



bristorm 

Hostile Vehicle
Mitigation

Bristorm Anti-Vehicle Solutions

Hill & Smith Ltd has a long history of the manufacture of highway safety barriers; their extensive product range includes both the Flexbeam corrugated barrier system and Brifen tensioned wire rope systems.

As a founding member of the Hill & Smith Infrastructure Products Group, Hill & Smith Ltd has used its expertise to develop new and novel solutions for the perimeter security market.

Bristorm is now the security division within Hill & Smith Ltd and has developed a range of Hostile Vehicle Mitigation solutions tested at TRL and MIRA to BSI PAS 68 and ASTM F2656. Since 2007, Bristorm has expanded its range to include Bollards and wide range of beam and fencing products all tested to BSI PAS 68, ASTM F2656, IWA 14-1 and BSI PAS 170.

Applications for Bristorm Hostile Vehicle Mitigation systems worldwide include: airports, data centres, banks, cash handling, law enforcement, oil and gas terminals, MOD property, Chemical Plants, Commercial locations and other Critical National Infrastructure.

Technical information can be found on our Xtratech service – xtratech.bristorm.co.uk

xtratech



bristorm 

bristorm.com



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**Quality design & manufactured
by a respected and established
British Company.**

Quick reference guide



Bristorm Zero Fence

ASTM F2656-07/15 tested and rated

Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Standard	Performance Rating	Penetration	Major Debris
Bristorm Zero	6,800	50	90	ASTM F2656	M50 P1	0.0 / 0.8m	n/a
Bristorm Zero-P2	6,800	50	90	ASTM F2656	M50 P2	3.0m	n/a

Bristorm Fence System

BSI PAS 68 tested and rated

Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Standard	Performance Rating	Penetration	Major Debris
Bristorm 30	7,500	30	90	BSI PAS 68	V / 7500 / 48 / 90 : 2.0 / 0.0	2.0m	0.0m
Bristorm 30	7,500	40	45	BSI PAS 68	V / 7500 / 64 / 45 : 2.0 / 0.0	2.0m	0.0m
Bristorm 40	7,500	40	90	BSI PAS 68	V / 7500 / 64 / 90 : 2.0 / 0.0	2.0m	0.0m
Bristorm 50	7,500	50	90	BSI PAS 68	V / 7500 / 80 / 90 : 2.0 / 12.0	2.0m	12.0m
Bristorm LP	2,500	30	90	BSI PAS 68	V / 2500 / 48 / 90 : 1.64 / 2.86	1.64m	2.86m
Bristorm LP	2,500	40	90	BSI PAS 68	V / 2500 / 64 / 90 : 3.2 / 4.5	3.2m	4.5m
Bristorm IVP	2,500	40	90	BSI PAS 68	V / 2500 / 64 / 90 : 2.4 / 0.0	2.4m	0.0m

Bristorm Beam Fence

BSI PAS 68 tested and rated

Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Standard	Performance Rating	Penetration	Major Debris
Bristorm Beam	7,500	30	90	BSI PAS 68	V / 7500 / 48 / 90 : 0.3 / 0.0	0.3m	0.0m

Different fence system layouts and configurations will alter the penetration rating. Please contact our technical department for further information on 01902 499400.



Bristorm Impeder Bollards

BSI PAS 68 and IWA 14-1 tested and rated

Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Standard	Performance Rating	Penetration	Major Debris
Impeder 30	7,500	30	90	BSI PAS 68	V / 7500 / 48 / 90 : 0.0 / 0.0	0.0m	0.0m
Impeder 30 shallow	7,500	30	90	BSI PAS 68	V / 7500 / 48 / 90 : 0.0 / 0.0	0.0m	0.0m
Impeder 40	7,500	40	90	BSI PAS 68	V / 7500 / 64 / 90 : 3.3 / 0.0	3.3m	0.0m
Impeder 50	7,500	50	90	BSI PAS 68	V / 7500 / 80 / 90 : 10.6 / 11.1	10.6m	11.1m
Impeder 50 HD	7,500	50	90	BSI PAS 68	V / 7500 / 80 / 90 : 0.8 / 18.1	0.8m	18.1m
Impeder 50 Shallow	7,200	50	90	IWA 14-1	V / 7200 / 80 / 90 : 3.0	3.0m	20.6m

Bristorm Stopper Bollards

BSI PAS 170 tested and rated

Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Standard	Performance Rating	Penetration	Major Debris
Stopper 10	2,500	10	90	BSI PAS 170	V / 2500 / 16 / 90 : 0.1	0.1m	n/a
Stopper 20	2,500	20	90	BSI PAS 170	V / 2500 / 32 / 90 : 1.8	1.8m	n/a



Type



Speed



Impact Angle



Performance Rating

Specialists in Hostile Vehicle Mitigation

Bristorm offers a novel range of static anti-vehicle perimeter fencing solutions as well as a range of BSI PAS 68 and BSI PAS 170 Hostile Vehicle Mitigation products.

Bristorm products are available in a wide range of specifications and offer protection from hostile vehicles from 2,500Kg to 7,500Kg and from 10mph to 50mph.

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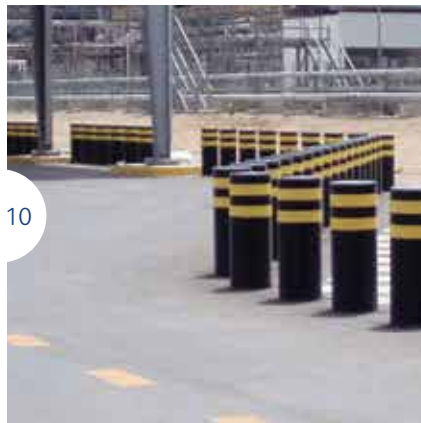
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Hill & Smith Total Perimeter Solutions:

> Zero Fence

Our newest and most advanced perimeter fence offering up to M50 P1 performance

> Impeder Bollards

An extensive range of high performance, high security static bollards tested to BSI PAS 68 or IWA 14-1

> Stopper Bollards

Our newest range of reliable, cost-effective, static Bollards tested to BSI PAS 170 are designed to mitigate errant, slow moving, passenger vehicles in all commercial and vulnerable locations

> Beam

Our combined rope and beam system offering shallow foundation but with an equally strong performance, tested against a 7,500Kg truck at 30mph with under 1m penetration

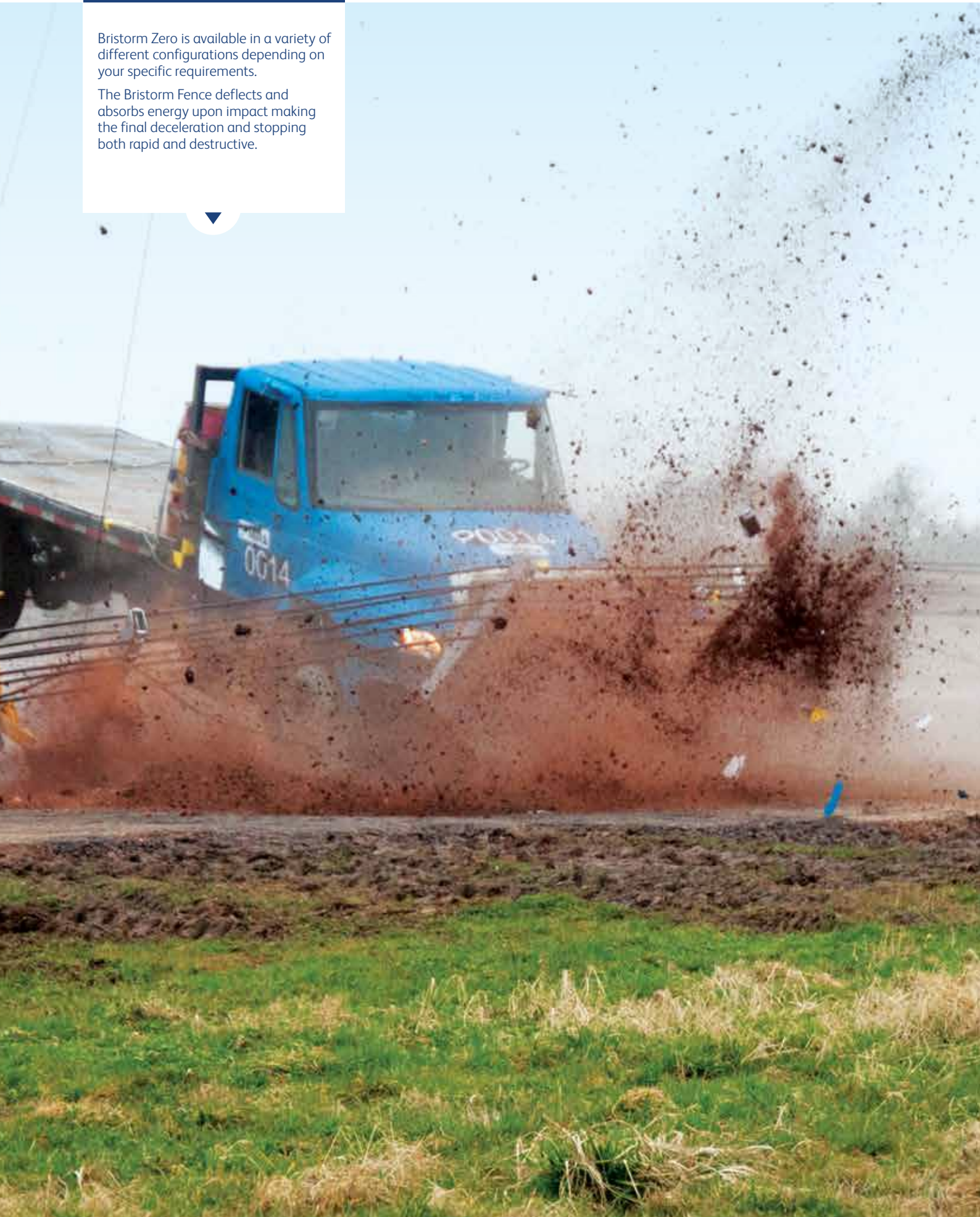
> Street Furniture

Our unique range of attractive Bollard and Street Furniture sleeves sit comfortably over all Impeder and Stopper Bollards, therefore fulfilling both aesthetic and security requirements

Product Profile

Bristorm Zero is available in a variety of different configurations depending on your specific requirements.

The Bristorm Fence deflects and absorbs energy upon impact making the final deceleration and stopping both rapid and destructive.





Bristorm Zero

Bristorm Zero. Zero Penetration. Zero Major Debris.

Bristorm Zero is the latest high performance anti-vehicle perimeter fence from Hill & Smith Ltd.

It is fully tested and rated to ASTM F2656 M50 P1 and can offer Zero Penetration by a 6,800Kg attacking vehicle.

Our Bristorm Zero is available in three different configurations.

Achieving both M50 P1 and M50 P2 ratings, Bristorm can offer a variety of high performance and cost-effective perimeter security solutions that will fulfil your site security and layout requirements.

www.bristormzero.com



Product Features:

- ✓ **ASTM F2656 M50 P1 tested and rated** – under 1 metre
- ✓ **Fully tested and rated in soft ground**
- ✓ Zero tension system – **no maintenance**
- ✓ **Zero major debris**
- ✓ **New rope mounting bracket technology**
- ✓ **Extended lengths** between main anchor posts
- ✓ **Truck remains outside your perimeter**
- ✓ **Seamless and flexible** – corners and angles are no issue
- ✓ **Can be combined with other Bristorm systems**
- ✓ Standard Bristorm steel ropes which are **easy to handle**
- ✓ **Fully galvanised** for erosion protection

Bristorm Zero System

ASTM F2656-07/15 tested and rated



Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Performance Rating	Penetration
Bristorm Zero	6,800	50	90	M50 P1	0.0 / 0.8m
Bristorm Zero-P2	6,800	50	90	M50 P2	3.0m

ASTM F2656-07/15 is the test method that provides a structured procedure to establish a penetration rating for vehicle perimeter barriers subjected to a vehicle impact at 30, 40 and 50mph. Knowing the penetration rating provides the ability to select an appropriate barrier for site-specific conditions around a facility. ASTM F2656 is most commonly recognised across the US and Middle East.

Product Profile

Varied levels of performance to ensure your site is appropriately protected from a perceived vehicular threat.

Modular fitment allows you to develop a cost-effective solution that will protect your perimeter from a vehicle-borne attack.





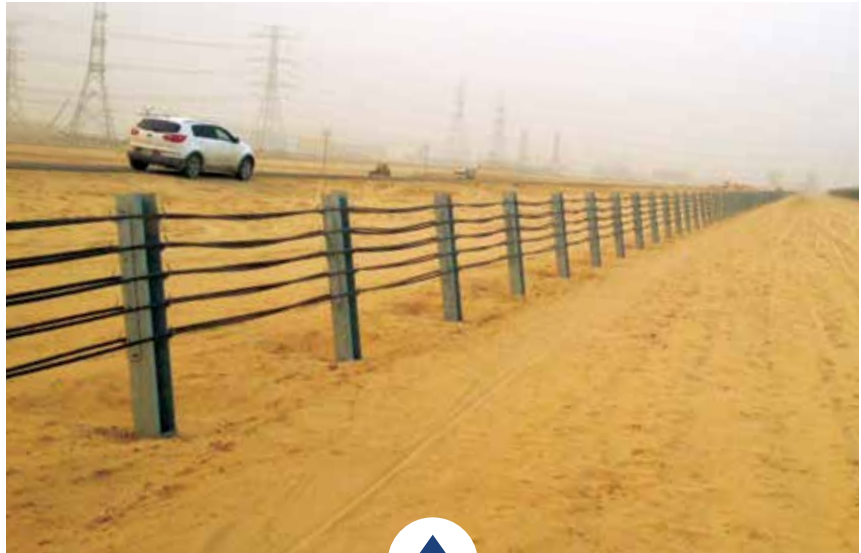
Bristorm Tensioned HVM Fence

Bristorm 30, 40, 50, LP & IVP. Discrete Wire Rope Perimeter Protection.

Bristorm HVM perimeter fence systems are novel solutions consisting of an arrangement of tensioned standard Bristorm steel ropes each supported on steel line posts and secured by anchor posts.

The high modulus of elasticity of the steel ropes means re-tensioning is not required and all components are fully galvanised at our own facility in the UK. All systems are rated and tested to BSI PAS 68 meaning they can appropriately mitigate a 7,500Kg hostile vehicle travelling at speeds of 30, 40 and 50mph.

Our Bristorm LP and IVP systems are crash tested at 40mph against a 2,500Kg pick-up truck. Our wire rope HVM perimeter fence within integrated personnel fence is a cost-effective alternative designed to protect long stretches of perimeter on uneven ground.



Product Features:

- ✓ Tested to BSI PAS 68
- ✓ 4 versions available – up to 7,500Kg/50mph N3 performance
- ✓ Economic, subtle and efficient operation
- ✓ Allows clear line of site
- ✓ Low maintenance
- ✓ Quick installation in all ground types
- ✓ Modular fitment – different levels of protection available in the same fence line
- ✓ Foundations remain in place after impact
- ✓ Immobilises attacking vehicle
- ✓ Ability to withstand subsequent encroachment

Bristorm Anti-Vehicle System

BSI PAS 68 tested and rated



Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Performance Rating	Penetration
Bristorm 30	7,500	30	90	V / 7500 / 48 / 90 : 2.0 / 0.0	2.0m
Bristorm 30	7,500	40	45	V / 7500 / 64 / 45 : 2.0 / 0.0	2.0m
Bristorm 40	7,500	40	90	V / 7500 / 64 / 90 : 2.0 / 0.0	2.0m
Bristorm 50	7,500	50	90	V / 7500 / 80 / 90 : 2.0 / 12.0	2.0m
Bristorm LP	2,500	30	90	V / 2500 / 48 / 90 : 1.64 / 2.86	1.64m
Bristorm LP	2,500	40	90	V / 2500 / 64 / 90 : 3.2 / 4.5	3.2m
Bristorm IVP	2,500	40	90	V / 2500 / 64 / 90 : 2.4 / 0.0	2.4m

BSI PAS 68 identifies impact test methods, tolerances, test vehicle type and vehicle performance criteria that need to be met in order to conform to PAS 68. PAS 68 cites a classification system for the performance of vehicle security barriers and their supporting foundations when subjected to a single horizontal impact by a 7,500Kg truck travelling at 30, 40 and 50mph. This standard is most commonly recognised across the UK and Europe.

Product Profile

Shallow and surface mount, tensioned HVM barrier offers 0.3 metre penetration by a 7,500Kg truck travelling at 30mph.

Suitably installed across industrial sites and Critical National Infrastructure where underground services are present.

Quick installation and reliable performance.





Bristorm Beam

Combined beam and rope technology. Shallow and surface mount.

Bristorm Beam uses combined technologies of rope and specially developed beam. This system consists of shallow end foundations of just 500mm deep and line posts then can be surface or shallow mounted into a 250mm deep ground beam.

It is ideal when underground services are present and if a penetration of less than 1 metre is required to mitigate a 7,500Kg truck travelling at 30mph. With zero major debris and a corrugated beam profile, it can be appropriately installed into heavily built up locations thus ensuring the protection of pedestrians and asset throughout, e.g. Industrial yards or distribution sites.



Product Features:

- ✓ Tested to **BSI PAS 68**
- ✓ Industry Leading – **low penetration of 0.3m with zero debris**
- ✓ **Shallow foundation** of 500mm at each end only
- ✓ **Surface mounted line posts** – or shallow beam of 250mm if required
- ✓ **Economical and robust alternative** to fence and bollards
- ✓ **Fast installation** with reduced civils

Bristorm Beam

BSI PAS 68 tested and rated



Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Performance Rating	Penetration
Bristorm Beam	7,500	30	90	V / 7500 / 48 / 90 : 0.3 / 0.0	0.3m

Product Profile

Impeder Bollards are the highest security bollards available in the UK.

Tested to BSI PAS 68 or IWA 14-1, Impeder Bollards offer variations in performance, thus allowing you to mitigate the vehicular threat perceived in that specific location.

Simple tested protection from hostile vehicles.



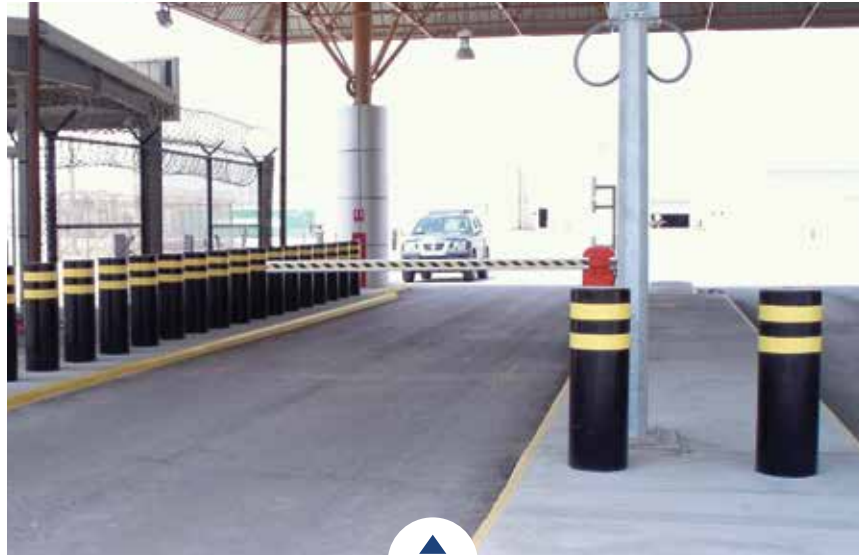


Bristorm Impeder Bollards



High security, high performance Bollards tested to BSI PAS 68 or IWA 14-1.

Bristorm Impeder Bollards are manufactured from steel tubes and cast into concrete foundations. They can be installed in small groups or as a complete perimeter line to ensure hostile vehicles, travelling at 30, 40 or 50mph, are mitigated.



Product Features:

- ✓ Tested to **BSI PAS 68** or **IWA 14-1**
- ✓ **Economical option** for short lengths of perimeter
- ✓ Can **integrate with other Bristorm products**
- ✓ **Shallow mount versions** available
- ✓ **Immobilises attacking vehicle**
- ✓ Ability to **withstand subsequent encroachment**
- ✓ **Certain models available as removable**
- ✓ **Under 1m penetration version** available
- ✓ All galvanised as standard – **EN ISO 1461:2009**
- ✓ **Stainless steel or powder coat finishes** available – see Bristorm Street Furniture

Bristorm Impeder Bollards

BSI PAS 68 and IWA 14-1 tested and rated



Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Performance Rating	Penetration
Impeder 30	7,500	30	90	V / 7500 / 48 / 90 : 0.0 / 0.0	0.0m
Impeder 30 Shallow	7,500	30	90	V / 7500 / 48 / 90 : 0.0 / 0.0	0.0m
Impeder 40	7,500	40	90	V / 7500 / 64 / 90 : 3.3 / 0.0	3.3m
Impeder 50	7,500	50	90	V / 7500 / 80 / 90 : 10.6 / 11.1	10.6m
Impeder 50 HD	7,500	50	90	V / 7500 / 80 / 90 : 0.8 / 18.1	0.8m
Impeder 50 Shallow	7,200	50	90	V / 7200 / 80 / 90 : 3.0	3.0m

Product Profile

PAS 170 is the newest Hostile Vehicle Mitigation standard to be published by the CPNI.

It is designed to provide a guaranteed level of protection to pedestrians and infrastructure within crowded locations.

Bristorm Stopper Bollards are the first UK Bollards to be rated against BSI PAS 170.



BSI PAS 170 is a Publicly Available Specification, sponsored by the CPNI

PAS 170 describes an efficient way of testing the performance of a single bollard when hit by a 2500Kg vehicle at low speed

It is a quick, and proportionate way of testing static bollards that will provide proven protection for many applications

PAS 170 tested Bollards will typically protect areas that may be hit by a passenger vehicle accidentally or by vehicle criminal at up to 20mph

Cost-effective solutions with a measurable performance





Bristorm Stopper Bollards

Medium security, cost-effective Bollards tested to BSI PAS 170.

Bristorm Stopper Bollards will appropriately protect pedestrians and infrastructure from accidental or intentional vehicular collisions, such as a ram raid attack. Manufactured from steel tubes and cast into concrete, Bristorm Stopper Bollards provide a guaranteed level of performance making them ideal across all retail, commercial and vulnerable locations.



Product Features:

- ✓ Fully tested anti-ram bollard solution
- ✓ Ideal for commercial and retail parks, car parks and city centres
- ✓ Reliable system with guaranteed performance
- ✓ No maintenance
- ✓ Proven anti-ram performance
- ✓ Mitigate errant passenger vehicles – intentional or accidental collisions
- ✓ Galvanised as standard – EN ISO 1461:2009
- ✓ Simple foundation, no rebar cage
- ✓ Bristorm Stopper Bollards are **the first UK Bollards** to be rated against **BSI PAS 170**

Bristorm Stopper Bollards

BSI PAS 170 tested and rated



Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Performance Rating	Penetration
Stopper 10	2,500	10	90	V / 2500 / 16 / 90 : 0.1	0.1m
Stopper 20	2,500	20	90	V / 2500 / 32 / 90 : 1.8	1.8m

Product Profile

Combining aesthetics and HVM to ensure all retail, commercial and crowded locations are kept safe and secure.





Combing aesthetics and HVM. Quality and Performance.

Bristorm Street Furniture and sleeves come in variety of finishes to ensure they can be fully integrated into any commercial environment. All Bristorm Sleeves fit over all Bristorm Impeder and Stopper Bollards meaning the required performance can still be implemented to ensure the protection of pedestrians and infrastructure from a vehicle-borne attack.

Bristorm have the resources and capabilities to develop novel and bespoke solutions that match the requirements detailed within a brief, without the product performance being compromised.

The current range of solutions:

- Stainless Steel Bollard Covers
- Cycle Hoops
- Living Walls
- Pedestrian Guardrail
- Planters



Product Features:

- ✓ **Mitre, Flat and Dome Bollard tops** available
- ✓ **Variety of sizes** available upon request
- ✓ **Stainless steel or powder coating finish**
- ✓ **Additional branding and reflective strips** available
- ✓ **Bolt down or cast-in foundations**

Bristorm has a range of services that will allow you to integrate an appropriate HVM Solution:

- Site visits
- Advise on systems available
- Advise on current HVM standards
- Technical presentations

Contact us for more information on **01902 499400** or email **info@bristorm.com**



Bristorm Bollard Sleeve and Cycle Hoops

Product Features:

- ✓ Bollard core tested to **BSI PAS 68** or **BSI PAS 170**
- ✓ **Stainless steel, anodized aluminium, aluminium brush galvanised finish**
- ✓ **Dome, Mitre or Flat tops**
- ✓ **Variety of colours and reflective strips available**
- ✓ **Sleeve fixed surface level or below**
- ✓ **Additional branding solutions available**
- ✓ **Integrated LED lighting**
- ✓ **Modular LED cap**
- ✓ **Variety of hoop configurations and designs available**



Bristorm Pedestrian Guardrail

Product Features:

- ✓ Posts tested to **BSI PAS 68** or **BSI PAS 170**
- ✓ **Variety of finishes available**
- ✓ **Variety of panel configurations and designs**
- ✓ **Secured above or below surface level**
- ✓ **Additional branding solutions available**



Bristorm Planters

Product Features:

- ✓ Core tested to **BSI PAS 68** or **BSI PAS 170**
- ✓ **Variety of finishes** available
- ✓ **Simple drainage system**
- ✓ **Different sizes and shapes** available upon request
- ✓ **1 Bollard for 1 Planter unit**



Fence

Bollards

Street Furniture

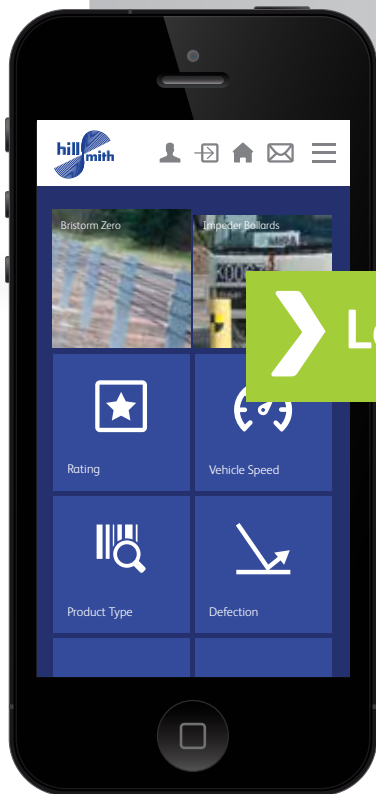
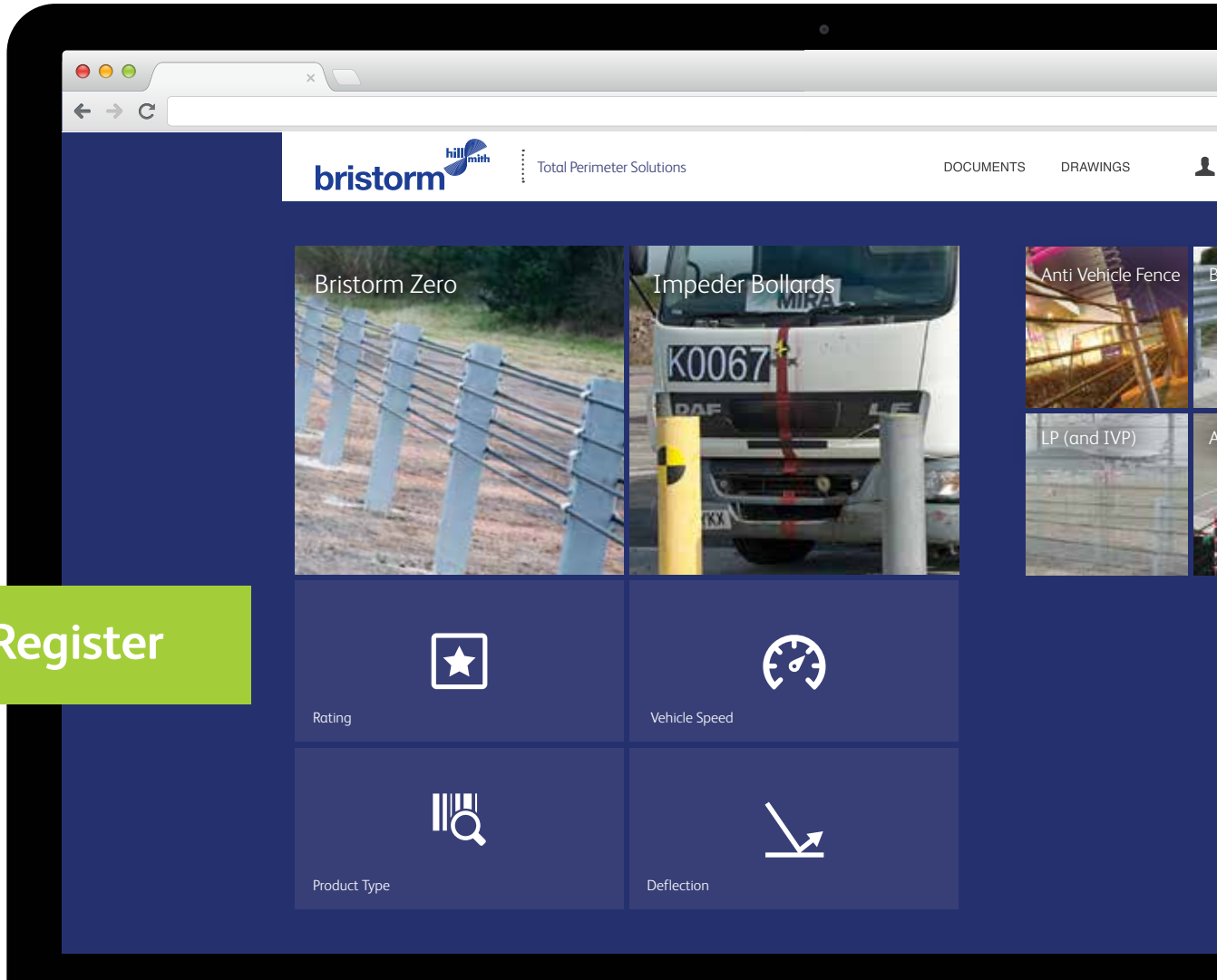


Bristorm Living Walls

Product Features:

- ✓ Core tested to **BSI PAS 68** or **BSI PAS 170**
- ✓ **Variety of finishes** available
- ✓ **Simple drainage system**
- ✓ **Shallow mount and zero penetration** available
- ✓ **Aesthetically pleasing crash rated protection**
- ✓ **Can be planted up** to provide wall of colour or greenery
- ✓ **2 Bollards for 1 Living Wall unit**



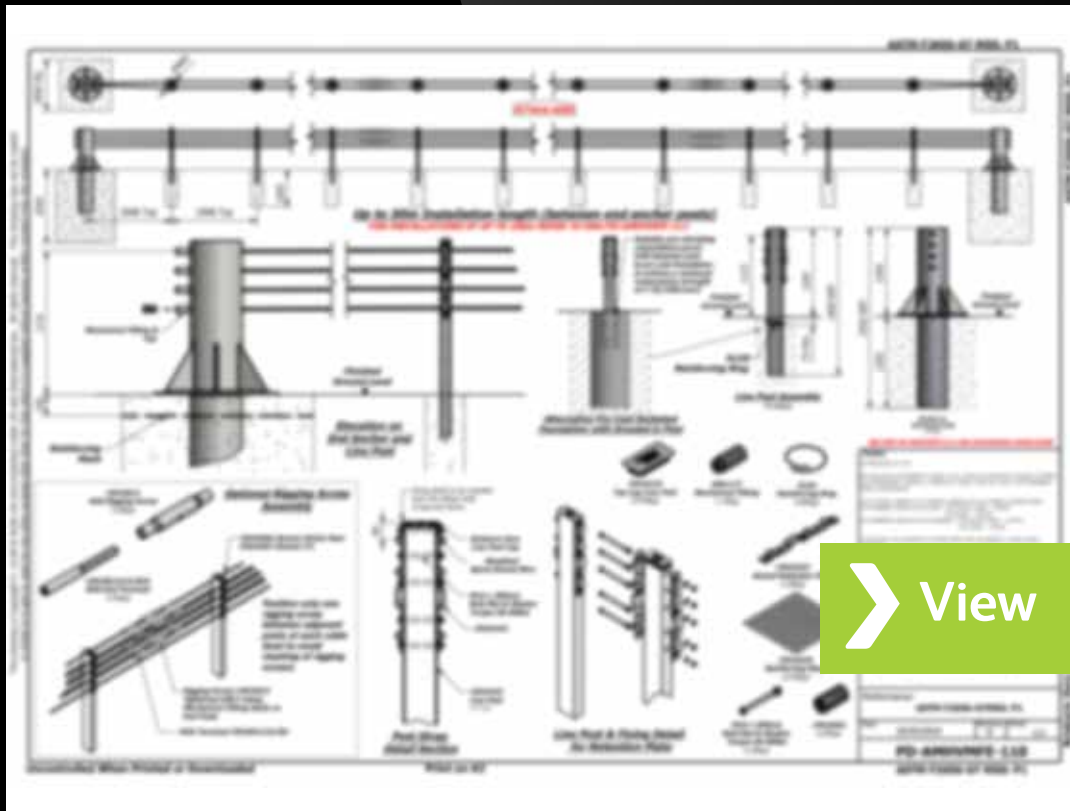


➤ Simple access to our system drawings and installation guidance:

xtratech.bristorm.co.uk

xtratech

Bristorm offers an unparalleled level of access to over 10 years of Hostile Vehicle Mitigation (HVM) system knowledge





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