



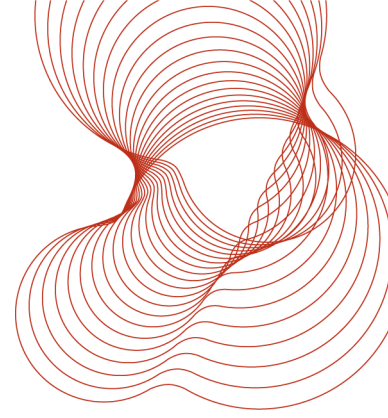
**bre**global

**An assessment of the  
fire performance of  
Promat Fire Compound  
Extra Strength mortar  
penetration seal  
systems**

Prepared for:  
Promat UK Limited  
The Sterling Centre  
Eastern Road  
Bracknell  
Berkshire  
RG12 2TD

31 October 2013

**Assessment report number  
CC 237371PUKL Review 1**



**Prepared on behalf of BRE Global by**

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Name Andrew C Russell

Position Senior Consultant

Signature 

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**Authorised on behalf of BRE Global by**

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Name Tony Baker

Position Laboratory Manager

Date 31 October 2013

Signature 

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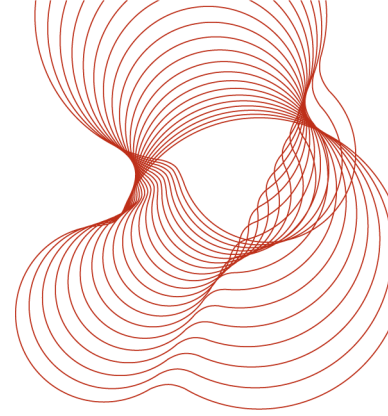
**Date of next review** 31 October 2018

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BRE Global  
Bucknalls Lane  
Watford  
Herts  
WD25 9XX  
T + 44 (0) 1923 664100  
F + 44 (0) 1923 664994  
E [enquiries@breglobal.com](mailto:enquiries@breglobal.com)  
[www.breglobal.com](http://www.breglobal.com)

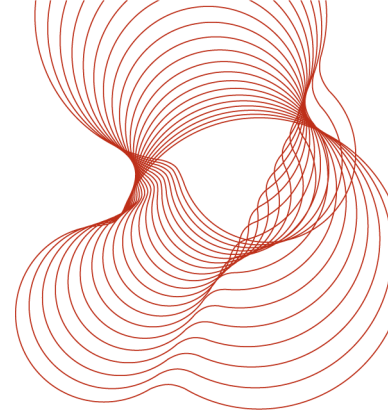
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## Contents

1	Introduction	4
2	Scope	4
3	Supporting data	4
4	Description of the proposals	4
5	Assessment	6
6	Conclusion	7
7	Validity of the assessment	8
7.1	Declaration by applicant	8
7.2	BRE Global Declaration	8
Appendix A – Supporting data		10



## 1 Introduction

Promaseal Fire Compound Extra Strength mortar penetration seal systems are designed to provide up to 240-minutes fire resistance with respect to the adopted integrity and insulation criteria of BS 476: Part 20: 1987, when installed around various services passing through concrete floors and concrete or masonry walls.

## 2 Scope

This assessment report considers the fire resistance of Promaseal Fire Compound Extra Strength mortar penetration seal systems, when installed around services passing through concrete floors and concrete or masonry walls, against the adopted integrity and insulation criteria of BS 476: Part 20: 1987, for fire exposures of up to 240 minutes from below in the case of seals installed in floors and from either side in the case of seals installed in walls.

## 3 Supporting data

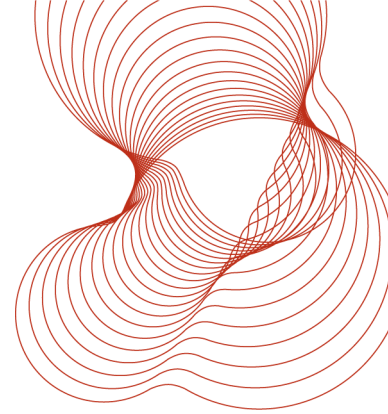
This assessment is based on supporting test data which is more than five years old. This supporting data has therefore been reviewed against current test procedures.

A series of fire resistance tests employing the draft European Standard prEN 1366-3 for penetration seals or adopting the procedures and performance criteria of BS 476: Part 20: 1987 have been carried out on the Promaseal Fire Compound Extra Strength mortar penetration sealing systems. Additional data has also been used from tests on penetrations sealed using a similar, less dense mortar.

Summaries of these tests and their results are given in the appendix to this report.

## 4 Description of the proposals

The Promaseal Fire Compound Extra Strength mortar penetration seal systems being considered in this assessment report are the same as those tested in the reports detailed in appendix A. The seals may be installed in concrete floors and masonry or concrete walls, at least 100mm thick or the thickness of the seal whichever is the greater, which have a fire resistance at least that required by the seal with respect to the integrity and insulation criteria of BS 476: Part 22 or the loadbearing capacity, integrity and insulation criteria of BS 476: Part 21, as appropriate. The minimum density of the concrete should not be less than 580kg/m<sup>3</sup> for floors and walls or 650kg/m<sup>3</sup> for walls constructed using concrete blocks.



The nominal dry density of the mortar is 1550kg/m<sup>3</sup>.

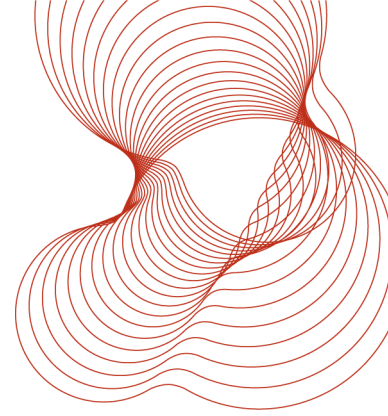
Three different seal configurations are included in this assessment, as follows:

- a) For seals in floors: A layer of 50mm-thick Rocksil LR140 stone mineral wool slab, nominal density 128kg/m<sup>3</sup>, is tightly fitted in the opening and then the mortar, from 50mm to 200mm thick, is cast on top of the slab. The slab may have to be supported while the mortar sets.
- b) For seals in walls: A layer of 50mm-thick Rocksil LR140 stone mineral wool slab is tightly fitted in the opening and then the mortar, from 25mm to 50mm thick, is trowelled over the slab on both faces.
- c) For seals in walls or floors: A layer of stone mineral wool shuttering is fitted into the opening and then the mortar, nominally 100mm thick, is cast (floors) or trowelled (walls) over the shuttering. The shuttering is removed once the mortar has set.

The services which may be fitted through the seals are electrical cables, steel, copper or plastic pipes and steel ducts fitted with steel dampers. The cables can be of various sizes from communication cables to power cables and may be mounted on steel cable trays or ladders or mounted in steel trunking or conduits. If fitted in trunking, the inside of the trunking around the cables must be filled with stone mineral wool where it passes through the seal. Plastic pipes must be fitted with intumescent closing devices or similar which have been shown by test or assessment to be suitable for use with this type and thickness of penetration sealing system, for the fire resistance specified, for the required orientation and for the pipe diameter and plastic type. Dampers should be installed within Fire Compound Extra Strength mortar. The dampers must also have been shown by test to be suitable for this type and thickness of installation and for the required fire resistance. The services must be supported adjacent to the seal on both sides so that the weight of the services is not taken by the seal.

For Fire Compound Extra Strength mortar seals between walls or floors and single or multiple dampers, the damper(s) must be mounted in a HEVAC/HVCA installation frame within the opening in the masonry or concrete wall or floor and the mortar must be at least 82mm thick. The Rocksil LR140 stone mineral wool, minimum thickness 50mm, is left in place for floor installations. The ratio of seal width between the edge of the installation frame reveal and the reveal of the wall or floor opening to the mortar depth must not exceed 12:1. For dampers with a clear opening (duct size) up to 1000mm x 1000mm, the installation frame does not need to be mechanically tied to the wall or floor. For larger dampers, the installation frame must be mechanically tied to the wall or floor. The damper seal configuration is suitable for up to 240-minutes fire resistance with respect to the integrity criteria of BS 476: Part 20: 1987 and for 120 minutes with respect to the insulation criteria, given that the damper assembly itself is uninsulated. The duct must be supported with steel supports on both sides of the damper so that the weight of the duct is not taken by the damper.

The thickness of seal required for various configurations and fire resistance periods are given in table 1.



**Table 1** Summary of assessed seal configurations

Wall or floor	Seal type and thickness (mm) <sup>1</sup>	Test criteria (min) <sup>2</sup>							
		Seal only		Cable tray & cables		Steel pipes		Plastic pipes with collars <sup>3</sup>	
		Int.	Ins.	Int.	Ins.	Int.	Ins.	Int.	Ins.
Floor	(a) 50(mw) + 50(m)	240	180	240	60	240	30 to 60	*	*
Floor	(a) 50(mw) + 100(m)	240	240	240	120	240	30 to 120	*	*
Floor	(a) 50(mw) + 150(m)	240	240	240	240	240	60 to 180	*	*
Floor	(a) 50(mw) + 200(m)	240	240	240	240	240	120 to 240	*	*
Wall	(b) 25(m) + 50(mw) + 25(m)	240	180	240	120	240	30 to 60	*	*
Wall	(b) 50(m) + 50(mw) + 50(m)	240	240	240	240	240	30 to 120	*	*
Wall	(c) 100(m)	240	240	240	120	240	30 to 120	*	*
Floor	(c) 100(m)	240	240	240	60	240	30 to 120	*	*

Notes:

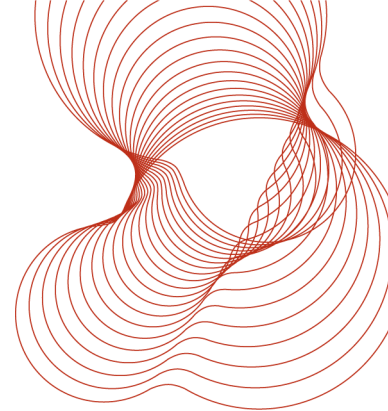
1. (a), (b) and (c) refer to the three different installation methods detailed on page 5; (mw) is stone mineral wool thickness and (m) is mortar thickness.
2. Int. = integrity. Ins. = insulation.
3. Fire resistance dependent of proven performance of intumescent pipe collars or wraps.

## 5 Assessment

Some of the tests referenced in appendix A of this assessment were carried out in accordance with prEN 1366-3. The only significant difference between this standard and BS 476: Part 20: 1987 is that plate thermometers are used to measure the furnace temperature in the prEN, whereas bare-wire thermocouples are used in the BS. This tends to lead to a more severe exposure with the prEN test. We would therefore expect a similar performance had the tests been carried out on an ad-hoc basis using the appropriate procedures, requirements and criteria of BS 476: Part 20: 1987.

The Promaseal Fire Compound Extra Strength mortar penetration seal systems, as described in section 4, are the same as the seals tested. The systems include vertical and horizontal seals and various penetrating services.

On the tested specimens, there was some hairline cracking of the mortar but the seals remained intact and in position for the duration of the heating periods. Where a specimen failed the integrity criteria of the standard, this was not due to cracking or detachment of the mortar but to the penetrating service, e.g., cable core or pipe, falling out and allowing flaming on the non-fire side. The slippage of the cables and pipes in the tests was due to the failure of the clamping devices as the temperature of the services increased. Table 1 gives details of the assessed fire resistance for the various seal configurations and



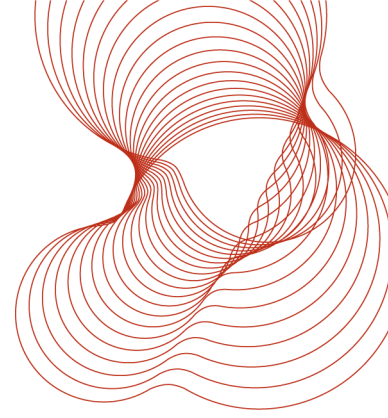
thicknesses. The tables give different values for the seals with and without penetrating services; the times given are based on the combined evidence from the tests, including those on a lighter mortar than the Fire Compound Extra Strength.

The maximum size seal tested was 600mm x 400mm with penetrating services and 1800mm x 1800mm with no penetrating services. Moreover, the seal in the latter test, which was not reinforced, supported a load of 271kg. In addition, ambient temperature loadbearing capacity tests on the fire stop mortar, without reinforcement, mounted in openings in concrete slabs, have been carried out at an independent research laboratory. These tests have demonstrated that, even if it is assumed that only 25mm to 30mm of sound material remains on the non-fire face of the seal, the seal is able to carry a load many times its self-weight. From these results, we are satisfied that Promaseal Fire Compound Extra Strength is suitable for openings up to 1.8m wide, where the opening span width to mortar depth does not exceed 20:1. The length of the opening is not restricted. It is assumed that the seal only needs to support its own weight in the event of a fire. The suitability of the seal for the applied load and span in normal conditions should be determined by a suitably qualified person for each application.

It is not possible to give precise details of the insulation performance for the services when mounted in the mortar seal systems, but table 1 gives typical insulation performance values. Cast iron pipes and copper pipes may be fitted as well as steel pipes. The insulation performance for the cast iron pipes will be similar to those for the steel pipes but the values for the copper pipes would be lower. As very limited test data has been presented on plastic pipes, these may only be fitted through the mortar seals if they comply with the requirements detailed in section 4 of this report. Also the requirements for the installation of dampers detailed in section 4 must be followed.

## 6 Conclusion

Therefore it is our opinion that Promaseal Fire Compound Extra Strength mortar penetration seal systems, as described in section 4 of this report, are suitable for installations where a fire resistance of up to those given in tables 1 is specified in accordance with the adopted integrity and insulation criteria of BS476: Part 20: 1987, for fire exposure from below in the case of seals installed in floors and for fire exposure from either side in the case of seals installed in walls, given the requirements and limitations described above.



## 7 Validity of the assessment

### 7.1 Declaration by applicant

- We the undersigned confirm that we have read and complied with the obligations placed on us by the PFPF Guide to Undertaking Assessments in Lieu of Fire Tests.
- We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which this assessment is being made.
- We agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.
- We are not aware of any information that could adversely affect the conclusions of this assessment.
- If we subsequently become aware of any such information we agree to cease using the assessment and ask BRE Global to withdraw the assessment.

Signed:

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For and on behalf of:

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This assessment report is not valid unless it incorporates the declaration duly signed by the applicant.

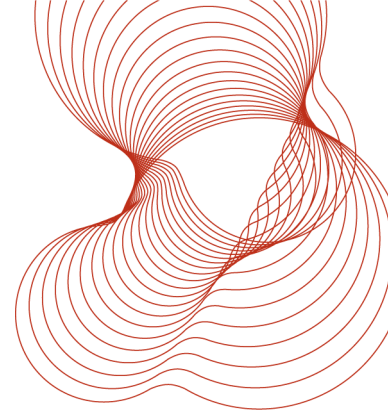
### 7.2 BRE Global Declaration

This assessment was reviewed on 31 October 2013. We have received written confirmation from Promat (UK) Limited that there have been no changes in the specification of their Promat Fire Compound Extra Strength mortar penetration seal systems since the original date of the assessment. There have been no changes in the fire test procedures or methods of assessment, which would adversely affect the fire performance of the systems. We are therefore satisfied that the validity of this assessment may be extended for a further five years.

This assessment is based on test data, experience and the information supplied. If contradictory evidence becomes available to BRE Global the assessment will be unconditionally withdrawn and the applicant will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence over an expressed opinion. The assessment is valid for a period of five years after which it should be returned for review to consider any additional data, which has become available or any changes in the fire test procedures. Any changes in the specification of the product will invalidate this assessment.

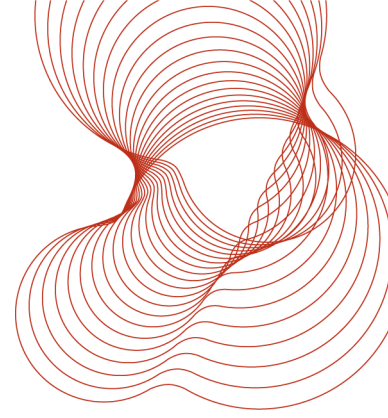
This assessment has been carried out in accordance with Fire Test Study Group Resolution No. 82. It relates to the fire performance of the product and does not cover aspects of quality, durability, maintenance





nor service requirements. This assessment relates only to the specimen(s) assessed and does not by itself infer that the product is approved under any Loss Prevention Certification Board approval or certification scheme or any other endorsements, approval or certification scheme.

Next review date: 31 October 2018



## Appendix A – Supporting data

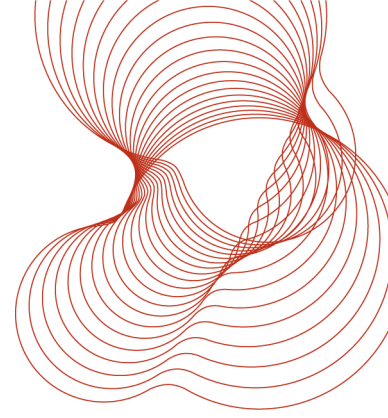
### A.1 LPC test report TE 88648

A fire resistance test on two mortar penetration sealing systems, each sealing apertures, 600mm x 400mm, in a 200mm-thick aerated reinforced concrete floor slab around a selection of electrical cables on two cable trays and a selection of mild steel pipes, was carried out employing the furnace heating conditions, procedures and criteria of prEN 1366-3:1996-1-28 for a duration of 300 minutes in on 26 June 1997. For the criteria adopted the following performances for the two systems were achieved:

Penetration A	Mortar, 1000kg/m <sup>3</sup> x 50mm thick, over 140kg/m <sup>3</sup> Rocksil mineral wool slab, 50mm thick	Integrity: 86 minutes Insulation: 31 minutes
Penetration B	Mortar, 1000kg/m <sup>3</sup> x 100mm thick, over 140kg/m <sup>3</sup> Rocksil mineral wool slab, 50mm thick	Integrity: 99 minutes Insulation: 42 minutes

The following table gives an indication of where failure occurred with reference to the specific services passing through each.

Penetration	Service ref.	Service Description	Insulation failure (min)	Integrity failure (min)
A	1	108mm-diameter steel pipe	31	no failure
	2	60.8mm-diameter steel pipe	40	no failure
	3	42mm-diameter steel pipe	45	no failure
	4	25mm-diameter steel pipe	73	no failure
	D	Cable tray with 16 x 13mm-diameter cables and a 55mm-diameter cable	59	86
	E	Cable tray with 3 x 35mm-diameter cables	48	89
	-	Centre of largest free area of seal	232	no failure
B	1	108mm-diameter steel pipe	42	no failure
	2	60.8mm-diameter steel pipe	67	no failure
	3	42mm-diameter steel pipe	80	no failure
	4	25mm-diameter steel pipe	160	no failure
	D	Cable tray with 16 x 13mm-diameter cables and a 55mm-diameter cables	93	99
	E	Cable tray with 3 x 35mm-diameter cables	84	119
	-	Centre of largest free area of seal	no failure	no failure



Test stopped after 300 minutes at the request of the sponsor.

For full details see LPC test report TE 88648.

## A.2 LPC test report TE 88122A

A fire resistance test on a Promaseal Fire Compound Extra Strength penetration sealing system, 100mm thick, sealing an aperture, 600mm x 400mm, in an aerated reinforced concrete floor slab around a selection of electrical cables on two cable trays and a selection of mild steel pipes, was carried out employing the furnace heating conditions, appropriate procedures and criteria of prEN 1366-3 on 16 December for a duration of 240 minutes.

The penetration sealing system achieved 35 minutes with respect to insulation and 82 minutes with respect to integrity.

For information the following table gives an indication of where failure occurred with reference to the specific services passing through the sealing system.

Service reference	Service description	Insulation failure min	Integrity failure min
1	25mm-diameter	90.5	No failure
2	42mm-diameter pipe	63.5	No failure
3	60.3mm-diameter pipe	49.0	No failure
4	108mm-diameter pipe	35.5	No failure
D	Cable tray with 3 x 35mm-diameter cables	57.0	No failure
E	Cable tray with 19 x 13mm-diameter cables and a 55mm-diameter cable	56.5	82*
-	Centre of largest free area of seal	231.0	No failure

\* Integrity failure caused by copper core slipping down out of cable insulating sleeve due to inadequate clamping.

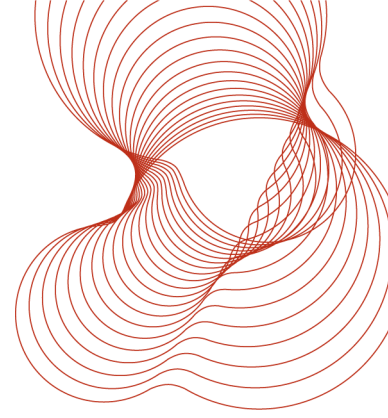
For full details see LPC test report TE 88122A.

## A.3 SGS Yarsley test report No. J 86627/1

A fire resistance test on a mortar penetration sealing system, sealing four apertures (A to D), each 200mm x 200mm, in a 250mm-thick aerated reinforced concrete floor slab and two apertures (E and F) in a 230mm-thick brick wall, each 600mm x 200mm. Each aperture was fitted with a selection of electrical cables on a cable tray and one aperture (F) was fitted with a steel pipe. The test was carried out employing the furnace heating conditions, appropriate procedures and criteria of BS 476: Part 20: 1987 for a duration of 240 minutes.

The seals were:

Penetration A 50mm-thick x 1000kg/m<sup>3</sup> mortar over 50mm x 128kg/m<sup>3</sup> Rocksil LR140 mineral wool slab.



Penetration B	100mm-thick x 1000kg/m <sup>3</sup> mortar over 50mm x 128kg/m <sup>3</sup> Rocksil LR140 mineral wool slab.
Penetration C	150mm-thick x 1000kg/m <sup>3</sup> mortar over 50mm x 128kg/m <sup>3</sup> Rocksil LR140 mineral wool slab.
Penetration D	200mm-thick x 1000kg/m <sup>3</sup> mortar over 50mm x 128kg/m <sup>3</sup> Rocksil LR140 mineral wool slab.
Penetration E	25mm-thick x 1000kg/m <sup>3</sup> mortar on both sides of 50mm x 128kg/m <sup>3</sup> Rocksil LR140 mineral wool slab.
Penetration F	50mm-thick x 1000kg/m <sup>3</sup> mortar on both sides of 50mm x 128kg/m <sup>3</sup> Rocksil LR140 mineral wool slab.

All the penetration seals satisfied the adopted integrity criteria for 240 minutes. Seals A to D satisfied the adopted insulation criteria for 240 minutes. Seal E satisfied the adopted insulation criteria for 180 minutes on the seal and 160 minutes on the cable tray and seal F for 240 minutes on the seal and cable tray and 160 minutes on the steel pipe.

For full details see SGS Yarsley test report no. J 86627/1.

#### **A.4 SGS Yarsley test report no. J 86627/2**

A fire resistance test on a mortar penetration sealing system, sealing an aperture in a 230mm-thick brick wall, 750mm x 250mm. The aperture was fitted with a selection of electrical cables on two cable trays. The mortar was 100mm thick and had a density of 1000kg/m<sup>3</sup>. The test was carried out employing the furnace heating conditions, appropriate procedures and criteria of BS 476: Part 20: 1987 for a duration of 242 minutes. The penetration seal satisfied the adopted integrity criteria for 242 minutes and satisfied the adopted insulation criteria for 242 minutes on the seal and 123 minutes on the cable tray.

For full details see SGS Yarsley test report no. J 86627/2.

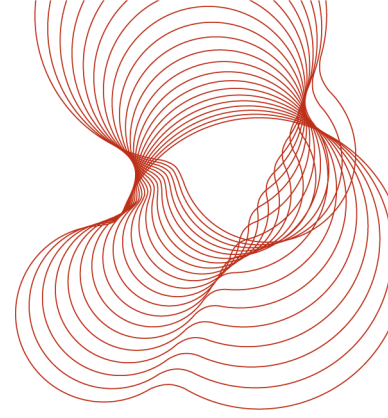
#### **A.5 LPC test report TE 90792**

An ad-hoc fire resistance test employing the furnace heating conditions, appropriate procedures and criteria of BS 476: Part 20: 1987 was carried out on 6 May 1998 on a damper penetration seal system in a dense concrete block wall, 140mm thick, for a heating period of 258 minutes. The Actionair Fire/Shield 201 damper was housed in a steel HEVAC/HVCA installation frame, 600mm x 575mm. The aperture between the frame and the 780mm x 780mm opening in the wall was sealed with Promaseal Fire Compound Extra Strength mortar, 82mm thick. The damper was restrained solely by the sealant; no fixings to the wall were employed. The damper and penetration seal satisfied the adopted integrity criteria for 258 minutes and satisfied the adopted insulation criteria on the seal for 164 minutes on the seal. The damper was uninsulated.

For full details see LPC test report TE 90792.

#### **A.6 LPC test report TE 91327A**

An ad-hoc fire resistance test employing the furnace heating conditions, appropriate procedures and criteria of BS 476: Part 20: 1987 was carried out on 20 July 1998 on a pipe penetration seal system in a lightweight



aggregate concrete floor, 1700mm x 1200mm x 200mm thick, for a heating period of 240 minutes. The two PVCu pipes, each 110mm outside diameter x 3.6mm wall thickness, were located 200mm apart and centrally through an aperture, 600mm x 150mm, so that 500mm protruded from each side and were strapped approx. 300mm above the slab using plastic-coated wire to a steel Unistrut frame fixed to the slab. Rocksil S140 was fitted tightly across the aperture in the slab around the pipes 100mm below the top of the slab. Sleeve pipe wraps were fitted around each pipe with a 10mm depth of the lower edge of each pipe wrap inserted into a channel cut in the Rocksil S140 to suit. One pipe wrap comprised four layers of intumescent sheet, each 2.5mm thick x 65mm wide, the other pipe wrap comprised four layers of intumescent sheet, each 2.5mm thick x 75mm wide. Promaseal Fire Compound Extra Strength mortar was poured and trowelled onto the Rocksil S140 around the pipes up to the level of the top of the slab forming a 100mm-deep seal. After the seal had set, the Rocksil S140 was not removed. The end of the pipe within the furnace was sealed with a 50mm-thick stone mineral fibre plug. The pipe and penetration seal satisfied the adopted insulation and integrity criteria for 240 minutes.

For full details see LPC test report TE 91327A.

#### **A.7 LPC test report TE 91327B**

An ad-hoc fire resistance test employing the furnace heating conditions, appropriate procedures and criteria of BS 476: Part 20: 1987 was carried out on 20 July 1998 on a damper penetration seal system in a lightweight aggregate concrete floor, 1700 x 1200mm x 200mm thick, for a heating period of 240 minutes. The Actionair Fire/Shield 201 damper was housed in a steel HEVAC/HVCA installation frame, 500mm x 400mm. The aperture between the frame and the 700mm x 600mm opening in the floor was sealed with Promaseal Fire Compound Extra Strength mortar, 90mm thick, with a permanent shuttering underneath the compound of Rocksil LR140, 40mm thick. The damper was restrained solely by the sealant; no fixings to the wall were employed. The damper and penetration seal satisfied the adopted integrity criteria for 240 minutes and satisfied the adopted insulation criteria on the seal, away from the damper, for 225 minutes to 240 minutes. The damper was uninsulated. After the heating period the damper was subjected to an imposed load of 210kg before the mortar could no longer support the load.

For full details see LPC test report TE 91327B.

#### **A.8 WFRC test report WARRES no. 101155**

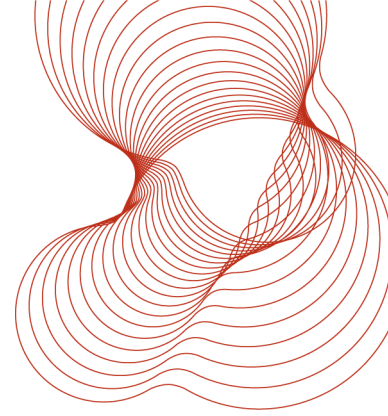
A non-combustibility test in accordance with BS 476: Part 4: 1970 was carried out on 9 December 1997 on Promaseal Fire Compound Extra Strength mortar. The material was found to be classifiable as non-combustible.

For full details see WFRC test report WARRES no. 101155.

#### **A.9 LPC test report TE 201433**

This document confirms that an ad-hoc fire resistance test employing the appropriate procedures and criteria of BS 476: Part 20: 1987 was conducted on two service penetration sealing systems in an aerated concrete floor, 1m x 1.5m x 200mm thick, for a duration of 245 minutes. The furnace was controlled to follow the hydrocarbon fire-simulation heating regime of Appendix D of the standard as closely as possible.

Both penetrations measured 600mm x 400mm. The following services passed through each penetration: a 225mm-wide slotted galvanised-steel cable tray bearing one 32mm-diameter cable and a bundle of sixteen 12mm-diameter cables; and steel pipes of diameter/wall thickness of 102mm/6mm, 60mm/5mm, 42mm/4mm



and 25mm/1.5mm. One penetration was sealed with Promaseal Fire Compound Extra Strength mortar, 100mm thick. The other penetration is not relevant to this assessment.

The test was carried out on 18 October 2000 and the results indicate that for the criteria adopted the following performances were achieved:

Integrity: 245 minutes  
Insulation: 23 minutes (102mm-diameter pipe)

The time to first exceeding the maximum temperature limit (180°C rise) for specific locations is given in the following table:

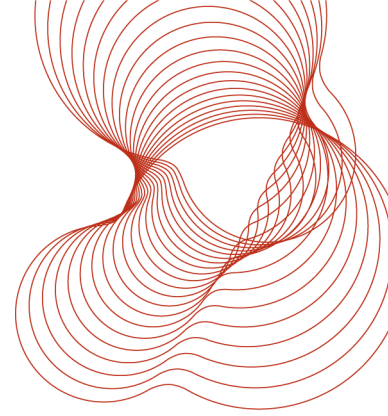
Location	Time to insulation failure min
On 32mm-diameter cable	40
On cable bundle	79
On cable tray	244
On 25mm-diameter pipe	47
On 42mm-diameter pipe	30
On 60mm-diameter pipe	26
On 102mm-diameter pipe	23
On seal away from services and the concrete	No failure

For full details see LPC test report TE 201433.

#### **A.10 BRE test report no. 209933**

An ad-hoc fire resistance test was carried out to determine the performance of four dampers sealed in a blockwork wall with Promaseal Fire Compound Extra Strength mortar when subjected to the heating conditions, appropriate procedures and criteria of BS 476: Part 20: 1987 for a duration of 240 minutes on 15 October 2002.

Four Actionair dampers were installed in a 2 x 2 array within the aperture, 2.50m wide x 2.57m high, of a concrete blockwork wall and sealed with Fire Compound Extra Strength mortar. The dampers were Fire/Shield 101 and 201 and two Smoke/Shield PTC501 dampers. Each was fitted into a HVCA frame. A length of duct was fitted to the non-fire face of the right-hand Smoke/Shield PTC501 damper, (as viewed from the non-fire side). Each damper was approximately 1m x 1m. The mortar filled the aperture in the wall between and around the dampers in widths of 90mm to 140mm, sealing and supporting the dampers in



the wall. The mortar was 90mm deep and flush with the fire side of the wall. The pairs of steel strips around the perimeter of the HVCA frames were not folded out such that the mortar was applied with the steel strips remaining almost parallel with the damper casing.

For the criteria adopted, the construction maintained integrity until 234 minutes when a gap developed between the blades in the left-hand Smoke/Shield PTC501 damper, (as viewed from the non-fire side). There was no integrity failure in any of the other dampers or in the mortar seal throughout the test. The dampers were not assessed with respect to the insulation criteria. The maximum temperature limit, (180°C rise), on the mortar remote from the dampers was first exceeded after 219 minutes.

For full details see BRE test report no. 209933.

#### **A.11 BRE test report no. 214570**

A 100mm-thick Promaseal Fire Compound Extra strength mortar seal closing the aperture, 1.8m x 1.8m, in a dense-concrete floor was submitted to a fire resistance test in accordance with prEN 1366-3: 2002 for a duration of 220 minutes on 26 May 2004. No services penetrated the floor.

The system achieved the following performance:

Integrity:	-	Sustained flaming:	220 minutes
	-	Cotton pad:	220 minutes
Insulation:			220 minutes

Before the fire resistance test a load of 1106kg was applied to the floor for 24 hours then removed. The seal supported the load.

A load of 271kg was applied on the central area of the seal before and for the duration of the fire resistance test. The seal supported the load until the seal collapsed 220 minutes after the start of the test.

For full details see BRE test report no. 214570.

=====REPORT ENDS=====