

ACOUSTIC PERFORMANCE AND STC RATING OF A PARTITION WALL WITH INSERT OF PROTECTA FR BOARD

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
15 St Andrews Road
Huddersfield
West Yorkshire
HD1 6SB
UK

Date: 1st October 2018

Report prepared by:

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Acoustics Testing Service
The University of Auckland



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a Partition Wall with insert of Protecta FR
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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/F13079/03) 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 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 exceeding 55 dB containing an insert of "Protecta FR Board 50mm 2-S". 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/F13079/03 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/F13079/03 was used to calculate an **STC rating of 55 dB** using the calculation method described in ASTM E413-16.

In my opinion, an identical test undertaken using an insert of "Protecta FR Board 60mm 2-S" instead of "Protecta FR Board 50mm 2-S" would produce an **STC rating of at least 55 dB**.

Acoustic Test

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

CONFIDENTIAL

Report: BMT/MTZ/F13079/03

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

Issue date: April 2014

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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

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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 FR Board 50mm 2-S inside a timber cassette. The overall cassette dimensions were 120mm wide x 1250mm high x 545mm deep and the seal dimensions were 50mm 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

Product Name	Protecta FR Board 50mm 2-S
Product Type	Ablative coated mineral rock fibre board
Product Dimensions	50mm deep x 30mm wide x 1200mm long
Product Density	160kg/m ³
Test Aperture (each face)	120mm wide x 1250mm high
Cassette Material Type	Softwood timber members fixed to MDF end caps. These were fixed with 8No. 5 x 60 woodscrews on each face.
Overall Dimensions (Cassette)	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.
Cassettes Density	400-600 kg/m ^{3**}

** Nominal density not tested by laboratory

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:

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

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_w 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})

MTL/Z13079/03/P007	Twin partition wall Protecta FR Board 50mm 2-S, 160kg/m ³ inside cassette. 50mm deep x 30mm wide x 1200mm long. Batch No. PRO065, BN - 15343	55 (-1;-1) 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 ± 0.01 Mbar (± 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

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

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

Appendix 1 - Test Data

MTL/Z13079/03/P007	Twin partition wall Protecta FR Board 50mm 2-S, 160kg/m ³ inside cassette. 50mm deep x 30mm wide x 1200mm long. Batch No. PRO065, BN - 15343
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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 FR Board 50mm 2-S, 160kg/m³ inside cassette. 50mm deep x 30mm wide x 1200mm long. Batch No. PRO065, BN - 15343

Ref. No.: MTL/Z13079/03/P007

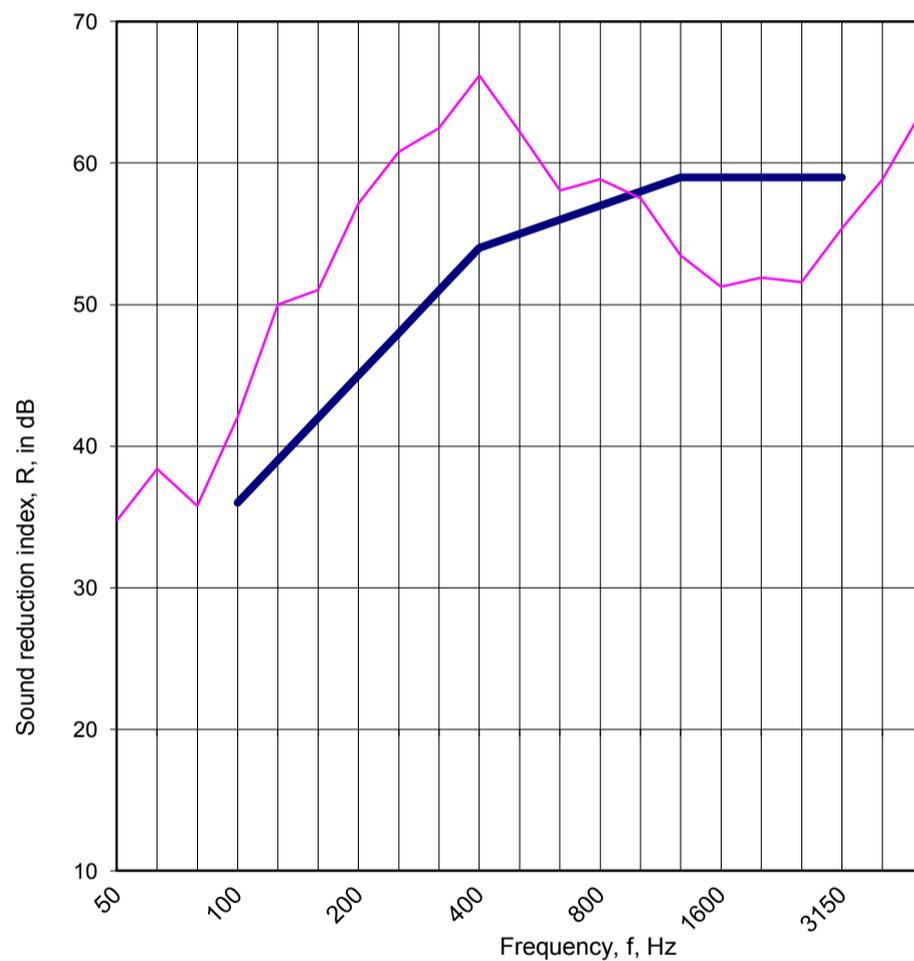
Date of Test: 04/02/2014

Source Room Volume: 86.00 m³

Receive Room Volume: 63.00 m³

f, Hz	R, dB
50 ⁺	34.7
63 ⁺	38.4
80 ⁺	35.8
100	42.0
125	50.0
160	51.0
200	57.2
250	60.8
315	62.5
400	66.2
500	62.2
600	58.1
800	58.8
1000	57.5
1250	53.5
1600	51.3
2000	51.9
2500	51.6
3150	55.4
4000	58.8
5000	≥ 63.7
AAD	-31.9

↑
Frequency range for rating in accordance with ISO 717-1
↓



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

$R_w = 55$ dB
 $R_w + C = 54$ dB
 $R_w + C_{tr} = 54$ dB

$C_{(50-3150)} = -1$ dB $C_{tr(50-3150)} = -4$ dB
 $C_{(50-5000)} = 0$ dB $C_{tr(50-5000)} = -4$ dB
 $C_{(100-5000)} = 0$ dB $C_{tr(100-5000)} = -1$ dB



Martin Durham
Technical Officer

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

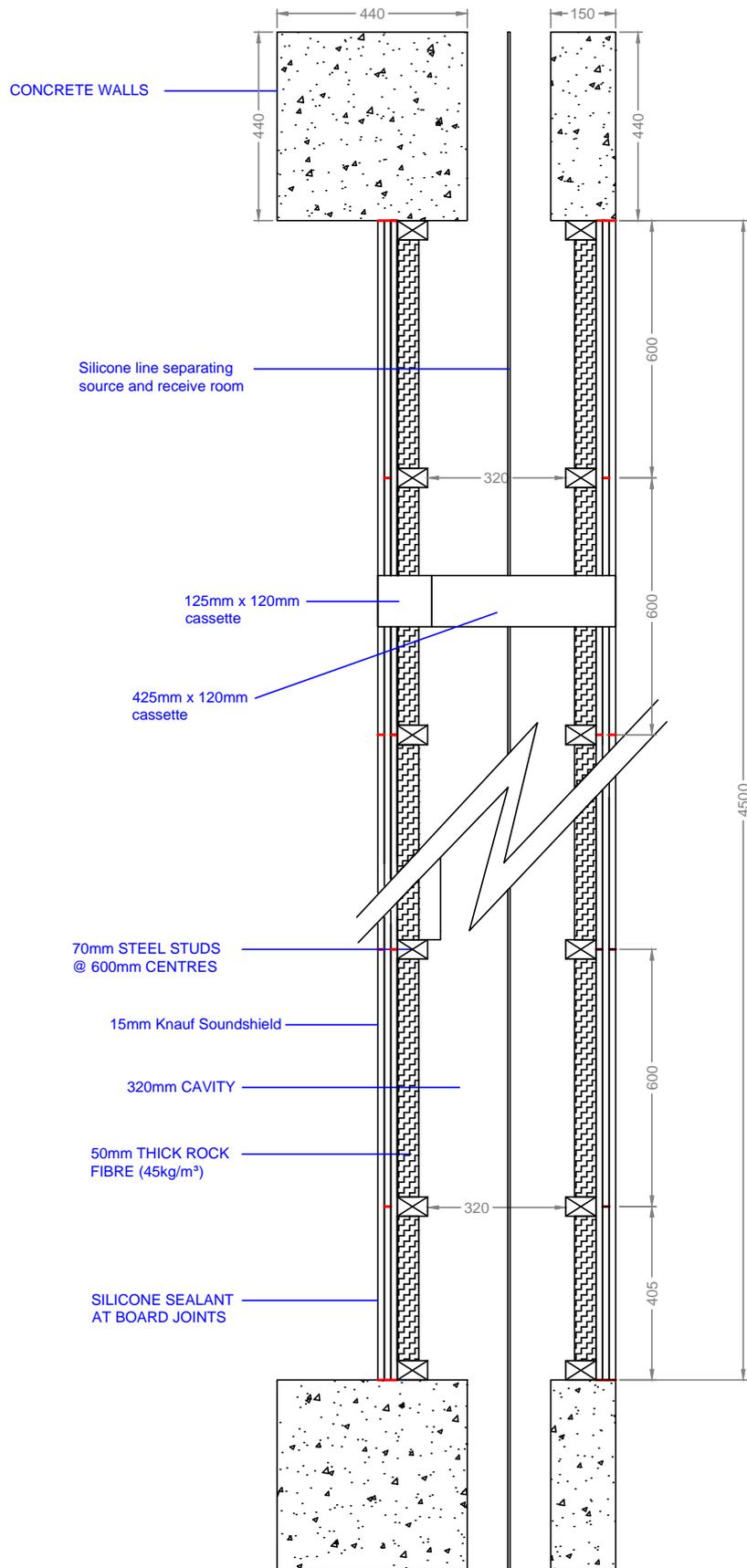
The legal validity of this report can only be claimed on presentation of the complete report

Appendix 2 – Drawings and Photographs (5 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 3	Schematic drawing showing horizontal cross section of cassette
Photograph A	Photograph of Cassette A and Cassette B as separate units
Photograph B	Photograph of Cassette A and Cassette B fixed to form single specimen (as used in test)

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BMTRADA

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Schematic drawing showing horizontal cross section of test wall

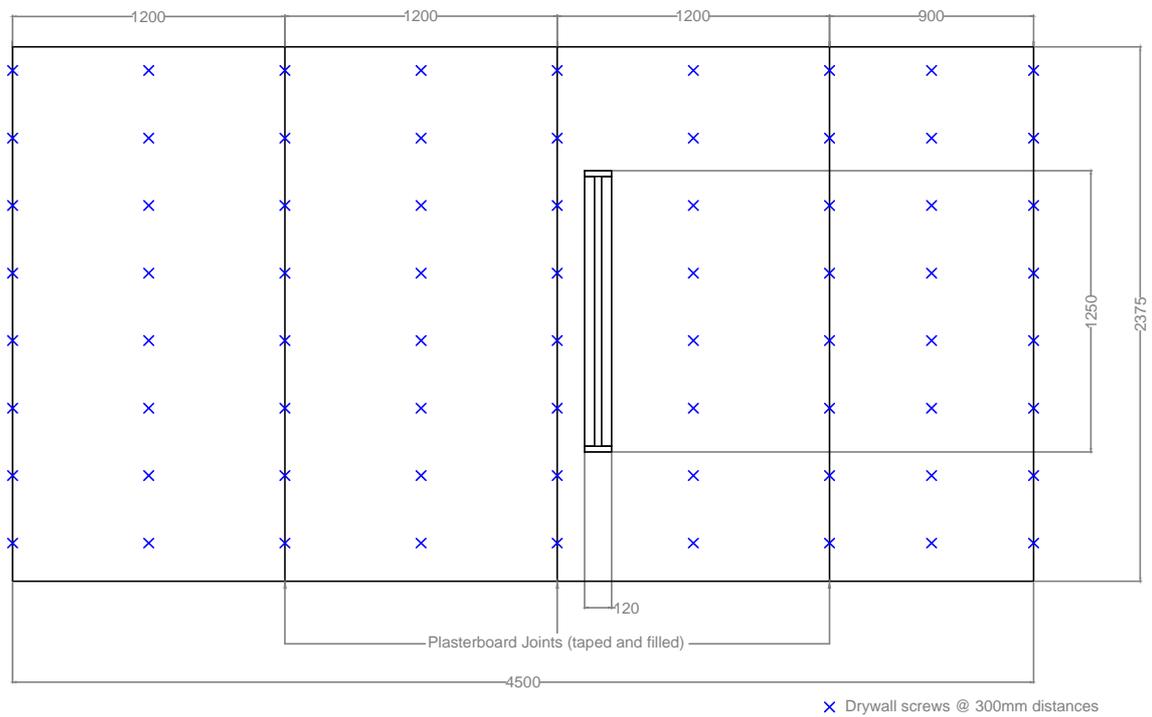
Date Drawn
 14/02/2014

Drawn By
 ATM

Scale Not to Scale
 All dimensions in mm
 unless otherwise stated

Project No.
 BMT/MTZ/F13079/03

Appendix 2



BMTRADA

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Schematic drawing showing source room section of test wall

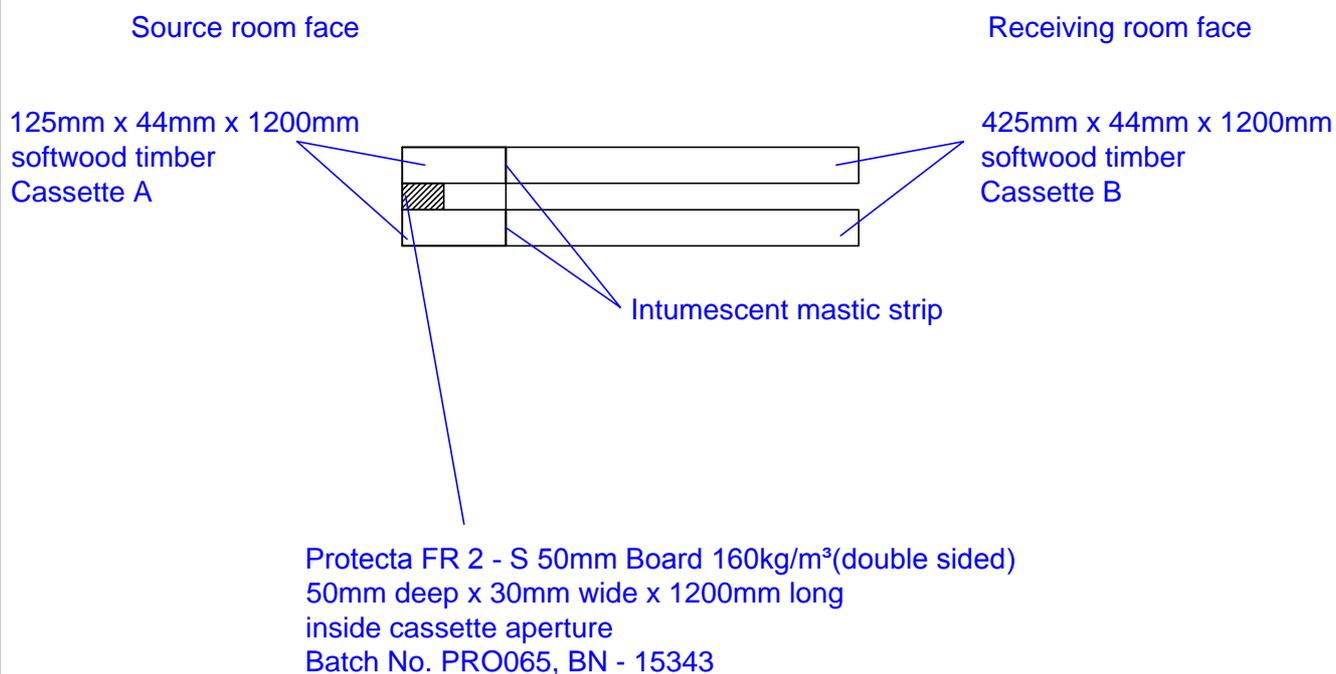
Date Drawn
 14/02/2014

Drawn By
 ATM

Scale Not to Scale
 All dimensions in mm
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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/F13079/03

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.



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