



TECHNICAL and MAINTENANCE MANUAL

Car Park Barrier



Manual reference CPB002

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A-Safe (UK) Ltd
Shay Lane
Halifax
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TECHNICAL and MAINTENANCE MANUAL

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1.0 Introduction

This manual provides information regarding applicable standards and regulations, technical product information, component and dimension details and care and maintenance requirements for the range of barrier and associated products available from A-Safe (UK) Ltd.

The products are installed as static internal or external fixtures and this manual therefore makes no reference to product operation.

As standard the products are supplied in a yellow/black colour combination and some products are also available in a cool grey colour option. The drawings and illustrations contained in the products section of this manual will generally show the barrier in its standard black and yellow colour format. Whatever colour option is provided the individual **products concerned are identical.**

The products are of modular construction and, with the exception of the coated post steel base plates, are manufactured from lightweight extruded plastic sections.

They are quickly and easily assembled without the use of nuts and bolts, brackets or welding. Installation is achieved by anchoring the post base plates to a sound concrete surface using the high quality steel fixing bolts, supplied with the individual products as standard.

The product technical information given in this manual is common to all A-Safe (UK) Ltd manufactured products.



2.0 Company Structure and Contact Details

Contact with A-Safe may be made by post, telephone, fax or email addressed to the relevant contact. Alternatively information is obtainable via the companies' web site at www.asafe.com.

A-Safe (UK) Ltd
Shay Lane
Halifax
West Yorkshire
HX3 6RL

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F 01422 323533

e sales@asafe.co.uk

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Contacts

Health and Safety	James Smith	james@asafe.co.uk
Technical	Luke Smith	luke@asafe.co.uk
Sales	Neil Clifford	neil@asafe.co.uk
Repairs	Luke Smith	luke@asafe.co.uk



3.0 Applicable Standards and Regulations

All of the individual barrier products supplied by A-Safe have been designed and produced to be compliant with the following standards and regulations. Where applicable, specific references are made to these documents in this manual.

- BS6180 Barriers in and about buildings – Code of Practice
- BS6399 Loading for buildings
Part 1 Code of practice for dead and imposed loads
- Building Regulations 2000 – Approved Document K
- DETR Edge Protection in Multi-Storey Car Parks – Design Specification and Compliance Testing Final Report October 2001

In addition recommendations have also been made in reports published by the Institute of Civil Engineers and the Institution of Structural Engineers which were incorporated in the report Partners in Innovation published by the Office of the Deputy Prime Minister in 2002.

4.0 Car Park Barrier

4.1 Introduction

The purpose of Barriers in single level or multi-storey car parks is to protect the car park edges and to restrain vehicles from breaching the car park perimeter. In a Car Park barriers, or edge restraints, have two primary important functions to fulfil:

- To provide both car park edge protection and vehicle edge restraint
- To provide protection and restraint for pedestrians, particularly children

In a car park even a low speed impact with a perimeter structure, or worse a pedestrian, can lead to expensive damage repair or serious injury. For raised single level car parks and on the upper or split levels in multi-storey car parks a vehicle driven off an edge can have even more severe consequences. A-Safe Car Park Barrier products are the perfect way to provide vehicle restraint and to prevent damage or injury occurring in both single level and multi-storey car parks.

In car parks several different product design variations are required to meet the specific application needs and purpose of barriers installed in different locations within a car park. The adaptability of the A-Safe product also means it is can be modified to be suitable for use on all the barrier applications found in car park environments.

The impact height centre of the barrier makes the product fully compliant with the requirements of current car park standards and regulations.

4.2 Component Parts

The car park barrier is assembled from modular components, end and mid post assemblies and 200mm OD rails. Standard rail lengths are used to assemble a barrier section on 1600mm post centres. However it is unlikely that the overall barrier section will allow assembly of a required barrier section length using only standard rails. A short non-standard rail, 600 – 1349mm, is available which, in combination with standard rails, allows barrier sections to be assembled to any desired overall length.

The minimum barrier section length that can be assembled using modular components is 1350mm. In circumstances where shorter section lengths are required pre-assembled fixed units are available which allows barrier sections down to 300mm to be catered for within a required barrier layout.

All post fixing bolts, 4 per post, needed to install a barrier section are supplied as part of the post assemblies. Details of the available component parts are detailed in section 4.4.

4.3 Dimensions

The assembled barrier shown on the product drawing in Section 4.4 is a section consisting of two end post modules, one mid post module and two standard length rails with posts on standard 1600mm post centres.

Some post centre distances may differ on an assembled barrier section depending on the number of non-standard short rail lengths required to assemble a section to a required overall length.

All dimensions indicated on the drawings are given in mm



4.0 Car Park Barrier

4.5 Post Fixing Bolt Technical Specification

Anchor Bolt, Hexagonal Head, Type AS M8-12/55/15

A-Safe Product Code	900_0048
Finish and Material	Blue passivated zinc plated Steel, Grade 8.8
Required Drill Diameter	12mm
Required Spanner Size	13mm
Bolt Thread Size	M8
Minimum Hole Depth	70mm
Total Fixture Length	90mm
Required Torque Setting	20Nm

Manufacturers Safe Working Load Details

The following criteria has been taken into account in calculation of the safe working loads detailed below:

The permissible loads have been calculated using the partial safety factors for resistances stated in the ETA-approval and a partial safety factor for actions of $\gamma_F = 1.4$. The permissible loads are valid for unreinforced concrete with a rebar spacing $s \geq 10$ cm if the rebar is 10mm or smaller.

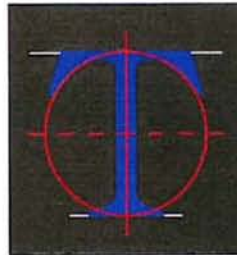
The permissible shear loads are based on a single anchor without influencing concrete edges. For shear loads applied close to an edge ($c = 60d$) concrete edge failure must be checked per ETAG 001. Annex C, design method A

	Concrete C20/25 (kN)	Concrete C40/50 (kN)	Concrete C50/60 (kN)
Permissible Tension Loads			
Cracked Concrete	3.60	5.00	5.50
Sound Concrete	4.80	6.70	7.4
Permissible Shear Loads			
Cracked Concrete	7.00	9.90	10.80
Sound Concrete	9.80	13.80	14.30



Car Park Barrier

1.5 Test Certificate



TESTCONSULT
TESTING AND CONSULTING SERVICES

TEST CERTIFICATE

Traffic Barrier

Client: A- FAX Ltd
Shady Lane
Halifax
HX3 6RL

Ref No: S2779
Job No: A4722

Date Tested: 06/10/2005
Date Reported: 20/10/2005

Site

Testconsult Ltd, Ruby House, 40A Hardwick Grange, Woolston,
Warrington, Cheshire, WA1 4RF
Traffic Barrier.

Barrier System

Test Specification:

BS 6399 Part 1 : 1996 Table 4 (xi) Minimum horizontal loads for barriers.

Test Engineer:

Mark Mairs / Lee Waterhouse

Test No.	Test Specification	Load (KN)	Max Deflection (mm)	Remarks (Pass/Fail)
1	Horizontal uniformly Distributed load impact between posts	52.5	195	Conforms to BS 6399 Part 1 : 1996. PASS
2	Horizontal uniformly Distributed load impact on middle post	49	245	Conforms to BS 6399 Part 1 : 1996. PASS

Lee Waterhouse
Instrumentation Engineer
TESTCONSULT LIMITED

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Warrington, Cheshire WA1 4RF
Tel: +44(0) 1925 286880 Fax: +44(0) 1925 286881 Email: jo@testconsult.co.uk
Website: www.testconsult.co.uk
Registered in England No. 1182561





5.0 General Technical Product Information

5.1 Technical Information Summary

The material used in the manufacture of the individual barrier products:

- Contains no substances classified as hazardous.
- Is not classified as dangerous
- Burns but is not classified as flammable. Water in a spread jet, dry chemicals or foam are suitable extinguishing media.
- Has a working environmental temperature range of -10 to $+50$ °C
- Has an ignition point of 360 °C in the presence of a burner flame and 409 °C in the absence of a burner flame.
- Will not give off toxic or noxious fumes should it ignite
- Contains no re-cycled material but is itself 100% recyclable

5.2 Specific Technical Information

5.2.1 UV Protection*

Barrier products may be installed externally or internally and are therefore exposed to daylight (containing UV radiation) to a greater or lesser extent.

To protect the products against UV degradation A-Safe use a UV protection package in the products extruded sections as standard. This package provides a recommended performance period for UV protection of 15-20 years out doors in Northern Europe and 10 years in the southern hemisphere.

* Further technical details regarding UV Protection are available on request

5.2.2 Operational Temperature Range

The working environmental temperature range specified for the A-Safe Barrier products is -10°C to $+50^{\circ}\text{C}$. The Izod impact strength of the material has been tested by the material manufacturers to the relevant standards.

The products will perform below -10°C but exhibit a reduction in mechanical performance. Below -20°C the extruded sections from which the products are assembled reach their glass transition temperature (the temperature at which a polymer becomes solid). Below a temperature of -10 °C the products extruded sections are prone to cracking under point load impact conditions, however they will still stop vehicles under the impact forces the products are designed to withstand.



5.0 General Technical Product Information

5.2.3 Ignition Point and Flammability

The ignition point of the material from which the products extruded sections are manufactured is 360°C (in the case of burner flame being present) and 407°C (in the absence of a burner flame). The rate at which the material burns is 100 mm/min. The materials' Combustible class is HB.

In the unlikely event that an ignition point of 360°C or 407°C occurs, if this temperature is reached most of the contents and structure in or around which the barriers are located will already have been destroyed or suffered severe damage.

The barrier materials will not give off any toxic or noxious fumes should they be ignited.

The same material type from which the barrier products extruded sections are manufactured is also used extensively in automotive parts, e.g. bumpers, radiator expansion tanks, brake fluid reservoir, windscreen washer tanks and parts of ventilation systems.



6.0 Cleaning and Routine Maintenance Schedule

6.1 General

The materials used in construction of the barrier products, extruded polypropylene sections and steel base plates, together with the design techniques employed in relation to barrier assembly and performance provide a barrier that requires minimal routine maintenance tasks to be undertaken. Routine and other maintenance is required to ensure correct product performance and to maintain its' appearance and high visibility. Attention is drawn to sub-section 6.4

6.2 Cleaning

Dust and other particulate material can be easily removed by simply wiping the product with a damp cloth.

Marks on the product caused by knocks and scrapes can generally be removed using a mildly abrasive liquid or cream cleaner.

Cleaning should be performed after impact or barrier repair, otherwise cleaning to preserve general barrier appearance and cleanliness can be done at periods determined by the car park operator

6.3 Maintenance

Routine maintenance is required to ensure barrier integrity and therefore performance is maintained over time. Areas where barrier integrity can be affected are chipping of the powder coating on the post base plates leading to rusting, post base plate fixing bolt nuts not being at the correct torque settings and damage occurring to barrier component parts (post modules and rails).

It is highly unlikely that every occurrence of impact on the barrier will be known about or even recorded. If a known impact event occurs the following maintenance procedures **MUST** be undertaken after impact on all component parts of the barrier section subject to impact. If no known impact events occur during a three month period the following maintenance procedures **MUST** be undertaken at three monthly intervals and be performed on a minimum of at least 20% of all the barrier sections mounted on an individual car park level and at least 20% of the post base plates, base plate anchoring bolt nuts, post components and rail components for each barrier section inspected. The components on which the routine three monthly maintenance procedures are performed on each barrier section may be chosen at random.



6.0 Cleaning and Routine Maintenance Schedule

6.3.1 Base plates

Base plates are to be inspected for chips or scratches on the base plates powder coated surface and rusting of the steel from which the base plates are manufactured.

Chips or scratches to the powder-coated surface are to be covered over using a suitable paint to protect the steel material exposed by the chip or scratch.

If rusting to a base plate is found that is causing erosion or crumbling of the base plates steel material, allowing manual movement of the barrier and associated base plate or affecting the ability of any of the fixing bolts to correctly anchor a base plate post module to which the base plate is attached **MUST** be replaced with a new post module.

PLEASE NOTE. Should any of the defects detailed above be found on inspection of a randomly selected component ALL components on the barrier section must be inspected for defects.

6.3.2 Fixing Bolt Integrity

All four base plate fixing bolts on each base plate inspected should be inspected for slippage, pull out and correct positioning in the holes in which they are located.

If a fixing bolt is not properly located the bolt should be hammered back in, or further into, the hole in which it is located and the fixing bolt nut correctly torqued to the setting specified in the relevant product section of this manual. If a fixing bolt nut cannot be tightened to the correct torque after relocation A-Safe (UK) Limited are to be contacted regarding the correct procedures to be followed.

PLEASE NOTE. Should the location and integrity of a fixing bolt found to be incorrect on inspection then the location of all fixing bolts on that barrier section must be checked and corrected.

6.3.3 Fixing Bolt Nuts Torque Setting

The torque settings of all four base plate fixing bolt nuts on each base plate inspected should be checked to be at the correct setting as specified in the relevant product section of this manual. If lower than than the specified setting the nuts should be re-tightened to the correct setting specified.

PLEASE NOTE. Should any of the torque settings checked be found to be incorrect, the nut torque settings on all the fixing bolts anchoring the barrier section must be checked and re-tightened as necessary. If a nut cannot be re-tightened to the correct torque setting refer to section 6.3.2.



6.0 Cleaning and Routine Maintenance Schedule

6.3.4 Condition & Integrity of individual barrier components

The plastic material of the barrier post modules should be visually inspected for signs of stress, usually indicated by white marking on the material at the point of stress, and straightness and correct location within the assembled barrier section.

Stressed or non-straight components are to be replaced with new components.

Incorrectly located components are to be correctly relocated within the barrier section assembly. If correct relocation cannot be achieved due to fixing bolt integrity problems, refer to section 6.3.2.

PLEASE NOTE. Should a barrier component be found to be defective then all components on that barrier section should be inspected for defects and remedial action be taken as indicated above.