Ad-hoc fire resistance test adopting procedures and criteria from B.S. 476 : Part 20 : 1987 on a plasterboard ceiling incorporating a Fire Proofing Services Ltd. access panel.

Prepared for:
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Protecting People, Property and the Planet

Ad-hoc fire resistance test on a Fire Proofing Services Ltd. access panel in a plasterboard ceiling.

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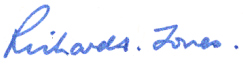
Signature 

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SUMMARY

An Ad-hoc fire resistance test adopting procedures and criteria from B.S. 476 : Part 20 : 1987 was carried out on 3rd June 2008 on a Fire Proofing Services Ltd. access panel, mounted in a plasterboard ceiling membrane. The ceiling (1.5m x 1.5 m) was constructed from a timber joist framework with two layers of Lafarge Firecheck plasterboard fixed on the underside, The access panel was installed in a structural opening, nominally 1745mm x 535mm near the centre of the ceiling, opening towards the furnace.

There was no failure of the adopted criteria for integrity throughout the 65 minute duration of the test.

This report covers a test which was conducted to a procedure which is not the subject of any British Standard specification, but the test utilised the general principles of fire resistance testing given in B.S. 476 : Part 20 : 1987. Since fire tests are the subject of a continuing Standardisation process, and because existing standards are the subject of review and possible amendment and new interpretations, it is recommended that the report be referred back to the test laboratory after a period of five years to ensure that the methodology adopted and the results obtained remain valid in the light of the situation prevailing at that time.

The test was not conducted under the requirements of UKAS accreditation.

1 OBJECTIVE

To determine, at the request of Fire Proofing Services Ltd., the performance of a single-leaf Fire Proofing Services Ltd. access panel, mounted in a timber joist / plasterboard ceiling membrane, when tested following procedures and criteria from B.S. 476 : Part 20 : 1987.

2 TEST CONSTRUCTION

2.1 General

The ceiling membrane was constructed independently of any supporting test frame, with the access panel mounted in a structural opening near the centre of the ceiling, opening towards the furnace.

The construction is shown in the attached Figures and Photographs.

2.2 Ceiling membrane

The ceiling membrane was constructed from a timber framework and two layers of 12.5mm-thick Lafarge Firecheck Plasterboard. The timbers were 145mm deep x 45mm wide, and formed an outer perimeter square, nominally 1.7m x 1.7m. Two 1.7m long timbers were located within this outer frame, with further shorter timbers located perpendicularly to form a grid and opening for the access panel, as shown in the Photographs. The opening for the access panel was lined with one layer of 12.5mm Firecheck plasterboard, to leave a final structural opening of 745mm x 535mm and the bottom of the timber framework was clad with two layers of 12.5mm Firecheck plasterboard.

All timbers were joined together using two 3-inch nails per joint, and the plasterboard layers were screwed to the timber using drywall screws at nominally 300mm centres.

Joints between boards on the exposed face were sealed with jointing compound and paper tape.

2.3 Access Panel

The access panel was delivered as a complete unit, and was fitted into the aperture in the ceiling. The following description was provided by the sponsor, and verified by BRE where possible.

The access panel consisted of a perimeter frame, providing a clear opening of 676mm x 466mm, which was closed via a single door leaf. The perimeter frame was made from 1.2mm thick Zintec steel which had been polyester powder coated to RAL 9010, 20% gloss. The frame was fitted into the ceiling from below and had a 25mm wide beaded front flange which was mitred in each corner and overlapped the plasterboard ceiling membrane by approximately 25mm. The frame was fixed into position via screws passing through the fame into the timber bracing. The gap between the access panel frame and the plasterboard surround of the structural opening was filled with Rockwool RW3, sealed into position using Sealocrete white fire resistant mastic.

The door leaf consisted of a 0.9mm thick folded Zintec steel tray and 0.9mm thick Zintec sheet steel backing plate, both polyester powder coated RAL 9010, 20% gloss. The backing plate was pop riveted to the door tray, and stated to be internally stiffened via a bracing channel. The door leaf was hung via a continuous hinge that was welded to the door tray and bolted to the frame using M6 bolts and washers. The leaf was fitted with one “Southco” push to close latch, as detailed in the figures. The latch could be operated from either side using a steel cord to operate the latch from the back of the leaf.

The 75mm-thick access panel leaf was stated to be filled with 50mm-thick Rockwool RW3 insulation.

Three 6mm x 8mm polyurethane open cell foam smoke seals, were used between the door leaf and frame, as shown in the figures.

3 TEST PROCEDURE

3.1 General

The test was carried out on the 3rd June 2008 following procedures and criteria from B.S. 476 : Part 20 : 1987 and was witnessed by Mr T Beasley representing the sponsor.

The ambient temperature at the start of the test was 16^{O}C.

3.2 Furnace control

The furnace temperature was measured using four bare-wire chromel/alumel thermocouples, with their measuring junctions 100mm below the exposed face of the ceiling. The furnace was controlled so that the mean of these thermocouple readings followed the time/temperature relationship of B.S. 476 : Part 20 : 1987.

A pressure-sensing head was located in the furnace 100mm below the ceiling. The pressure conditions within the furnace were maintained as closely as possible to 18Pa above the laboratory.

3.3 Temperature measurements on specimen

Although no assessment of insulation performance was required by the sponsor, the temperatures of the unexposed face of the access panel were measured (for information) using five chromel / alumal thermocouples fixed to the surface and covered with an insulating pad. The location of the thermocouples is described in the following table.

Location of surface thermocouples.

Thermocouple	Location
1	On the frame of the access panel, adjacent to the latch.
2	On the access panel leaf, adjacent to the latch.
3	In the centre of the access panel leaf.
4	On the access panel frame, mid way along one edge.
5	On the access panel leaf, near a hinged corner.

4 RESULTS

Observations made during the test are given in the following table. Unless otherwise stated observations are from the unexposed face.

Observations

Time Minutes	Observation
0	Start test.
3½	Some smoke is coming from the access panel leaf / frame interface.
6½	Some slight distortion of the leaf has occurred, resulting in a distortion towards the furnace of approximately 2mm to 3mm at mid span of the leaf.
23	Parts of the access panel frame, and perimeter edges of the leaf are darkening and turning black in colour as they heat up.
30	All plasterboard on the ceiling is intact inside the furnace.
42	No significant visible changes.
54	A red glow is visible between the plasterboard and the timber of the ceiling construction, but the location is remote from the access panel.
58	A piece of the first layer of plasterboard is starting to bend away from the ceiling on the exposed face.
59	The plasterboard ceiling is darkening in colour on the unexposed face.

Time Minutes	Observation
61	The surface coating on the hinged edge of the access panel, and the frame at this edge have charred to a white ash.
64	The supporting construction failed to satisfy the adopted integrity criteria for integrity, as some of the timbers caught fire. This occurred remotely from the access panel.
65	Test stopped.

Although the supporting construction failed to satisfy the adopted integrity criteria after 64 minutes, there was no failure of the access panel, (or the supporting construction in the close vicinity of the access panel) throughout the 65 minute duration of the test.

The access panel is shown after 60 minutes of the test in the attached photographs.

4.1 Furnace temperature

The mean furnace temperature, together with the specified curve for comparison is given in the attached graphs.

4.2 Surface temperatures

Temperatures recorded on the unexposed face of the access panel are given in the attached graphs.

5 PERFORMANCE CRITERIA

The criteria for integrity adopted from B.S. 476 : Part 20 : 1987 used to assess the performance of the access panel were as follows:

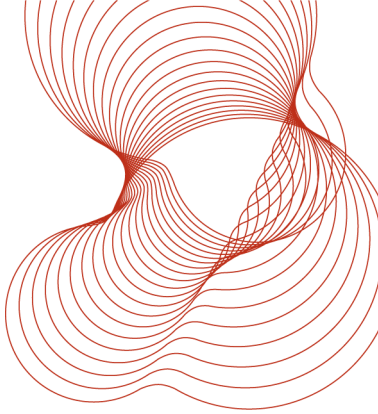
Integrity : Failure is deemed to occur:

a) when collapse or sustained flaming for not less than 10s on the unexposed face occurs;

b) when cracks, gaps or fissures allow flames or hot gases to cause flaming or glowing of a cotton fibre pad;

c) when a 6mm-diameter gap gauge can penetrate through a gap into the furnace, other than at sill level in doorsets, and be moved in the gap for a distance of at least 150mm;

d) a 25mm-diameter gap gauge can penetrate through a gap into the furnace.



6 CONCLUSION

A timber joist / plasterboard ceiling incorporating a single-leaf Fire Proofing Services Ltd. access panel installed in the centre, as described in this report, was tested using procedures and criteria from British Standard 476 : Part 20 : 1987.

There was no failure of the adopted integrity criteria on or adjacent to the access panel throughout the 65 minute duration of the test.

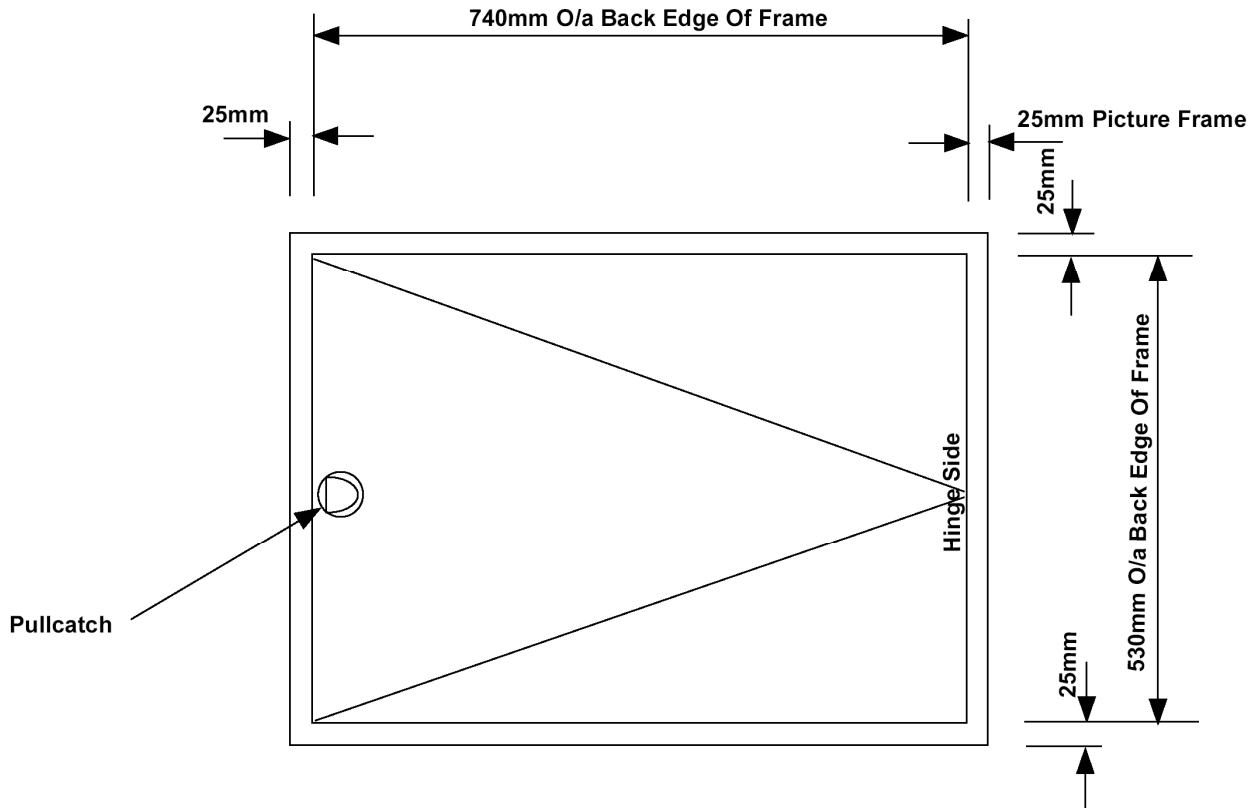
The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. The laboratory that issued the report 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.

The results only relate to the behaviour of the specimen 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.

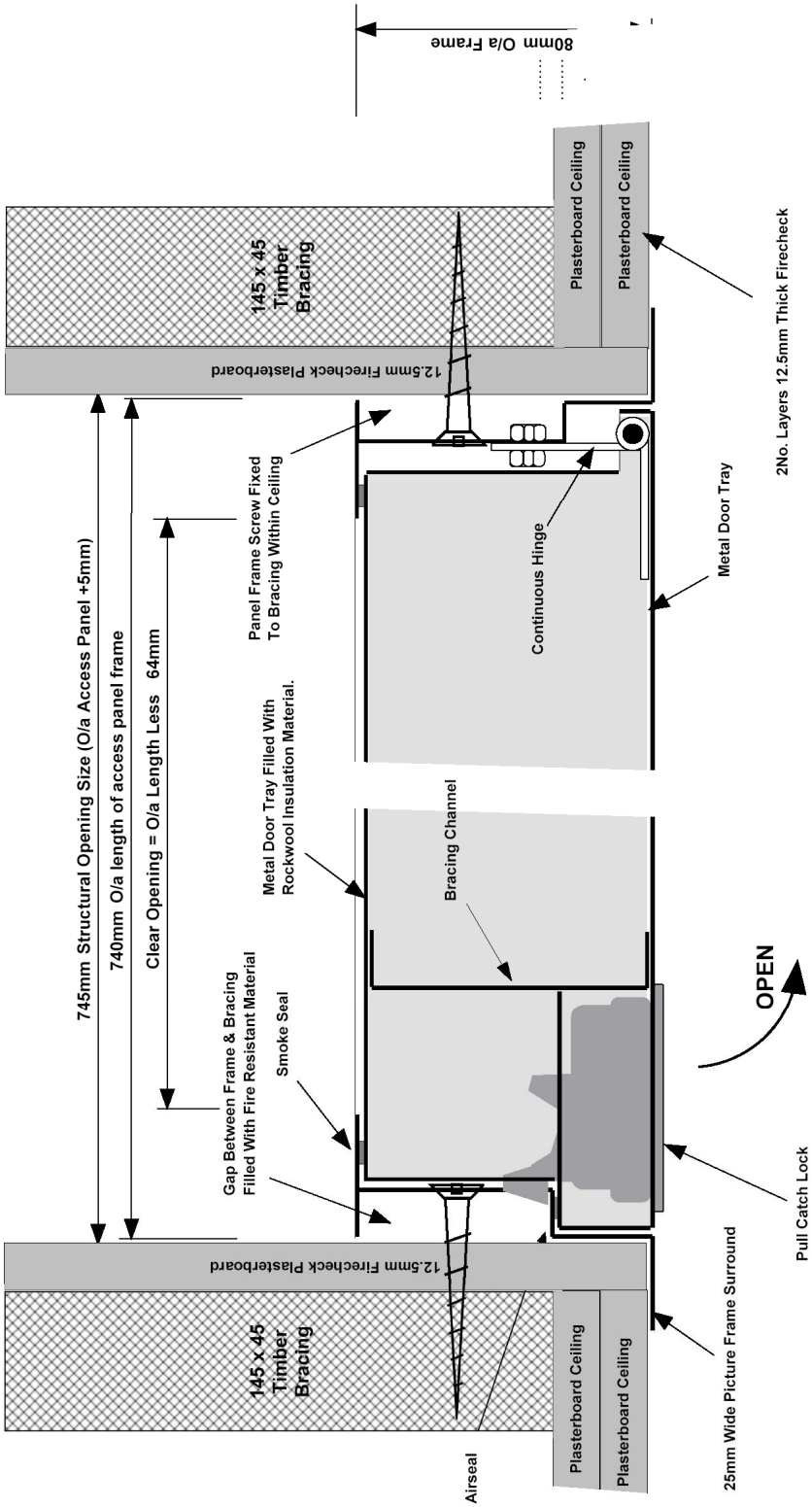
7 REFERENCE

- Fire tests on building materials and structures. Part 20. Method for determination of the fire resistance of elements of construction (general principles). British Standard 476 : Part 20 : 1987. British Standards Institution, London, 1987.

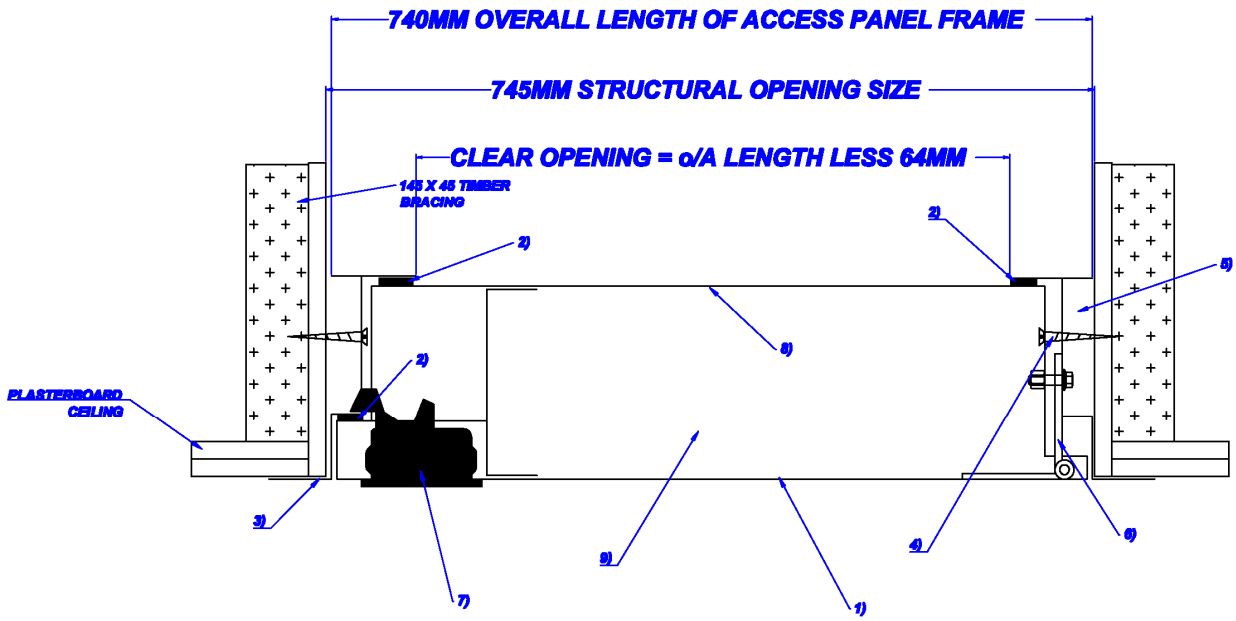
8 FIGURES



Plan view (from below) of access panel.



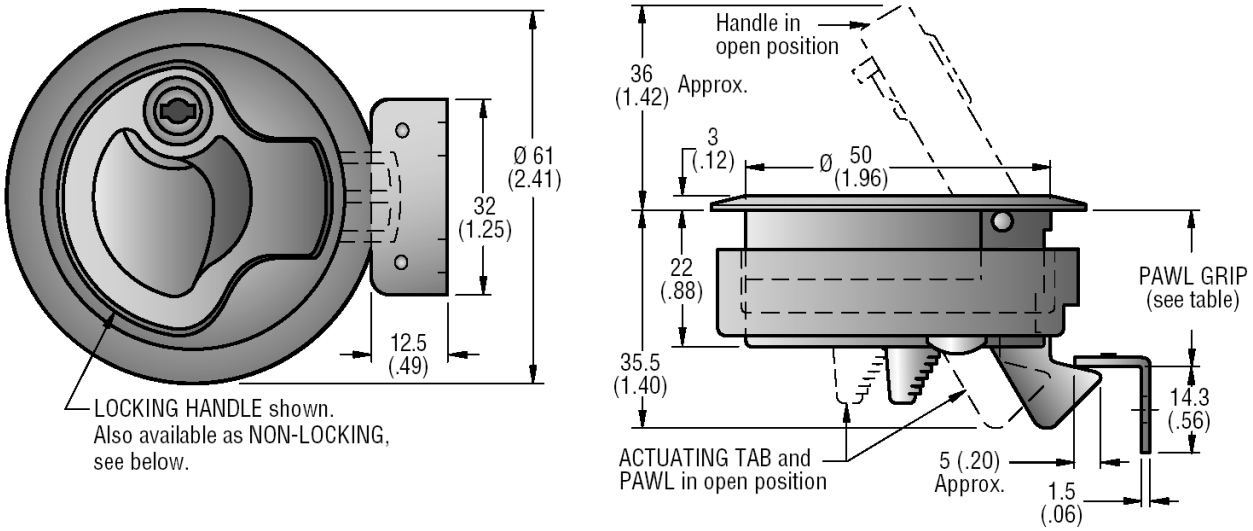
Section view of specimen.



Key to 1hr Fire Rated Loft Access Pull Catch

1) Access panel door tray manufactured from powder coated 0.9mm Zintec steel, cut and folded. The door tray was 75mm deep overall.
2) Foam strip polyurethane open cell foam 6mm x 8mm
3) Access panel frame manufactured from 1.2mm Zintec sheet steel. The 25mm picture frame was mitred at each corner.
4) Access panel frame screw fixed to bracing within ceiling
5) Gap filled with RW3 Rockwool and sealed with Selocrete Fire proof mastic.
6) Mild steel continuous hinge welded to the door tray and bolted to the frame using M6 bolts, nuts and washers.
7) Flush pull latch manufactured from steel.
8) Full backing plate pop riveted to the door tray to conceal insulation manufactured from 0.9mm thick Zintec sheet steel
9) Door tray filled with Rockwool 50mm thick RW3 insulation

Section view of specimen providing further details.



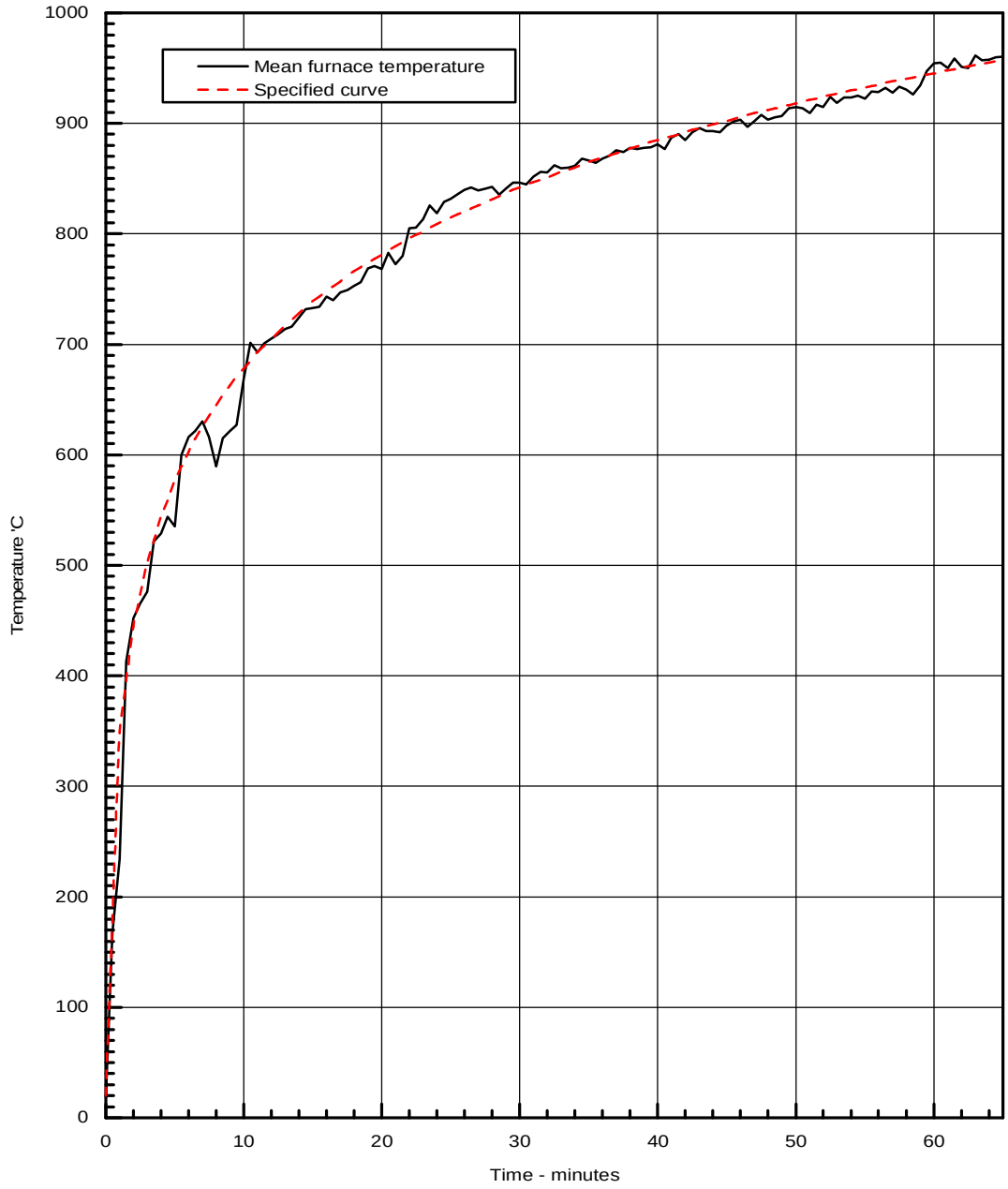
Material and Finish

HOUSING, HANDLE , PAWL, LOCK PLUG and MOUNTING BRACKETS: CF-8M stainless steel (nominal cast equivalent of 316 SS), electropolished.
LOCK PLUG O-RING: Buna-N, natural.
LOCK PLUG RETAINING RING:
420 Stainless steel.
PIN: 302 Stainless steel, passivated.
KEYS, SPRINGS, KEEPER AND SCREWS:
300 Series stainless steel, passivated.

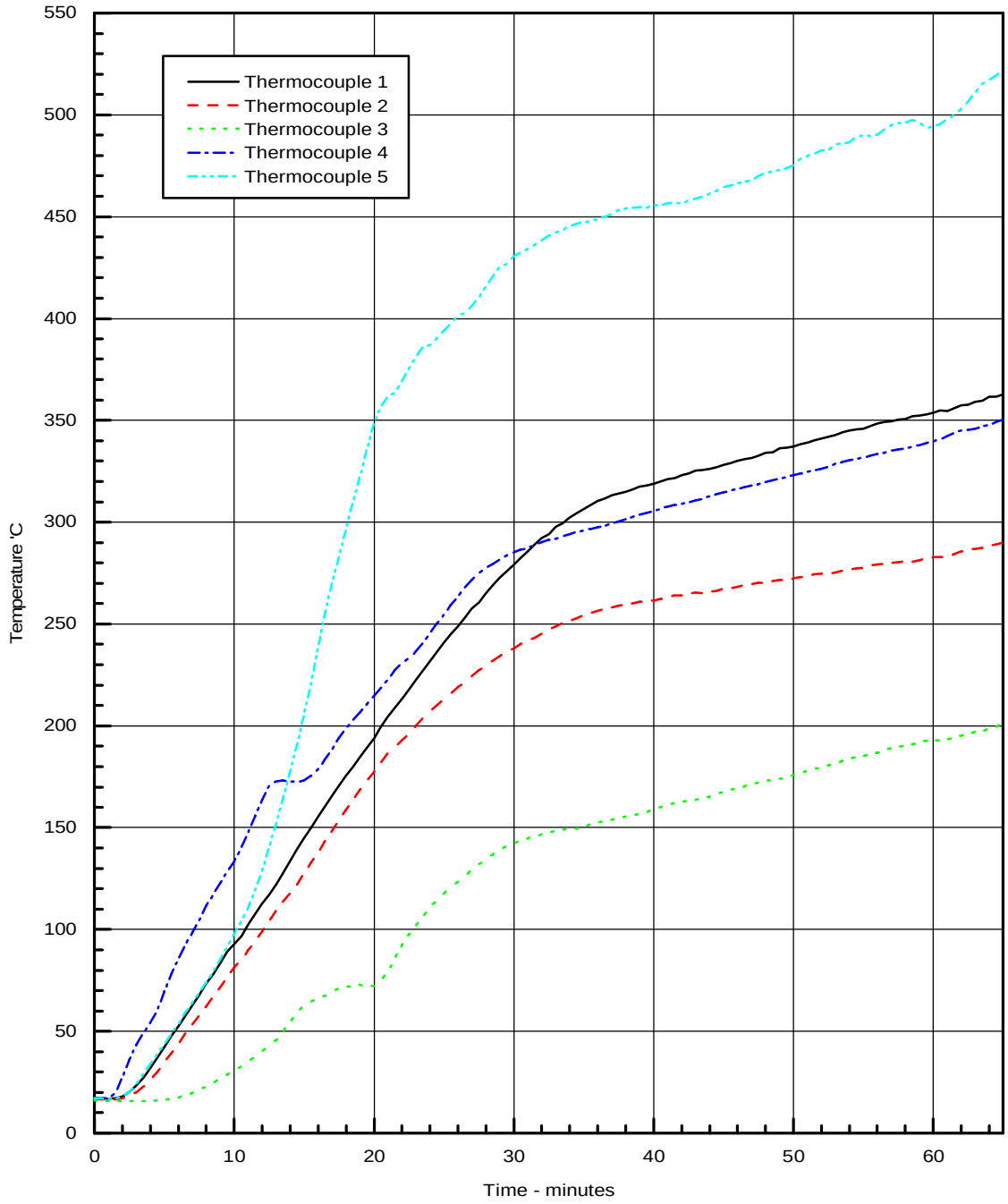
NOTE: Although the details above state that the latch was made from Stainless steel, the sponsor has advised that the latch actually used in the test was made from mild steel.

Details of latch.

9 GRAPHS



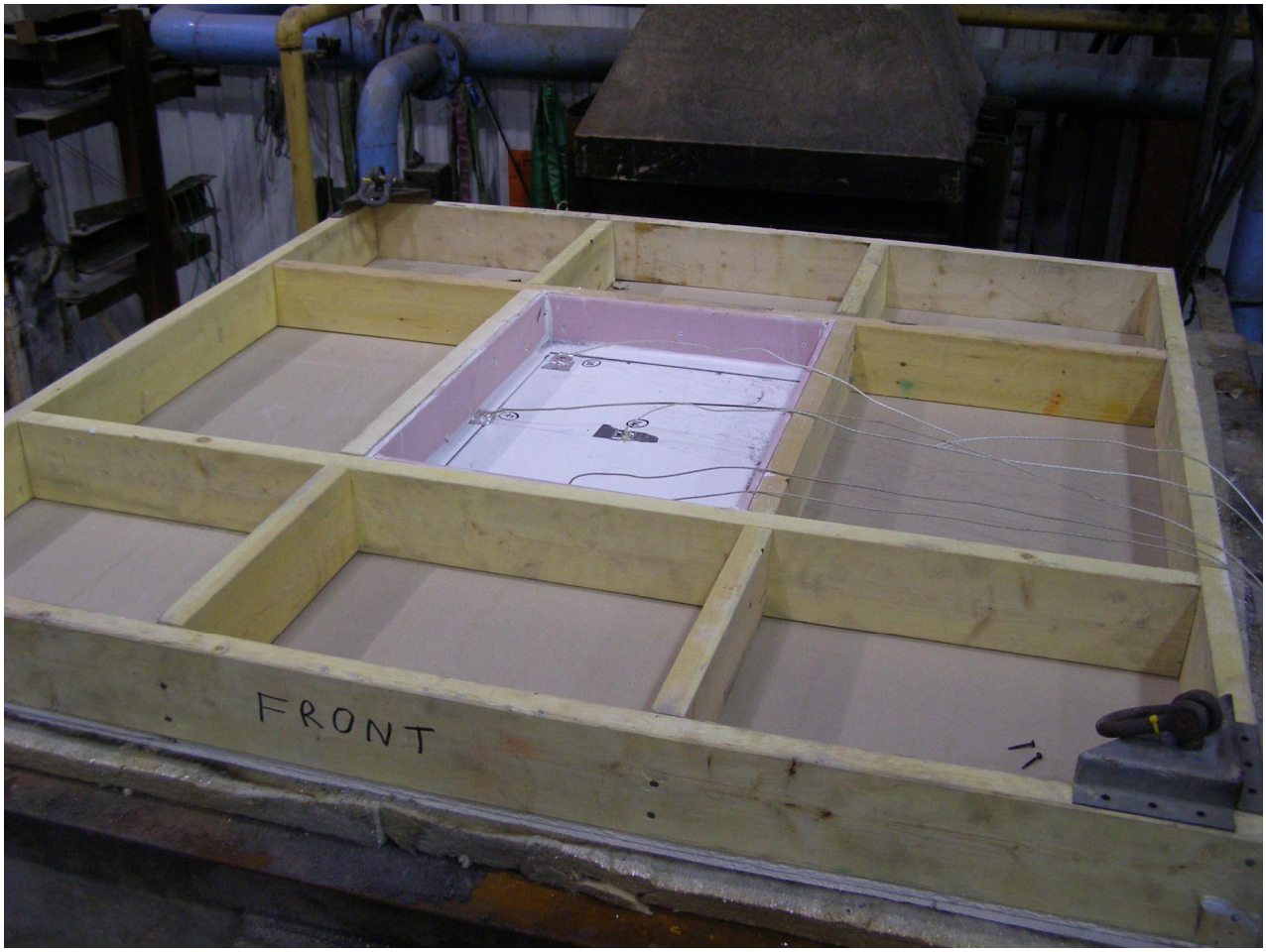
Mean furnace temperature with specified curve for comparison.



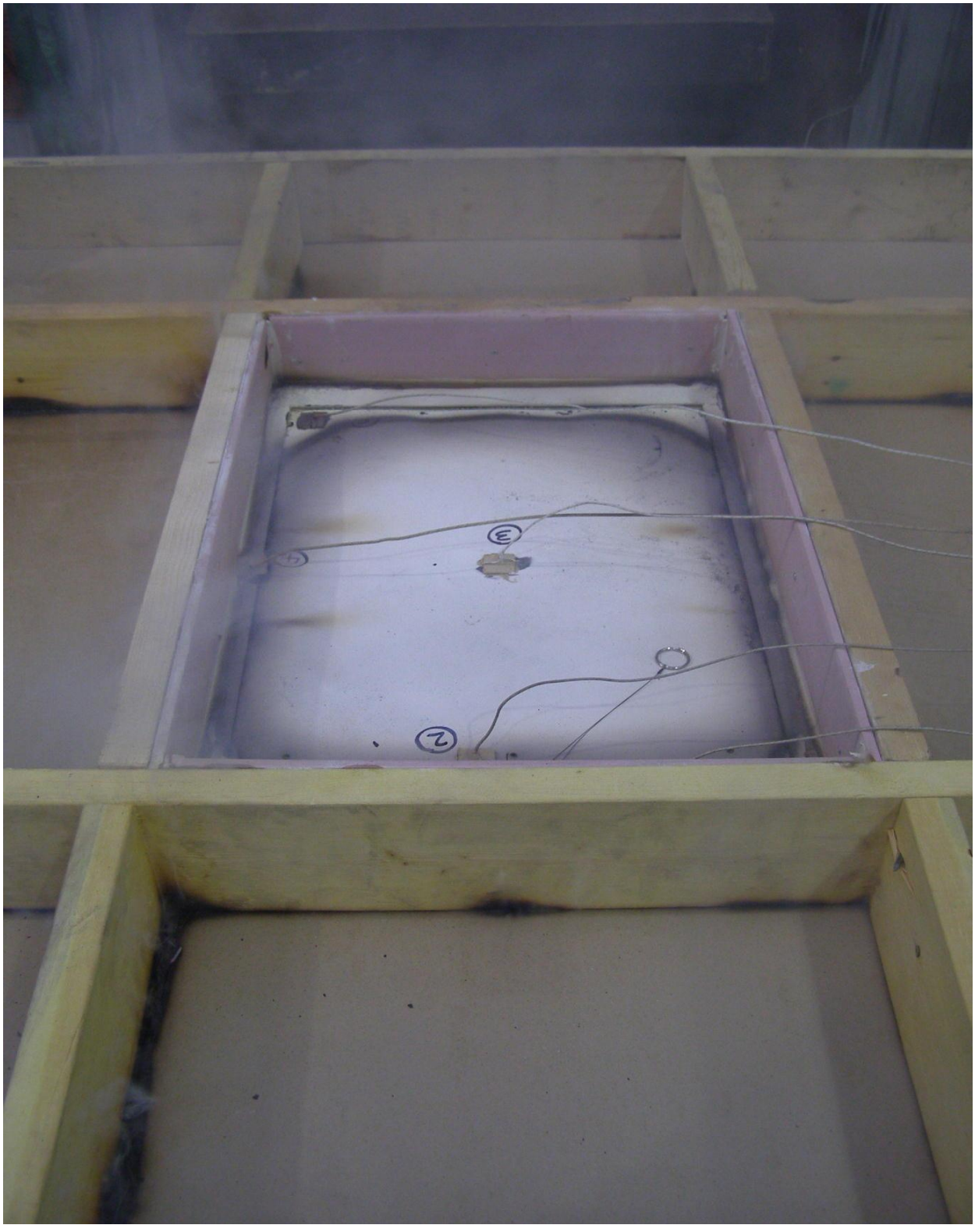
Temperatures recorded on the unexposed face of the specimen (for information).

10 PHOTOGRAPHS

Exposed face of specimen before test.



Unexposed face of ceiling and access panel before test.



Unexposed face of access panel after 60 minutes.

==========REPORT ENDS==========