4	0m	8.4m

### Perimeter Wall System - Data on request

Successful tests against attack by a variety of vehicle borne assaults have ranged from impact from a 7.5 tonne skip lorry to attack by bucket from a standard JCB type excavator and a 20 tonne Komatsu type excavator.

## Pedestrian Portal

PAS68:2010 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration	Debris Dispersion
Pedestrian Portal	7,500	64	90	PAS 68	V/7500[N2]/64/90:0.22/0	0.22m	0m
Pedestrian Portal	7,500	64	90	PAS 68	V/7500[N2]/64/90:0.16/0	0.16m	0m

## Zoneguard & Varioguard

IWA 14 -1:2013 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration
Zoneguard & Varioguard	7,200	48	90	IWA 14 -1	V/7200[N2A]/48/90:3.9	3.9m
Zoneguard+	7,200	48	90	IWA 14 -1	V/7200[N2A]/48/90:11	11m

## Multibloc PAS68

PAS68:2010 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Standard	Performance Rating	Penetration	Debris Dispersion
Multibloc	7,500	48	90	PAS 68	V/7500[N2]/48/90:3/0.0	3m	0m
Multibloc	7,500	64	90	PAS 68	V/7500[N2]/64/90:5/0.0	5m	0m

# Barge Units

Barges are used extensively in all manner of HVM schemes.

Whilst they can be used in short runs to provide protection across a small span, they are also used in many other of the HVM products such as the drop arm and swing gates.



## Key Features:

- ✔ Units can be supplied in standard or premium paint finishes.
- ✔ Barges can be connected in a variety of different ways to suit a scheme.
- ✔ Tested and rated arrangement also requires connection shafts, threaded connections and end caps.
- ✔ Barge units can be connected to other products in the HVM range using the appropriate connector.

## Testing parameters

**PAS68:2010 tested and rated**



6 X Barges on standard connectors for all these tests.

**NPSA VADS 10-2019**



Pairs of barges are certified by NPSA for HVM Delay-Rated.

Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Barge	1,500	120	90	V1500[M1]/120/90:0.6/0	0.6m	0m
Barge	7,500	50	90	V7500[N2]/50/90:1.0/0	1m	0m
Barge	7,500	64	90	V7500[N2]/64/90:2/0	2m	0m
Barge	7,500	64	90	V7500[N3]/64/90:5.4/0	5.4m	0m

## Product information

Barge  
3072kg

## PAS 68 Vehicle classification

## Product Profile

Barges are extremely versatile and can be connected in a variety of different ways to other Bristorm ReDeploy units to suit sites operational requirements.



## Pedestrian Portal

To enable pedestrian movement through a line of HVM measures where a more visual point of access is required in the aiding of crowd control.

### Key features:

- ✔ Units can be supplied in standard or premium paint finishes.
- ✔ Tested and rated arrangement requires barges and accessories.
- ✔ A wide variety of multiple portal frames and barge configurations can be applied to suit specific applications.



### Testing parameters

**PAS68:2010 tested and rated**



Test layout – PAS68:2010 Pedestrian Portal

Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Pedestrian Portal	7,500	64	90	V/7500[N2]/64/90:0.22/0	0.22m	0m
Pedestrian Portal	7,500	64	90	V/7500[N2]/64/90:0.16/0	0.16m	0m

### Product information

Single Portal Frame

970kg

Portal Threaded Connector

(4 no. per portal frame)

6kg (per item)

Portal End Cap

(4 no. per portal frame)

4kg (per item)

### PAS 68 Vehicle classification



Bristorm ReDeploy

# Straight Barriers

Controls traffic effectively across a variety of road layouts.

Large numbers of barriers can be linked together to create an extended length of HVM.



### Key features:

- ✔ Units can be supplied in standard or premium paint finishes.
- ✔ Tested and rated arrangement requires the use of connection pins between units.
- ✔ Barrier units can be connected to other HVM solutions using the appropriate connector.



# Curved Barriers

Curved barriers are available in a range of radii to suit a wide range of road layouts.

They can be used in conjunction with straight barriers to create full HVM solutions.

### Testing parameters

PAS68:2010 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Straight Barrier	7,500	64	30	V7500[N2]/64/30:0/1.25	0m	1.25m
Curved Barrier	7,500	64	90	V7500[N2]/64/90:9.0/0	9m	0m

### Key features:

- ✔ Units can be supplied in standard or premium paint finishes.
- ✔ Tested and rated arrangement requires the use of connection pins between unit.

### Product information

Straight Barrier  
2858kg

Shallow Curved Barrier  
(Radius 15.13m) – Right Handed  
2934kg

Shallow Curved Barrier  
(Radius 15.13m) – Left Handed  
2934kg

Tight Curved Barrier  
(Radius 3.81m) – Right Handed  
2928kg

Tight Curved Barrier  
(Radius 3.81m) – Left Handed  
2928kg

### PAS 68 Vehicle classification

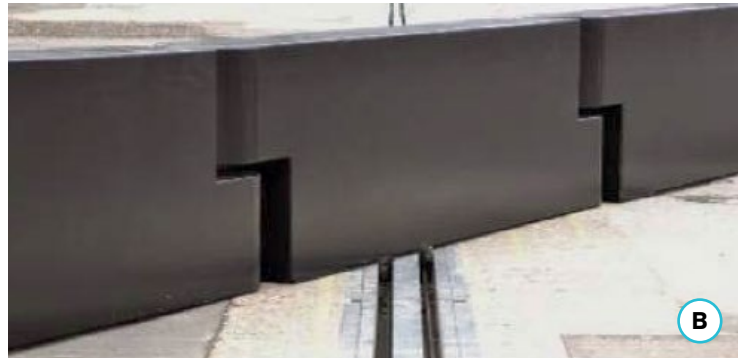


Bristorm ReDeploy

# Quicklink Lite

Utilised where weight or space prevents the use of heavier or larger walling units.

These barriers can be used with the added flexibility and speed of deployment of the Quicklink joint, which allows for rapid movement and deployment of the system.



# Quicklink Heavy

Featuring the enhanced flexibility and rapid deployment capabilities of the Quicklink joint.

### Key features:

- ✓ Units can be supplied in standard or premium paint finishes.
- ✓ Units available in a variety of sizes.
- ✓ Units can be connected to other products in the HVM range using the appropriate connector.
- ✓ End units, linking units and 'T' units also available.

### Testing parameters

**PAS68:2010 tested and rated**



Test layout – PAS68:2010

Herringbone Layout (A) Temporary Barrier V/3500[N1]/48/90:2.9/0

Straight Layout (B) Temporary Barrier V/3500[N1]/48/30:0.3/0

Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Herringbone Layout	3,500	48	90	V/3500[N1]/48/90:2.9/0	2.9m	0m
Straight Layout	3,500	48	30	V/3500[N1]/48/30:0.3/0	0.3m	0m
Quicklink Heavy	7,500	64	30	V/7500[N2]/64/30:0.5/0	0.5m	0m

### Product information

Quicklink Lite Z Barrier  
813kg

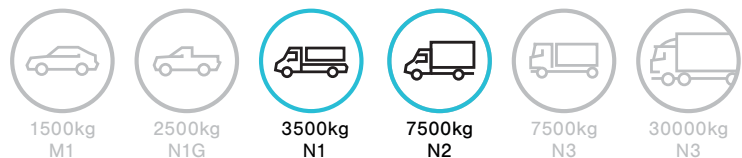
Quicklink Lite T Barrier  
825kg

Quicklink Lite T Connector  
218kg

Quicklink Lite Stability Post  
227kg

Quicklink Heavy 'Z' Barrier  
2879kg

### PAS 68 Vehicle classification





### Product Profile

An alternative to larger walling units where weight or space matter, and deployment speed is essential.

BARGES

PEDESTRIAN PORTAL

BARRIERS

GATES

BOLLARDS

WALLING

FENCES

Bristorm ReDeploy

# Vertical Opening Gate

Provides a high level of protection whilst facilitating quick and easy authorised vehicle access.

These incorporate heavy steel sections and locking points attached to barges. Gate openings are available in a range of sizes.

It can be configured inline using wall units instead of barges for maximum performance combined with minimal footprint.

The HVM inline drop arm gate is ideal for locations where the width of the location dictates that the standard gate is unsuitable on single sections of roads for example.

### Key features:

- ✔ Units can be supplied in standard or premium paint finishes.
- ✔ Tested and rated I arrangement also requires barges and accessories.
- ✔ Gate Assembly does not include Barges and Barge Connections.



## Testing parameters

**PAS68:2010 tested and rated**



Test layout – PAS68:2010 Rising Gate

Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Vertical Opening Gate	7,500	48	90	V/7500[N2]/48/90:4.7/0	4.7m	0m

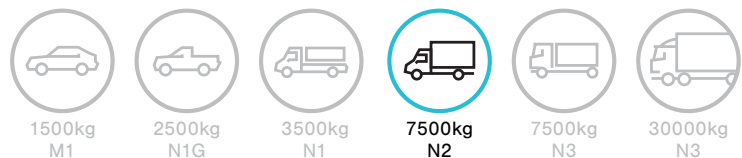
## Product information

Hinge Barrier  
3100kg

Latch Barrier  
3500kg

Gate Boom (4.5m Illustrated)  
1450kg

## PAS 68 Vehicle classification



# Swing Gate

Provides a high level of protection whilst facilitating quick and easy authorised vehicle access.

These incorporate heavy steel sections and locking points attached to barges. Gate openings are available from 3.0 metres to 6.30 metres to suit a wide variety of access layouts.



### Key features:

- ✔ Units can be supplied in standard or premium paint finishes.
- ✔ Tested and rated arrangement also requires barges and accessories.
- ✔ Standard Gate openings supplied - 3.0m, 3.75m, 4.0m, 4.5m, 5.0m and 6.3m. Other sizes are available on request.

### Testing parameters

**PAS68:2010 tested and rated**



Test layout – PAS68:2010 Swing Gate

Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Swing Gate 4.5m Opening	7,500	64	90	V/7500[N2]/64/90:4.9/0	4.9m	0m
Swing Gate 6.3m Opening	7,500	64	90	V/7500[N2]/64/90:3.7/0	3.7m	0m

### Product information

Gate Boom

Varies

Gate Latch

160kg

Gate Hinge

230kg

### PAS 68 Vehicle classification



Bristorm ReDeploy

# Double Swing Gate

Provides a high level of protection whilst facilitating quick and easy authorised vehicle access.

These incorporate heavy steel sections and locking points attached to barges. The Double Swing Gate is ideal for providing protection across dual carriageways and wider roadways.

### Key features:

- ✔ Units can be supplied in standard or premium paint finishes.
- ✔ Tested and rated arrangement also requires barges and accessories.
- ✔ Other sizes of clear opening are available on request.



### Testing parameters

**PAS68:2010 tested and rated**



Test layout – PAS68:2010 Double Swing Gate

Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Double Swing Gate	7,500	64	90	V/7500[N2]/64/90:10.6/0	10.6m	0m

### Product information

Gate Latch Bracket

530kg

Gate Latch

555kg

Gate Hinge

230kg (per item)

### PAS 68 Vehicle classification



## Product Profile

Our range of gates allows various configurations, providing a high level of protection yet enabling quick access for authorised vehicles.



BARGES

PEDESTRIAN PORTAL

BARRIERS

GATES

BOLLARDS

WALLING

FENCES

Bristorm ReDeploy

# Surface Bollards

This system can be used as a permanent installation without the need for civil groundworks and can be coated in bituminous macadam or rubber to provide smooth ramped access.

Alternatively it can be installed as an ultra-shallow installation.



### Key features:

- ✓ Exact configuration may vary subject to project requirements.
- ✓ All plated can be shaped to accommodate curvature in plan (details on application).
- ✓ Bollards can be provided in various coatings and bollard top geometries (details on application).
- ✓ Stainless steel sleeves can be provided (details on application).

### Testing parameters

**PAS68:2010 tested and rated**



Test layout – PAS68:2010 Surface Mounted Bollard

Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Surface Bollards	7,500	48	90	V/7500[N2]/48/90:1.7/0	1.7m	0m

### Product information

Base Plate  
736kg

Bollard C.H.S  
144kg

Unit Connector  
171kg

### PAS 68 Vehicle classification



## Product Profile

A versatile temporary or permanent bollard solution without the need for civil groundworks.

BARGES

PEDESTRIAN PORTAL

BARRIERS

GATES

BOLLARDS

WALLING

FENCES

# Bollard systems

The bollard systems are designed as standard modules that deliver a straight line of bollards positioned at regular intervals.

Variants are available to include curved foundation units for use at road entrances, junctions and irregular road layouts. A variety of bespoke units can be supplied to meet specific street scape requirements.

Removable bollards can be installed within the shallow and standard bollard systems to enable easy authorised vehicle access whilst maintaining the integrity of the perimeter.

The bollard systems can also be used in conjunction with the wall systems offering a wide range of protective street scape solutions.

## Applications

The bollard systems are permanent security solutions. They are ideal for providing high level perimeter protection for busy inner-city sites where minimising disruption to the local community (visitors, workers and commuters) is a key consideration. Our perimeter protection systems are currently in use in major city centres and other crowded places protecting life, property and operational continuity.

## Sustainability

The modular nature of the bollard system units means that in the event of an attack, re-instatement of the security boundary can be readily re-established.

The re-usable and relocatable capabilities of both the ultra-shallow and shallow bollard systems enable us to extend their usefulness. When recycled at the end of their service life their carbon footprint has been fully optimised.

## Key features:

- ✔ Proven PAS 68 rated protection - against unauthorised vehicle access, criminal and VBIED attack.
- ✔ Security that blends with the street scape.
- ✔ Modular offsite construction - enables rapid onsite installation.
- ✔ Project programme and budget savings - reduced depth foundations minimise unnecessary excavation and mitigate expensive re-routing of services.

## Testing parameters

**PAS68:2010 tested and rated**

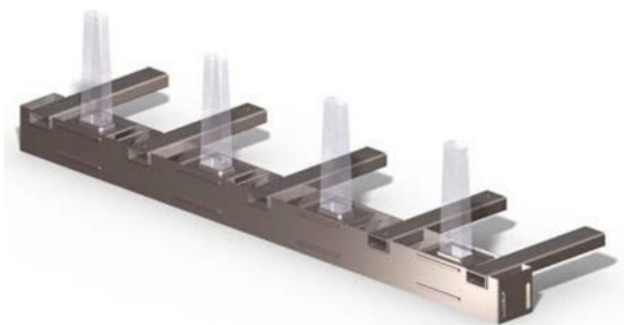


Test layout – PAS68:2010

Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Shallow Foundation	7,500	64	90	V/7500[N2]/64/90:0.66/4.5	0.66m	4.5m
Ultra Shallow Foundation	7,500	80	90	V/7500[N3]/80/90:21.7/19.6	21.7m	19.6m
Ultra Shallow Foundation	7,500	64	90	V/7500[N2]/64/90:3.1/4.4	3.1m	4.4m

## PAS 68 Vehicle classification





### Bollard System - Standard

This high performance system has a structural foundation depth of 500mm and is ideal for use at sites that may be considered very high risk or where



little or no stand-off distance is available between the protected building and the bollard line. Crash rated Manganese bollards can be supplied.



### Bollard System - Shallow

This system has a reduced structural foundation depth of 216mm, which can minimise the requirement to



re-route underground utilities, saving installation time and cost. Crash rated bollards can be supplied.



### Bollard System - Ultra Shallow

With a structural depth of only 75mm, this is one of the shallowest bollard foundation systems that has been PAS 68 tested available anywhere in the world. It has been designed to avoid re-routing underground utilities which may need to be disturbed if deeper foundations are required. Rapid installation, up to 20 bollards per hour (dependent on ground conditions) makes the system highly cost effective.



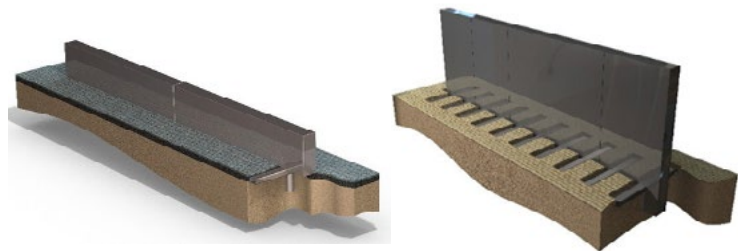
The unique design means that the system can be installed in locations where ground conditions are uneven - the connectors enable the base plates to adapt to different contours to ensure that the bollards are easily installed and aligned correctly. The system incorporates integrated bollards, with several styles available to suit client requirements.

# Wall Systems

Superior wall system developed to provide protection against VBIED attack and unauthorised access.

This permanent system features fixed walls with pre-fabricated, rapid-install mini-pile foundations. It uses proprietary construction materials, combining two steel plates connected by transverse bars, filled with ready-mix concrete, offering exceptional protection against vehicle impacts and blasts.

Various wall configurations are available, from standard blast walls to advanced solutions for high-security sites. All systems are tested to BSI PAS 68 standards and suitable for city centres, transport hubs, industrial facilities, and government or defence sites.



## Key features:

- ✓ PAS 68 certified – Protection against VBIED attacks, unauthorised access, and blasts.
- ✓ Customisable aesthetics – Paint, brick/stone cladding, or cement rendering to blend with surroundings.
- ✓ Impact and blast mitigation – Prevents dangerous secondary projectiles.
- ✓ Modular construction – Speeds up onsite installation.
- ✓ Compact design – High strength with a smaller footprint than reinforced concrete.
- ✓ Rapid-install foundations – Minimal excavation reduces utility diversion and saves time.
- ✓ Bristorm wall systems are tailored to meet project needs and a variety of explosive and HVM threat levels.

## Testing parameters

**BSI PAS 68 tested and rated**



Exact configuration will vary subject to project requirements. The Bristorm low wall and perimeter wall system can be designed to meet a variety of explosive and HVM threat levels.

### Low wall system

Successful explosive tests have ranged from 50lbs (23kgs) “in-contact” charges through to +4,400lbs (2,000kgs) “close proximity” charges 10ft (3m).

### Perimeter Wall System

Successful tests against attack by a variety of vehicle borne assaults have ranged from impact from a 7.5 tonne skip lorry to attack by bucket from a standard JCB type excavator and a 20 tonne Komatsu type excavator

Successful explosive tests have ranged from 50lbs (23kgs) “in-contact” charges through to +4,400lbs (2,000kgs) “close proximity” charges 10ft (3m).

Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Low Wall System	7,500	80	90	V/7500[N3]/80/90:3.8/17.5	3.8m	17.5m
Low Wall System	7,500	64	60	V/7500[N3]/64/60:0/8.4	0m	8.4m

## Product Profile

PAS 68 tested and rated, our permanent perimeter and stand-off protection solutions have been designed to deliver high level protection to meet long term security needs, from protecting key government and commercial buildings to critical national infrastructure such as airports, utilities and key industrial sites.

BARGES

PEDESTRIAN PORTAL

BARRIERS

GATES

BOLLARDS

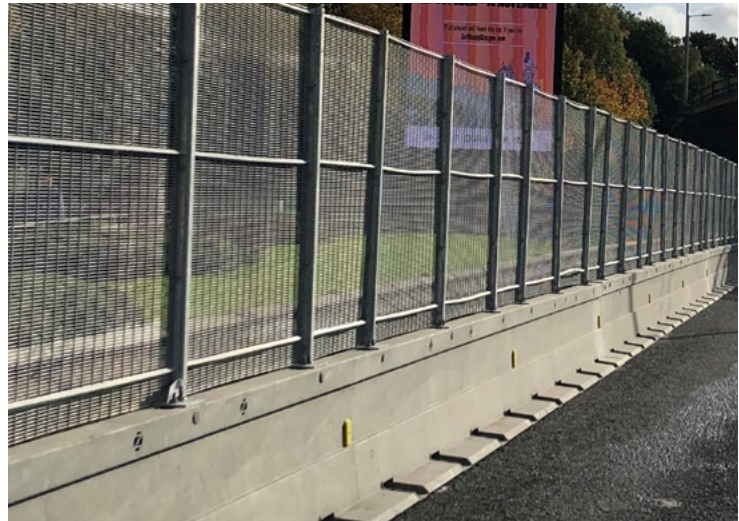
WALLING

FENCES

# Zoneguard & Varioguard

Zoneguard plus is a rapidly deployable hostile vehicle mitigation system.

This has been successfully tested and accredited to both IWA 14 and CPNI Base standards.



## Key features:

The system uses the standard Zoneguard Vehicle Restraint System (VRS) as its core, with modular elements added to meet the demands of both urban and non-urban applications; these elements include anti-climb fencing, pedestrian portals, vehicular access gates, connections and transitions to the National Barrier Asset (NBA) systems, end and intermediate terminals and special units to allow for differences in both horizontal and vertical alignment.

The core system is fully tested in accordance with both European and US VRS standards (EN 1317, MASH 2016 and NCHRP 350), providing a safe, crash worthy barrier for errant motorists in addition to its HVM and CPNI Base capabilities.

Anchor systems are also available for installation on varying ground conditions, ranging from shallow urban pavements to soft uneven fields.

## Zoneguard and Varioguard HVM

These incorporate steel sections with unique speed joints allowing installation of 300m in just one hour.

## Zoneguard Plus HVM

Provides a very high level of protection whilst facilitating quick and easy installation of short and long lengths. Zoneguard Plus incorporates three high-tensile cables across the rear of the units.

## Testing parameters

IWA 14 -1:2013 tested and rated



Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetration
Zoneguard & Varioguard	7,200	48	90	V/7200[N2A]/48/90:3.9	3.9m
Zoneguard+	7,200	48	90	V/7200[N2A]/48/90:11	11m

## Product information

Zoneguard – 12m Length  
(Includes joints)  
1104kg

Varioguard – 12m Length  
(Includes joints)  
1316kg

Zoneguard Plus – 12m Length  
(Includes joints, excludes cables)  
1104kg

## IWA 14-1 Vehicle classification



## Product Profile

Provides a high level of protection whilst facilitating quick and easy installation of short and long lengths.



# Multibloc PAS68

The Multibloc system is a tried and tested product that has seen decades of successful service across a broad spectrum of applications.

As the name suggests, these concrete barriers have a multitude of other uses and applications.



### Key features:

- ✓ 2-metre barriers, curved and corner barriers are available
- ✓ Highways England approved system tested in accordance with EN 1317-2 providing N2/W3 containment.
- ✓ M24 threaded sockets cast into the barrier allow for mounted fence systems.
- ✓ Unpinned system for quick deployment.
- ✓ Suitable for uneven surfaces and tight bends.
- ✓ RAL painting service or branding options are available on request.

### Testing parameters

**PAS68:2010 tested and rated**



Test layout – PAS68:2010 Multibloc PAS68 Concrete Barrier

Type	Vehicle (Kg)	Speed (km/h)	Impact Angle	Performance Rating	Penetr.	Debris Disp.
Multibloc	7,500	48	90	V/7500[N2]/48/90:3/0.0	3m	0m
Multibloc	7,500	64	90	V/7500[N2]/64/90:5/0.0	5m	0m

### Product information

Multibloc Concrete Barrier  
 Sections  
 2500kg

### PAS 68 Vehicle classification

## Product Profile

Multibloc PAS68 provides a high level of perimeter protection

BARGES

PEDESTRIAN PORTAL

BARRIERS

GATES

BOLLARDS

WALLING

FENCES



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