



Fire Safety Design Report



Boiler Room Alterations

South End School
275 High Street South
Carterton

Reference	Revision	Date	Comment
17082R01	A	6 th June 2017	

INTRODUCTION

This assessment has been undertaken in order to review the proposed boiler room alterations within the existing classroom block at South End Primary School, 275 High Street South, Carterton and report on the fire safety requirements of the NZ Building Act 2004 and New Zealand Building Code.

FIRE ENGINEERING DESIGN PHILOSOPHY

This assessment has been undertaken in accordance with Section 112 of the New Zealand Building Act 2004 and has taken into consideration the requirements of the New Zealand Building Code (NZBC) clauses C/AS4 (Fire Safety), F6/AS1 (Visibility in Escape Routes), F7/AS1 (Warning Systems) and F8/AS1 (Signs).

NZ FIRE SERVICE

According to “Building Controls Update No. 132: Gazette notice updated for fire design review” and “Gazette Notice 49”, designs for building consent must be submitted to the Fire Service Commission **when both criteria 1 and 2 below are met:**

Criteria 1 - Building type

Only the following types of buildings require designs be submitted to the Fire Service Commission (provided the design/building work meets one of Criteria 2 below):

Buildings (or parts of buildings) used for:

- gathering together of 100 or more people (for any purpose)
- employment for 10 or more people
- accommodation for 6 or more people (other than in 3 or fewer household units)
- hazardous substances in quantities exceeding prescribed minimum amounts
- early childhood facilities
- nursing, medical, or geriatric care
- specialised care for persons with disabilities

- lawful detention of people (not home or community detention).

Excluding the following:

- Crown buildings that are specified by the Minister in the Gazette premises of diplomatic missions
- single household units
- buildings in which every fire-cell is a household unit separated vertically from the other fire-cells, and each fire-cell has independent and direct egress to a safe place outside the building
- an internal fit-out, unless the fit-out relates to a change of use
- outbuildings or ancillary buildings.

Criteria 2 - Designs/building work type

Consent applications need to be sent to the Fire Service Commission in any of the following circumstances:

- Designs for new buildings using alternative solutions (not using an Acceptable Solution or Verification Method) to comply with any of the following Building Code clauses:
 - C1-C6 Protection from Fire
 - D1 Access routes
 - F6 Visibility in escape routes
 - F8 Signs.
- When waivers or modifications to any of the above Building Code clauses are required.
- Alterations, change of use or subdivisions that have a more than minor effect on fire safety systems.

As the proposed work will not have more than a minor effect on the fire safety systems, **this application for Building Consent is not required to be sent to the NZ DRU.**

FIRE SAFETY AND EVACUATION OF BUILDINGS REGULATIONS 2006 AND HAZARDOUS SUBSTANCES AND NEW ORGANISMS ACT (HSNO)

This fire safety assessment does not take into consideration the requirements of the “Hazardous Substances and New Organisms Act” (HSNO) or the “Fire Safety and Evacuation of Buildings Regulations 2006” and it is important that the owners understand their legal requirements to comply with these legal documents.

A copy of the above Act and Regulation is available free of charge from <http://www.legislation.govt.nz>

BUILDING DESCRIPTION

South End School is a primary school based in Carterton. The block to which the boiler room alteration is proposed is known as Block B. It is single storey and has four classrooms along with the boiler room.

PROJECT DESCRIPTION

The proposed work involves an alteration to reduce the size of the existing coal powered boiler room which is to be converted to a gas system. The resulting available space will be used as a resource room with an internal access door from the adjacent classroom.

BASIS OF REPORT

This assessment has been based on the drawings forming Appendix 1 of this report as well as a site visit undertaken on the 26th of May 2017.

PART 1: GENERAL

Risk group

The principal risk group for the building is CA in accordance with Table 1.1, C/AS4.

Design occupancy

The design occupancy for Block B based on C/AS4 is as follows;

Classrooms / breakout spaces: 330m² approx. / 2.5m² per person = 132 persons

Ancillary areas: used by persons counted elsewhere = 0 persons

Total = 132 persons

The design occupancy is more than actually occurs however will be used for the purposes of this assessment.

PART 2: FIRECELLS, FIRE SAFETY SYSTEMS AND FIRE RESISTANCE RATINGS

Escape heights

The existing building is single storey.

Fire safety systems

The block has an existing Type 2 manual fire alarm system (with supplementary smoke detection) which satisfies the requirements of C/AS4. The Type 2 manual fire alarm system within Block B shall be altered if required to suit the proposed works in accordance with the version of NZS 4512 to which the base system was installed.

A fire hydrant system is not required as the fire service hose run distance is less than 75m to any point of the building.

PART 3: MEANS OF ESCAPE

Number of escape routes

Each space within the building has a minimum of a single means of escape which terminate at a safe place (outside) as indicated on the attached plan and this satisfies the requirements of the Acceptable Solutions.

Escape route width

The clear egress width from the altered area is required to be a minimum of 850mm for horizontal travel (1200mm along the accessible route and 810mm through doorways) in accordance with C/AS4.

Escape route length

The following are the allowable and actual worst case escape distance from the altered area of the building.

Allowable Escape Distance		
	D.E.O.P	T.O.P
CA	20m	50m
Actual Escape Distance		
	D.E.O.P	T.O.P
Worst case	19.5m	28m

The actual escape distances are within the allowable maxima.

Signage

Photo-luminescent (glow in the dark) exit signs shall be provided within the altered block in accordance with clause F8/AS1 as indicated on the attached plan.

Emergency lighting

In accordance with clause F6/AS1 emergency lighting is required to illuminate the areas of escape distance exceeding the initial 20 metres and changes in level as indicated on the floor plan.

PART 4: CONTROL OF INTERNAL FIRE AND SMOKE SPREAD

Fire separation

The new wall between the boiler and the new resource room shall be fire rated to 90/90/90 FRR up to the underside of the roof cladding.

The existing wall between the boiler room and the classroom is plasterboard lined and will continue to comply to at least the same extent as before.

Interior surface finishes

Any new internal surface finishes (paints etc) on ceilings and walls are required to satisfy the group number requirements of Section 4.17.7, C/AS4.

Surface Finishes	
Location	Group Number
> 1.2m off the ground	2S or less
< 1.2m off the ground	3 or less

Please refer to Appendix 2 for the Resene Paint Test data which may be used to satisfy the above requirements.

Penetrations

Any new penetrations through fire rated construction shall be appropriately fire stopped using fire rated collars, wraps, dampers and/or sealants etc as required, installed in accordance with the manufacturer's specifications.

Flooring

The proposed flooring (carpet, vinyl etc) shall have a critical radiant heat flux of not less than that specified in Table 4.2 of C/AS4 being 2.2 kW/m². This information can be obtained from the flooring manufacturer.

Suspended flexible fabrics (curtains etc)

New suspended flexible fabrics (curtains etc) shall have a flammability index of no greater than 12 when tested to AS 1530 Part 2. This information may be obtained from the manufacturer.

Boiler room

The boiler room will be separated with 90/90/90 FRR construction, has an external exit direct to the outside and the floor level will be no lower than the ground level outside the external wall. Thereby the requirements of paragraph 4.10.3 of C/AS4 are satisfied.

PART 5: CONTROL OF EXTERNAL FIRE SPREAD

The external walls of the boiler room to which the alterations are proposed are remote from the boundaries and are therefore permitted to be 100% unprotected.

FIRE SAFETY INSPECTIONS

Any fire safety construction inspections required as part of the Building Consent can be carried out by the Building Consent Authority. There are no specific inspections required to be carried out by a Fire Engineer.

COMPLIANCE SCHEDULE

The proposed emergency lighting shall be installed and maintained in accordance with AS/NZS 2293.2:1995.

MINISTRY OF EDUCATION FIRE SAFETY AND DESIGN GUIDELINES

The following describes additional fire safety recommendations of the Ministry of Education (M.o.E) for state schools. These recommendations are derived from the recently issued Ministry of Education Fire Safety and Design Guidelines for Schools July 2008, and where these requirements exceed those of the building code these have been identified as M.o.E requirements, and the decision as to whether these are to be incorporated or not, is a decision for the school board of trustees.

Means of escape

There are a minimum of a single means of escape from each space having less than 50 persons which satisfy the M.o.E guidelines.

Fire fighting facilities

The guideline require fire service vehicle stand areas to be provided within 18 metres from the building to be protected and this requirement is satisfied.

There is no requirement to provide fire hose reels. Note however that the NZFS may require provision of portable multi-purpose dry-powder fire extinguishers (for combined fire classes

A, B and E) under regulation 10 of the Fire Safety and Evacuation Regulations 1992. Discuss the provision of appropriate portable fire extinguishers, including training in their use, with the NZ Fire Service.

Fire alarm

The M.o.E requires that the existing manual fire alarm system be retained and altered as outlined in accordance with the version of NZS 4512 to which the base system was installed.

Sprinklers

The existing block is not classed as a new school nor is the extension resulting in the block exceeding 1000m², and therefore there is no requirement to provide sprinklers in accordance with the other M.o.E Guidelines.

Building separations

For buildings of single storey construction, the M.o.E guidelines require a building separation of not less than 6m from other buildings on the school site. Separation is to be measured from the maximum point of eaves overhang. The existing building satisfies this requirement.

Surface finishes

New surface finishes should meet the requirements of the NZBC as specified above and therefore will satisfy the M.o.E requirements.

Fire separations

Except where sprinklered, school buildings are required to be subdivided with 60 minute fire separation so as to create a maximum firecell size of three classrooms. The existing building has four classrooms and is considered to comply to at least the same extent as before.

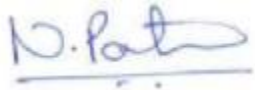
SUMMARY

1. The School Board of Trustees and the Ministry of Education are to approve the fire safety proposals as specified in this report.
2. The Type 2 manual fire alarm system within Block B shall be altered if required to suit the proposed works in accordance with the version of NZS 4512 to which the base system was installed.
3. The clear egress width from the altered area is required to be a minimum of 850mm for horizontal travel (1200mm along the accessible route and 810mm through doorways) in accordance with C/AS4.
4. Photo-luminescent (glow in the dark) exit signs shall be provided within the altered block in accordance with clause F8/AS1 as indicated on the attached plan.
5. In accordance with clause F6/AS1 emergency lighting is required to illuminate the areas of escape distance exceeding the initial 20 metres and changes in level as indicated on the floor plan.
6. The wall between the boiler and resource room shall be fire rated to 90/90/90 FRR up to the underside of the roof cladding.
7. The floor level of the gas fired boiler room shall be no lower than the ground level outside the external wall as required by paragraph 4.1.3 (c) C/AS4.
8. Any new interior surface finishes (paints etc) on ceilings and walls shall comply with the requirements of this report.
9. Any new penetrations through fire rated construction shall be appropriately fire stopped using fire rated collars and/or sealants etc as required, installed in accordance with the manufacturer's specifications.
10. Any new flooring (carpet, etc) shall have a critical radiant heat flux of not less than that specified in this report.

11. Any new suspended flexible fabrics (curtains etc) shall have a flammability index of no greater than 12 when tested to AS 1530 Part 2.

Report Prepared by

Vishnu Fire Safety Limited



Nirav Patel

Fire Engineer / Director

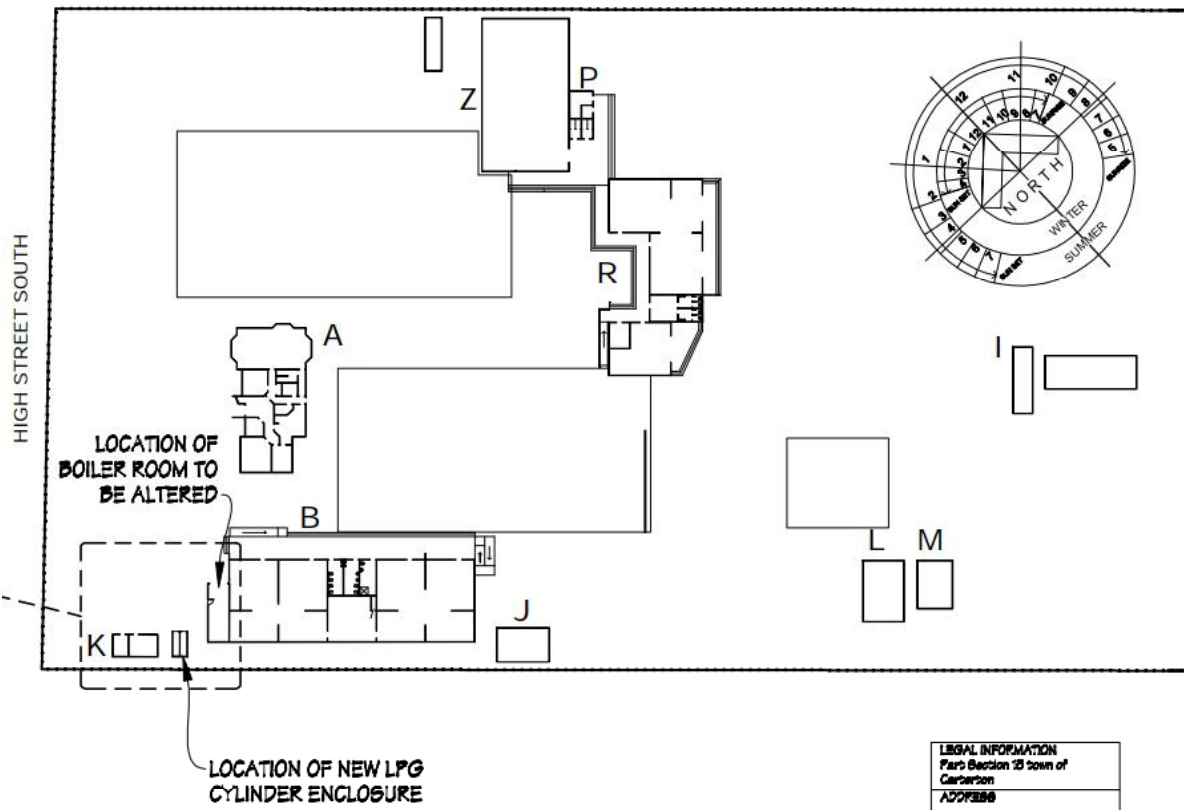
BBSc, G.Dip (Fire.Safe.Eng)

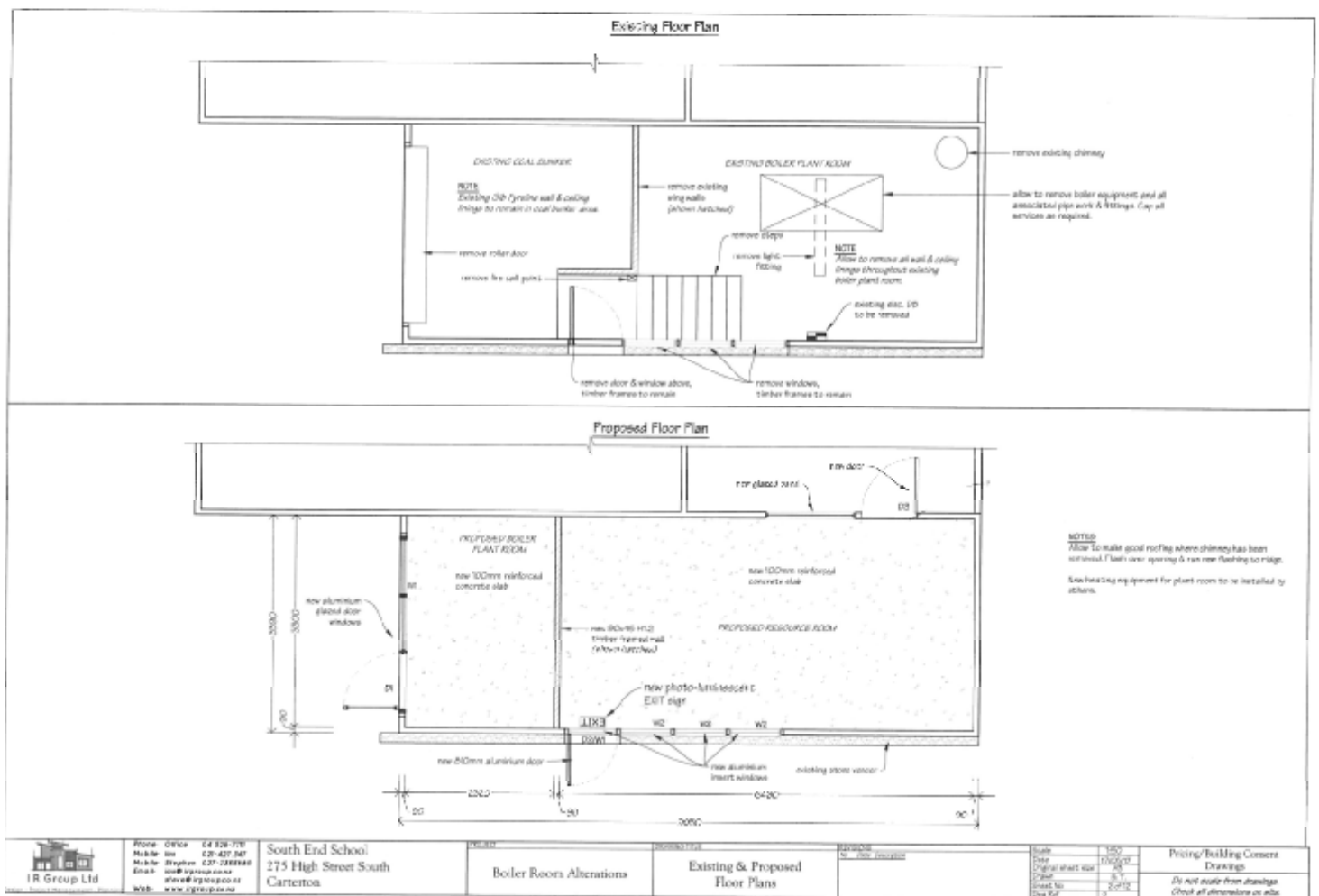
nirav@vishnufiresafety.co.nz

APPENDIX 1

DRAWINGS

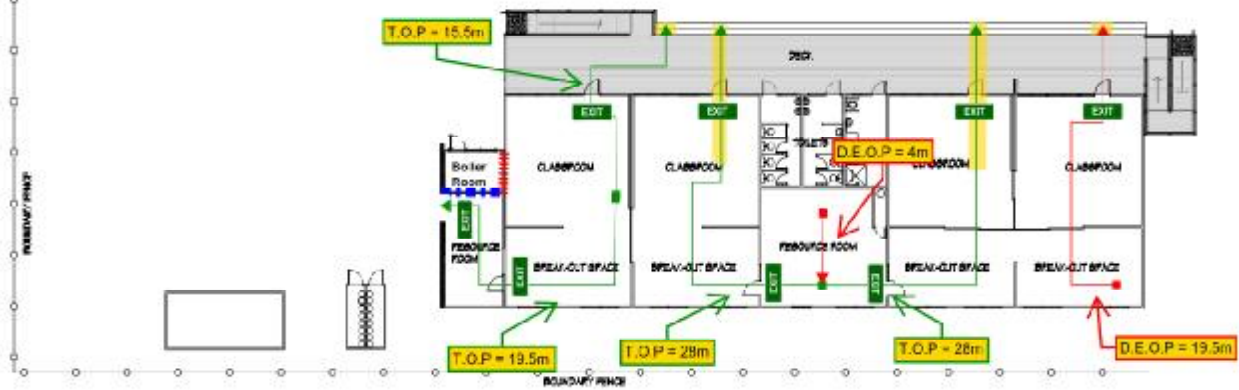
Site Plan
scale 1/150





REV A 06/06/2017

- Area to be covered by emergency lighting to clause F6/AS1
- EXIT
- Photo - luminescent (glow in the dark) exit signs to clause F8/AS1
- Wall to be fire rated to 90/90/90 FRR upto underside of roof cladding
- Existing wall unaltered and will continue to comply ANARP



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APPENDIX 2

RESENE PAINT TEST INFORMATION

Resene Paint Systems - Fire Ratings



The listed Resene paint systems over the listed substrate have been fire tested using a cone calorimeter in accordance with ISO 5660 to determine Group Classification in accordance with New Zealand Building Code (NZBC) Verification Method C/VM2 Appendix A; National Construction Code (NCC) Volume One Specification C1.10 and A2.4 of the Building Code of Australia

Substrate	Undercoat (1 coat unless otherwise stated)	Topcoat (2 coats unless otherwise stated)	Indicated Group No.	Test Report
10mm Paperfaced Plasterboard	Resene Broadwall Waterborne Wallboard Sealer (SR 10 sqm/L)	Resene SpaceCote Low Sheen (SR 15 sqm/L)	1-S (NZBC) 1 (NCC)	FH4967
10mm Paperfaced Plasterboard	Resene Broadwall Waterborne Wallboard Sealer (SR 10 sqm/L)	Resene SpaceCote Flat (SR 15 sqm/L)	1-S (NZBC) 1 (NCC)	FH4967
10mm Paperfaced Plasterboard	Resene Broadwall Waterborne Wallboard Sealer (SR 10 sqm/L)	Resene Zylone Sheen (SR 15 sqm/L)	1-S (NZBC) 1 (NCC)	FH4967
10mm Paperfaced Plasterboard	Resene Broadwall Waterborne Wallboard Sealer (SR 10 sqm/L)	Resene Ceiling Paint (SR 12 sqm/L)	1-S (NZBC) 1 (NCC)	FH4967
10mm Paperfaced Plasterboard	Resene Sureseal (SR 15 sqm/L)	Resene SpaceCote Flat (SR 14 sqm/L)	1-S (NZBC) 1 (NCC)	7-593235-CO
10mm Paperfaced Plasterboard	Resene Sureseal (SR 15 sqm/L)	Resene Lustacryl (SR 14 sqm/L)	1-S (NZBC) 1 (NCC)	7-593262-CO
13mm Paperfaced Plasterboard	Resene Broadwall Waterborne Wallboard Sealer (SR 11 sqm/L)	Resene ClinicalCote Satin (SR 14 sqm/L)	1-S (NZBC) 1 (NCC)	FH4925
13mm Paperfaced Plasterboard	Resene Broadwall Waterborne Wallboard Sealer (SR 11 sqm/L)	Resene ClinicalCote Low Sheen (SR 15 sqm/L)	1-S (NZBC) 1 (NCC)	FH4925
13mm Paperfaced Plasterboard	Resene Broadwall 3 in 1 (SR 2.5 sqm/L)	Resene ClinicalCote Satin (SR 14 sqm/L)	1-S (NZBC) 1 (NCC)	FH4925
13mm Paperfaced Plasterboard	Resene Broadwall 3 in 1 (SR 2.5 sqm/L)	Resene ClinicalCote Low Sheen (SR 15 sqm/L)	1-S (NZBC) 1 (NCC)	FH4925
13mm Paperfaced Plasterboard	Resene Broadwall Surface Prep & Seal (SR 6 sqm/L)	Resene ClinicalCote Satin (SR 14 sqm/L)	1-S (NZBC) 1 (NCC)	FH4925
13mm Paperfaced Plasterboard	Resene Broadwall Surface Prep & Seal (SR 6 sqm/L)	Resene ClinicalCote Low Sheen (SR 15 sqm/L)	1-S (NZBC) 1 (NCC)	FH4925
13mm Paperfaced Plasterboard	Resene Broadwall 3 in 1 (2 coats) (SR 7 sqm/L)	-	1-S (NZBC) 1 (NZBC)	FAR3981
13mm Paperfaced Plasterboard	Resene Broadwall 3 in 1 (SR 7 sqm/L)	Resene Zylone Sheen VOC Free (SR 16 sqm/L)	1-S (NZBC) 1 (NZBC)	FAR3981
13mm Paperfaced Plasterboard	Resene Broadwall 3 in 1 (SR 7 sqm/L)	Resene SpaceCote Low Sheen (SR 16 sqm/L)	1-S (NZBC) 1 (NZBC)	FAR3981
13mm Paperfaced Plasterboard	Resene Waterborne Smooth Surface Sealer (SR 12 sqm/L)	Resene SpaceCote Low Sheen (SR 16 sqm/L)	1-S (NZBC) 1 (NZBC)	FAR3981
13mm Paperfaced Plasterboard	Resene Broadwall Waterborne Wallboard Sealer (SR 10 sqm/L)	Resene Ceiling Paint (SR 12 sqm/L)	1-S (NZBC) 1 (NZBC)	FAR3981
6mm Fibre Cement Board	Resene Quick Dry (SR 12 sqm/L)	Resene Uracryl 802 (SR 16 sqm/L)	1-S (NZBC) 1 (NCC)	FH5139*
6mm Fibre Cement Board	Resene Quick Dry (SR 12 sqm/L)	Resene Uracryl 803 (SR 16 sqm/L)	1-S (NZBC) 1 (NCC)	FH5139*
6mm Fibre Cement Board	Resene Sureseal (SR 12 sqm/L)	Resene Uracryl 802 (SR 16 sqm/L)	1-S (NZBC) 1 (NCC)	FH5139*

6mm Fibre Cement Board	Resene Sureseal (SR 12 sqm/L)	Resene Uracryl 803 (SR 16 sqm/L)	1-S (NZBC) 1 (NCC)	FH5139*
8mm MDF	Resene Quick Dry (SR 12 sqm/L)	Resene Fireguard (SR 3.5 sqm/L)	3 (NZBC) 3 (NCC)	FH5137
8mm MDF	Resene Quick Dry (SR 12 sqm/L)	Resene Fireguard (SR 3.5 sqm/L), Resene SpaceCote Low Sheen (SR 14 sqm/L)	3 (NZBC) 3 (NCC)	FH5137
18mm MDF	Resene Quick Dry (SR 12 sqm/L)	Resene Fireguard (SR 3.5 sqm/L)	3 (NZBC) 3 (NCC)	FH5137
18mm MDF	Resene Quick Dry (SR 12 sqm/L)	Resene Fireguard (SR 3.5 sqm/L), Resene SpaceCote Low Sheen (SR 14 sqm/L)	3 (NZBC) 3 (NCC)	FH5137
9mm thick 'A' grade plywood	Resene Aquaclear Semi-Gloss	Resene Aquaclear Semi-Gloss (3 coats SR 12 sqm/L)	3 (NZBC)	FAR3981
≥ 26mm Metrapanel	Pre-primed	Resene Fireguard (SR 1 sqm/L), Resene SpaceCote Low Sheen (SR 16 sqm/L)	1-S (NZBC) 1 (NCC)	FH5334

Notes:

Test reports give the Group rating determined by application of a paint system to a given substrate thickness. The same Group rating applies to the paint system applied to greater thicknesses of the substrate given in the test report.

The Group rating of a given substrate coated with a standard 3 coat acrylic paint system will be the same as the uncoated substrate.

FH5139*

It is considered that the resulting Group Classifications achieved by paint systems on fibre cement substrates would not be adversely affected if applied to a concrete substrate. Paint system applied at coverage rates not less than the minimum specified for the fibre cement substrate.

31 Jan 2014