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CONFIDENTIAL

Test Report : Chilt/IF04002

A fire resistance test performed on 4No pipe penetration sealing systems and 4No plastic duct penetration sealing systems fitted within a blockwork floor slab

Test conducted in accordance with the general principles of BS 476: Parts 20 and 22: 1987

Test Date: 16 January 2004

Test for : **Tenmat Ltd**
Ashburton Road West
Trafford Park
Manchester
M17 1RU

Contents

1 Introduction

Eight specimens were tested during this test.

The pipes, ducts and fire sleeves were supplied for test by the client and delivered on 14 January 2004. Chiltern International Fire Limited (CIFL) constructed blockwork supporting construction and installed the specimens.

2 Specification

2.1 Supporting construction

The supporting construction was a 1.5m x 1.5m x 140mm thick Thermalite block floor slab.

2.2 Penetrating service specifications

The services penetrating the blockwork slab were supported on the unexposed face 300mm above the face of the blockwork. Both ends of each service were sealed with mineral fibre to simulate a continuous run. Each penetration sealing system, except specimen E, comprised intumescent sheet material enclosed within a polythene wrapper with self-adhesive tabs to close the sleeve. Specimen E was a 30mm thick insulating pipe sleeve (ref. Firefly 109). The duct seals were referenced "Firefly Flat Duct Wrap". The pipe seals were referenced "Firefly Pipe Wrap for circular pipes".

Specimen	Type	Material	Size (mm)	Wall thickness (mm)	Exposed length (mm)	Sealing system (intumescent size)
A	Duct	PVC	180 x 94	1.7	500	Firefly 101M Duct Wrap 180x94 (4mm thick x 70mm wide)
B	Pipe	PVC	Ø110 (OD)	3.5	500	Firefly 107 Pipe Wrap 110mm (4mm thick x 60mm wide)
C	Duct	PVC	310 x 28	3.5	500	Firefly 101M Duct Wrap 308x28 (4mm thick x 70mm wide)
D	Pipe	MuPVC	Ø55 (OD)	2.5	500	Firefly 107 Pipe Wrap 55mm (4mm thick x 50mm wide)
E	Pipe	PB	Ø28 (OD)	2.8	500	Firefly 109 Insulating Pipe Sleeve (30 thick x 140mm wide)
F	Duct	PVC	110 x 54	1.5	500	Firefly 101M Duct Wrap 110x54 (4mm thick x 80mm wide)
G	Pipe	PVC	Ø110 (OD)	3.5	500	Firefly 101M Pipe Wrap 110mm (8mm thick x 100mm wide)
H	Pipe	PVC	Ø160 (OD)	3.5	500	Firefly 101M Pipe Wrap 160mm (8mm thick x 100mm wide)

3 Test conditions

3.1 Where areas of the test specification are ambiguous or open to interpretation the Fire Test Study Group Resolutions No's 70, 71 and 72 have been followed (further specific details are available on request). These Resolutions provide basis of common agreements between the fire test laboratories which are members of this Group.

3.2 The ambient temperature of the test area at commencement of test was 9°C.

3.3 After the first eight minutes of the test, the furnace pressure was maintained at 20 ± 2 Pa with respect to atmosphere, at the underside of the blockwork slab.

3.4 The furnace was controlled to follow the temperature/time relationship specified in BS 476: Part 20: 1987 as closely as possible, using the average of four thermocouples suitably distributed within the furnace on the vertical plane. The temperatures recorded are shown graphically in Section 7.1.

3.5 The temperature of the unexposed surface of the pipes was monitored by means of thermocouples fixed on the services 25mm from where the services protrude from the unexposed face of the blockwork slab and also 25mm away from the services on the blockwork slab. The temperature of the services is shown graphically in Section 7.2.

4 Test results

When tested in accordance with the general principles BS 476: Part 20: 1987, the requirements of the standard were satisfied for the following periods:

	Insulation	Integrity
Specimen A	**14 (fourteen) minutes**	**14 (fourteen) minutes**
Specimen B	**92 (ninety two) minutes**	**92 (ninety two) minutes**
Specimen C	**133 (one hundred & thirty three) minutes***	**133 (one hundred & thirty three) minutes***
Specimen D	**133 (one hundred & thirty three) minutes***	**133 (one hundred & thirty three) minutes***
Specimen E	**133 (one hundred & thirty three) minutes***	**133 (one hundred & thirty three) minutes***
Specimen F	**133 (one hundred & thirty three) minutes**	**133 (one hundred & thirty three) minutes***
Specimen G	**133 (one hundred & thirty three) minutes**	**133 (one hundred & thirty three) minutes**
Specimen H	**133 (one hundred & thirty three) minutes**	**133 (one hundred & thirty three) minutes**

* The test was terminated at the request of the sponsor. The specimens had not failed the integrity criteria at this time.

5 Limitations

The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires.

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. CIFL will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

	Checked by:	**Written by:**
Signature:		
Name:	Mark Cummings	Jonathan Osborn
Title:	Test Engineer	Technical Manager
Date of issue:	27/4/04	

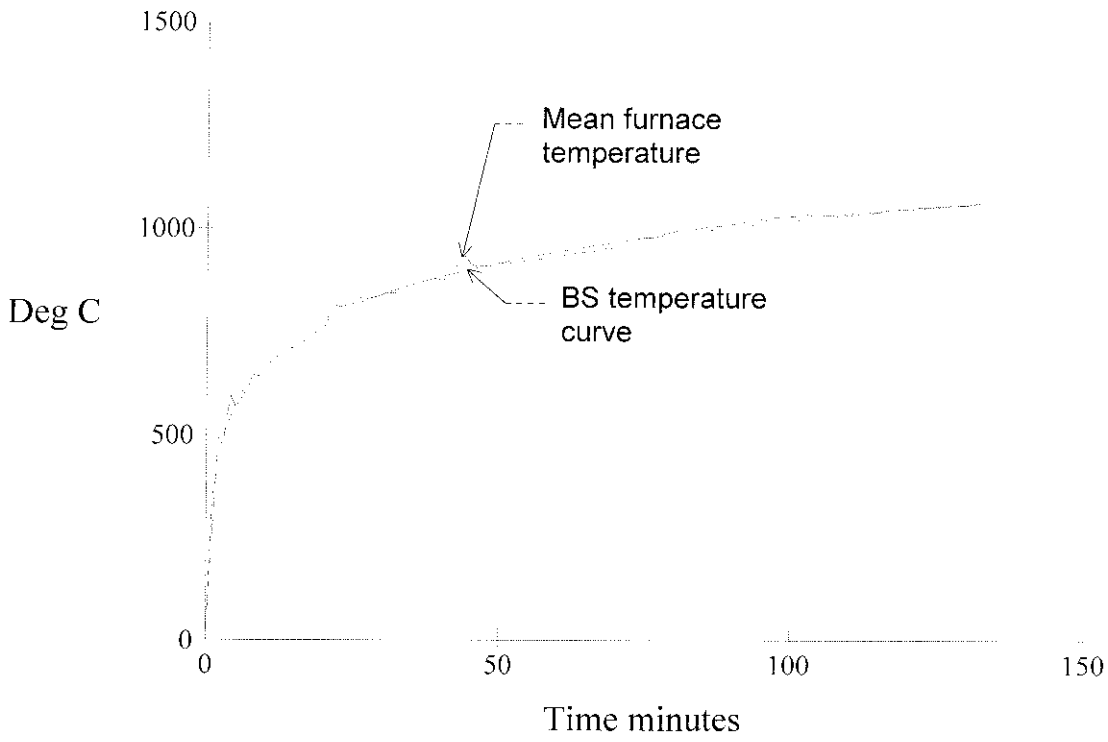
6 Observations

All comments relate to the unexposed face unless otherwise specified.

Time (minutes)	Comments
00.00	Test started.
02.59	There is smoke issuing. Thermocouple 20 is broken.
14.01	**A**, 25mm gap gauge test was performed which resulted in **integrity failure**.
15.30	**A**, a cotton pad integrity test was performed which resulted in further **integrity failure**.
30.04	**C**, there is slight browning up the sides of the trunking.
76.40	There is browning appearing around the base of all the pipes and trunking.
88.49	There is yellow smoke issuing from around pipe **B**.
90.10	There is a glow visible on the side of pipe **B**.
92.50	A cotton pad integrity test was performed on pipe **B** which resulted in ignition of the cotton pad thereby constituting **integrity failure**.
98.15	The services are beginning to melt slightly around the base of all services.
133.45	Test terminated.

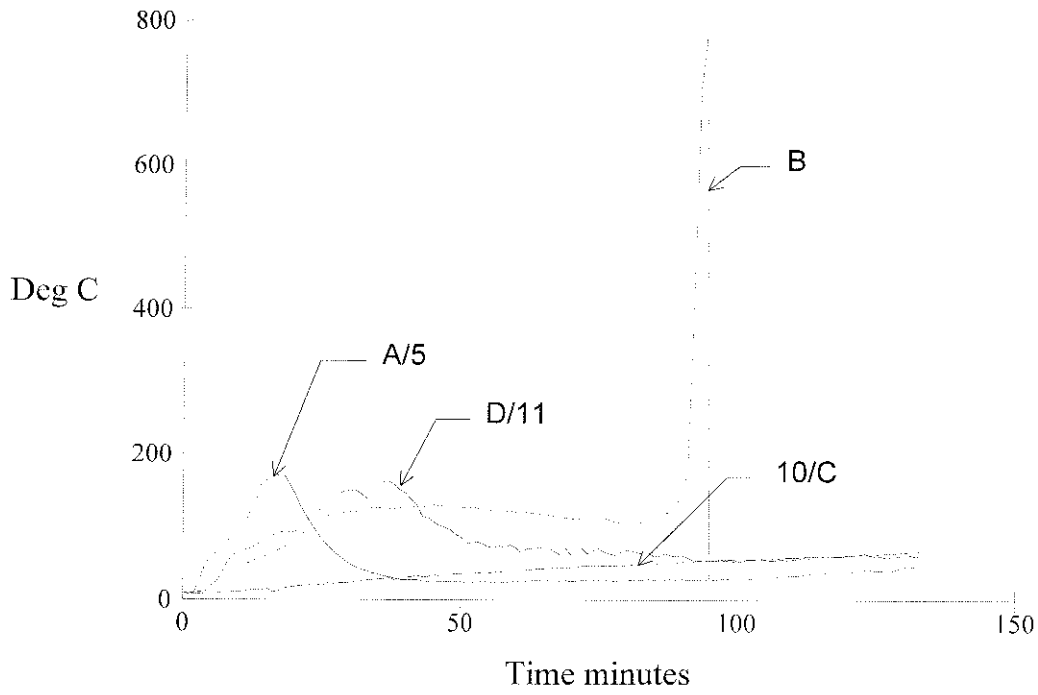
7 Furnace temperature curve

7.1 Furnace temperature curve

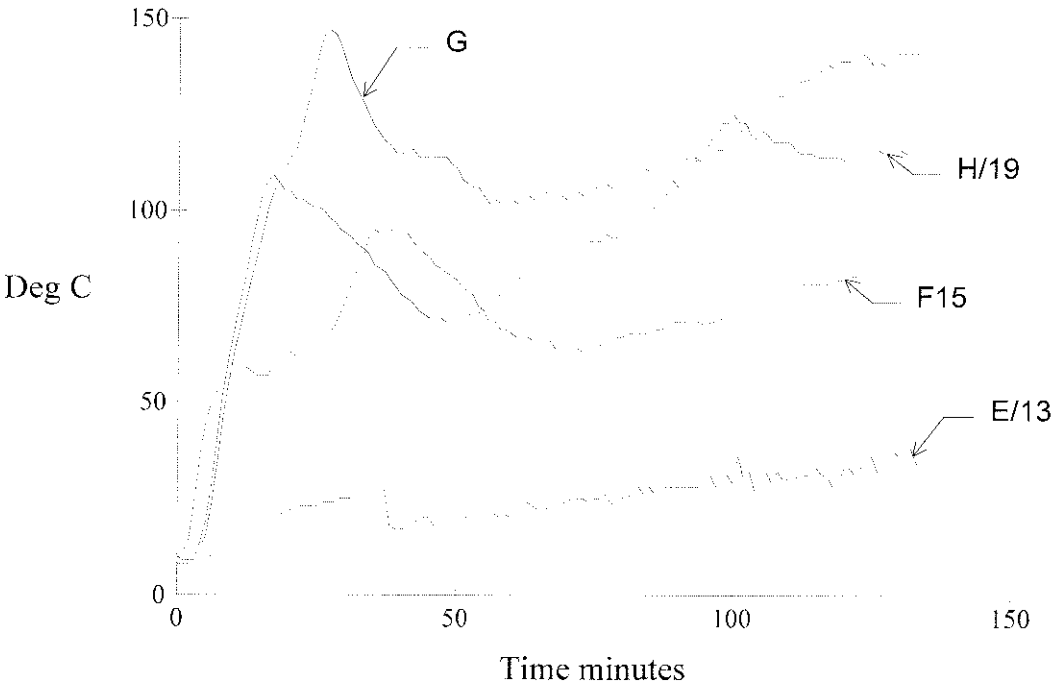


7.2 Unexposed face temperature curve of pipes

Maximum temperature of specimens A-D

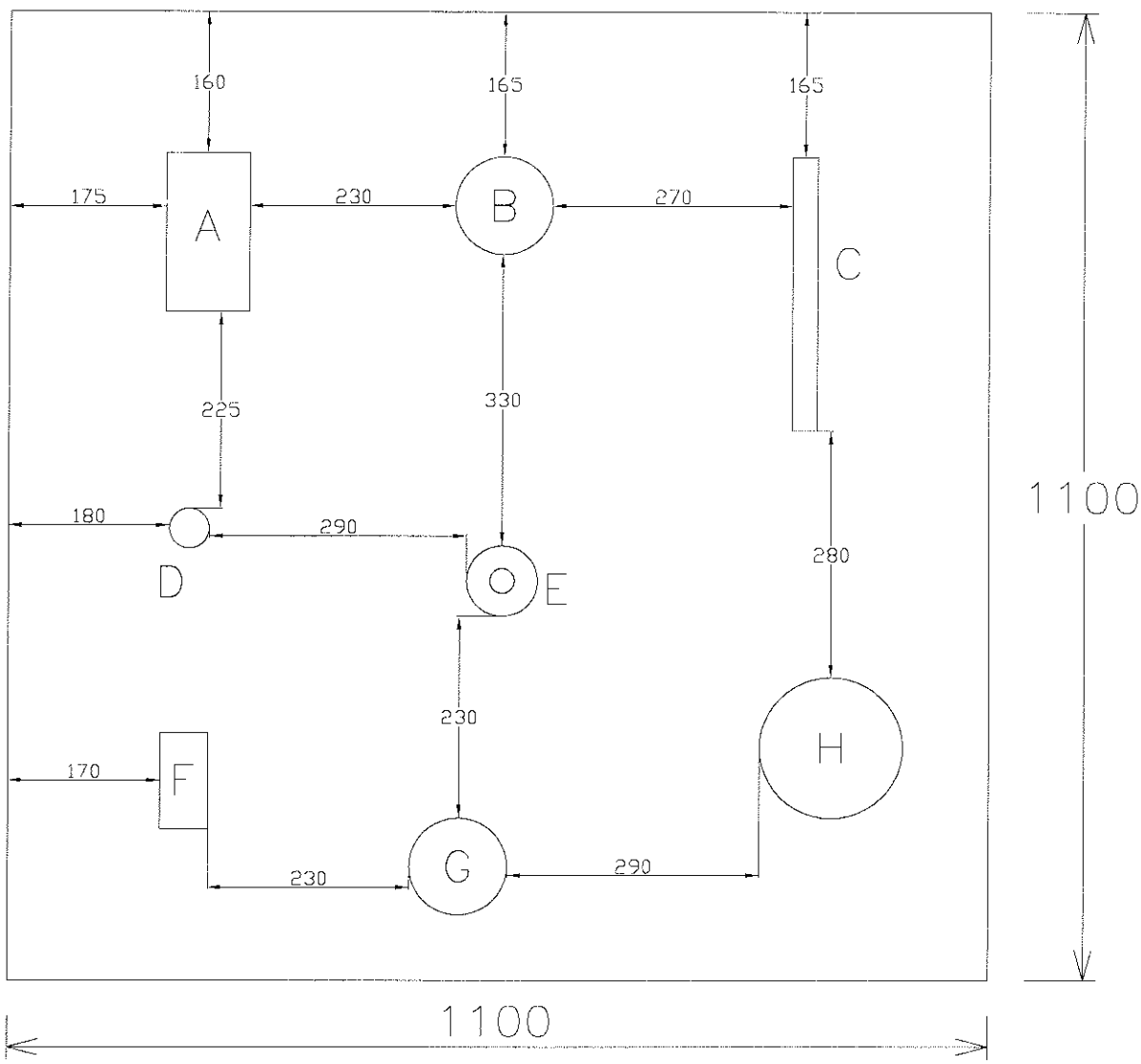


Maximum temperature of specimens E-H



Key to figures

1. Penetrating service
2. 140mm thick blockwork floor slab
3. Penetration sealing system
4. Mineral fibre bung



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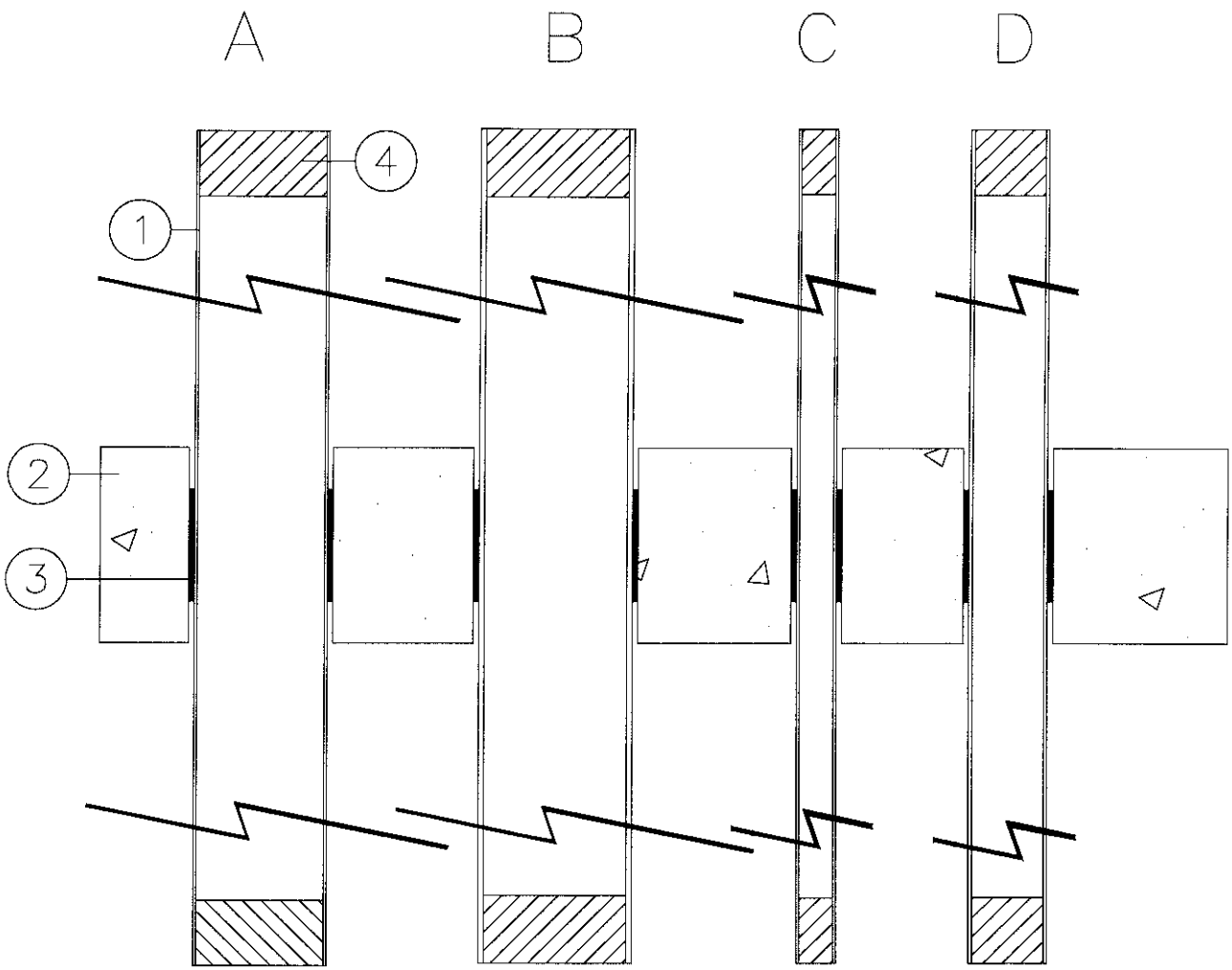
Title: Unexposed face of block work slab showing penetration locations
(All dimensions in mm)

Date Drawn	Drawn By	Scale
4/03/04	AE	NTS

Project No. Chilt/IF04002



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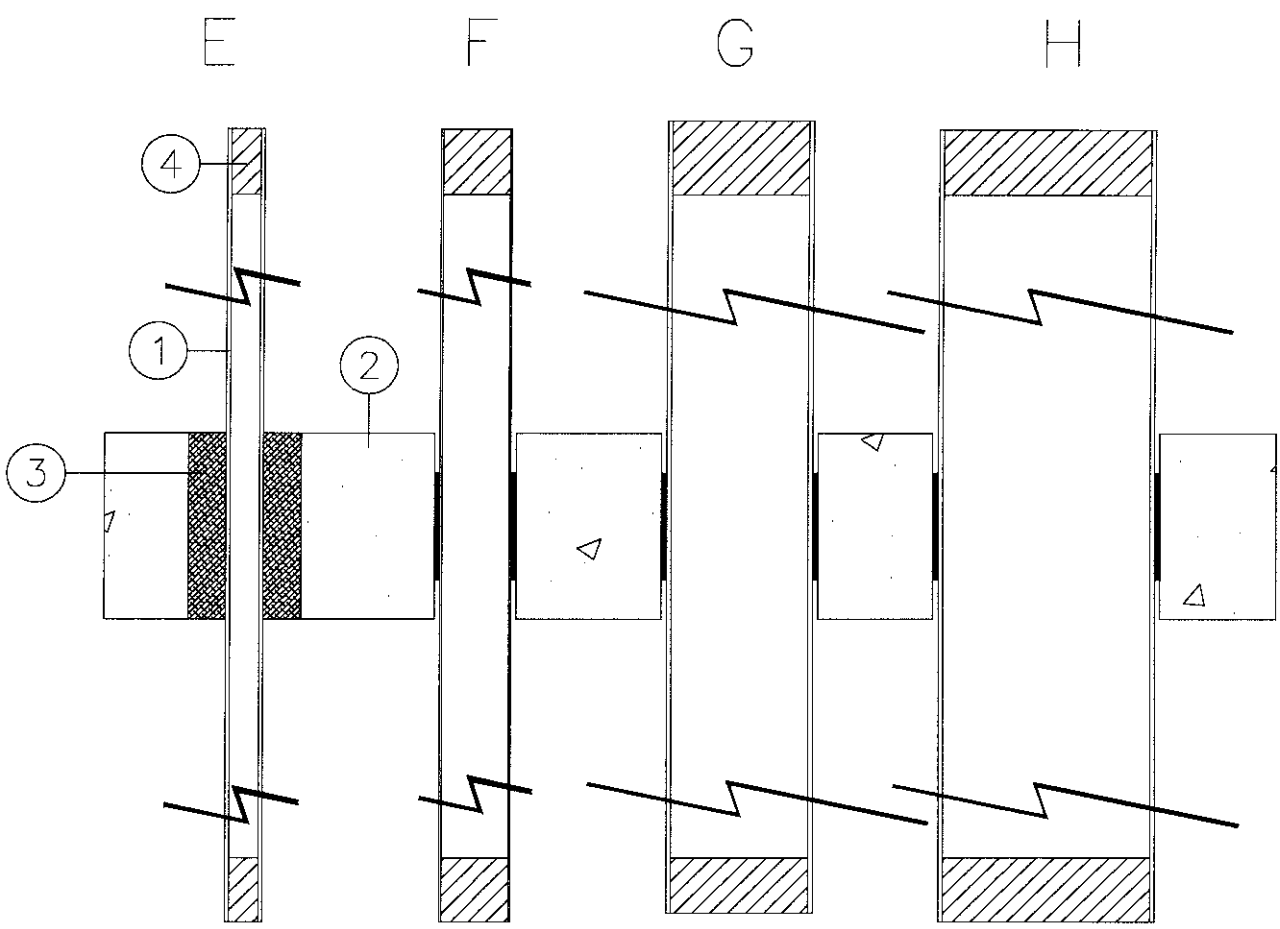
Title: Cross section showing penetration sealing systems
(All dimensions in mm)

Date Drawn	Drawn By	Scale
4/02/04	AE	NTS

Project No. Chilt/IF04002

Figure 3 of 3	Tenmat Ltd



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Title	Cross section showing penetration sealing systems (All dimensions in mm)		
Date Drawn 4/02/04	Drawn By AE	Scale NTS	
Project No. Chilt/IF04002		Page 12 of 12	