

Sealmaster



ENFIELD SYSTEM

The Enfield System was originally developed as a system which would effectively seal off service ducts to fire and smoke at each floor level in high rise residential London tower blocks. With no effective fire break at each storey, the potential chimney effect of the ducts had posed a great threat to life. The system has been proved successfully not only in laboratory tests, but when fire broke out in one of the tower blocks soon after installation of the Enfield System. The fire was contained effectively in the compartment, and extinguished quickly.

Use

The system is designed to be used to seal large and complex, horizontal or vertical apertures with penetrations, such as service ducts or pipes, where the free area exceeds 100mm in all directions. Particular emphasis is on a long working life. Other examples of applications are in curtain walling, under raised flooring, in roof spaces or around cable trays. The Enfield System is suitable for use through concrete, blockwork, and steelwork.

Product description

The Enfield System is a composite construction using Sealmaster Firebar, Firefoam and Silicone Sealant, and possibly other items in the Sealmaster penetration sealing range. The system is strong and lightweight, but easily modified to accept new services or to have existing services removed and the hole patched to retain the overall fire resistance. The boards are durable and rigid, and will withstand vibration or other movement. Normally the construction of the Enfield System is to be non-load-bearing, but it can be adapted if a load-bearing facility is required.

Firebar's main purpose in the system is to act as bulk space filler, while Firefoam is used to seal around the periphery of the aperture and around service pipes and cables. Silicone Sealant is used to ensure that the system provides a sealed barrier to cold smoke. The materials are easy to cut and tailor to any aperture shape using conventional tools, and the system allows for installation in restricted duct space.

Performance

In the event of a fire, the intumescent coatings on Firebar and Firefoam begin to expand on the fire side of the aperture to form a sealed barrier to flames and hot toxic smoke between fire compartments. The Enfield System has been independently tested to BS 746 and the fire integrity proved for periods in excess of two hours. Test reports can be provided on request.

To specify

When specifying the Enfield System, consider the clear space. For example, if the application is a large aperture where part of the space is taken up by an air conditioning duct, it is the space around the duct that is considered for the purposes of specifying.

Fitting Instructions

Support

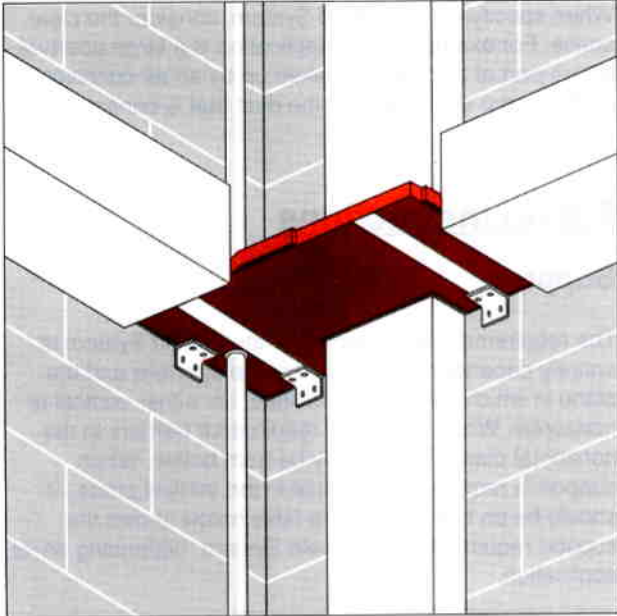
The requirement for supports for the Enfield System is entirely dependent on the size of the aperture and the plane in which the material is fitted, i.e. either vertical or horizontal. When support is required for barriers in the horizontal plane, it need only be from below. When support is required for material in the vertical plane, it should be on both sides. The table below shows the support required for the Enfield System, depending on its application.

Plane of Barrier	Aperture size (max)	Support required
Vertical	Up to 300 x 300mm	None.
	300 x 300mm up to 600 x 600mm	Angle tabs, top and bottom centrally to both sides.
	600 x 600mm up to 1200 x 1200mm	Angle tabs, top and bottom on thirds to both sides.
	1200 x 1200mm up to 1800 x 1800mm	As above, plus angle tabs and primary strap at half height, to both sides.
Horizontal	Up to 300 x 300mm	None.
	300 x 300mm up to 600 x 600mm	angle tabs, centrally to each edge, underneath.
	600 x 600mm up to 1200 x 1200mm	As above, plus primary strap horizontally and secondary strap vertically.
	1200 x 1200mm up to 1800 x 1800mm	Angle tabs to all edges on thirds, primary straps horizontally & secondary straps vertically.

Where apertures are larger or shapes more complicated, please contact Sealmaster Technical Services

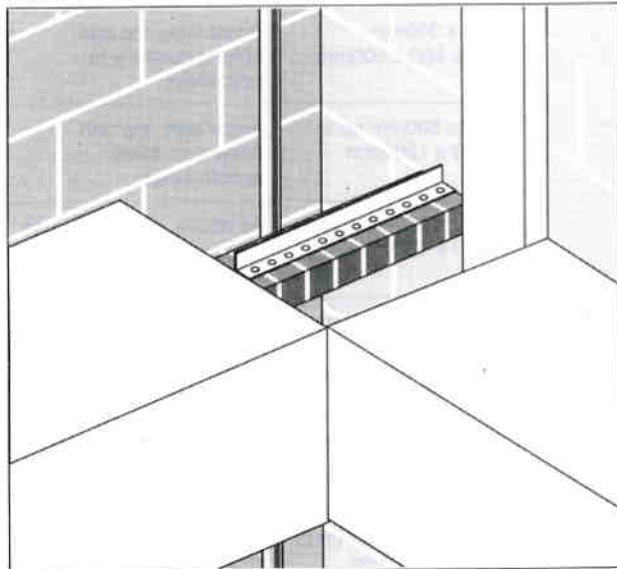
The support system described above is the preferred method. Alternatives may be used only with the approval of Sealmaster. All supports should be made using galvanised steel. Angle tabs (120mm long), and primary straps (length as required) should be constructed from 50mm x 50mm x 1.5mm thick angle, and secondary

straps should be 1.5mm thick x 50mm wide. Primary straps should be used to support the longest dimension of the barrier, with cross straps on the shorter to create a cross-hatch framework. The steelwork should be assembled using steel pop rivets, and the steel support should be fixed to the aperture using either Tapcon, Fischer, Hilti or similar steel fixings. Sealmaster Silicone Sealant should be used to seal the frame to the aperture. If, in the design of the aperture, some form of support is already available for the Enfield System, then the details of the metal support may be altered subject to the approval of the Sealmaster Technical Services team.



Firebar supported with edge brackets and cross straps in vertical service duct, viewed from below

Aperture Dividing System



Aperture dividing system

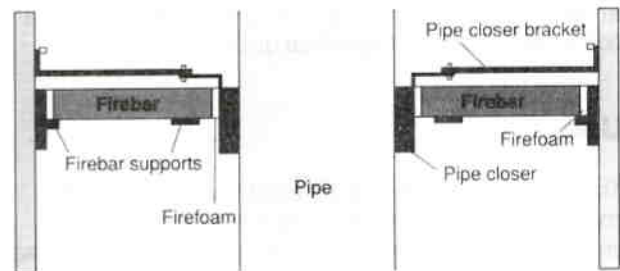
Where apertures exceed the maximum specified size of 1800mm x 1800mm, then simple dividing elements can be employed to enable use of the Enfield System. These dividers can be made easily using standard 150mm lightweight building blocks fixed to 6mm thick 50mm x 50mm steel angles. The blocks would be fixed to the steel using 100mm long Tapcon fixings. The blocks should be sealed against the steel using Sealmaster Silicone Sealant, and the same should be used to seal the interface between each block. The steel angles

should then be fixed in a suitable manner across the aperture to ensure stability during a fire. Other methods of dividing the aperture may be suitable. Please contact Sealmaster Technical Service for advice.

Pipe Closers

If the service penetrating the aperture is a thermally softening pipe, it will need to be protected using a Sealmaster TC1 Pipe Closer. The Pipe Closer must be supported by a bracket totally independent of the Firebar structure. The interface between the Pipe Closer and the Firebar should be protected using Firefoam.

All penetrating services should be independently supported, and should not rely on Firebar to keep them in place.



Support bracket for pipe closer

Cutting

Cutting the Firebar material to suit the aperture and its services should not affect the positioning of the supports, but common sense should be used to ensure that all material is held firmly in place.

It should be ensured that when cutting Firebar to fit an aperture, the largest pieces possible should be used, and any sections required less than 100mm x 100mm should be discarded and Firefoam used to fill the space. Firefoam should be positioned so that the intumescent coating is in contact with the cut edge of the Firebar, so that if a fire occurs the coating on the Firefoam will swell to seal the area. Therefore multiple layers of Firefoam up to 100mm may be required.

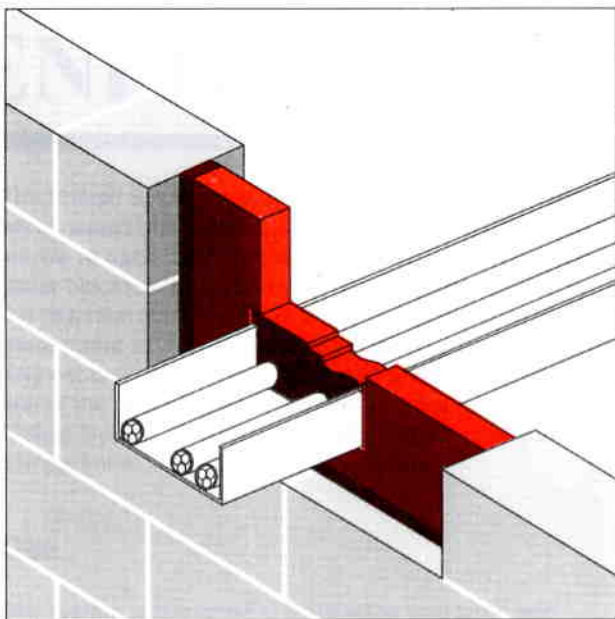
Where Firebar approaches the edge of the aperture, or the services passing through the aperture, or where cut edges meet, Firefoam must be used to protect the interface.

Sealing

Sealmaster Silicone Sealant should be used to seal the top and bottom of all interfaces within or between the Firebar, Firefoam, the periphery of the aperture, and penetrating services. Follow the application instructions provided with the sealant. A thin skin of silicone sealant should also be used to cover the exposed edge of the Firefoam to prevent smoke leakage through the foam.

If, after fitting, there are small holes (less than 5mm) in the barrier, a smoke proof system can be achieved by filling with silicone sealant. If holes are larger than 5mm,

then they should be plugged firmly with Firefoam and then sealed with silicone sealant. Silicone should be tooled to a smooth finish using a wooden spatula wetted in soapy water to prevent sticking.



Firebar with penetration using Firefoam and Silicone Sealant

Technical Information

Material: Firebar is a resin bonded high density mineral fibre board coated on both sides with an expandable graphite based intumescent material. Firefoam is a fire retardant polyurethane flexible foam coated on both sides with a 2mm thick expandable graphite-based intumescent sealant.

Density: Firebar mineral fibre block has a density of 170kg/m³.

Compressibility: (of Firebar)

at 100kg/m² compressibility is less than 1%
at 500kg/m² compressibility is less than 4%

Size: Firefoam strip: 1m x 50mm x 22mm
Firebar board: 1200mm x 600mm x 50mm

Colour: Firebar and Firefoam coatings are black.

Aperture size: (Without services)

Minimum = 100mm x 100mm
Maximum = 1800mm x 1800mm per unit of construction.

Fire resistant rating: Independently tested to BS 476 for two hours.

Durability: Firebar and Firefoam are dimensionally stable, and are water and moisture resistant. They are unaffected by atmospheric carbon dioxide. They are designed to be sufficiently robust to withstand the rigours of the building site.

Other properties: Firebar and Firefoam have good thermal and acoustic insulation properties.

Safety: Firebar and Firefoam are both asbestos free.

Only small quantities of fibres are released from the cut edges of Firebar, which can be sealed with a skin of Sealmaster Silicone Sealant. Cutting of Firebar should be carried out in a well ventilated area which is not susceptible to airborne fibres, and the use of dust masks, cotton gloves and eye protection is recommended.

Storage: Store in a cool dry place before installation.

Expert System

The Enfield System can be specified with complete confidence using the Sealmaster Expert System. This is a unique computer programme designed to operate so that all specifications for materials in the Enfield System are made with reference to existing test data. These specifications are underwritten by International Fire Consultants who designed the programme.

This unique service means that any specification generated by the Expert System complies with the requirements of BS 476. Indeed, the programme will not allow specifications to be made where the parameters exceed those of current test data.

Availability

The Enfield System is available ex-stock with delivery normally within 7-10 days.

Services

Sealmaster provides initial design services with technical support at all stages of work from planning through to site installation, without obligation.

Installation

Sealmaster can take on the total package responsibility of supply and installation using in-house expertise or approved specialist sub-contractors. Also available is a unique annual monitoring service for five years after installation to report on the condition of the fire barriers to ensure that safety has not been compromised during the working life of the construction.

Further Information

Our sales and technical teams will be only too pleased to provide further advice or technical information on Sealmaster's fire penetration systems or any form of passive fire protection

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