

REPORT FSV 0079

# FIRE-RESISTANCE TEST ON A NON-LOADBEARING WALL

IN CONFIDENCE TO  
CSR HEBEL AUSTRALIA PTY LTD

AUGUST 1990



**CSIRO**  
AUSTRALIA

DIVISION OF BUILDING, CONSTRUCTION AND ENGINEERING

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AUSTRALIA

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**FIRE-RESISTANCE TEST  
ON A NON-LOADBEARING WALL**

**SPONSORED INVESTIGATION No FSV 0079**

**IDENTIFICATION  
OF SPECIMEN:**

The sponsor identified the specimen as a non-loadbearing wall constructed of 100 mm thick Autoclaved Aerated Concrete blocks laid in CSR Hebel thin bed adhesive.

**SPONSOR:**

CSR Hebel Australia Pty Ltd  
Unit 4A, 4 Central Avenue  
THORNLEIGH NSW

**MANUFACTURER:**

CSR Hebel Australia Pty Ltd  
Unit 4A, 4 Central Avenue  
THORNLEIGH NSW

**TEST STANDARD:**

Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4 - 1990, Fire resistance tests of elements of building construction.

**TEST NUMBER:**

NF08SV0376

**TESTED:**

The fire-resistance test was conducted on 22 May 1990.

**DESCRIPTION  
OF SPECIMEN:**

GENERAL

The specimen comprised a single leaf, non-loadbearing wall of autoclaved aerated concrete blocks, laid up in stretcher bond, using CSR Hebel thin bed adhesive with joints in the range of 1 mm - 3 mm.

**DIMENSIONS**

The wall was 3000 mm high x 3000 mm wide x 100 mm thick. The individual blocks were 600 mm long x 200 mm high x 100 mm wide. All dimensions are nominal.

**RESTRAINT**

All the edges of the wall were restrained by the specimen frame.

**DOCUMENTATION:** The following documents were supplied by the sponsor as a complete description of the specimen and should be read in conjunction with this report:

Drawing numbered HB 18-1, dated 19 July 1990, by CSR Hebel Australia Pty Ltd.

Confidential information about the composition of materials and/or manufacturing processes used in the test specimen has been submitted and is retained at NBTC.

**EQUIPMENT:****FURNACE**

The furnace has a nominal opening of 3000 mm x 3000 mm for the attachment of vertical specimens.

The furnace is lined with refractory bricks and materials with the thermal properties specified in AS1530.4-1990 and is heated by combustion of a mixture of natural gas and air.

**TEMPERATURE**

The temperature in the furnace chamber was measured by nine K-type thermocouples housed in high-nickel steel tubes substantially sealed at the exposed end. Each wire was 0.8 mm in diameter and electrically insulated with ceramic insulators.

The temperatures of the specimen were measured by glass-fibre insulated and sheathed, K-type thermocouples with a wire diameter of 0.5 mm.

**PRESSURE**

The furnace pressure was measured by a differential low-pressure transducer with a range of  $\pm 50$  Pa.

**DEFLECTION**

Deflections of the element were measured by linear-displacement transducers operating on the potentiometric principle with a range of 300 mm. A spring-loaded probe, exerting a force of about 10 N, transmitted the deflections of the element to the transducers.

**MEASUREMENT SYSTEM**

The primary measurement system comprised a multiple-channel datalogger scanning at one minute intervals during the test.

After each scan the information was stored on magnetic disc by the computer controller.

**AMBIENT****TEMPERATURE:**

The temperature of the test area was 16°C at the commencement of the test.

**DEPARTURE FROM  
TEST STANDARD:**

There were no departures from the requirements of the standard.

**TERMINATION  
OF TEST:**

The test was terminated at 241 minutes by agreement with the sponsor.

**TEST RESULTS:****CRITICAL OBSERVATIONS**

The following observations were made during the fire-resistance test:

- 15 mins - Little visible change.
- 60 mins - Little visible change. Light steam is being emitted from the top of the specimen.
- 120 mins - Little visible change.

- 180 mins - The exposed face of the wall has developed a crazed cracking pattern.
- 207 mins - Viewing the exposed face, shrinkage of the blocks has caused the joints to open 2 mm. No through openings can be observed from the unexposed face at this time.

#### FURNACE TEMPERATURE

Figure 1 shows the standard curve of temperature versus time for heating the furnace chamber and the actual curves of average and maximum temperature recorded during the heating period.

#### SPECIMEN TEMPERATURE

Figure 2 shows the curve of average and maximum temperature versus time recorded on the unexposed face of the specimen.

#### SPECIMEN DEFLECTION

Figure 3 shows the magnitude of deflections versus time recorded at the centre of the exposed face of the specimen.

#### PERFORMANCE

Performance observed in respect of the following criteria:

- Structural adequacy - no failure at 241 minutes.
- Integrity - no failure at 241 minutes.
- Insulation - no failure at 241 minutes.

#### FIRE-RESISTANCE LEVEL:

For the purpose of building regulations in Australia, the FRL of the test specimen is 240/240/240.

The fire resistance level is applicable from either direction.

The results of these fire tests may be used to directly assess fire hazard, but it should be recognized that a single test will not provide a full assessment of fire hazard under all conditions.

**ATTACHMENTS:**

Fig. 1. FURNACE TEMPERATURE

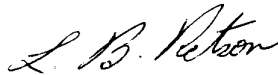
Fig. 2. SPECIMEN TEMPERATURE - On the unexposed face  
of the specimen.

Fig. 3. SPECIMEN DEFLECTION - At the centre of the  
specimen face.  
over joints.

Drawings numbered HB 18-1, dated 19 July 1990, by CSR  
Hebel Australia Pty Ltd.

A copy of Certificate of Test No. 216.

**TESTED BY:**



L B Retson  
Testing Officer



G E Collins  
Experimental Scientist



R J Dayeh  
Principal Experimental  
Scientist

AUGUST 1990

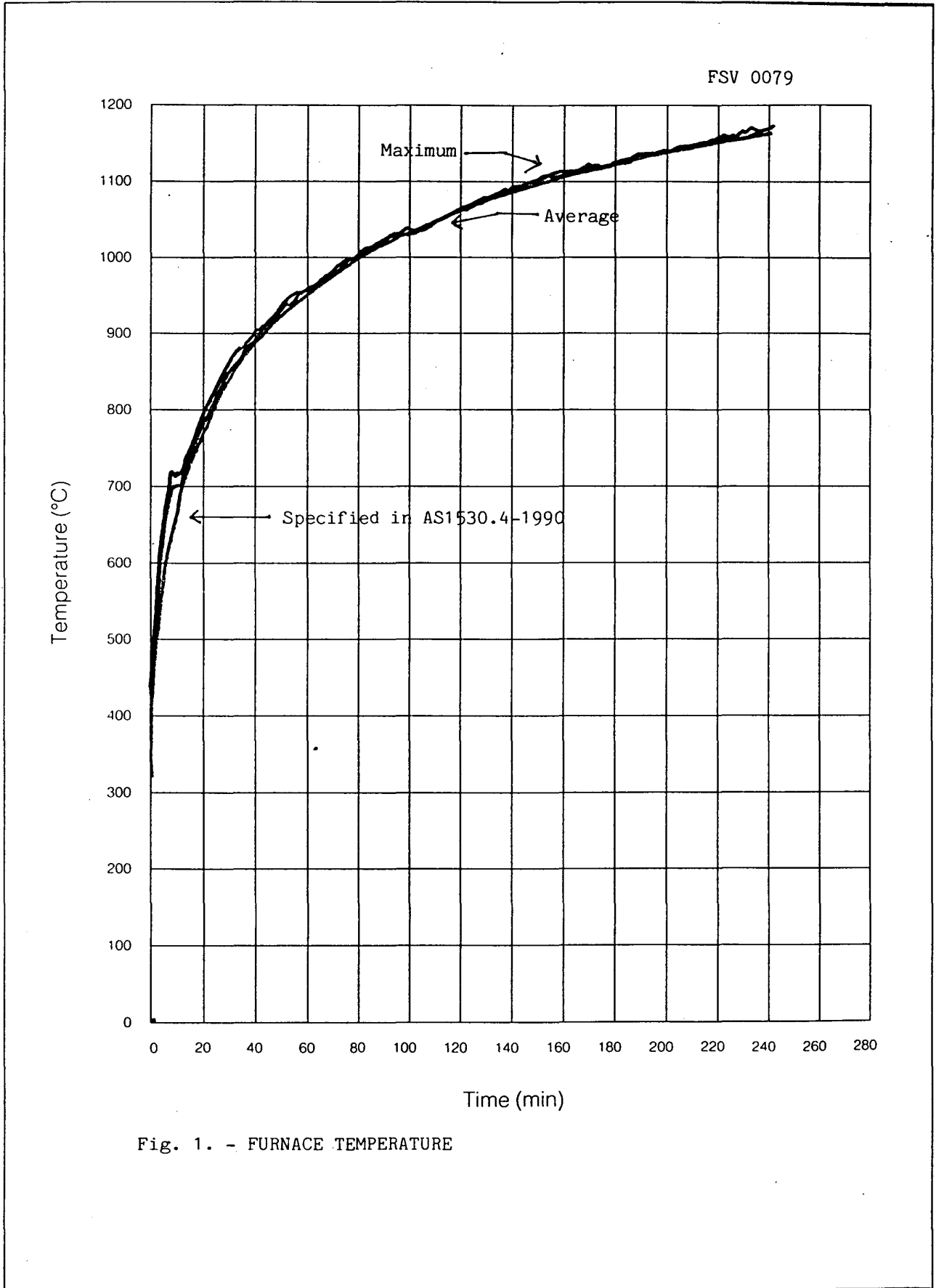


Fig. 1. - FURNACE TEMPERATURE

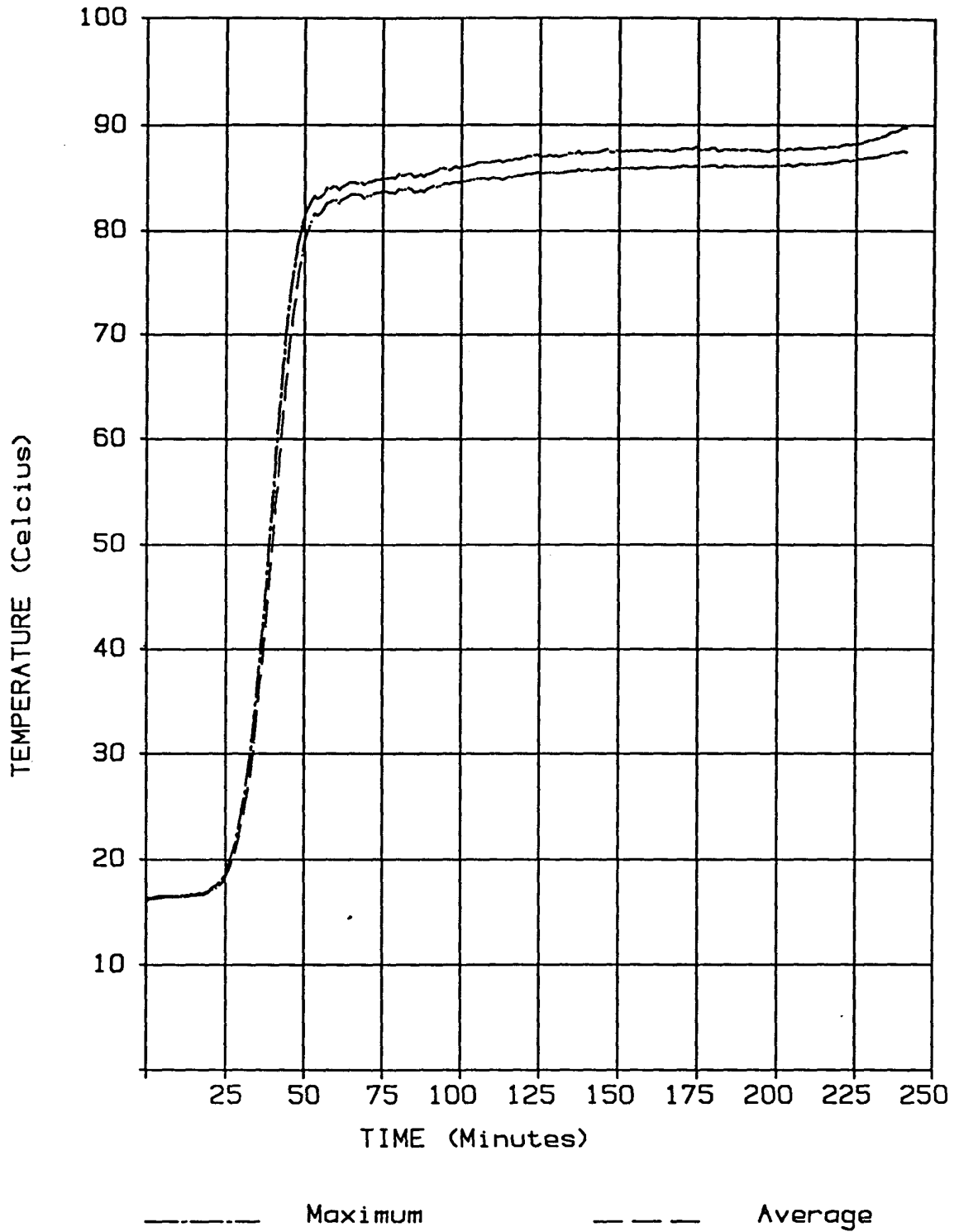


FIG. 2 - SPECIMEN TEMPERATURE  
on the unexposed face of the specimen.



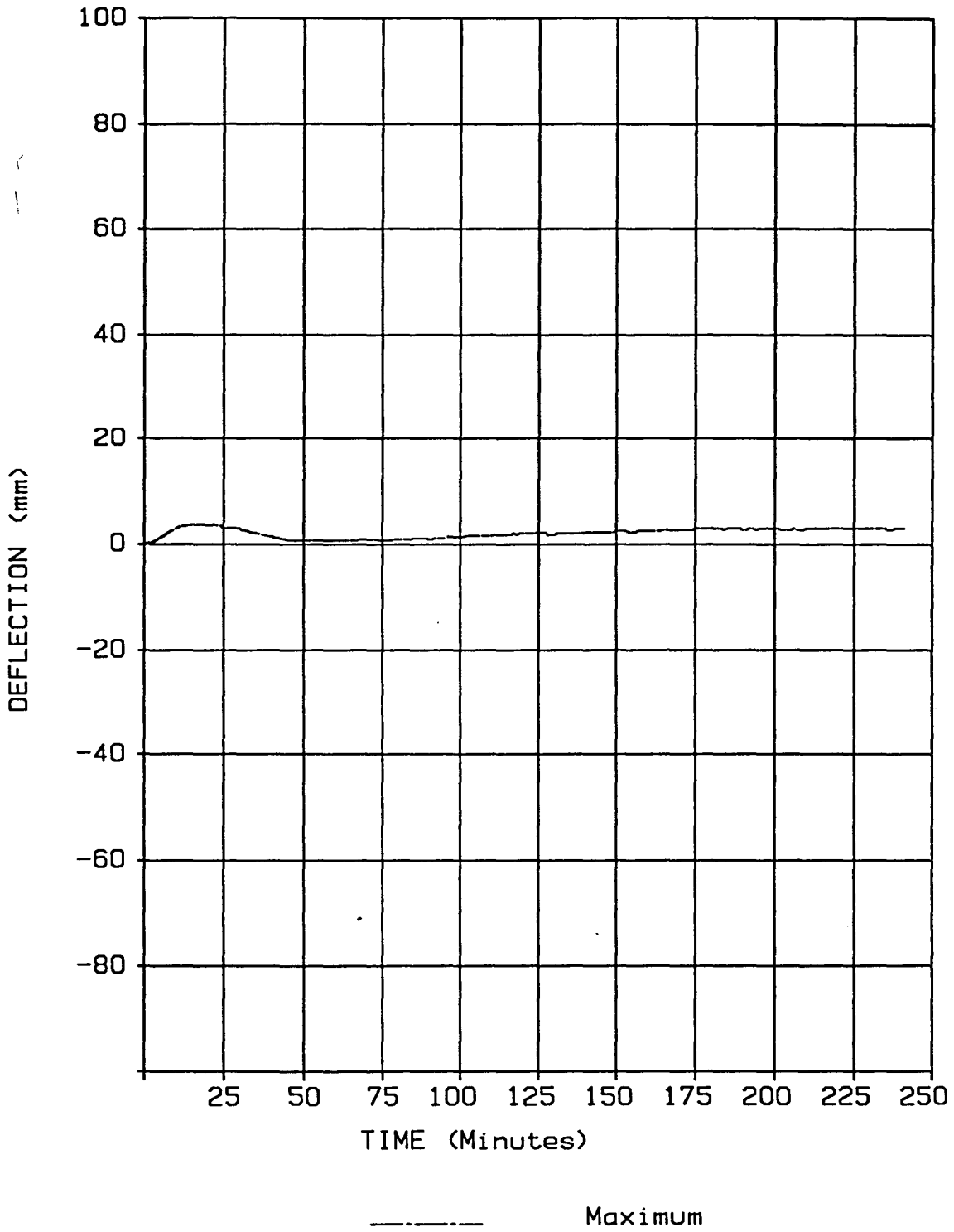
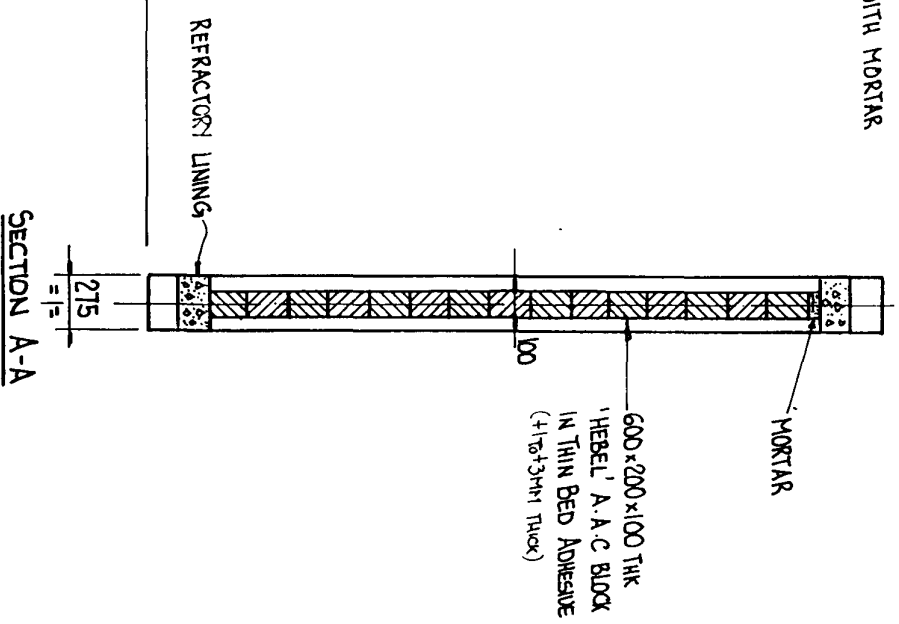
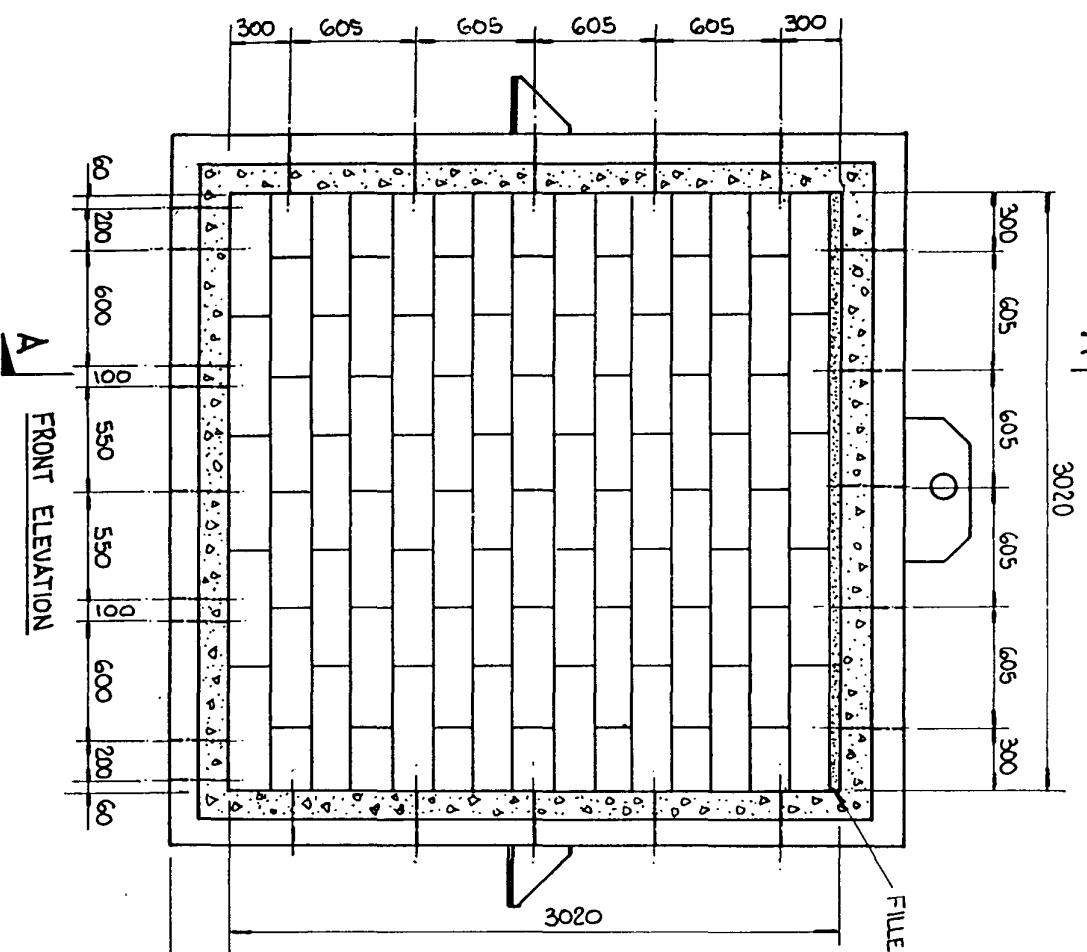


FIG. 3 - SPECIMEN DEFLECTION  
At the centre of the specimen face.

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- NOTES**
- ALL DIMENSIONS MUST BE COMPARED BY BUILDERS ON SITE PRIOR TO FABRICATION OF PANELS BY HEBEL.
  - PANELS MUST NOT BE CUT ON SITE WITHOUT APPROVAL OF CSR HEBEL.
  - REINFORCING BARS IN THE RING BEAMS SHALL BE IN ACCORDANCE WITH AS 1300 OR AS 1304.
  - MINIMUM 75 DAY STRENGTH OF CONCRETE IN THE RING BEAMS SHALL BE 25 MPa.
  - ALL STEEL WORK TO BE PROTECTED AGAINST CORROSION.
  - ALL MATERIALS USED IN SURFACE TREATMENT OF AAC BLOCKS AND PANELS MUST BE APPROVED BY CSR HEBEL.
  - ANY DISCREPANCIES ON CONFLICTING INFORMATION SHOULD BE REFERRED TO CSR HEBEL TECHNICAL ADVISORY SERVICES.

APPROVED	DRAWN	TITLE
<i>[Signature]</i>	KROUJER	SECTION A-A
REFERENCE	CHECKED	SCALE
	<i>[Signature]</i>	1:25

DRAWING NUMBER
<b>H818-1</b>
REVISION

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# Certificate of Test

This is to certify that the element of construction described below was tested by CSIRO Division of Building, Construction and Engineering in accordance with Australian Standard 1530.4-1990 Methods for fire tests on building materials, components and structures, Part 4: Fire resistance tests of elements of building construction, on behalf of

CSR Hebel Australia Pty Ltd  
Unit 4A, 4 Central Avenue  
THORNLEIGH NSW

A full description of the test specimen and the complete test results are detailed in the Division's report FSV 0079

**Product Name:** Non-loadbearing wall constructed of 100 mm thick Autoclaved Aerated Concrete blocks laid in CSR Hebel thin bed adhesive.

**Description:** The specimen comprised a single-leaf non-loadbearing wall of autoclaved aerated concrete blocks, laid up in stretcher bond, using CSR Hebel thin bed adhesive with joints in the range 1 mm to 3 mm thick. The wall was 3000 mm high x 3000 mm wide x 100 mm thick. The individual blocks were 600 mm long x 200 mm high x 100 mm wide. All edges of the wall were restrained by the specimen frame. Construction is detailed in .drawing numbered HB 18-1, dated 19 July 1990 by CSR Hebel Australia Pty Ltd.


The element of construction satisfied the following criteria during the fire test for the period stated

Structural Adequacy	no failure at 241 minutes
Integrity	no failure at 241 minutes
Insulation	no failure at 241 minutes

and therefore for the purposes of Building Regulations in Australia achieved FRL of 240/240/240

Testing Officer L B Retson Date of Test 22 May 1990

Issued on the 14 th day of August 1990 without alterations or additions

  
R J Dayeh  
Principal Experimental Scientist  
for Manager, Fire Technology.



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