



FIRE Technical Opinion

FC11917-001 ISSUE 1

**FIRE RESISTANCE OF CLAY BRICK & PAVERS MANUFACTURERS ASSOCIATION MEMEBERS
CLAY BRICK VENEER ON STEEL OR TIMBER FRAMED LOADBEARING WALLS**

CLIENT

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Grafton
Auckland, 1023
New Zealand



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ASSESSMENT OBJECTIVE

To assess the fire resistance of Clay Brick & Pavers Manufacturers Association members clay brick veneer on steel or timber framed loadbearing walls.

CONCLUSION

Fire resistance rating

It is considered that the fire resistance in accordance with AS 1530.4-2005 or 2014 of any fire rated timber or steel stud plasterboard faced wall system up to at least an FRR of 60/60/60 from either side, established by test or assessment, will not be prejudiced if the plasterboard to one face of the wall is replaced with a 70 mm, 80 mm, 90 mm, 100 mm or 110 mm thick Clay Brick & Pavers Manufacturers Association members veneer brick wall provided that the veneer is not loadbearing. Any weep holes at ground level are not considered to be detrimental to the wall for an FRR of at least 60/60/60.

Compliance with NZBC Acceptable Solutions C/AS1 and C/AS2

The wall may be up to two storeys high and any weep holes above ground level meet the requirements of the New Zealand Building Code Acceptable Solution for Fire Safety C/AS2 paragraph 5.4 as a Type A area and C/AS2 for residential buildings such as houses, townhouses and small multi-unit dwellings. A Type A area is no greater than 0.1 m² and must be separated from other Type A area by at least 1.5 m.

LIMITATION

This report is subject to the accuracy and completeness of the information supplied.


BRANZ reserves the right to amend or withdraw this assessment if information becomes available which indicates the stated fire performance may not be achieved.

This assessment report may only be quoted or reproduced in full.

TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in BRANZ Services Agreement for this work.

The results reported here relate only to the item/s described in this report.

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1. INTRODUCTION

This report gives BRANZ's assessment of the fire resistance of Clay Brick & Pavers Manufacturers Association members clay brick veneer on steel or timber framed loadbearing walls. Fire exposure is from either side, the bricks may be 70 mm to 110 mm thick and the wall can include weep holes.

2. BACKGROUND

In BRANZ assessment report FAR 2487, it was considered that the fire resistance of any fire rated timber or steel stud plasterboard faced wall system with an FRR of up to 60/60/60, established by test or assessment, will not be prejudiced if the plasterboard on one face of the wall is replaced with a 70 mm thick veneer brick wall, provided that the veneer is not loadbearing. This applied to fire from either face.

In BRANZ fire resistance test report FR 1062 a loadbearing timber framed wall lined on one side with two layers of 14.5 mm fire rated plasterboard and on the other side with 7.5 mm construction plywood and 94 mm clay bricks tied to the timber framing was tested in accordance with ISO 834-1975 and found to achieve 138 minutes Stability, Integrity and Insulation. The 4,000 mm high brick wall was exposed to the furnace heating and not loaded.

3. DISCUSSION

3.1 Test Standard

BRANZ assessment report FAR 2487 used test data in accordance with AS 1530.4-1997 and BRANZ fire resistance test report FR 1062 describes a test carried out to ISO 834-1975. A review has been undertaken between the 1997, 2005 and 2014 versions of AS 1530.4 and ISO 834-1975 with respect to wall testing. Based on the review it is considered the changes in versions would not have changed the reported performance of the walls. Therefore, it is expected that were the walls tested in accordance with AS 1530.4-2005 and 2014 a similar result for Integrity and Insulation would be achieved.

3.2 Wall fire resistance

BRANZ assessment report FAR 2487 established that a 70 mm brick veneer replacing one lining of a steel or timber framed plasterboard wall would not be detrimental to the wall achieving its tested or assessed FRR up to 60/60/60. This applies to fire from either the brick veneer face or the plasterboard lined face.

Australian Standard for Masonry Structures AS 3700-2018, Section 6 covers Design For Fire Resistance, and clause 6.3.3, copied below, specifically relating to walls based on test results.

6.3.3 Design of walls based on test results

Where the design of a wall is based on test results, the following shall apply:

- (a) *The results shall be from tests in relation to structural adequacy in accordance with AS 1530.4, on a specimen or specimens built using the same type of masonry unit.*



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For the purpose of this Clause the masonry units shall be regarded as being of the same type where—

- (i) for clay units, clay and shales are of the same mineralogy and geological type, blended in the same proportions and manufactured by similar processes.*

The Australian standard is considered to be a useful guide with respect to masonry walls, therefore bricks from other manufactures may be considered to have the same fire resistance properties when they meet this definition. Therefore, it is considered that any brick manufactured by members of the Clay Brick & Pavers Manufacturers Association, which meets this definition can be used.

BRANZ assessment report FAR 2487 discussed nominal 70 mm thick bricks. It is proposed to include nominal 80 mm, 90 mm, 100 mm or 110 mm thick bricks. As these are thicker than nominal 70 mm thick bricks, it is considered they would not be detrimental to the FRR of the walls in which they are used.

The clay bricks described in BRANZ fire resistance test report FR 1062 were installed in a wall with two layers of plasterboard and a layer of 7.5 mm structural plywood. Whilst this includes a greater thickness of plasterboard and a plywood lining than would be typical of a wall with an FRR of 60/60/60, the clay brick wall was 4,000 mm high, directly exposed to the furnace heating conditions and exhibited minimal deflection. At 60 minutes the deflection of the wall was 10 mm and the temperature rise on the fire unexposed face of the clay bricks had not exceeded 100°C. This demonstrated the ability of the brick ties to retain the bricks in place and for the wall to experience minimal deformation. In that respect it is considered that if the wall was extended to a height sufficient for a two storey building, when exposed from the brick face, it would remain in place and maintain the FRL of the wall for at least an FRR of 60/60/60.

This is on the understanding that the wall has been designed to meet structural and serviceability requirements under ambient conditions. This will determine wall heights and is limited to building constructed in accordance with AS 3604 which has a 10 m height limit to the highest point on the roof.


3.3 Weep holes

3.3.1 Fire resistance rating

The discussion in section 3.2 above regarding fire resistance does not take into account the presence of weep holes. When the weep holes are at the bottom of a wall, they will be in the negative pressure zone of the furnace with ambient air being drawn through them. This will not cause the passage of flames and hot gasses therefore is not considered to be detrimental to the fire resistance of the wall.

3.3.2 Compliance with NZBC Acceptable Solutions C/AS1 and C/AS2

Where weep holes are placed at any other location than at the bottom of the wall there is the possibility for flames and hot gasses to pass through the wall. However, in the New Zealand Building Code Acceptable Solution for Fire Safety C/AS2, it is permitted to have non-fire rated openings (unprotected areas) in walls provided they meet certain criteria. For weep holes C/AS2 paragraph 5.4 may be applied. This defines a Type A area as no greater than 0.1 m² with each Type A area being separated 1.5 m from other Type A areas. Weep holes are

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typically 10 mm wide and the height of the brick, approximately 75 mm. This gives an area of 0.00075 m² which qualifies as a Type A area. Therefore, spacing weep holes at 1.5 m would meet the requirements of the New Zealand Building Code Acceptable Solution for Fire Safety C/AS2 and can also be applied to C/AS1 for residential buildings such as houses, townhouses and small multi-unit dwellings.

4. CONCLUSION

4.1 Fire resistance rating

It is considered that the fire resistance in accordance with AS 1530.4-2005 or 2014 of any fire rated timber or steel stud plasterboard faced wall system up to at least an FRR of 60/60/60 from either side, established by test or assessment, will not be prejudiced if the plasterboard to one face of the wall is replaced with a 70 mm, 80 mm, 90 mm, 100 mm or 110 mm thick Clay Brick & Pavers Manufacturers Association members veneer brick wall provided that the veneer is not loadbearing. Any weep holes at ground level are not considered to be detrimental to the wall for an FRR of at least 60/60/60.

4.2 Compliance with NZBC Acceptable Solutions C/AS1 and C/AS2

The wall may be up to two storeys high and any weep holes above ground level meet the requirements of the New Zealand Building Code Acceptable Solution for Fire Safety C/AS2 paragraph 5.4 as a Type A area and C/AS2 for residential buildings such as houses, townhouses and small multi-unit dwellings. A Type A area is no greater than 0.1 m² and must be separated from other Type A area by at least 1.5 m.



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Technical Opinion Summary



This is to certify that the specimen described below has been examined by BRANZ on behalf of the sponsor.

Sponsor

Clay Brick & Paver Manufacturers Association (NZ)
145 Khyber Pass Road
Grafton
Auckland, 1023
New Zealand

Reference BRANZ Reports FC11917-001 ISSUE 1

Referenced Standard AS1530.4-2005 and 2014

Specimen Name: Clay Brick & Paver Manufacturers Association (NZ) members 70 mm, 80 mm, 90 mm, 100 mm or 110 mm thick clay bricks

Specimen Description: 70 mm, 80 mm, 90 mm, 100 mm or 110 mm thick clay bricks used as a veneer on steel or timber framed plasterboard lined walls with an FRR of at Least 60/60/60. The veneer may include weep holes no greater than 0.1 m² in area and must be separated from other weep holes by at least 1.5 m

Orientation: Exposure from either side

The assessed results are as follows

FRR = 60/60/60*

- In conjunction with C/AS2 paragraph 5.4

Issued by

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Regulatory authorities are advised to examine FC11917-001 ISSUE 1 before approving any product.

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