

FIRE TECHNICAL OPINION

FC11619-001

FIRE RESISTANCE OF RESENE CONSTRUCTION SYSTEMS INTERTENACY WALL

CLIENT
Resene Construction Systems Ltd
5 Venture Place
Middleton
Christchurch 8024
New Zealand

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

ASSESSMENT OBJECTIVE

To assess the fire resistance, in accordance with AS 1530.4:2014, of the Resene Construction intertenancy wall with variations of construction.

CONCLUSION

It is considered that the fire resistance, in accordance with AS 1530.4:2014, of a load bearing Resene intertenancy wall constructed as tested in BRANZ fire resistance test FR 6289, but with the frame and plasterboard lining to both faces, will achieve a fire resistance for exposure from either side of at least:

Structural Adequacy[#]	120 minutes
Integrity	120 minutes
Insulation	120 minutes

[#] applies only to the wall frame to the unexposed face of the wall

with the following variations:

- Inclusion of thermal/acoustic insulation in the wall cavities of, but not limited to, fibreglass, polyester, wool or wool blend, and
- Replace the timber studs with steel studs of equivalent structural strength to carry the imposed load per stud; and
- Increase in height up to 12 metres provided the steel or timber studs are increased in size to meet the structural design requirements for the increased height, and
- The spacing between studs may be reduced to 400 mm between centres provided that the imposed load per stud is not greater than that tested or determined by structural design; and
- The studs may be increased in cross section above 45 mm x 90 mm provided that the imposed load per stud is not greater than that tested or determined by structural design; and
- The lining to each face of the wall may be any gypsum based plasterboard of at least 10 mm thick.

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.

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

CONTENTS

SIGNATORIES **4**

DOCUMENT REVISION STATUS **4**

1. INTRODUCTION **5**

2. BACKGROUND **5**

3. DISCUSSION **5**

3.1 General 5

3.2 Addition of cavity insulation 6

3.3 Steel framing 6

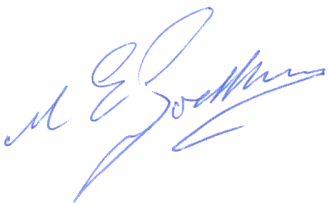
3.4 Increase in height 6

3.5 Reduction of stud spacing 7

4. CONCLUSION **7**

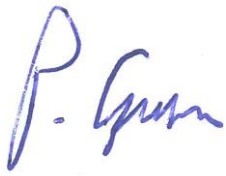
branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

SIGNATORIES



Author

M. E. Godkin
Senior Fire Testing Engineer
BRANZ



Reviewer

P. Chapman
Senior Fire Testing Engineer
BRANZ

DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	REVIEW DATE	DESCRIPTION
01	22 August 2019	22 August 2024	Initial Issue

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

1. INTRODUCTION

This report gives BRANZ's assessment, in accordance with AS 1530.4:2014, of the fire resistance of the Resene Intertenancy wall as tested in BRANZ fire resistance test FR 6289 with variations to construction including types of thermal insulation, steel stud frame, reduced stud spacing and increased height.

2. BACKGROUND

In BRANZ fire resistance test FR 6289 the test specimen consisted of a wall nominally 3,000 mm high x 3,000 mm wide. One half of the inter-tenancy wall system was tested. This was considered worst case as having another set of framing and plasterboard on the exposed side would provide more protection to the Integra AAC panel.

The wall frame was timber studs and lined with Integra 50 mm thick Autoclaved Aerated Concrete (AAC) panels to the exposed face and 10 mm thick GIB® Standard plasterboard to the unexposed face. The Integra AAC panels were 2,200 mm long by 600 mm wide by 50 mm thick. The panels were installed horizontally and were fixed to the framing with aluminium brackets. The angle brackets measured 75 mm x 50 mm x 3 mm thick and were 50 mm wide. At each face of the brackets a piece of silicon was fixed with adhesive to minimise sound transmission. Each panel was held in place with two brackets, one at each end at approximately mid-height of the panel. The panels were pre-drilled and 14-10 x 75 mm Timber Roofing Type 17 hex head screws with seals were driven through from the exposed face into the 50 mm x 50 mm face of the brackets. A 25 mm gap was left between the panels and the framing. Timber Roofing Type 17 hex head screws with seals were used to fix the 75 mm x 50 mm face of the bracket to the framing.

A 25 mm gap was left between the top of the AAC panels and the test frame to allow the framing to take the load, not the panels. The gap was loosely packed with mineral insulation to prevent furnace gases from passing though. A uniformly distributed axial load of 18 kN (4.5 kN/stud) was applied to the timber frame of the specimen wall.

The specimen wall was subjected to a fire resistance test, in accordance with AS 1530.4:2014, for a duration of 125 minutes and achieved the following fire resistance:

Structural Adequacy	125 minutes	No failure
Integrity	125 minutes	No failure
Insulation	125 minutes	No failure

3. DISCUSSION

3.1 General

The specimen wall tested in BRANZ fire resistance test FR 6289 represented the proposed intertenancy wall without one facing to the exposed side so that the central AAC panels were directly exposed to the furnace. This is considered a more severe situation than if the additional plasterboard lining on timber studs were present on the exposed face. If the exposed face plasterboard was present it is estimated that this would provide an additional approximately 10 minutes protection to the wall before the plasterboard lining fell away to allow

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

full fire exposure to the AAC panels. Hence the full intertenancy wall with 10 mm thick Gib® Standard plasterboard facings on timber studs to both faces would be expected to conservatively achieve at least 120 minutes fire resistance. Because of the additional layer of plasterboard to the exposed face it is also expected that any gypsum based plasterboard of thickness 10 mm or greater can be used to line both faces of the wall without prejudice to the established fire resistance.

However, once the plasterboard on the exposed face had fallen away the timber studs on that side would be subjected to the full furnace conditions and would begin to char away. Hence the timber studs to the exposed side of the AAC panels would not be able to carry a load and consequently Structural Adequacy would only apply to the stud wall on the unexposed side of the AAC panels.

3.2 Addition of cavity insulation

The wall tested in FR 6289 did not have any form of thermal insulation in the wall cavities between studs. The addition of non-mineral thermal and/or acoustic insulation in the wall cavities is expected to increase the Insulation of the wall and provide some protection to the studs from charring before the insulating material melts and shrinks. On the exposed face the thermal insulation will melt and fall/shrink away once the plasterboard lining falls away. However, as stated in 3.1 above there was no insulation or plasterboard lining to the exposed face in the test and hence the loss of insulation on the exposed side would not reduce the fire resistance of the wall for at least 120 minutes. The insulation may be, but is not limited to, fibreglass, polyester, wool or wool blend.

3.3 Steel framing

It is proposed to replace the timber studs, as tested in the FR 6289 fire resistance test, with steel studs. In test FR 6289 temperatures on the aluminium brackets holding the AAC panels to the timber studs in the cavities on the unexposed side of the AAC panels were measured. At the end of the 125 minute test the temperature on these brackets was approximately 200°C and this would be indicative of the temperature on steel studs held off the AAC panels by the brackets. According to Australian Standard AS 4100 *Steel structures* structural steel at these temperatures would still retain at least 100% of their yield stress. Also, as the studs are separated from the AAC panels the differential temperature across the studs, and hence the thermal deflection, will be minimal. Hence provided that the structural design of the studs is adequate to carry the imposed load it is considered that the use of steel studs would not prejudice the fire resistance of the wall for at least 120 minutes. As discussed in 3.1 above this would only apply to the Structural Adequacy of the wall on the unexposed side of the AAC panels.

3.4 Increase in height

It is proposed to increase the height of the wall to 12 metres. As discussed in Clauses 3.2 and 3.3 above there was minimal char of the timber studs on the unexposed side and the temperature of the alternative steel studs to the unexposed side would not degrade their strength for up to 120 minutes. It is therefore considered that the fire resistance of the proposed wall up to 12 metres high would maintain a fire resistance of at least 120 minutes provided that the structural design of the timber or steel studs is adequate to meet the

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

increased height. Again, as discussed in 3.1 above this would only apply to the Structural Adequacy of the wall on the unexposed side of the AAC panels.

3.5 Reduction of stud spacing

It is proposed to reduce the spacing of the studs from 600 mm to 400 mm between centres. Clause 3.9(c)(v) and 3.9(c)(ii) of test standard AS 1530.4:2014 states that the results of the fire test are directly applicable to similar constructions where, for framed walls, there is a decrease in stud spacing and or increase in cross section of the studs. It is therefore acceptable that the stud spacing be decreased to 400 mm between centres and the studs are increased in size above the 45 mm x 90 mm tested provided that the imposed load on each stud is not greater than that tested or determined by structural design.

4. CONCLUSION

It is considered that the fire resistance, in accordance with AS 1530.4:2014, of a load bearing Resene intertenancy wall constructed as tested in BRANZ fire resistance test FR 6289, but with the frame and plasterboard lining to both faces, will achieve a fire resistance for exposure from either side of at least:

Structural Adequacy[#]	120 minutes
Integrity	120 minutes
Insulation	120 minutes

[#] applies only to the wall frame to the unexposed face of the wall

with the following variations:

- Inclusion of thermal/acoustic insulation in the wall cavities of, but not limited to, fibreglass, polyester, wool or wool blend, and
- Replace the timber studs with steel studs of equivalent structural strength to carry the imposed load per stud; and
- Increase in height up to 12 metres provided the steel or timber studs are increased in size to meet the structural design requirements for the increased height, and
- The spacing between studs may be reduced to 400 mm between centres provided that the imposed load per stud is not greater than that tested or determined by structural design; and
- The studs may be increased in cross section above 45 mm x 90 mm provided that the imposed load per stud is not greater than that tested or determined by structural design; and
- The lining to each face of the wall may be any gypsum based plasterboard of at least 10 mm thick.

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

FC11619-001
Technical Opinion Summary

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

Sponsor

Resene Construction Ltd
5 Venture Place
Middleton
Christchurch 8024
New Zealand

Reference BRANZ Reports FC11619-001

Referenced Standard AS1530.4:2014

Specimen Name: Resene Intertenancy wall

Specimen Description: Load bearing Resene intertenancy wall constructed as tested in BRANZ fire resistance test FR 6289, but with the frame and plasterboard lining to both faces and with the following variations:

- Inclusion of thermal/acoustic insulation in the wall cavities of, but not limited to, fibreglass, polyester, wool or wool blend, and
- Replace the timber studs with steel studs of equivalent structural strength to carry the imposed load per stud; and
- Increase in height up to 12 metres provided the steel or timber studs are increased in size to meet the structural design requirements for the increased height, and
- The spacing between studs is reduced to 400 mm between centres and the stud cross section increased provided that the imposed load per is not greater than that tested or determined by structural design; and
- The wall may be lined with any gypsum based plaster board at least 10 mm thick.

Orientation: Exposure from either side

The assessed results were as follows

Structural Adequacy[#]	120 minutes
Integrity	120 minutes
Insulation	120 minutes

[#] applies only to the wall frame to the unexposed face of the wall

Issued by

M. E. Godkin
Senior Fire Testing Engineer

Reviewed by

P. Chapman
Senior Fire Testing Engineer

Regulatory authorities are advised to examine test reports before approving any product.

Issue Date
22 August 2019

Expiry Date
22 August 2024