

## Permanent perimeter and stand-off protection

# Bi-Steel bollard system

### Introduction

The current threat from terrorism remains real and serious. Enhanced building stand-off protection to deter attack and reduce consequential loss, particularly from vehicle borne improvised explosive devices (VBIEDs), is increasingly specified for many vulnerable site perimeters and crowded places. However, a trade off often exists between the requirements for increased stand-off protection and the practicalities of installing additional security measures. Bi-Steel has designed its latest perimeter protection offering to address this issue, providing systems that enhance protection whilst minimising disruption during installation.

### Benefits

- Proven protection against VBIED attack, unauthorised vehicle access and explosive blast
- Security that blends with the streetscape
- Modular offsite construction enables rapid onsite installation
- Bi-Steel PAS 68\* bollard foundation requires less than 40% of the groundwork excavation compared with a PAS 68 RC foundation
- Reduction in utilities and services diversions enables project programme and budget savings

### System description

The Bi-Steel bollard system has been developed to provide superior protection against VBIED attack. The high strength capabilities of this steel/concrete composite material have enabled the creation of a unique shallow foundation design into which crash rated bollards can be directly fixed. PAS 68 approved bollards can be supplied by Bi-Steel or directly from the manufacturer.



Bi-Steel bollard foundation units are designed as 'standard' modules that deliver a straight line of bollards positioned at regular intervals. However, variants are supplied to include curved units for use at road entrances and junctions and a variety of bespoke units can be supplied to meet specific streetscape requirements. Bi-Steel bollard foundation units can also be used in conjunction with Bi-Steel wall systems offering a wide range of streetscape solutions.



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The compact modular Bi-Steel bollard foundation units are easy and rapid to install. Once in position, Bi-Steel panels within the foundation units are concrete filled, as well as back filling the narrow trench in which they are located. The Bi-Steel PAS 68 tested bollard foundation requires less than 40% of the groundwork excavation compared with an equivalent PAS 68 reinforced concrete foundation.

Ultra shallow Bi-Steel units are currently in development for locations where minimal service disruption is paramount or where there is no opportunity to excavate foundations.

## Applications

The Bi-Steel bollard system is a permanent security solution. It is ideal for providing high level perimeter protection for busy inner city sites where minimising disruption to the local community (visitors, workers and commuters) is a key consideration. Bi-Steel perimeter protection systems are being utilised in major city centres and other crowded places. Many of these projects provide robust protection for key locations, thus protecting life, property and operational continuity. At each location the Bi-Steel system is providing an effective and highly reliable solution to the client's individual needs.

## System performance

The Bi-Steel bollard system provides modular offsite manufactured foundations that can be rapidly installed onsite. Bi-Steel's high strength and the resulting smaller footprint reduces the need to re-route local utilities (such as power/gas supplies and communications cables) located underneath the pavement, minimising excavation work. Rapid installation reduces disruption as well as enabling savings to be made on both project programme time and budget.

Bi-Steel, as a product, has been extensively tested under blast loading conditions. The Bi-Steel bollard foundation unit has also been tested to resist close proximity and above ground explosions. In each case, securing the perimeter and deploying Bi-Steel stand-off protection will reduce security risks and provide additional protection for people and assets.

The Bi-Steel bollard system has been tested and meets the requirements of the relevant agencies operating within the security and defence fields. These tests have included:

- Vehicle impact - successfully tested in accordance with PAS 68
- Blast - successfully tested

For security purposes testing criteria is not published but can be discussed with potential clients.

## About Bi-Steel

A Corus-patented construction material, Bi-Steel comprises two steel plates that are permanently connected together to form panels by an array of friction welded transverse bars. These panels are then filled with concrete to create a construction material with outstanding strength. The resulting composite offers unrivalled protection against explosive blast, meeting stringent security standards.

## Quality and integrity from a leading UK company

Corus is one of the world's leading steel producers and a major UK company. Operating to the highest international quality and manufacturing standards Corus is committed to offering the very best in customer service and support.

### \*PAS 68:2007 - specification for vehicle security barriers

This Publicly Available Specification (PAS) has been prepared to address the needs of organisations who wish to have assurance that vehicle security barriers will provide the level of impact resistance that they seek.



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