

HOSTILE VEHICLE MITIGATION



bristorm

**HILL &
SMITH**
INFRASTRUCTURE

BRISTORM HOSTILE VEHICLE MITIGATION (HVM) SOLUTIONS

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Bristorm HVM solutions are designed to protect Critical National Infrastructure and perimeters from hostile vehicles. With a variety of Fences, Gates and Bollards tested to BSI PAS 68, BSI PAS 170, IWA 14-1 and ASTM F2656, Bristorm can secure your perimeter from beginning to end.

Bristorm fence systems provide critical perimeter security protection to sites across the world; they are an effective method of stopping hostile or errant vehicles. Bristorm fences have been used on sites all across the world including: oil and gas, military bases, power, nuclear and technology bases and within the financial sector.

Our Bristorm bollards are designed and manufactured in the UK. From low impact to high-security protection, the Bristorm bollards are effective hostile vehicle mitigation solutions that can be installed in both high security environments or front of house. They are a versatile solution designed to protect people and places.

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.

SPECIALISTS IN HOSTILE VEHICLE MITIGATION

Bristorm offers a range of static anti-vehicle perimeter fencing solutions as well as a range of BSI PAS 68, BSI PAS 170, IWA 14-1 and ASTM F2656-15 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.

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.

ACCESS

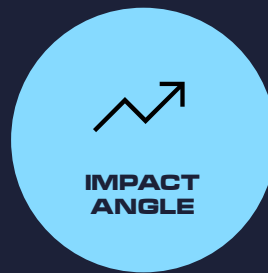
Manually operated HVM gates used to restrict access at emergency access points, around city centres and outside stadiums.

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QUICK REFERENCE GUIDE



BRISTORM ZERO FENCE

ASTM F2656 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

BRISTORM BRI-RISE GATE

ASTM F2656-15 and IWA 14-1 tested and rated

Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Standard	Performance Rating	Penetration	Major Debris
Bri-RISE	6,800	50	90	ASTM F2656-15	M50 P1	n/a	n/a
Bri-RISE	7,200	50	90	IWA 14-1	V / 7200[N2B] / 80 / 90 : 0.7	0.7m	n/a

BRISTORM SWING GATE

IWA 14-1 tested and rated

Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Standard	Performance Rating	Penetration	Major Debris
Swing Gate	7,200	50	90	IWA 14-1	V / 7200[N2A] / 64 / 90 : 7.9	7.9m	n/a

BRISTORM ZERO

**BRISTORM ZERO.
ZERO PENETRATION.
ZERO MAJOR DEBRIS.**

The Bristorm Zero Fence is the most robust in the Bristorm portfolio.

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.

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 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 F2656-15 is most commonly recognised across the US and Middle East.

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.



FENCE

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ACCESS

BRISTORM TENSIONED HVM FENCE

BRISTORM 30, 40, 50, LP & IVP. DISCRETE WIRE ROPE PERIMETER PROTECTION.

The Bristorm HVM perimeter fence systems consist 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 costeffective 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

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 vehicleborne attack.

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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

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.



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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	7,500	50	90	V / 7200 / 80 / 90 : 3.0	3.0m

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 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

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 2,500Kg 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 BRI-RISE GATE

COMPLETE YOUR P1 PERIMETER WITH THE BRI-RISE EMERGENCY ACCESS GATE.

The Bri-RISE Gate one of the highest performing emergency access gates on the market.

Designed to integrate with the Bristorm ZERO Fence, the Bri-RISE gate will complete any ASTM F2656-15 M50 P1 perimeter line. The manually lifting arm can be easily opened and closed by a single operative, reducing the risk of mechanical or electrical failure. The self-balancing arm also reduces risk of injury to individuals operating the gate.

The Bri-RISE gate can be integrated alongside alternative, existing or new fence lines. As well as this, the rising arm can be fixed in position allowing the arm to bridge a gap where underground services may be present.

This reduces cost and eliminates the need to disrupt on site operations.



BRISTORM BRI-RISE GATE ASTM F2656-15 and IWA 14-1 tested and rated

Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Performance Rating
Bri-RISE	6,800	50	90	M50 P1
Bri-RISE	7,200	50	90	V / 7200[N2B] / 80 / 90 : 0.7

PRODUCT FEATURES:

- ✓ Tested to ASTM F2656-15 and IWA 14-1
- ✓ Self-Balancing Arm
- ✓ Lifting weight of only 10kg
- ✓ Seamless integration with the Bristorm ZERO Fence
- ✓ Available as a stand alone gate
- ✓ Available as a fixed spanning arm.

PRODUCT PROFILE

Manually operated rising arm gate to secure emergency access points and complete any M50 P1 perimeter.



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BRISTORM SWING GATE

PROTECTING INFRASTRUCTURE AND PEDESTRIANS AROUND YOUR CITY CENTRE.

The Swing Gate is a cost-effective HVM gate that will effectively protect surrounding infrastructure and pedestrians from hostile vehicles.

Designed to perform as a stand alone gate, the Swing Gate will stop a hostile vehicle within the gates own working envelope (under 8m). It is a viable solution around arenas and stadiums; it can temporarily restrict access to vehicles guaranteeing the protection of crowds on match days or during busy annual events.

PRODUCT FEATURES:

- ✓ Tested to IWA 14-1
- ✓ Galvanised as standard
- ✓ Different Powder Coated finishes available
- ✓ Stops vehicle within its own working envelope
- ✓ 6.4m maximum clearance.



BRISTORM SWING GATE

IWA 14-1 tested and rated

Type	Vehicle (Kg)	Speed (mph)	Impact Angle	Performance Rating
Swing	7,200	40	90	V / 7200[N2A] / 64 / 90 : 7.9

PRODUCT PROFILE

Manually operated Swing gate to restrict vehicle access in and around city centres or nearby stadiums and arenas.

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