



CE

**Britpave CSB**

The guarantee of safety and quality

## Fully CE Marked In-situ Vehicle Restraint System

# SYSTEM OVERVIEW

The range of Britpave CSB profiles has been developed and tested by Britpave over a number of years.

The factors influencing the choice of step barrier type and profile include:

- Available central reserve width
- Level difference between carriageways and / or superelevation
- Obstructions in central reserve
- Requirement for lighting columns, signs, etc.
- First and long term cost

Starting from an original Dutch step barrier design, Britpave has developed and tested a complete surface mounted Concrete Step Barrier (CSB) safety restraint system allowing true integration within any highway project.

The Britpave solution includes several new step barrier profiles such as variable, wide, trough wide, as well as transitions to other barrier systems and structures, sign and street lighting fixings, gates for emergency crossing points and expansion joints.

Britpave first launched the system in 2005. Since that date Britpave CSB has become an increasingly common sight within the UK and in Europe. Britpave CSB is designed, tested and installed in compliance with EN1317-5:2007 providing H2 and N2 containment levels and an ASI B Impact Severity Level. Working widths vary from W1 to W3 dependent upon the specific barrier type. Britpave CSB requires minimal foundation and is constructed by a fully automated slipform process which provides high productivity and rigorous quality control.

In December 2010, Britpave was awarded its EC Certificate of Conformity by MIRA Ltd, making it the first company to successfully affix a CE Mark to an in-situ concrete product. Britpave CSB carries a CE certification on the installed 'as-tested' product. This fully CE marked barrier system is supplied through a network of approved Licensed Installation companies.



CSB Profile	Applications	Containment Level	Working Width	Impact Severity Level
CSB (Concrete Step Barrier)	<ul style="list-style-type: none"> <li>• Double-sided central reserve barrier</li> <li>• Dual barrier (lighting columns, signs, gantries, adjacent to structures, level difference between carriageways, bifurcation)</li> <li>• Protection of obstruction located in verge</li> </ul>	N2	W1*	ASI B
CSB (Concrete Step Barrier)	Same applications as above	H2	W1*	ASI B
WCSB (Wide CSB)	<ul style="list-style-type: none"> <li>• Lighting columns</li> <li>• Signs, gantries</li> </ul>	H2	W3	ASI B
TWCBSB (Trough Wide CSB)	Cable duct for lighting columns, signs, gantries can be laid in trough	H2	W3	ASI B
VCSB (Variable CSB)	<ul style="list-style-type: none"> <li>• Height difference between carriageways</li> <li>• Superelevation across carriageways</li> </ul>	H2	W2	ASI B
VWCSB (Variable Wide CSB)	Combined applications of WCSB and VCSB	H2	W3	ASI B

\*The barrier will be deemed as H2W1 under the requirements of EN1317:2010 with a vehicle intrusion of V12.

The complete CSB system and ancillary products are fully detailed within the Britpave Technical Construction File (TCF) which features drawings and guidance documents.

## Key benefits of Britpave (surface mounted) CSB

### A tested and complete solution

- CE mark on the installed 'as-tested' system
- Fully complies with EN1317-5:2007
- Versatile – installation can be made almost anywhere
- Development of complete concrete barrier safety restraint solution including various barrier profiles and ancillary products such as lighting columns and fences
- Possibility to act as a kerb line for drainage purposes

### Economic, sustainable solution

- Maintenance free
- Cost-effective solution with low whole life costs
- Rapid and easy installation
- Serviceable life of at least 50 years
- Cost reduction by eliminating the need for expensive foundations
- CSB is a simple system with minimal components and no requirement for a stock of spare parts
- Permanent solution
- Space saving through operation with minimum working width – no deformation like steel barriers
- Reduced traffic congestion - fewer lane closures
- Only one concrete barrier is needed in the central reservation to serve both sides of the road
- CSB causes no pollution of water courses as can be caused by products from degrading steel systems
- Fully recyclable and can use recycled aggregates in its concrete

### Developed to increase safety

- High containment (H2) reduces risk of crossover accidents
- ASI B rating
- Designed to redirect errant vehicles
- Accident frequency reduction
- Improved worker safety - fewer interventions for repair
- Reduced risk of impact injuries to motorcyclists because of its smooth face
- CE Marking means accurate manufacturing and high quality of production to replicate the tested system
- Concrete provides built-in resistance to fire

*Within the UK there are more than 200 crossover accidents where vehicles break through the central reservation barrier each year and about 40 deaths (at a cost of £1m per a fatality).*

*Up to April 2012, on motorways where Britpave CSB has been installed, no crossover accidents have occurred.*

*It is a Britpave Barrier Systems requirement that all  
Licensed Installers carry a CE Mark.*

CE

- CE Marking ensures that the product which has been tested and certified under EN1317-5:2007 is the product constructed on site.
- CE Marking reaffirms compliance to performance standard EN1317-5:2007.
- CE Marking guidelines set requirement for annual Factory Production Control Audit (FPC Audit) and only Licensees who pass the audit are allowed to build the Britpave CSB.
- In-situ barriers carry a CE Mark for the manufacturing and installation process. Therefore the CE Mark on an in-situ product guarantees that the product is constructed 'as-tested'. Steel barriers by contrast CE mark only the manufacturing process of the components and therefore lack further checking/audit control over the installation of the factory produced product.

# BRITPAVE CSB - FULLY CE MARKED

*CE Marking gives the assurance  
that the team at  
Britpave Barrier Systems is  
committed to providing highest  
quality products.*



# WHY BRITPAVE CSB?

Britpave CSB is designed to increase safety and durability whilst eliminating maintenance



**Shape**  
The advantages of the step profile compared to other shapes such as the New Jersey profile is to prevent the possibility of roll-over accidents and to significantly reduce vehicle damage and occupant injury. Britpave CSB is designed to redirect errant vehicles. It limits minor vehicle contact by the vehicle tyres and suspension systems to the base of the barrier, so that a slight impact will, in most cases, allow the vehicle to continue its journey safely.

**Construction Process requiring minimal foundation**  
Primarily constructed by the slipform technique Britpave CSB is installed rapidly, under rigid quality control, to fine tolerances using state of the art equipment. Slipform paving is a wholly mechanised process which is free from manual handling and results in a reduction of cost compared to other construction methods. The slipformed concrete is laid onto a hard surface. As the concrete dries a bond to the surface develops and creates a friction connection. This friction connection means that when the barrier is hit it does not move. Therefore there is no need for further reinforcement or embedment which reduces construction time, cost, traffic management and material usage. Britpave CSB provides a 50 year maintenance free design-life. The prescriptive specification, high strength concrete and rigorous audit system ensure that Britpave CSB will meet the design expectations of the system and the 'as-tested' performance.

# Britpave CSB The guarantee of quality products

## Creation of a unique Technical Construction File (TCF) and Technical Query Service (TQ Service)

Britpave has developed an unrivalled Technical Construction File (TCF) including a suite of detailed but easy to follow drawings and guidance documents. The Technical Query Service is a unique web-based support system provided by

Britpave. It gives comprehensive response to questions raised by Licensed Installers covering all aspects of CSB construction and implementation which ensures compliancy with Britpave specifications and quality standards.



WHY BRITPAVE CSB?

QUALITY ASSURED

### Development of the complete concrete barrier safety restraint solution

Through further development of the CSB profile Britpave Barrier Systems is able to offer a variety of CSB shapes and more functionality such as the variable CSB which is a single barrier with low working width across two different heights of carriageway.

Britpave CSB also features transitions to other barrier systems and structures as well as ancillary products like sign and street lighting fixings, gates for emergency crossing points and expansion joints. Supply chain partners provide additional accessories making CSB a complete solution.

**All Britpave Barrier Systems products and profiles are fully certified and compliant with EN1317-5:2007 and carry the CE Certificate of Conformity.**

### Constructed by highly experienced and CE marked Licensed Installers

Britpave CSB can only be installed by Licensed Installers who have been qualified and approved by Britpave as being competent, experienced and trained to install Britpave products.

To attain the Britpave Licence potential Licensed Installers have to go through a highly regulated prequalification process with the highest level of quality control to ensure that the high standards and extensive experience demanded by Britpave are realised.

A Britpave Licence can be revoked at any time should a Licence holder fail to adhere to the design conditions set out by Britpave. Britpave Licences are renewed annually. All Britpave CSB installations must be undertaken in accordance with the specifications and construction details provided in the current Britpave Technical Construction File. Britpave Terms & Conditions categorises the level of non-conformance to the Technical Construction File and gives processes of rectification. All modifications to the systems must be reported to Britpave and certified by the Notified Body under EN1317-5:2007.

The Britpave Technical Construction File provides strict controls including material design, testing criteria, 'as-built' tolerances as well as quality and environmental certification.

To ensure compliance with Britpave specifications and general standards (EN1317, CE Marking) Britpave Licensed Installers are audited each year with review of both office and on site procedures carefully examined by the Notified Body MIRA.

**It is a Britpave requirement that all Licensed Installers carry a CE Mark.**

# Britpave CSB and the Environment

Concrete safety barriers make efficient use of natural resources and respect the environment during their entire life cycle.

They provide services to society in terms of mobility and safety by means of judicious choices regarding design, construction, maintenance and demolition.



## Sustainable consumption & production

Britpave CSB production involves a fully-automated, accurate process that ensures a high quality product in terms of functionality and appearance, using the minimum amount of material and producing the minimum amount of waste. Both recycled aggregates and cement replacement materials can be used in its construction, and the barriers provide a maintenance-free service life of at least 50 years.

## Climate change & energy

Britpave CSB out-performs competing solutions in terms of both embodied levels of CO<sub>2</sub> in the materials used and holistic impacts over the solution's whole life cycle. The average embodied quantity of CO<sub>2</sub> in a metre of surface-mounted CSB can be as low as 19% of a similarly performing (H2) containment steel solution over a 50-year period. Further long-term benefits are due to CSB's long maintenance-free service life that reduces CO<sub>2</sub> emissions and energy impacts related with routine repairs and traffic management, and the virtual elimination of potential delays and traffic congestion associated with these operations.

## Delivering a safe, reliable future

Britpave CSB is a maintenance free safety barrier system offering high containment and, critically, the barrier system remains serviceable even following an impact. The risks to road users and maintenance workers will therefore be greatly reduced by wider installation of CSB on the road network. Less maintenance work leads to reduced congestion on roads improving journey reliability.

Britpave CSB offers a long serviceable life, uses recyclable materials, employs lean construction techniques, uses continuous steel strand and slipform processes to minimise waste. With no requirement for routine maintenance, Britpave CSB leads to a reduction in vehicle emissions associated with traffic congestion and from maintenance vehicles.

In summary, Britpave CSB is a sustainable solution that encompasses social, environmental and economic benefits.

Environment	Economic factors	Society
<ul style="list-style-type: none"> <li>80% less embodied CO<sub>2</sub> than competing systems</li> <li>Minimum material usage and waste</li> <li>Non-polluting in service</li> <li>100% recyclable</li> <li>Maintenance-free over its 50 year design life</li> <li>Reduces traffic congestion and associated emissions</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance free</li> <li>50 year design life</li> <li>Minimum space required</li> <li>Free of damage after even severe collisions</li> <li>High daily production of 400 to 800mm possible</li> <li>CE marked</li> </ul>	<ul style="list-style-type: none"> <li>Increasing safety for road user and worker</li> <li>No crossover</li> <li>Maintenance free system increases road availability and reduces traffic congestion</li> <li>Safe solution for motorists</li> </ul>

## Natural resources & enhancing the environment

Britpave CSB can be constructed using a wide range of secondary and recycled materials, is non-polluting in service and is fully recyclable at the end of its 50 year design life. CSB requires minimum maintenance so reduces potential sediment loadings to drainage systems, and takes up less space than its competitor barriers.

## Creating sustainable communities

By restraining traffic effectively and withstanding impact damage, Britpave CSB provides for the safety and well-being of road users and construction workers alike, helps to keep traffic moving and has a neutral impact on vehicle noise. To date there have been no crossover accidents when using Britpave CSB in the central reserve.

A thorough environmental investigation has been undertaken which can be purchased under [www.britpave.org.uk/Shop.ink](http://www.britpave.org.uk/Shop.ink)





**Disclaimer**

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