

**ACOUSTIC PERFORMANCE AND STC  
RATING OF A PARTITION WALL WITH  
INSERT OF PROTECTA EX MORTAR**

**AUCKLAND UNISERVICES LIMITED**

a wholly owned company of

**THE UNIVERSITY OF AUCKLAND**

**Report prepared for:**

Firestop Centre  
Unit J – 657 Great South Road  
Penrose, Auckland 1061  
New Zealand

&

Polyseam Ltd  
15 St Andrews Road  
Huddersfield  
West Yorkshire  
HD1 6SB  
UK

Date: 1<sup>st</sup> October 2018

**Report prepared by:**

Dr Michael Kingan  
Acoustics Testing Service  
**The University of Auckland**



Reports from Auckland UniServices Limited should only be used for the purposes for which they were commissioned. If it is proposed to use a report prepared by Auckland UniServices Limited for a different purpose or in a different context from that intended at the time of commissioning the work, then UniServices should be consulted to verify whether the report is being correctly interpreted. In particular it is requested that, where quoted, conclusions given in UniServices reports should be stated in full.

**Acoustic Performance and STC Rating of  
a Partition Wall with insert of Protecta EX  
Mortar**

Prepared for: Firestop Centre  
Unit J – 657 Great South Road  
Penrose, Auckland 1061

&

Polyseam Ltd  
15 St Andrews Road  
Huddersfield  
West Yorkshire  
HD1 6SB  
UK

Prepared by: Acoustics Testing Services  
Department of Mechanical Engineering  
THE UNIVERSITY OF AUCKLAND

**AUCKLAND UNISERVICES LTD  
THE UNIVERSITY OF AUCKLAND  
PRIVATE BAG 92019  
AUCKLAND**

Dr Michael Kingan



## Opinion

A test report entitled "Report on the testing of Linear Seals for acoustic performance to BS EN ISO 10140-2:2010" (issue date: April 2014. Issued by: Chiltern International Fire Ltd. (trading as BM TRADA). Report #: BMT/MTZ/F13079/04) 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 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 an insert of "Protecta EX Mortar" with dimensions 50 mm deep × 30 mm wide × 1200 mm long. The report contains detailed descriptions, drawings and photographs of the wall and insert.

In my opinion, the laboratory tests described in the test report BMT/MTZ/F13079/04 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/F13079/04 was used to calculate an **STC rating of 64 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/F13079/04**

Report on the testing of Linear Seals for  
acoustic performance to BS EN ISO  
10140-2:2010

**Issue date: April 2014**



Page 1 of 9

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document is confidential and remains the property of Chiltern International Fire Ltd. The legal validity of this report can only be claimed on the presentation of the complete report.



**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](http://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 .....4

2 Test Specimens .....4

3 Detailed Specimen Description .....4

4 Methodology .....5

5 Results.....6

6 Limitations & Parameters .....6

7 Authorisation.....6

Appendix 1 – Test Data.....7

Appendix 2 – Drawings and Photographs (5 Pages).....9

*The legal validity of this report can only be claimed on presentation of the complete report.*

## 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 4, Methodology.

## 2 Test Specimens

The specimen was identified as Protecta EX Mortar inside a timber cassette. The overall cassette dimensions were 120mm wide x 1250mm high x 545mm deep and the seal dimensions were 12mm deep x 30mm wide inside the cassette. The cassette was fitted into a partition wall.

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

## 3 Detailed Specimen Description

<b>Product Name</b>	Protecta EX Mortar
<b>Product Type</b>	Compound mortar
<b>Product Dimensions</b>	50mm deep x 30mm wide x 1200mm long
<b>Backing Material</b>	50mm deep 150kg/m <sup>3</sup> mineral rock fibre
<b>Product Density</b>	700kg/m <sup>3</sup>
<b>Test Aperture (each face)</b>	120mm wide x 1250mm high
<b>Cassette Material Type</b>	Softwood timber members fixed to MDF end caps. These were fixed with 8No. 5 x 60 woodscrews on each face.
<b>Overall Dimensions (Cassette)</b>	The overall dimensions were 120mm wide x 545mm deep x 1250mm long. This consisted of 2 parts: Part 1 – Cassette A contained the product in a 120mm wide x 125mm deep x 1250mm long cassette. Part 2 - Cassette B was an extension (at the clients request) to Cassette A, enabling the specimen (as a whole) to span the depth of the partition wall. This measured 120mm wide x 420mm deep x 1250mm long cassette. Part 1 and 2 were butt jointed and fixed with an intumescent mastic. See Appendix 2, Drawings and Photographs for details.
<b>Cassettes Density</b>	400-600 kg/m <sup>3</sup> **

\*\* Nominal density not tested by laboratory

*The legal validity of this report can only be claimed on presentation of the complete report.*



## 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<sub>tr</sub>, 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:

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

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<sub>w</sub> dB

### Test Equipment

Equipment	Equipment reference number
Bruel & Kjar Sound Level Meter (Type 2270)	ACT-009
Bruel & Kjar Microphones (Type 4189)	ACT-010 & ACT-016
Bruel & Kjar 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**

**$R_w (C;C_{tr})$**

MTZ/F13079/04/P008	<b>Twin partition wall</b> Protecta EX Mortar 50mm deep x 30mm wide x 1200mm long inside cassette. Batch No. 20019090	64 (-1;-6) 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  $\pm 0.1^\circ\text{C}$
- Barometric pressure was reported to within  $\pm 0.01$  Mbar ( $\pm 1$  Pa)
- Humidity was reported to within  $\pm 1\%$
- 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**

	<b>Issued by:</b>	<b>Checked by:</b>
<b>Signature:</b>		
<b>Name:</b>	Martin Durham	Vincent Kerrigan
<b>Title:</b>	Technical Officer	Technical Manager
<b>Date of Issue</b>	1st May 2014	

*The legal validity of this report can only be claimed on presentation of the complete report.*

## Appendix 1 - Test Data

MTZ/F13079/04/P008	<b>Twin partition wall</b> Protecta EX Mortar 50mm deep x 30mm wide x 1200mm long inside cassette. Batch No. 20019090
--------------------	--

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 %

Test Specimen Description: Protecta EX Mortar 50mm deep x 30mm wide x 1200mm long inside cassette. Batch No. 20019090

Ref. No.: MTZ/F13079/04/P008

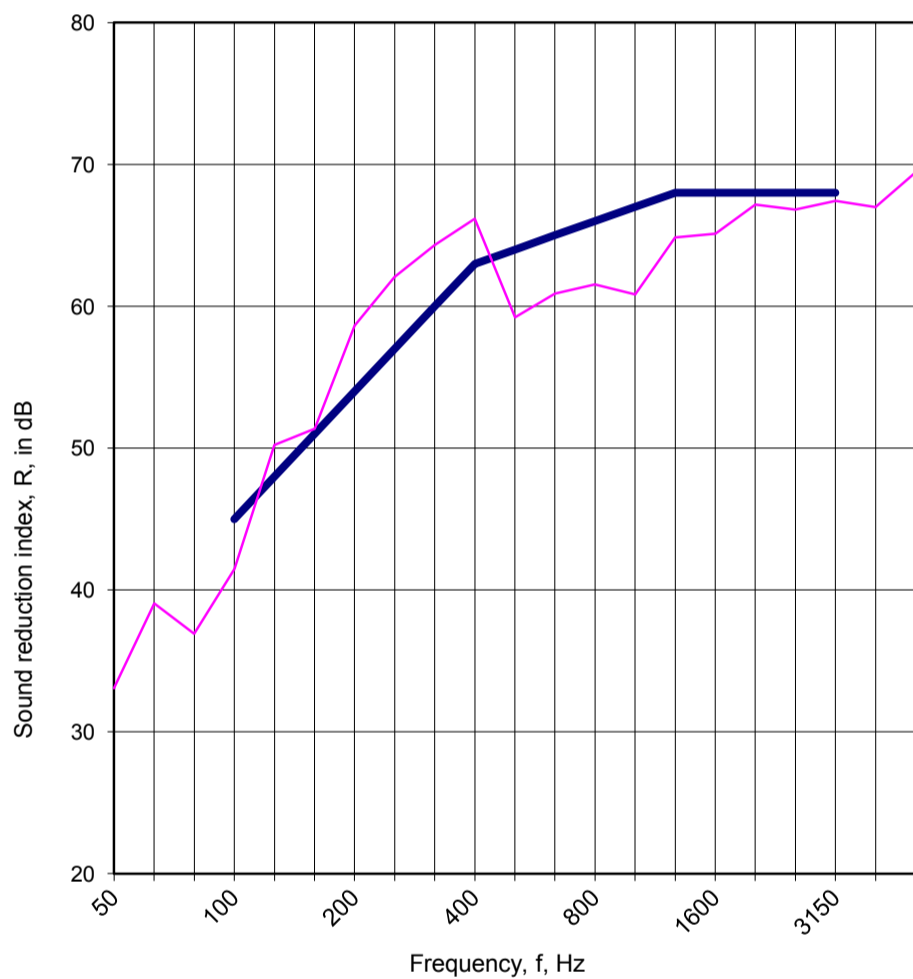
Date of Test: 04/02/2014

Source Room Volume: 86.00 m<sup>3</sup>

Receive Room Volume: 63.00 m<sup>3</sup>

f, Hz	R, dB
50 <sup>+</sup>	33.1
63 <sup>+</sup>	39.0
80 <sup>+</sup>	36.9
100	41.5
125	50.2
160	51.4
200	58.6
250	62.1
315	64.3
400	66.2
500	59.2
600	60.9
800	61.5
1000	60.8
1250	64.9
1600	65.1
2000	67.2
2500	≥ 66.8
3150	≥ 67.4
4000	≥ 67.0
5000	≥ 69.5
AAD	-31.7

Frequency range for rating in accordance with ISO 717-1



— Rating Curve (ISO 717-1) — Sound Reduction Index, R, in dB

$R_w = 64$  dB  
 $R_w + C = 63$  dB  
 $R_w + C_{tr} = 58$  dB

$C_{(50-3150)} = -2$  dB     $C_{tr(50-3150)} = -11$  dB  
 $C_{(50-5000)} = -2$  dB     $C_{tr(50-5000)} = -11$  dB  
 $C_{(100-5000)} = -1$  dB     $C_{tr(100-5000)} = -6$  dB



Martin Durham  
Technical Officer

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

The legal validity of this report can only be claimed on presentation of the complete report

Report for: Polyseam AS

Report Ref: BMT/MTZ/F13079/04

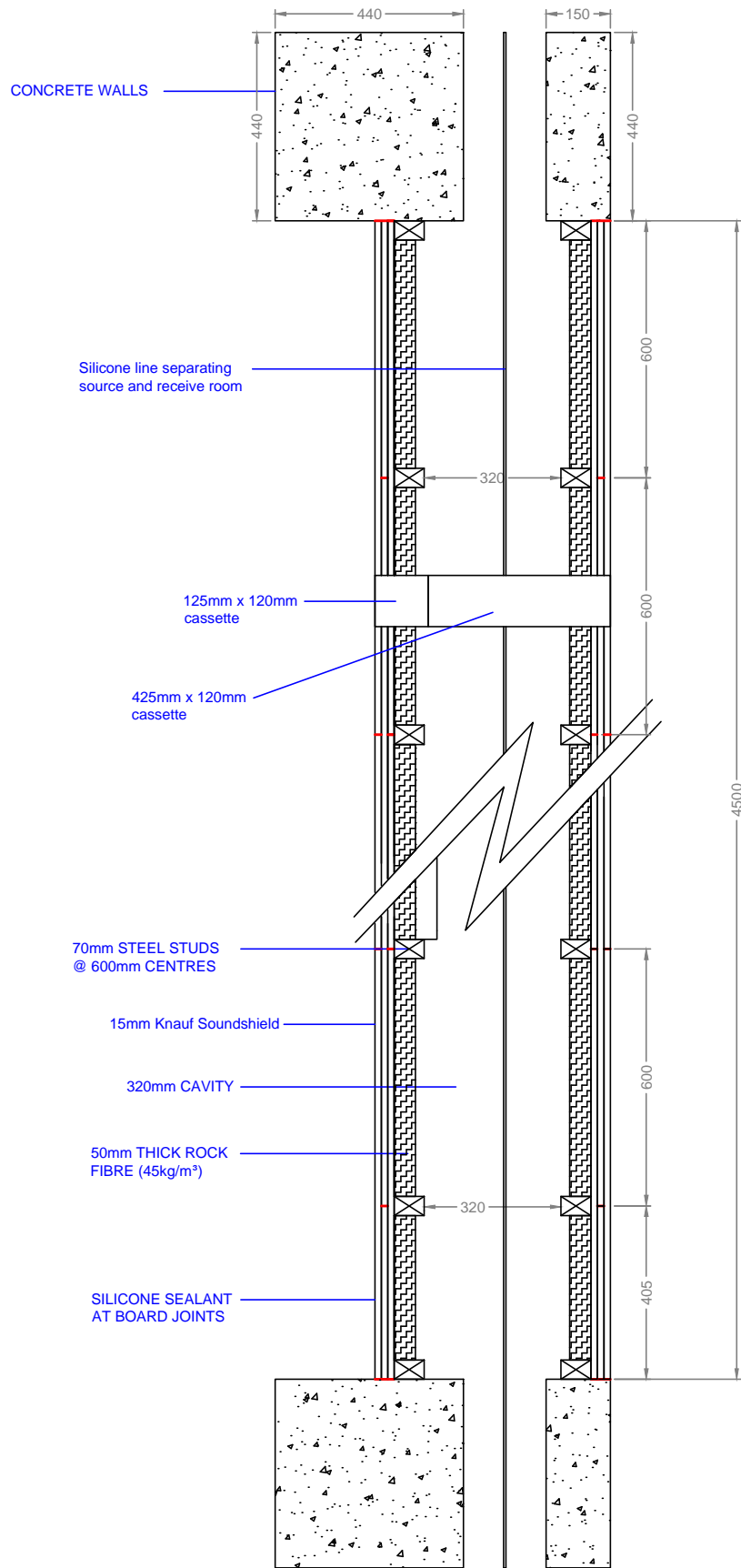
Page 8 of 9

## Appendix 2 – Drawings

### List of Drawings

<b>Figures</b>	<b>Drawing Reference</b>
<b>Figure 1</b>	Schematic drawing showing horizontal cross section of test wall
<b>Figure 2</b>	Schematic drawing showing source room section of test wall
<b>Figure 3</b>	Schematic drawing showing horizontal cross section of cassette
<b>Photograph A</b>	Photograph of Cassette A and Cassette B as separate units
<b>Photograph B</b>	Photograph of Cassette A and Cassette B fixed to form single specimen (as used in test)

*The legal validity of this report can only be claimed on presentation of the complete report.*



**BMTRADA**

Chiltern House, Stocking Lane, Hughenden Valley  
 High Wycombe, Buckinghamshire, HP14 4ND, UK.  
 Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Schematic drawing showing horizontal cross section of test wall

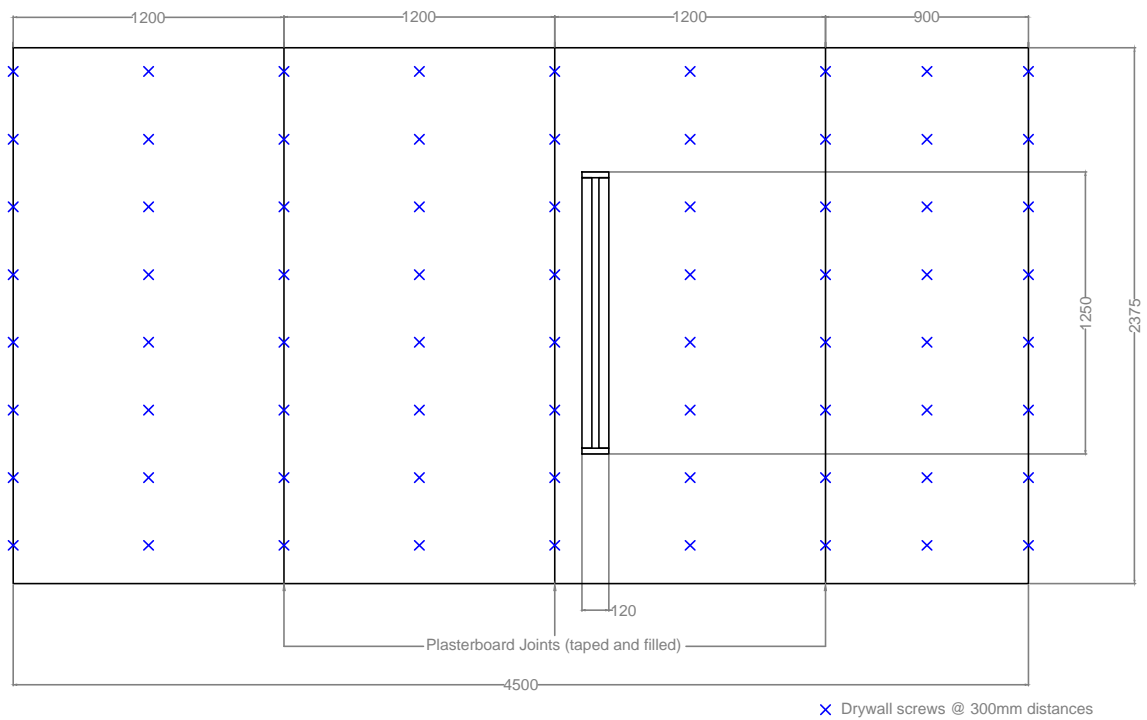
Date Drawn  
 14/02/2014

Drawn By  
 ATM

Scale Not to Scale  
 All dimensions in mm  
 unless otherwise stated

Project No.  
 BMT/MTZ/F13079/04

Appendix 2



**BMTRADA**

Chiltern House, Stocking Lane, Hughenden Valley  
 High Wycombe, Buckinghamshire, HP14 4ND, UK.  
 Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Schematic drawing showing source room section of test wall

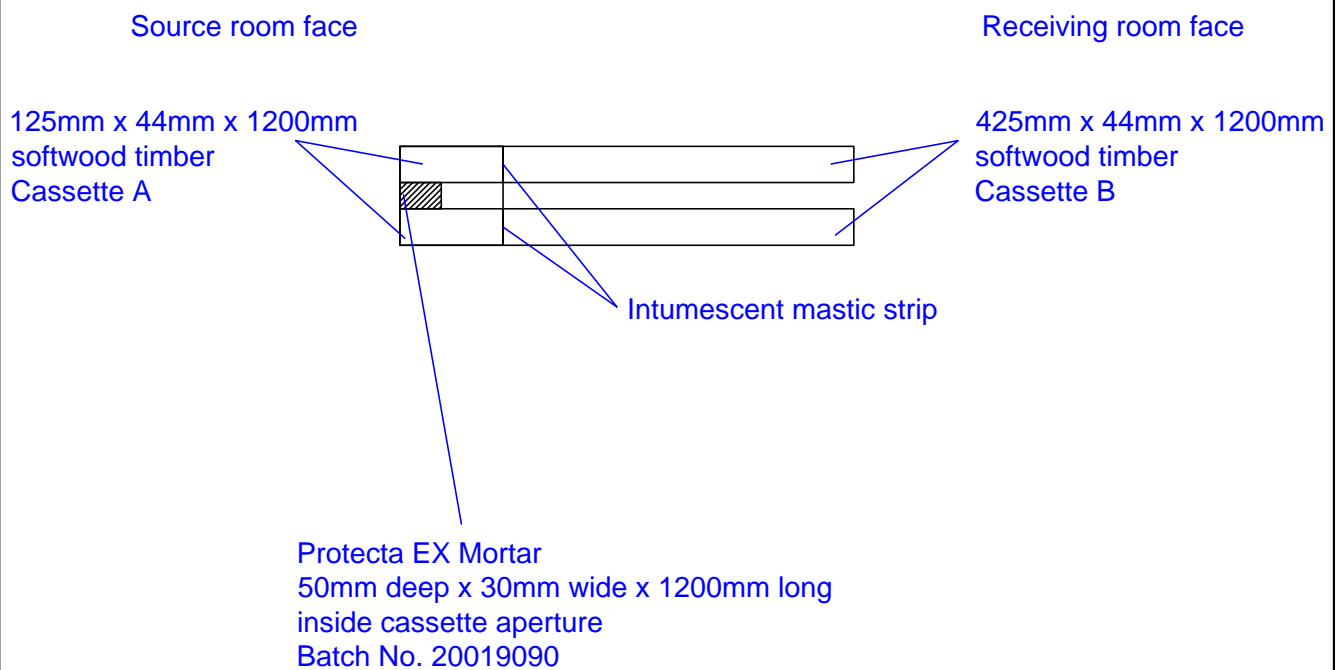
Date Drawn  
 14/02/2014

Drawn By  
 ATM

Scale Not to Scale  
 All dimensions in mm  
 unless otherwise stated

Project No.  
 BMT/MTZ/F13079/04

Appendix 2



**BMTRADA**

Chiltern House, Stocking Lane, Hughenden Valley  
High Wycombe, Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Schematic drawing showing horizontal cross section of cassette

Date Drawn  
27/02/2014

Drawn By  
ATM

Scale Not to Scale  
All dimensions in mm  
unless otherwise stated

Project No.  
BMT/MTZ/F13079/04

Appendix 2



Photograph A



**Photograph B**



**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.



[testing@bmtrada.com](mailto:testing@bmtrada.com)



[bmtradagroup.com](http://bmtradagroup.com)



**+44 (0) 1494 569800**