

# Fire Resistance Testing

CONFIDENTIAL

Report: Chilt/RF02093 AR1 Revision B

A fire resistance test performed on a floor section fitted with EXTON TNF fire acoustic system

Test conducted in accordance with BS 476 : Part 22 : 1987

Test date: 2 September 2002

Prepared for:  
Exton Construction  
Supplies Ltd  
Unit 2, Solent Industrial  
Estate  
Shamblehurst Lane  
Hedge End  
Southampton  
SO30 2FX

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This test report was originally issued on 22nd September 2004. Since this date, there have been no changes to the test standard BS 476: Part 22: 1987, which would invalidate the test result.

The details of the sponsor of test report Chilt/RF02093 Revision B are held on file by BM TRADA. This report is additional to that issued as Chilt/RF02093 Revision B and dated 11 November 2013 and the original report shall remain valid and is not replaced by the additional report.

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.

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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## 1 Introduction

BM TRADA constructed the floor from the specified materials and installed the floor on to the furnace. The test sponsor then installed EXTON TNF fire and acoustic system 70mm thick one side coated stone fibre slab between the joists.

## 2 Specification

Details of the specimen are shown in Figures 1 to 4.

### 2.1 Floor

The test specimen comprised a 3290mm wide x 2250mm long ceiling/floor section constructed using C16 Grade 6" x 2" softwood joists with 6 joists at 450mm centres (see Figure 1). The ends of each joist were tosh-nailed (toe-nailed) to 100mm wide x 38mm thick softwood wall plates using 2No 75mm long galvanised nails. A C16 Grade 6" x 2" rimboard was fixed using 75mm galvanised nails across the ends of the joists.

The test sponsor friction fitted EXTON TNF fire and acoustic system 70mm thick one side coated stone fibre slab (74mm thick measured by test engineer) between the joists, flush with their lower surface (see Figure 3). The upper face of the slabs was sealed to the joist using a bead of Firetherm acrylic-based intumescent mastic.

The upper surface of the specimen was clad with 18mm thick tongue and groove flooring grade chipboard secured using 50mm long countersunk steel wood screws at nominally 150mm centres across the joists. The chipboard sheets measured 2250mm long x 1200mm wide.

The exposed surface of the specimen was clad with 12mm thick WBP hardwood ply fixed across the joists using 40mm long steel screws at 300mm centres. The plywood sheets measured 2250mm long x 1200mm wide (see Figure 2).

All joints in the plywood sheets were taped using British Gypsum jointing tape and then filled using British Gypsum jointing compound, which was further used to spot all screw heads.

The wall plates were protected using 12.5mm thick Gyproc Fireline board architrave, fixed to the wall plate using 40mm long galvanised nails at 150mm centres.

Any gaps between the edge of the specimen and the supporting construction were filled with Rockwool mineral fibre (nominal density 40kgm<sup>-3</sup>).

The total floor area exposed to the furnace was 3090mm wide x 2250mm long (6.95m<sup>2</sup>).

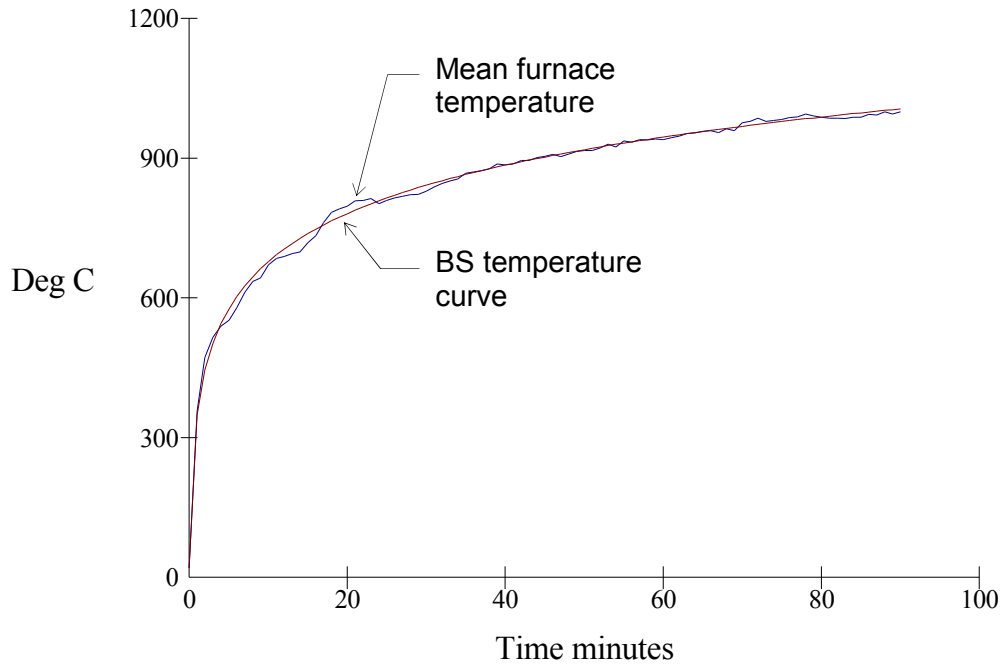
### **3 Test conditions**

- 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 17°C.
- 3.3 After the first 5 minutes of the test, the furnace pressure was maintained at  $0 \pm 2$  Pa with respect to atmosphere, at a point 1m from the notional floor level.
- 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 six thermocouples suitably distributed within the furnace. The temperatures recorded are shown graphically in Section 4.1.
- 3.5 The temperature of the unexposed face was monitored by means of five thermocouples fixed to the unexposed face of the floor decking. Further thermocouples were fitted inside the floor cavity to monitor the temperatures of the separate elements and of the cavity. The thermocouple positions are shown in Figure 5. The average temperature and maximum temperature of the unexposed face are shown graphically in Section 4.2. The temperatures recorded from the internal thermocouples are shown in Section 4.3.

## 4 Test results

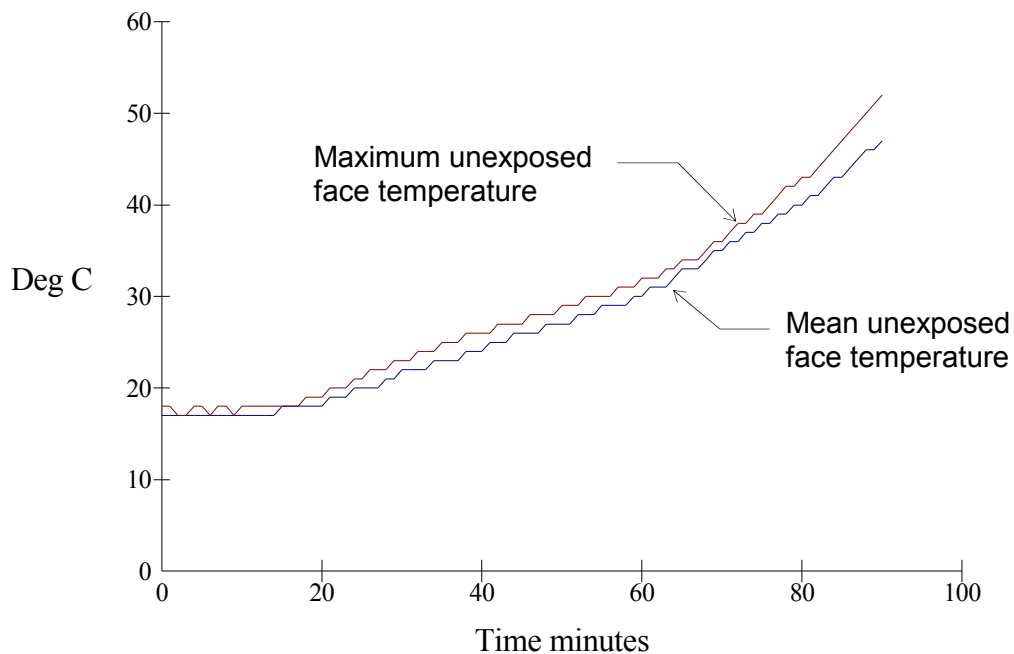
The following data and observations were recorded during the test.

### 4.1 Furnace temperature curve



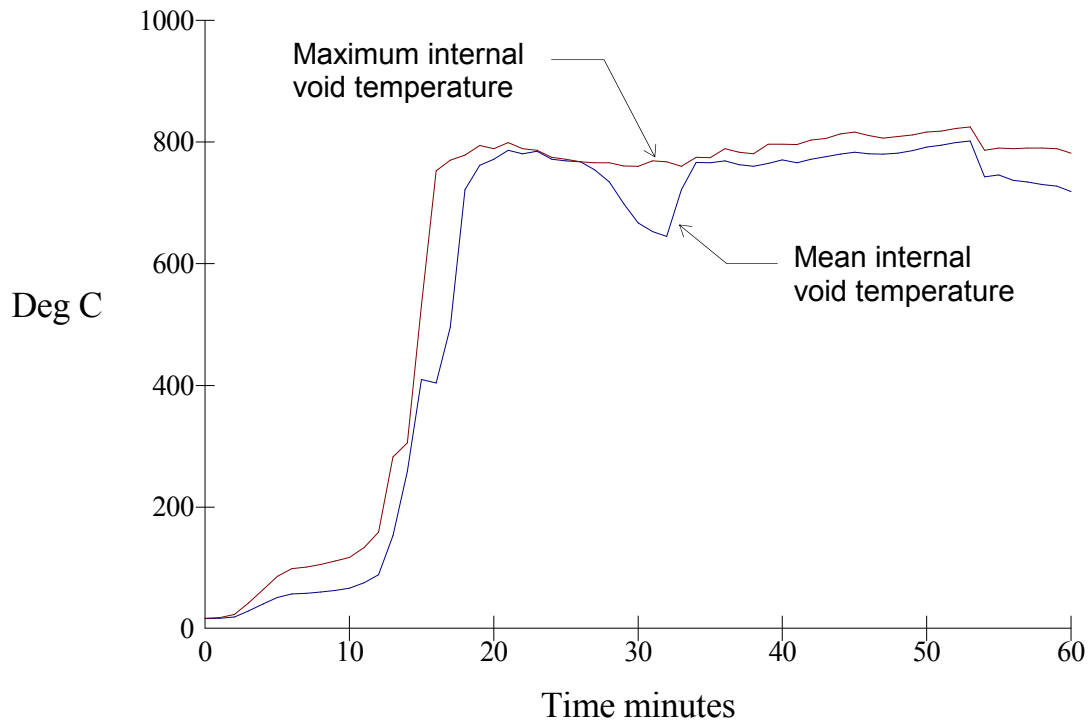
### 4.2 Unexposed face temperature curves

#### Unexposed face



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

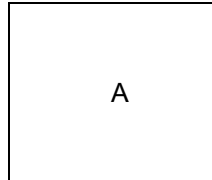
Internal void temperature



### 4.3 Floor distortion data

A positive measurement indicates the floor distorting in towards the furnace.

#### Floor distortion



#### Floor section

Distortion measurements were recorded throughout the test at one point every 15 minute.

Time	A
15	2
30	1
45	2
60	3
75	4



#### 4.4 Observations

All comments relate to the unexposed face unless otherwise specified.

Time (minutes)	Comments
00.00	Test started.
02.26	There is smoke issuing from the floor section.
03.29	The plywood ceiling is starting to discolour.
04.01	The entire ceiling has discoloured black.
05.02	There is an increase in the level of smoke issuing from the specimen, from between the tongue and groove and joists.
07.24	There is an increase in the level of smoke issuing.
15.24	There is an increase in the level of smoke issuing.
16.12	A large section of plywood has dropped from the ceiling.
17.30	Plywood is dropping but the void is still not visible.
20.41	The joists and battens are totally exposed to the fire.
26.56	There are fissures across the entire length of the joist.
35.27	Smoke continues to issue.
40.22	There is an increase in the level of shrinkage of the battens and fissures on the joists, the gaps are approximately 5mm in width.
49.22	There is an increase in the level of smoke issuing.
65.35	There is a glow visible at the back of the furnace along the joints, approximately 30mm into the joists.
66.00	The joists are continuing to shrink back and are approximately 8mm behind the battens and the fissures are approximately 6mm in size.
70.24	There is an increase in the level of smoke issuing from around the perimeter of the floor.
88.03	The joists continue to shrink, they have shrunk back by approximately 10mm.
90.00	Test terminated at the request of the client.

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**4.5 Times to failure**

When tested in accordance with BS 476: Part 22: 1987 Method 9 of determination of fire resistance of ceiling membranes, the requirements of the standard were satisfied for the following periods:


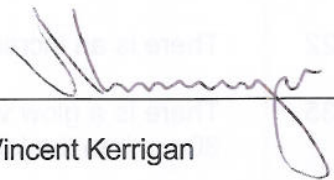
Integrity	90 (ninety) minutes*
Insulation	90 (ninety) minutes*

\* The test was terminated at the request of the client, no failure was recorded.

**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. BM TRADA 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.

	Written by:	Checked by:
<b>Signature:</b>		
<b>Name:</b>	Robert Axe	Vincent Kerrigan
<b>Title:</b>	Lead Technical Officer - Fire Resistance	Technical Manager
<b>Date of issue:</b>	14-11-2013	14-11-2013

Revision A – May 2008 – Revalidation of test report  
 Revision B – November 2013 – Revalidation of test report

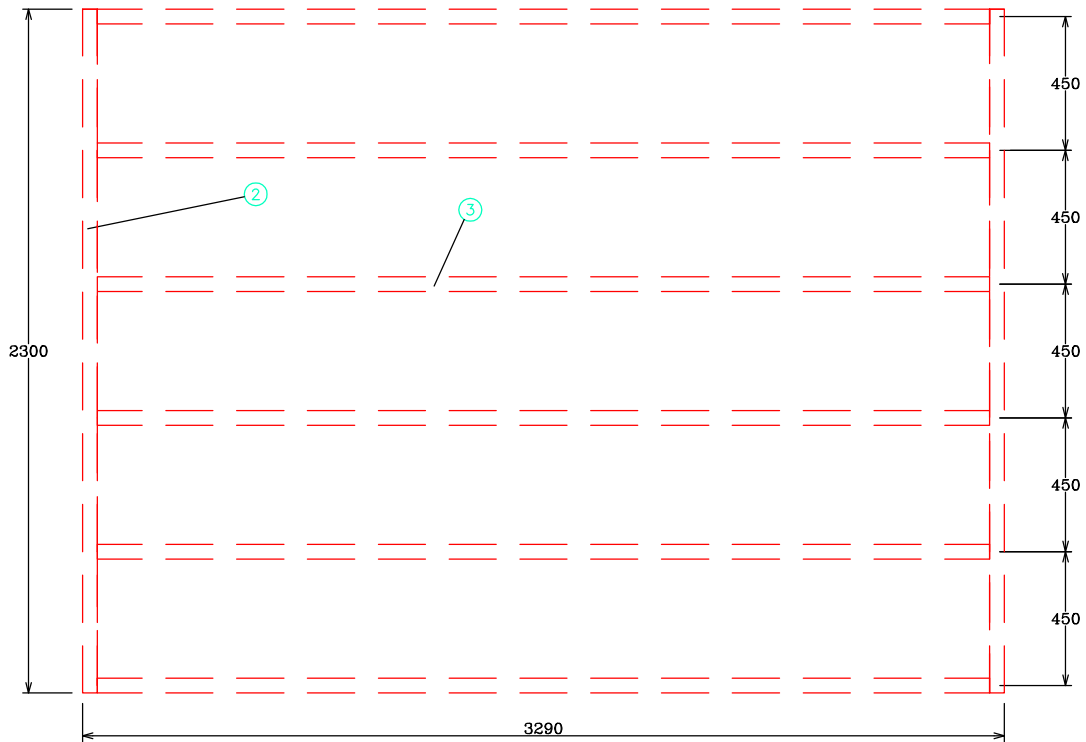
*The legal validity of this report can only be claimed on presentation of the complete report. .*

**Appendix 1 (figures 1 – 4) and Key to Figures**

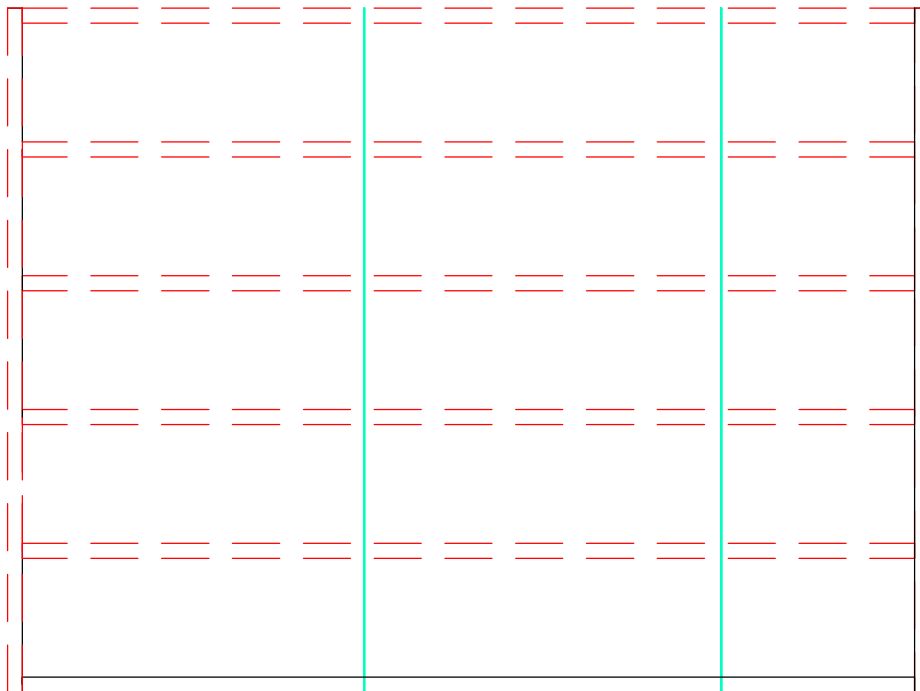
(all dimension of Figures in mm)

1. C16 Grade 6" x 2" joists
2. 100 wide x 38 thick softwood wall plate
3. C16 Grade 6" x 2" rimboard
4. 12 thick WBP hardwood ply
5. 40 long steel screws
6. 18 thick tongue and groove flooring grade chipboard
7. 50 long countersunk steel wood screws
8. EXTON EX240 acrylic-based intumescent mastic
9. EXTON TNF fire and acoustic system

### Joist layout of floor



### Top board layout



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Title Unexposed face elevation showing  
joist and top board positions  
(All dimensions in mm)

Date Drawn  
01/10/02

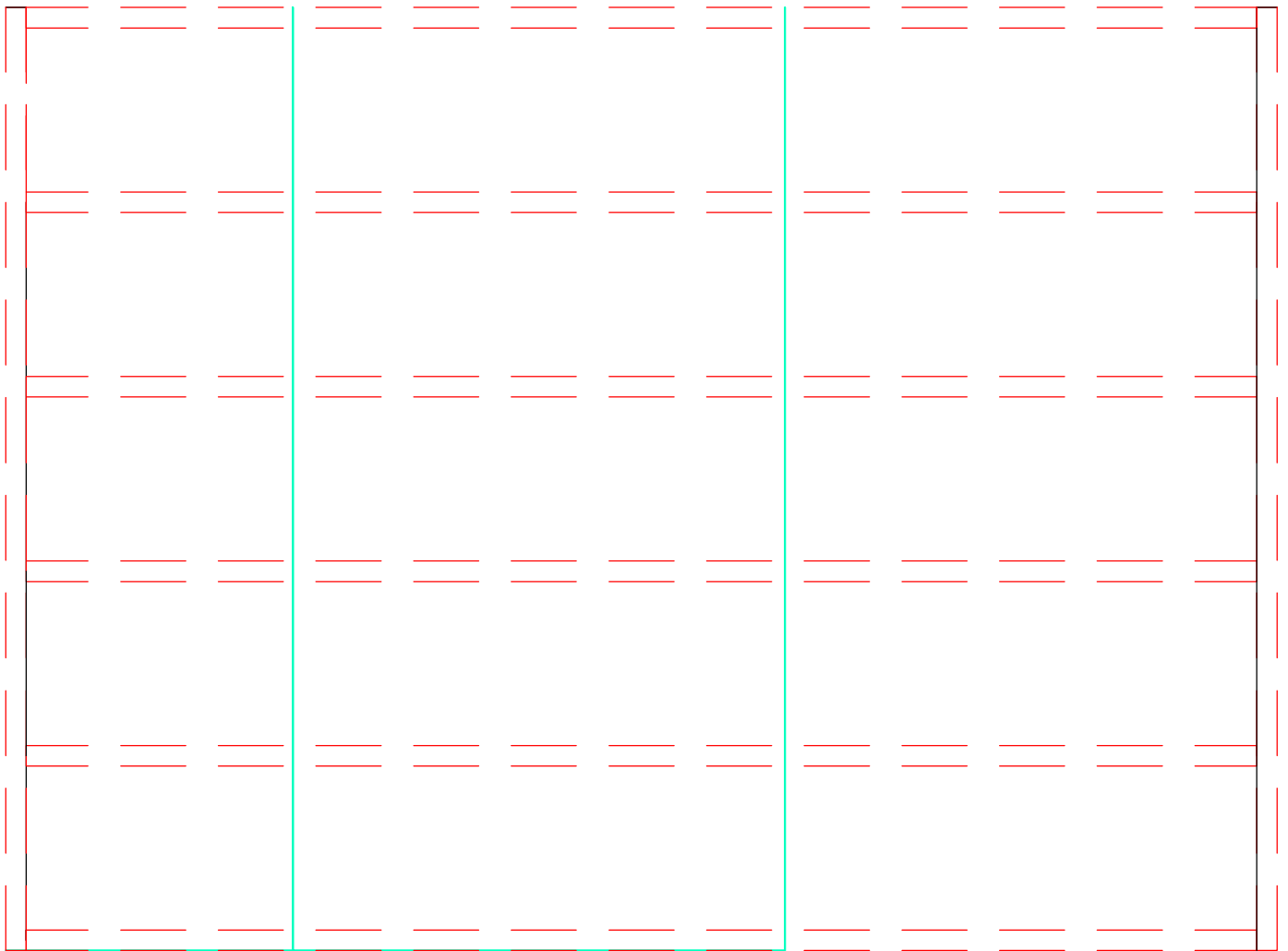
Drawn By  
PJJ

Scale  
NTS

Project No.  
Chilt/RF02093 AR1 Rev B

Appendix 1

# Bottom board layout



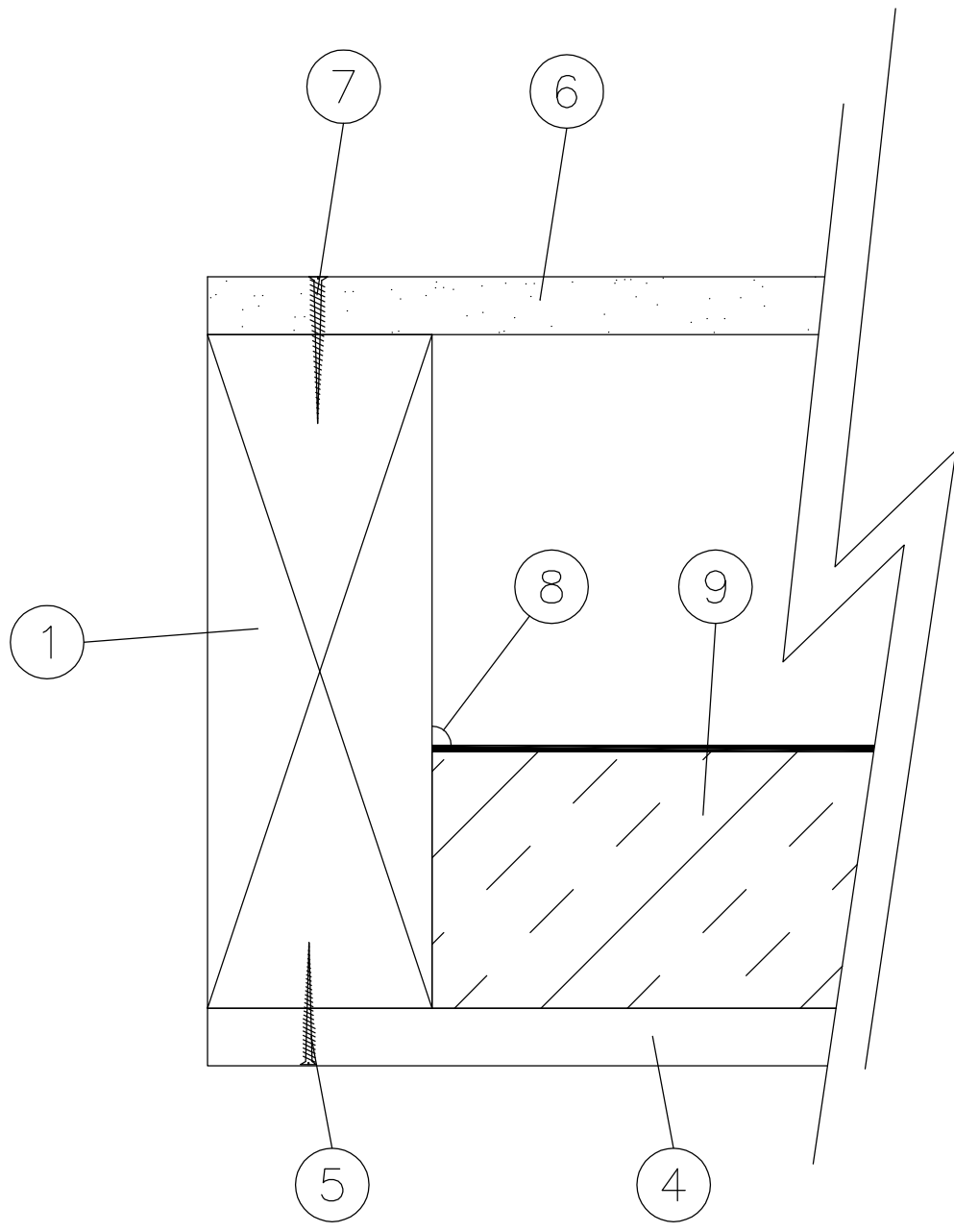
# BMTRADA

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Title Unexposed face elevation showing bottom board positions (All dimensions in mm)

Date Drawn 01/10/02	Drawn By PJJ	Scale NTS
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Project No. Chilt/RF02093 AR1 Rev B	Appendix 1
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Title

Cross section showing  
TNF slab installation

Date Drawn

02/10/02

Drawn By

JJO

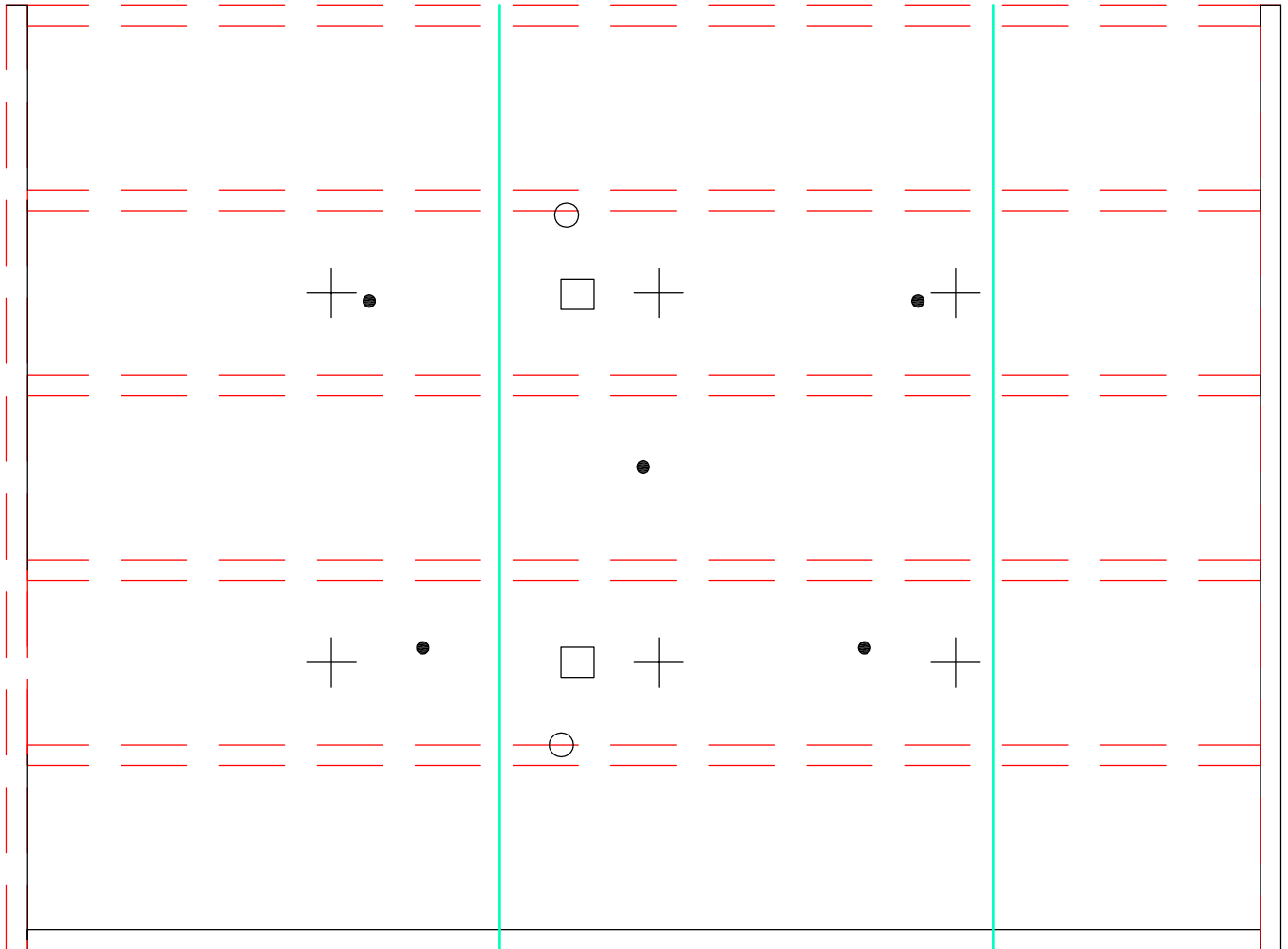
Scale

NTS

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Appendix 1



- ✚ : Furnace Thermocouples
- : Unexposed Face Thermocouples
- : Void Thermocouples
- : Thermocouples on joists

Viewed From Unexposed Face

**BMTRADA**

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Title Unexposed face elevation showing  
 thermocouple locations  
 (All dimensions in mm)

Date Drawn 01/10/02	Drawn By PJJ	Scale NTS
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Project No. Chilt/RF02093 AR1 Rev B	Appendix 1
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