

F.1 Fire Test Certificates

Included in this appendix are some of the relevant Test Reports conducted by CSIRO on the CSR Hebel product. The enclosed copies of the Test Certificates have been included with the permission of the CSIRO.

Certificate Number	Report Number	Test	FRL	Page
216	FSV 0079	100mm Non-Loadbearing Hebel Block Wall (All Edges Laterally Supported)	240/240/240	F.2
504	FSV 0258	100mm Non-Loadbearing Hebel Block Wall (Top and Bottom Edge Laterally Supported)	240/240/240	F.3
223	FSV 0093	150mm Loadbearing Hebel Block Wall	240/240/240	F.4
555	FSV 0327	100mm Vertical Reinforced Hebel Wall Panels	240/120/90	F.5
409	FSV 0221	125mm Vertical Reinforced Hebel Wall Panels	240/240/240	F.6
225	FSV 0081	150mm Horizontal Reinforced Hebel Wall	240/240/240	F.7
529	FSH 0291	150mm Reinforced Hebel Floor Panels	60/60/60	F.8
331	FSH 0150	200mm Reinforced Hebel Floor Panels	120/120/120	F.9
964	FSV 0706	100mm Non-Loadbearing Hebel Block Wall & 1:0:4 + Dynex nominal 10mm thick cement mortar joint (One Vertical Edge Restrained)	240/240/180	F.10
1111	FSV 0797	75mm Loadbearing Hebel Block Wall (Top & Bottom Restrained; H = 3000mm, 41kN load)	60/60/60	F.11
NKCE NE2226	FNE 6844	Simultaneous Determination of Ignitability, Flame Propagation, Heat Release and Smoke Release	–	F.12
479	FSP 0251	Fire resistance test on a joint between lightweight concrete	–/180/240	F.13

No. 216

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

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



National Building Technology Centre PO Box 310 North Ryde 2113 Australia Telephone (02) 888 8888 Fax (02) 888 9335 Telex AA123400
Division of Building, Construction and Engineering Institute of Minerals, Energy and Construction

Certificate of Test

No. 504

This is to certify that the element of construction described below was tested by the CSIRO Division of Building, Construction and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures Part 4-1990, Fire-resistance tests of elements of building construction and the general principles of British Standard 476, Fire Tests on Building Materials and Structures, Parts 20 & 22-1987 on behalf of

CSR Hebel
2nd Floor, 9 Help Street, CHATSWOOD, NSW

A full description of the test specimen and the complete test results are detailed in the Division's report FSV 0258

Product Name: A 100 mm thick CSR Hebel block wall laid up with thin bed adhesive.

Description: The specimen comprised a wall built of CSR Hebel lightweight concrete blocks measuring 600 mm x 200 mm x 100 mm wide. The blocks were laid up in stretcher bond with CSR Hebel thin bed adhesive. The wall was 3000 mm high x 3000 mm wide. The test frame measured 3020 mm x 3020 mm. Ceramic fibre was inserted along the top of the wall in a 20 mm gap and along the sides and bottom of the wall in a 10 mm gap. Along the top of the specimen were 5 evenly spaced steel angles, 200 mm in length. The wall was built on a rectangular mild steel section placed along the length of the wall at the centre of the blockwork.
Details of the construction are shown in the following:
Drawing numbered FTS30, dated 21 July 1993 by CSR Hebel Australia..

Restraint: The wall was subject to lateral restraint at the top and bottom but no rotational restraint. Both vertical sides of the specimen were free.

The element of construction described above satisfied the following criteria for fire-resistance 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 purpose of Building Regulations in Australia achieved a FRL of 240/240/240

The rating applies to elements of the same construction as the specimen and is applicable from either side.

Testing Officer: L B Retson Date of Test: 31 August 1993

Issued on the 13th day of October 1993
without alterations or additions


R J Dayeh
for, Manager, Fire Technology

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No. 223

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 0093 .

Product Name: A loadbearing wall constructed of 150 mm thick Autoclaved Aerated Concrete Blocks laid in CSR Hebel thin bed adhesive.

Description: The specimen comprised a single-leaf 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 150 mm thick. The individual blocks were 600 mm long x 200 mm high x 150 mm wide. A load of 68 kN/m was applied for the duration of the test. Construction is detailed in . drawing numbered HB 18-3, 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: G E Collins

Date of Test: 12 September 1990

Issued on the 18th day of October 1990
without alterations or additions



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



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Certificate of Test

No. 555

This is to certify that the element of construction described below was tested by the CSIRO Division of Building, Construction and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-1990, Fire-resistance tests of elements of building construction, on behalf of

CSR Hebel Australia Pty Ltd
Level 2, 9 Help Street
CHATSWOOD NSW

A full description of the test specimen and the complete test results are detailed in the Division's report FSV 0327

Product Name: Non-Loadbearing Lightweight Concrete Wall.

Description: The specimen comprised a non-loadbearing lightweight concrete wall 3000 mm high x 3000 mm wide x 100 mm thick. Each individual panel was 3000 mm high x 600 mm wide x 100 mm thick. The bottoms of the panels were slotted to fit onto a 50 mm x 20 mm x 1.2 mm steel angle, while the tops of the panels were secured by FD8 Hebel brackets, nailed to the panels and welded to 75 mm x 6 mm steel plate bolted to the frame. Thin bed adhesive was used between panels. The specimen was unrestrained on the vertical sides. The vertical gap between specimen frame and wall was filled with compressed ceramic fibre.

Construction is detailed in the following:

- Drawing numbered SK-012; dated July 1994, by CSR Hebel Australia Pty Ltd.

The element of construction described above satisfied the following criteria for fire-resistance for the period stated.

Structural Adequacy	-	241 minutes.
Integrity	-	165 minutes.
Insulation	-	112 minutes.

and therefore for the purpose of Building Regulations in Australia achieved a FRL of 240/120/90. The fire-resistance level is applicable for exposure to fire from the same side as the test.

Testing Officer: G R G Everingham Date of Test: 8 August 1994

Issued on the 15th day of September 1994 without alterations or additions.


G E Collins
for Manager, Fire Technology

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Certificate of Test

No. 409

This is to certify that the construction described below was tested by the Division of Building, Construction and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-1990, Fire-resistance tests of elements of building construction, on behalf of

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

A full description of the test specimen and the complete test results are detailed in the Division of Building, Construction and Engineering's report numbered FSV 0221

Product Name: Non-Loadbearing Wall System Incorporating 125 mm thick Autoclaved Aerated Concrete Panels

Description: The specimen comprised a 3020 mm x 3020 mm x 125 mm wall system fabricated from 600 mm wide x 125 mm thick CSR Hebel Reinforced Autoclaved Aerated Concrete Panels. Each panel was reinforced with 5 mm diameter mesh. The panels were keyed together with a 10 mm deep tongue and groove system and installed vertically using thin bed adhesive. The panels were secured to the specimen containing frame with 125 mm x 50 mm (FB8) angles at the top and bottom. The angles were attached to the frame with masonry nails and to the individual panels with FB5/1 nails. One end the panels were attached to the frame with two FB8 angles. Construction is detailed in

- drawing numbered STD-601; and
- drawing numbered STD-602, dated 3 August 1992, by CSR Hebel Australia Pty Limited.

Orientation: The specimen was symmetrical.

The element of construction satisfied the following criteria for fire-resistance 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 purpose of Building Regulations in Australia achieved a FRL of 240/240/240 when exposed to fire from either direction.

Testing Officer: G E Collins

Date of Test: 17 September 1992

Issued on the 17 th day of November 1992
without alterations or additions

R. J. Dayeh
R J Dayeh

for Manager, Fire Technology.

Division of Building, Construction and Engineering
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No. 225

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 4, 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 0081

Product Name: Non-loadbearing wall constructed of 150 mm thick Autoclaved Aerated Concrete Panels laid horizontally in CSR Hebel thin bed adhesive.

Description: The specimen comprised a single-leaf non-loadbearing wall of autoclaved aerated concrete panels, laid horizontally using CSR Hebel thin bed adhesive with. The wall was 3000 mm high x 3000 mm wide x 150 mm thick. The individual panels were 600 mm high x 150 mm thick. All edges of the wall were restrained by the specimen frame. Construction is detailed in
drawing numbered HB 18-2, 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 which is applicable from either direction.

Testing Officer: G E Collins

Date of Test: 4 July 1990

Issued on the 16 th day of October 1990
without alterations or additions

R. J. Dayeh
R J Dayeh

Principal Experimental Scientist
for Manager, Fire Technology.



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Division of Building, Construction and Engineering Institute of Minerals, Energy and Construction

Certificate of Test

No. 529

This is to certify that the element of construction described below was tested by the CSIRO Division of Building, Construction and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-1990, Fire-resistance tests of elements of building construction, on behalf of

CSR Hebel Australia Pty Limited
2/9 Help Street
CHATSWOOD NSW

A full description of the test specimen and the complete test results are detailed in the Division's report FSH 0291

Product Name: Autoclaved Aerated Concrete Flooring System 150 mm Thick.

Description: The specimen comprised a precast reinforced autoclaved, aerated concrete panels of nominal overall dimensions of 3920 mm long x 600 mm wide x 150 mm thick. An end panel of nominal overall dimensions of 3920 mm long x 470 mm wide x 150 mm thick was included to suit the furnace chamber dimensions. The panels were butted against each other and Y12 ring anchor steel reinforcing was placed in the resultant recesses to encircle the individual panels. After placement of reinforcement in every recess, the recesses were filled with grout and finished flush with the top surface. The resultant floor was supported on three sides by 230 mm brickwork, the panels projecting 130 mm over the brickwork. The outside edges of these three sides were capped by cement grout 50 mm thick reinforced with Y12 ring anchoring steel all round the specimen. The fourth unrestrained side was placed with a 20 mm gap against a 230 mm wall. The gap between panel and wall was filled with ceramic fibre. A uniformly distributed load of 3 kPa was applied to the top surface of the specimen. The specimen was supported on three sides by 230 mm brickwork. The fourth edge of the specimen, in the direction of the span, was butted against a 230 mm brick wall and left unrestrained against a 20 mm thick ceramic fibre gasket.

Construction is detailed in the following:
- drawing numbered 0946, undated, by CSR Hebel Australia Pty Limited

The element of construction described above satisfied the following criteria for fire-resistance for the period stated.

Structural Adequacy	-	no failure at 71 minutes.
Integrity	-	no failure at 71 minutes.
Insulation	-	no failure at 71 minutes.

and therefore for the purpose of Building Regulations in Australia achieved a FRL of 60/60/60 for exposure to fire from the same direction as in the test.

Testing Officer: C Broadhead **Date of Test:** 18 March 1994
Issued on the 29th day of March 1994 without alterations or additions.



R J Dayeh
for Manager, Fire Technology

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No. 331

Certificate of Test

This is to certify that the element of construction described below was tested by the CSIRO Division of Building, Construction and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures Part 4-1990, 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 FSH 0150

Product Name: The sponsor identified the specimen as a floor system constructed with reinforced autoclaved, aerated concrete precast panels.

Description: The specimen comprised precast reinforced autoclaved aerated concrete panels of nominal overall dimensions of 4000 mm long x 600 mm wide x 200 mm thick. The panels were butted up against each other and the spaces between were filled with grout from the top which was finished flush at the joint. A uniformly distributed load of 5 kPa was applied to the top surface of the specimen.
Construction is detailed in
- drawings numbered FR-1 and FR-2, dated July 1991, by CSR Hebel Australia Pty Ltd.

Orientation: The floor panels were tested to model fire on the underside.

The element of construction described above satisfied the following criteria for fire-resistance for the period stated

Structural Adequacy	-	164 minutes
Integrity	-	162 minutes
Insulation	-	164 minutes

and therefore for the purpose of Building Regulations in Australia achieved a FRL of 120/120/120.

The rating applies to elements of the same construction as the specimen and exposed to fire from the same side as in the test

Testing Officer: L B Retson Date of Test: 14 November 1990

Issued on the 4th day of October 1991 without alterations or additions



R J Dayeh
for Manager, Fire Technology.

Division of Building, Construction and Engineering
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Certificate of Test

No. 964

This is to certify that the element of construction described below was tested by the CSIRO Division of Building, Construction and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-1997, Fire-resistance tests of elements of building construction, on behalf of

CSR Hebel Limited
702 Woodville Road
VILLAWOOD NSW

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSV 0706.

Product Name: Non-loadbearing Hebel block wall

Description: The specimen comprised a single leaf non-loadbearing Hebel block wall 3000 mm high x 3000 mm wide x 100 mm thick. The block wall was built using 400 mm long x 250 mm high x 100 mm wide Grade 1 Hebel blocks. The blocks had a density of 500 kg/m³. The blocks were laid up in stretcher bonds with 10 mm fully filled beds and perpend, using a mortar mixture that comprised one part cement, no lime and four parts of sand plus dynex - water thickener (mortar classification m3 in accordance with AS3700). The specimen was unrestrained along one of the vertical sides. The vertical gap on the unrestrained side between specimen frame and wall was filled with compressed ceramic fibre. The vertical gap along the restrained side and along the top of the wall was sealed (on each side) with a fire rated sealant against a backing rod. Construction as detailed in drawings numbered JS-001, JS-002 and JS-003, all dated 25 September 1999, by CSR Hebel Limited.

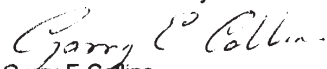
The elements of construction described above satisfied the following criteria for fire-resistance for the period stated.

Structural Adequacy	-	no failure at 240 minutes
Integrity	-	no failure at 240 minutes
Insulation	-	220 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of 240/240/180. The FRL is applicable for exposure to fire from either direction.

Testing Officer: Chris Wojcik Date of Test: 28 September 1999

Issued on the 5th day of October 1999 without alterations or additions.


Garry E Collins
Manager, Fire Testing and Assessments



Accreditation No. 3632

This laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of accreditation.



Improving the Built Environment

Building, Construction and Engineering

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Certificate of Test

No. 1111

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This is to certify that the element of construction described below was tested by the CSIRO Division of Building, Construction and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-1997, on behalf of

CSR Hebel Limited
702 Woodville Road
VILLAWOOD NSW

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSV 0797.

Product Name: Loadbearing Hebel Block Wall.

Description: The specimen comprised a single leaf loadbearing Hebel block wall 2980 mm high x 3000 mm wide x 75 mm thick. The block wall was built using 600 mm long x 200 mm high x 75 mm wide Hebel Thermoblok blocks (HBT75). The blocks had a dry density of 500 kg/m³. The blocks were laid up in thin beds and perpend, using a thin bed adhesive prepared in accordance with supplied instructions. The specimen was unrestrained along the vertical sides. The vertical gaps between specimen frame and wall were filled with compressed ceramic fibre. The wall specimen was 2980 mm high x 3000 mm wide x 75 mm thick to suit the load-bearing specimen containing frame. All dimensions are nominal. Uniformly distributed load of 41 kN was applied to the specimen for the duration of the test. Construction is detailed in: -

- Drawings numbered 75LB-01, 75LB-02 and 75LB-03, all dated 19 October 2000, by CSR Hebel Limited.

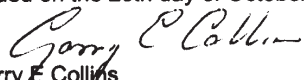
The element of construction described above satisfied the following criteria for fire-resistance for the period stated.

Structural Adequacy	-	82 minutes
Integrity	-	82 minutes
Insulation	-	no failure at 82 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of 60/60/60. The FRL is applicable for exposure to fire from either direction.

Testing Officer: Chris Wojcik Date of Test: 20 October 2000

Issued on the 26th day of October 2000 without alterations or additions.


Garry E Collins
Manager, Fire Testing and Assessments



Accreditation No. 3632

This laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of accreditation.



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Building, Construction and Engineering

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Certificate of Test

NKCE NE2226

REPORT NO. FNE6844

SIMULTANEOUS DETERMINATION OF IGNITABILITY, FLAME PROPAGATION, HEAT RELEASE AND SMOKE RELEASE

TRADE NAME: CSR HEBEL AAC

SPONSOR: CSR Limited (CSR Hebel)
702 Woodville Road
VILLAWOOD NSW

DESCRIPTION OF TEST SPECIMEN: The sponsor described the specimen as an autoclaved aerated concrete (AAC) product with CSR Hebel External Render applied to the exposed face.
Nominal total thickness (AAC): 75 mm
Nominal thickness of render: 3 mm
Nominal total mass: 37.5 kg/m²
Colour: grey

TEST PROCEDURE: Six samples were tested in accordance with Australian Standard 1530.3-1989, Simultaneous Determination of Ignitability, Flame Propagation, Heat Release and Smoke Release.
For the test each sample was clamped to the specimen holder in four places.

RESULTS: The following means and standard errors were obtained:

Parameter	Mean	Standard Error
Ignition Time (min)	N/A	N/A
Flame Spread Time (s)	N/A	N/A
Heat Release Integral (kJ/m ²)	N/A	N/A
Smoke Release (log ₁₀ D)	-2.522	0.279

For regulatory purposes these figures correspond to the following indices:

Ignitability Index (0-20)	Spread of Flame Index (0-10)	Heat Evolved Index (0-10)	Smoke Developed Index (0-10)
0	0	0	0-1

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

DATE OF TEST: 15 April 1997

Issued on the 28th day of April 1997 without alterations or additions.


Z. Trojko
Project Officer


G.E. Collins
Manager Fire Testing/Assessment



This laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of accreditation.



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Certificate of Test

No. 479

This is to certify that the construction described below was tested by the Division of Building, Construction and Engineering in accordance with Australian Standard 1530, Methods for Fire Tests on Building Materials, Components and Structures, Part 4-1990, Fire-resistance Tests of Elements of Building Construction, on behalf of

CSR Hebel Australia Pty Ltd
Level 2, 9 Help Street
Chatswood NSW

A full description of the test specimen and the complete test results are detailed in the Division of Building, Construction and Engineering report FSP 0251

Product Name: Joint between CSR Hebel 125 mm Thick Autoclaved Aerated Concrete Blockwork and Wall Panel.

Description: The specimen comprised a single leaf composite wall measuring 1150mm x 1150mm x 125mm built of CSR Hebel AAC blockwork in stretcher bond, butting against a CSR Hebel AAC wall panel. The joint was filled with CSR Hebel adhesive with an average thickness of 2mm. Two MET 38mm x 125mm brackets were used to tie the blockwork to the panel.

Construction is detailed in:
Drawing numbered PSK1, dated 31 May 1993, by CSR Hebel.

The Element of Construction satisfied the following criteria for fire-resistance for the period stated

Structural Adequacy	Not Applicable
Integrity	192 minutes
Insulation	241 minutes

and therefore for the purpose of Building Regulations in Australia achieved a fire-resistance level of NA/180/240.

This fire-resistance level applies to joints of the same specification exposed to fire from either direction.

Testing Officer L B Restson Date of Test 4 June 1993
Issued on the 29th day of June 1993 without alterations or additions



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