

## Crash Testing



The key to critical infrastructure protection from a **Vehicle Borne Improvised Explosive Device (VBIED)** is a combination of access restriction and approach speed management and whilst careful planning and layout design can assist with the restriction of approach speed, the final line of defence is the blocking system.

As the blocking systems are designated as life saving equipment, it is essential that they are suitable to combat today's ever increasing threat types. The equipment developed by Avon Barrier has therefore been extensively tested in a number of ways to ensure that when it needs to perform, it will play its part.

Testing work undertaken to date includes dynamic impact testing with a variety of different impact forces, penetration testing (mainly aimed at the pedestrian control equipment) and explosive shrapnel dispersal testing.

In today's environment higher levels of perimeter protection are increasingly necessary and Design Consultants are tasked with ensuring that installations are not only safe and secure in the current climate but are also future proofed against the escalating threat levels.

Avon Barrier's commitment to protection extends to the provision of a frontline service to Design Consultants to assist in the correct specification and design of security control points.

# Crash Testing



Until recently impact testing standards were restricted to the US DoS test standards as follows:

US Department of State ratings:	Vehicle Speeds	Site Penetration	Impact Force
15,000lb (6,810Kg) Vehicle	K12 = 50mph (80kph)	L3 < 915mm	1681Kj
	K8 = 40mph (65kph)	L2 915mm 6100mm	1110Kj
	K4 = 30mph (50kph)	L1/ 6100mm 15,300mm	657Kj



The British Government have developed and introduced an alternative rating system which records not only the vehicle size, speed and penetration of the load bearing structure but also takes into consideration the maximum major debris dispersal, the foundation depth, the permanence of the installation and the post impact condition.

The rating system has been produced by CPNI (Centre for Protection of National Infrastructure) and TRL (Transport Research Laboratory) in conjunction with the main equipment manufacturers and is documented in BSI PAS (Publicly Available Specification) 68/69.

PAS 68 has been prepared to address the needs of organizations who wish to have assurance that vehicle security barriers will provide the level of impact resistance that they seek.

Many systems are available that are either promoted or considered suitable for use as vehicle security barriers. As their characteristics differ in both function and form, a comparative means of assessing their performance is required.

PAS 68 specifies a classification system for the performance of vehicle security barriers and their supporting foundations when subjected to a single horizontal impact.

In the course of the document three alternative assessment methods of determining the performance classification of vehicle security barriers are given:

- The vehicle impact method
- The pendulum method (only suitable for testing bollards at lower energy levels)
- The design method.

This PAS identifies impact test tolerances and vehicle performance criteria that need to be met in order to conform. Design guidance is provided in PAS 69.

**Avon Barrier Crash Tested Products**  
All tests carried out by independent test agencies TRL or MIRA in accordance with the PAS requirements using a 7500kg vehicle

Avon Product	Test	Vehicle Speed	Site Penetration	Post Test Operable	Impact Force
RB780 Blocker	23/12/04	50kph	Zero	Yes	723Kj
	05/03/05	80kph	N/A	Yes	1852Kj
	05/05/05	80kph	Zero	Yes	1852Kj
RB880 Blocker (Shallow)	01/06/05	50kph	Zero	Yes	723Kj
	21/06/05	80kph	Zero	NO (due to previous damage)	1852Kj
EB950CR Barrier	01/08/05	50kph	Zero	Yes	723Kj
SB970CR Bollard (single unit)	18/11/05	80kph	Zero	Yes	1852Kj
SB970CR Bollard (double unit)	02/03/06	80kph	Zero	Yes	1852Kj
RB980CR Blocker	22/03/06	80kph	Zero	Yes	1852Kj
GC1100CR Gate	19/03/07	80kph	5.7m	No	1852Kj
SG1100CR Gate	04/07/08	80kph	WV	No	1852Kj
SG1500CR Gate	14/10/08	80kph	Zero	No	1852Kj