



FIRE Technical Opinion

FAR 4552 ISSUE 2

FIRE RESISTANCE OF RESENE CONSTRUCTION SYSTEMS INTEGRA EXTERNAL FIRE RATED WALL SYSTEM WITH GIB® PLASTERBOARD

CLIENT

Resene Construction Systems
10B Abros Place
Burnside
Christchurch
New Zealand



REPORT NUMBER:

FAR 4552 ISSUE 2

ISSUE DATE:

15 April 2021

REVIEW/EXPIRY DATE

15 April 2026

PAGE:

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ASSESSMENT OBJECTIVE

To assess the fire resistance of Resene Construction Systems Integra loadbearing timber or steel framed wall system in accordance AS 1530.4-2005 and AS 1530.4:2014 with Winstone Wallboards Limited GIB® plasterboard to the interior face.

CONCLUSION

It is considered that the following Resene Construction Systems Integra loadbearing framed wall systems would achieve the stated fire resistance ratings (FRRs) if tested in accordance with AS 1530.4-2005/2014 when exposed from either direction as follows:

| GIB® reference | Description | FRR |
|-----------------------|---|-------------|
| Timber framing | | |
| GBTL 15 | 1 x 10 mm GIB® Standard | 15/15/15 |
| GBTL 30 | 1 x 10 mm GIB Fyreline® | 30/30/30 |
| GBTL 60 | 1 x 13 mm GIB Fyreline® | 60/60/60 |
| GBTL 90 | 1 x 16 mm GIB Fyreline® | 90/90/90 |
| GBTL 120 | 2 x 16 mm GIB Fyreline® | 120/120/120 |
| Steel framing | | |
| GBSL 15 | 1 x 13 mm GIB® Standard | 15/15/15 |
| GBSL 30a | 1 x 16 mm GIB Fyreline® | 30/30/30 |
| GBSL 30b | 2 x 10 mm GIB Fyreline® | 30/30/30 |
| GBSL 60a | 1 x 19 mm GIB Fyreline® | 60/60/60 |
| GBSL 60b | 2 x 13 mm GIB Fyreline® | 60/60/60 |
| GBSL 90 | 1 x 16 mm GIB Fyreline® + 1 x 13 mm GIB Fyreline® | 90/90/90 |
| GBUW 120 | 2 x 19 mm GIB Fyreline® | 120/120/120 |

It is also considered the following variations would not prejudice the fire resistance of the wall system:

- Stainless steel fasteners securing the Integra panel to the framing with minimum of three 14g x 100 mm to each stud.
- Any underlay complying with the requirements of the New Zealand Building Code documents C/AS1 and C/AS2 for Fire Safety
- Any insulation within the timber framing as specified by Winstone Wallboards for fire rated systems.
- Panel thickness increased to 75 mm.
- Reduction in stud spacing from maximum of 600 mm centres.
- Increase in stud dimensions i.e. from 90 mm x 45 mm to 140 mm x 45 mm for timber framed walls or 64 mm to 76 mm studs for steel framed walls.
- The Integra panels maybe mounted on 20 mm or 40 mm thick timber battens



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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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DOCUMENT REVISION STATUS

| ISSUE NO. | DATE ISSUED | REVIEW DATE | DESCRIPTION |
|-----------|---------------|---------------|---|
| 01 | 15 March 2016 | 15 March 2021 | Initial Issue |
| 02 | 15 April 2021 | 15 April 2026 | Re-issued to include additional details (BRANZ reference FC12996) |



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1. INTRODUCTION

This report gives BRANZ's assessment of the fire resistance of Resene Construction Systems Integra loadbearing timber or steel framed wall system in accordance AS 1530.4-2005/2014.

Figure 1 and Figure 2 show a sectional view and a general exploded view of the wall system.

2. BACKGROUND

In BRANZ fire resistance test FR 5740 a loadbearing timber framed wall comprising one layer of 10 mm GIB® Standard plasterboard on the unexposed face and 50 mm horizontal Integra AAC panels on the exposed face was tested. The Integra panels were mounted on 20 mm thick timber battens and two of the framing cavities were filled with polyester insulation. The wall was tested in accordance with AS 1530.4-2005 and found to achieve the following:

| | |
|---------------------|-------------|
| Structural Adequacy | 167 minutes |
| Integrity | 167 minutes |
| Insulation | 159 minutes |

On behalf of Winstone Wallboards Limited, BRANZ has undertaken a number of fire resistance tests and assessments on timber and steel framed plasterboard wall systems in accordance with AS 1530.4 in support of their BRANZ appraised technical manual:

Winstone Wallboards Ltd GIB® Fire Rated Systems Specification and installation manual (October 2018)

3. DISCUSSION

3.1 AS 1530.4-2005 vs 2014

With respect to tests on a loadbearing wall system, it is considered that there are no significant differences between the 2005 and 2014 versions of the AS 1530.4 test standard. It is therefore considered that the wall tested in accordance with the 2005 version of the test standard are expected to achieve the same fire resistance if tested in accordance with AS 1530.4:2014.

3.2 Integra Lightweight Concrete Façade Systems

3.2.1 Timber framed system

3.2.1.1 Fire from the Integra panel side

In BRANZ fire resistance test FR 5740 the fire exposure was from the Integra face and the system achieved a fire resistance rating (FRR) of at least 120/120/120. The unexposed face lining was 10 mm GIB® Standard plasterboard which is the thinnest and least fire resistant of the range of GIB® plasterboard linings listed in the *Winstone Wallboards Ltd GIB® Fire Rated Systems Specification and installation manual (October 2018)*. It is therefore considered that lining the unexposed face with any of the GIB® plasterboard products given in the *GIB® Fire Rated Systems Specification and installation manual (October 2018)* would not be detrimental to the Integra wall system with fire exposure from the Integra face.



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3.2.1.2 Fire exposure from the GIB® plasterboard face

In BRANZ fire resistance test FR 5740 the Integra panel was exposed to the furnace conditions. This assessment considers fire exposure from the plasterboard face and changing the GIB® plasterboard lining depending on the FRR required.

Table 1 lists the fire rated loadbearing timber stud wall systems listed in the *Winstone Wallboards Ltd GIB® Fire Rated Systems Specification and installation manual (October 2018)*.

Table 1: Winstone Wallboards timber framed loadbearing wall systems

| Reference | Lining Each Side | FRR |
|-----------|-------------------------|-------------|
| GBTL 15 | 1 x 10 mm GIB® Standard | 15/15/15 |
| GBTL 30 | 1 x 10 mm GIB Fyrelite® | 30/30/30 |
| GBTL 60 | 1 x 13 mm GIB Fyrelite® | 60/60/60 |
| GBTL 90 | 1 x 16 mm GIB Fyrelite® | 90/90/90 |
| GBTL 120 | 2 x 16 mm GIB Fyrelite® | 120/120/120 |

The systems in Table 1 have been assessed as demonstrating their stated FRRs when exposed from the plasterboard side of the wall. Each system is loadbearing which means that the timber framing has been designed to limit the extent of charring sufficient to maintain the loadbearing capacity of the wall. The Integra panels are fixed to the timber framing which, as a consequence of the plasterboard lining providing protection, is considered to remain intact and support the Integra panels for the duration of the stated FRR.

For the systems to maintain their expected FRR with fire exposure from either direction, the most onerous direction must be chosen. In this case for all systems given in Table 2, except for the GBTL 120 system which has an equal FRR from either direction, the most onerous direction is from the plasterboard lining side and the systems would therefore achieve an FRR from either direction as given in Table 2.

Table 2: Integra Lightweight Concrete Façade Systems with 50 mm Integra Panel

| Reference | Description | FRR |
|-----------|-------------------------|-------------|
| GBTL 15 | 1 x 10 mm GIB® Standard | 15/15/15 |
| GBTL 30 | 1 x 10 mm GIB Fyrelite® | 30/30/30 |
| GBTL 60 | 1 x 13 mm GIB Fyrelite® | 60/60/60 |
| GBTL 90 | 1 x 16 mm GIB Fyrelite® | 90/90/90 |
| GBTL 120 | 2 x 16 mm GIB Fyrelite® | 120/120/120 |



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3.2.2 Steel framing

It is proposed to modify the Integra Façade System by changing the tested timber framing with steel framing. The fixing of the Integra panel is to remain the same as tested, with three 14g x 100 mm screws per stud, only the framing will change.

The performance of steel at elevated temperatures is well understood with the steel strength reducing with increasing temperature. It is generally considered that if the steel stud temperature is kept below 450 °C. For exposure from the Integra panel face it is therefore expected that loadbearing steel studs would have maintained the Structural Adequacy criteria for at least 120 minutes. Where the wall is exposed from the plasterboard side protection is provided by the linings for up to 120 minutes.

The *Winstone Wallboards Ltd GIB® Fire Rated Systems Specification and installation manual (October 2018)* include a number of load bearing steel stud plasterboard walls, which are included in Table 3 below.

Table 3: Winstone Wallboards steel framed loadbearing systems

| Reference | Lining Each Side | FRR |
|-----------|--|-------------|
| GBSL 15 | 1 x 13 mm GIB® Standard | 15/15/15 |
| GBSL 30a | 1 x 16 mm GIB Fyrelite® | 30/30/30 |
| GBSL 30b | 2 x 10 mm GIB Fyrelite® | 30/30/30 |
| GBSL 60a | 1 x 19 mm GIB Fyrelite® | 60/60/60 |
| GBSL 60b | 1 x 13 mm GIB Fyrelite® | 60/60/60 |
| GBSL 90 | 1 x 16 mm GIB Fyrelite® +1 x 13 mm GIB Fyrelite® | 90/90/90 |
| GBUW 120 | 2 x 19 mm GIB Fyrelite® | 120/120/120 |

Further to section 3.2.1.2 the above systems have been deemed to achieve their stated FRR's with steel framing as loadbearing walls. If the Integra wall system is lined with the GIB® plasterboard as given in Table 3 above it is considered that the stated FRR will be achieved from either face.

3.3 System Variations

The following system variations are not considered to be detrimental to the FRR of the Integra Lightweight Concrete Façade Systems.

- Stainless steel fasteners securing the Integra panel to the framing with minimum of three 14g x 100 mm to each stud as tested in FR 5740.
- Any underlay complying with the requirements of the New Zealand Building Code documents C/AS1 and C/AS2 for Fire Safety.
- Any insulation within the timber framing as specified by Winstone Wallboards for fire rated systems.
- Panel thickness increased to 75 mm.
- Reduction in stud spacing from maximum of 600 mm centres.
Increase in stud dimensions i.e. from 90 mm x 45 mm to 140 mm x 45 mm for timber framed walls or 64 mm to 76 mm studs for steel framed walls.
- The Integra panels maybe mounted on 20 mm or 40 mm thick timber battens.



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4. CONCLUSION

It is considered that the following Resene Construction Systems Integra loadbearing framed wall systems would achieve the stated fire resistance ratings (FRRs) if tested in accordance with AS 1530.4-2005/2014 when exposed from either direction as follows:

| GIB [®] reference | Description | FRR |
|----------------------------|--|-------------|
| Timber framing | | |
| GBTL 15 | 1 x 10 mm GIB [®] Standard | 15/15/15 |
| GBTL 30 | 1 x 10 mm GIB Fyrelite [®] | 30/30/30 |
| GBTL 60 | 1 x 13 mm GIB Fyrelite [®] | 60/60/60 |
| GBTL 90 | 1 x 16 mm GIB Fyrelite [®] | 90/90/90 |
| GBTL 120 | 2 x 16 mm GIB Fyrelite [®] | 120/120/120 |
| Steel framing | | |
| GBSL 15 | 1 x 13 mm GIB [®] Standard | 15/15/15 |
| GBSL 30a | 1 x 16 mm GIB Fyrelite [®] | 30/30/30 |
| GBSL 30b | 2 x 10 mm GIB Fyrelite [®] | 30/30/30 |
| GBSL 60a | 1 x 19 mm GIB Fyrelite [®] | 60/60/60 |
| GBSL 60b | 2 x 13 mm GIB Fyrelite [®] | 60/60/60 |
| GBSL 90 | 1 x 16 mm GIB Fyrelite [®] +1 x 13 mm GIB Fyrelite [®] | 90/90/90 |
| GBUW 120 | 2 x 19 mm GIB Fyrelite [®] | 120/120/120 |

It is also considered the following variations would not prejudice the fire resistance of the wall system:

- Stainless steel fasteners securing the Integra panel to the framing with minimum of three 14g x 100 mm to each stud.
- Any underlay complying with the requirements of the New Zealand Building Code documents C/AS1 and C/AS2 for Fire Safety
- Any insulation within the timber framing as specified by Winstone Wallboards for fire rated systems.
- Panel thickness increased to 75 mm.
- Reduction in stud spacing from maximum of 600 mm centres.
- Increase in stud dimensions i.e. from 90 mm x 45 mm to 140 mm x 45 mm for timber framed walls or 64 mm to 76 mm studs for steel framed walls.
- The Integra panels maybe mounted on 20 mm or 40 mm thick timber battens



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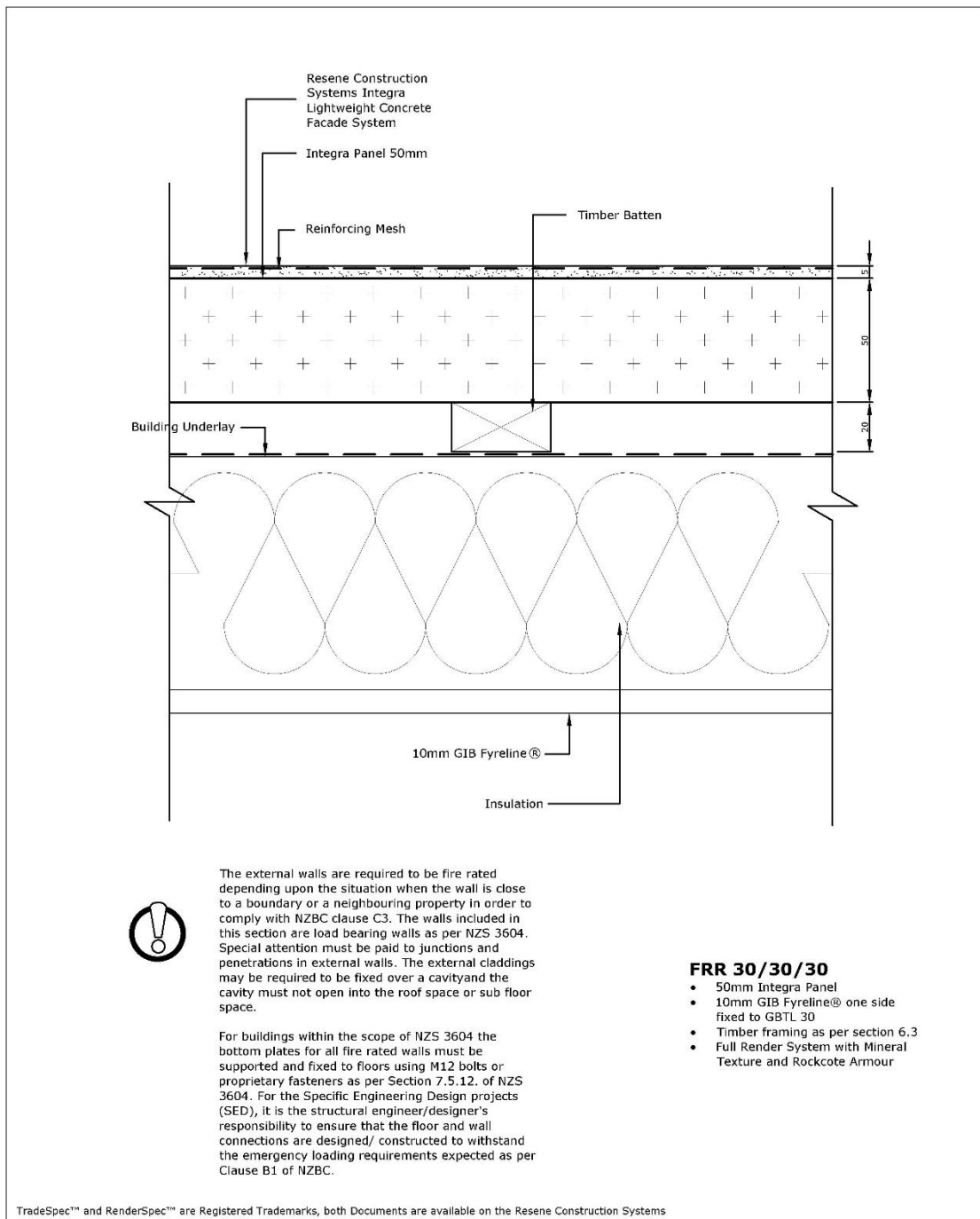
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Figure 1: Client supplied drawing 2 Way Firewall Cross-section FRR = 30/30/30




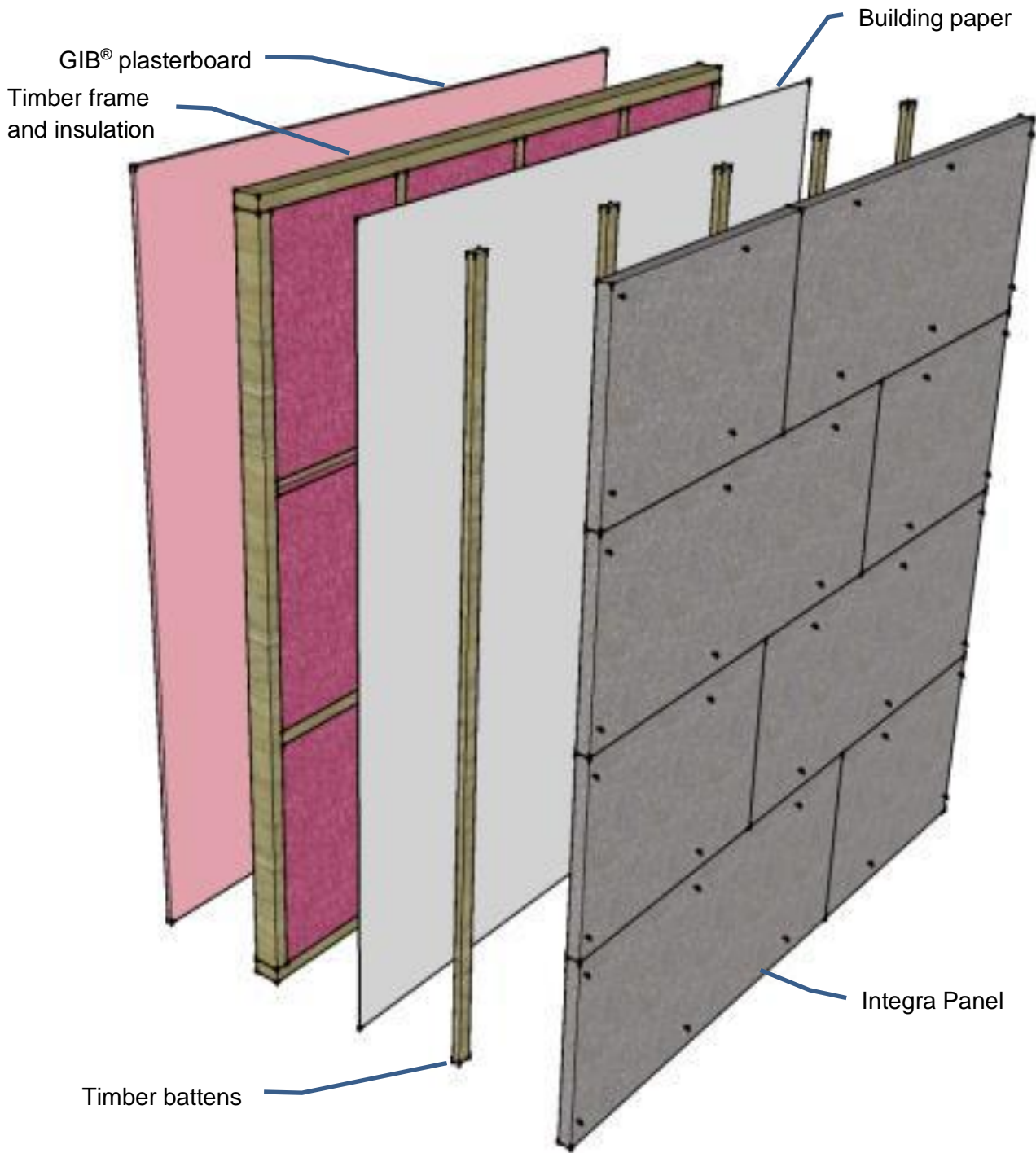
| | | |
|---|--|-----------------|
|  <p><small>CONFIDENTIALITY: No part of this publication may be reproduced or transmitted other than the intended use by Resene Construction Systems without written consent from the author.</small></p> | System | Scale |
| | Integra Lightweight Concrete Facade System | 1 : 2 @ A4 |
| | Substrate | Date |
| | Integra Panel 50mm | 2 December 2015 |
| | Drawing Name | Sheet |
| | 2 Way Firewall Cross Section - 30FRR | 10.18.50 |

Figure 2: Exploded view of timber wall construction



FAR 4552 C1 Issue 2

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 Systems
10B Abros Place
Burnside
Christchurch
New Zealand

Reference BRANZ Reports FAR 4552 Issue 2

Referenced Standard AS1530.4-2005/2014

Specimen Name: Integra Lightweight Concrete Façade Systems

Specimen Description: Loadbearing timber or steel framed wall system with 50 mm or 75 mm Integra Panels on one face and GIB® plasterboard linings on the other face as given below.

Orientation: Exposure from either side


The assessed results were as follows:

| Framing | GIB® reference | Description | FRR |
|----------------|----------------|--|-------------|
| Timber framing | GBTL 15 | 1 x 10 mm GIB® Standard | 15/15/15 |
| | GBTL 30 | 1 x 10 mm GIB Fyrelime® | 30/30/30 |
| | GBTL 60 | 1 x 13 mm GIB Fyrelime® | 60/60/60 |
| | GBTL 90 | 1 x 16 mm GIB Fyrelime® | 90/90/90 |
| | GBTL 120 | 2 x 16 mm GIB Fyrelime® | 120/120/120 |
| Steel framing | GBSL 15 | 1 x 13 mm GIB® Standard | 15/15/15 |
| | GBSL 30a | 1 x 16 mm GIB Fyrelime® | 30/30/30 |
| | GBSL 30b | 2 x 10 mm GIB Fyrelime® | 30/30/30 |
| | GBSL 60a | 1 x 19 mm GIB Fyrelime® | 60/60/60 |
| | GBSL 60b | 2 x 13 mm GIB Fyrelime® | 60/60/60 |
| | GBSL 90 | 1 x 16 mm GIB Fyrelime® +1 x 13 mm GIB Fyrelime® | 90/90/90 |
| | GBUW 120 | 2 x 19 mm GIB Fyrelime® | 120/120/120 |

It is also considered the following variations would not prejudice the fire resistance of the wall system:

- Stainless steel fasteners securing the Integra panel to the framing with minimum of three 14g x 100 mm to each stud.
- Any underlay complying with the requirements of the New Zealand Building Code documents C/AS1 and C/AS2 for Fire Safety
- Any insulation within the timber framing as specified by Winstone Wallboards for fire rated systems.
- Reduction in stud spacing from maximum of 600 mm centres.
Increase in stud dimensions i.e. from 90 mm x 45 mm to 140 mm x 45 mm for timber framed walls or 64 mm to 76 mm studs for steel framed walls.
- The Integra panels may be mounted on 20 mm or 40 mm thick timber battens

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Issue Date

15 April 2021

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E. Soja
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Expiry Date

15 April 2026

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