Our Ref: MK1802

ACOUSTIC PERFORMANCE AND STC RATING OF A PARTITION WALL WITH PVC PIPE INSERT WITH PROTECTA FR COLLARS

AUCKLAND UNISERVICES LIMITED
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THE UNIVERSITY OF AUCKLAND

Report prepared for:
Firestop Centre
Unit J – 657 Great South Road
Penrose, Auckland 1061
New Zealand

&

Polyseam Ltd
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West Yorkshire
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UK

Date: 1st October 2018

Report prepared by:
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Dr Michael Kingan

Acoustics
Testing Service

Opinion

A test report entitled “Report on the testing of a PVC pipe with collars for acoustic performance to BS EN ISO 10140-2:2010” (issue date: May 2014. Issued by: Chiltern International Fire Ltd. (trading as BM TRADA). Report #: BMT/MTZ/F13079/12) was supplied for the purposes of calculating an STC rating. This report is included as an attachment to this opinion. The report describes acoustic testing to determine the sound transmission loss performance of a wall system with a PVC pipe insert, which was conducted by “BM TRADA” in a laboratory located in Buckinghamshire in the UK for a client identified as “Polyseam AS”. Testing was conducted on a wall with an STC likely exceeding 64 dB containing a 160 mm diameter PVC pipe with wall thickness of 3.2 mm with “Protecta FR Collar 160” on both sides. The pipe extended 500 mm into both the source and receiver rooms and was capped on both ends with 50 mm Ablative Coated Batt (160 $kg.m^{-3}$ density). The report contains detailed descriptions, drawings and photographs of the wall and pipe insert.

In my opinion, the laboratory tests described in the test report BMT/MTZ/F13079/12 were conducted in accordance with “ISO 10140-2 Airborne Sound Insulation of Building Elements”. The one-third octave band sound transmission loss data from the laboratory test contained in the test report BMT/MTZ/F13079/12 was used to calculate an **STC rating of 58 dB** using the calculation method described in ASTM E413-16.

Acoustic Test

Sponsor:
Polyseam AS
Ravneveien 7
Linnestad
Næringsområde
N-3174 Revetal
Norway

CONFIDENTIAL

Report: BMT/MTZ/F13079/12

Report on the testing of a PVC pipe with collars for acoustic performance to BS EN ISO 10140-2:2010

Issue date: May 2014

UKAS TESTING 1762

BM TRADA – the new name for Chiltern International Fire Ltd

From July 1st 2013, Chiltern International Fire Ltd commenced trading under the name of its parent company BM TRADA and at the same time adopted a brand new visual identity.

Historically, the group has delivered its services through a number of individual companies: BM TRADA Certification Ltd, TRADA Technology Ltd, Chiltern International Fire Ltd (including Chiltern Dynamics) and a network of international offices. Both BM TRADA Group and these individual companies will now trade under the same name - BM TRADA - and adopt the new visual identity.

To coincide with this change, our Technical Reports, Test Reports, Products Assessments, company stationery and marketing collateral have been re-designed to carry the new branding and visual identity.

The validity of all documents previously issued by the individual companies including certificates, test reports and product assessments is unaffected by this change and a letter to this effect will be available to download from our website www.bmtradagroup.com.

About BM TRADA.

With origins dating back to 1934, we have a deep history and services which are highly valued by our customers. We offer independent certification, testing, inspection, training and technical services around the world. In all these areas we continue to use industry-leading experts in their chosen fields to develop and deliver services – an ethos that has been at the heart of our approach since we began.

In all these areas we use industry-leading experts in their chosen fields to develop and deliver services – an ethos that has been at the heart of our approach since we began.

A recent review of our businesses and customers revealed that the individual identities sometimes make communications confusing, and that in an already complex business area, clarity and simplicity in communications is rare, but valued. It also revealed that a single identity and combined offer would help us strengthen our appeal.

With this in mind, we brought the companies together under the name BM TRADA and took the opportunity to create a fresh new visual identity.

We have modernised our image and combined our strengths. However, our values, our people and the integrity of our services remain the same. I hope you will welcome these changes and the improvements they will bring.

Jon Osborn
Chief Operating Officer

Contents

1 Introduction

The specimen was supplied by the client and delivered to BM TRADA on 4 February 2014. The specimen was installed into a timber stud partition within the test chamber by BM TRADA.

Test Details

The specimen was tested to BS EN ISO 10140-2:2010 Acoustics - Laboratory measurement of sound insulation of building elements. Measurement of airborne sound insulation

Testing was conducted at BM TRADA, Chiltern House, Stocking Lane, Hughenden Valley, Buckinghamshire. HP14 4ND on the 4 February 2014.

For details of the testing, please see section 3, Methodology.

2 Test Specimens

The specimen was identified as 160mm x 3.2mm Polypipe with a Protecta FR Collar 160 fixed to each face of the partition wall. The pipe was installed through a 180mm diameter aperture in the wall. The perimeter gap between the pipe and the aperture was back filled with 20mm deep 35kg/m^3 mineral fibre wool. The pipe protruded by 500mm from each face of the wall and was capped each end with mineral fibre batt and sealed with mastic.

The partition consisted of two wall leaves separated by a 320mm air gap. Each wall leaf was constructed of nominal 25mm x 70mm steel studs at 600mm centres with three layers of 15mm plasterboard on each face. The stud wall cavities were filled with 50mm thick insulation.

3 Detailed Specimen Description

Product Name	Protecta FR Collar 160
Product Type	Fire rated pipe closure device
Product Description	Powder coated steel sleeve with an 184mm internal diameter, 203mm external diameter and 60mm high, the steel was 1mm thick and the collar had 4No. surface fixings. Within the collar was a graphite intumescent infill, 15mm thick with a nominal internal diameter of 160mm.
Pipe specification	PVC plastic pipe 160mm x 3.2mm x 1545mm

4 Methodology

Airborne Sound Insulation Test

- The loudspeakers were placed in the corners of the source room
- The sound level meter was calibrated prior to testing.
- 5 measurements were taken in the source room, at fixed positions.
- 5 measurements were taken in the receive room at fixed positions.
- Background measurements were taking at each third octave frequency between 50Hz and 5000Hz.
- 6 Reverberation measurements were taken in the receive room, in accordance with BS EN ISO 3382-2:2008 interrupted, engineering method.
- Calculations, including C & C_{tr}, were carried out in accordance with BS EN ISO 717-1

- The sound reduction index was calculated using the following formula from BS EN ISO 10140-2:2010:

$$R_w = L1 - L2 + 10Log\left(\frac{S}{A}\right)\ dB$$

Where:

L1 is the logarithmic average of the source room measurements
L2 is the logarithmic average of the receive room measurements
S is the area of the test specimen
A is the equivalent absorption area, where $A = \frac{0.16V}{T}$

Where:

V = The volume of the receive room
T = the reverberation time measured in seconds

1. Logarithmic average of 5 Measurements (L1 & L2)
2. Deduction of L1s from L2s
3. Area of test specimen (S) divided by equivalent sound absorption area (A)
4. Weighted Final Result R_w dB

Test Equipment

Equipment	Equipment reference number
Bruel & Kjear Sound Level Meter (Type 2270)	ACT-009
Bruel & Kjear Microphones (Type 4189)	ACT-010 & ACT-016
Bruel & Kjear Calibrator (Type 4231)	ACT-011
Amplifiers	ACT-007 & ACT-020
Noise Generators	ACT-008 & ACT-009
Loudspeakers (EV ZX1-90PA)	ACT-006, ACT-021, ACT-022
Graphic Equaliser (DBX Dual Channel)	ACT-023

5 Results

MTZ/F13079/12/P017	**Twin partition wall** 160mm x 3.2mm PVC pipe with a Protecta FR Collar 160, 500mm exposed in source and receive rooms, capped on both ends with 50mm Ablative Coated Batt (160kg/m³ density). Collars on both faces.	58 (0;-3) dB

The results only relate to the performance of the samples under the particular conditions of test.

Full test results for each test are presented in Appendix 1.

6 Limitations & Parameters

The test fulfilled all criteria required of ISO 10140-2, including:

- Sound level meter (microphone) was located as required
- Sound sources (loudspeakers) were located as required
- Reverberation Time readings were greater than 20dB but not so large that the observed decay cannot be represented by a straight line.
- Background noise measurements were 10dB below L2 measurements.
- Temperature was reported to within ± 0.1°C
- Barometric pressure was reported to within ± 0.01 Mbar (±1 Pa)
- Humidity was reported to within ± 1%
- Frequencies 50Hz, 63Hz and 80Hz are outside of our UKAS accreditation, and are for reference only. These frequencies do not affect the over R_w figure.
- R'_{max} of the test chambers was measured to be 65dB
- The test chambers are two cuboid rooms 5.49m wide and a ceiling height of 2.58m, volumes of chambers for testing are reported with the individual test data

7 Authorisation

	Issued by:	**Checked by:**
Signature:		
Name:	Martin Durham	Vincent Kerrigan
Title:	Technical Officer	Technical Manager
Date of Issue	15th May 2014	

Appendix 1 - Test Data

MTZ/F13079/12/P017	**Twin partition wall** 160mm x 3.2mm PVC pipe with a Protecta FR Collar 160, 500mm exposed in source and receive rooms, capped on both ends with 50mm Ablative Coated Batt (160kg/m³ density). Collars on both faces.

BMTRADA

Laboratory measurement to BS EN ISO 10140-2 - Airborne Sound Insulation of Building Elements

UKAS TESTING No. 1762

Test Specimen Name: Twin partition wall
Client: Polyseam AS
Test Specimen Installed By: Client
Area of Specimen (S): 14.20
Temperature in Test Rooms: 19.1 °C
Static Pressure: 982500.0 Pa
Humidity in Test Rooms: 51.1 %

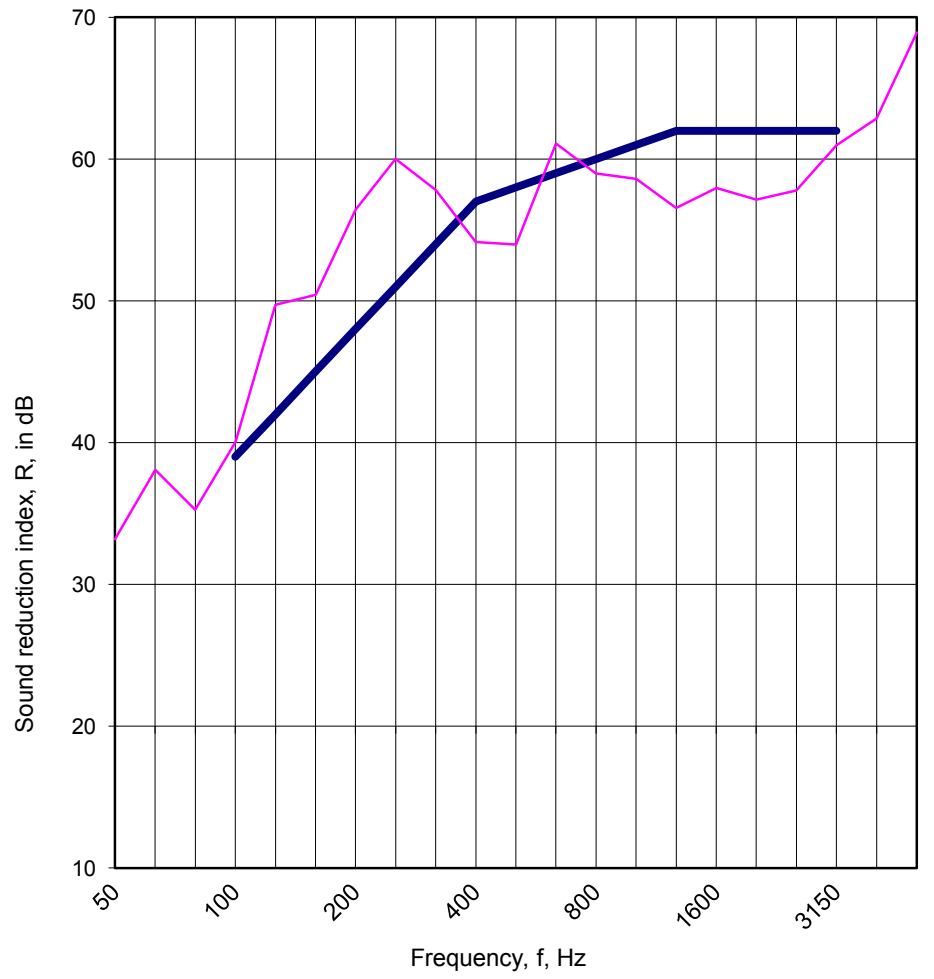
Ref. No.: MTZ/F13079/12/P017
Date of Test: 04/02/2014

Source Room Volume: 86.00 m^3
Receive Room Volume: 63.00 m^3

Test Specimen Description: 160mm x 3.2mm PVC pipe with a Protecta FR Collar 160, 500mm exposed in source and receive rooms, capped on both ends with 50mm Ablative Coated Batt (160kg/m³ density). Collars on both faces.

f, Hz		*R* ,dB
50+		33.2
63+		38.1
80+		35.3
100		40.0
125		49.7
160		50.4
200		56.4
250		60.0
315		57.8
400		54.1
500		54.0
600		61.1
800		59.0
1000		58.6
1250		56.6
1600		57.9
2000		57.1
2500		57.8
3150		61.0
4000	≥	62.9
5000	≥	68.9
AAD		-29.9

Frequency range for rating in accordance with ISO 717-1



R_w =	58 dB	$C_{(50-3150)}$ =	-1 dB	$C_{tr\ (50-3150)}$ =	-7 dB
R_w+C =	58 dB	$C_{(50-5000)}$ =	0 dB	$C_{tr\ (50-5000)}$ =	-7 dB
R_w+C_{tr} =	55 dB	$C_{(100-5000)}$ =	0 dB	$C_{tr\ (100-5000)}$ =	-3 dB

Martin Durham
Technical Officer

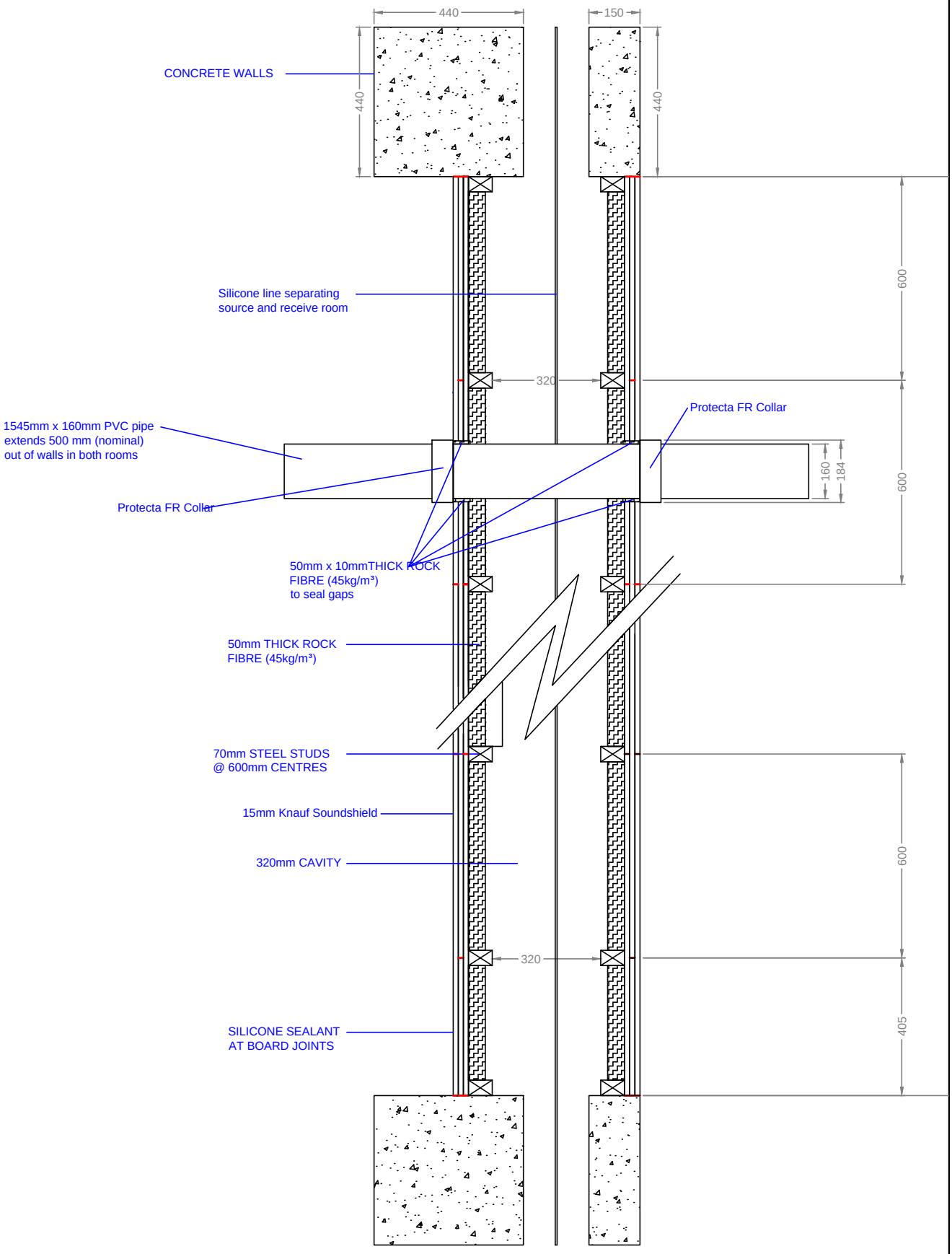
+ indicates that the frequency is outside of our UKAS accreditation and is for information only

Appendix 2 – Drawings (2 Pages)

List of Drawings

Figures	Drawing Reference
Figure 1	Schematic drawing showing horizontal cross section of test wall
Figure 2	Schematic drawing showing source room section of test wall

Figure 1 of 2	FR Collars - both faces (P017)



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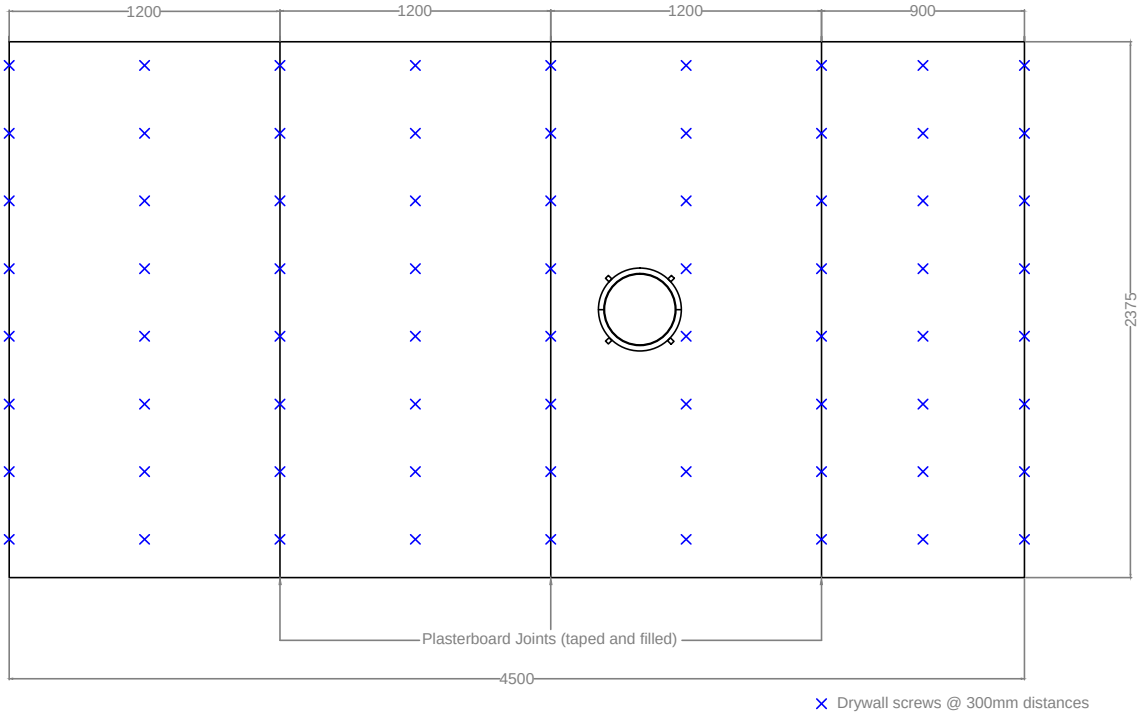
Schematic drawing showing horizontal cross section of test wall

Date Drawn	Drawn By	Scale
14/02/2014	ATM	Not to Scale All dimensions in mm unless otherwise stated

Project No.	
BMT/MTZ/F13079/12	Appendix 2

Figure 2 of 2	FR Collars - both faces (P017)



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Schematic drawing showing source room section of test wall

Date Drawn	Drawn By	Scale
14/02/2014	ATM	Not to Scale All dimensions in mm unless otherwise stated

Project No.	
BMT/MTZ/F13079/12	Appendix 2

CHILTERN INTERNATIONAL FIRE LTD *(trading as BM TRADA)*

BM TRADA provides independent certification, testing, inspection, training and technical services around the world. We help customers large and small to prove their business and product credentials and to improve performance and compliance. With an international presence across many industry sectors, we offer a special focus and long history of technical excellence in supply chain certification, product certification and testing, and technical services to the timber, building, fire and furniture industries.

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