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the protection you need

Car Park Products

Safety Barriers · Cladding
Speed Restraints · Bollards
Handrails · Column Protectors

Full design, supply and installation service

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Berry Systems

Berry Systems are market leaders in ‘Off Highway’ safety barriers. In general terms this means safety barriers used in car parks, logistics yards, warehouses, inside and outside factories, retail parks, loading bays, etc. Their objective is the protection of people, vehicles, plant and buildings. This brochure is concerned specifically with their use in car parks.

Most people are familiar with the appearance of highway barriers - the ubiquitous Armco. But it would be a mistake to think that if a barrier can cope with a high speed motorway crash they must be able to cope with the low speeds in a car park. Whilst looking superficially similar, off highway barriers are quite different and different standards, regulations and operating requirements apply.

Firstly, many accidents are likely to be perpendicular to the barrier, not oblique. Secondly, the main priority is the protection of both people and property - and that property includes both the barrier itself and the vehicle that hits it. Thirdly, the barriers are also used to protect pedestrians and to physically restrict their access to certain areas.

Berry Systems was formed in the 1970s and developed a spring steel barrier system. After early tests at MIRA (Motor Industry Research Association) it was progressively adopted as the benchmark system for use in UK multi-storey car parks. Over the last 40 years standards and authoritative recommendations have advanced considerably and the solutions offered by Berry Systems have matched, and in many cases exceeded, these requirements. In 1999 the company became a subsidiary of Hill and Smith Holdings.

Test Evidence

All Berry Systems vehicle barriers have been tested at MIRA and by other independent consultants to ensure they comply with the relevant standards and recommendations. Copies of test certificates and reports are available on request.
Standards

Standards, Regulations and Independent Recommendations

Building Reg. Part K – Vehicle Barriers and Loading Bays

This states quite simply and clearly that barriers must be fitted to the edge of any building with vehicular access and these barriers must have an impact height of at least 375mm and be capable of withstanding the forces set out in BS 6399.

BS 6399 Part 1 1996

The British Standard defines the way to calculate the horizontal force required to be withstood by a vehicle barrier: 
\[ F = 0.5mv^2 \]
where 
\[ m \] is the gross vehicle weight (in kilos), \[ v \] is the velocity of the vehicle in metres per second. \[ \delta_c \] is the deformation of the vehicle and \[ \delta_b \] the deflection of the barrier.

In practical terms for car parks, for vehicles under 2500kg - i.e. cars, \[ m \] can be taken as 1500kg, \[ v \] is taken to be 4.5 metres per second (10mph). In the absence of better evidence the deformation of the vehicle, \[ \delta_c \], is taken to be 100mm and, for a rigid barrier the deflection is assumed to be zero. If these values are applied to the formula, 
\[ F = 150kN. \]

BS 6399 also states that, for cars, the force acts at 375mm above the floor (assumed bumper height) is distributed over a length of 1.5metres. Where there is a normal perimeter edge or half-level edge the 150kN force applies. But, where vehicles are travelling on a confined ramp – and cannot possibly impact the sides of the ramp structure at 90 degrees, then the requirement allows for “half force” i.e. 75kN. Where there is a perimeter edge opposite a down ramp which exceeds 20m in length, then a double or “twice force” barrier will be required i.e 300kN. (See Figure 1).

BS 6180 : 1995

This is the code of practice for barriers in and about buildings. It slightly pre-dates BS 6399 but states that barriers are required where there is a drop greater than 380mm. It further requires that, if these are in areas used by pedestrians, handrails and infill panels are required at a height of 1100mm and no gaps are allowed through which a sphere 100mm diameter can pass. BS 6180 also defines a load requirement of 1.5kN/m² on the handrails and infill panels with a similar point loading on the handrail of 1.5kN. Therefore, a vehicle impact barrier needs to absorb a force 66 times greater than a pedestrian handrail rail system.

Independent Recommendations

Reports have also been published by the Institution of Structural Engineers (ISE) and the Institute of Civil Engineers (ICE). Between them they have recommended:

- Vehicle impact height be increased from 375mm to 445mm centre height - This was to allow for changes in vehicle designs and fashions.
- Any rail edge less than 550mm from floor level be considered a step up point and that the 1100mm handrail height be taken from this point unless footholds can be spoiled – The ‘climb assist’ rule.
- Where the approach to a barrier is greater than 20 metres, typically at aisle ends, a ‘twice force’ barrier is required. (See Figure 1).

Designers and operators should also recognise the need to consider temporary or permanent changes to traffic flow.

RIBA Approved CPD Seminar

A CPD Seminar is available entitled ‘The Design and Installation of Vehicle Barriers in Off Highway Applications’. This material has been approved by the RIBA. If you are interested in participating in this seminar please see page 25 for further details or call 01902 491100 or email sales@berrysystems.co.uk.

For more information on Berry Systems visit www.barbourproductsearch.info
Barrier Types

Fundamentally there are two types of car park safety barriers - column mounted or floor mounted. Each will stop vehicles from breaching the car park perimeter (if correctly specified) and each has its own particular features and benefits. These two main types of barriers then sub-divide into flexible or rigid options.

Flexible barriers

Flexible barriers are designed to ‘give’, i.e. deflect, on impact absorbing minor knocks without damage to either the barrier or the impacting vehicle. Harder impacts will sustain damage but, in the case of the barrier, this will be limited to easily replaceable or repairable components and structural integrity is maintained. Damage to vehicles is minimised and the driver and any passengers are less likely to suffer injury. The level of deflection by the barrier varies from system to system and space must be allowed for this if any external cladding or other facade is also fitted.

Rigid systems

Rigid systems tend to use heavier sections which, by their nature, transfer more load to the structure on impact rather than deflecting. Significant impacts are more likely to cause damage to the structure of the car park as well as damage to the barrier. Generally speaking, repairs or replacements of rigid systems are more expensive than flexible systems as the fixing foundations are often not re-useable and material costs are greater.

Column Mounted Systems.

The main advantage of column mounted systems is that often they have little or no footprint in the parking bay thereby releasing more space for parking use. The barrier is mounted directly onto the structural columns with interim posts fitted if necessary, subject to the system chosen. This makes them best suited for new build car parks so that designs can take into account the weight of the system and the forces and stresses transferred from the barrier to the columns in the event of impacts.

The absence of fixings to the deck allows the use of thinner deck substrates and lighter deck materials.

Berry Systems offer three flexible systems (Brisafe page 8, System 3 page 8 and Flexi-Panel page 9) and a rigid RHS system (page 9). Alternatively Berry can design a bespoke system to marry architectural aesthetics with British Standards performance criteria by utilising the wide range of experience, test data and expertise accumulated over the last 40 years.
Floor Mounted Systems

For areas away from the perimeter, floor mounted systems are often the only option. Columns are not usually available to affix barriers for ramps, split levels, car park approaches or to protect doorways, walkways, plant or ductwork. Floor mounted systems are also the most common choice for perimeter refurbishments to minimise structural upgrading.

Berry Systems offer two types of flexible floor mounted systems and one rigid system, each with a choice of 3 rail profiles - Berry Beam, Barrier Rail (Armco type) or Open Box Beam.

Spring Steel Buffer System

The Berry Spring Steel Buffer System has been the benchmark, flexible, floor mounted system in UK car parks for nearly 40 years. Over that time it has been improved and developed to incorporate a range of buffer types to suit almost all circumstances and more recent changes to standards and relevant recommendations have led to the development of integral pedestrian handrail and anti-climb systems.

One of the key features of the Spring Steel Buffer is that they are designed to yield not fail. Deflection during the type of impact defined in the British Standard (BS 6399) is typically about 300mm. However, the majority of this is contained within the footprint of the system. This means the impact forces are absorbed by the buffers rather than transmitted direct to the mounting bolts or towards the deformation of the rail. Frequently they only require 1 (or at most 2) x 16mm bolts. Embedment can be a mere 125mm and the pull out loading is just 75kN (including a 50% safety factor). Compared to rigid posts, this is a quarter of the number of bolts at less depth. A major saving in terms of installation time and materials. Shallower embedment can be achieved (see page 7).

The Berry Flexi-Post

The Berry Flexi-Post provides a semi-flexible system. The upper part of the post is mounted into a rubber shock absorber which allows a limited deflection of the post - about 120mm. Flexi-Posts use 4 x 12mm screw anchor bolts, 150mm embedment and a pull out loading of only 85kN (including a 50% safety factor). They are ideal when a limited amount of space is available for barrier deflection, but reduced anchor bolt loading is essential compared to a rigid system.
Barrier Deflection

In the event of an impact between a vehicle and the safety barrier, the forces defined in BS 6399 have to be absorbed. There are only two things that can absorb that force - the car or the barrier - or, more realistically, a combination of the two. This results in damage to the car, deformation of the barrier and pull out force on the barrier anchorage.

Damage to the car is unfortunate and undesirable as it may result in injury to the occupants but, in practical terms, some degree of damage to the vehicle in an impact is unavoidable.

Damage to the barrier is expensive for the car park operator but the level of that expense can be mitigated by the choice of barrier system.

Rigid systems represent one extreme set of circumstances. The typical impact force defined in BS 6399 is arrived at by assuming a 100mm deformation of the vehicle and zero deflection of the posts. The resultant 150kN is then transmitted to the anchor points and also manifests itself in damage to the rail. In ‘twice force’ locations this figure rises to 300kN.

If a flexible system is used, such as spring steel buffers, the deflection on impact is typically 300mm* reducing the force to be absorbed to only 38kN. This puts much less strain on the anchorage and means less damage to the rail - and fewer expensive repairs.

Some Berry Spring Steel Buffer systems are designed to contain that deflection within their own footprint so that additional space behind is not required. Where space is available, typically on split levels, the footprint in the parking bay can be reduced and the deflection allowed for outside the parking area.

Please contact Berry Systems for advice regarding specific situations.
Floor Mounted Anchorages

Selection of the correct anchorage solution is vital to the performance of any floor mounted barriers and there is a solution for almost any deck construction, even the thin decks prevalent in today’s designs.

In simple terms, the greater the forces directed through the anchorage from an impact on the barrier, the deeper will be the required embedment - but this can be mitigated by careful specification of the barrier and mounting posts.

Rigid systems impart the greatest forces through the anchorage and typically a rigid bolt down barrier will need to be anchored with 4 x M20 chemical anchors per post at an embedment of 170mm to cope with the 150kN pull out load (including 50% safety margin) generated by an impact as defined in BS 6399.

Flexible or semi flexible systems reduce the pull out loading so that Flexi-Posts can usually be secured with 4 x M14 x 130 specialist screw type anchors embedded to 125mm to withstand the maximum pull out load of 85kN (including 50% safety factor).

Spring Steel Buffers absorb more of the impact themselves through deflection thus reducing the pull out load to 75kN (including 50% safety factor). Typically these can be anchored with just 1 x M16 x 165 specialist screw type anchor at 125mm embedment. This can be reduced further by careful choice of concrete specification. Please contact Berry Systems for guidance.

Concrete Specification

It is sometimes thought that a C35 concrete specification will provide sufficient solidity to resist the 75kN pull out force for spring steel buffers. However, this assumption can be misleading as modern concrete specifications do not give a reliable measure of tensile strength. Where necessary Berry Systems can arrange for pull out tests to be carried out on site.

Thin Decks

Where insufficient embedment exists a shallow embedment box plate can be used with spring steel buffers to enable the use of 2 x M16 x 125mm specialist screw type anchors at an embedment of only 75mm.

Other alternatives include through deck fixings or the use of upstands to provide a greater depth of concrete at the critical positions.

If using hollow core slabs, structural screed toppings or cold rolled steel decking please contact Berry Systems for a tailored solution.
Berry Systems offer three flexible Column Mounted Systems and one Rigid System. In addition, bespoke systems can be designed to marry architectural aesthetics with the necessary performance criteria. The flexible systems share the same range of panel infill options (see page 9 for details). Standard features include:

- Independently tested to BS 6399 and ICE Recommendations
- Requires no anchorage into the car park deck
- Zero bay footprint
- Integrated anti-climb system
- Stylish vehicle and pedestrian protection
- Re-useable after impact
- Cost-effective single panel replacement
- Combined infill offers numerous design opportunities
- RAL matching and even logo application

System 3

System 3 is a new development from Berry Systems that utilises tensioned steel bars. Infill panels with anti-climb mesh and integrated handrails complete the installation. The system is “locked off” at each column location and, where suitable columns are not available, the Berry Flexi-Bollard can be employed to give absolute design flexibility and even lower deflection levels when subjected to an impact. In such circumstances the steel bars can be easily and speedily replaced if necessary.

Independent dynamic impact tests were carried out at MIRA to BS 6399 on 7.5 metre column centres and 2.5 metre centres with Flexi-Bollards. The reduced impact deflection figures make System 3 attractive for both new build and refurbishment projects.

Brisafe Wire Rope Edge Protection System

The Berry Brisafe system is based on three lengths of wire rope anchored under tension to the car park structure. These ropes are then fitted with infill panels. On impact, the wire ropes deflect absorbing the impact energy forces and then return to their normal “resting” position. Following an impact, any damaged infill panels can be swiftly removed and replaced. The wire rope elements are fully re-usable and can be re-tensioned on site if required.

The deflection of the system under impact means that Brisafe is not usually suitable for use where an additional facade or cladding is also specified.
Flexi-Panel

Berry Flexi-Panel provide a fast fit option for a system featuring a combined vehicle barrier and pedestrian handrail complete with anti-climb mesh. Ideally suited to steel framed structures, pre-assembled Flexi-Panel are bolted to the columns not the car park deck.

Standard panels are 4.8 metres or 7.2 metres wide but where wider spans are required, Berry’s own Flexi-Bollards can be used as interim posts. These will “flex” on impact returning to their normal position thereafter, minimising impact damage to both car and barrier.

Rigid Steel Sections

Where facade or other requirements preclude the use of flexible systems, the Berry Rigid Steel Section barrier can be used. Fixed direct to the car park structure the rigid steel barriers provide a very solid resistance to any impact. A wide range of design formats is available including pedestrian handrails and anti-climb infill where needed.

Column Spacing

Brisafe Wire Rope and System 3 are designed and tested for use on column spacings up to 7.5m. For greater widths interim supports are required and the use of the Berry Flexi-Bollard offers many advantages. Flexi-Bollards work on the same principle as the Flexi-post (see page 5) with built in rubber shock absorbers absorbing much of any impact force.

By placing Flexi-Bollards at 2.4m or 2.5m spacings they can be use to delineate parking bays whilst significantly reducing barrier deflection in the event of impacts – particularly in locations requiring “twice force” performance. Custom sized units can be manufactured where needed.

Infill Options

All Berry Systems column mounted flexible barriers share the same range of panel infill options that provide an anti-climb feature from floor level to the integral pedestrian handrail at 1100mm. Unlike traditional vehicle barriers, Berry column mounted systems can be supplied in any RAL colour and the infill can include custom designs, logos or customer information thereby providing innovative opportunities for designers to create unique themes and to integrate identities between car parks and the facilities they serve.
Perimeter Cladding Systems

Protecta-Clad Combined Barrier and Cladding

Some specifiers may be concerned about the use of flexible barrier systems when architectural or planning considerations require the use of exterior cladding. By definition flexible systems deflect to greater or lesser degrees depending on the system and this could interfere with the facade. However, Berry Systems have developed Protecta-Clad, a combined barrier and cladding system that not only resolves the issue of deflection but also combines two installation operations into one.

Protecta-Clad can be floor or column mounted by utilising brackets cleverly affixed to either the spring steel buffer base plates or the column fixings. These brackets are designed so that the barrier can still deflect on impact but the cladding is not affected. Frequently installation can be undertaken from within the structure rather than by using scaffolding or cherry pickers. This not only leads to savings of time, number of fixings and money but also provides a safer working environment for the installers.

All Berry Systems’ barriers are independently tested at MIRA and those used in Protecta-Clad are no exception. In addition, the cladding element of Protecta-Clad can be potentially specified to meet the pedestrian loading requirements of BS 6180 so that no pedestrian handrail is required on the main perimeter. Alternatively a handrail can be mounted onto the barriers in the normal way.

Protecta-Clad can incorporate most styles of floor or column mounted barriers and a wide choice of cladding styles including rain screens or full facade. Those shown here are just examples of the choices available.

Cladding Only Packages

Berry Systems have unrivalled expertise and experience of the car park market, specifically designing systems to perform to the requirements of BS 6399 and beyond. Increasingly this is being utilised by specifiers and contractors to design and install car park cladding systems independently of the barrier requirements. Early involvement in the specification process can lead to significant benefits and savings and a more efficient perimeter solution.
A selection from the wide range of available cladding options

Expanded Metal Mesh

Perforated Metal

Woven Stainless Steel Mesh

Rainscreen Cladding

Bespoke

Key Partners

www.berrysystems.co.uk BERRY SYSTEMS CAR PARK PRODUCTS
Perimeter Systems - Floor Mounted

Any general perimeter barrier system must be capable of withstanding the 150kN impact defined in BS 6399 (excluding twice force areas) and minimise any residual energy being passed into the structure. Typical perimeter barrier systems already in use on car parks throughout the UK and Europe are outlined opposite, but this is not a definitive list - please contact us to discuss your full requirement in detail.

The choice of an effective perimeter edge protection is based on a number of variable factors:
- Space available in which to install a barrier system and minimise any encroachment into parking bay length
- Cladding/external facade detail to be protected and location in relation to the barrier
- Climbability of any barrier located in front of existing perimeter walls/facades
- Handrail/mesh infill system requirements, if any
- Edge detail in relation to suitable anchorage, i.e. edge beam detail, concrete slab thickness/structure and waterproofing details
- General aesthetical appearance
- System can be mounted on upstands if required.

Left: RB1X (100 x 14) Spring Steel Buffer with Berry Beam, Handrail and Mesh Infill
Below: GH Spring Steel Buffer used with woven stainless steel mesh cladding.
Bottom left: Rigid Post with Berry Beam, Handrail and Mesh Infill
Bottom right: RB1X with Barrier Rail and Parapet Mounted Balustrade
RB1X (100 x 14.3mm) Spring Steel Buffer

Max Post Centres
- 1600mm Barrier Rail
- 1500mm Berry Beam

Standard Height
- 610mm (1100mm with handrail) from finished floor level.

No of fixing bolts
- 1

Offering an economical footprint, the RB1X (100 x 14.3mm) buffer is the ideal flexible solution for perimeter protection. The deflection can be contained within the barrier area by reducing post centres. The single bolt fixing has obvious installation advantages over other systems.

GH Spring Steel Buffer

Max Post Centres
- 1600mm Barrier Rail
- 1500mm Berry Beam

Standard Height
- 610mm (1100mm with handrail) from finished floor level.

No of fixing bolts
- 2

Containment of deflection within the buffer footprint and versatility are the key features of this system. The GH buffer has long been the flagship flexible system in UK car parks. The use of 2 fixings means the energy absorbing properties are enhanced.

P224 Rigid Posts

Max Post Centres
- 1600mm Barrier Rail
- 1500mm Berry Beam

Standard Height
- 610mm (1100mm with handrail) from finished floor level.

No of fixing bolts
- 4

When deflection needs to be minimised rigid posts are a suitable system for consideration. In the event of an impact, more of the loading is transferred to the structure so much thicker slabs are required for fixing. Rigid posts are also much more likely to sustain permanent damage to both barrier and an impacting vehicle.
Ramps

Ramp barriers are usually only required to take glancing blow impacts from vehicles, hence the 1/2 force requirement in BS 6399. In situations where pedestrians could also use the ramp, a handrail and mesh infill system should be added. Typical examples include, but are not limited to:

**RB1 (76 x 12mm) Spring Steel Buffer System**

- **Max Post Centres**
  - 1600mm Barrier Rail
  - 1500mm Berry Beam
- **Standard Height**
  - 610mm (1100mm with handrail) from finished floor level.
- **No of fixing bolts**
  - 1

Used on open edge applications where space is available behind the barrier for deflection. The footprint of the RB1 minimises incursion into the ramp width. Single anchor fixing facilitates speedy installation.

**RB1X (76 x 12mm) Spring Steel Buffer System**

- **Max Post Centres**
  - 1600mm Barrier Rail
  - 1500mm Berry Beam
- **Standard Height**
  - 610mm (1100mm with handrail) from finished floor level.
- **No of fixing bolts**
  - 1

Where a structure behind the barrier requires protection, the RB1X style buffer automatically creates deflection room while limiting the effect on ramp width.

NB. Anti-climb handrail and infill systems can be added to both these systems where pedestrians have access to the ramps. Standard height is then 1100mm.
Ramp Returns / Split Level

Ramp Returns
Where ramps start or finish within the deck, a drop will be created that needs protecting. In most cases a half force barrier will be sufficient although handrails with anti-climb mesh infill will be needed too.

Split level
Split level protection is to prevent vehicles and pedestrians falling through the open spaces in between floor levels. Any drop greater than 380mm needs to be protected and a simple barrier system is the minimum requirement. A pedestrian mesh infill system is also recommended with the mesh meeting the 100mm sphere ruling from BS 6180. Lighter weight systems can generally be used taking advantage of the free space behind for barrier deflection and to minimise incursion into the parking bay lengths. Typical examples include, but are not limited to:

RB1 Spring Steel Buffer
Combined System
Max Post Centres
- 1600mm Barrier Rail
- 1500mm Berry Beam
Special height buffers can be custom made to suit the opening.

No of fixing bolts
1
The RB1 buffer has a small footprint (only 200mm) in the parking bay and overall parking length is only reduced by the 100mm depth of the barrier. Free space must be available behind for barrier deflection.

RB1X Spring Steel Buffer
Combined System
Max Post Centres
- 1600mm Barrier Rail
- 1500mm Berry Beam
Extension pieces and mesh can be added to suit appropriate split level openings if required.

No of fixing bolts
1
The RB1X is designed to reduce deflection while minimising the incursion onto the parking bay. It is ideal where a structure behind the barrier needs to be protected as well.
Twice Force Barriers

The latest ICE/ISE recommendations outline the need for a ‘twice force’ (i.e. 300kN) system where traffic travel can exceed 20m in length. Twice force barriers need to withstand a 1500kg car travelling head on at 14.4mph.

Primarily this relates to traffic flow aisle ends and opposite ramps of downward travel. This requirement is achieved by either using heavier duty systems or, in some cases, halving the post centres on standard systems.

**RB1X (100 x 20) Spring Steel Buffers with Open Box Beam fitted at 1200mm centres**

- **Standard Height**: 610mm (1100mm with handrail) from finished floor level.
- **No of fixing bolts**: 1

The thicker heavy duty box beam enables it to absorb more impact than the standard corrugated rail. A combination of the spring steel properties of the buffer and the 5mm thick box beam means that the enormous energy potentially generated under impact is largely absorbed minimising damage to both anchorages and vehicles.

**Flexi-Posts with Barrier Rail fitted at 800mm centres**

- **Standard Height**: 610mm (1100mm with handrail) from finished floor level.
- **No of fixing bolts**: 4

Ideal for use where space for deflection is limited. Testing has shown that reducing the post centres increases the strength of the system when using barrier rail. The semi-flexible solution offered by the Flexi-Post is able to contain vehicles at the higher speeds twice force areas demand.

**Rigid P224 Posts with Berry Beam fitted at 800mm centres**

- **Standard Height**: 610mm (1100mm with handrail) from finished floor level.
- **No of fixing bolts**: 4

For use when minimal deflection is essential but in consequence significantly increased load is transferred onto the structure compared to flexible systems.

NB. Where these barriers are used in areas accessible by pedestrians, or where perimeter protection is also needed, then handrail extensions and anti-climb mesh infill panels should also be fitted. The ICE/ISE recommendations also state that temporary or permanent changes in traffic flow should be anticipated so that twice force barriers should be considered to be installed opposite the bottom of ‘up’ ramps and at both ‘aisle end’ locations in case traffic flow ever needs to be reversed.

For more information on Berry Systems visit [www.barbourproductsearch.info](http://www.barbourproductsearch.info)
Column & Pipework Protection

Supporting Columns are highly vulnerable to damage from vehicle traffic. Repairs can be costly and, in the worst cases, could affect the structural integrity of the car park with far reaching consequences. Exposed pipework and lighting columns are also highly vulnerable and can not always be placed in traffic free areas. All Berry Systems’ column protection products cater for various sizes and can be tailored to your precise needs. These can also be wall mounted to protect pipework.

**Column Buffa Plus**

Stronger than the standard Column Buffa these are available in full or semi-circle units and are recommended to be double height. The spring steel buffers, combined with enclosed semi-circles offer strong protection from vehicles at low speeds. The feet can also be turned inwards to prevent a trip hazard or damage to tyres. Minimum size is 500mm internal diameter.

**Column Buffa**

A light and economic monostat system which offers protection from cars at low speeds. It can be radiused as low as 200mm and is suitable for both interior and exterior use.

**Column Corner Guard**

These Rubber Buffas are for use when the impact is likely to be brushing or scraping the column rather than head on impacts. 1200mm height.

**Corner Fender**

The Corner Fender is an alternative to the Column Corner Guard and is supplied in standard 1m lengths. It features high visibility yellow strips on both sides.

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For more information on Berry Systems visit www.barbourproductsearch.info
Plant and equipment also needs protection from potential vehicle impacts and proper risk assessments should be carried out in all cases to ascertain the likely danger and potential speeds of vehicles involved. Berry Systems can help and advise in these circumstances and recommend either standard products from the Berry Systems range or design bespoke solutions.

**GH Spring Steel Buffers**

**Max Post Centres**
- 1600mm Barrier Rail
- 1500mm Berry Beam

**Standard Height**
- 610mm (760mm for HGV applications)

**No of fixing bolts**
- 2

A strong, adaptable multi-purpose system that can take blows at up to 10mph either head on or at glancing angles, depending on the vehicle type. It absorbs the impact energy using the unique properties of the spring steel. This means less damage to the structure or plant and whole life cost savings compared to traditional rigid solutions.

**Flexi-Posts**

**Max Post Centres**
- 1600mm Barrier Rail
- 1500mm Berry Beam

**Standard Height**
- 610mm (760mm for HGV applications)

**No of fixing bolts**
- 4

Where impact is potentially at higher speeds than those required by BS 6399 then the Flexi-Post is an ideal solution. It is designed to take regular light knocks as well as single heavy impacts from various angles. Strength can be further increased in high risk areas by reducing post centres.

**Rigid Posts**

**Max Post Centres**
- 2400mm Open Box Beam

**Standard Height**
- 610mm (760mm for HGV applications)

**No of fixing bolts**
- 4

Where minimal deflection is essential a combination of Rigid P224 Posts and Open Box Beam will provide a very good level of protection. However, significantly increased load is transferred into the structure compared to flexible solutions. Both cast-in and bolt down solutions are available. Strength can be further increased in high risk areas by reducing post centres.
Wall Protection

With modern building materials getting lighter and lighter, it is important that they are adequately protected to both minimise damage from traffic flow and, more safety critically, avoid materials being displaced and falling onto pedestrians or vehicles below.

Structural damage could be very expensive to repair and all damage, whether structural or cosmetic, looks unsightly and harms the overall image and ambience of the car park. Consideration must also be given to what lies behind any given wall. If it is on the edge of the car park then BS 6999 applies (refer to General Perimeter section on page 8).

Anywhere that could sustain a head on impact should be protected by steel barrier systems such as the examples shown here. If impacts are likely to be glancing blows causing cosmetic damage only, then it would be sufficient to use Rubber Wallguard and D Section systems as illustrated. These also give good protection to the impacting vehicles from light knocks and scratches.

Typical rubber sections available are outlined below, but other sections are available upon request.

- **Double 'D' Section**
  - Standard length: 6000mm coil
  - Material: EPDM Rubber

- **Wallguard Section**
  - Standard length: 3000mm
  - Material: EPDM Rubber

- **D Fender**
  - Standard length: 1000mm
  - 5 pre-drilled fixing holes

- **'D' Section**
  - Standard length: 3000mm
  - Material: EPDM Rubber

For more information on Berry Systems visit www.barbourproductsearch.info
Pedestrian Protection

Protection to stairwell walls adjacent to parking or traffic flow areas have been highlighted as a requirement to be considered in the ODPM report of Sept 2002. The juxtaposition of cars and pedestrians is obviously dangerous.

Twin Ball Handrail System

It is vital that pedestrian areas are delineated with handrails at the very least. The Berry Twin Ball system provides a sturdy and effective solution. However, where there is a risk of vehicles entering pedestrian areas then vehicle barriers must be added.

RB1 Spring Steel Buffer

Max Post Centres 1600mm Barrier Rail
1500mm Berry Beam

Standard Height 1100mm including handrail

No of fixing bolts 1

The RB1 Spring Steel Buffer and Barrier Rail provides real protection and presents no trip hazard for pedestrians. If pedestrians are allowed access to ramps then walkways must be delineated and barriers for a 1/2 force application must be included.

At perimeter edges, on ramps or anywhere with a drop greater than 380mm, mesh infill should be used between barrier and handrail. Particular attention should be paid to areas where pedestrians step from a stair well directly into a traffic flow area.

‘Pedestrian friendly’ end caps are available for Barrier Rails, Berry Beams and Open Box Beams to protect legs and clothing from sharp steel edges.

For more information on Berry Systems visit www.barbourproductsearch.info
Berry Systems offer a wide range of Bollards and Parking Posts. The more common uses include:

**For delineating entry/exit lanes.**
These plastic bollards are highly visible but will give on impact so that no damage is done to the impacting vehicle. They are for use as markers only and do not provide physical protection.

**For marking boundaries**
These steel boundary posts are spring-mounted to give on impact while presenting a substantial boundary marker. Available powder coated or galvanised.

**For restricting access**
Lockable hinged parking posts are ideal for restricting access to specific areas or parking bays. Their normal position is locked upright but, when required, they are unlocked and the hinged mounting allows them to be laid flat allowing free access.

Telescopic versions are also available.

**Ornamental Bollards**
A wide range of ornamental bollards are available in either steel or plastic.

**Standard Bollards**
A wide range of standard bollards are available in either steel or plastic.

### Steel

<table>
<thead>
<tr>
<th>Overall diameter (mm)</th>
<th>Overall length (mm)</th>
<th>Above ground (mm)</th>
<th>Below ground (mm)</th>
<th>Wall thickness (mm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>1400</td>
<td>1000</td>
<td>400</td>
<td>3.6</td>
<td>11</td>
</tr>
<tr>
<td>127</td>
<td>1400</td>
<td>1000</td>
<td>400</td>
<td>3.2</td>
<td>16</td>
</tr>
<tr>
<td>168</td>
<td>1400</td>
<td>1000</td>
<td>400</td>
<td>5.0</td>
<td>28</td>
</tr>
</tbody>
</table>

### Plastic

<table>
<thead>
<tr>
<th>Plastic Type</th>
<th>Overall Length (mm)</th>
<th>Above Ground (mm)</th>
<th>Below Ground (mm)</th>
<th>Wall Thickness (mm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 Chamfered</td>
<td>1600</td>
<td>1000</td>
<td>600</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>150 Diamond</td>
<td>1400</td>
<td>1000</td>
<td>400</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>150 Domed</td>
<td>1400</td>
<td>1000</td>
<td>400</td>
<td></td>
<td>22</td>
</tr>
</tbody>
</table>
Speed Control

Speed control products can be used to reduce the potentially higher speeds in surface car parks to safer levels. They can also be used in multi-storey car parks to reduce the need for 2 x force barriers under BS 6399.

Site Sentry
- Easy to install and relocate
- Durable rubber moulded sections
- High visibility yellow and black ramps
- 10mph control rating
- Cats’ eyes for night time safety
- Any length of ramp can be formed by adding together the 500mm wide sections.
- Two end sections make a circular bump
- Fixing bolts are included with all sections
- Budget System

Safespeed
- Available in standard 1m, 2m or 3m lengths
- 300mm wide x 50mm high
- Pre-drilled to accommodate fixings
- Assumes the camber of the surface to which it is fitted
- Two co-extruded yellow stripes enhance visibility
- Rubber moulded end pieces available
- Will restrict the speed of cars and light vans to less than 10mph

Mini Site-Cop
- Modular design
- Made from recycled rubber
- Consists of 400mm x 500mm sections
- 400mm x 250mm end pieces
- Can be assembled to any overall width
- Installed with a reinforcing connecting tube
- Reduces car speeds to between 5 and 10 mph
- Not suitable for HGVs
Access Control

Berry Goalpost Height Restrictors
One of the most cost effective ways to prevent unauthorised vehicles from entering the Car Park area. Made to order to suit your site with a maximum width of 6m. Available with fixed or swing boom.

Manual Arm Barriers and Swing Gates
Both are available as a manual method of entry to site that can be locked to prevent access when required. Various sizes and designs.

One Way Flow Plates
Manufactured from heavy duty steel. One way flow plates are designed to restrict traffic flow to one direction. N.B. These plates are not suitable where HGVs have access.
RIBA CPD Seminar

Berry Systems has prepared a CPD Seminar entitled “The Design and Installation of Vehicle Safety Barriers in ‘Off Highway’ Applications” for presentation to architects and engineers.

This 40 minute seminar has been vetted and approved by the RIBA and Berry Systems are members of the RIBA Providers Network.

The seminar covers the following areas:

- The main features of off highway barriers
- Relevant regulations and standards
- Recent recommendations
- The performance of different post types
- The forces defined in BS 6399
- Anchorage details
- Maintenance
- Future issues

If you would like Berry Systems to present one of these seminars to your staff, please telephone 01902 491100 or contact us by email at: sales@berrysystems.co.uk.

TopDeck Parking

In 2007 Berry Systems launched TopDeck Parking as a separate division within the parent company Hill and Smith.

TopDeck Modular Car Parks can be the answer to your parking problem. By incorporating Speed-Build Technology a TopDeck Car park can be erected over the top of your existing car park in a matter of days to increase your parking capacity by between 80% and 100% (typically). Disruption to existing parking is minimised and can often be partially or even wholly maintained during the short build period.

TopDeck also offers:

- Demountable and relocatable construction.
- Cost effective solution to your parking problem.
- Modular design
- Pre-Finished Anti-Skid Decks
- Plug & Play Electrics
- Integral Safety Barriers - pre-fitted and independently tested to BS 6399.
- Modular Ramps and Stairs
- Optional Speed-Build Cladding - where required.
- Available to hire or buy.

For more information call 01902 499400 or visit www.topdeckparking.co.uk or email us at info@topdeckparking.co.uk.

www.berrysystems.co.uk
Technical drawings - floor mounted systems

Perimeter Systems

Rigid-Posts

Bolt Down Post

Ramps / Split level

Twice Force

Wall Mounted WH

Others

GB Type 76 x 10mm

RB1X Type 100 x 14.3mm foot length 300mm

GH Type 76 x 10mm

RB1 Type 76 x 12.7mm

RB1X Type 76 x 12mm

48 dia. Handrail Standards

Standard Barrier Rail (3200 length)

610/760 High Flexi-Post

Rubber Shock absorbers

Floor Level

P 224 Type 1* P 224 Type 2

P 224 Type 3/1.1

P 224 Type 3/1.5

*Car park height

Min 300mm centre or square concrete surround

Planted Post Buffer complete with Sheath 76 x 12.7mm

127 x 76 RSJ

127 x 76 RSJ

127 x 76 RSJ

A B A B

A B C

A B C

610 440 760 570

600 445 500

800 630 700

For more information on Berry Systems visit www.barbourproductsearch.info

sales@berrysystems.co.uk
Berry Beam 3mm Galvanised Mild Steel. Available in 3000mm lengths.

3mm wall thickness, available in 3000mm lengths

Connecting Spigot

External Corner

Flat and Round End Terminal

Barrier Rail 3mm Galvanised Mild Steel. Available in 3200mm and 1600mm* effective lengths.

*1600mm length can be ‘adjusted’ to account for small changes in floor angle.

Open Box Beam 5mm Galvanised Mild Steel. Available in 4800mm, 2400mm or 1200mm lengths.

Typical Combination Solutions

For more information on Berry Systems visit www.barbourproductsearch.info
The look you want
the protection you need

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Ask for a copy
of our Industrial
Products
brochure

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Hill & Smith Ltd

For more information on Berry Systems visit www.barbourproductsearch.info