

# Vehicle Restraint Systems

DESIGN. SUPPLY. INSTALLATION.

Creating **world class car park** environments.

**VEHICLE RESTRAINT SYSTEMS** / CLADDING & FACADES  
STRUCTURAL REFURBISHMENT / CAR PARK CONSTRUCTION / STREET FURNITURE



The logo consists of a red rounded rectangle containing the word "Berry" in white, and a white rounded rectangle below it containing the word "SYSTEMS" in red.**Berry****SYSTEMS**The background image is a dark grey sphere with a complex network of white dots and lines, resembling a molecular or network structure. The lines connect the dots in a way that creates a series of overlapping triangles and polygons, giving it a three-dimensional, crystalline appearance.

# Who We Are

Berry Systems specialise in the design, supply and installation of vehicle restraint systems for the off highway market, cladding solutions, industrial products, refurbishment and maintenance of multi-storey car parks along with modular build which completes our car park product spectrum. Not only do we operate throughout the UK, but with an extensive global distribution network, Berry Systems offer a truly world-class reach. Our aim is to provide you with a safe and compliant car parking facility.

**No job is too difficult**

We offer bespoke solutions that help accommodate your project requirements, which are designed to your exact needs.

**From concept to completion**

We have a thorough understanding of design and construction programmes so we are here to help, not hinder. We are unrivalled experts within car park markets.

**Dedicated to make you compliant**

Safety is paramount in all that we do and we assist our customers in delivering the same exact standards in meeting the appropriate legislation.

**HILL & SMITH** HOLDINGS PLC

Hill & Smith Holdings PLC are a group of companies that are market leaders in providing infrastructure products. Their main focus is upon engineering products for the roads and utilities markets to deliver solutions worldwide. They hold strong positions in niche markets to help deliver value to both customers and shareholders.

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# Completed Projects

- ABP, Southampton
- Arora Hotel, Gatwick
- Aggreko, Dumbarton
- Amersham MSCP
- Biffa, Horsham
- Birmingham Airport, Birmingham
- Bristol Broadmead, Bristol
- Central Park, Telford
- Cheshire Oaks, Cheshire
- Dale Street, Liverpool
- Derriford Hospital, Derriford
- Drakes Circus, Plymouth
- East Marketgait, Dundee
- Heathrow Airport, London
- Merrywalks, Stroud
- Morrisons, Bradford
- New Street Station, Birmingham
- Picadilly Plaza, Manchester
- Porter Building, Slough
- Redrock, Stockport
- Southwater, Telford
- University of Birmingham
- Westfield Broadway, Bradford
- Westfield White City, London



# Why choose Berry Systems

We offer our customers a full turnkey solution for vehicle restraint systems, cladding, facades, structural refurbishment, car park construction, modular car parks and street furniture. The services we offer compliment the high quality products that we design, manufacture, supply and install worldwide. We combine the two to deliver a total solution to meet the needs of your project.



## Manufacture

We can manufacture our products bespoke to accommodate architect's aspirations without compromising on safety. Our products are tested in accordance with current standards. Production methods originate from our wealth of knowledge in steel and car park products to produce items of the highest quality.



## Account Management

From initial concept right through to completion, we will support you.



## Maintenance

Maintenance and inspection of multi-storey car parks are carried out in accordance with the IStructE.



## Logistics

We will work with you to plan and schedule deliveries to meet the demands of your project.



## Design

All of our design work is inhouse utilising the latest design software.

Aspirational briefs are all that we require to create a bespoke design and put your aspirations into a reality.



## Surveying

We offer a full surveying service for both supply only and supply and fit projects.

A consultancy service is available for all services and products offered from Berry Systems.



## Samples

We can provide visual 3D renders and physical samples for your project.

# Standards & Regulations

## Eurocodes

The Eurocodes are made up of 10 European standards that detail how structural design should be conducted throughout the European Union. They are applicable to a variety of structures including buildings, bridges, towers and masts. The codes act as a method of good practice when it comes to structural design and construction – in total there are 58 parts to the ten Eurocodes. Below are the Eurocodes applicable for the design of VRS (Vehicle Restraint Systems) and ones we abide by:

## Building regulations

Within our off road vehicle restraint systems spectrum of products we make pedestrian safety one of our top priorities and incorporate this into our product range. Part K of the UK building regulations states the following:

- Minimum height requirement of 1100mm above finished floor level
- Systems must be anti-climb where a fall risk is viable.

### BS EN 1991-1-1

Annex B

### BS6399

Applicable to low speed  
(10mph/16km/hr)

Impact: 90 °

Priority: Contain vehicle within the prescribed deflection zones and deliver protection of building structure and personnel

Posts should not fail

Damage to the barrier system, vehicle, occupants and building should be minimal if any at all

### The loading calculation for BS EN 1991-1-1 can be defined as:

Horizontal Force Calculation:

$$F = \frac{0.5MV^2}{\Delta c + \Delta b}$$

Key:

M – Vehicle Mass

V – Velocity in m/s

$\Delta c$  – Deformation of vehicle

$\Delta b$  – Barrier deflection

$$F = \frac{0.5 \times 1500.0 \text{ kg} \times 4.47 \text{ m/s}^2}{100 \text{ mm} + 0 \text{ mm}}$$

$$F = 150 \text{ kN}$$

### BS EN 6180

Barriers in and around buildings

There are minimal horizontal imposed loads for parapets, barriers and balustrades

Depending on the occupancy of the structure or building depends on the impacts loads the barrier must withstand

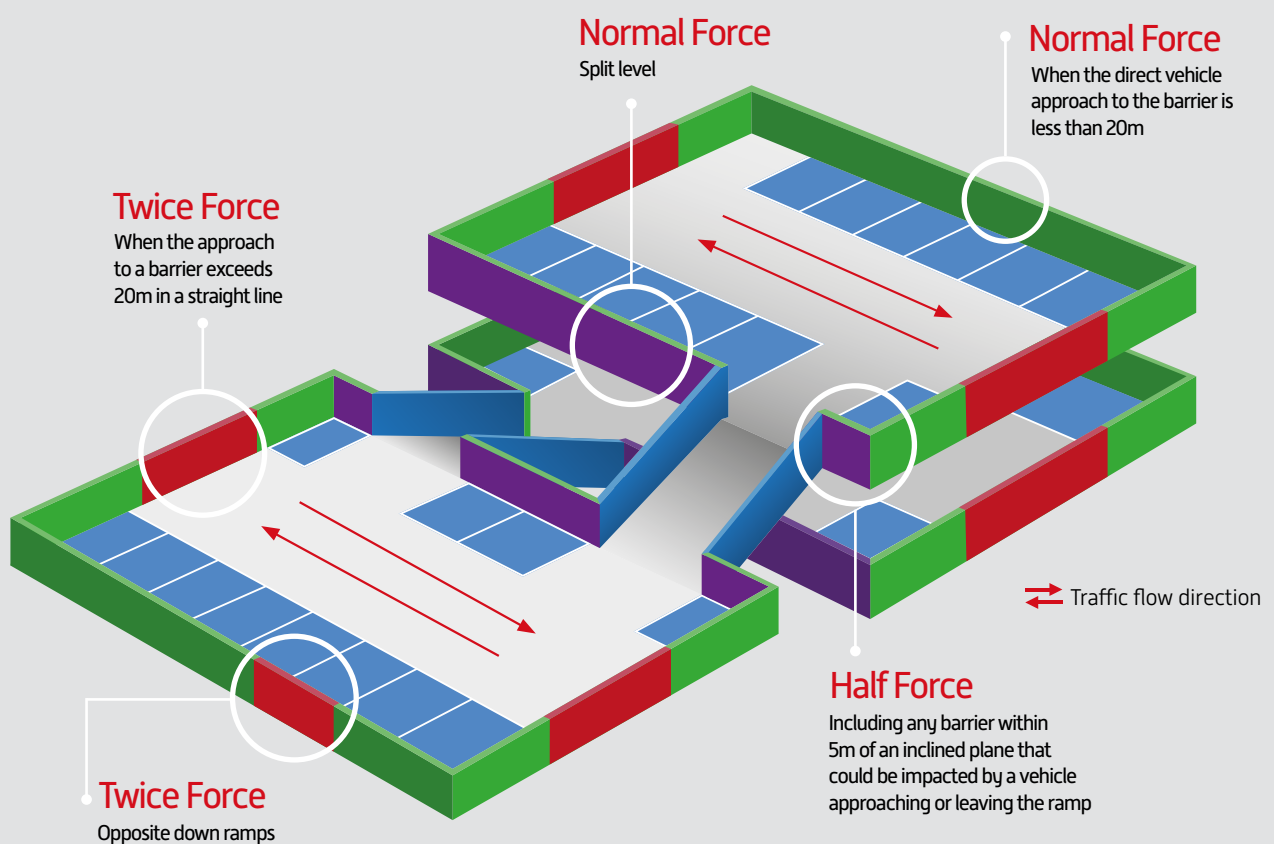
For structures classified as 'Vehicular' the figure for the various types of load is 1.5 (kN/M)

Other types of structures can be explored in more detail by referring to 'Table 2 – Minimum horizontal imposed loads for parapets, barriers and balustrades'

## Institute of Structural Engineers

As a business operating within structural engineering criteria, we endeavour to meet the recommendations advised by the Institution of Structural Engineers

In the IStructE 'Design recommendations for multi-storey and underground car parks', there are significant proposals for the use of vehicle barriers and design considerations within multi-storey car parks. The diagram and supporting key helps demonstrate the advice given.



## Twice Force Systems

As per the latest BS EN standard, 'twice force' systems are required in order to provide additional protection for areas more likely to withstand higher impact loads..

This is also to comply with the Institution of Structural Engineers (IStructE) 'Design recommendations for multistorey and underground car parks'. The diagram above on the right shows where single and twice force systems need to be applied:

- |  |   |   |
|--|---|---|
| <p>① <b>Twice Force –</b><br/>Opposite the ends of straight ramps intended for downward travel which exceed 20m in length, the barrier has to withstand twice the force.</p> | <p>② <b>Normal Force –</b> Split level</p>  | <p>④ <b>Half Force –</b><br/>Including any barrier within 5m of an inclined plane that could be impacted by a vehicle approaching or leaving the ramp</p> |
|  | <p>③ <b>Normal Force –</b><br/>When the direct vehicle approach to the barrier is less than 20m</p> |   |





# Off-Highway Safety Barriers

Designing, manufacturing and supplying vehicle restraint systems has been our specialty and area of expertise for over 45 years. We can deliver our solutions to meet project requirements and facilitate superior crash barrier protection for the off highway market.

The barriers we offer are mainly utilised in car parks but can be implemented in distribution centres and industrial areas. In such environments, we can accommodate impacts from industrial vehicles and have been specifically designed with

this in mind. These types of vehicle restraint systems are installed for the protection of people, vehicles, plant and buildings.

We ensure compliance to varying standards by only installing and supplying tested and approved systems to maintain the safety of all those using the car park facility.

We have a range of beam profiles and different systems available to suit your car park design and we will work with you to supply the best solution.

**Our specialty and area of expertise for over 45 years.**



# Car Park Beam Profiles

All our vehicle restraint systems are compatible with a range of different beam profiles. Different beams offer enhanced visual aesthetics and improved performance.

Our beam profiles are tested in accordance with BS EN 1991-1-1 (BS6399) to enable compliance and provide you with confidence upon purchase and installation.

## BESPOKE SOLUTIONS

Want to save valuable time on site? Let us know your dimensions and we can cut beams to exact lengths to reduce the requirements for hot work on site.

## BARRIER RAIL (ARMCO)

This beam profile is the more traditional profile used in the majority of vehicle restraint systems. It is widely used for the highway market but is utilised off road also as it is a well-designed barrier solution. Barrier Rail provides a high quality steel barrier system to ensure protection and restraint of the vehicle upon impact.

This particular system can be mounted on a variety of posts to create a complete barrier system. Only correctly specified and fully traceable steel is used in all of our products to deliver the high level protection that we promise.

- ✓ Overlapping design ensures no exposed ends face traffic flow
- ✓ Provides high protection under impact
- ✓ Manufactured from quality steel



# Berry Beam

Our Berry Beam profile provides a neat barrier that offers the same levels of protection as the well-known Barrier Rail (Armco). This type of profile is best applied to structures that require a less industrial look.

- ✓ Aesthetically pleasing appearance
- ✓ Manufactured from British Steel
- ✓ Enables flexible post centres

## Industrial Beam Profiles

### OPEN BOX BEAM

The Berry Open Box Beam profile has been designed to prevent large vehicles and HGVs (Heavy Goods Vehicles) from damaging property or equipment upon impact. The Open Box Beam is usually floor mounted onto Heavy Duty Spring Steel Buffers for it to be able to withstand even larger impacts and increases the level of protection from heavier vehicles.

By implementing the HD Buffer allows a higher containment level for the heavier vehicles. This is more commonly used within an industrial environment or common traffic flows for HGVs.

### WAREHOUSE RAIL

Warehouse rail as the name suggests has been specifically designed by Berry Systems for use within Industrial applications. This slimline profile is commonly used as a low level barrier to protect forklift protrusions under barrier systems.



# Floor Mounted Systems

## Flexi-Post

As part of our floor mounted system range, we have our Flexi-Post that is designed to allow slight flexibility upon impact. It is mounted to the floor and is best described as a semi-flexible system. The base of the post is mounted into a rubber shock absorber enabling a limited deflection. Upon impact the forces are absorbed by the rubber to prevent structural damage to the floor and the post itself. The base plate helps spread these impact forces over a larger surface area to stop the post being ripped from the ground or the barrier failing to contain the impact. Our Flexi-Post is compliant with the requirements of the BS EN 1991-1-1 (BS6399) standard.

## Considerations

- Compatible with the following beam profiles:
    - Berry Beam
    - Barrier Rail
    - Open Box Beam
  - System is manufactured with mild steel to enable flexibility
  - Suitable for all car park environments
  - Can also be used in an industrial environment
  - Standard post sizes from finished floor level include:
    - 610mm
    - 760mm
- ✓ Damage to both the barrier and vehicle is reduced due to the anchor bolts
  - ✓ Great impact protection for vehicles, machinery and pedestrians
  - ✓ Eurocode, AUS & British standard compliant system





# Floor Mounted Systems

## HD Buffer

The HD (Heavy Duty) buffer, as its name suggests, is specifically designed to be able to withstand impacts from larger vehicles. This is to enhance the level of protection against HGVs (Heavy Goods Vehicles) and other larger vehicles that are used regularly in an off road environment – particularly in warehousing and industrial environments. It can absorb the impact of a 40 tonne vehicle traveling at 3.35mph from a 90° impact. This buffer can facilitate an Open Box Beam profile and is again available with handrail and mesh as optional extras and are 450kN rated systems.

## Considerations

- Compatible with the following beam profiles:
    - Berry Beam
    - Barrier Rail
    - Open Box Beam
  - Has been a benchmark floor mounted system in the UK for nearly 40 years
  - Standard post sizes from finished floor level include:
    - 610mm
- ✓ Handrail and mesh can be added for further protection
  - ✓ Eurocode, AUS & British standard compliant system
  - ✓ Deflects within its own footprint so will not encroach into the car parking bay
  - ✓ Versatile system that can be made bespoke
  - ✓ Uses x2 fixings increasing the energy absorbing properties





# Floor Mounted Systems

## P224 Bolt Down

These posts are aptly named as they are bolted directly into the structure itself using substantial anchor bolts to install the full post and beam profile system. This creates a full vehicle restraint system with low deflection and deformation of the barrier rail. Where minimal deflection is essential, we recommend a combination of Rigid P224 Posts and Open Box Beam profile to provide a high level of protection. When using this combination, an increased load is transferred into the structure when compared to using flexible solutions.

## Considerations

- Compatible with the following beam profiles:
  - Berry Beam
  - Barrier Rail
  - Open Box Beam
- Standard posts sizes from finished floor level include:
  - 610mm
  - 760mm
- Bespoke manufacture available to suit your requirements
- ✓ Eurocode, AUS & British standard compliant system
- ✓ Number of sizes available
- ✓ Strength can be further increased by reducing post centres
- ✓ Cost effective solution
- ✓ Ideal for structures that can't accommodate any deflection



# Floor Mounted Systems

## RB1X

This system offers an economical footprint and is a flexible system designed to withstand impacts from vehicles in an industrial, warehousing, distribution and car park environment. The deflection from the impact can be contained within the barrier footprint by reducing post centres. Again, a base plate can be used to spread the impact load to avoid further damage. The base plate can also be used to assist in levelling the buffer installation on un-even surfaces. The RB1X can also feature our BS EN 6180 compliant restraint strap. This innovative design offers limited handrail deflection under pedestrian loading whilst not compromising the beneficial flexibility of the spring steel posts. The RB1X is exclusively available from Berry Systems and only provided by us throughout the UK and worldwide.

### Considerations

- Compatible with the following beam profiles:
  - Berry Beam
  - Barrier Rail
  - Open Box Beam
- Post thickness sizes available:
  - 76 x 12
  - 100 x 14
  - 100 x 20 (Twice Force)
- Standard post sizes from finished floor level include:
  - 610mm
  - 760mm
- ✓ Requires a single anchor fixing
- ✓ Reduced loading into slab
- ✓ Speedy installation to keep labour costs down
- ✓ Eurocode, AUS & British standard compliant system
- ✓ Suitable for split level and ramps



# Floor Mounted Systems

## RB1

Our RB1 post is produced from spring steel to enable flexibility upon impact. This particular system has a small footprint upon install. Sufficient space must be left behind the barrier to enable the degree of deflection upon impact.

A base plate can be used to spread the impact load on the buffer over a wider surface area to reduce potential damage to the substrate.

## Considerations

- Compatible with the following beam profiles:
    - Berry Beam
    - Barrier Rail
    - Open Box Beam
  - Standard post thickness sizes available:
    - 76mm x 12mm
    - 100mm x 14mm
    - 100mm x 20mm (Twice Force)
  - Standard post sizes from finished floor level include:
    - 610mm
    - 760mm
- ✓ Requires a single anchor fixing
  - ✓ Reduced loading into slab
  - ✓ Speedy installation to keep labour costs down
  - ✓ Eurocode, AUS & British standard compliant system
  - ✓ Suitable for split level and ramps





# Cast In Systems

## P224

Similar to the Bolt Down post, the Cast In Rigid Post system is where the posts are cast directly into the sub structure. These will also have minimal deflection and deformation to the barrier rail upon impact and is tested to the same standards as the P224 Bolt Down Post. We also recommend combining this post with an Open Box Beam Profile for minimal deflection.

### Considerations

- Compatible with the following beam profiles:
  - Berry Beam
  - Barrier Rail
  - Open Box Beam
- Standard overall post sizes include 1100mm and 1500mm
- Bespoke manufacture available to suit your requirements
- ✓ Eurocode, AUS & British standard compliant system
- ✓ Strength can be further increased by reducing post centres
- ✓ Cost effective solution
- ✓ Ideal for structures that can't accommodate any deflection





# Wall Mounted Systems

## WH Buffer

Berry Systems provide a wall mounted solution, facilitated by our WH Buffers, to prevent extensive damage to walls adjacent to traffic areas that would result in costly maintenance and repair work. With modern building materials getting lighter and lighter, it is important that walls are adequately protected to minimise damage from traffic flow. Protection to stairwell walls adjacent to parking or traffic flow areas have been highlighted as a requirement to be considered in the ODPM report created in September 2002. In areas where there is insufficient room for a surface or floor mounted barrier, our WH buffers can be installed as they are affixed directly into the wall. The mounting brackets utilised upon install will protect the wall from the full force of the collision and minimise damage to the wall itself. This particular system is comprised of spring steel so will deflect upon impact slightly to contain the impact itself.

## Considerations

- Can be installed in the following environments:
    - Industrial
    - Distribution
    - Warehousing
    - Single storey car park
    - Multi-storey car park
  - Made with a U-shaped protrusion
- ✓ Aesthetically pleasing
  - ✓ Provides superior amount of protection
  - ✓ Delivers safety without compromising on style



# Column Mounted Systems

## Brisafe Wire Rope Edge Protection System

The Berry Brisafe system is manufactured from three lengths of wire rope that are anchored under tension to the car park columns. This then forms a barrier to prevent both vehicle and driver from falling from the edge of the structure itself. Upon impact, the wire ropes deflect and absorb the impact energy forces to then return to their normal 'resting' position. Following an impact, the damaged infill panels can be swiftly removed and replaced and the wire rope elements are fully re-usable – thus delivering a cost effective solution with minimal maintenance. By choosing our Brisafe solution enables truly flexible design that meets the relevant safety criteria for performance.

### Considerations

- Can be supplied in any RAL colour
  - Can support custom designs including logos
  - Internal supports added for limited deflection
  - Provides additional pedestrian protection with an anti-climb system and design
  - Ideal for new build car parks
- ✓ Zero bay footprint
  - ✓ Requires no anchorage into the car park deck
  - ✓ Customisable options available
  - ✓ Cost-effective VRS solution
  - ✓ Single panel replacement should an impact occur
  - ✓ Integrated anti-climb system for increased pedestrian protection
  - ✓ Independently tested to BS EN 1991-1-1
  - ✓ Eurocode, AUS & British standard compliant system



# Column Mounted Systems

## System 3

The System 3 solution from Berry Systems comprises of untensioned steel bars anchored to the structural steel columns of the car park itself to provide protection against impacts from vehicles. The reduced impact deflection and footprint figures make System 3 an attractive solution for both new build and refurbishment projects. Upon install, the system is 'locked off at each column location so can be easily replaced should an impact occur. Where suitable columns are not available to affix the system to, the Berry Flexi-Bollard can be implemented to increase design flexibility and deliver even lower impact deflection levels. Like the Brisafe system, there are a wide range of infill panel options to choose from including wire mesh and screen printed panels.

### Considerations

- Can be supplied in any RAL colour
  - Can support custom designs including logos
  - Internal supports added for limited deflection
  - Provides additional pedestrian protection with an anti-climb system and design
  - Ideal for new build car parks
- ✓ Zero bay footprint
  - ✓ Requires no anchorage into the car park deck
  - ✓ Customisable options available
  - ✓ Cost-effective VRS solution
  - ✓ Single panel replacement should an impact occur
  - ✓ Integrated anti-climb system for increased pedestrian protection
  - ✓ Independently tested to BS EN 1991-1-1
  - ✓ Eurocode, AUS & British standard compliant system





# Split Levels

In order to guarantee compliance, split levels must also be accommodated for to ensure that pedestrians and vehicles cannot fall between the open spaces left between the different levels of the car park. A drop that is greater than 380mm needs to have barrier protection installed. We recommend utilising our pedestrian mesh infill system to increase safety to pedestrians and prevent them from falling through the open spaces between levels.



# Ramps

As ramps help transport vehicles from one level to another, a drop is required in order to facilitate the ramp. Because of this it must be protected by a system that will absorb the impact forces and prevent the vehicle from falling. In most cases, a half force barrier system is sufficient as impacts experienced on ramps will be oblique as opposed to perpendicular.

To increase safety further to the car parking facility and any ramps featured, we again recommend our pedestrian mesh infill system to make sure pedestrians cannot climb on the ramp or fall through the drop between levels.





# Column & Pipework Protection

In every car park, it is recommended that supporting columns are sufficiently protected from vehicle impacts. Damage to these can weaken the structural integrity of the car park and be extremely costly to repair so is a cost effective option in the long term.

Exposed pipework and lighting columns are left vulnerable without this type of protection and cannot always be installed in traffic free areas. The column and pipework protection we provide can be delivered and utilised in a number of materials and finishes to accommodate your car park style. Column protection is very effective in reducing loads transferred into the column to prevent further damage.

## Column Mounted

- Bespoke rubber column protection unit

## Floor Mounted

- Column Buffa Plus
- 500, 750 and 1000mm diameter

## I Beam Column Protection Unit

- Made bespoke to suit each and individual column



# Additional Products

As part of our car park product spectrum, we offer multiple products to increase safety and reduce speed in a car parking environment. Our industrial range can be applied to both as our products used span across both, industrial and car park sectors.

We also deliver a range of solutions to help designate safe crossing zones and walkways for pedestrians to navigate themselves safely around the car parking facility. Maintenance and refurbishment services can also be specified by us if required.

Speak to our team today to take advantage of our expert knowledge and consultancy services.

## Additional Products Available

- Access Control Systems
- Bollards
- Column Protection Units
- Fendering Profiles
- Height Restriction Systems
- Pedestrian Systems
- Speed Restraint Systems
- Cladding
- Facades
- TopDeck – Modular Car Park Solutions
- Car Park Maintenance Services
- Car Park Refurbishment Services



## Infill Options and Design

All column mounted solutions provided by Berry Systems share the same range of panel infill options. These provide an anti-climb feature as part of the barrier solution and can be accompanied by handrail to increase pedestrian protection. We provide a wide range of customisable options such as wire mesh or perforated panels to accommodate your aesthetic aspirations. We can incorporate any RAL colour and logo design into our

infill panels for a truly unique look and to reflect your branding. Our infill options will provide superior protection and work as tested with our systems to withstand vehicle impacts. This ensures compliance without compromising on style. The variety of custom products we provide demonstrates our aptitude for understanding architectural aspirations so we try to limit restrictions on design as much as possible.



# Bespoke VRS Solutions

We can offer you a truly bespoke vehicle restraint system by utilising our in-house design team and consultancy services. Our solutions can be tailored to meet your exact requirements. We can adapt our current product specifications and work with you to create a system that's not only compliant, meets legislations but exceeds your expectations. Beam lengths, beam profiles and materials are all customisable factors for you to consider for your project. To discuss further what we can do for you, contact our Sales Department.





We are **Berry Systems**.  
We are **more than just barriers**.

**VEHICLE RESTRAINT SYSTEMS** / CLADDING & FACADES  
STRUCTURAL REFURBISHMENT / CAR PARK CONSTRUCTION / STREET FURNITURE



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#morethanjustbarriers

