DN 14401

COMPLIANCE & ELECTRICAL SAFETY CERTIFICATE

DELTA
THINK.INFRASTRUCTURE

1 LOCATION OF INSTALLATION

ADDRESS: 44 Leven St, Bel.

2 CUSTOMER INFORMATION

NAME: Ferro

POSTAL ADDRESS: 18 Jubilee St, Bellhaven, Bel

EMAIL:

PHONE (03) 453 4971

3 ELECTRICAL WORKER INFORMATION

NAME: STUART SHIELDS REGISTRATION: I 254648

ORGANISATION: Delta PHONE: 021 2722343

EMAIL: PERSON BEING SUPERVISED:

4 WORK DETAILS

THE WORK IS: (CIRCLE) ADDITIONS **ALTERATIONS** (circled) NEW WORK

THE PRESCRIBED ELECTRICAL WORK IS: (TICK) ◯ HIGH RISK ☑ GENERAL ◯ LOW RISK

◯ THE HOMEOWNER HAS UNDERTAKEN PART OF THE ELECTRICAL INSTALLATION WORK

TICK IF WORK INCLUDES ◯ Mains ◯ MEN switchboard closest to point of supply ◯ Main Earthing System ◯ Electrical Lines

BRIEF DESCRIPTION:

Installed meter's, Test mains 780 Mn TPS. Tail to comm. Cover, Polarity check, load test meter, Certify issued.

5 CERTIFICATION OF WORK

I certify that the completed prescribed electrical work to which this certificate applies, has been done lawfully and safely and the information in the certificate is correct in that the installation, or part of the installation:

☑ has been installed in accordance with a certified design

◯ has an earthing system that is correctly rated

☑ contains fittings which are safe to connect to a power supply

☑ relies on supplier's Declaration of Conformity (attach or reference[1])

☑ relies on manufacturers instructions (attach or reference[1])

☑ has been satisfactorily tested in accordance with Electricity (Safety) Regulations 2010

☑ is safe to connect

TEST RESULTS

	Electrical Worker	Inspector
Polarity (independent earth):		✓
Insulation resistance:		780 Mn
Earth continuity:		
Bonding:		
Other (specify)		

ELECTRONIC REFERENCE: Delta Meter.

ELECTRICAL WORKER'S SIGNATURE: [signature] DATE: 10-10-16

1 If it is impractical to attach a copy of a particular manufacturers instructions, or of any certified design or supplier declarations of conformity, provide a reference to where the documents can be found, in a readily accessible format, through electronic means.

6 ELECTRICAL SAFETY CERTIFICATE

I certify and that the installation, or part of the installation to which the Electrical Safety Certificate applies is connected to a power supply and is safe to use

u

NAME: STUART SHIELDS REGISTRATION: I 254648

SIGNATURE: [signature] DATE: 10-10-16

(if certifier is different from electrical worker)

CUSTOMER COPY – THIS IS AN IMPORTANT DOCUMENT AND SHOULD BE RETAINED

DN005704

RECORD OF INSPECTION

DELTA
THINK.INFRASTRUCTURE

1 CUSTOMER INFORMATION

NAME: Ferro PHONE: (03) 4534971

LOCATION ADDRESS: 44 Leven St, Brn.

2 ELECTRICAL WORKER INFORMATION

REFERENCE:	NAME:	REGISTRATION:	DATE:
1023	Shane Christian	E18834	10-10-16

3 HIGH RISK CATEGORY

- ○ NOT TO AS/NZS 3000 PART 2 (6A(2)A(I))
- ○ HIGH VOLTAGE INSTALLATION (6A(2)A(II))
- ○ MAINS PARALLEL GENERATION (6A(2)A(III))
- ○ PHOTOVOLTAIC SYSTEM (6A(2)A(IV))
- ○ HAZARDOUS AREA (6A(2)A(V))
- ○ INSTALLATION LOCATED IN A MINE (6A(2)A(VI))
- ○ ELECTRICAL MEDICAL AREA (6A(2)A(VII))
- ✓ MAINS WORK (6A(2)B)
- ○ ANIMAL STUNNING OR MEAT CONDITIONING (6A(2)A(V))
- ○ OTHER Please describe

4 WORK DETAILS

THE WORK IS: (CIRCLE) ADDITIONS **(ALTERATIONS)** NEW WORK

THE PRESCRIBED ELECTRICAL WORK IS: (TICK) ✓ HIGH RISK ○ GENERAL ○ LOW RISK

○ MAINS ✓ SWITCH BOARD ○ MAIN EARTH ✓ METERING ○ ELECTRICAL LINES ○ OTHER

Visual check on replaced main switchboard, Test existing mains 780 Mn 16 mm² TPS TWIN, Installed meters, live polarity check, Network connection test and check, Main earth existing check.

5 COMPLIANCE AND TEST RESULTS

Specify what the inspection was carried out in accordance with (regulation/s and/or companion standard/s):

✓ AS/NZS 3000 ○ AS/NZS 3003 ○ AS/NZS 5033 ○ AS/NZS 60079 ○ OTHER

WHAT ARE THE RESULTS OF THE INSPECTION: ✓ TEST EQUIPMENT CALIBRATED ○ OTHER RESULTS ATTACHED

P/N LOOP 0.21 Ω PSCC 1k AMPS VOLTAGE 236 V P/E LOOP 91 Ω RESISTANCE OF M.O.E 0.28 Ω

INSULATION OF NETWORK POLE FUSE TO METERBOX/SWITCHBOARD 780 MΩ METERBOX TO SWITCHBOARD >999 MΩ

ANY NON-COMPLIANCE ○ FIXED BEFORE LIVENING

✓ POLARITY CHECKED WITH LINK OUT ✓ CHECKED WITH TRAILING LEAD ○ PHASE ROTATION CHECKED

6 INSPECTION DETAILS

I confirm that the part of the installation, to which this Record of Inspection applies is connected to the network, is safe to use and complies to electrical safety regulations:

✓ HAS BEEN ENLIVENED

NAME: Stuart Stirling REGISTRATION: E254648

SIGNATURE: [signature] DATE: 10-10-16

PHONE: 0212722343 COMPANY: Delta

~~INSPECTOR'S~~ COPY

Pelletronics

Murray Mackie Electrical

PO Box 13161
Green Island
Dunedin

Phone # 03 4882 846

Tax Invoice/Statement

Invoice Date	31/01/2017

GST No:	45-341-275

To:

Paul Ferro,
18 Jubilee Street,
Belleknowes,
Dunedin 9011

Due Date	2/10/2017	Job No	B2277

Description	Qty	Rate	Amount
Account Leven Street			
Replacing all existing circuits in rubber and conduits.			
Replace switch board complete with meter panel , RCDs & MCBs			
Rewire kitchen appliances,plugs and lights			
Retain all existing lights switches with wooden blocks			
Rewire bathroom, light,fan,heater & towel rail.			
Provide sub main to garage, Pay Inspection & Metering charges			
Materials		2,679.13	2,679.13
Labour 107 Hours		5,885.00	5,885.00

Subtotal	$8,564.13
GST	$1,284.62
Total	$9,848.75

Please pay on this Tax Invoice as no Statement will be issued.
Terms strictly 14 days

Goods remain the property of Murray Mackie Electrical until paid for in full

Invoice #	3743

Please Detach and return this portion with your remittance to:
Murray Mackie Electrical
PO Box 13161, Green Island

Bank: 06 0901 0063316 00

Balance Due	$9,848.75

Certificate of Compliance & Electrical Safety Certificate.

Electrical Safety Regulations 2010.

Job Reference: 1023	Company Details

Client: Paul Ferro	Location of installation: 44 Levea St
Address: 18 Jubilee St, Belleknowes Dunedin 9011	Phone #:
	Email:

Certificate of Compliance

This form is to be used to certify low voltage installations or part installations that comply with Part 1 or Part 2 of AS/NZS 3000 and are safe to be connected to a 230/400 volt multiple earthed neutral (MEN) system of electrical supply.

Description of Prescribed Electrical Work Completed.

Install new Switch Board complete RCDs + MCBs Remove all conduits & rubber cables Install new 2.5 TPE cables to Kitchen, Office + Laundry Connect to Existing 16mm MS mains & main earth

0.21Ω PFC 1K 0.236 E 91Ω

	RCD 1	RCD 2	RCD 3	RCD 4
≤	24ma	24ma	24ma	24ma
I	27ms	27ms	27ms	27ms
½I	16ms	16ms	14ms	15ms

Work includes:

Part 1 ○ Part 2 ○

Mains: ✓ Main earthing system: _____

MEN switch board: ✓ Electric lines: _____

This work is: (Circle what is applicable:)

Additions / Alterations / New work; and is: General work / High risk / Low risk / Part installation by Home owner.

I certify that the completed prescribed electrical work to which this certificate applies, has been done lawfully and safely and the information in the certificate is correct in that the installation or part of the installation:

- ○ has been installed in accordance with a certified design
- ○ has an earthing system that is correctly rated
- ○ contains fittings which are safe to connect to a power supply
- ○ relies on manufacturers instructions (attach or reference)
- ○ relies on supplier's Declaration of Conformity (attached or reference)
- ○ has been satisfactorily tested in accordance with Electrical Safety Regulations 2010
- ○ is safe to connect

Test Results

Earth continuity: 0.28Ω

Insulation resistance: >99.9MΩ

Bonding: ✓

Polarity: _____

Other: _____

Electrical Worker's Name: Shane Christian Registration PL #: E 88344

Organisation: Murray Mackie Electrical Telephone number: _____

Electrical Worker's Signature _____ Electronic reference: _____

Names of person(s) being supervised: _____

Electrical Safety Certificate

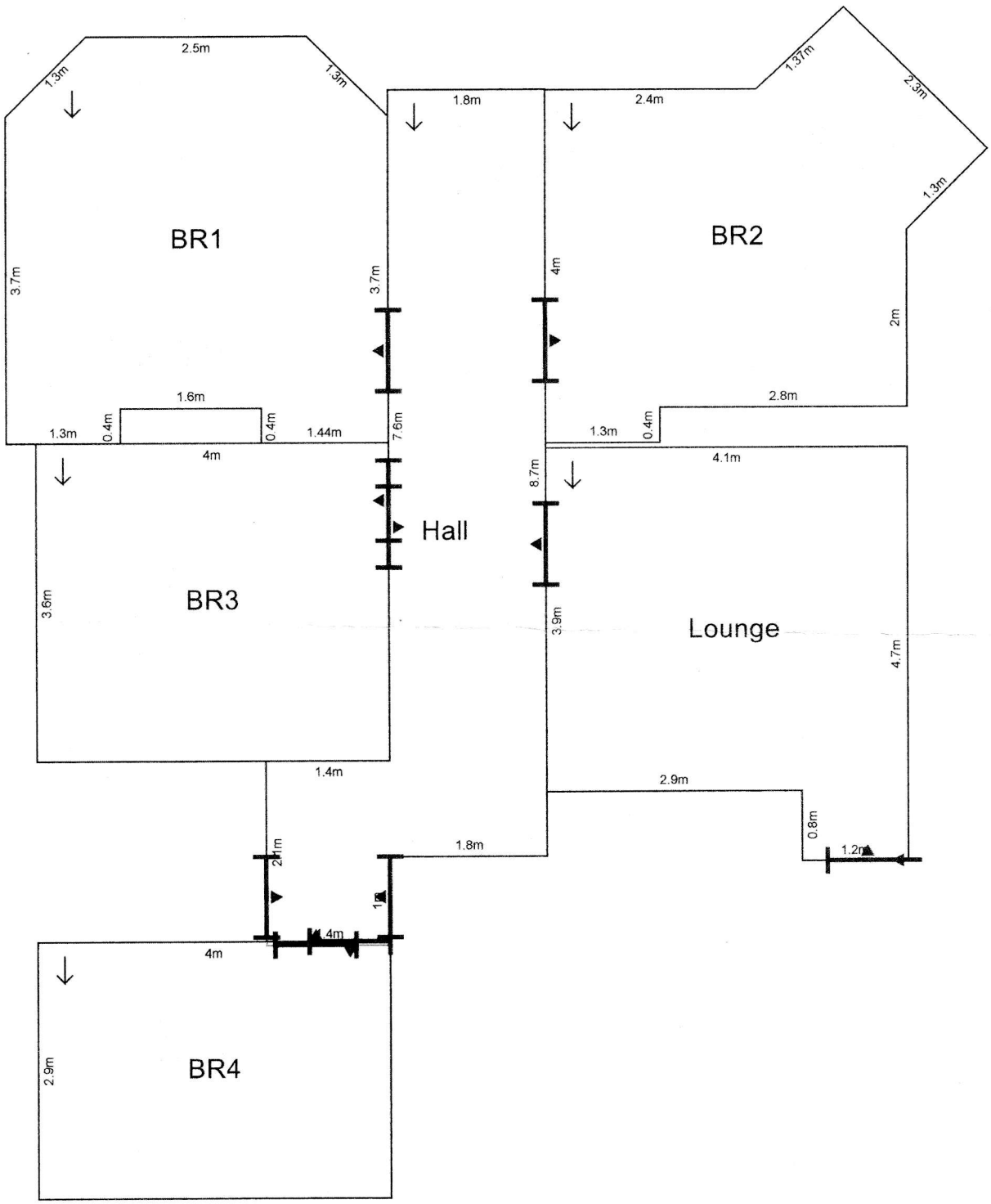
I certify that the installation, or part installation, to which this Electrical Safety Certificate applies, complies with current electrical regulations. The work done complies with the NZ building code, is connected to a power supply, has not adversely affected any other part of this installation, and is safe to use.

Name: SHANE CHRISTIAN Registration PL #: E 18834

Signature: _____ Date: 10-10-16

Appended Documents: _____

44 Leven Street



☐ American Carpet

1 LOCATION PLAN
Diagrammatic Only

LEGAL DESCRIPTION:

PT LOT 8 BLK V DEEDS 15, PT
LOT 8 BLK V DEEDS 15

Area = 480m²

Valuation # = 26970-19500

PHYSICAL ADDRESS:

44 Leven Street
Roslyn
Dunedin

SITE INFORMATION:

WIND ZONE =HIGH

Region A
Urban terrain
Sheltered site
T1 (Outer/Mild)

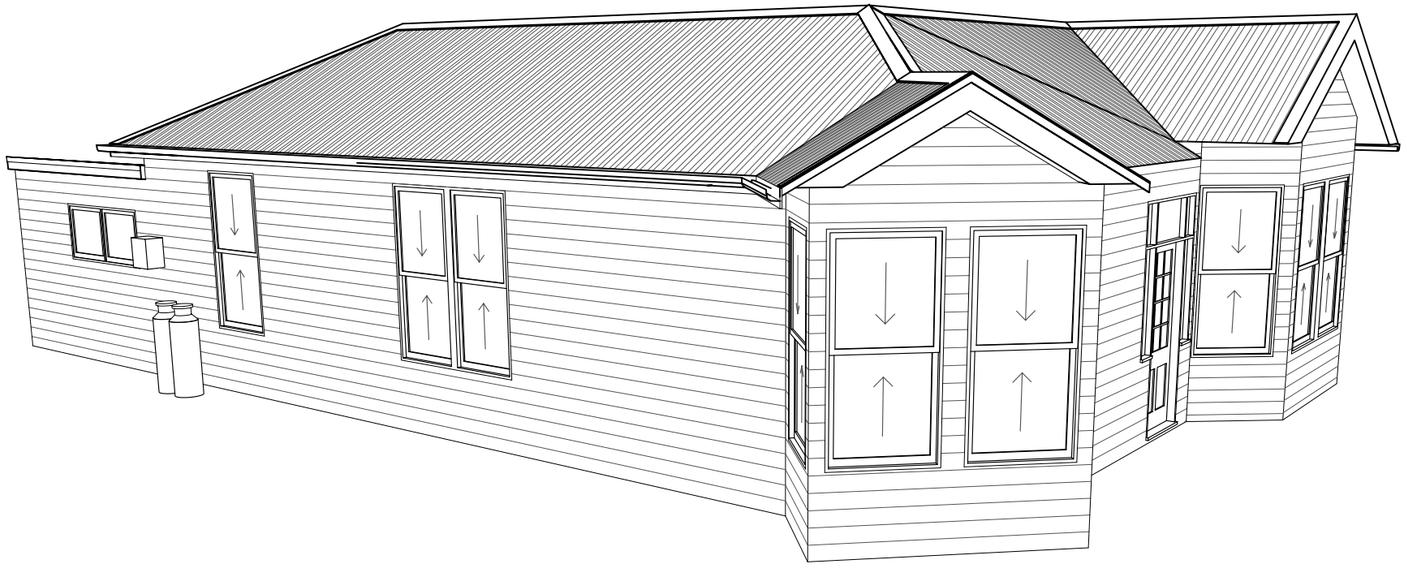
Wind Zone = MEDIUM(calculated from NZS3604:2011)

SEISMIC ZONE = Earthquake Zone = 1
(calculated from NZS3604:2011 Fig.5.4)

EXPOSURE ZONE = C
(calculated from NZS3604:2011 Fig.4.2)

ALTITUDE: 175m above sea level

INDEX:



2 PERSPECTIVE
Diagrammatic Only

LICENSED BUILDING PRACTITIONER
www.dbh.govt.nz
BUILDING CONFIDENCE

KATIPOdesign
Architectural design+draughting

CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION

PROJECT	LEVEN ST ALTERATIONS		PROJECT # 5312
CLIENT	Paul & Nicky Ferro	DATE # June 2016	DWG # A00
		SCALE NTS @ A3	
DWG	PERSPECTIVE / LOCATION PLAN	DRAWN SM	
		PLOT DATE 23/6/16	REVISION

postal: 47 Tyne Street Roslyn, Dunedin *offices:* 3rd Floor, Imperial Building 1 Dowling Street, Dunedin *contact:* 03-477-0462*office* 021-294-7430 *mobile* stu@katipodesign.co.nz

LEGEND:

-Existing weatherboards on timber framing

-Existing timber internal framing / GIB linings

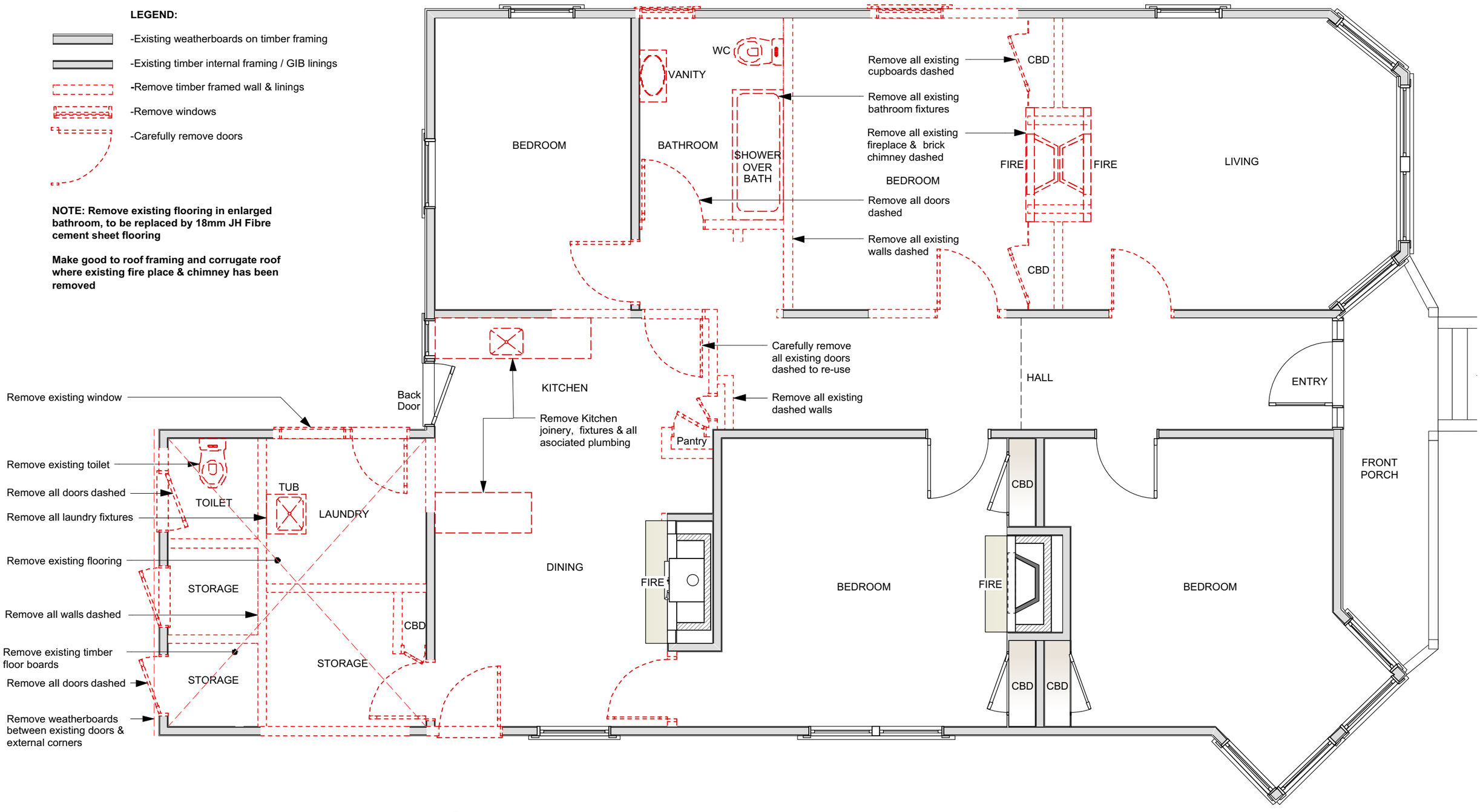
-Remove timber framed wall & linings

-Remove windows

-Carefully remove doors

NOTE: Remove existing flooring in enlarged bathroom, to be replaced by 18mm JH Fibre cement sheet flooring

Make good to roof framing and corrugate roof where existing fire place & chimney has been removed



1 EXISTING FLOOR PLAN

Scale: 1:50

EXISTING FLOOR AREA = 146m² apx including front porch area

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CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION

PROJECT: LEVEN ST ALTERATIONS — PROJECT # 5312

CLIENT: Paul & Nicky Ferro — DATE # June 2016 — DWG # A01

SCALE 1:50 @ A3

DRAWN SM

DWG: EXISTING FLOOR PLAN — PLOT DATE 23/6/16 — REVISION

postal: 47 Tyne Street Roslyn, Dunedin *offices:* 3rd Floor, Imperial Building 1 Dowling Street, Dunedin *contact:* 03-477-0462 *office* 021-294-7430 *mobile* stu@katipodesign.co.nz

GENERAL CONSTRUCTION NOTES:

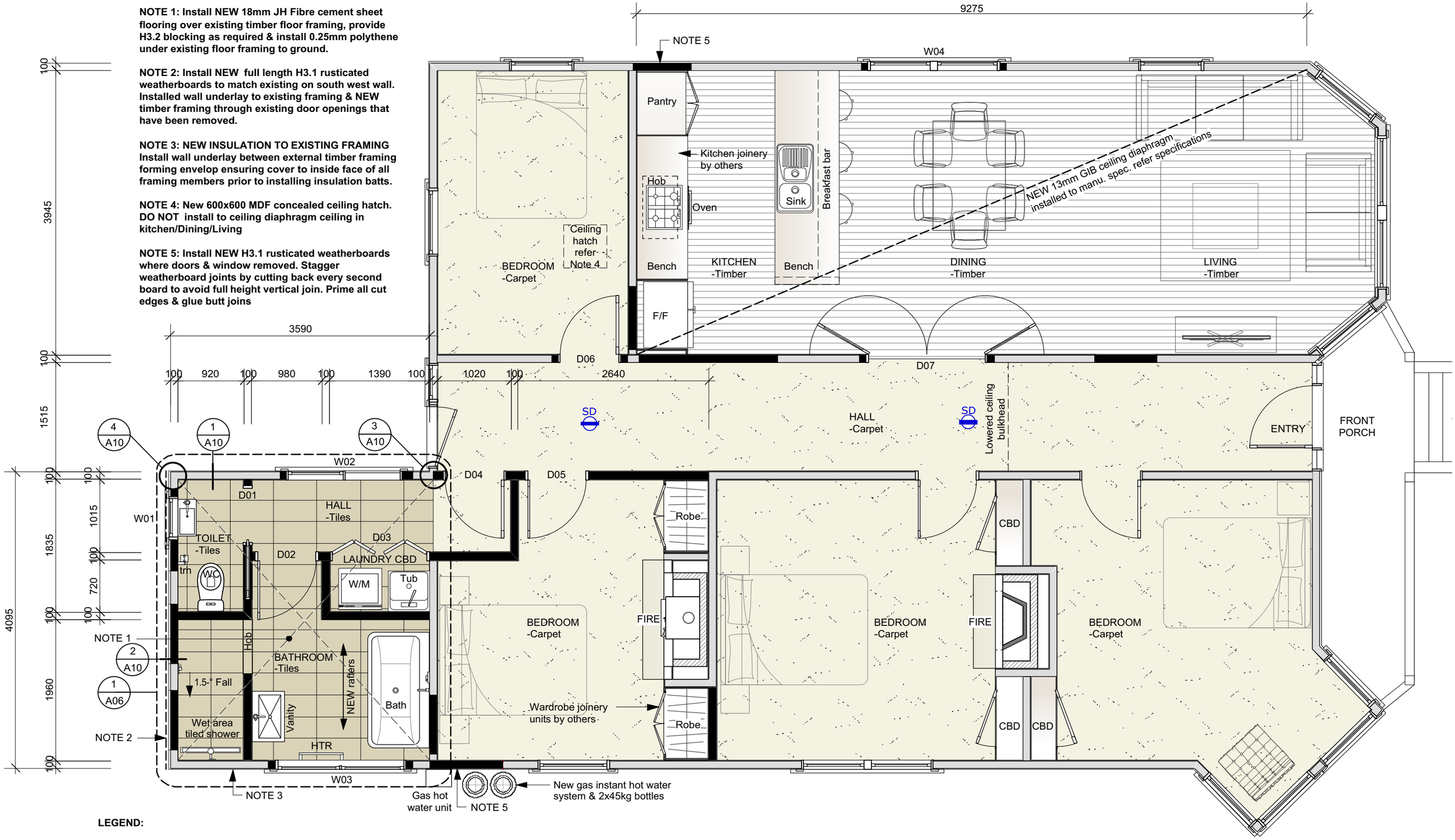
NOTE 1: Install NEW 18mm JH Fibre cement sheet flooring over existing timber floor framing, provide H3.2 blocking as required & install 0.25mm polythene under existing floor framing to ground.

NOTE 2: Install NEW full length H3.1 rusticated weatherboards to match existing on south west wall. Installed wall underlay to existing framing & NEW timber framing through existing door openings that have been removed.

NOTE 3: NEW INSULATION TO EXISTING FRAMING Install wall underlay between external timber framing forming envelop ensuring cover to inside face of all framing members prior to installing insulation batts.

NOTE 4: New 600x600 MDF concealed ceiling hatch. DO NOT install to ceiling diaphragm ceiling in kitchen/Dining/Living

NOTE 5: Install NEW H3.1 rusticated weatherboards where doors & window removed. Stagger weatherboard joints by cutting back every second board to avoid full height vertical join. Prime all cut edges & glue butt joins



LEGEND:

-Existing weatherboards on timber framing / GIB lining

-Existing timber internal framing / GIB linings

-NEW timber framing with weatherboards on wall underlay with 10mm GIB internal lining & wall insulation (To match existing)

-NEW 100x45 timber framing @ 400crs / 10mm GIB linings

SD -New smoke alarm within 3m of sleeping spaces

1 PROPOSED FLOOR PLAN
Scale: 1:50

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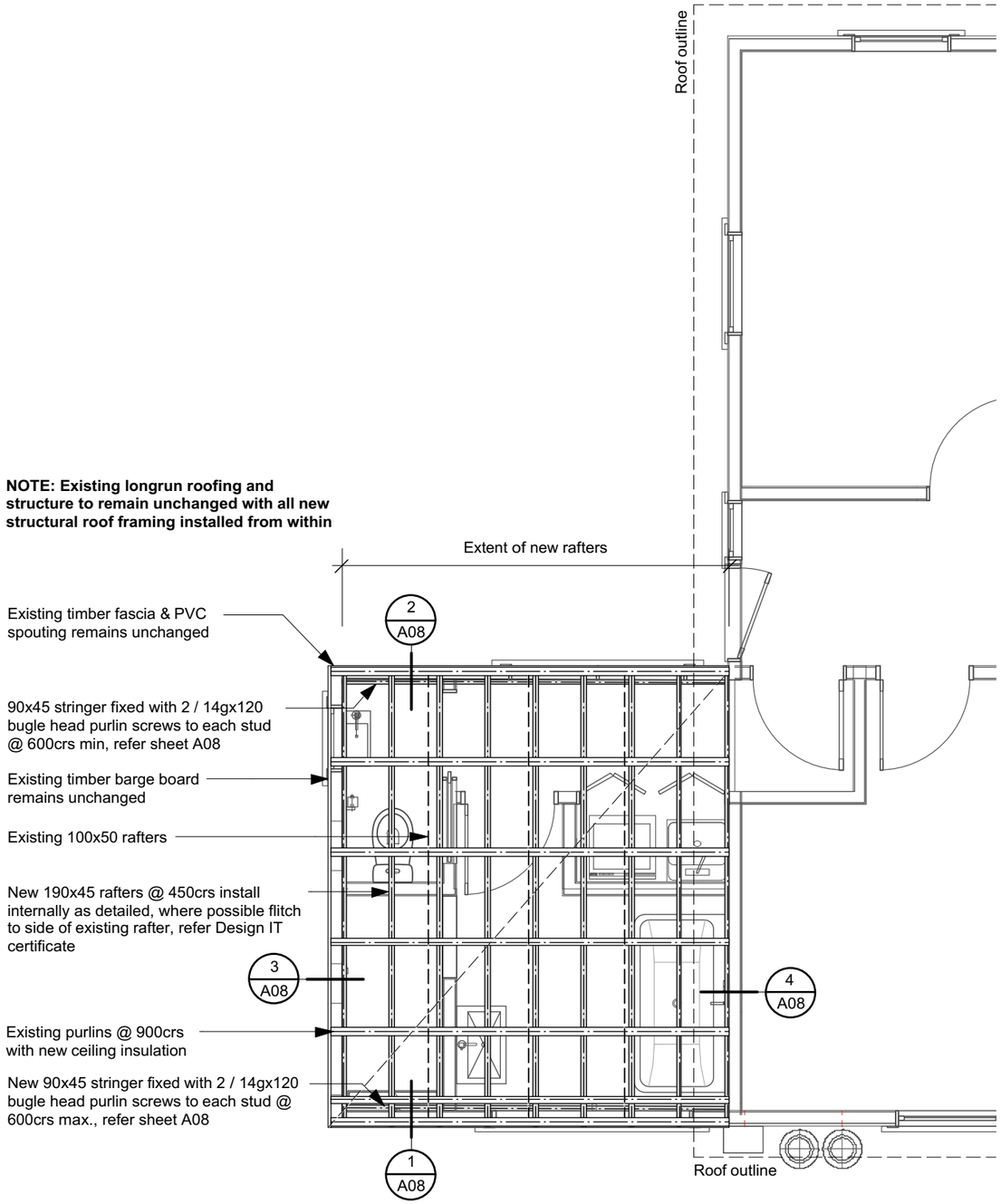
CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION

PROJECT	LEVEN ST ALTERATIONS		PROJECT # 5312
CLIENT	Paul & Nicky Ferro	DATE # June 2016	DWG # A02
		SCALE 1:50 @ A3	
DWG	PROPOSED FLOOR PLAN	DRAWN SM	
		PLOT DATE 23/6/16	REVISION

postal: 47 Tyne Street Roslyn, Dunedin *offices:* 3rd Floor, Imperial Building 1 Dowling Street, Dunedin *contact:* 03-477-0462 *office* 021-294-7430 *mobile* stu@katipodesign.co.nz



1 ROOF FRAMING PLAN
Scale: 1:50

CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION

PROJECT: LEVEN ST ALTERATIONS — PROJECT # 5312

CLIENT: Paul & Nicky Ferro — DATE # June 2016 — DWG # A03

DWG: ROOF FRAMING PLAN — SCALE 1:50 @ A3 — DRAWN SM — PLOT DATE 23/6/16 — REVISION

postal: 47 Tyne Street, Roslyn, Dunedin — *offices:* 3rd Floor, Imperial Building, 1 Dowling Street, Dunedin — *contact:* 03-477-0462 *office* 021-294-7430 *mobile* stu@katipodesign.co.nz

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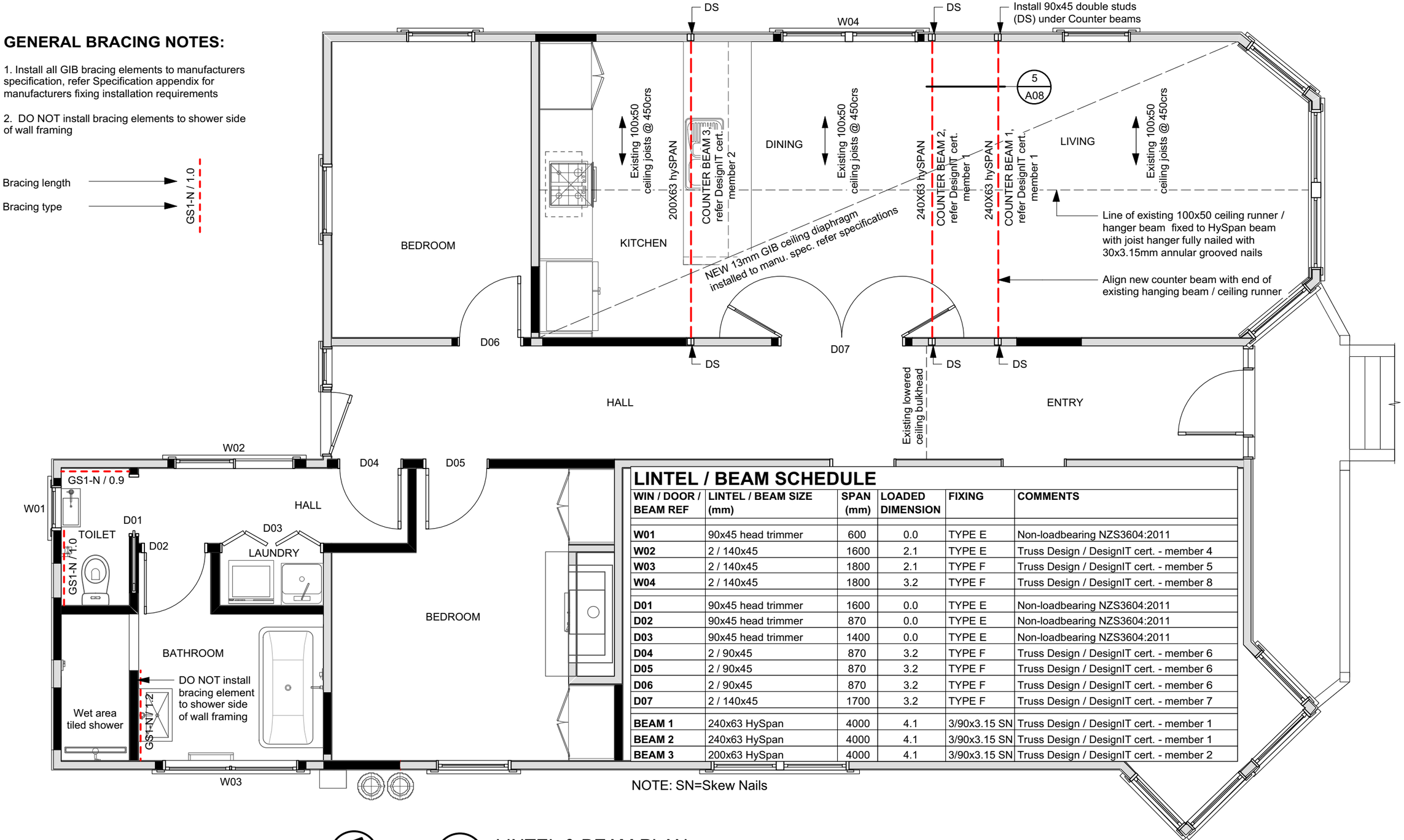
GENERAL BRACING NOTES:

1. Install all GIB bracing elements to manufacturers specification, refer Specification appendix for manufacturers fixing installation requirements

2. DO NOT install bracing elements to shower side of wall framing

Bracing length →

Bracing type → GS1-N / 1.0



LINTEL / BEAM SCHEDULE

WIN / DOOR / BEAM REF	LINTEL / BEAM SIZE (mm)	SPAN (mm)	LOADED DIMENSION	FIXING	COMMENTS
W01	90x45 head trimmer	600	0.0	TYPE E	Non-loadbearing NZS3604:2011
W02	2 / 140x45	1600	2.1	TYPE E	Truss Design / DesignIT cert. - member 4
W03	2 / 140x45	1800	2.1	TYPE F	Truss Design / DesignIT cert. - member 5
W04	2 / 140x45	1800	3.2	TYPE F	Truss Design / DesignIT cert. - member 8
D01	90x45 head trimmer	1600	0.0	TYPE E	Non-loadbearing NZS3604:2011
D02	90x45 head trimmer	870	0.0	TYPE E	Non-loadbearing NZS3604:2011
D03	90x45 head trimmer	1400	0.0	TYPE E	Non-loadbearing NZS3604:2011
D04	2 / 90x45	870	3.2	TYPE F	Truss Design / DesignIT cert. - member 6
D05	2 / 90x45	870	3.2	TYPE F	Truss Design / DesignIT cert. - member 6
D06	2 / 90x45	870	3.2	TYPE F	Truss Design / DesignIT cert. - member 6
D07	2 / 140x45	1700	3.2	TYPE F	Truss Design / DesignIT cert. - member 7
BEAM 1	240x63 HySpan	4000	4.1	3/90x3.15 SN	Truss Design / DesignIT cert. - member 1
BEAM 2	240x63 HySpan	4000	4.1	3/90x3.15 SN	Truss Design / DesignIT cert. - member 1
BEAM 3	200x63 HySpan	4000	4.1	3/90x3.15 SN	Truss Design / DesignIT cert. - member 2

NOTE: SN=Skew Nails

1 LINTEL & BEAM PLAN
Scale: 1:50

CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION

PROJECT: LEVEN ST ALTERATIONS — PROJECT # 5312
CLIENT: Paul & Nicky Ferro — DATE # June 2016 — DWG # A04
SCALE 1:50 @ A3
DWG: LINTEL & BEAM PLAN — DRAWN SM
PLOT DATE 23/6/16 — REVISION

LICENSED BUILDING PRACTITIONER www.dbh.govt.nz BUILDING CONFIDENCE

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postal: 47 Tyne Street Roslyn, Dunedin *offices:* 3rd Floor, Imperial Building 1 Dowling Street, Dunedin *contact:* 03-477-0462 *office* 021-294-7430 *mobile* stu@katipodesign.co.nz

GENERAL PLUMBING NOTES:

1. All plumbing & drainage works & materials to comply with NZBC G13/AS1 - Sanitary Plumbing & G13/AS2 - Foul Water Drainage and Acceptable Solutions E1/AS1 - surface water. Test all PVC drainage pipes below ground in accordance with AS/NZS 2032 section11.

2. All plumbing & drainage is diagramatic only, Sub-contractor to confirm all pipe routes and site levels prior to commencing and provide AS-BUILT drawings as required for Code of Compliance by the local Territorial Authority.

3. Sub-contractor to supply & install hot & cold water feeds to all fixtures as required to comply with NZBC G12: AS1. Test all water supply pipework prior to concealment with 1500kPa pressure test for 15 minutes, visually inspect for leaks & have local TA inspect & confirm test on site.

4. Sub-contractor to supply & install frost protection lagging to all piping outside building thermal envelop & hot water pipes between HWC & outlets with 13mm thick min. closed cell foam polymer insulation.

5. Sub-contractor to install tempering valve to all hot water supply to hygiene fixtures to not exceed 55°C in accordance with the NZBC E3/AS1

6. Contractor to liaise with Client and confirm all fixtures, fittings, accessories for selection & ensure availability to plumbing sub-contractor as & when required.

7. Main contractor to allow to install blocking as required for fixing of all fixtures, fittings & accessories.

8. Install Brace-IT THRU-Brackets to all structural timber members at pipe penetrations through joists, studs, top plates & rafters as required, Refer Specification Appendix for manu. details

9. Install 16x3mm Dux white PVC strapping or 25x1mm galvanised steel strap looped around discharge pipes and screw fixed to floor joists at 1.2m max under timber floor

10.Sub-contractor to install bond break sleeving to all pipework through concrete slab & foundations with 25mm flexible Aqua sleeve tubing or similar approved

11. Install Marshall pipe penetration Trade-Seal to all pipes at wall penetrations

12. Install Dektite flashing to all pipes at roof penetrations

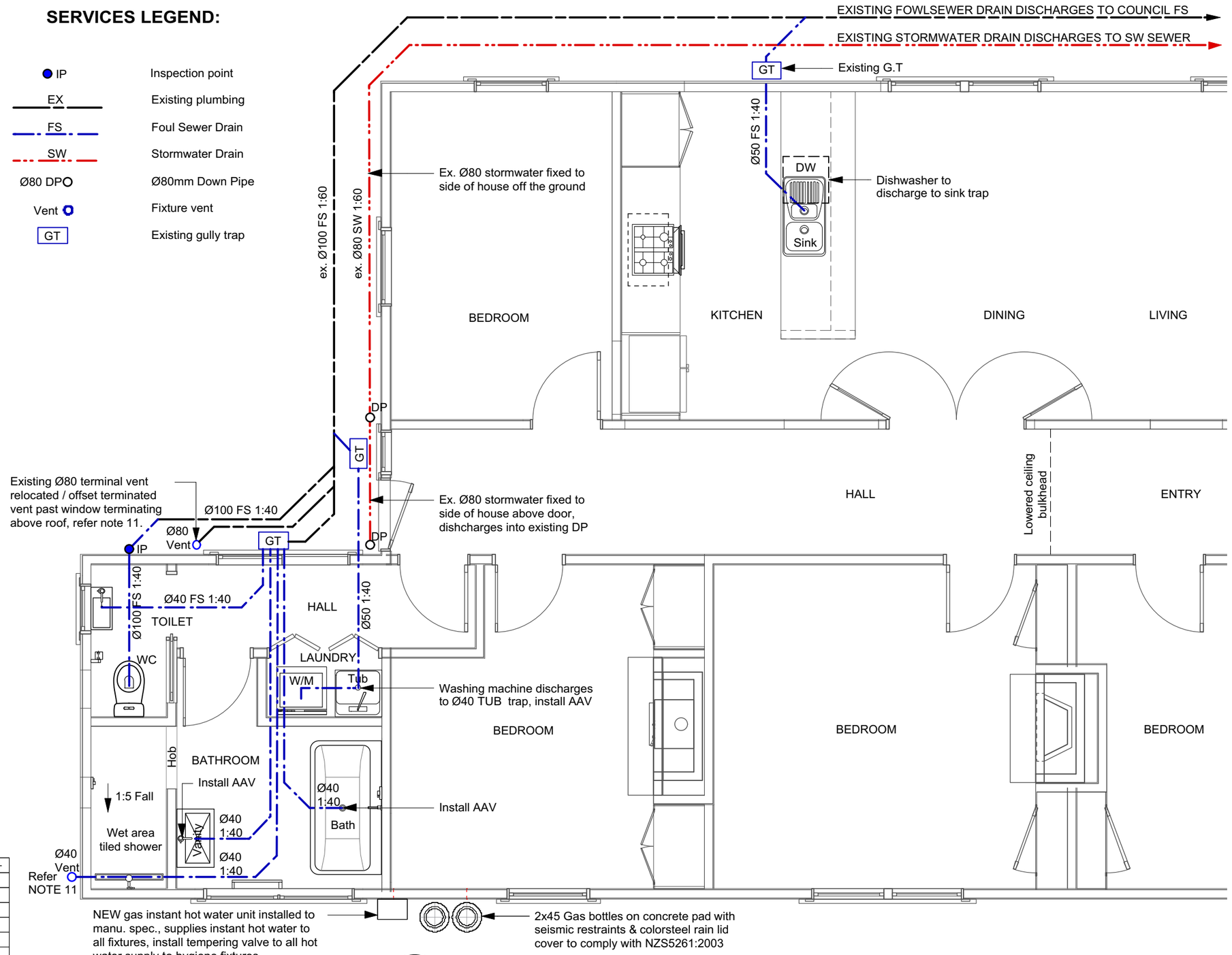
13.All FS vents terminate to outside 600mm above eaves & 150mm above roof complete with to have slotted vent cap installed

14. All exposed pipes & downpipes to be fixed with S/S munzing pipe clamp

15. All Gully traps are existing & remain unchanged, ensure at least one fixture discharged over GT to provide water seal to trap

SERVICES LEGEND:

IP	Inspection point
EX	Existing plumbing
FS	Foul Sewer Drain
SW	Stormwater Drain
Ø80 DP	Ø80mm Down Pipe
Vent	Fixture vent
GT	Existing gully trap



1 PLUMBING & DRAINAGE PLAN
Scale: 1:50

PLUMBING SCHEDULE:

FOUL WATER	PIPE SIZING	GRADIENT
Waste pipe & trap to bath	40mm PVC to NZBC G13 AS1	1:40
Waste pipe & trap to Vanity basin	40mm PVC to NZBC G13 AS1	1:40
Waste pipe & trap to Shower	40mm PVC to NZBC G13 AS1	1:40
Waste pipe & trap to kitchen Sink	50mm PVC to NZBC G13 AS1	1:40
Waste pipe & trap to Laundry Tub	50mm PVC to NZBC G13 AS1	1:40
Waste pipe & trap WC	100mm PVC to NZBC G13 AS1	1:60
FS drains & traps to GT	100mm UPVC to NZBC G13 AS1	1:60
FS drains	100mm UPVC to NZBC G13 AS1	1:60

HOT WATER	PIPE TYPE	STANDARD
20mm pipework to bath	Polybutylene	AS/NZS 2642:Parts 1,2 & 3
15mm pipework to basins in bathroom / Toilet	Polybutylene	AS/NZS 2642:Parts 1,2 & 3
20mm pipework to Shower	Polybutylene	AS/NZS 2642:Parts 1,2 & 3
15mm pipework to kitchen sink	Polybutylene	AS/NZS 2642:Parts 1,2 & 3
20mm pipework to Laundry Tub	Polybutylene	AS/NZS 2642:Parts 1,2 & 3
20mm pipework 600mm from gas instant hot water unit	Copper	NZS 3501

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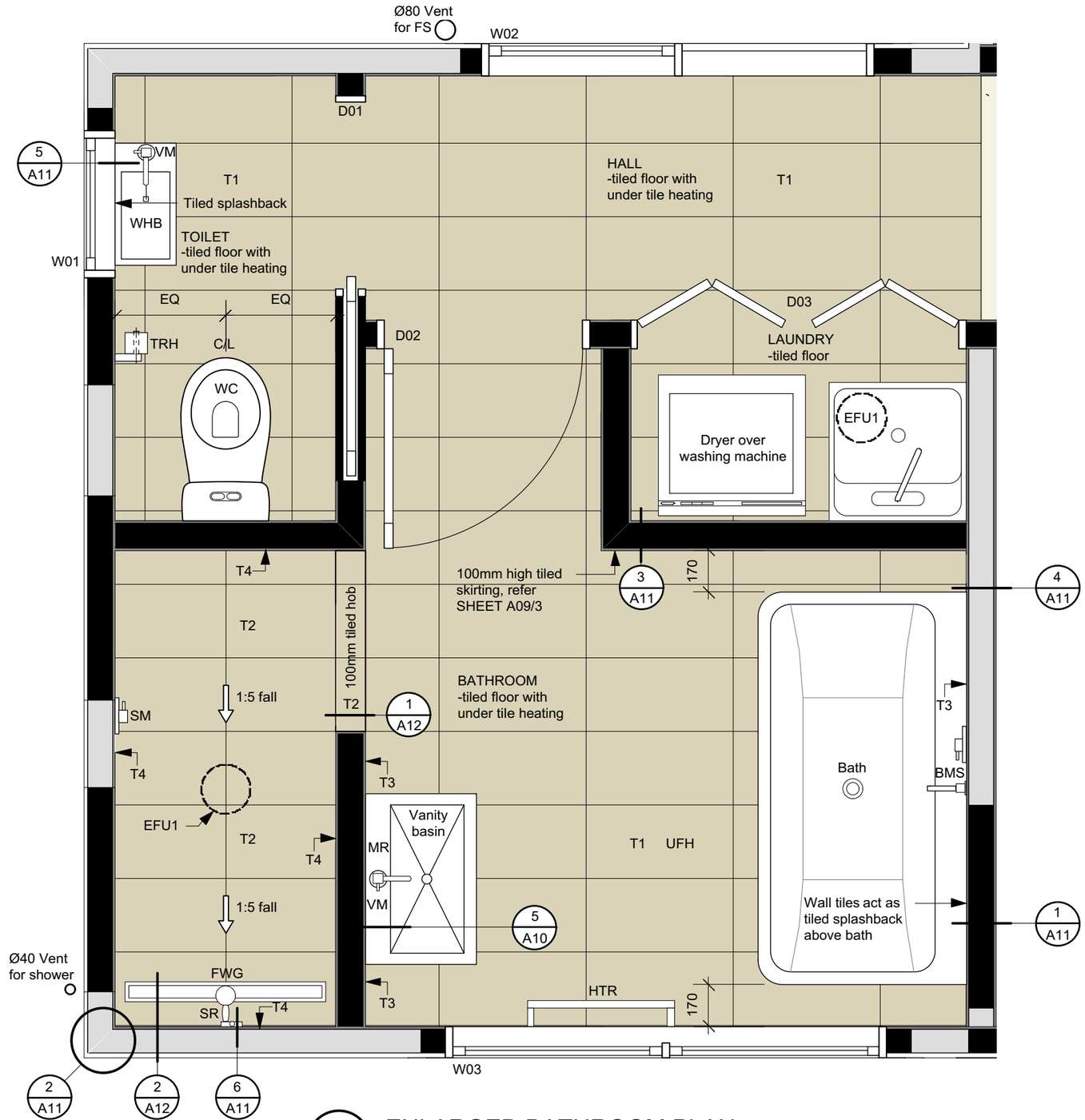
CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION

PROJECT: LEVEN ST ALTERATIONS — PROJECT # 5312
CLIENT: Paul & Nicky Ferro — DATE # June 2016 — DWG # A05
SCALE 1:50 @ A3
DWG: PLUMBING & DRAINAGE PLAN
DRAWN SM
PLOT DATE 23/6/16 — REVISION

postal: 47 Tyne Street Roslyn, Dunedin
offices: 3rd Floor, Imperial Building 1 Dowling Street, Dunedin
contact: 03-477-0462 office 021-294-7430 mobile stu@katipodesign.co.nz



1 ENLARGED BATHROOM PLAN
Scale: 1:20

LEGEND:

T1	Floor tiles on 6mm Marmox insulation board complete with proprietry underfloor heating system & self leveling compound over NEW JH 18mm fibre cement sheet flooring glued & screwed to existing joists & new blocking if required in wet area shower
T2	Floor tiles to shower on waterproof membrane on Marmox preformed shower tray over NEW JH 18mm fibre cement sheet flooring glued & screwed to existing joists & new blocking if required in wet area shower
T3	Bathroom wall tiles outside shower on 13mm GIB Aqualine, install to ceiling
T4	Bathroom wall tiles on waterproof membrane in shower on 13mm GIB Aqualine, install to ceiling
WHB	Wash hand basin with tiled splashback
SR	Shower rose with Aquatite wetwall caddy seal system
SM	Shower mixer with Aquatite wetwall caddy seal system
VM	Vanity basin mixer
MR	Mirror complete with demister pad behind, connect demister to light circuit
HTR	Heated towel rail
TRH	Toilet roll holder
EFU1	Extractor fan unit, vent to outside through roof complete with cowl & dektite flashing- Manrose 150mm thru roof extractor fan system (153 l/s, 550m3/hr) FAN0530
UFH	Under floor heating unit system, refer electrical note 3 below
FWG	Approved S/S tile insert shower strip drain installed to manu. spec.
BSM	Wall mounted bath mixer & spout

NOTE:
Install Thru joist brackets to any joist requiring pipe penetrations

Existing Ø80 vent to relocate and fix to FS. New fixings with no vents to have AAV installed to comply with NZBC. (Bath & Vanity to have AAV installed)

BATHROOM TILES
- Refer Spec. & confirm tile type & grout with client

WET AREA SHOWER:
-Type Custom tiled shower - Ardex waterproof membrane - refer details & accompanying Ardex spec.

-Ardex products as follows:
Ardex LQ92 under tile levelling compound
Ardex Multiprime
Ardex WPM001 liquid applied waterproof membrane
ABA Abaflex wall floor tile adhesive
Ardex FG8 grout with ABA grout booster
Ardex SE silicon

GENERAL ELECTRICAL NOTES TO WET AREAS:

1. All electrical fittings, switches, sockets to be confirmed on site with client prior to installation

2. 150mm Manrose extractor fan unit with delay timer cut out & switching control separate to lights, install through soffit to outside with grill external 75l/s axial fan unit # FAN 0532

3. Under tile proprietry heating system (UFH)

-Type: Warmup heating Mat with 7 day fully programmable
controller & x2 in-floor thermostat sensors (one
sensor as back up spare, installed & tied off at control unit.
-Location: Tiled bathroom floor, DO NOT install into shower tray
-Control Panel: Install 1.5m off FFL above light switch

4. All recessed LED downlights to bathroom to be CA, IC or IC-F rated

5. Main contractor to install blocking for all fixtures & fittings as required

WET AREA LININGS:

-Bathroom	-GIB Aqualine, 10mm to walls, 13mm to ceiling -GIB stopping to level 3 stopping, tile finish -GIB stopping to level 4 stopping, paint finish
-Shower	-9mm JH villaboard to wet area shower walls -Stopping to level 3 stopping, tile finish
-General	-GIB linings installed to manu. spec. -Use GIB paper tape & *GIB Goldline Platinum tape on trims* -*GIB ceiling linings* on Rondo batten system @ 600crs max

CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION

PROJECT: LEVEN ST ALTERATIONS — PROJECT # 5312
CLIENT: Paul & Nicky Ferro — DATE # June 2016 — DWG # A06
DWG: ENLARGED BATHROOM PLAN — SCALE 1:20 @ A3 — DRAWN SM — PLOT DATE 23/6/16 — REVISION

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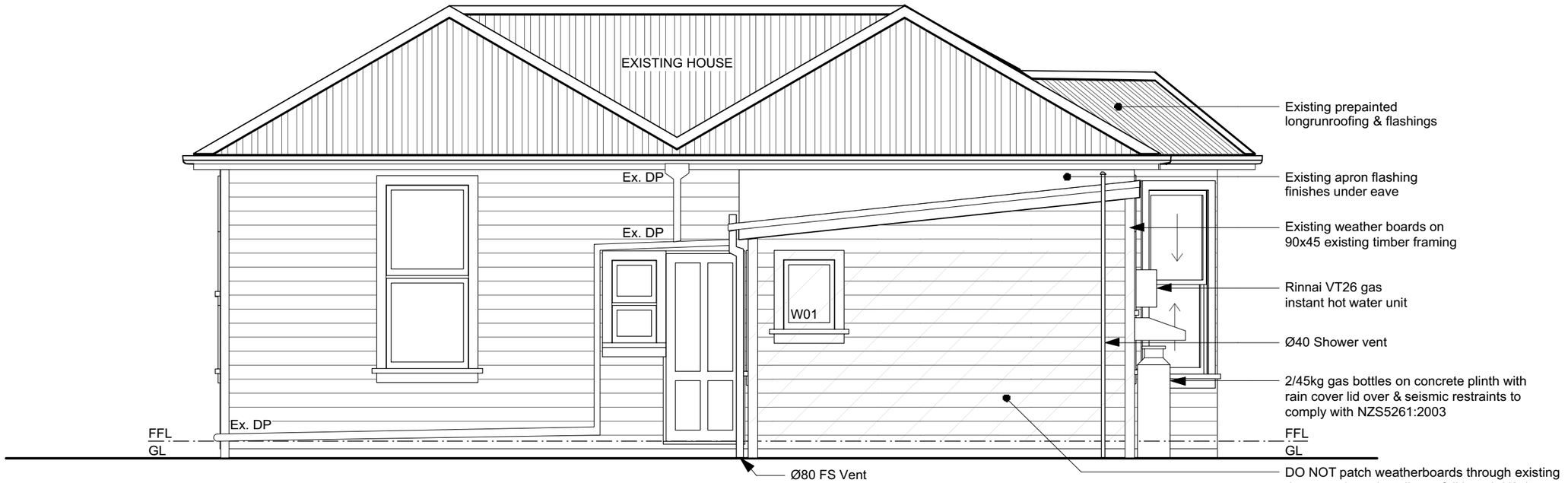
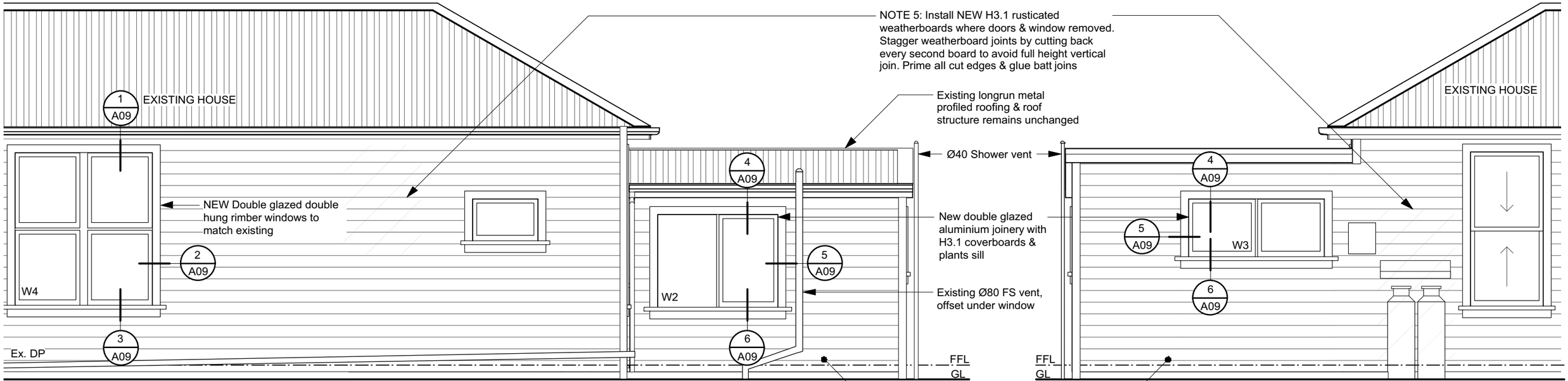


1 EAST ELEVATION
Scale: 1:50



2 NORTH ELEVATION
Scale: 1:50

3 SOUTH ELEVATION
Scale: 1:50

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ISSUE	DATE	REVISION

PROJECT	LEVEN ST ALTERATIONS		PROJECT # 5312
CLIENT	Paul & Nicky Ferro	DATE # June 2016	DWG # A07
DWG	ELEVATIONS	SCALE 1:50 @ A3	
		DRAWN SM	
		PLOT DATE 23/6/16	REVISION

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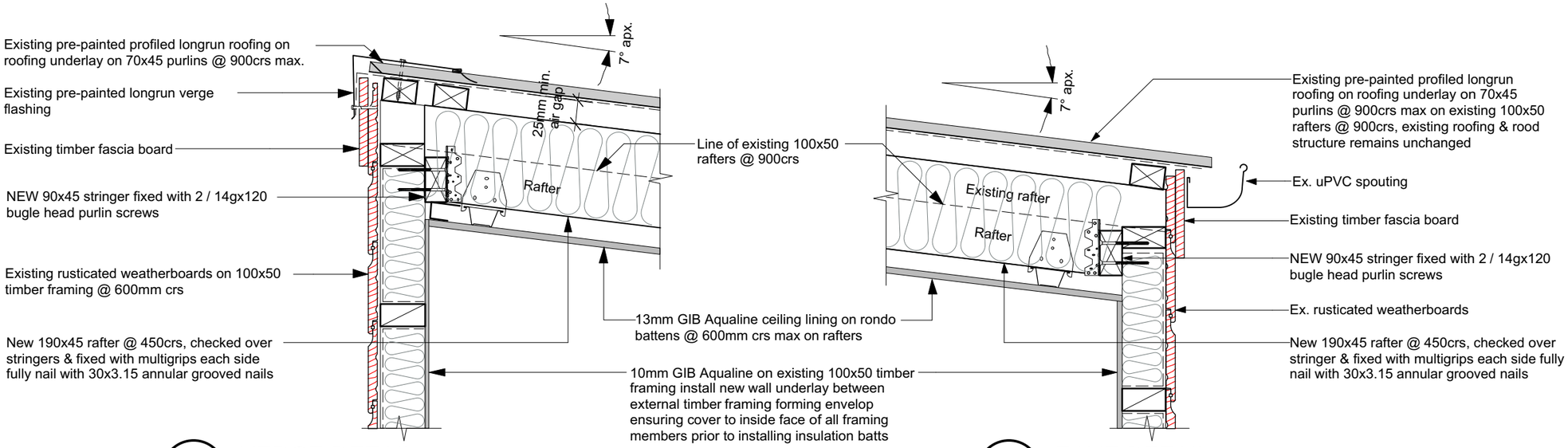
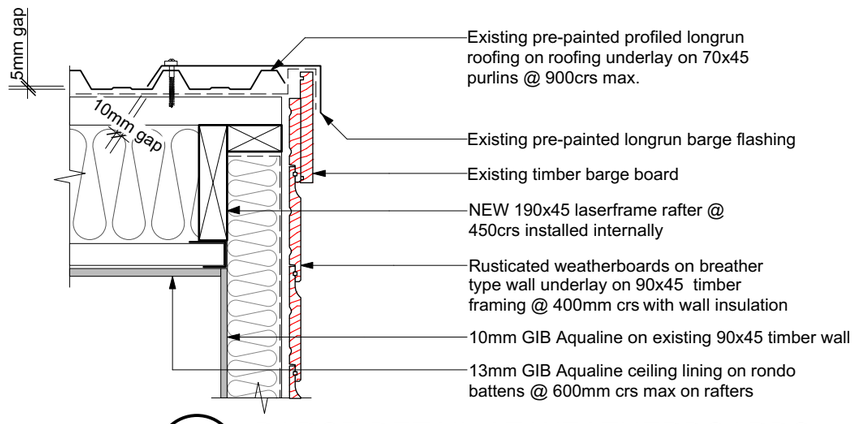
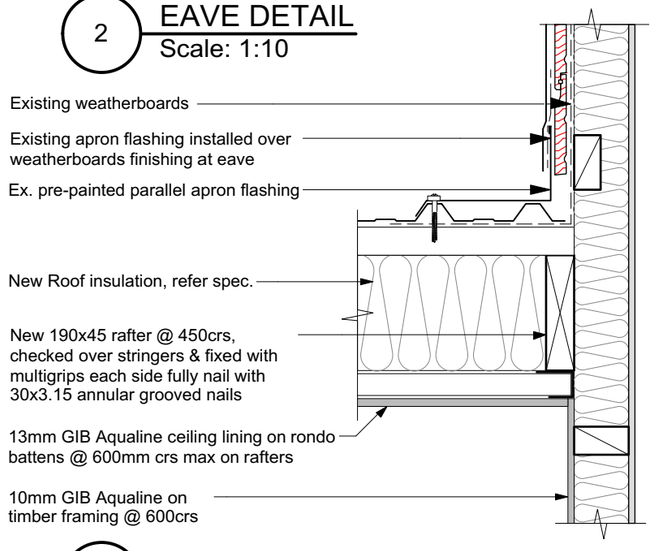


1 VERGE DETAIL
Scale: 1:10

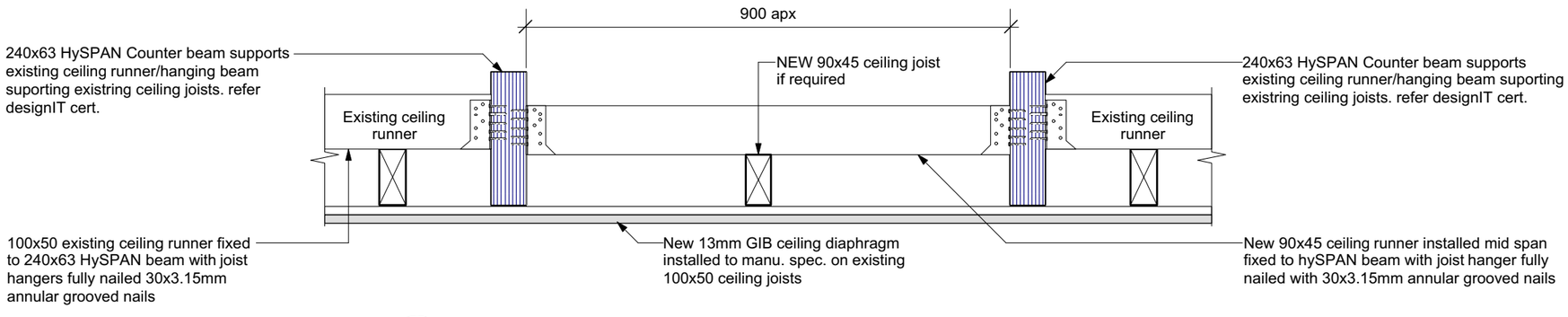
2 EAVE DETAIL
Scale: 1:10



3 BARGE DETAIL AT WEATHERBOARDS
Scale: 1:10



4 PARALLEL APRON FLASHING
Scale: 1:10



5 NEW COUNTER BEAM FIXING
Scale: 1:10

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CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION	
PROJECT	LEVEN ST ALTERATIONS		PROJECT # 5312
CLIENT	Paul & Nicky Ferro	DATE # June 2016	DWG # A08
		SCALE 1:10 @ A3	
DWG	DETAILS	DRAWN SM	
		PLOT DATE 23/6/16	REVISION

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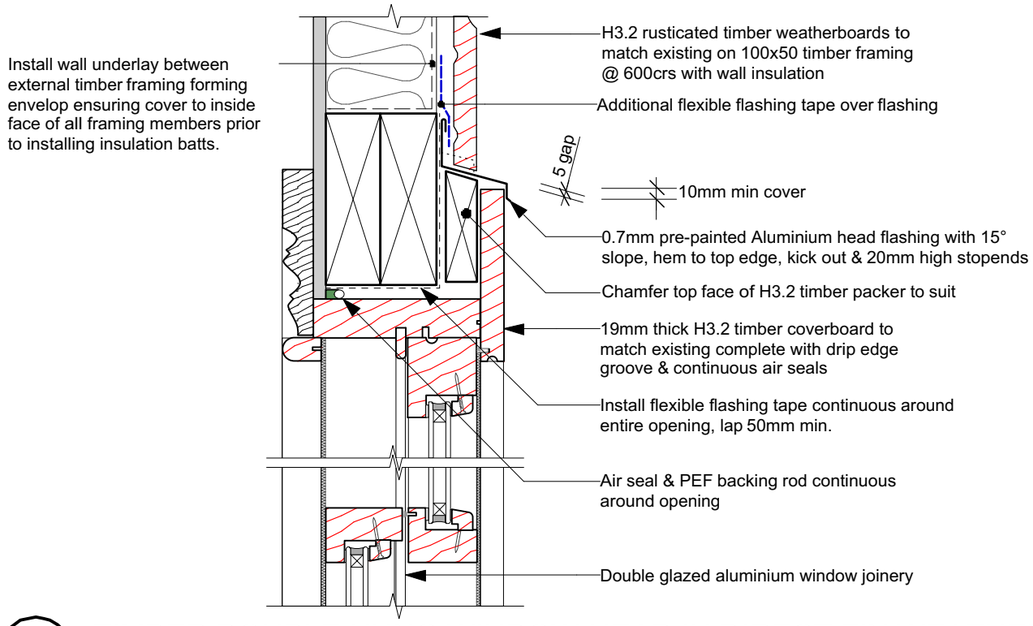
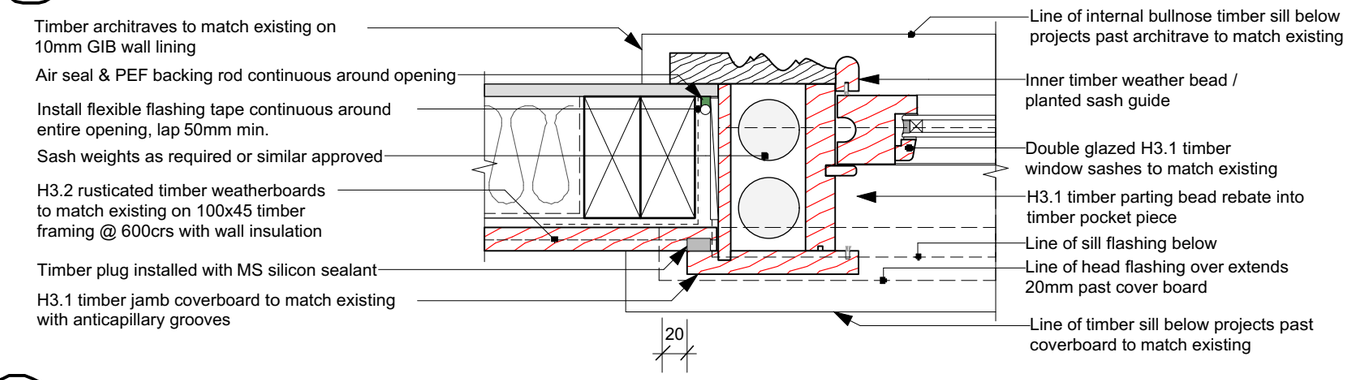
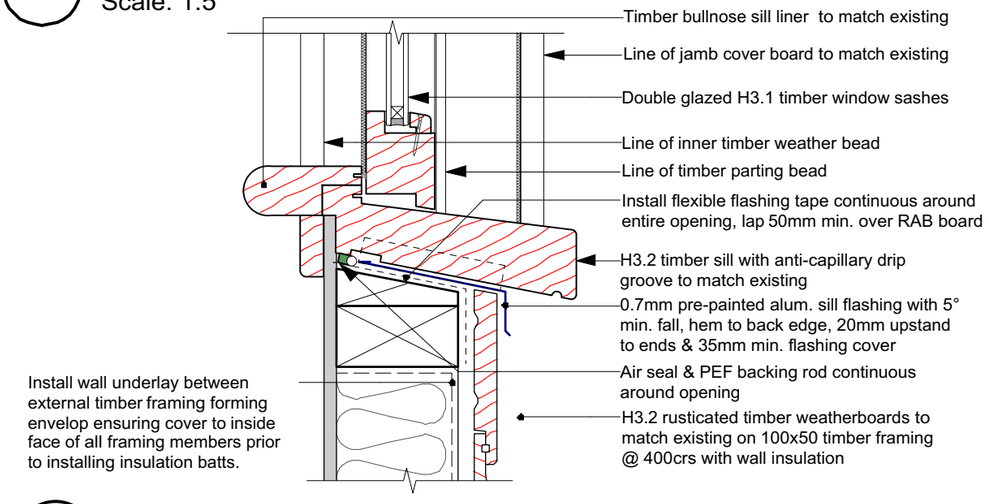


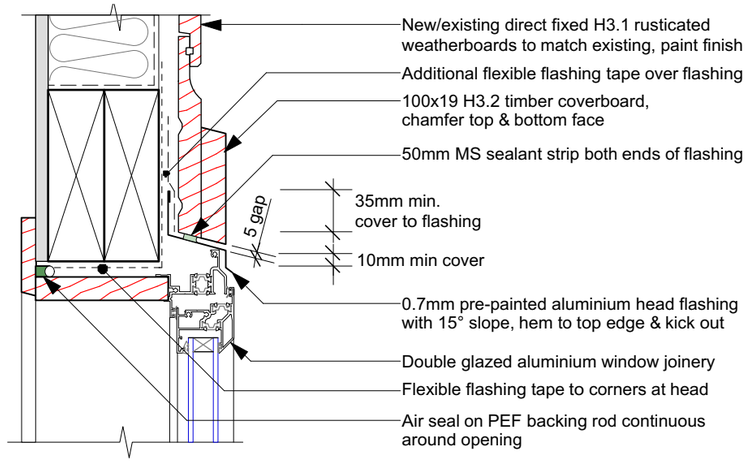
1 TIMBER DOUBLE HUNG WINDOW HEAD IN DIRECT FIX WEATHERBOARD
Scale: 1:5



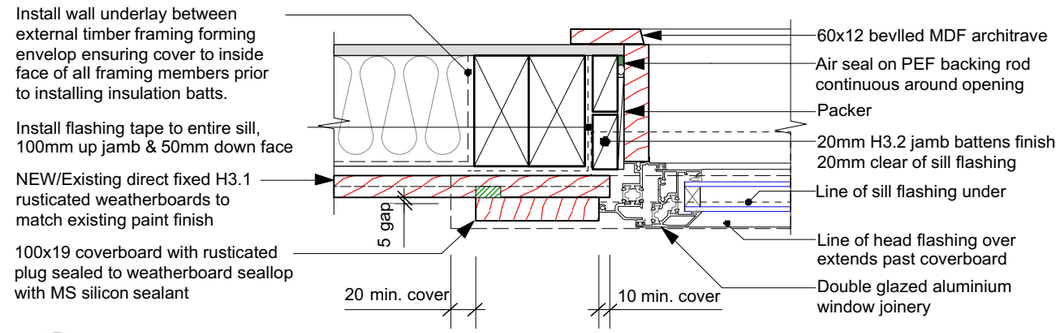
2 TIMBER DOUBLE HUNG WINDOW JAMB IN DIRECT FIX WEATHERBOARD
Scale: 1:5



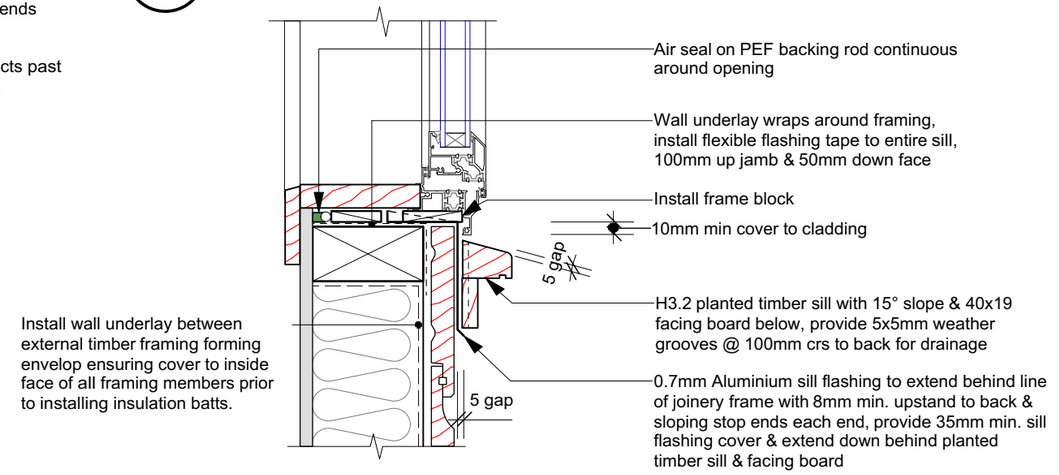
3 TIMBER DOUBLE HUNG WINDOW SILL IN DIRECT FIX WEATHERBOARD
Scale: 1:5



4 WINDOW HEAD IN DIRECT FIX WEATHERBOARD
Scale: 1:5



5 WINDOW JAMB IN DIRECT FIX WEATHERBOARD
Scale: 1:5



6 WINDOW SILL IN DIRECT FIX WEATHERBOARD
Scale: 1:5

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ISSUE	DATE	REVISION		
PROJECT	LEVEN ST ALTERATIONS		PROJECT #	5312
CLIENT	Paul & Nicky Ferro	DATE #	June 2016	DWG # A09
		SCALE	1:5 @ A3	
DWG	DETAILS	DRAWN	SM	
		PLOT DATE	23/6/16	REVISION

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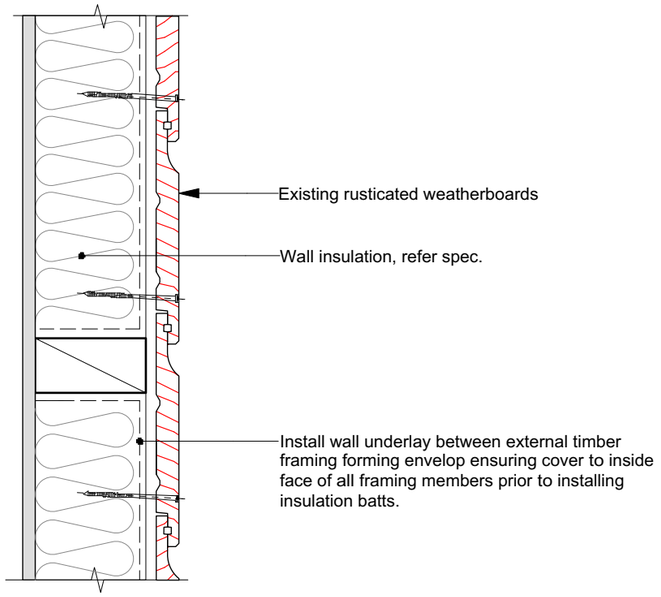
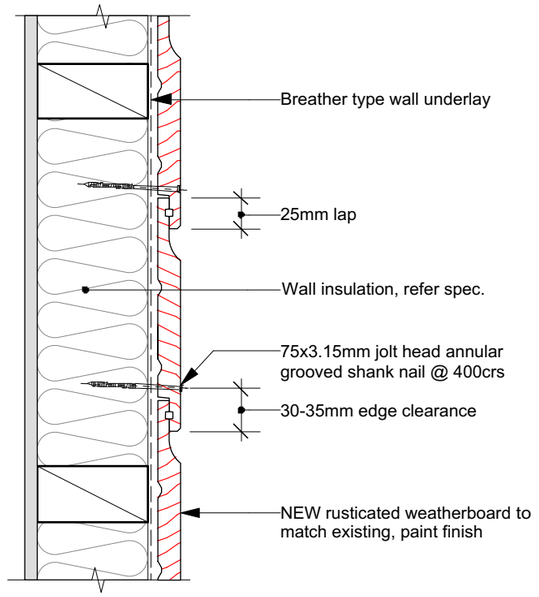
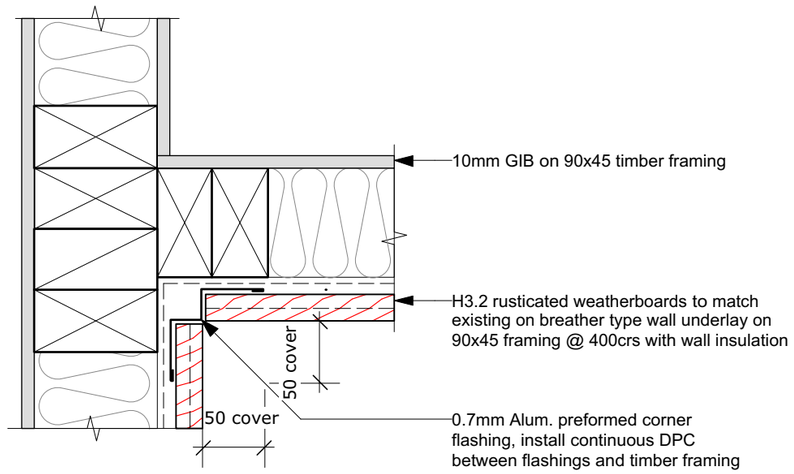


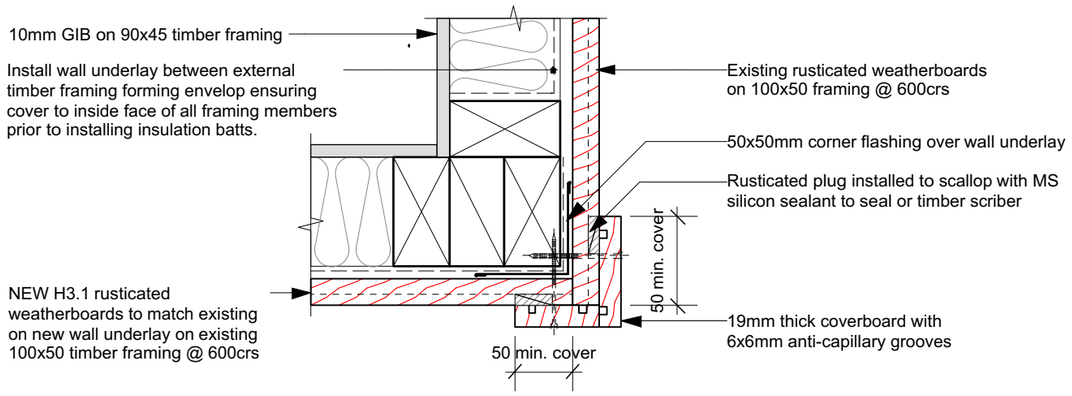
1 EXISTING RUSTICATED WEATHERBOARD
Scale: 1:5



2 NEW RUSTICATED WEATHERBOARD
Scale: 1:5



3 INTERNAL WEATHERBOARD CORNER
Scale: 1:5



4 EXTERNAL WEATHERBOARD CORNER
Scale: 1:5

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CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION

PROJECT: LEVEN ST ALTERATIONS — PROJECT # 5312
CLIENT: Paul & Nicky Ferro — DATE # June 2016 — DWG # A10
SCALE 1:5 @ A3
DWG: DETAILS — DRAWN SM
PLOT DATE 23/6/16 — REVISION

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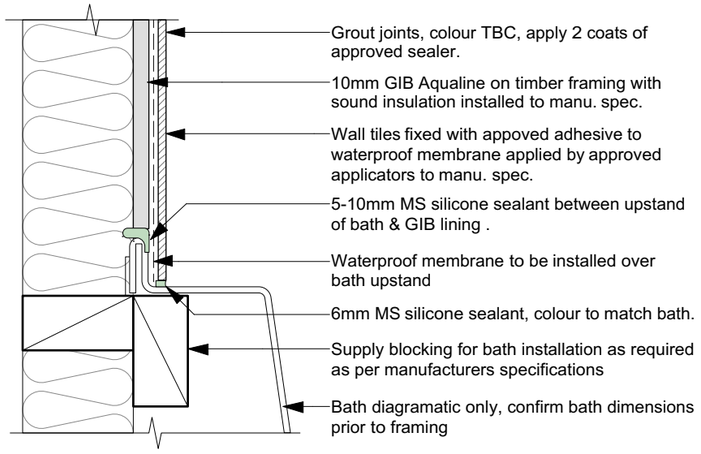
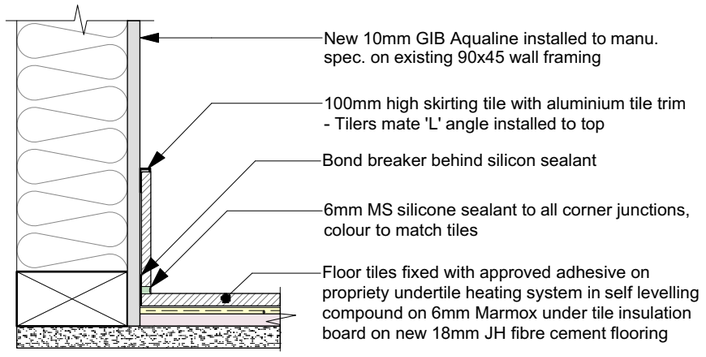
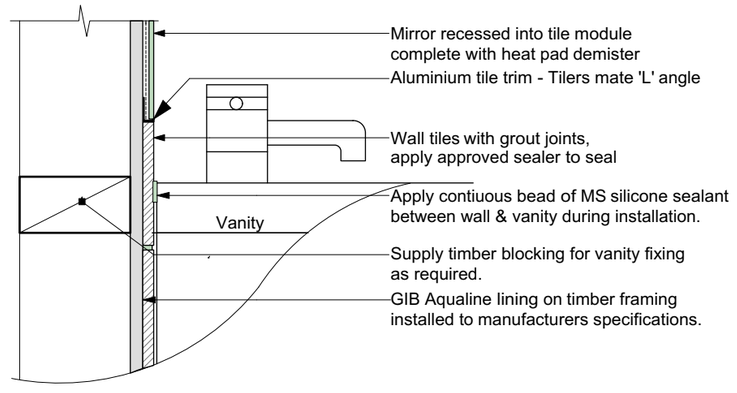


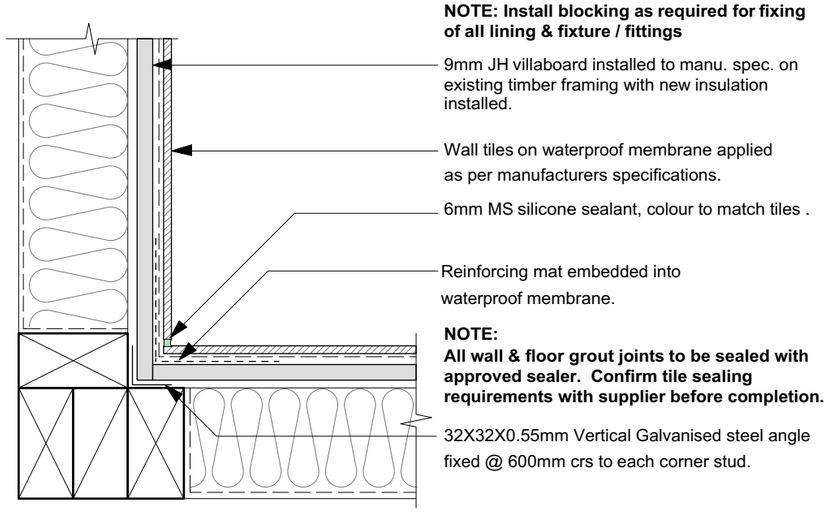
1 TILED WALL / BATH UPSTAND
Scale: 1:5



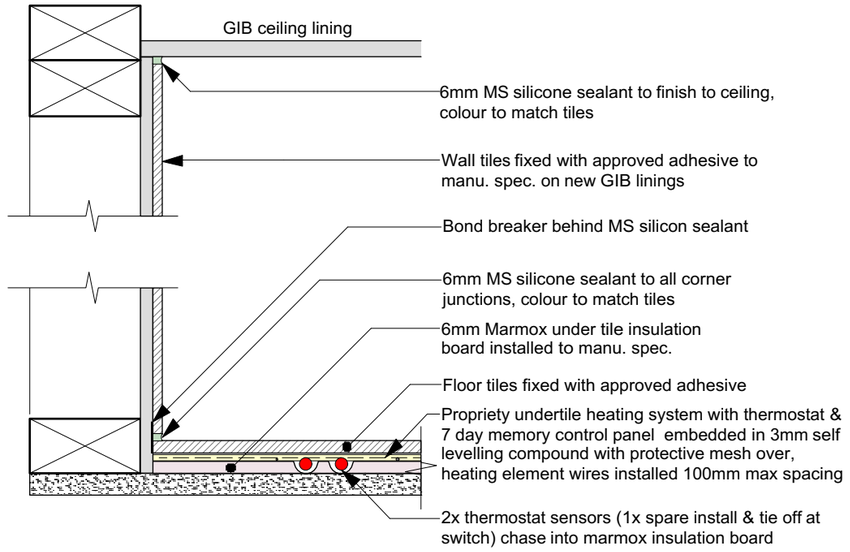
3 TILED SKIRTING
Scale: 1:5



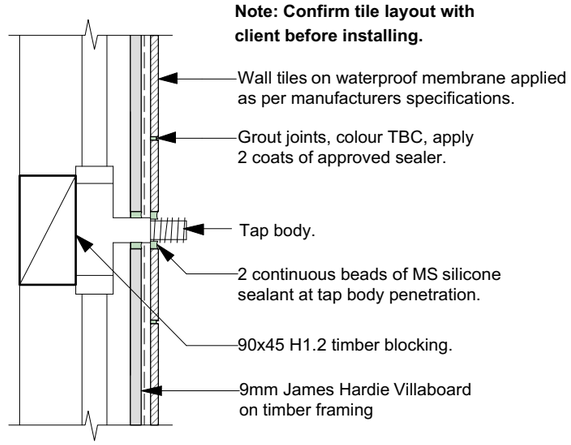
5 TILED WALL AT VANITY
Scale: 1:5



2 TILED WET AREA INTERNAL CORNER IN PLAN
Scale: 1:5



4 TILED FLOOR / WALL JUNCTION
Scale: 1:5



6 PIPE PENETRATION THROUGH TILED WALL
Scale: 1:5

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ISSUE	DATE	REVISION	
PROJECT	LEVEN ST ALTERATIONS		PROJECT # 5312
CLIENT	Paul & Nicky Ferro	DATE # June 2016	DWG # A11
		SCALE 1:5 @ A3	
DWG	DETAILS	DRAWN SM	
		PLOT DATE 23/6/16	REVISION

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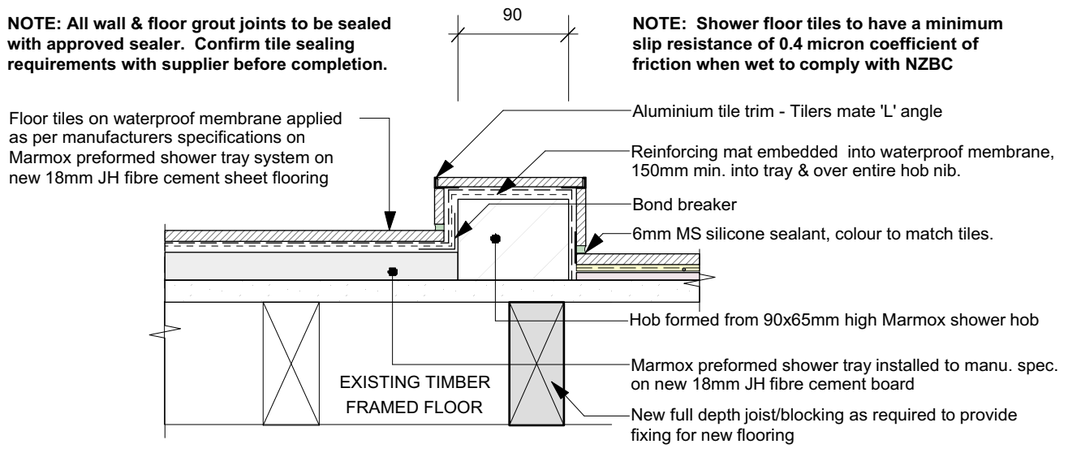
NOTE: All wall & floor grout joints to be sealed with approved sealer. Confirm tile sealing requirements with supplier before completion.

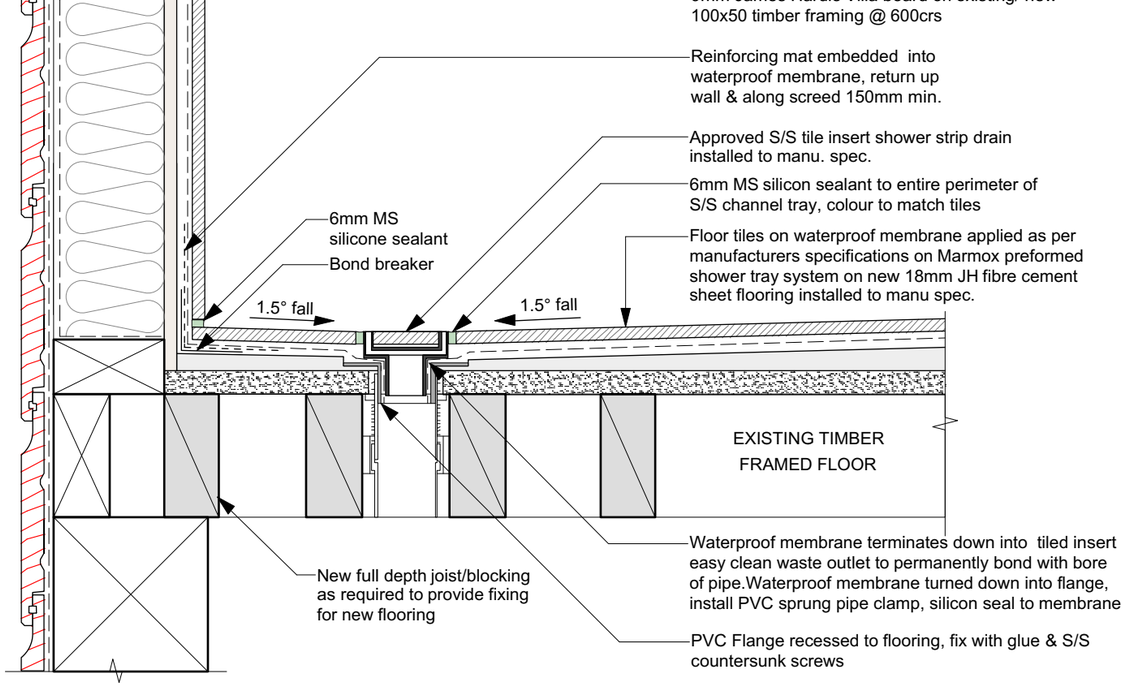
NOTE: Shower floor tiles to have a minimum slip resistance of 0.4 micron coefficient of friction when wet to comply with NZBC



1 TILED WET AREA SHOWER WITH HOB
Scale: 1:5

NOTE: All wall & floor grout joints to be sealed with approved sealer. Confirm tile sealing requirements with supplier before completion.

NOTE: Shower floor tiles to have a minimum slip resistance of 0.4 micron coefficient of friction when wet to comply with NZBC



2 TILED WET AREA SHOWER
Scale: 1:5

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ISSUE	DATE	REVISION

PROJECT	LEVEN ST ALTERATIONS		PROJECT # 5312
CLIENT	Paul & Nicky Ferro	DATE # June 2016	DWG # A12
		SCALE 1:5 @ A3	
DWG	DETAILS	DRAWN SM	
		PLOT DATE 23/6/16	REVISION

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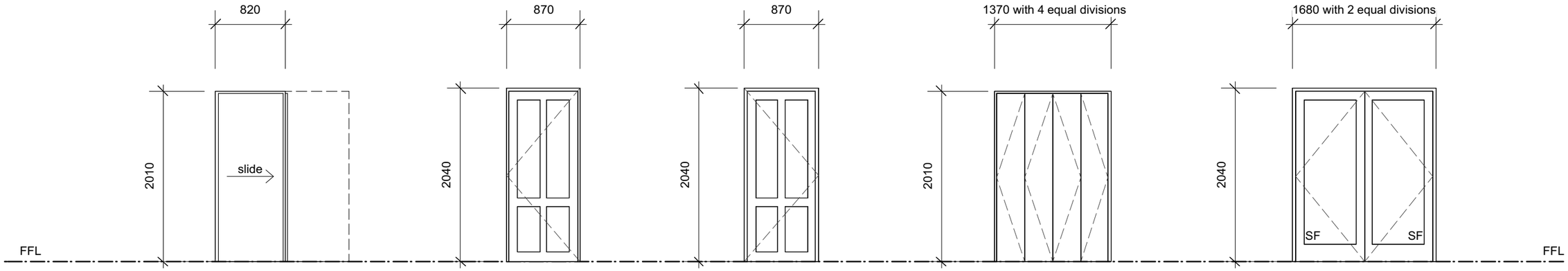
IMPORTANT:
ALUMINIUM & TIMBER JOINERS TO CONFIRM OPENING SIZES ON SITE PRIOR TO MANUFACTURE, ALL DIMENSIONS ARE NOMINAL TRIM OUT SIZE ONLY



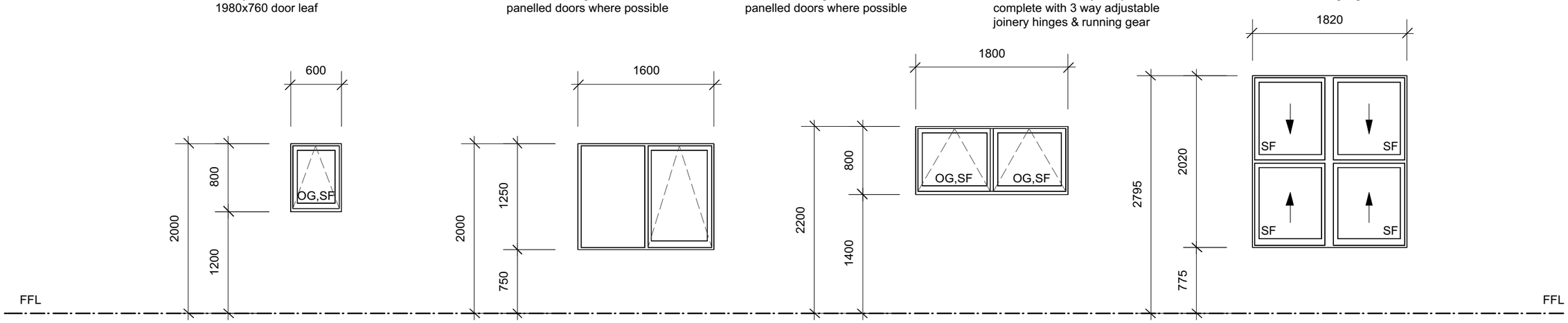
D01
Cavity slider door
1980x760 door leaf

D02,D05
Re-use existing solid timber panelled doors where possible

D04,D06
Re-use existing solid timber panelled doors where possible

D03
18mm MDF bifold joinery doors complete with 3 way adjustable joinery hinges & running gear

D07
New single glazed internal timber french doors



W01
Alum. window

W02
Alum. window

W03
Alum. window

W04
NEW double hung timber window to match existing

NEW INTERNAL TIMBER DOOR JOINERY:

HINGED DOORS

TYPE:	Solid timber panelled doors to match existing, re-use existing where possible
REVEAL:	19mm No. 1 clears timber reveals
HARDWARE:	TBC with client
FINISH:	Semi gloss enamel paint - colour TBC

FRENCH DOORS

TYPE:	Pinus Radiata soid timber frame
REVEAL:	19mm No. 1 clears timber reveals
GLAZING:	Single glazed Safety glass to meet NZS4223 Glazing to be rebated to frame & installed using timber finishing beads NOT putty
HARDWARE:	TBC with client
FINISH:	Semi gloss enamel paint - colour TBC

CAVITY SLIDER DOORS

TYPE:	CS for doors - Spacemaker Hollow core, flush panel
REVEAL:	19mm No. 1 clears timber reveals
HARDWARE:	TBC with client
FINISH:	Semi gloss enamel paint - colour TBC

ALUMINIUM WINDOW JOINERY:

TYPE:	Powdercoated aluminium
SUITE:	Residential
REVEAL:	19mm H3.1 No.1 clears timber reveals Paint finish
HARDWARE:	As re quired, confirm with client
GLAZING:	Double glazed to meet NZS4223 Argon gas filled
FINISH:	Alum - Duralloy powder coated finish with an average of 80 microns with a minimum of 50 microns Reveals - Semi gloss enamel paint
COLOUR:	Confirm with client
FLASHINGS:	0.7mm Aluminium formed to suit details provided

NEW INTERNAL DOOR HARDWARE:

All hardware as follows unless otherwise stated.

Type:	TBC with client
Finish:	Satin Chrome plate
Hinges:	Fixed pin, satin chrome
Locks, latches etc:	Privacy latches to all bathroom & Toilet

EXTERNAL TIMBER WINDOW JOINERY:

TYPE:	Solid timber windows
FRAMES:	Canadian Oregan No.1 clears timber , paint finish
SILL:	Canadian Oregan No.1 clears timber , paint finish
REVEALS:	H3.1 No.1 clears timber reveals
HARDWARE:	As required, confirm with client
SEALS:	Rebated continuous rubber/mohair seals, NOT foam strips
GLAZING:	Double glazed Safety glass to meet NZS4223 Argon gas filled Glazing to be rebated to reveal & installed using timber finishing beads NOT putty
FINISH:	Exterior - paint finish to match existing window joinery Interior - paint finish to match existing window joinery
FLASHINGS:	0.7mm pre-painted aluminium formed to suit details provided

KEY:

SF = Safety glass to comply with NZS4223
R = Restrictor stays
Low E = Low E double glazing
OG = Opaque glazing - sea drift finish

GENERAL NOTES:

1. All Window joinery to be Aluminium unless noted otherwise
2. All aluminium joinery comply with NZS 3504 Aluminium Windows NZS 4211 : 1985 Performance of Windows
3. All timber joinery comply with NZS 3610:1979 Profiles of mouldir joinery & NZS 4211 : 2008 Performance of Windows
4. All glazing to comply with NZS4223 requirements
5. All External glazing requiring double glazed safety glass to be ex pane laminated safety glass & interior pane toughened safety glass
6. Also refer specification & details for installation

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CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION	
PROJECT	LEVEN ST ALTERATIONS		PROJECT # 5312
CLIENT	Paul & Nicky Ferro	DATE # June 2016	DWG # A13
		SCALE 1:50 @ A3	
DWG	DOOR & WINDOW SCHEDULE	DRAWN SM	
		PLOT DATE 23/6/16	REVISION

postal: 47 Tyne Street Roslyn, Dunedin
offices: 3rd Floor, Imperial Building 1 Dowling Street, Dunedin
contact: 03-477-0462*office* 021-294-7430 *mobile* stu@katipodesign.co.nz

TIMBER TREATMENT & GRADE SCHEDULE

Sub-floor timber floor framing if required	H3.2 SG8
Internal structural framing timber	H1.2 SG8
CHH HySPAN beam	H3.1 SG8
Timber door reveals	Pine dressed no.1 clears, paint finish
Internal architraves to match existing	Pine dressed no.1 clears, paint finish

All other materials & sizes as specified in drawings

All structural members to comply with NZS3604:2011 & NZS3602:2003 with 50 years durability

All exterior claddings & decking to comply with NZS3604:2011 & NZS3602:2003 with 15 years durability

Place continuous full width DPC between all 1) timber & concrete, 2) Steel members & concrete.

FINISHES:

GIB WALL LININGS EXCLUDING WET AREAS- GIB level 4 finish to maunfacturers specifications with wall board acrylic sealer/undercoat *(Resene Broadwall)* with 2 top coats of a wall board waterbourne enamel paint *(Resene SpaceCote low sheen)*, client to confirm colour.

GIB CEILING LININGS EXCLUDING WET AREAS - GIB level 4 finish to maunfacturers specifications with wall board acrylic sealer/undercoat (Resene Broadwall) with 2 top coats of a wall board waterbourne enamel paint (Resene ceiling flat*)*, client to confirm colour.

BATHROOM / LAUNDRY GIB WALL & CEILING LININGS
GIB level 4 finish install to maunfacturers specifications with Oil based sealer/ undercoat (Resene Sureseal) with 2 top coats of wall board waterbourne enamel paint (Resene SpaceCote low sheen kitchen & bathroom) or 2 top coats of wall board oil based enamel paint (Resene room Velvet) if bathroom to be used within 2weeks of applying, client to confirm colour.

INTERNAL TIMBER & MDF - REVEALS/ ARCHITRAVES/ SKIRTINGS & DOORS PAINT FINISH - Quick dry arcylic primer/ undercoat (Resene Quick Dry waterbourne primer undercoat) with 2 top coats of a Arcylic enamel paint (Resene Lustacryl), client to confirm brand & colour.

INTERIOR T&G FLOORING - CLEAR FINISH - Sand & prepare, finish with 3 coats of a solvent based polyurethane (eg: Resene Qristal clear)

INTERIOR TIMBER PANELLING, ARCHITRAVES & SKIRTING - CLEAR FINISH - Sand & prepare, with 2 coats of a waterbourne polyurethane (eg: Resene Aquaclear satin)

EXTERNAL TIMBER WINDOWS / DOORS PAINT FINISH - Quick dry arcylic primer/ undercoat (Resene Quick Dry waterbourne primer undercoat) with 2 top coats of a Arcylic semi-gloss enamel paint (Resene Lustacryl), client to confirm brand & colour.

EXTERIOR TIMBER WEATHERBOARDS- Acrylic sealer/ undercoat (eg:Resene Quick Dry waterbourne primer undercoat) with 2 top coats of exterior semi gloss acrylic paint(eg: Resene Sonyx 101) , client to confirm brand & colour. (NOTE: Undercoat required over pre-primed boards as per manu. spec.)

FLOOR FINISHES - selected by client

Tiles to laundry, bathroom

NOTE: ALL PAINT applied to manufacturers specifications.

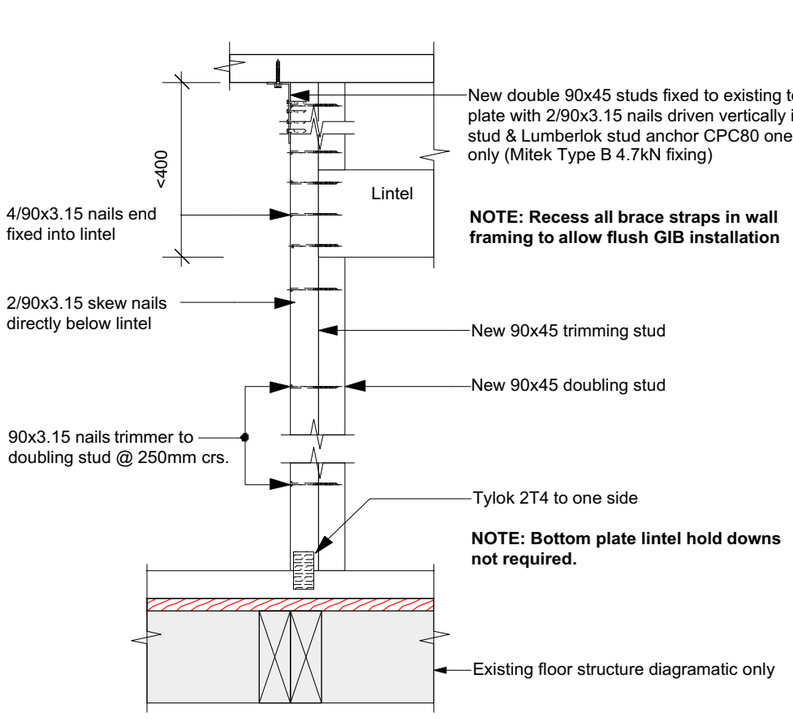
GENERAL CONSTRUCTION NOTES:

Details derived from best assumptions of existing building & site, if contractor finds construction method unsuitable with details drawn inform designer immediately for alternative solution.

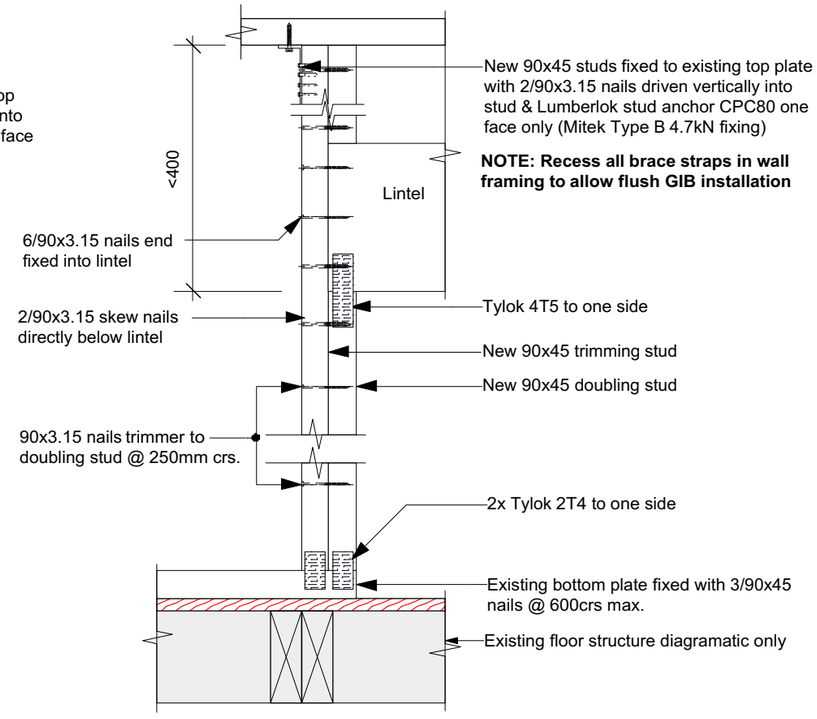
All work to comply with NZS 3604: 2011 amendments 1&2

All glazing to comply with NZS4223: 1999

All materials & products installed to manufacturers specification



1 MITEK TYPE E (1.4kN) LINTEL FIXING
Scale: 1:10



2 MITEK TYPE F (4.0kN) LINTEL FIXING
Scale: 1:10

WALL FRAMING NOTES:

1. Studs in Loadbearing walls up to 2.7m
Studs up to 2.7m in height to be 90x45 SG8 @ 600crs & dwangs @ 800crs generally unless otherwise specified, refer floor plan for wall thickness requirements.

2. Studs in Loadbearing walls up to 3.6m
Studs up to 3.6m in height to be 2/90x45 SG8 @ 600crs & dwangs @ 800crs generally unless otherwise specified, refer floor plan for wall thickness requirements.

3. Studs in non-loadbearing walls
Studs up to 3.0m in height to be 90x45 SG8 @ 600crs & dwangs @ 800crs

LICENSED BUILDING PRACTITIONER www.dbh.govt.nz BUILDING CONFIDENCE

KATIPOdesign
Architectural design+draughting

CONTRACTOR MUST CONFIRM CRITICAL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT

ISSUE	DATE	REVISION	
PROJECT	LEVEN ST ALTERATIONS		PROJECT # 5312
CLIENT	Paul & Nicky Ferro	DATE # Feb 2016	DWG # A14
DWG	SCHEDULE & NOTES	SCALE 1:10 @ A3	
		DRAWN SM	
		PLOT DATE 23/6/16	REVISION

postal: 47 Tyne Street Roslyn, Dunedin *offices:* 3rd Floor, Imperial Building 1 Dowling Street, Dunedin *contact:* 03-477-0462 *office* 021-294-7430 *mobile* stu@katipodesign.co.nz

SPECIFICATION

of work to be done and materials to be used in carrying out the works shown on the accompanying drawings

Leven St alterations

(project name)

44 Leven St, Roslyn, Dunedin, New Zealand

(project address)

Paul & Nicola Ferro

(client)

Project Ref: 5312.3

Date: 23 June 2016

TABLE OF CONTENTS

1270 CONSTRUCTION

1 GENERAL

This GENERAL section relates to common requirements for construction issues including: -

- Quality assurance
- Noise and nuisance
- Set out
- Common execution requirements
- Common materials requirements
- Supply of spare materials
- Common requirements for samples and tests
- Final presentation and cleaning
- Commissioning

Quality control and assurance

1.1 QUALITY ASSURANCE

Carry out and record regular checks of material quality and accuracy, including:

- Concrete quality and finish.
- Dimensional accuracy of structural column locations (following completion of foundations).
- All perimeter columns and frames for plumb.
- Levels of all floors relative to the site datum.
- Framing timber moisture content.

Where any material, quality or dimension falls outside specified or required tolerances, obtain written direction from the contract administrator. Where building consent approval is affected, confirm remedial action with the Building Consent Authority.

Provide all materials, plant, attendances, supervision, inspections and programming to ensure the required quality standards are met by all project personnel.

Noise and nuisance

1.2 LIMIT CONSTRUCTION NOISE

Minimise the effects of noise generation by including in the planning of the work such factors as placing of plant, programming the sequence of operations and other management functions. Limit construction noise to comply with the requirements of NZS 6803, the requirements of the Resource Management Act sections 326, 327 and 328 and the Health and Safety in Employment Regulations clause 11.

1.3 ACCEPTABLE NOISE LEVELS

Refer to NZS 6803 Tables 2 and NZS 6803, tables 3 for the upper limits of construction work noise in residential and industrial areas over the various time periods, particularly 0730 to 1800 hours. Note also the allowed adjustments and exemptions in NZS 6803, 6. Do not exceed these limits.

1.4 PROVIDE INFORMATION TO NEIGHBOURS

Provide information to neighbours of any noise generation from the site liable to constitute a problem. Explain to them the means being used to minimise excessive noise and establish with them the timings most suitable for the noise generating work to be carried on.

Discuss with any complainant the measures being used to minimise noise. Where possible modify these measures to accommodate particular circumstances. Finally, determine the sound level at the location under discussion using methods and observation reporting as laid down in NZS 6803. If the noise level is above the upper limits of NZS 6803, tables 2 and NZS 6803, tables 3, cease the noise generating operation and remedy the problem.

1.5 INCONVENIENCE TO OTHERS

When the works are to be carried out in or around occupied premises, ascertain the nature and times of occupation and use. Carry out the works in a manner to minimise inconvenience, nuisance and danger to occupants and users.

1.6 DIRT AND DROPPINGS

Remove dirt and droppings deposited on public or private thoroughfares from vehicles servicing the site to the satisfaction of the appropriate authorities and the contract administrator.

1.7 DAMAGE AND NUISANCE

Take all precautions to prevent damage and nuisance from water, fire, smoke, dust, rubbish and all other causes resulting from the construction works.

Set-out and tolerances

1.8 SURVEY INFORMATION

Locate and verify survey marks and datum points required to set out the works. Record and maintain their position. Re-establish and replace disturbed or obliterated marks.

1.9 USE OF SET-OUT INSTRUMENTS

Permit without charge, the use of instruments already on site for checking, setting out and levels.

1.10 CHECK DIMENSIONS

Check all dimensions both on drawings and site, particularly the correlation between components and work in place. Take all dimensions on drawings to be between structural elements before linings or finishes, unless clearly stated otherwise.

1.11 TOLERANCES

All work to be level, plumb, and true to line and face. Unless otherwise specified in specific work sections of this specification, tolerances for structural work shall comply with the following:

Concrete construction:	To NZS 3109 Concrete construction Clause 3.9 Tolerances for reinforcement Table 5.1 Tolerance for precast components Table 5.2 Tolerance for in situ construction To NZS 3114 Concrete surface finishes
Masonry construction:	To NZS 4210 Masonry construction: Materials and workmanship Clause 2.6.5 Tolerances Table 2.2 Maximum tolerances
Structural steelwork:	To NZS 3404:1997 Steel structures standard Section 14.4 Tolerances (after fabrication) Section 15.3 Tolerances (erection)
Timber framing:	To NZS 3604 Timber-framed buildings Clause 2.2 Tolerances Table 2.1 Timber framing tolerances

Refer to work sections for tolerance requirements for finishes.

Execution

1.12 EXAMINE PREVIOUS WORK

Before commencing any part of the work carefully examine the previous work on which it may depend. Report in writing to the contract administrator defects that may affect the quality of the proposed work and obtain instructions. Commencing work on any part means that previous work is accepted as being satisfactory for work of the required standard.

1.13 WORKER QUALIFICATIONS

All work to be level, plumb, and true to line and face. Employ only experienced workers familiar with the materials and techniques specified.

Materials

1.14 NEW PRODUCTS AND MATERIALS

Materials and products to be new unless stated otherwise, of the specified standard, and complying with all cited documents.

1.15 COMPATIBILITY OF MATERIALS AND FINISHES

Ensure all parts of a construction or finish are compatible and their individual use approved by the manufacturers and suppliers of other parts of the system. Source all parts of a system from a single manufacturer or supplier.

1.16 STORING PRODUCTS AND MATERIALS

Take delivery of and store products, materials and components in accordance with codes of practice and the product manufacturer's or supplier's stated requirements. Maintain the proper condition of any protective packaging, wrappings or supports during delivery, unloading and storage.

1.17 HANDLING PRODUCTS AND MATERIALS

Handle products, materials and components in accordance with codes of practice and the manufacturer's or supplier's stated guidelines. Avoid distortion and any contact with potentially damaging surfaces or conditions.

1.18 SUBSTRATE CONDITIONS

Ensure substrate conditions are within the manufacturer's or supplier's stated guidelines both before and during the installation of any material, product or system. Obtain written instructions on the necessary action to rectify unsatisfactory conditions.

1.19 INSTALLING PRODUCTS AND MATERIALS

Install in accordance with the manufacturer's or supplier's technical literature. Ensure that all installers are familiar with the required substrate conditions and the manufacturer's or supplier's specified preparation, fixing and finishing techniques.

1.20 COMPLY WITH STANDARDS

Comply with the relevant and/or cited Standard for any material or component. Obtain certificates of compliance when requested by the contract administrator.

1.21 CONDITION OF MATERIALS AND COMPONENTS

To be in perfect condition when incorporated into the work.

1.22 INCOMPATIBLE MATERIALS AND METALS

Separate incompatible materials and metals with separation layers, sleeves or gaskets of plastic film, bituminous felt or mastic or paint coatings, installed so that none are visible on exposed surfaces.

Samples and tests

1.23 SAMPLES AND PROTOTYPES

Where specified in the work sections, submit samples, prepare sample panels, and construct prototypes for review as to appearance, form and conformance with the drawings and specifications. Submit all information required to assist the review process, including technical data, manufacturer's literature, independent appraisals and producer statements.

Timing for the provision and review of samples, sample panels and prototypes to be included in the contract programme. Allow a minimum of 10 working days for each review. Proceed only after instructions to proceed have been issued in writing by the contract administrator.

In situ work may be incorporated in the finished work if so confirmed, otherwise allow to remove completely and replace.

1.24 CONTROL STANDARD

Obtain the contract administrator's confirmation of material, component and work samples which then become the quality control standard. Remove from the site any rejected samples. Retain confirmed samples with care on site for comparison throughout the contract. Remove from the site when no longer required.

Spares

1.25 SPARES

Collect, protect and store safely all spare materials required under the contract. Give the contract administrator an inventory of all spares.

Final presentation and cleaning

1.26 REMOVE TEMPORARY PROTECTION

Remove all temporary markings, coverings, labels and protective wrappings unless instructed otherwise.

1.27 REPLACE DAMAGED MATERIALS

Replace all materials or component damaged during the works to the standard of and integral with the original.

1.28 COMPLETE ALL SERVICES

Ensure all services are complete and operational, with all temporary labelling removed, required labelling fixed and service instructions provided.

1.29 CLEANING BY CONTRACTOR

Clear the contract works of all construction materials, waste, dirt and debris. Clean the contract works including:

- Wipe all surfaces to remove construction dust
- Clean out service ducts and accessible concealed spaces
- Clean out all gutters and rainwater heads
- Wipe dust from both sides of glass. Take particular care when removing paint or cementitious materials to not damage the glass.
- Remove adhesive residue left by labels and other temporary protection/markings
- Clean out the interior of all cabinetry
- Wash down external concrete including driveways and concrete masonry. Take care when waterblasting to not cause damage to the surface or allow water to enter the building.

- Remove rubbish and building material from the area immediately adjacent to the contract works

Commissioning

1.30 MOVING PARTS

Adjust, ease and lubricate all doors, windows, drawers, hardware, appliances, controls and all moving parts to give easy and efficient operation.

1.31 TESTS AND CERTIFICATION

Gas instant hot water system
Water prerssure
Waterproof membrane flood test to wet area shower

1.32 SECURITY AT COMPLETION

Remove any temporary lock cylinders and complete final keying prior to handing over keys to the principal on completion of the works. Leave the works secure with all accesses locked. Account for all keys/cards/codes and hand to the principal along with an itemised schedule, retaining a duplicate schedule signed by the principal as a receipt.

3820L LASERFRAME® CARPENTRY

1 GENERAL

This section relates to the supply and erection of light timber framing, incorporating Carter Holt Harvey Timber **Laserframe®** kiln-dried framing.
It includes:

- engineered timber - Futurebuild® LVL

1.1 RELATED WORK

Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
WorkSafe NZ:	Guidelines for the provision of facilities and general safety in the construction industry

***A copy of NZS 3604 Timber-framed buildings, must be held on site.**

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Laserframe product information:
Laserframe Product Specification Guide
Laserframe Product Technical Statement

Copies of the above literature are available at

Company:	Carter Holt Harvey
Web:	www.laserframe.co.nz
Telephone:	0800 74 63 99

Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

2 PRODUCTS

2.1 BUILDING UNDERLAYS

Refer to 4230 WALL CLADDING, 4161 UNDERLAYS, FOIL AND DPC and 4710 INSULATION for the supply of wall underlays, roof underlays and sheet insulation products.

2.2 TIMBER SUB FLOOR FRAMING

Species and treatment to NZBC B2/AS1, NZS 3602, table 1B and moisture content to NZS 3602, table 4. verified structural grade (SG) to NZS 3603.

2.3 TIMBER FRAMING

Laserframe® kiln dried, verified structural grade (SG) to NZS 3603, with moisture content at supply of 90% of the product, within MC range of 8 - 26%.

2.4 TIMBER FRAMING, TREATED FOR INTERIOR USE

Laserframe® kiln dried, verified structural grade (SG) to NZS 3603, Boron H1.2 with moisture content at supply of 90% of the product, within MC range of 8 - 26%.

2.5 TIMBER FRAMING, TREATED FOR EXTERIOR EXPOSED USE AND CANTILEVERED DECKS

Pinex Verified radiata pine to NZS 3603, treated H3.2 CCA (preservative code 01 or 02) to NZS 3602, table 1, reference B.3, with moisture content to NZS 3602, table 4, Allowable moisture content.

2.6 CEILING BATTENS

Merchantable grade or better.

2.7 EXTERIOR WALL BATTENS/STRAPPING

Merchantable grade or better, treated H3.1 to NZS 3602, table 1, reference 1D.10.

2.8 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC section

2.9 NAILS

Type to NZS 3604, section 4, **Durability**, and of the size and number for each particular types of joint as laid down in the nailing schedules of NZS 3604, section 6 -10.

2.10 BOLTS AND SCREWS

Bolts and screws of engineering and/or coach type complete with washers, to the requirements of NZS 3604, section 4, Durability, and of the number and form required for each particular junction to NZS 3604, sections 6-10.

2.11 NAIL PLATES

Comply with the requirements of NZS 3604, section 4, Durability, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Plates to the plate manufacturer's design for the particular locations as shown on the drawings.

2.12 CONNECTORS

Comply with the requirements of NZS 3604, section 4, Durability, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Connectors and structural brackets to the connector manufacturer's design for particular locations shown on drawings.

2.13 CORROSION RISKS

For interior timber, treated with copper-based timber preservatives (H3.2 or higher), use a minimum of hot-dipped galvanized steel fixings and fasteners.

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

3 EXECUTION

3.1 EXECUTION

To NZS 3603 and NZS 3604. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, and stairs).

3.2 SEPARATION

Separate all timber framing timbers from concrete, masonry and brick by: -

- a full length bituminous damp-proof membrane overlapping timber by at least 6mm; or
- a 12mm minimum free draining air space

3.3 ATTENDANCE

Provide and fix blocks, nogs, openings and other items as required by other trades.

3.4 MOISTURE CONTENT

Maximum allowable equilibrium moisture content (EMC) for framing supporting interior linings:

- At enclosure: 24%
- At lining: 20%
- Timber strip flooring: 12% - 18% at time of laying

3.5 DIMENSIONS

All timber sizes except for battens are actual minimum dried sizes.

3.6 PROTECT

Keep **Laserframe®** dry and wrapped prior to erection. Protect against damage and from inclement weather and ensure that any variation in moisture content is kept to a minimum, before and after erection and before enclosure.

3.7 PROTECT MID FLOOR BOUNDARY JOISTS

Before flooring is laid, place a 600mm wide strip of wall underlay over mid floor boundary joists and down over the outside face to cover the full depth of the boundary joist to provide temporary protection from potential rain wetting. Staple or nail in place with a minimum number of fasteners to enable air circulation behind the underlay during the construction period prior to the cladding being erected.

3.8 SET OUT

Set-out framing generally in accordance with the requirements of NZS 3604, to carry superimposed loads and as required to support sheet linings and claddings. Set back nogs 12.5mm from face of studs where required for back-blocking of plasterboard non-tapered ends or edges.

3.9 SET TIMBERS

Set timbers true to the required lines and levels with all mitres, butt joints, laps and housings cut accurately to provide full and even contact over the whole of the bearing surface.

3.10 TIMBER CUTTING

Select and cut spanning members to minimise allowable defects and avoiding knots and short grain on edges in the middle third, and shakes, splits and checks at mid-span and close to ends. Refer to the recommendations appropriate for the treatment type (if any) for the field application of timber preservatives to cut ends.

3.11 HOLES AND NOTCHES

Limit holes and notches, checks and half-housing for the structure to those allowable in NZS 3604. Neatly form holes and notches for services without lessening the structural integrity of the member.

3.12 CUTTING

Cutting for straightening to comply with NZS 3604.

3.13 EXPOSED TIMBER CONNECTORS AND FIXINGS

Do not use on any structural framing exposed to view unless detailed on the drawings.

3.14 POWDER ACTUATED AND MECHANICALLY POWERED FIXING

Comply with the WorkSafe NZ: Guidelines for the provision of facilities and general safety in the construction industry, part 5, section 5.7.

3.15 ADDITIONAL FRAMING

Position and fix all necessary members for the fixing of all services, fittings, fixtures, edges of linings or claddings, and to provide lateral support to load carrying framing.

3.16 FORM NAILED JOINTS

Fully drive nails in all structural joints with the number and location for each joint to the requirements of NZS 3604. Except that 75mm x 3.15mm nails may be used in 35mm timber joints in wall frames and 90mm x 3.15mm nails may be used in 45mm timber joints in wall frames. 100mm x 3.75mm nails should not be used without pre-drilling to 80% of nail diameter.

3.17 FRAMING SUB-FLOOR

Frame up off foundation walls and piles, all fabricated, fastened and braced to NZS 3604, section 6.10, **Framed subfloor walls**.

3.18 FRAMING WALLS

Frame to required loading and bracing complete with lintels, sills and nogs, all fabricated and fastened to NZS 3604, section 8, **Walls**.

3.19 FRAMING ROOFS

Frame to required loading and bracing complete with valley boards, ridge boards and purlins. Design and fit roof trusses complete with anchorage. All fabricated and fastened to NZS 3604, section 9, **Posts** and section 10, **Roof framing**.

3.20 FRAMING CEILINGS

Frame to required loading and bracing complete with runners and battens set out to support ceiling lining. All fabricated and fastened to NZS 3604, section 13, **Ceilings**. Trim for openings in ceilings and hatches to NZS 2604 section 13.3, **Openings in ceilings**. Provide blocking for water tanks located in the ceiling space to NZS 3604, section 13.4, **Water tanks in roof space**.

3.21 INSTALLING WALL BATTENS

Lay out, fabricate and fasten to suit the selected wall cladding or lining.

3.22 INSTALLING CEILING BATTENS

Fabricate and fasten to NZS 3604, section 13 **Ceilings**, table 13.1 **Ceiling battens**.

3.23 FIT JAMB BATTENS

For walls with direct fix cladding, fit 20mm (nominal) jamb battens over the wall underlay, to the jambs of window and door rough openings, to NZBC E2/AS1, fig 72A. Cut around sill flashings. Fix with 60 x 2.8 flat head galvanized nails at 300mm centres.

3.24 DPC TO TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section

4 SELECTIONS

For further details on selections go to www.laserframe.co.nz.
Substitutions are not permitted to the following, unless stated otherwise.

4.1 SUB-FLOOR FRAMING IF REQUIRED

Member	Type	Grade	Treatment
Ground floor joists/blocking:	Laserframe®	SG8	H3.2 CCA

Note: CCA preservative code 01 or 02

4.2 EXTERIOR WALL FRAMING

Member	Type	Grade	Treatment
Exterior walls:	Laserframe®	SG8	H1.2
Jamb battens:	Radiata pine	Merch	H3.1

4.3 ROOF FRAMING

Member	Type	Grade	Treatment
Rafters:	Laserframe®	SG8	H1.2

4.4 LAMINATED VENEER LUMBER (LVL)

Member	Brand	Type
Hanging beams:	Futurebuild® LVL	hySPAN

4.5 INTERIOR FRAMING

Member	Type	Grade	Treatment
Non structural walls:	Laserframe®	SG8	H1.2
Structural and braced walls:	Laserframe®	SG8	H1.2

4.6 EXTERIOR FINISHING TIMBERS

Member	Type	Treatment
Weatherboards:	Rusticated to match existing	H3.1
Coverboards:	To match existing	H3.1
Exterior mouldings:		H3.1

4.7 CEILING BATTENS

Timber/grade/treatment: Gauged, H1.2, merchantable grade radiata pine

4.8 DAMP-PROOF COURSE

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

4161T THERMAKRAFT UNDERLAYS, FOILS & DPC

1 GENERAL

This section relates to the application of **Thermakraft Industries (NZ) Ltd**, DPC, DPM, underfloor foil insulation, wall underlays and roofing underlays.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

NZMRM	New Zealand Metal Roofing Manufacturers Inc.

The following definitions apply specifically to this section:

Wall underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic wall underlays, sometimes called, wall wraps, building wraps or building papers.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS1-AS7	Protection from fire
NZBC E2/AS1	External moisture
AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
NZS 2295	Pliable, permeable building underlays
AS/NZS 2904	Damp-proof courses and flashings
NZS 3604	Timber-framed buildings
AS/NZS 4200.1	Pliable building membranes and underlays - Materials
NZS 4214	Methods of determining the total thermal resistance of parts of buildings
AS/NZS 4389	Roof safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ metal roof and wall cladding Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Thermakraft documents relating to work in this section are:
Thermakraft product manual and technical data sheets.
BRANZ Appraisal 329 - Supercourse 500 Damp-Proof Course and Concealed Flashing
BRANZ Appraisal 651 - Thermakraft Covertek™ 407 Fire Retardant Self Supporting Synthetic Roofing Underlay
BRANZ Appraisal 695 - Watergate-Plus Fire Retardant Wall Underlay
BRANZ Appraisal 710 - Thermakraft Covertek 403 Absorbent Breathable Roof Underlay
BRANZ Appraisal 711 - Thermakraft Covertek 403 Fire Retardant Absorbent Breathable Wall Underlay
BRANZ Appraisal 743 - Thermakraft Covertek 405 Absorbent Breathable Roof Underlay
BRANZ Appraisal 803 - Bulldog™/Aluminium Window Sealing System
BRANZ Appraisal 878 - Thermakraft Aluband Window Flashing Tape
Code Mark Certificate 30029 - Thermakraft Covertek 403 Absorbent Breathable Roof Underlay
Code Mark Certificate 30030 - Thermakraft Covertek 405 Absorbent Breathable Roof Underlay
Code Mark Certificate 30028 - Thermakraft Covertek 407 Absorbent Breathable Roof Underlay

Manufacturer/supplier contact details

Company:	Thermakraft Industries (NZ) Ltd
Web:	www.thermakraft.co.nz
Email:	info@thermakraft.co.nz
Telephone:	0800 806 595

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Warrant this work under normal environmental and use conditions against failure of materials and execution. Thermakraft Industries Ltd warrant performance of products if design and installation complies with relevant technical literature, NZBC, and recognised industry Codes of Practice. Copy of Thermakraft Product Warranty available on request.

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified materials, or associated products, components or accessories.

1.6 INSTALLATION SKILL LEVELS

Installers to be experienced in the installation of Thermakraft products and familiar with Thermakraft Industries technical literature and the related documents listed in this design i.e. NZMRM CoP NZ metal roof and wall cladding Code of Practice.

2 PRODUCTS

Materials

DPC

2.1 EMBOSSED POLYETHYLENE

Supercourse 500™ hi-impact polyethylene film to AS/NZS 2904 and embossed on both sides. Thickness 500 microns minimum, manufactured for use as a damp-proof course and concealed flashings around doors and windows and to BRANZ Appraisal 329. Refer to SELECTIONS for type of jointing tape.

DPM

2.2 DAMP-PROOF MEMBRANE - MEDIUM DUTY, BLACK - GROUND COVER TO SUSPENDED TIMBER FLOORS

Thermathene Black™ polyethylene sheet with minimum thickness of 0.25 mm and a minimum vapour flow resistance of 50MNs/g to NZS 3604, 7.5.6, Polyethelene (polythene) sheet damp-proof membranes. Refer to SELECTIONS for type of jointing tape.

Wall underlays

2.3 BITUMINOUS HEAVY WEIGHT UNDERLAY

Thermakraft 213™, bituminous heavy weight underlay to NZS 2295.

Accessories

2.4 WINDOW AND DOOR SEALING TAPE

Thermakraft Aluband™ Window Sealing Tape system consists of synthetic faced reinforced bituminous window sealing tape, Thermakraft Aluband™ Corner Moulding™ piece, used in conjunction with the Thermakraft Aluband™ Hand Tool to ensure good adhesion and a tight fit into corners. See Thermakraft Data Sheet 312 for installation details and BRANZ Appraisal 878.

2.5 WINDOW AND DOOR SEALING TAPE

Thermakraft Bulldog™ Window Sealing Tape system consists of synthetic faced bituminous window sealing tape, Thermakraft Aluband™ Corner Moulding™ piece, used in conjunction with the Thermakraft Aluband™ Hand Tool to ensure good adhesion and a tight fit into corners. See Thermakraft Data Sheet 312 for installation details and BRANZ Appraisal 803.

2.6 TAPE

Thermakraft tapes to compliment the underlay. Pressure sensitive aluminium foil tapes for joining foil insulation and vapour barriers. These include:

- Thermakraft White General Purpose Underlay Tape
- Thermakraft Window Sealing Tapes, used to repair damaged bituminous underlays

2.7 DRAINAGE MATT

Thermakraft Drainage Matt, an extruded 3 dimensional synthetic black mesh, used as an air separation layer between fully sarked roof and roof cladding. Used in wall applications to allow air passage and drainage where no other cavity is provided.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

Design application and installation of Thermakraft Building products to NZBC E2/AS1, BRANZ Appraisals, Thermakraft Technical Literature and Industry Codes of Practice.

3.2 STORAGE

Store building underlays and accessory materials, under conditions that ensure no deterioration or damage. Store rolls in an upright position on a smooth floor and protected from sunlight, UV radiation and moisture.

3.3 INSPECTION

Before starting work, check that the building construction phase will allow work of the required standard. Carry out remedial work identified before laying underlay.

Application DPC

3.4 DPC TO LOSP/CCA TREATED TIMBER

Lay Supercourse 500™ DPC under LOSP or CCA treated bottom plate of all timber framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.

3.5 DPC TO TIMBER / STEEL

Lay DPC under the bottom plate of all timber / steel framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier. Refer to SELECTIONS for type.

3.6 DPC TO MASONRY AND BRICK VENEER

Lay DPC along based of cavity and fix top edge to studs with galvanized clouts. Turn DPC out over concrete rebate under bottom course of veneer.

Application - DPM

3.7 DPM TO GROUND UNDER SUSPENDED TIMBER FLOOR

Lay DPM on ground under enclosed subfloor suspended timber floor in accordance with NZS 3604, 6.14.3, Ground cover, and as follows.
Ensure that:

- the vapour barrier is weighted down and held against air movement by bricks or rocks
- total subfloor ground area is covered
- polyethylene sheet is new and unpunctured
- adjacent sheets are lapped a minimum of 75mm
- sheets are butted up to surrounding foundation walls, piles and other penetrating elements
- ground is shaped to prevent water accumulation on the vapour barrier and to drain to the exterior.

Note: In accordance with NZS 3604 the minimum requirement for subfloor ventilation under all situations is to be no less than 700mm² for every 1m² of floor area.

Application - wall underlay

3.8 WALL UNDERLAY

Fix horizontally to outside face of framing in true alignment, with succeeding sheets overlapping 150mm to NZBC E2/AS1, 9.1.7, Wall underlay, and refer to Thermakraft Industries for requirement for fastenings. Fix to Thermakraft Industries Technical Data specifications. Scribe neatly around penetrations and openings to leave no gaps. Tape all penetrations. Keep clean, undamaged and without visible weather deterioration until closed in.

3.9 METAL CLADDING ON TIMBER CAVITY BATTENS

Fix strip of Thermakraft DPC as a separator between the timber and metal cladding.

Completion

3.10 CLEAN UP

Clean up as the work proceeds.

3.11 LEAVE

Leave work to the standard required by following procedures.

3.12 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.thermakraft.co.nz.
Substitutions are not permitted to the following, unless stated otherwise.

Damp Proof Course

4.1 THERMAKRAFT - SUPERCOURSE 500™ DPC

Location:	As required
Type:	Supercourse 500™ DPC
Jointing tape:	Thermakraft Aluband

Damp Proof Membrane

4.2 THERMATHENE BLACK™ - GROUND UNDER SUSPENDED TIMBER FLOOR

Location:	Sub-floor retrofit installed under bathroom lean-to floor framing to ground
Type:	Thermathene Black™
Jointing tape:	Thermakraft "White General Purpose Underlay Tape"

Wall Underlays

4.3 THERMAKRAFT 213™

Location:	Retro-fit as required
Type:	Thermakraft 213™
Jointing tape:	Thermakraft White GP tape

Window / Door Sealing System

4.4 THERMAKRAFT - ALUBAND™

Location:	Windows & doors as required
Type:	Thermakraft window sill tape 75mm Aluband™

4.5 THERMAKRAFT BULLDOG™

Location:	Windows & doors as required
Type:	Thermakraft Bulldog™,

4230 WALL CLADDING

1 GENERAL

This section relates to the supply and installation of exterior cladding, including:

- associated flashings
- timber fascias
- timber barges
- timber trims
- timber beads
- timber facings

1.1 RELATED WORK

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Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC E2/AS1	External moisture
AS/NZS 1491	Finger jointed structural timber
AS/NZS 2269.0	Plywood - Structural - Specification
AS/NZS 2908.2	Cellulose-cement products - Flat sheets
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3617	Profiles of weatherboards fascia boards and flooring
NZS 3631	New Zealand timber grading rules
BRANZ BU 441	Sealed joints in external claddings - 2. Sealants

1.3 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:
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Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

Performance

1.4 PERFORMANCE

Accept responsibility for the weathertight performance of the completed cladding system, including all penetrations.

2 PRODUCTS

2.1 WALL UNDERLAYS

For flexible wall underlays, rigid wall underlays and rigid air barriers, refer to the appropriate separate section (s).

2.2 TIMBER WEATHERBOARD

Dressing grade to NZS 3631, to NZS 3617 for profile and treated to NZS 3602, table 2, reference 2.A1, Requirements for wood-based building components to achieve a 15-year durability performance.

2.3 NAILS, SCREWS AND FASTENINGS

Metal, size and pattern, to cladding manufacturer's requirements and complying with the relevant aspects of NZS 3604, section 4, Durability.

2.4 FLASHINGS

To NZBC E2/AS1, 4.0 **Flashings**. Material, grade and colour as detailed and scheduled. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings.

3 EXECUTION

3.1 MOISTURE CONTENT

Maximum allowable moisture content to NZS 3602 for:
Equilibrium moisture content (EMC)

- Framing: 20% at closing in
- Weatherboards: 14% at time of fixing
- Exterior joinery and trim: 14%

3.2 EXECUTION METHODS AND PRACTICES

To NZS 3604 except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.3 PENETRATIONS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:

- wall underlay/rigid air barrier to openings finished and dressed off with flashing tape ready for the installation of window and door frames and other penetrations
- claddings neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

3.4 PRIME OR SEAL TIMBER WEATHERBOARDS AND TRIM

Prime or seal all front and back faces, edges and end grain before fixing weatherboards and exterior trim, to the finish and quality specified in painting sections.

3.5 FIXINGS TO TIMBER CLADDINGS

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3.6 INSTALL TIMBER WEATHERBOARDS

Install level, true to line and face, to NZBC E2/AS1: 9.4 Timber weatherboards. Refer to NZS 3604 for fixings durability requirements for specific provisions.

3.7 INSTALL EXTERIOR TIMBER FINISHINGS

Install timber fascias, barge boards, facings, beads, trim and enclosures level, true to line and face, with all end grain sealed and joints mitred.

3.8 INSTALL FLASHINGS

Install flashings, covers and soakers as detailed on the drawings and to NZBC E2/AS1.

3.9 USE OF SEALANTS

Selection and use of sealants to follow BRANZ BU 441 Sealed joints in external claddings - 2. Sealants.

3.10 COMPLETE

Ensure the work is complete with all flashings, finishings and trim properly installed so the cladding system is completely weathertight.

3.11 REPLACE

Replace damaged or marked elements. Remove unused materials from the site.

4 SELECTIONS

4.1 TIMBER WEATHERBOARD

Location:	Bathroom lean-to at rear of house, patch repairs to make good to existing weatherboards where doors & windows removed
Size/profile:	Rusticated to match existing
Species and grade:	Pinus Radiata
Treatment	H3.1 min.
Priming	Pre-primed

4.2 EXTERIOR FINISHING TIMBER

Species and grade:	Pinus Radiata
Treatment:	H3.1 min.
Location:	External corner coverboards if required Window coverboards as detailed
Priming:	Site prime prior to installation, refer paint spec.

4.3 NAILS, SCREWS AND FASTENINGS

Cladding	Fixing/fastening (metal/finish)	Fixing/fastening (type, gauge and length)	Centres (general and edge)
Weatherboard	S/S	65mm flat head nail	

4.4 FLASHINGS

Install flashing as detailed

4511 EXTERIOR TIMBER WINDOWS & DOORS

1 GENERAL

This section relates to the supply and installation of:

- exterior timber windows
- exterior door frames and doors
- generally unglazed

1.1 RELATED WORK

Refer to glazing sections for glazing
Refer to painting sections for finishes

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements

1.3 ABBREVIATIONS AND TERMS

SLS	Serviceability limit state
ULS	Ultimate limit state

Warranties

1.4 WARRANTY

Provide warranty for:
5 years for materials
Warrantor: Joiner

Provide the warranty in the standard form in the general section 1237WA WARRANTY AGREEMENT.

Refer to the general section 1237 WARRANTIES for additional requirements.

Performance

1.5 PERFORMANCE - STRUCTURAL/WEATHER-TIGHTNESS

The structural and weather-tight performance of the completed window installation, the glazing and infill panels is the responsibility of the window manufacturer.

Performance to NZS 4211

1.6 CERTIFICATION

Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of NZS 4211.

1.7 PERFORMANCE - WINDOWS AND DOORS

To NZS 4211,including:

- deflection, opening sashes, air infiltration, water penetration, ultimate strength, torsional strength of sashes, marking.

Refer to SELECTIONS.

Performance - Wind (design by contractor)

1.8 WIND - NON SPECIFIC DESIGN

Design the installation to the wind zone parameters of NZS 3604, table 5.4.
Refer to SELECTIONS for wind zone.

2 PRODUCTS

Materials - general

2.1 EXTERIOR TIMBER

Solid timber to NZS 3602 to profiles detailed. Moisture content 16% ex factory.

2.2 SASHES

Solid/finger jointed timber to profiles detailed and complete with weather-seals and weather hoods as necessary.

2.3 EXTERIOR FACINGS AND SCRIBERS

Treated H3.1 unless durable heart wood, to profiles detailed/scheduled.

2.4 GLASS

Refer to glazing sections for glass type and thickness. To NZS 4223.3.

2.5 PANELS

Refer to SELECTIONS for type.

2.6 INTERIOR TIMBER

To NZS 3602. Moisture content 10-14%.

Materials - doorsets

2.7 STANDARD DOORSETS, SIDE HUNG DOOR

Frames to profile as detailed and dimensioned.

Components

2.8 FLASHINGS GENERALLY

Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

2.9 WINDOW AND DOOR FURNITURE

Refer to 5521 HARDWARE for type.

2.10 METAL FASTENINGS

Galvanized steel or non-corrodible metal.

2.11 SCREWS

Stainless steel or non-corrodible metal. Length sufficient to penetrate into the background support up to the shank. Screws for fixing hinges, hardware or furniture to match the item being attached.

2.12 NAILS

Length sufficient to penetrate into the background support at least half the nail length, except if into radiata pine then three-fifths their length.

2.13 SASH STAYS

Aluminium, nylon-bearing friction stays - 2 per sash. Size and gauge to suit sash size and weight.

2.14 SAFETY STAYS

Stainless steel non releasable restrictors to limit window opening to NZBC F4/AS1, Table 2, Acceptable opening sizes for barriers.

2.15 HINGES

Size and gauge to carry door size and weight. Refer to SELECTIONS for type, size and material.

Finish

2.16 PRIMER

Alkyd wood primer coating system.

3 EXECUTION

Conditions

3.1 GENERALLY

Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, and stairs).

3.2 DO NOT DELIVER

Do not deliver any elements which cannot be unloaded immediately into suitable storage conditions.

3.3 HANDLE

Handle, unload and store elements without distortion and avoiding pre-finished surfaces rubbing together, and contact with mud, moisture and other damaging materials.

3.4 PROTECT

Protect all elements against damage to arrises and glazing beads. Store frames and doors flat and away from moisture or direct sunlight.

3.5 FABRICATE DOORSETS

Fabricate doorsets in the factory with doors hung, provision for furniture made, finishes applied and fully operable.

3.6 FABRICATE DOORS

Fabricate doors in the factory, with provision for door furniture.

3.7 CHECK ALL OPENINGS

Check all openings on site for size and standard of execution before installing window or door frames.

3.8 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.

Required preparatory work includes the following:

- wall underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 Wall underlay to wall openings.
- claddings neatly finished off to all sides of openings
- installation of flashings (those which are required to be installed prior to frames).

Assembly

3.9 FABRICATION GENERALLY

Manufacture and fabricate frames, doors and sashes as detailed. Install hinges, stays and running gear as scheduled.

3.10 FABRICATION SASHES

Solid/finger-jointed timber to profiles detailed, complete with weather seals and weather hoods as necessary and as detailed.

3.11 HINGES

Fit hinges to doors to support the door size and weight

3 hinges	Doors up to 2.2 metres
4 hinges	Doors 2.2 - 2.6 metres
5 hinges	Doors 2.6 - 5.0 metres

Fit minimum 2 hinges per window sash

3.12 FACTORY FINISHING

Before delivery to site:

- Prime assemblies scheduled for paint finish with an alkyd wood primer.
- Prime rebates and concealed faces of beads of assemblies scheduled for clear finish with an alkyd wood primer.
- Brace square and provide protection to assemblies during delivery to site. Where factory glazed, indicate the presence of transparent glasses with whiting, tape or signs compatible with the glass type.

3.13 ON SITE FINISHING

Before installation:

- Prime assemblies scheduled for paint finish not already primed with an alkyd wood primer.
- Prime all rebates and concealed faces of beads of assemblies scheduled for clear finish with an alkyd wood primer.
- Re-prime/seal any subsequently cut edge.
- Refer to painting section/s for finishing.

Installation - frames

3.14 FIXING FRAMES

Fit flashings to frame and framing as required. Fix and assemble frames rigidly in place, plumb, level and true to line and face without distortion and with all opening sashes fully and easily operating. Fit facings, scribers, draught-stopping and sealants.

3.15 DISTORTION

Do not distort frames when wedging or other packing, or when tightening fixings. If necessary adjust packing and fixings to eliminate binding. Do not cut, plane or sand frames to remedy distortion.

3.16 FIXINGS

Fix frames so that nail heads are covered by applied stops and beads. Punch all nail heads below timber surfaces which will be visible in completed work. Ensure that at least one frame fixing is adjacent to each hanging point.

3.17 EXTERNAL DOOR AND WINDOW FRAMES AND SASHES

Fabricate as detailed. Jamb, head and sill liners as detailed. Wedge and rigidly fix in place without distortion, plumb, and true to line and face, complete with full length sill tray, jamb and cap flashings and with all doors and sashes operating freely. Fit hardware.

3.18 INSTALL FLASHINGS

Install flashings to heads, jambs and sills of frames as required by the window manufacturer and as detailed on the drawings. Finish head flashings to match window finish.

Place all flashings so that the head flashing weathers the jamb flashings, which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.

Except where window/door frames are recessed, ensure that head flashings over-sail jamb facings by 15mm at each end. Refer to 4821 FLASHINGS section for supply and installation.

3.19 COMPLETE AIR SEAL

To NZBC E2/AS1:9.1.6 Air seals. Form an air-tight seal by means of proprietary expanding foam, compressible foam strips, or sealants used with backing rods. Ensure that in combination with the internal linings a complete air seal is created.

3.20 FIX HARDWARE

Fix all sash hardware and furniture as scheduled.

3.21 SAFETY STAYS

Factory fit safety stays to all windows scheduled for safety stays and to all windows where safety stays are required to comply with NZBC F4/AS1 4.0, Opening windows.

Installation - doorsets

3.22 PROPRIETARY ELEMENTS

Fix in accordance with the door manufacturer's requirements.

3.23 INSTALLATION GENERALLY

Frames finished to match the width of lined walls. Wedge frames into opening and nail through into the studs. Locate all wedges and fixing at hinge positions and opposite, with one fixing in the vicinity of the lock. Fixings concealed behind planted stops.

Hang doors on hinges, sliding or bi-fold gear as specified and to operate freely. Fit all hardware and door furniture.

Installation - standard doorsets

3.24 TIMBER STUD WALLS - TIMBER FRAMES

Wedge into opening and nail through into the studs. All wedges and fixing to be at hinge positions and opposite, with one fixing in the vicinity of the lock.

3.25 REMOVE DOORS

Remove doors from the frames if necessary to protect them, or for re-finishing, store safely and near completion refit them, all without any damage.

3.26 INSTALL PANELS

Prime rebates and beads; install sealant backing strips or silicone. Install dry beading to outside of panels as selected. Do not mitre corners of beads.

3.27 MANIFESTATIONS

To NZS 4223.3, 2.2 Manifestation (making glass visible).

3.28 INSTALL FURNITURE

Install latches, locks and door furniture as scheduled.

3.29 CHECK

Check and adjust operation of all doors, hardware and furniture.

Completion

3.30 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.31 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

3.32 PROTECTION

Provide the following temporary protection of the finished work:
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4 SELECTIONS

Performance - Wind (design by contractor)

4.1 WIND - NON SPECIFIC DESIGN

Building wind zone: Medium (refer to NZS 3604, table 5.4)

JOINERY FRAMES

4.2 EXTERIOR TIMBER WINDOW FRAME AND SASH

Location:	Dining room
Timber species:	Canadian Oregan
Grade:	Dressed No.1 clears
Treatment:	Natural treatment
Finish:	Paint finish to match existing, refer paint spec.

4.3 INTERNAL STANDARD DOORSETS, SIDE HUNG DOOR

Door type:	French doors
Door leaf dimensions:	2010x810
Door finish:	Paint finish
Frame material and finish:	Pinus Radiata, Dressed no.1 clears
Glazing:	Single glazed toughened safety or laminated safety
Hinge type and finish:	100mm fixed pin strainless steel hinges
Wall type and thickness:	100mm framing assumed- confirm overall wall thickness on site prior to manufacturer

4.4 FLASHINGS

Material/type:	0.7mm Pre-painted aluminium flashing
Pattern:	Formed to suit details provided

4.5 WINDOW SCHEDULE

Window number:	W04
Location:	Dining room
Type:	Double hung to match existing
No. off:	1

4521AR APL RESIDENTIAL ALUMINIUM WINDOWS & DOORS

1 GENERAL

This section relates to the fabrication, supply and installation by either an **Altherm, First** or **Vantage** fabricator of:

- Residential aluminium windows and doors
- Metro Series aluminium windows and doors
- APL Architectural Series aluminium windows and doors
- Metro Thermal Heart aluminium windows and doors
- Smartwood composite aluminium / timber windows and doors
- Roof windows and overhead glazing
- Balustrading
- Hardware and furniture
- Flashings and sealants

1.1 ABBREVIATIONS AND TERMS

SLS	Serviceability limit state
ULS	Ultimate limit state
WANZ	Windows Association of New Zealand
PQAS	Powder Coating Quality Assurance System

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
NZBC H1/VM1	Energy efficiency
NZBC H1/AS1	Energy efficiency
AS/NZS 1580.108.1	Methods of test for paints and related materials - Determination of dry film thickness on metallic substrates - Non destructive methods
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 1734	Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
AAMA 2604.05	Performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
NZS 3604	Timber-framed buildings
AS 3715	Metal finishing - Thermoset powder coatings for architectural applications
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
WANZ Installation Guide	The WANZ Guide to Window Installation as described in E2/AS1 Amendment 5
WANZ PQAS	Powder Coating Quality Assurance System
WANZ SFA 3503-03	Anodic Oxide coatings on wrought aluminium for external architectural application (2005)
BRANZ BU 337	Protecting Window Glass from Surface Damage
AAMA 2604	Voluntary specification, performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2605	Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminium extrusions and panels

US Federal Specification

TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)
TT-S-00230C	Sealing compound, elastomeric type, single component (for caulking, sealing and glazing in buildings and other structures)

1.3 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are contained within:
Altherm Specifier's Guide
First Specifier's Guide
Vantage Specifier's Guide

Copies of the above literature are available from:

Web:	www.altherm.co.nz
	www.firstwindows.co.nz
	www.vantagejoinery.com
Email:	specifiersguide@aplnz.co.nz
Telephone:	09 309 3251
Facsimile:	09 309 3298

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/fabricator warranty:
5 years: For fabrication

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer warranty:
2 years: For installation

- Provide this warranty in the installer standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified **APL** aluminium system, or associated components and products.

1.7 QUALIFICATIONS

Work to be carried out by tradesmen experienced, competent and familiar with the materials and techniques specified.

1.8 COMPLIANCE

Windows and doors to be manufactured and installed to NZBC E2/AS1.

1.9 CERTIFICATION

Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of NZS 4211

Performance

1.10 PERFORMANCE - WINDOWS AND DOORS

To NZS 4211, including:

- deflection, opening sashes, air infiltration, water penetration, ultimate strength, torsional strength of sashes, marking.

Refer to SELECTIONS.

1.11 STRUCTURAL/WEATHER-TIGHTNESS

The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window fabricator.

Performance - Wind (design by contractor)

1.12 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Design the installation to the wind zone parameters of NZS 3604, table 5.1.

Refer to SELECTIONS for wind zone.

Finishes

1.13 CERTIFY COATINGS - POWDER COATING

Certify on request, compliance with this specification and support with control and sampling records. Test for film thickness to BS 3900, part C5, method No. 4, using method (b) or to AS/NZ 1580.108.1 for certifying thickness and method (a) where any dispute arises as to the thickness provided.
The coating should be applied by an applicator who can certify that the coating has been applied in accordance with the specification.

2 PRODUCTS

2.1 WINDOWS

Refer to SELECTIONS for type and finish.

Materials

2.2 ALUMINIUM EXTRUSIONS

Alloy designation to comply with AS/NZS 1866. Branded and extruded for anodising or powder coating.

2.3 ALUMINIUM SHEET AND STRIP

Complying with AS/NZS 1734 of suitable thickness. Rolled for anodising or powder coating.
Alloy designation: 5251 - H16 or 5005 - H16

2.4 STAINLESS STEEL SHEET AND STRIP

Type:	316 austenitic steel
Finish grade:	2B (satin lustre)

2.5 GLASS

Refer to the glazing section for glass types and installation.

Reveals

2.6 REVEALS - TIMBER PAINTED

Timber reveals for paint finish with all sides primed grooved for wall linings or flush finished for architraves.

Flashings

2.7 FLASHINGS GENERALLY

To NZBC E2/AS1, 9.1.10 **Windows and Doors**. Material, grade and colour of head flashings to match the window frames. Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

Components for installation - direct fix systems

2.8 SILL PAN FLASHING

To NZBC E2/AS1, 9.1.10.5 **Windows and Door Sills**. Flashing for direct fix claddings to collect and drain water that may penetrate through the window or door unit. Size to extend from the inner most point of the aluminium frame out over the external face of the cladding.

2.9 SUPPORT ANGLE

A Standard aluminium support angle for use below the sill pan for deeper claddings to transfer the weight of the window back to the frame. Size to suit cladding thickness.

Components

2.10 GLAZING GASKETS

Thermoplastic rubber. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.

2.11 HARDWARE AND FURNITURE

Hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer. Refer to SELECTIONS for type and finish. Key alike all lockable window hardware able to be keyed alike.

2.12 SAFETY STAYS

Stainless steel non releasable restrictors to limit window opening to NZBC F4/AS1, Table 2, Acceptable opening sizes for barriers.

2.13 FIXING BRACKETS

Designed by manufacturer to specific design.

2.14 WEATHERING/INSTALLATION SEALANT

Building sealant used in accordance with manufacturer's instructions for weather sealing aluminium frames to the cladding, complying with US Federal Specification TT S 0011534A, or a one-part polyurethane moisture curing, elastic joint sealant of medium modulus (± 25% movement) to US Federal Specification TT S 00230C.

Finishes

2.15 DURALLOY POWDER COATED ALUMINIUM

Polyester powder organic coating in accordance with WANZ PQAS and AS 3715.

3 EXECUTION

Conditions - generally

3.1 DO NOT DELIVER

Do not deliver to site any elements which cannot be unloaded immediately into suitable conditions of storage.

3.2 UNLOAD WINDOW JOINERY

Unload, handle and store elements in accordance with the window manufacturer's requirements.

3.3 AVOID DISTORTION

Avoid distortion of elements during transit, storage and handling.

3.4 PREVENT DAMAGE

Store windows and doors on site in a clean and dry environment in such a manner as to prevent damage to prefinished surfaces. Stack the units in a vertical position resting on their sills, with layers interleaved between to prevent rubbing. Keep paper and cardboard wrappings dry.

3.5 PROPRIETARY ELEMENTS

Fix in accordance with the window manufacturer's requirements.

3.6 PROTECTIVE COVERINGS

Retain protective coverings and coatings to BRANZ BU 337 and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

3.7 ADDITIONAL PROTECTION

Supply and fix additional protection as necessary to prevent marking of surfaces which will be visible on completed work.

Conditions - fixings and fastenings

3.8 SUPPLY OF FIXINGS

Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS. Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 316 stainless steel or if not exposed to the weather may they be hot-dip galvanized steel with a coating weight of 610 g/m² complying with AS/NZS 4680.

3.9 INSTALLATION FIXING

To NZBC E2/AS1, 9.1.10.8, **Attachments for windows and doors**. Fix windows/doors through reveal to frame with a pair of 75 x 3.15mm minimum galvanised jolt head nails or a pair of 8 gauge x 65mm minimum stainless steel screws. Fix at a maximum of 450 centres along all reveals and a maximum of 150mm from reveal ends. Ensure fixings do not penetrate metal flashings.
Install packers between reveals and framing at fixing points, except at the head.

Assembly

3.10 FABRICATION

Fabricate frames as detailed on shop drawings. Install glazing, hinges, stays and running gear as scheduled. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation.

3.11 TIMBER REVEALS

Before fixing to aluminium frames, ensure that timber reveals which are being painted have been primed on all surfaces. Securely fix reveals through aluminium fin.

3.12 HARDWARE GENERALLY

Factory fit all required and scheduled hardware. Account for all keys and deliver separately to the site manager.

3.13 SAFETY STAYS

Factory fit safety stays to all windows scheduled for safety stays and to all windows where safety stays are required to comply with NZBC F4/AS1 4.0, Opening windows.

Installation - windows and doors

3.14 SUPPLY OF FIXINGS

Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS.

3.15 EXPOSED FIXINGS AND FASTENINGS

Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 304 stainless steel.

3.16 PROTECTED FIXINGS AND FASTENINGS

Fixings and fastenings not exposed to the weather may be hot-dip galvanized steel with a coating weight of 610 g/m² complying with AS/NZS 4680.

3.17 CORROSION PROTECTION

Before fixing, apply suitable barriers of bituminous coatings, stops or underlays between dissimilar metals in contact, or between aluminium in contact with concrete.

3.18 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.

Required preparatory work includes the following:

- wall cladding underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 **Wall underlays to wall openings.**
- Full height 20mm jamb battens to NZBC E2/AS1 figure 72A (direct fix only)
- claddings neatly finished off to all sides of openings
- installation of flashings (those which are required to be installed prior to frames).
- application of waterproof sealer to all door and window sills in concrete floor or concrete sill situations. To door sills only, apply a suitable membrane over the sealer
- all in accordance with the shop drawings, where applicable.

3.19 INSTALLATION

Fix to comply with the reviewed shop drawings and installation details including flashings and bedding compounds, pointing sealants and weathering sealants.

3.20 INSTALLATION DIRECT FIX

Install to window manufacturers details and drawings including sill pans to window and door units.

3.21 INSTALL FLASHINGS

Install flashings to heads, jambs and sills of frames as supplied and required by the window manufacturer and as detailed on the drawings. Finish head flashings to match window finish.

Place all flashings so that the head flashing weathers the jamb flashings, which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.

Except where window/door frames are recessed, ensure that head flashings over-sail unit by 20mm plus any jamb scriber width at each end.

3.22 COMPLETE AIR SEAL

To NZBC E2/AS1:9.1.6 **Air seals**. Form an air-tight seal by means of proprietary expanding foam or sealants used with PEF backing rods, applied between the window / door reveal and structural framing to a depth of 10 - 20mm, to provide a continuous air tight seal to the perimeter of the window or door.

3.23 FIX HARDWARE

Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing

3.24 SEAL FRAMES ON SITE

Seal frames to each other and to adjoining structure and finishes, all as required by the window and sealant manufacturer and to make the installation weathertight.. In very high and extra high or greater wind zones, seal between the window head and the head flashing. Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.

3.25 PREPARE JOINTS

Ensure joints are dry. Remove loose material, dust and grease. Prepare joints in accordance with the sealant manufacturer's requirements, using required solvents and primers where necessary. Mask adjoining surfaces which would be difficult to clean if smeared with sealant.

3.26 BACK UP

When using back-up materials do not reduce depth of joint for sealant to less than the minimum required by the manufacturer of the sealant. Insert polyethylene rod or tape back-up behind joints being pointed with sealant.

3.27 SEALANT FINISH

Tool sealant to form a smooth fillet with a profile and dimensions required by the sealant manufacturer. Remove excess sealant from adjoining surfaces, using the cleaning materials nominated by the sealant manufacturer and leave clean.

Cleaning

3.28 REMOVE TRADE DEBRIS

Remove trade debris by appropriate means on a floor by floor basis as each floor is completed and again before any work is covered up by others. Arrange for general removal.

3.29 TRADE CLEAN

Trade clean window frames, operable windows and doors, glass and other related surfaces inside and out at the time of installation to remove marks, dust and dirt, to enable a visual inspection of all surfaces.

Completion

3.30 PROTECTIVE COVERINGS

Retain protective coverings and coatings and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

3.31 REPLACE

Replace damaged, cracked or marked elements.

3.32 PROTECTION

Protect finishes against damage from adjacent and following work.

3.33 IN-SITU TOUCH-UP TO POWDER COATED ALUMINIUM

In situ touch-up of polyester or fluoropolymer coated aluminium is only permitted to minor surface scratching. Otherwise replace all damaged material.

3.34 SAFETY

Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Masking tape must not be used for this purpose.

4 SELECTIONS

Substitutions are not permitted to the following selections.

4.1 SUPPLY AND INSTALLATION

Supply and installation of the specified **APL** aluminium joinery.

Supply:	By fabricator
Installation:	By Contractor

Performance

4.2 THERMAL PERFORMANCE

R-value:	R0.26 (as determined from NZBC H1/VM1 or H1/AS1)

Performance - Wind (design by contractor)

4.3 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building wind zone	Medium (refer to NZS 3604, table 5.1)

Finishes

4.4 DURALLOY - POWDER COATING FINISH

Type:	Polyester organic powder coating
System integrity:	10 years min. film integrity, 7 years colour integrity
Thickness:	Average of 80 microns with a minimum of 50 microns
Colour:	Confirm with client

Glazing

4.5 GLASS

Type/thickness:	Refer to glazing section/s for type and thickness.

Hardware

4.6 WINDOW HARDWARE

Window fastener:	Confirm with client

4.7 HARDWARE FINISH

Finish:	Powder coat
Colour:	Black

Flashings and Sealant

4.8 FLASHINGS

Material/type:	0.7mm Pre-painted Aluminium
Pattern:	Formed to suit details provided

4.9 WEATHERING SEALANT

Type:	1-part polyurethane moisture curing, elastic joint sealant
Colour:	Ensure sealant matches cladding or is paintable

Reveals

4.10 TIMBER JAMB REVEALS

Timber species:	Pinus Radiata
Grade/treatment:	H3.2
Thickness:	19mm
Reveals:	Flush finish for architraves
Finish:	Paint finish, refer paint spec.

Window and door system - RESIDENTIAL

4.11 APL RESIDENTIAL AWNING WINDOW

Brand/type:	**Altherm RESIDENTIAL Series**
Window No.:	W01, W02, W03

4710K EARTHWOOL® GLASSWOOL INSULATION

1 GENERAL

This section relates to **Earthwool® glasswool by Knauf Installation** installed, fixed or fitted as thermal and acoustic insulation:
It includes:

- Earthwool® glasswool insulation: Wall segments
- Earthwool® glasswool insulation: Ceiling segments
- Earthwool® glasswool insulation: Acoustic segments

1.1 RELATED WORK

Refer to 4161 UNDERLAYS, FOIL AND DPC for wall underlay and roofing underlay.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC H1/AS1	Energy efficiency
AS/NZS 3000	Electrical installations
NZS 4218	Energy efficiency - Small building envelope
NZS 4220	Code of practice for energy conservation in non-residential buildings
NZS 4243.1	Energy efficiency - Large buildings - Building thermal envelope
NZS 4246	Energy efficiency - Installing insulation in residential buildings
AS/NZS 4859.1	Materials for the thermal insulation of buildings - General criteria and technical provisions
AS/NZS 60598.2.2:2001	Luminaires- Particular Requirements - Recessed luminaires
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Knauf Insulation Product Guide New Zealand
Earthwool® glasswool insulation: Wall and Ceiling Datasheets (roll and segments)
Earthwool® glasswool insulation: Wall and Ceiling Datasheets (roll and segments)
Earthwool® glasswool insulation: Installation Instructions
BRANZ Appraisal 648 - Earthwool glasswool Insulation

Manufacturer/supplier contact details

Company:	**Knauf Insulation New Zealand**
Web:	www.knaufinsulation.co.nz
Email:	info.nz@knaufinsulation.com
Telephone:	0800 KNAUFi (562 834)
Technical Support:	tech.nz@knaufinsulation.com
Customer Service:	sales.nz@knaufinsulation.com

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:
50 years: For unfaced glasswool materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS

Work to be carried out by tradesmen experienced, competent and familiar with the Knauf Insulation materials and techniques specified.

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Knauf Insulation, associated products, components or accessories.

Performance - acoustic insulation

1.7 SOUND RATING REQUIREMENTS

Provide sound rated systems as detailed in SELECTIONS.

2 PRODUCTS

Materials - thermal insulation

2.1 EARTHWOOL® GLASSWOOL: INSULATION CEILING SEGMENTS / ROLLS

Earthwool® glasswool: Ceiling segments and rolls to AS/NZS 4859.1, NZS 4218, NZS 4243.1 and NZS 4220. Rectangular insulation segments and rolls made using recycled glass and with ECOSE® Technology.
Refer to SELECTIONS for location, type, R-value and thickness.

2.2 EARTHWOOL® GLASSWOOL INSULATION: WALL SEGMENTS

Earthwool® glasswool: Wall segments to AS/NZS 4859.1, NZS 4218, NZS 4243.1 and NZS 4220. Rectangular insulation segments and rolls made using recycled glass and with ECOSE® Technology.
Refer to SELECTIONS for location, type, R-value and thickness.

Materials - acoustic insulation

2.3 EARTHWOOL® GLASSWOOL INSULATION: ACOUSTIC SEGMENTS / ROLLS

Earthwool® glasswool: Acoustic segments to AS/NZS 4859.1, NZS 4218, NZS 4243.1 and NZS 4220. Rectangular insulation segments and rolls made using recycled glass and with ECOSE® Technology.
Refer to SELECTIONS for location, thickness and density options.

Components

2.4 FASTENERS

Staple gun/tacker to fix underfloor strapping - segments only. Underfloor roll with a wind wash barrier can be directly fixed in place.

2.5 TAPES

Polypropylene or similar strapping stapled across framing to retain insulation in wall and ceiling applications. Underfloor segments
require polythene banding, 12mm wide with a 50kg breaking strain.

3 EXECUTION

Conditions

3.1 STORAGE

Accept materials undamaged and dry and store in a location that protects them from the weather and damage. Avoid distortion, stretching, puncturing and compression. Do not use damaged or wet insulation material.

3.2 HANDLING

Wear protective clothing as necessary and when handling, avoid delamination or distortion of the rectangular form. Maintain full thickness unless compression is an installation system requirement.

3.3 INSPECTION

Before starting installation of Earthwool® glasswool check that the location and framing are dry, that the cavities are not interconnected and that mesh, wall and roof underlays and vapour barriers are in place. Install when the building is enclosed and when the construction materials have achieved the maximum permitted moisture content or less.

Application - general

3.4 INSTALL INSULATION - GENERAL

Lay, install, fit and fix to NZBC H1/AS1: Energy efficiency, 2.0 Building thermal envelope, and to manufacturer's requirements. Install in housing to NZS 4218 and NZS 4246. Install in large buildings to NZS 4243.1 and NZS 4220. Allow insulation to re-loft/relax prior to installation. Do not cover vents. Allow a clear gap around metal flues as recommended by the fireplace manufacturer. Where possible lift up electrical wires, lighting transformers/controllers and lay the insulation underneath. Refer to manufacturer's installation instructions and NZS 4246 for further details.

3.5 RECESSED LIGHT FITTINGS - CLEARANCE

Non-residential applications;

The clearance between insulation and recessed downlights
- 100mm gap to AS/NZS 3000, figure 4.9.
- Provide larger clearances where required by the light manufacturer.

Residential applications;
- Ensure new recessed downlights are one of the new classes classified in AS/NZS 60598.2.2; CA 80, CA 135, IC and IC - F
- Classification type CA 80, CA 135, to AS/NZS 60598.2.2; insulation can abut the sides
- Classification type IC and IC - F, to AS/NZS 60598.2.2; insulation can abut and cover over the top of the downlight
- Classification type NON IC to AS/NZS 60598.2.2; insulation cannot abut or cover the downlight. This class of downlights is banned from residential applications.
- Provide larger clearances where required by the light manufacturer.
- In a retrofit situation where recessed downlights are unclassified or unknown, ensure 100mm clearance between insulation and downlights to AS/NZS 3000, figure 4.9.

3.6 CHECK WALL AND ROOF UNDERLAYS

Ensure these are dry, clean, undamaged and free of debris before being covered.

Application - walls

3.7 FIT EARTHWOOL® GLASSWOOL INSULATION - TIMBER FRAMING

Friction fit Earthwool® glasswool: Wall segments between framing members and linings. Cut on site to fill cavity and provide a close even fit. When cutting to fill a void, oversize by up to 10mm to ensure a tight fit. Ensure there is a friction fit on all faces of the insulation. If cavity depth is greater than the insulation nominal thickness, fix or strap the product to secure in accordance with installation instructions. Cut into smaller pieces for smaller spaces and around penetrations to achieve efficient thermal performance. Do not fold, tuck or compress the insulation. Refer to NZS 4246 for installation guidelines and Earthwool® glasswool Product Data Sheets, for detailed installation instructions.

Application - ceiling

3.8 FIT EARTHWOOL® GLASSWOOL INSULATION SEGMENT - BETWEEN RAFTERS (SKILLION ROOF)

Friction fit Earthwool® glasswool: Ceiling segments between ceiling rafters. Use a sharp craft knife to cut to required size or around penetrations if required. Maintain a minimum clearance of 25mm between the insulation and the roofing membrane (underlay) except where a solid timber (or plywood) substrate is used under the roof cladding.

3.9 CEILING INSULATION EDGE DETAIL

Where perimeter of ceiling space is too low to allow full depth of insulation plus the 25mm air gap, provide reduced perimeter insulation to NZS 4246.5.2, Ceilings - lined.

Application - acoustic insulation

3.10 FIT EARTHWOOL® GLASSWOOL INSULATION: ACOUSTIC SEGMENTS

Friction fit the Earthwool® glasswool: Acoustic segments in place to completely fill the whole of the cavities, after the wall lining is fixed to one side of the partition. Slightly oversize to retain friction fit. Keep clean and undamaged until closed in. Close in as soon as possible after fixing.

Completion

3.11 CLEAN UP

Clean up as the work proceeds. Ensure no spare off cuts or any other materials remain behind claddings or linings.

3.12 LEAVE

Leave work to the standard required by following procedures.

3.13 REMOVE

Remove debris, unused materials and elements from the site. Earthwool® glasswool packaging is recyclable.

4 SELECTIONS

For further details on selections go to www.knaufinsulation.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

Wall insulation

4.1 EARTHWOOL® GLASSWOOL INSULATION: WALL SEGMENTS

Location:	Bathroom, toilet, laundry, hallway external walls retro-fit
Brand:	Earthwool® glasswool
R-value:	R2.4
Thickness:	90mm
Dimensions:	580x1160mm

Ceiling insulation

4.2 EARTHWOOL® GLASSWOOL INSULATION: CEILING SEGMENT - SKILLION ROOF

Location:	Bathroom, toilet, laundry, hallway ceiling retro-fit
Brand:	Earthwool® Ceiling Segment
R-value:	R3.6
Thickness:	150mm
Dimensions:	1200mm x7m

Acoustic insulation

4.3 EARTHWOOL® GLASSWOOL INSULATION: ACOUSTIC SEGMENTS

Location:	Bedroom wall to bathroom / laundry
Brand:	Earthwool® glasswool
Thickness:	90mm
R-value:	R2.6
Density:	20 kg/m³
Dimensions:	580x1160mm

5111H JAMES HARDIE FIBRE CEMENT SHEET LININGS

1 GENERAL

This section relates to the supply and installation of James Hardie Villaboard® Lining and HardieGroove™ Lining for:

- internal wall linings

1.1 RELATED WORK

Refer to 5113G for GIB plasterboard linings.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

AS/NZS 2589	Gypsum linings - Application and finishing
AS/NZS 2908.2	Cellulose-cement products - Flat sheet
NZS 3602	Timber and wood-based products for use in buildings

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

James Hardie documents relating to this part of the work:
Villaboard® Lining
HardieGroove™ Lining

Manufacturer/supplier contact details

Company:	James Hardie New Zealand
Web:	www.jameshardie.co.nz
Email:	info@jameshardie.co.nz
Telephone:	Ask James Hardie™ on 0800 808 868

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years:	For James Hardie™ Villaboard. (refer to James Hardie™ product warranty)
15 years:	For accessories supplied by James Hardie (refer to James Hardie™ product warranty)
From:	Date of purchase

- Provide this warranty on the manufacturer's standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

1.6 COMPLIANCE

Fibre cement sheets to AS/NZS 2908.2.

2 PRODUCTS

Materials

2.1 PLAIN FIBRE CEMENT SHEET LININGS

James Hardie Villaboard® Lining manufactured from treated cellulose fibre, portland cement, sand and water. Cured by high pressure autoclaving and manufactured to AS/NZS 2908.2. Sealed on the face.

Components

2.2 BATTENS, TIMBER

Minimum 45mm wide, 35mm deep timber with depth suitable for length of fasteners used.

2.3 PACKERS

3 - 4mm timber packers.

2.4 SCREWS FOR POWER SCREW GUN DRIVING

Timber framing

6mm and 9mm linings:	Villadrive 6 gauge x 30mm self embedding screws or HardieDrive™ self embedding stainless steel screws
Steel framing:	Steel 8 gauge x 32mm self embedding screws

2.5 WALL BOARD ADHESIVE

Polyurethane wallboard adhesive. Refer to James Hardie product installation manual.

Accessories

2.6 CONTROL JOINTS SECTION

45mm x 10mm shaped PVC control joint or Rondo P35 jointer.

2.7 EXTERNAL CORNER SECTIONS

30mm x 30mm x 1.2mm PVC angle.

2.8 POLYETHYLENE TAPE

Self adhesive polyethylene for behind expressed joints and expressed control joints.

2.9 JOINT REINFORCING TAPE

52mm wide perforated paper tape.

2.10 BEDDING COMPOUND

James Hardie® Base Coat compound powder.

2.11 FINISHING COMPOUND

James Hardie® Top Coat premixed.

2.12 SEALANT

Silicone or polyurethane sealant. Refer to the James Hardie installation manual.

3 EXECUTION

Conditions

3.1 MOISTURE CONTENT

Maximum moisture content of timber framing to NZS 3602.

3.2 PROTECT

Protect joinery, fittings and finishes already in place from water staining or damage from lining installation.

3.3 BUILDING

Ensure building is weatherproof before lining work commences.

3.4 STORAGE

Take delivery of products dry and undamaged on pallets, and keep on pallet. Protect edges and corners from damage and covered to keep dry until fixed.

3.5 HANDLING

Avoid distortion and contact with potentially damaging surfaces. Carry sheets vertically. Do not drag sheets across each other, or across other materials. Protect edges, corners and surface finish from damage.

3.6 SUBSTRATE

Do not commence work until the substrate is of the standard required by the relevant manufacturer's technical literature for the specified finish; plumb, level and in true alignment. Maximum moisture content of timber framing to NZS 3602.

Application

3.7 FIXING IN TILED AREAS

Prepare and fix sheets, horizontally or vertically and stagger joints where possible, to James Hardie installation manual.

3.8 PROVIDE VERTICAL CONTROL JOINTS

Provide vertical control joints at 7.2 metre centres maximum for general application and 4.2 metres centres maximum for tiled applications. Provide acoustic sealant in walls having an acoustic rating.

3.9 PROVIDE HORIZONTAL CONTROL JOINTS

Provide horizontal control joints at 7.2 metres centres maximum for general application and 4.2 metre centres maximum for tiled applications.

3.10 PROVIDE EXTERNAL CORNER ANGLE

Provide perforated PVC external corner angle or paper faced rigid spine corner mould to external corners.

3.11 INTERNAL CORNERS

When used in tiling applications provide a Lumberlock Stud saver to framed internal corner prior to fixing of Villaboard® Lining.
Provide perforated PVC corner mould, or paper faced rigid spine corner mould or solid blocking to internal corners.

3.12 SILICONE JOINTS

Provide polyethylene tape behind joints finished with flexible sealant.

Levels of Finish

Refer to AS/NZS 2589.
Refer to SELECTIONS/drawings for required levels of finish.

3.13 LEVEL 3 FINISH

Application:	For use in areas which are to receive heavy or medium texture (spray or hand applied) finishes or where heavy paper wall coverings are to be applied as the final decoration.
Jointing/setting:	Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape and James Hardie Top Coat.
Finish:	This level of finish must be sufficiently smooth to accept vinyl, tiles or textured coatings without blemishes.

Joint Finishing

3.14 JOINT FINISHING FOR TILED AREAS

Joints and corner joints set with James Hardie Base Coat reinforced with perforated paper tape to achieve a level 3 finish.

Completion

3.15 REPLACE

Replace damaged or marked elements.

3.16 CLEAN

Clean adjoining surfaces and fittings of spots, marks, dust and droppings.

3.17 LEAVE

Leave work to the standard required by following procedures.

3.18 REMOVE

Remove debris, unused materials and components from the site.

4 SELECTIONS

Linings

4.1 JAMES HARDIE VILLABOARD® LINING

Location:	Wet Area Tiled Shower
Type:	James Hardie Villaboard® Lining
Thickness:	9mm
Fixing method:	Screw fixed

4.2 FIXING TILED AREAS

Location:	Wet Area Tiled Shower
Fasteners:	Villadrive 6g x 30mm self-embedding screw or HardieDrive 7g x 30mm self-embedding screw

4.3 LEVELS OF FINISH

To conform to the following levels of finish:

Location	Finish level
Wet Area Tiled Shower	level 3 for tiling

5113G GIB® PLASTERBOARD LININGS

1 GENERAL

This section relates to the supply, fixing and jointing of GIB® plasterboard linings and accessories to timber and steel framed walls and ceilings to form:

- standard systems
- bracing systems
- wet area systems

1.1 RELATED WORK

Refer to 5111H for James Hardie cement interior villaboard lining.

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

AWCINZ	Association of Wall and Ceiling Industries New Zealand

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2-AS6	Protection from fire
NZBC E2/AS1	External moisture
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3604	Timber-framed buildings
AS/NZS 4600	Cold-formed steel structures
ISO 5660.1	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate (cone calorimeter method)
ISO 5660.2	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 2: Smoke production rate (dynamic measurement)
BRANZ Technical Paper P21	BRANZ Technical Paper P21: A wall bracing test and evaluation procedure (2010)
NASH	Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:

- GIB® Site Guide (Dec 2014)
- GIB Ultraline® Plus lining system (February 2006)
- GIB® Noise Control Systems (March 2006)
- GIB® Fire Rated Systems (Oct 2012)
- GIB Aqualine® Wet Area Systems (March 2007)
- GIB Superline® (June 2013)
- GIB® Ezybrace® Systems (June 2011), with amendments (Dec 2014)
- GIB® Ezybrace® Software (2011), with amendments (Dec 2014)
- GIB® Ezybrace® for Steel Frame Housing (NASH) Software (2011)
- GIB® Rondo® Metal Ceiling Batten Systems
- GIB-Cove®
- GIB® Goldline™ Platinum Tape-on Trims (Jan 2006)
- GIB® UltraFlex® high impact corner mould (Sept 2004)
- GIB® Tough Systems (Nov 2014)

BRANZ Appraisal 294 (2011) - GIB® Ezybrace® Systems
BRANZ Appraisal 427 (2007) - GIB Aqualine® Wet Area Systems

GreenTag Certification - GreenTag™ GreenRate/Level C for:

- GIB® Standard (10mm & 13mm)
- GIB Fyreline®(10mm, 13mm, 16mm &19mm)
- GIB Braceline® (10mm & 13mm)
- GIB® Noiseline® (10mm & 13mm)
- GIB Toughline® (13mm)

Copies of the above literature are available at

Company:	Winstone Wallboards
Web:	www.gib.co.nz
Telephone:	0800 100 442

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified GIB® systems, GIB® system components, GIB® plasterboard, associated GIB® products or GIB® accessories.

1.6 INSTALLER WORK SKILLS AND QUALIFICATIONS

GIB® plasterboard fixers and plasterers to be experienced competent workers, familiar with GIB® plasterboard lining systems installation and finishing techniques. Submit evidence of experience on request. For example:

- National Certificate of Interior Systems; or
- Certified Business member of AWCINZ.

Performance

1.7 INSPECTIONS AND ACCEPTANCE

Allow for inspection of the finished plasterboard surface:

- before applying sealer and
- before applying finish coatings or decorative papers,

so that after assessment of the type and/or angle of illumination and its effect on the completed decorative treatment, group approval and acceptance of the surface can be given.

1.8 BRACING REQUIREMENTS

Provide braced wall systems using GIB® Ezybrace® Systems (June 2011) or GIB® Ezybrace® Software (2011) to meet the requirements of NZS 3604 when tested to BRANZ Technical Paper P21. Alternatively use GIB® Ezybrace® for Steel Frame Housing (NASH) Software 2011 to meet the requirements of NASH Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria. Refer to drawings for location and type.

2 PRODUCTS

Materials

2.1 GIB® PLASTERBOARD

Gypsum plaster core encased in a face and backing paper formed for standard and water resistance use to AS/NZS 2588. Refer to SELECTIONS for location, type, thickness and finish.
GIB® Standard plasterboard
GIB Wideline® plasterboard
GIB Ultraline® and/or GIB® Ultraline PLUS high quality surface plasterboard
GIB Fyreline® fire resistant plasterboard
GIB Braceline® & GIB® Noiseline® dual purpose wall bracing & noise control plasterboard
GIB Aqualine® wet area plasterboard
GIB Toughline®
GIB Superline®

2.2 CORNICE

GIB-Cove® plasterboard cornice. Refer to SELECTIONS for profile and size.

Components

2.3 CEILING BATTENS

GIB® Rondo® metal ceiling battens, batten joiners and perimeter channel.

2.4 SCREWS

GIB® Grabber® drywall screws.

2.5 NAILS

GIB® Nails (gold passivated).

Size:	30mm, 40mm

2.6 TAPE ON TRIMS AND EDGES

GIB® Goldline™ tape-on trims
GIB® UltraFlex® high impact corner mould
GIB® Levelline® Tape on Trim

2.7 METAL ANGLE TRIMS

GIB® galvanized steel slim angle trims.

2.8 CONTROL JOINTS

GIB® Rondo® P35 control joints.
GIB® Goldline™ tape-on trims

Accessories

2.9 ADHESIVE

Timber frame and/or steel frame:
GIBFix® One ultra low VOC water based wallboard adhesive
GIBFix® All-Bond solvent based wallboard adhesive

2.10 JOINTING COMPOUND

Bedding compound:	GIB Tradeset®, GIB Lite Blue®, GIB MaxSet®, GIB ProMix® All Purpose, GIB Plus 4®
Finishing compound:	GIB ProMix® All Purpose, GIB® Trade Finish®, GIB® Trade Finish® Lite, GIB ProMix® Lite, GIB® U-Mix, GIB Plus 4®, GIB Trade Finish® Multi
Cove:	GIB-Cove® Bond

2.11 JOINTING TAPE

GIB® paper jointing tape.

2.12 GAP FILLER

GIB® Gap Filler ultra low VOC multi-purpose acrylic flexible filler

3 EXECUTION

Conditions

3.1 STORAGE

Store GIB® plasterboard sheets and accessories in dry conditions stored indoors out of direct sunlight in neat flat stacks on either an impervious plastic sheet or clear of the floor with no sagging and avoiding damage to ends, edges and surfaces. Reject damaged material. Refer to GIB® Site Guide (Dec 2014).

3.2 LEVELS OF PLASTERBOARD FINISH

Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in AS/NZS 2589.

3.3 CONFIRM LEVELS OF PLASTERBOARD FINISH ACCEPTANCE

Before commencing work, agree in writing upon the surface finish assessment procedure towards ensuring that the quality of finish expectations are reasonable and are subsequently obtained and acceptable.

Do not apply decorative treatment until it is agreed in writing by the contractor, subcontractors and decorator that the specified plasterboard Level of Finish has been achieved.

"Levels of plasterboard finish" is a tool for specifying the required quality of finish when installing and flush stopping GIB® plasterboard **prior** to the application of a range of decorative finishes under various lighting conditions. Refer to **AS/NZS** 2589.

3.4 SUBSTRATE

Do not commence work until the substrate is plumb, level and to the standard required by the sheet manufacturer's requirements. Refer to GIB® Site Guide (Dec 2014).

3.5 TIMBER FRAME MOISTURE CONTENT

Maximum allowable moisture content to AS/NZS 2589 for timber framing at lining: 18% or less for plasterboard linings. Refer to NZBC E2/AS1 and GIB® Site Guide (Dec 2014).

3.6 PROTECTION

Protect surfaces; cabinetwork, fittings, equipment and finishes already in place from the possibility of water staining and stopping damage. Refer to GIB® Site Guide (Dec 2014).

Application

3.7 INSTALL CEILING BATTENS

Install to GIB® Rondo® Ceiling Batten Systems requirements.

3.8 LINING WALLS AND CEILINGS GENERALLY

Form to GIB® Site Guide (Jan 2010). Ensure bulk insulation thickness shall not exceed that of the wall framing.

3.9 BOARD ORIENTATION

Minimise joints by careful sheet layout using the largest sheet sizes possible, and generally fixing horizontally. Where part sheets are required for various stud heights they should be positioned so the cut sheet is as low as possible to keep joints below eye level.

3.10 FORM WET AREA SYSTEMS

Form to GIB Aqualine® Wet Area Systems requirements.

3.11 FORM BRACING SYSTEMS

Form to GIB® Ezybrace® Systems (June 2011) requirements.

3.12 FORM CONTROL JOINTS

Form control joints to GIB® Site Guide (Dec 2014) requirements.

3.13 INSTALL COVES

Install to GIB-Cove® literature using GIB-Cove® Bond.

3.14 INSTALL TAPE-ON TRIMS

Install to GIB® Goldline™ Tape-on trims literature and/or GIB® Ultraflex high impact corner mould literature.

Finishing

3.15 FINISHING GENERALLY

To GIB® Site Guide (Dec 2014) and AS/NZS 2589.

Completion

3.16 REPLACE

Replace damaged sheets or elements.

3.17 CLEAN DOWN

Clean down completed surfaces to remove irregularities and finally sand down with fine paper to the sheet manufacturer's requirements, to leave completely smooth and clean.

3.18 REMOVE

Remove debris, unused materials and elements from the site.

3.19 LEAVE

Leave work to the standard required by following procedures.

4 SELECTIONS

Plasterboard

4.1 GIB® STANDARD SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Bedroom, kitchen, hall etc	GIB® Standard plasterboard	10mm	4

4.2 GIB® WATER RESISTANT SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Bathroom, toilet, laundry	GIB Aqualine® plasterboard	10mm	4

4.3 GIB® STANDARD SYSTEMS CEILINGS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Bedroom, kitchen, hall etc	GIB® Standard plasterboard	13mm	4

4.4 GIB® WATER RESISTANT SYSTEMS CEILINGS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Bathroom, toilet, laundry	GIB Aqualine® plasterboard	13mm	4

4.5 GIB® BRACING SYSTEMS

Refer to GIB® Ezybrace® Systems. For bracing element location refer to drawn documentation.

Accessories

4.6 GIB® CORNICE

Size/brand/type:	90mm classic to kitchen / dining / living Square stopped to bathroom / toiler / laundry

4.7 GIB® RONDO® CEILING BATTENS

Brand/type:	GIB® Rondo® Ceiling battens

4.8 GIB® TAPE ON EDGE OR CORNER TRIMS

Brand/type:	Goldline tape on trims

5438H JAMES HARDIE FIBRE CEMENT INTERIOR FLOORING

1 GENERAL

This section relates to the supply and installation of James Hardie **Secura™ Interior Flooring** substrate for:

- interior wet and dry area applications
- over timber or lightweight steel floor joists.

1.1 RELATED WORK

Refer to tiling section for tiling.
Refer to waterproofing section for waterproofing.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E3/AS1	Internal moisture
AS/NZS 2908.2	Cellulose-cement products - Flat sheet
NZS 3602	Timber and wood-based products for use in buildings

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
James Hardie **Secura™ Interior Flooring** Installation Manual

Manufacturer/supplier contact details

Company:	James Hardie New Zealand
Web:	www.jameshardie.co.nz
Email:	info@jameshardie.co.nz
Telephone:	Ask James Hardie™ on 0800 808 868

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years:	For James Hardie™ **Secura™ Interior Flooring**. (refer to James Hardie™ product warranty)
15 year:	For accessories supplied by James Hardie (refer to James Hardie™ product warranty)
From:	Date of purchase

- Provide this warranty on the manufacturer's standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any James Hardie™ specified system, or associated components and products.

1.6 COMPLIANCE

Fibre cement sheets to AS/NZS 2908.2.

2 PRODUCTS

Materials

2.1 FIBRE CEMENT SHEET FLOORING

Secura™ Interior Flooring, lightweight proprietary Scyon® technology, 2700mm x 600mm x 19mm thick fibre cement sheet, manufactured from treated cellulose fibre, Portland cement, sand and water to AS/NZS 2908.2. Tongue and groove jointing system and pre-sealed with a water resistant sealer.

Components

2.2 NAILS FOR TIMBER

50mm x 2.87mm RounDrive, Stainless steel or hot dipped galvanised nails.

Accessories - not supplied by James Hardie

2.3 BACKING ROD

PEF backing rod to be used with sealant in control joints.

2.4 SEALANT

James Hardie approved sealant used in v joint for tiled applications. Ensure compatibility with waterproofing membrane system selected.

2.5 WATERPROOFING MEMBRANE

James Hardie approved waterproofing membrane over the Secura™ Interior Flooring in wet areas. Refer to waterproofing section.

2.6 ADHESIVE

Adhesive used over joists prior to installation of Secura™ Interior Flooring. Refer to adhesive manufacturers technical data and James Hardie technical specifications. Refer to adhesive section.

3 EXECUTION

Conditions

3.1 MOISTURE CONTENT

Maximum moisture content of timber framing to NZS 3602.

3.2 STORAGE

Take delivery of products dry and undamaged on pallets, and keep on pallet. Protect edges and corners from damage and covered to keep dry until fixed.

3.3 HANDLING

Avoid distortion and contact with potentially damaging surfaces. Carry sheets vertically. Do not drag sheets across each other, or across other materials. Protect edges, corners and surface finish from damage.

3.4 SUBSTRATE

Do not commence work until the substrate is of the standard required by the relevant manufacturer's technical literature for the specified finish; plumb, level and in true alignment. Maximum moisture content of timber framing to NZS 3602.

Application

3.5 SUPPORT FRAMING

Ensure support framing is completed to James Hardie stated requirements.

3.6 SUPPORT EDGES AND JOINTS

Fully support edges and joints of sheets, other than tongue and groove joints.

3.7 FIXINGS

Minimum 50mm from a corner, 12mm from the edge, 200mm maximum centres along edges and on intermediate supports. Leave heads flush with surface.

3.8 FIXING SHEETS - TILE APPLICATIONS

Fix Secura™ Interior Flooring sheets to James Hardie requirements. Lay sheets in a staggered layout, long edge of sheet at right-angles to support and with sheets in square, true alignment and plane. Install sheet with label 'This side down for tiles' facing down. Always lay sheets across the floor joists. Refer to tiling section for tiling.

3.9 WATERPROOFING MEMBRANE - WET AREAS

Ensure all sheet fixing is completed to James Hardie installation requirements before the primer and solvent free waterproofing membrane is applied. Refer to waterproofing section for waterproofing installation and manufactures requirements.

3.10 CUT SHEETS

Ensure the minimum length of any site cut sheet is 900mm minimum or more.

3.11 CONTROL JOINTS

Form control joints where floor dimensions exceed 4.05 metres in the long direction and where existing structural joints are located. Position joints symmetrical about the centre of the floor where possible. Form control joints where there are changes in wall direction and at doorways where the tiled surface is carried through into the next room. When laying tiles the joint location must coincide with the control joint in the underlay.

Place a 6-8mm diameter polyethylene backing rod in the bottom of the joint between the sheets and fill the joint with a suitable flexible sealant. All square edges to be fully supported.

Completion

3.12 REPLACE

Replace damaged or marked elements.

3.13 CLEAN

Clean adjoining surfaces and fittings of spots, marks, dust and droppings.

3.14 LEAVE

Leave work to the standard required by following procedures.

3.15 REMOVE

Remove debris, unused materials and components from the site.

4 SELECTIONS

For further details on selections go to www.jameshardie.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

4.1 SECURA™ INTERIOR FLOORING

Location:	BATHROOM / TOILET / LAUNDRY / HALL
Brand:	James Hardie
Type:	**Secura™ Interior Flooring**
Thickness:	19mm
Fixings:	Ø2.87x50mm RounDrive stainless steel nails

6221A ARDEX TILING SOLUTIONS

1 GENERAL

This section relates to the preparation of floor and wall surfaces for tiling systems with ARDEX Tiling Solutions:

- acoustic underlays
- levelling screeds
- primers
- undertile heating
- waterproofing systems
- decoupling system
- adhesives
- sealants
- grouts

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC D1/VM1	Access routes
NZBC D1/AS1	Access routes
AS CA27	Code of recommended practice for internal plaster on solid backgrounds
AS 1315	Portland Cement
AS/NZS 3661.1	Slip resistance of pedestrian surfaces - Requirements
AS 3740	Waterproofing of wet areas within residential buildings
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
AS/NZS 4671	Steel reinforcing materials

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.2 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:

Ardex Tiling Solutions
BRANZ Appraisal 472 - Superflex® Wet Area Membranes
BRANZ Appraisal 473 - Superflex™ External Waterproofing Membranes
BRANZ Appraisal 727 - Ardex Undertile Sheet Membrane (WPM 750)

Copies of the above literature are available from Ardex

Web:	www.ardex.co.nz
Email:	ardexspec@ardexnz.com
Telephone:	0800 2 ARDEX (27339)
	0-9-636 0005 Auckland
	0-4-568 5949 Wellington
	0-3-373 6900 Christchurch

Warranties - waterproofing

1.3 WARRANTY

Warrant this waterproofing work under normal environmental and use conditions against failure of materials and execution

Warranty period:	Materials	15 years
	Execution	2 years

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Warranties - tiling

1.4 WARRANTY

Warrant this tiling work under normal environmental and use conditions against failure of materials and execution

Warranty period:	2 years

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Ardex materials, or associated products, components or accessories.

1.6 QUALIFICATIONS

Waterproofing work to be carried out by an Ardex approved waterproofing applicator.
Tiling to be carried out by competent workers experienced with the materials and in the techniques specified.

1.7 DEFLECTION CRITERIA FOR SUSPENDED FLOORS

Check that the floor is rigid enough for the tiling. Deflection of suspended floors should not exceed 1/360th of the span under dead load and live load.

1.8 SYSTEMS ARDEX PROJECT

Contact Ardex with any relevant key dates and for a list of approved applicators. The contractor is to contact Ardex prior to starting the contract.

Web:	www.ardex.co.nz
Email:	ardexspec@ardexnz.com
Telephone:	0800 2 ARDEX (27339)
	0-9-636 0005 Auckland
	0-4-568 5949 Wellington
	0-3-373 6900 Christchurch

Performance

1.9 SLIP RESISTANCE FOR ACCESS ROUTES

Slip resistance for tiles to comply with NZBC D1/AS1: 2.0 Level access routes and 3.0 Ramps.

- when in place on a level access route, to have a mean coefficient of friction (μ) not less than 0.4 when tested in accordance with AS/NZS 3661.1.
- when in place on a sloping access route, to have a coefficient of friction (μ) not less than 0.4 + 0.0125S (S = slope of surface expressed as a percentage).

1.10 PROVIDE EVIDENCE OF SLIP RESISTANCE

Provide evidence that the tiles comply with the standard of performance specified.

1.11 CERTIFY SLIP RESISTANCE

Provide certificates and any other evidence at the time of selection/supply that the tiles comply with NZBC D1/VM1 and NZBC D1/AS1: Access routes.

1.12 QUALITY ASSURANCE

Prepare an inspection and test plan (ITP) for the work. Record on the ITP the inspections and checks as they are made. Make ITP's available for inspection.

Refer to Ardex Tiling flow chart and check list.

2 PRODUCTS

Materials - preparation

2.1 FLOORING UNDERLAY

Fibre cement, 6mm thick sheet of Portland cement, sand, fine cellulose fibre and water, with a smooth finish.

2.2 SCREED

Use Abacrete liquid polymer or Abacrete mixed with 3:1 Portland cement, coarse washed sand gauged to the tile manufacturer's stated requirements.

2.3 ARDEX LQ 92

Cement based, fast setting, under-tile levelling compound.

2.4 ARDEX MULTIPRIME

Water based primer for porous substrates.

Materials - Waterproofing

2.5 WATERPROOFING SYSTEM

Flexible waterproofing membranes.

Superflex Premixed:	ARDEX WPM 001 (internal/external wet areas)
Superflex Two part:	ARDEX WPM 002 (swimming pools, internal/external wet areas)
Sheet Membrane: .	ARDEX WPM 750 (wet rooms, internal wet areas)
Hybrid Premixed:	ARDEX WPM 155 (rapid set, internal/external wet areas)

Materials - Additives

2.6 ARDEX ABACRETE

Liquid polymer additive. A bonding agent designed to improve shear and tensile bond strength of sand/cement screeds, renders and also ARDEX's standard cement-based adhesives.

Materials - Tile adhesives

2.7 ARDEX ABAFLEX

High performance, flexible, polymer modified, cement based floor and wall adhesive for Ceramic,Porcelain,and large format tiles.

2.8 ARDEX X52

Rubber modified cementitious floor and wall adhesive, where minimal movement is anticipated, for Ceramic and Porcelain tiles.

2.9 ARDEX X10

Flexible, non-slump, polymer fortified, cement based floor and wall tile adhesive, with mastic properties, for Ceramic, Porcelain, glass Mosaic tiles and some stones.

2.10 ARDEX D2

High performance, non slump, water resistant dispersion, mastic wall adhesive, for porous Ceramic and Mosaic tiles.
High performance shear adhesion and non slump characteristics. Suitable for porous tiles and porous substrates only.

2.11 ARDEX S16

Rapid drying, interior, cement based floor and wall adhesive with ARDEX Rapidry Formula Technology, particularly suitable for natural stone, and floor tiling.
Ready to grout after 2 to 3 hours.

2.12 ARDEX X56

Fast setting, highly flexible, rubber, polymer modified, acoustic floor and wall adhesive, for Ceramic, Porcelain,and Mosaic tiles.
Suitable for tiling directly to timber, over heated slabs, and other areas where movement is anticipated.

Materials - Sealants - grouts

2.13 SEALANTS

Ardex SE Acetic cure, for movement joints within a tiling system.
Ardex ST Neutral cure, for bond breakers or movement joints within a tiling system.
Sealants and back-up materials as described in clause 2.7 of AS 3958.1 and clause 9.18 of AS 3740.
Colours match some grout colours

2.14 ARDEX GROUTS

Ardex FG8 for joints 1mm to 8mm wide, for wet areas mixed with groutbooster polymer.
Ardex FSDD non-scratch, fine sanded grout for joints 1 - 4mm.
Ardex MG Rapid Drying (90 minutes) Marble and moisture sensitive Natural Stone.
Ardex WA Easy to use Epoxy Grout and Adhesive, for joints 2mm to 12mm wide.
Ardex WJ50 for joints 2mm to 50mm wide.

2.15 ARDEX GROUT BOOSTER

A water-based, synthetic polymer grout additive formulated for use with cement-based grouts for improved adhesion strength, flexibility and abrasion resistance.

Undertile heating

2.16 UNDERTILE HEATING

Refer to appropriate underfloor heating section for electric undertile heating system.

Components

2.17 STRIPS AND WEATHERBARS

Unless otherwise specified tile trim, edge strips, floor finish divider strips and weather bars shall be aluminium.

2.18 EXPANSION JOINT, METAL AND RUBBER

Clear anodised aluminium/brass with metal anchor to set into in-situ concrete, cement screed/bed and complete with rubber infill.

2.19 EXPANSION JOINT, METAL AND COMPOUND

Aluminium/brass angles with high density foam rubber insert and jointing compound.

2.20 EXPANSION JOINT, PLASTIC

Rigid stabilised PVC sides with flexible central section, for external corners within a tiling system.

3 EXECUTION

General

3.1 HANDLING AND STORAGE

Take delivery of packets of tiles undamaged and dry. Handle tiles with care to avoid chipping, soiling and damage. Store on hard level standings in non-traffic, non-work areas that are enclosed, clean and dry.

3.2 CHECK TILES

Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT

Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT

Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

3.5 PREPARATION OF BACKGROUNDS

Prepare backgrounds in accordance with AS 3958.1, section 4 and to the manufacturer's instructions for the selected substrate. See also the Ardex Flooring Solutions manual by visiting www.ardex.co.nz/

Conditions

3.6 SERVICES AND ACCESSORIES

Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

3.7 DO NOT START

Do not start laying tiles until concrete floors are cured, moisture content of floors is such that shrinkage is complete, thermal movement has been accommodated and the levels and surface finish will allow for tile laying of the required standard.

3.8 SUBSTRATE TEMPERATURE

Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.9 MOISTURE CONTENT

Ensure the floor is dry and if in doubt check for moisture content by hygrometer. Do not proceed with tiling work until readings for the whole area show 75% relative humidity or less.

Application

3.10 APPLICATION GENERALLY

Prepare backgrounds as described in AS 3958.1, Section 4. Suitably prepare backgrounds and substrates to the manufacturer's instructions to receive the bedded finish. Remove all dirt, dust, grease, oil, loose particles and any other form of contamination or deleterious material. Ensure that substrates are sound and dry.

Installation to be in accordance with AS 3958.1, Section 5, including setting out, fitting, movement joints, sealants, tile finish and joints, and grouting.

3.11 BACKGROUND MATERIALS

Ensure that the installation of background materials and substrate materials meets relevant standards and the manufacturer's instructions. Inspect background and substrate materials for any conditions unsuitable for tiling over. Do not commence work until the affected area is rectified. Confirm any specific preparation required for the adhesive being used.

3.12 FLOORING UNDERLAY

Underlay material: CFC sheet 6mm or ARDEX DS60 decoupling system as advised.

Locations:	In internal locations apply underlay over the following flooring backgrounds subject to movement - strip timber flooring (T&G); particleboard sheet flooring.
Installation:	Supply and install CFC or decoupling system to the manufacturer's recommendations.

Waterproofing

3.13 WET AREA WATERPROOFING

Provide waterproofing to wet areas as described in AS 3740.

Material:	Refer to SELECTIONS
Locations:	Extent of wet areas as described in AS 3740 and as shown on the drawings.
Installation:	Supply and install waterproofing membrane to the manufacturer's recommendations by an Ardex approved Superflex waterproofing applicator.

Undertile heating

3.14 INSTALL UNDERTILE HEATING

Refer to appropriate underfloor heating section for electric undertile heating system.

Screed

3.15 SCREED

Install as described in AS 3958.1, appendix A.

Preparation:	Apply a slurry coat to background of 3:2 by volume of cement to Abacrete, to improve adhesion.
Mixing:	For screeds mix 21 litres of diluted Abacrete (1:3 by volume, Abacrete to water) with 40kg of Portland cement and 120kg of clean sand. Apply screed while slurry coat is still damp.
Thickness:	Reinforce as per AS 3958.1 if over 40mm thick. Minimum screed thickness is 15mm with Abacrete.
Tiling over:	Allow at least 7 days after screeding before tiling over, unless using X77 or X78 in which case tiling can commence after 16 hours.

3.16 CEMENT RENDER

Prepare surfaces, mix and apply as described in AS 3958.1, Appendix B.

Cement render:	Apply slurry coat and render coat to required thickness.
Slurry coat:	3:2 by volume of cement to Abacrete.
Render coat:	Mix 27 litres of diluted Abacrete (1:3 by volume, Abacrete to water) with 40kg of Portland cement and 120kg of clean sand. Apply render while slurry coat is still damp. Apply renders up to 13mm thick in the normal manner. For renders over 13mm contact Ardex before proceeding.
Tiling over:	Allow at least 7 days after rendering before tiling over, unless using X77 in which case tiling can commence after 16 hours.

Tiling

3.17 ADHESIVE APPLICATION METHODS

Ensure that the whole of the back of the tile is in good contact with the adhesive with no voids. Remove a tile periodically during installation to ensure correct coverage. Do not fix tiles over skinned adhesive.

Notched trowel method

- Adhesive application to be as described in AS 3958.1, clause 5.6.2(a). Notched trowel sizes shall be 4.5mm x 4.5mm x 4.5mm (mosaics) 6mm x 6mm x 6mm, 10mm x 10mm x 10mm, 12mm x 12mm x 12mm. Use an appropriately notched trowel to achieve full coverage.

Buttering method

- Adhesive application to be as described in AS 3958.1, Clause 5.6.2(c).

Tiles in awkward locations

- The buttering method may be required, or fixing might be necessary to achieve full bedding, even though the notched trowel method is used generally.

3.18 SETTING OUT

Setting out, cutting and fitting of tiles to be as described in AS 3958.1, clauses 5.4.2 and 5.4.3. Set out tiling as shown on the drawings. Confirm bond and pattern before installing. Provide even and correct falls to floor tiles where required, including falls to floor wastes. Ensure that a level finish is provided at wall lines. Where falls are not required ensure that the tiles are laid level.

3.19 TILE FINISH AND JOINTS

Provide tile finish and joints, including tolerances, as described in AS 3958.1, clause 5.4.6. Joint widths to be suited to tile and to the manufacturer's instructions.

3.20 MOVEMENT JOINTS

Provide movement joints as described in AS 3958.1, clause 5.4.5 and AS 3740, clause 8.5.

Depth:	Movement joints to go right through the tile and bed to the background.
Width:	Minimum 6mm.
Corner locations:	In wall tiling at internal vertical corners; in floor tiling at walls, columns, nibs, hobs and similar.
Interruptions:	Around sanitary fixtures, around fixtures interrupting the tile surface; at junctions with joinery fixtures, including window and door frames and built in cupboards; at changes in substrate or background.
Large areas:	In floor tiling provide joints at not less than 4.5 metres spacing in both directions and 3.5 metres externally. In wall tiling provide vertical joints at not less than 3.5 metres spacing along the length of a wall. In wall tiling, provide horizontal joints at each story rise in the height of a wall. Over all existing expansion joints.

3.21 GROUTING

Grout tiling to AS 3958.1, clause 5.7.

3.22 SILICONE

Apply Ardex SE acetic cure or Ardex ST neutral cure silicone to movement joints between tiles, and at junctions to tiled walls and tiled floors. The silicone should only be fixed to two surfaces to allow movement. On flat joints use a polyethylene tape or release agent and on floor to wall joints greater than 10mm deep use a backing rod.

Completion

3.23 REPLACE

Replace damaged tiles or elements.

3.24 CLEANING

Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

3.25 LEAVE

Leave work to the standard required by following procedures.

3.26 REMOVE

Remove debris, unused materials and elements from the site.

3.27 PROTECT TILES

Protect tiles from damage. Ensure tiles are not disturbed by foot traffic for at least 24 hours after laying and after grouting. Provide protection to tiles by laying sheet material such as insulating board for the period between completion of laying and completion of the contract works.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

4.1 COMPRESSED FIBRE CEMENT UNDERLAY

Manufacturer:	James Hardie
Brand:	18mm Compressed fire cement sheet flooring complete with 6mm Marmox insulation board

4.2 PORCELAIN TILES

Location:	Bathroom / laundry / toilet - floor & skirting, wet area shower - floor & walls, bath splashback
Supplier/Manufacturer:	Selected & supplied by client

Systems Ardex typical application selections

4.3 RESIDENTIAL FLOORS AND WALLS ON CONCRETE OR CFC SHEET

Primer:	Ardex Multiprime
Screeding compound:	Ardex A46
Levelling compound:	Ardex LQ92 (for use with heating elements)
Waterproofing:	Ardex Superflex WPM 001 or WPM 002
Tile adhesive floors:	Ardex Abaflex or Ardex X52
Tile adhesive walls:	Ardex D2 or X10
Grout/colour:	Ardex FSDD 1 - 4mm, Ardex FG8 4 - 8mm with Ardex Grout Booster
Silicone/colour:	Ardex SE or Ardex ST

6700R RESENE PAINTING GENERAL

1 GENERAL

This section relates to the general matters related to **Resene** painting work.

1.1 RELATED WORK

Refer to 6721R RESENE PAINTING INTERIOR
Refer to 6711R RESENE PAINTING EXTERIOR

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

MPNZA	Master Painters New Zealand Association Inc.
SIPDS	Surface Information & Preparation Data Sheets

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

Health and Safety at Work Act 2015

AS/NZS ISO 9001	Quality management systems - Requirements
MPNZA	Specification Manual

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents related to this section are:

Resene	Surface Information & Preparation Data Sheets (SIPDS) (hard copy or at www.resene.co.nz)
Resene	Product Data Sheets (hard copy or at www.resene.co.nz)
Resene	Putting your safety first

Copies of the above literature are available from Resene

Telephone:	0800 RESENE (0800 737 363)

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Warrant this work under normal conditions of use against failure referring to the Resene Promise of Quality in the Resene One-Line specifications and product data manual.

Requirements

This painting specification is written based on information available at the time of writing.

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Resene coating system, or associated components and products. Do not combine paints from different manufacturers in a paint system.

If in the applicator's own expertise and judgement an amendment to this specification is required, or where a substrate preparation, or required painting system is not covered in this specification, this shall be brought to the attention of the contract administrator and any amendment agreed before work proceeds any further.

1.7 QUALIFICATIONS

Painters to be experienced competent workers, familiar with the materials and the techniques specified and with the Resene coating systems and be members of the Master Painters New Zealand Association Inc.

The applicator is to have the necessary skill, experience and equipment to undertake the work. The applicator remains responsible for ensuring proper completion of the work.

Painters to be selected from the Resene Eco.Decorator programme. The Resene Eco.Decorator programme is designed to recognise a nationwide network of environmentally responsible, quality focussed painting contractors.
Refer to www.resene.co.nz/ecodecorator.htm for a list of Eco.Decorators in your area.

1.8 PRIOR TO WORK COMMENCING

Before any work commences painters should verify, with Architects or specifying authority, that their paint matches a previously supplied standard card or panel. Differently coloured paints will vary in price, opacity and durability. Resene normally only specify two coats of colour but with certain colours, such as yellows and oranges, three coats may be needed. Refer to SELECTIONS for location and type.

1.9 INFORMATION FOR OPERATION AND MAINTENANCE

Refer to the general section 1239 OPERATION & MAINTENANCE for provision of the following general operation and maintenance information as electronic PDF format documents:
Maintenance guide for Resene paint finishes www.resene.co.nz/comn/services/maintenance.htm.

Provide this information prior to practical completion.

1.10 HEALTH AND SAFETY

Refer to and comply with the requirements of the Health and Safety at Work Act 2015 including the obligation to:

- Eliminate hazards and if hazards cannot be eliminated or isolated, then minimise the hazards in this work by using the proper equipment and techniques as required by the MPNZA Painters hazard handbook and Resene Putting your safety first handbook.
- Supply protective clothing and equipment.
- Inform the contractor as well as the employees and others on site of those hazards and put in place procedures for dealing with emergencies.

1.11 SAFETY DATA SHEETS

Obtain from Resene (phone 0800 RESENE, or www.resene.co.nz) the safety data sheet for each product used and comply with the required safety procedures. Keep sheets on site.

Performance

1.12 RESENE INSPECTION

Permit representatives of Resene to inspect the work in progress and to take samples of their products from site if requested. Resene will take care when inspecting the work, but does not accept any responsibility for the proper completion of the work before or after such inspection.

1.13 INSPECTION OF THE WORK

Inspection of the whole of the work at each of the stages set out in SELECTIONS may be made. Agree on a programme that will facilitate such inspection, including notification when each part and stage of the work is ready for inspection.

2 PRODUCTS

Materials

2.1 MATERIALS GENERALLY

Do not combine paints from different manufacturers in a paint system.

Use only Resene products (which are guaranteed for consistency and performance under AS/NZS ISO 9001 and APAS) prepared, mixed and applied as directed in the Resene One-Line Specifications and Product Data Manual. This specification has been written using where practical and available both low/no VOC and Environmental Choice approved products.

2.2 DARK COLOURS

Darker colours in areas of high sun exposure place significant stress on the coating and substrate. Resene 'CoolColour' technology reduces heat absorption of a wide range of colours. Contact your local Resene Representative or visit www.resene.co.nz for more information or visit www.resene.co.nz/coolcolour. View a list of Resene colours that can be made using Resene CoolColour technology at www.resene.co.nz/colourlibrary.

2.3 THINNERS/ADDITIVES

Use only if and when expressly directed by Resene for their particular product in a particular application. Always wear gloves when handling any solvents including turpentine as harmful chemicals may be absorbed into the body through the skin.

Accessories

2.4 ACCESSORIES

Contact your local Resene ColorShop for a full range of accessories and usage advice.

3 EXECUTION

Conditions

3.1 EXECUTION

To conform to required trade practice, which shall be deemed to include those methods, practices and techniques contained in the Master Painters New Zealand Association Inc. Specification manual.

3.2 TREATED SURFACES

Where surfaces have been treated with preservatives or fire retardants, check with the treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance. If they are not compatible, obtain instructions before proceeding.

3.3 ANCILLARY SURFACES

The descriptions of areas in schedules and elsewhere are of necessity simplified. Coat ancillary exposed surfaces to match similar or adjacent materials or areas, except where a fair-faced natural finish is required or items are completely prefinished. In cases of doubt obtain written instructions before proceeding.

3.4 HARDWARE

Do not paint hinges or hardware that cannot be removed. Before commencing work carefully remove hardware, fixtures and fittings, set aside where they cannot be damaged or misplaced and replace on completion. Refer to SELECTIONS for hardware, fixtures and fittings for removal.

3.5 PROTECTION

Supply, lay and fix drop sheets, coverings and masking necessary to protect adjoining, fixtures, fittings and spaces from paint drops, spots, spray and damage.

Application - preparatory work

3.6 SURFACE PREPARATION

Refer to the Resene Surface Information & Preparation Data Sheets (SIPDS) and product data manual for surface preparation sheets (or obtain them by phoning 0800 RESENE, or at www.resene.co.nz) listed in the materials systems schedule clauses. Carry out the preparatory work required by them for each of the substrates.

3.7 SHARP EDGES, CRACKS AND HOLES

Remove and/or repair sharp edges, cracks and holes if present, as outlined in the preamble of the Resene One-Line specifications and product data manual.

Elastomeric sealants, if used, should not be painted. The paint film will not match the flexibility of the sealant and may severely limit its effectiveness.

3.8 REMEDIAL WORK

If any substrate or surface, that even with the preparation work called for in this section, cannot be brought up to a standard that will allow painting or clear finishing of the required standard then do not proceed until remedial work is carried out.

3.9 GAP FILLING

Make good cracks, holes, indented and damaged surfaces. Use suitable gap fillers to match the surface being prepared. Any special priming requirements of the fillers must be satisfied. Allow to dry or set before sanding back level with the surface. Prime or seal timber before using putty.

Exterior and wet areas: Use only Portland cement base or water-insoluble organic base gap fillers.

3.10 OFF-SITE WORK

Carry out this work under cover in a suitable environment with suitable lighting. Store items, both before and after coating, in a clean, dry area protected from the weather and mechanical damage, properly stacked and spaced to allow air circulation and to prevent sticking. Specific instructions for transport to site to avoid damage to the factory applied paint system may be required particularly for metallic top coat paints.

3.11 PRIMING JOINERY

Pre-treat any cut surfaces of preservative treated timber before priming. Ensure L.O.S.P. treated joinery has dried sufficiently to lose solvent odour. Pre-treat bare timber with Resene TimberLock (see Data Sheet D48) to improve the durability of subsequent coats.

Liberally coat end grain, allow to soak in and then recoat.

3.12 CONCEALED JOINERY SURFACES

Where off-site coatings are specified they must be applied to surfaces including those concealed when incorporated into the building.

3.13 CONCEALED METAL SURFACES

Apply primer to suit the coating system to surfaces which will be concealed when incorporated into the building.

3.14 EXTERNAL DOORS

Prime or seal and paint bottom edges before hanging.

3.15 BEAD GLAZING

Stained, varnished, or painted joinery to have the first two coats of a suitable primer and one undercoat, applied to rebates and beads before glazing.

3.16 PUTTY FRONTING - LINSEED GLAZING PUTTIES

According to the putty manufacturer's instructions allow putty to set, then prime with Resene Wood Primer (see Data Sheet D40) or Resene Enamel Undercoat (see Data Sheet D44). Fully protect the putty by completing the Resene coating system as soon as it is sufficiently firm.
Glazing putties not based on linseed oil to be over coated according to the putty manufacturer’s instruction.

Application - generally

3.17 PAINTING GENERALLY

Comply with the Resene SIPDS Surface Information & Preparation Data Sheets or Resene One-Line specifications and product data manual data sheets and the additional requirements of this work section. Ensure large wall areas that require more than one container of paint per coat, have enough paint boxed (mixed) together to complete the final coat. This will not apply if a single factory batch of paint, rather than shop tinted paint, is applied.

3.18 MIXING

Although generally supplied ready to use, all paints must be thoroughly mixed to lift any settled pigment and ensure the paint is homogeneous.

3.19 ENVIRONMENT

Defer painting of exterior surfaces until weather conditions are favourable - warm dry days without frost or heavy dews. Avoid painting in direct sunlight any surfaces that absorb heat excessively. As far as possible apply paint in the temperature range 15°C to 25°C. If temperatures fall outside the range of 10°C and 35°C do not paint unless paints with the necessary temperature tolerance have been specified. Resene Hot Weather Additive can be added to most Resene waterborne top coats to extend open time when application is undertaken at elevated temperatures or conditions that will cause rapid loss of water from the applied wet film. Do not apply solvent borne paint if moisture is present on the surface.

3.20 SEQUENCE OF OPERATIONS

Painting work to generally follow the following sequences:

- Complete surface preparation before commencing painting.
- Apply primers, sealers, stains, undercoats, paints and clear coatings in the sequences laid down by Resene.
- Allow the full drying time between coats laid down by Resene.
- Do not expose primers, undercoats and intermediate coats beyond Resene's recommendations before applying the next coat.
- Finish broad areas before painting trim.
- Ensure batch numbers of tins are matched for whole areas.
- Internally, paint ceilings before walls and walls before joinery, trim and other items.

3.21 APPLICATION

Select brush, roller, or pad and apply coatings to the requirements of Resene to obtain a smooth, even coating of the specified thickness, uniform gloss and colour.

3.22 LIGHTLY SAND

Lightly sand primers, sealers, undercoats and intermediate coats to remove dust pick-up, protruding fibres and coarse particles. A more thorough sanding to provide a mechanical key for the new paint system may be required depending upon the condition or age of the existing paint system..

3.23 DEFECTIVE WORK

Correct defective work immediately and recoat as required, following precisely the Resene system being applied. The same applies to transportation damage to site of factory painted items.

3.24 EACH COAT

Each coat of paint and the completed paint system to have the following qualities and properties:

- Uniform finish, colour, texture, sheen and hiding power and the proper number of coats applied.
- No blemishes such as runs, sags, crinkling, fat edges, entrained paint skins, hairs, dust, bare or starved patches, cracks, significant brush marks, ladder marks and blistering.
- Proper covering of corners, crannies, thin edges, cracks, end grain and other difficult places of application.

Completion

3.25 CLEAN

Clean adjoining surfaces, glass and fittings of any paint contamination. Clean off glass indicators at the completion of the building works. Clean glass inside and out to a shining finish. Use the Resene Washwise on site 'paint equipment clean-up water' reclamation system to minimise the environmental impact of cleaning paint application tools.

3.26 LEAVE

Leave the whole of this work uniform in gloss and colour, of correct thickness, free from painting defects, clean and unmarked and to the standard required by following procedures.

3.27 REMOVE

Remove drop sheets, coverings and masking to leave surrounding surfaces and areas clean, tidy and undamaged. Remove debris, unused materials and elements from the site.

3.28 REPLACE

Replace hardware without damage to it or the adjoining surface and leave hardware properly fitted and in working order.

3.29 DISPOSAL OF PAINTS AND THINNERS

Note: The use and disposal of paint and thinners represents a significant environmental hazard.
Ensure all paint and thinners are disposed of in the following manner:

- When requested hand over part used paint containers to client for maintenance touch ups.
- Recycle leftover paint at a Resene ColorShop as part of the Resene "Paintwise programme". Contact your local Resene ColorShop for details or view information online at www.resene.co.nz/paintwise.htm.
- Donate left over paint to local community groups.
- Solvent based paints, paint thinners, turpentine, mineral spirits and solvents require special disposal procedures. Do not pour down sewer or stormwater drains, sinks or into the ground. If they cannot be recycled they must be disposed of in a refuse dump licensed to take toxic waste.

3.30 MAINTENANCE

Good maintenance of coating systems involves a routine of regular cleaning as well as regular inspections. Regular inspections of the coating systems are recommended to identify breakdown, accidental damage to or undesirable deterioration of the paint.
Wash down of exterior coatings should be undertaken on an annual basis using Resene Paint Prep and Housewash (see Data Sheet D812).

Refer the Resene Caring for your paint finish brochure and the Resene website, www.resene.co.nz/comn/services/maintenance.htm.

4 SELECTIONS

4.1 SELECTIONS

Refer to 6711R RESENE PAINTING EXTERIOR and 6721R RESENE PAINTING INTERIOR for selections.

6711R RESENE PAINTING EXTERIOR

1 GENERAL

This section relates to the surface preparation, painting and clear finishing of new and existing exterior substrates using **Resene** architectural and decorative coating systems.

1.1 RELATED WORK

Refer to 6700R RESENE PAINTING GENERAL for general matters related to painting work.
Refer to 6721R RESENE PAINTING INTERIOR for interior paint systems.

2 PRODUCTS

Materials

2.1 PAINT TYPES GENERALLY/ THINNERS AND ADDITIVES

Refer to 6700R RESENE PAINTING GENERAL for product clauses.

3 EXECUTION

Conditions

3.1 EXECUTION

Refer to 6700R RESENE PAINTING GENERAL for execution clauses.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

4.1 INSPECTION OF WORK

Resene paints representative in conjunction with site applicator to inspect the work in progress at each stage of the work and on completion and to take samples of their products from site if requested.
In addition to the above, inspection of the whole of the work at any stage may be made by the Principal's representative.

4.2 HARDWARE

Hardware for removal:	Yes all hardware

Resene exterior paint systems

Exterior timber - new

4.3 RESENE NEW EXTERIOR TIMBER WEATHERBOARDS - UNPRIMED

Surface Prep:	Resene SIPDS No2 and Spec Sheet 2: 1/1
1st coat:	Resene Quick Dry D45, Waterborne Acrylic Primer Undercoat
2nd coat:	Resene Sonyx 101 D30, Semi-Gloss Acrylic
3rd coat:	Resene Sonyx 101 D30, Semi-Gloss Acrylic

4.4 RESENE NEW EXTERIOR TIMBER JOINERY

Surface Prep:	Resene SIPDS No2 and Spec Sheet 2: 7/1
1st coat:	Resene Quick Dry D45, Waterborne Acrylic Primer Undercoat
2nd coat:	Resene Lustacryl D310, Semi-Gloss Waterborne Enamel
3rd coat:	Resene Lustacryl D310, Semi-Gloss Waterborne Enamel

Exterior timber - existing

4.5 RESENE EXISTING EXTERIOR TIMBER WEATHERBOARDS

Surface Prep:	Resene SIPDS No2 and Spec Sheet 2: 1/3
Spot Prime:	Resene Quick Dry D45, Waterborne Acrylic Primer Undercoat
1st coat:	Resene Sonyx 101 D30, Semi-Gloss Acrylic
2nd coat:	Resene Sonyx 101 D30, Semi-Gloss Acrylic

4.6 RESENE EXISTING EXTERIOR TIMBER JOINERY

Surface Prep:	Resene SIPDS No2 and Spec Sheet 2: 7/3
Spot Prime:	Resene Quick Dry D45, Waterborne Acrylic Primer Undercoat
1st coat:	Resene Lustacryl D310, Semi-Gloss Waterborne Enamel
2nd coat:	Resene Lustacryl D310, Semi-Gloss Waterborne Enamel

6721R RESENE PAINTING INTERIOR

1 GENERAL

This section relates to the surface preparation, painting and clear finishing of new and existing interior substrates using **Resene** architectural and decorative coating systems.

1.1 RELATED WORK

Refer to 6700R RESENE PAINTING GENERAL for general matters related to painting work.
Refer to 6711R RESENE PAINTING EXTERIOR for exterior paint systems.
Refer to 6711RE RESENE ENVIRONMENTAL PAINTING EXTERIOR for exterior paint systems.

2 PRODUCTS

Materials

2.1 PAINT TYPES GENERALLY/ THINNERS AND ADDITIVES

Refer to 6700R RESENE PAINTING GENERAL for product clauses.

3 EXECUTION

Conditions

3.1 EXECUTION

Refer to 6700R RESENE PAINTING GENERAL for execution clauses.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

4.1 INSPECTION OF WORK

Resene paints representative in conjunction with site applicator to inspect the work in progress at each stage of the work and on completion and to take samples of their products from site if requested.
In addition to the above, inspection of the whole of the work at any stage may be made by the Principal's representative.

4.2 HARDWARE

Hardware for removal: Yes all hardware

Resene interior paint systems

Plasterboard - new

4.3 RESENE NEW INTERIOR PLASTERBOARD, WALLS - DRY AREAS (LEVEL 4 FINISH)

Surface Prep:	Resene SIPDS No1 and Spec Sheet 1: 1/1
Fire rating:	Group 1-S. Test Report FH4967
1st coat	Resene Broadwall D403, Waterborne Wallboard Sealer
2nd coat:	Resene Spacecoat Low Sheen D311, Waterborne Low Sheen enamel
3rd coat:	Resene Spacecoat Low Sheen D311, Waterborne Low Sheen enamel

4.4 RESENE NEW INTERIOR PLASTERBOARD, WALLS - WET AREAS

Surface Prep:	Resene SIPDS No1 and Spec Sheet 1A: 1/1
Fire rating:	Group 1-S. Test Report 7-593235-CO
1st coat:	Resene Sureseal D42, solvent-borne Pigmented Sealer (NEC)
2nd coat:	Resene SpaceCote Low Sheen Kitchen & Bathroom D311K Waterborne Enamel
3rd coat:	Resene SpaceCote Low Sheen Kitchen & Bathroom D311K Waterborne Enamel

4.5 RESENE NEW INTERIOR PLASTERBOARD, CEILINGS - DRY AREAS (LEVEL 4 FINISH)

Surface Prep:	Resene SIPDS No1 and Spec Sheet 1: 1/1
Fire rating:	Group 1-S, Test Report FH4967
1st coat:	Resene Broadwall D403, Waterborne Wallboard Sealer
2nd coat:	Resene Ceiling Paint D305, Waterborne Flat
3rd coat:	Resene Ceiling Paint D305, Waterborne Flat

Where durable easily cleaned coating is required substitute 2nd & 3rd coats with:

4.6 RESENE NEW INTERIOR PLASTERBOARD, CEILINGS - WET AREAS

Surface Prep:	Resene SIPDS No1 and Spec Sheet 1A: 1/1
Fire rating:	Group 1-S, Test Report 7-593235-CO
1st coat:	Resene Sureseal D42, solvent-borne Pigmented Sealer (NEC)
2nd coat:	Resene SpaceCote Flat Kitchen & Bathroom D314K, Waterborne Enamel
3rd coat:	Resene SpaceCote Flat Kitchen & Bathroom D314K, Waterborne Enamel

Plasterboard - existing

4.7 RESENE EXISTING INTERIOR PLASTERBOARD, WALLS - DRY AREAS

Surface Prep:	Resene SIPDS No1 and Spec Sheet 1: 1/3
Spot Prime:	Resene Broadwall D403, Waterborne Wallboard Sealer
1st coat:	Resene Spacecoat Low Sheen D311, Waterborne Low Sheen enamel
2nd coat:	Resene Zylone Sheen D302, Waterborne Low Sheen

4.8 RESENE EXISTING INTERIOR PLASTERBOARD, WALLS - WET AREAS

Surface Prep:	Resene SIPDS No1 and Spec Sheet 1A: 1/3
Spot Prime:	Resene Sureseal D42, solvent-borne Pigmented Sealer (NEC)
1st coat:	Resene SpaceCote Low Sheen Kitchen & Bathroom D311K, Waterborne Enamel
2nd coat:	Resene SpaceCote Low Sheen Kitchen & Bathroom D311K, Waterborne Enamel

4.9 RESENE EXISTING INTERIOR PLASTERBOARD, CEILINGS - DRY AREAS

Surface Prep:	Resene SIPDS No1 and Spec Sheet 1: 1/3
Spot Prime:	Resene Broadwall D403, Waterborne Wallboard Sealer
1st coat:	Resene Ceiling Paint D305, Waterborne Flat
2nd coat:	Resene Ceiling Paint D305, Waterborne Flat

4.10 RESENE EXISTING INTERIOR PLASTERBOARD, CEILINGS - WET AREAS

Surface Prep:	Resene SIPDS No1 and Spec Sheet 1A: 1/3
Spot Prime:	Resene Sureseal D42, solvent-borne Pigmented Sealer (NEC)
1st coat:	Resene SpaceCote Flat Kitchen & Bathroom D314K, Waterborne Enamel
2nd coat:	Resene SpaceCote Flat Kitchen & Bathroom D314K, Waterborne Enamel

Interior timber - new

4.11 RESENE NEW INTERIOR TIMBER JOINERY - SKIRTING

Surface Prep:	Resene SIPDS No2 and Spec Sheet 2: 9/1
1st coat:	Resene Quick Dry D45, Waterborne Acrylic Primer Undercoat
2nd coat:	Resene Lustacryl D310, Waterborne Enamel
3rd coat:	Resene Lustacryl D310, Waterborne Enamel

4.12 RESENE NEW INTERIOR TIMBER JOINERY - CLEAR COAT

Surface Prep:	Resene SIPDS No2 and Spec Sheet 2: 10/1
1st coat:	Resene Aquaclear Satin D59, Waterborne Urethane Varnish
2nd coat:	Resene Aquaclear Satin D59, Waterborne Urethane Varnish
3rd coat:	Resene Aquaclear Satin D59, Waterborne Urethane Varnish

Interior timber - existing

4.13 RESENE EXISTING INTERIOR TIMBER JOINERY, SKIRTING

Surface Prep:	Resene SIPDS No2 and Spec Sheet 2: 9/3
Spot Prime:	Resene Quick Dry D45, Waterborne Acrylic Primer Undercoat
1st coat:	Resene Lustacryl D310, Waterborne Enamel
2nd coat:	Resene Lustacryl D310, Waterborne Enamel

Note: This section assumes the existing coating is enamel (which must be thoroughly abraded)

4.14 RESENE EXISTING INTERIOR TIMBER JOINERY – CLEAR COAT

Surface Prep:	Resene SIPDS No2 and Spec Sheet 2: 10/3
1st coat:	Resene Aquaclear Satin D59, Waterborne Urethane Varnish
2nd coat::	Resene Aquaclear Satin D59, Waterborne Urethane Varnish

7120 HOT & COLD WATER SYSTEM

1 GENERAL

This section relates to piped potable water supply systems from the network utility supply authority water main to designated points and appliances, the installation of hot water heating appliances, distributing piped hot water to other appliances, and the installation of valves.

1.1 RELATED WORK

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures and tapware selections.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC C/AS1-AS7	Protection from fire
NZBC G4/AS1	Ventilation
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC H1/AS1	Energy Efficiency
AS 1432	Copper tubes for plumbing, gasfitting and drainage applications
AS/NZS 2492	Cross Linked Polyethylene (PE-X) pipe for pressure applications
AS/NZS 2537.2	Mechanical joining fittings for use with crosslinked Polyethylene (PE-X) for pressure applications - Plastics piping systems for hot and cold water installations - Crosslinked Polyethylene (PE-X) - Fittings
AS/NZS 2642.1	Polybutylene pipe systems - Polybutylene (PB) pipe extrusion compounds
AS/NZS 2642.2	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
AS/NZS 2642.3	Polybutylene pipe systems - Mechanical jointing fittings for use with polybutylene (PB) pipes for hot and cold water applications
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design and performance requirements
AS 2845.3	Water supply - Backflow prevention devices - Field testing and maintenance
AS/NZS 3500.1:2003	Plumbing and drainage - Water services
AS/NZS 3500.4: 2003	Plumbing and drainage - Heated water services
AS/NZS 3500.5	Plumbing and drainage - Housing installations
NZS 3501	Specification for copper tubes for water, gas and sanitation
AS 3688	Water supply - Metallic fittings and end connectors
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
NZS 4305	Energy efficiency domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4607	Installation of thermal storage electric water heaters: valve-vented systems
NZS 4617	Tempering (3-port mixing) valves
AS/NZS 5601.1: 2010	Gas installations - general installations
DIN 8077	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - Dimensions
DIN 8078	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - General quality requirements and testing.

Gas (Safety and Measurement) Regulations 2010

Plumbers, Gasfitters and Drainlayers Act 2006

NZ Backflow Testing Standard:	NZ Backflow Testing Standard 2011, Field testing of backflow prevention devices and verification of air gaps

1.3 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:
~

Copies of the above literature are available from ~

Web: ~
Email: ~
Telephone: ~
Facsimile: ~

Requirements

1.4 QUALIFICATIONS

Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.5 INFORMATION FOR OPERATION AND MAINTENANCE

Provide the following general operation and maintenance information as electronic PDF format documents:
~

Provide this information prior to practical completion.

Warranties

1.6 WARRANTY

Provide warranty for:
2 years: For the supply and installation of the plumbing system and fixtures

- Provide the warranty in the standard form in the general section 1237WA WARRANTY AGREEMENT.
- Commence the warranty from the date of practical completion of the contract works.

Performance

1.7 TESTING - TO NZBC G12/AS1

Test to NZBC G12/AS1, 7.5, **Watertightness**, for hot and cold water.

- Test to a pressure of1500 kpa for period not less than 15 minutes.

Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed.
Slowly fill service pipes with water to exclude air. Test and ensure there is no measurable loss of pressure for the minimum period. Slowly fill distribution pipes with water to exclude air. Ensure that with draw-off taps closed the system must remain water-tight.

1.8 STANDARDS FOR COPPER PIPE

This section is based on NZS 3501 to NZBC G12/AS1 for the supply of copper pipe and fittings.
If the specified pipe is not available, pipes to AS 1432 and fittings to AS 3688 can be used, under NZBC G12/VM1 if written BCA approval is obtained by the plumber (both Standards are referenced in AS/NZS 3500.1:2003). If these Standards are used adjust diameters so that bore sizes are not compromised, otherwise comply with all other aspects of this section.
The whole project to be either to NZS 3501 or AS 1432.

1.9 GAS CERTIFICATE OF COMPLIANCE

Provide a Certificate of Compliance (CoC) as required by the Gas (Safety and Measurement) Regulations 2010 to the owner, and when required provide a copy to the energy supplier before connection.

1.10 GAS SAFETY CERTIFICATION

Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the owner and when required the BCA. To be provided at completion of the work, prior to Practical Completion.

1.11 GAS APPLIANCE COMPLIANCE

Supplier to provide a Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

2 PRODUCTS

2.1 COPPER PIPE

To NZS 3501 complete with copper-alloy compression fittings or crox type joints and seal ring compression joints complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1, Table 1 and NZBC G12/AS1, Table 1.

2.2 POLYBUTYLENE PIPE

Polybutylene tubing to AS/NZS 2642.1, AS/NZS 2642.2 and AS/NZS 2642.3 complete with fittings and accessories brand-matched with durability to NZBC B2/AS1 Durability, table 1 and NZBC G12/AS1, table1.

2.3 VALVES

Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief or temperature valve, pressure relief valve and isolating valves to NZBC G12/AS1.

2.4 BACKFLOW PREVENTION DEVICES

Provide backflow prevention devices to AS/NZS 2845.1 where it is possible for water or contaminants to backflow into the potable water supply. Refer to NZBC G12/AS1 3.4 Backflow protection, and NZBC G12/AS1, table 2, Selection of Backflow Protection.

2.5 TEMPERING VALVE

Tempering valve to NZS 4617 to NZBC G12/AS1.

Materials - Hot water heating appliances

2.6 GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE

Continuous flow unit with an integral gas burner and flue to NZS 4305.

Components

2.7 INSULATION

Pre-formed pipe sections complete with bends and fittings, with fixing tape to the manufacturer's requirements and to NZBC H1/AS1.

2.8 PROTECTIVE TAPE

Plasticised PVC tape system with primer, mastic fixing and outer coating.

Fire stopping accessories

2.9 FIRE STOPPING SYSTEMS

For sealing around pipe penetration through fire walls and floors use a combination of the following:

- Gunnable inorganic or silicone elastomer sealant, packed to maintain the specified fire resistance rating of the floor or wall.
- Two-part silicone foam elastomer sealant, packed to maintain the specified fire resistance rating of the floor or wall.
- Fire wrap containing intumescent material used in conjunction with the selected sealer.
- Fire collar with intumescent packing to maintain the specified fire resistant rating of the floor or wall.

3 EXECUTION

3.1 EXECUTION GENERALLY

Generally carry out the whole of this work and tests to NZBC G12/VM1 or NZBC G12/AS1.

3.2 HANDLE AND STORE

Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress.

Store tapware in a shelved, dry and securely locked area. Retain tapware in the manufacturer's original packaging, complete with all fixings and installation instructions. Label each unit separately with its space/fixture number to match.

3.3 CORE HOLES AND SLEEVES

Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.

3.4 CONCEAL

Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.

3.5 CORROSION

Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

3.6 THERMAL MOVEMENT

Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.

3.7 PIPE SIZE

Flow rates to each outlet to be no less than those given in NZBC G12/VM1 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures. Pipe size as determined in NZBC G12/AS1, table 4, Tempering valve and nominal pipe diameters.

3.8 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.

3.9 EXCAVATE

Excavate for the water main to a firm, even trench base in straight runs. Allow to backfill.

Application - Jointing

3.10 JOINTING COPPER PIPE

Braze pipe, fit alloy compression fittings, crox type joints and seal ring compression joints to NZBC G12/AS1.

3.11 JOINTING POLYBUTYLENE PIPE

Aluminium clamped, seal ring compression or push fit "O" ring seal jointing to pipe system manufacturer's requirements.

Application - Pipework installation

3.12 POTABLE WATER SUPPLY PIPEWORK INSTALLATION

From connection point, run pipes complete with all fittings, support and fixing, joins and install to manufacturers specifications. Size the pipes and branches in straight runs to deliver the acceptable flow rate to NZBC G12/VM1 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures and size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Pipework support spacing to be firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with machine made 3 diameter bends, complete with necessary valves and fittings. Conceal pipework and pressure test before the wall linings are fixed.

3.13 HOT WATER PIPEWORK

Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to NZBC G12/VM1 or NZBC G12/AS1, table 7 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, and preformed 3 diameter bends, complete with all necessary valves and fittings

Lag all pipes with rigid insulation to the manufacturer's requirements and G12/VM1 or G12/AS1.

3.14 EQUIPOTENTIAL BONDING

Earth metallic water supply pipe and metallic sanitary fixtures to NZBC G12/AS1, 9.0.

3.15 IN-LINE FILTER

Install an in-line filter immediately adjacent to the main isolating valve at the point of entry to the building, in an accessible position to allow for easy cleaning.

Application - Hot water systems

3.16 HOT WATER CYLINDER INSTALLATION GENERALLY

Install hot water cylinders complete to the manufacturer's requirements and to NZBC G12/AS1, 6. 11, Water heater installation. Valve-vented systems to NZS 4607.

3.17 SEISMIC RESTRAINTS - GAS WATER HEATING APPLIANCES

Gas appliances to be restrained to manufacturer's requirements, AS/NZS 5601.1 and NZBC C/AS1-AS7, 7.2 Gas-burning Appliances.

3.18 INSTALLING HOT WATER PIPE INSULATION

Insulate all hot water pipes to NZBC H1/AS1, AS/NZS 3500.5, 3.33 **Water and Energy Efficiency**, and to the insulation manufacturer's instructions. Cut insulation sections tight between timber framing and tight between the webs of steel studs.

3.19 INSTALL GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE

Install complete with the necessary fittings to the manufacturer's requirements and in accordance with NZBC G12/AS1, 6. 11, Water heater installation. Install flue in accordance with the manufacturer's details and requirements and, AS/NZS 5601.1 (for internal or external appliances) or NZBC G4/AS1 (internal appliances). Also refer to section 7221 GAS APPLIANCES for installation of gas appliances.

3.20 INSTALL TEMPERING VALVE

Install 1 metre minimum from outlet of hot water cylinder and to manufacturer's instructions. Install copper pipework for 1 metre minimum downstream of tempering valve prior to connection of non-metallic pipework.

3.21 PENETRATIONS

Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

Application - Fire resistant work

3.22 FIRE STOPPING WORK

Prepare pipe penetration and install fire stopping system around pipes to manufacturer's installation instructions.

Installation - Valves

3.23 INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED

Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.

3.24 INSTALLING BACKFLOW PREVENTION DEVICE

Provide and install backflow prevention device as near as practicable to the potential source of contamination, and in an accessible position for maintenance and testing to AS 2845.3 or NZ Backflow Testing Standard.

Completion

3.25 LABEL

Label all pipework with permanent adhesive markers at 3 metre minimum intervals.

3.26 CLEAN IN-LINE FILTER

Clean all in-line filters on completion of works.

3.27 REPLACE

Replace damaged or marked elements.

3.28 LEAVE

Leave work to the standard required by following procedures.

3.29 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

Pipework

4.1 SELECTIONS

PIPEWORK
Plumbing sub-contractor to select & supply all copper & Polybutylene pipe as required complete with rigid insulation.

VALVES & ACCESSORIES
Plumbing sub-contractor to select & supply all valves as required. Ensure Tempering valve fitted after water heating unit on hot water supply to all personal hygiene fixtures

GAS HOT WATER SYSTEM, continuous flow type Refer RINNAI HOT WATER SYSTEMS that follows

7126RH RINNAI HOT WATER SYSTEMS

1 GENERAL

This section relates to the supply and installation of **Rinnai New Zealand Limited** hot water systems.
It includes:

- Rinnai continuous flow gas water heating units
- Rinnai storage and electric water heaters
- Rinnai supplied HJ Cooper storage and electric water heaters

1.1 RELATED WORK

Refer to the hot and cold water system section for pipe systems
Refer to 7211 GAS SYSTEM UTILITY NETWORK for piped gas supply
Refer to 7212 GAS SYSTEM LPG CYLINDERS for cylinder gas supply
Refer to 7554RS RINNAI SPACE HEATING SYSTEMS for space heating

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS1-AS7	Protection from fire
NZBC G10/AS1	Piping for gas used as an energy source
NZBC G12/AS1	Water supplies
AS/NZS 1596	Storage and handling of LP Gas
AS/NZS 3823.1.1	Performance of electrical appliances - Air conditioners and heat pumps - Part 1.1: Non-ducted air conditioners and heat pumps - Testing and rating for performance
AS/NZS 3823.1.2	Performance of electrical appliances - Air conditioners and heat pumps - Part 1.2: Ducted air conditioners and air-to-air heat pumps - Testing and rating for performance
AS/NZS 3823.2	Performance of electrical appliances - Air conditioners and heat pumps - Energy labelling and minimum energy performance standard (MEPS) requirements
NZS 4603	Energy efficiency - Domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4607	Installation of thermal storage electric water heaters: valve vented systems
AS/NZS 5601.1: 2010	Gas installations Part 1: General installations

Electricity (Safety) Regulations 2010
Gas (Safety and Measurement) Regulations 2010
Plumbers, Gasfitters and Drainlayers Act 2006

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:
Rinnai Operation and Installation Guides

Manufacturer/supplier contact details

Company:	**Rinnai New Zealand Limited**
Web:	www.rinnai.co.nz
Email:	info@rinnai.co.nz
Telephone:	0800 RINNAI (0800 746 624)

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

12 years:	For heat exchanger pro-rata (depreciates 10% / year)
5 years:	For all other parts

The manufacturer/supplier warranty period will depend on the type, model, parts, labour and application of the selected product. Refer to Rinnai New Zealand Limited for confirmation of appropriate warranty details.

- Provide this warranty on the Rinnai New Zealand Limited standard form.
- Commence the warranty from the date of installation.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer warranty:
3 years: For labour
The installer warranty period will depend on the type, model, parts, labour and application of the selected product. Refer to Rinnai New Zealand Limited for confirmation of appropriate warranty details.

- Provide this warranty on the installer standard form.
- Commence the warranty from the date of installation.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Rinnai products, or associated products, components or accessories.

1.7 COMPLY

Comply with the Gas (Safety and Measurement) Regulations 2010, Electricity (Safety) Regulations 2010 and the network utility operator's requirements. Give notices for inspections and carry out tests as required.

1.8 QUALIFICATIONS

Gasfitters to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a Certifying Gasfitter under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.9 INFORMATION FOR OPERATION AND MAINTENANCE

Supply maintenance information to requirements set out in the 1239 OPERATION & MAINTENANCE section.

Performance

1.10 FINAL INSPECTION AND TEST

Submit the work for inspection and test and prove to the satisfaction of the network utility operator that the installation complies with all Acts and Regulations and has been tested for leakage and proved to be sound.

Testing should be at the time of completion. Confirm this timing before carrying out any tests. Test and demonstrate the system according to manufacturer's specification.

1.11 GAS CERTIFICATE OF COMPLIANCE

Provide a Certificate of Compliance (CoC) as required by the Gas (Safety and Measurement) Regulations 2010 to the owner, and when required provide a copy to the energy supplier before connection.

1.12 GAS SAFETY CERTIFICATION

Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the owner and when required the BCA. To be provided at completion of the work, prior to Practical Completion.

1.13 APPLIANCE COMPLIANCE

Supplier to provide a Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

2 PRODUCTS

Materials - hot water gas heating units

2.1 CONTINUOUS FLOW GAS HOT WATER HEATING UNIT

Rinnai INFINITY® continuous flow gas hot water heating unit with an integral gas burner. Water temperature electronically preset by digital controllers where selected. Refer to SELECTIONS for controller type.

2.2 DIGITAL CONTROLLER(S)

Rinnai digital controller for Rinnai INFINITY® continuous flow gas hot water heating units. Refer to SELECTIONS for type.

Components

2.3 FLUES

Matching Rinnai Flue system.

2.4 SECURITY BRACKET

Rinnai INFINITY® security bracket.

2.5 RECESS BOX

Rinnai INFINITY® recess box for housing the external Rinnai INFINITY® unit, pipe work and power supply behind a hinged door.

2.6 PIPE COVER

Rinnai INFINITY® pipe cover (where a recess box is not being used), attaches to the base of the Rinnai INFINITY® unit.

3 EXECUTION

Installation - general

3.1 HANDLE AND STORE

Handle and store units, cylinders, pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress. Store according to manufacturer's instructions.

3.2 CONCEAL

Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.

3.3 CORROSION

Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

3.4 THERMAL MOVEMENT

Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.

3.5 PIPE SIZE

Plumber to check and confirm adequate pipe size, incoming mains and meter on site as a part of the installation. Pipe sizing calculation to NZBC G12/AS1, table 4.

Installation - general, hot water cylinders

3.6 HOT WATER CYLINDER INSTALLATION - GENERALLY

Install hot water cylinders complete to the manufacturer's requirements and to NZBC G12/AS1, 6.11, Water heater installation. Valve-vented systems to NZS 4607.

3.7 SEISMIC RESTRAINTS - GAS WATER HEATING APPLIANCES

Gas appliances to be restrained to manufacturer's requirements, AS/NZS 5601.1 and NZBC C/AS1-AS7, 7.2 Gas-burning Appliances.

3.8 INSTALL TEMPERING VALVE

Install one metre minimum from outlet of hot water cylinder and to manufacturer's instructions.

Installation - gas hot water systems

3.9 INSTALL CONTINUOUS FLOW GAS HOT WATER HEATING UNIT

Install Rinnai INFINITY® continuous flow gas hot water heating unit complete with the necessary fittings to Rinnai requirements and to NZBC G12/AS1, 6.11, Water heater installation. Install flue (if applicable) to Rinnai details and requirements and digital controllers in location specified. Install in Rinnai recess box with security bracket where specified. Refer to section 7221 GAS APPLIANCES for installation of gas appliances.

3.10 INSTALL GAS APPLIANCES

Fit and connect gas appliances complete with flues as required to the appliance manufacturer's requirements and AS/NZS 5601.1. Also refer to section 7221 GAS APPLIANCES for installation.

Completion

3.11 REPLACE

Replace damaged or marked elements.

3.12 LEAVE

Leave work to the standard required by following procedures.

3.13 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.rinnai.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

Gas hot water systems

4.1 RINNAI INFINITY® - EXTERNAL CONTINUOUS FLOW GAS HOT WATER HEATING UNIT

Location:	South east wall of
Brand:	Rinnai
Model:	Rinnai INFINITY® VT24
Gas type:	LPG

Components

4.2 RINNAI DIGITAL CONTROLLER

Location:	Bathroom
Brand:	Rinnai
Mode/type:	Bathroom deluxe controller
Number:	1

4.3 RINNAI SECURITY BRACKET

Location:	External unit
Brand:	Rinnai
Size:	To suit VT24

4.4 RINNAI PIPE COVER

Location:	External wall of bathroom
Brand:	Rinnai
Model:	Rinnai INFINITY® VT24

7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES

1 GENERAL

This section relates to the supply and installation of sanitary fixtures, tapware and sanitary accessories.

1.1 RELATED WORK

Refer to 7120 or 7123 HOT AND COLD WATER SYSTEM for hot water cylinders.
Refer to 7420 or 7421 SANITARY SYSTEMS for the supply and fitting of waste disposal pipework
Refer to the electrical section/s for electrical connection of accessories.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E3/AS1	Internal moisture
NZBC F2/AS1	Hazardous building materials
NZBC G1/AS1	Personal hygiene
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC G13/AS1	Foul water
NZBC G13/AS3	Plumbing and drainage
AS/NZS 1730	Washbasins
AS/NZS 2023	Baths for ablutionary purposes
AS/NZS 3500.1:2003	Plumbing and drainage - water services
AS/NZS 3500.2:2003	Plumbing and drainage - sanitary plumbing and drainage
AS/NZS 3662	Performance of showers for bathing
NZS 4223.3	Glazing in buildings - Human impact safety requirements
Plumbers, Gasfitters and Drainlayers Act 2006	

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.3 QUALIFICATIONS

Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a Certifying Plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.4 SUPPLIER

A specialist in the supply of tapware, and employing experienced architectural representatives available to assist during the course of the installation.

1.5 SUBMIT A SUPPLIER'S SCHEDULE

Confirm with client

2 PRODUCTS

2.1 SANITARY FIXTURES

Refer to SELECTIONS for product selection.

2.2 TAPWARE

Refer to SELECTIONS for product selection.

2.3 SANITARY APPLIANCES

Refer to SELECTIONS for product selection.

2.4 SANITARY ACCESSORIES

Refer to SELECTIONS for product selection.

2.5 ELECTRICAL SANITARY ACCESSORIES

Refer to SELECTIONS for product selection.

3 EXECUTION

Conditions - sanitary fixtures

3.1 DELIVERY

Only deliver to the site fixtures or fittings that can be immediately unloaded into suitable storage or be placed for direct installation.

3.2 STORAGE AND HANDLING

Take delivery of and store components complete with protective casings and coverings in areas that are enclosed, clean and dry and where no work is being done. Remove protection only to the extent that will allow installation.

3.3 QUALITY STANDARDS INCLUDING NZBC G13/AS1

Installation work to comply with NZBC G1/AS1, NZBC G12/VM1, NZBC G12/AS1, NZBC G13/AS1 and the fixture manufacturer's requirements.

3.4 SUBSTRATE

Ensure substrate and fixings will allow work of the specified standard.

3.5 CO-ORDINATION

Do not proceed if the points of supply and drainage services do not match the points of the fixtures without force or distortion.

3.6 INSTALLATION REQUIREMENTS INCLUDING NZBC G13/AS1

Install to NZBC G1/AS1, NZBC G12/VM1, NZBC G12/AS1, NZBC G13/AS1, NZBC E3/AS1 and to the fixture manufacturer's installation requirements for each component. Carry out preparatory and assembly work, including connections to supply and drainage services and the application of slurries and sealants in sequence.
Seal between all sanitary fixtures and wall linings, fixtures and the tops they are in, the tops and wall linings, to NZBC E3/AS1, 3.2.2. Fixtures include baths, basins, tubs or sinks, Tops include, vanities, bath surrounds, sink benches, etc, and there upstands.

3.7 PROVIDE SUPPORT

Confirm fixing points needed for each unit and provide solid blocking at each fixing bracket location.

Conditions - tapware

3.8 RETAIN

Retain tapware in the manufacturer's original packaging and ensure that units are complete with fixings and installation instructions. Label each unit separately with its fitting name and space number.

3.9 STORE

Store tapware packages in a shelved, dry and securely locked area. Provide supervision when the secure area is unlocked and packages and cartons are being distributed; signing off each package from the schedule as released.

Conditions - sanitary accessories

3.10 RETAIN

Retain fixtures, fittings and hardware in the manufacturer's original packaging and ensure that units are complete with associated fixings and installation instructions. Label each unit separately to match the submitted and approved schedule.

3.11 PACKAGE

Package fixtures, fittings and hardware units required in clear plastic and label each to match the drawings and the submitted schedule. Place packages in cartons selected for 'level', 'location', and/or 'sector' and label the packages and the cartons similarly.

3.12 STORE

Store items in a shelved, dry and securely locked area. Provide supervision when the secure area is unlocked and packages and cartons are being distributed; signing off each package from the schedule as released.

3.13 INSPECTION

Before starting the installation of proprietary items, check relevant spaces and wall and floor finishes for any condition that would not allow the proper installation of any unit. Do not proceed until such conditions have been remedied.

Installation - sanitary fixtures

3.14 INSTALLING TOILET PAN

Carry out preparatory and assembly work, including connections to supply and drainage services and the application of slurries/bedding and sealants in sequence. Fit the toilet pan in position, plumb, level, flush and rigid without stressing the attachment points of the component. Fixings to be corrosive resistant. Fit seat.

3.15 INSTALLING CISTERNS

Fit firmly in place and connect the specified cisterns from the supply services through the flush pipes to the relative fixtures in the positions as detailed all plumb and level.

Installation - Basins

3.16 INSTALLING WASHBASINS

Install to NZBC G1/AS1, AS/NZS 1730. Set basins firmly to walls or vanities as detailed and to comply with NZBC E3/AS1. Connect to supply and drains through trap to the drainage system.

3.17 INSTALLING VANITIES - INTEGRAL BASINS

Install in accordance with the manufacturer's requirements. Connect to supply and drains through trap to the drainage system. Seal top and upstand to wall surface to comply with NZBC E3/AS1.

Installation - Showers

3.18 INSTALLING SHOWER FITTINGS

Shower waste, mixer and rose to be install to NZBC G1/AS1 and to AS/NZS 3662.

Installation - Baths

3.19 INSTALLING BATHS

Install to NZBC G1/AS1. Set firmly in cradle with required points fully supported, level and flush. Connect to supply and drainage services.

Installation - Sinks

3.20 INSTALLING SINK BENCHES

Install in accordance with manufacturer's/supplier's requirements. Connect to supply and drainage services.

3.21 INSTALLING CLEANERS SINKS AND TUB UNITS

Install in accordance with manufacturer's requirements. Connect to supply and drainage services.

Installation - Miscellaneous

3.22 INSTALLING STAINLESS STEEL FIXTURES

Carry out preparatory work and fit elements in position plumb, level, flush and rigid without stressing the attachment points in sequence. Connect to supply and drainage services.

Application - tapware

3.23 GENERAL

To AS/NZS 3500.1 dated 2003 and in accordance with the manufacturer's requirements. Maintain safe water temperatures to comply with NZBC G12/AS1.

Application - sanitary accessories

3.24 INSTALLING ACCESSORIES

Fit specified fittings firmly in place at required dimensions relative to floor and adjoining sanitaryware fittings, all plumb and level.

3.25 LOCATE

Locate units at heights and/or locations shown on the drawings, or as required to comply with NZBC G1/AS1. For any dimension not shown or known, request direction before proceeding.

3.26 CUTTING AND FITTING

Where cutting and fitting of the substrate is necessary for installing any unit, carry out this work before the painting or finishing of that surface. Remove any hardware when required for painting, placing it in the packaging or carton originally supplied and returning it to the secure store until ready for re-installation.

3.27 INSTALLING UNITS

Install each unit in accordance with the proprietary fixture manufacturer's requirements, using the templates and tools supplied or recommended by them. Set units level, plumb and true to line and required location, with moving parts and actions freely and easily operating. Do not make any modifications to supplied units.

Completion

3.28 REPLACE

Replace damaged or marked elements.

3.29 PROTECTIVE COVERINGS

Leave fixtures, fittings and accessories clean and unblemished with stickers and protective coverings removed, with supply and drainage connections and all parts fully operating and working. Leave the whole of this work free of blemishes, undamaged and to the standard of finish required for following work.

3.30 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

4.1 SELECTIONS

7212 GAS SYSTEM LPG CYLINDERS

1 GENERAL

This section relates to Installation and maintenance of a 45kg LPG twin cylinder system and associated piping systems.

1.1 RELATED WORK

Refer to 7126RH for Rinnai Hot Water Systems

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.
The following abbreviations apply specifically to this section:

WorkSafe:	WorkSafe New Zealand.
HSNO:	Hazardous Substances and New Organisms Act 1996.
LPGA	LPG Association of New Zealand Inc.

The following definitions apply specifically to this section:

Condensate:	The liquid that separates from the gas downstream of any regulator due to the reduction in temperature resulting from pressure reduction.
Condensate trap:	(also known as a drip leg or tailpipe) a device installed in a gas line to trap the condensate liquid
Enclosure:	A compartment, an enclosed area or a partitioned-off space primarily used for the installing of a gas cylinder meter, or gas pressure regulator.
LAB number:	Number allocated by WorkSafe when a cylinder is approved.
POL fitting:	(Prest-O-Lite) The common name given for a standard union with left hand thread, used for connection to a 45 Kg cylinder.
Pigtail:	A short length of flexible tube or copper pipe completed with end couplings. Use for connecting the cylinder to the manifold or the changeover valve.
Twin cylinder installation:	A cylinder installation where two cylinders are connected separately to the system. Each cylinder is connected to a change over valve that can be operated manually or automatically, to change over the cylinder which is supplying LPG to the installation. Connection may be made using flexible rubber or copper pigtails, or pipe fittings.

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC G10/AS1	Piped services
NZBC G11/AS1	Gas as an energy source
AS/NZS 1596	The storage and handling of LPG.
AS/NZS 4129	Fittings for polyethylene pipes for pressure applications
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
AS 4176	Polyethylene/aluminium and cross linked polyethylene/aluminium macrocomposite pipe systems for pressure applications
AS/NZS 5601.1: 2010	Gas Installations - general installations
LPGA CoP No.2	Installation and maintenance of twin 45kg cylinder systems

Electricity (Safety) Regulations 2010
Gas (Safety and Measurement) Regulations 2010
Plumbers, Gasfitters and Drainlayers Act 2006

Warranties

1.4 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years:	For the complete gas system

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 COMPLY

Comply with the Gas (Safety and Measurement) Regulations 2010 and Electricity (Safety) Regulations 2010.

1.6 QUALIFICATIONS

Work to be carried out by gasfitters experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying gasfitter under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.7 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS

Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

1.8 AS BUILT DOCUMENTS

Refer to the general section 1238 AS BUILT DOCUMENTATION for the requirements for submission and review of as built documents and records.

Provide the following as built documents and records:
1:100 scale as-built plan of the gas pipe runs, sizes componentry and fittings.

Provide as built information prior to practical completion.

1.9 DESIGN

Design the piping system to AS/NZS 5601.1, with pipe sizes to give a minimum pressure at any appliance inlet, to AS/NZS 5601.1, Table 5.1, of 2.75 kPa for LPG. Include pressure regulators if required.

1.10 LOCATION OF CYLINDERS

Cylinders and associated equipment to be installed external to buildings, except where AS/NZS 1596 permits. Location and clearances to AS/NZS 5601.1. Ensure location allows good accessibility for cylinder replacement to AS/NZS 5601.1. Coordinate with electrical installations to ensure clearances are maintained.

Compliance information

1.11 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -
Manufacturer's, importers or distributors warranty

- Installer / applicator's warranty
- Gasfitting Certificate of Compliance - from the installer

1.12 GAS CERTIFICATE OF COMPLIANCE

Provide a Certificate of Compliance (CoC) as required by the Gas (Safety and Measurement) Regulations 2010 to the owner, and when required provide a copy to the energy supplier before connection.

1.13 GAS SAFETY CERTIFICATION

Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the owner and when required the BCA. To be provided at completion of the work, prior to Practical Completion.

1.14 GAS APPLIANCE COMPLIANCE

Supplier to provide Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

2 PRODUCTS

Materials

2.1 PIPEWORK GENERAL

Pipework requirements to AS/NZS 5601.1, particularly AS/NZS 5601.1, Section 4, **Materials fittings and components**.

2.2 COPPER PIPE

Complete with fittings to AS/NZS 5601.1. Range of use to AS/NZS 5601.1, table 4.1 **Consumer Piping Materials**.

2.3 MACROCOMPOSITE PIPE

Polyethylene/aluminium/cross linked polyethylene combination (PE/AL/PE, PE-X/AL/PE-X or PE-X/AL/PE) macrocomposite pipe systems for pressure applications to AS 4176. Range of use to AS/NZS 5601.1, table 4.1 **Consumer Piping Materials**. Used for general pipework, can also be used in ground beneath a building.

2.4 POLYETHYLENE PIPE

Polyethylene pipes to AS/NZS 4130 Series two, or AS/NZS 4130 Series three. Fittings to AS/NZS 4129. Range of use to AS/NZS 5601.1, table 4.1 **Consumer Piping Materials**. For use in ground but not beneath a building.

2.5 ISOLATING VALVES

Manual shut-off valves to AS/NZS 5601.1.

2.6 CYLINDERS

Full 45kg cylinders to be supplied by the LPG supply company.

Components

2.7 CHANGEOVER VALVES

To the requirements of AS/NZS 5601.1.
Automatic changeover valves including a non-return valve on each pigtail connection. The valve must comply with the requirements of HSNO and WorkSafe.

Changeover valves may be comprised of a first and second stage regulator system in a single body, or as a combination of separate component items.

Changeover valves complete with all components necessary for the operation of the bottle gas system including: -

- Flexible Pigtails
- Regulators
- Condensate trap
- Over pressure shut off
- All required valves

Protect from weather.

Accessories

2.8 ANCHORS AND CHAINS

To the requirements of LPGA COP No.2.
All cylinders larger than 25 litres capacity shall be securely held in place by galvanized chains and brackets. The brackets shall be fastened to a wall or similar robust anchorage. The cylinder's fastenings must be capable of withstanding a steady applied load equal to four times the weight of the filled cylinder.

3 EXECUTION

Conditions

3.1 GENERALLY

Carry out the whole of this work to the requirements of NZBC G10/AS1, NZBC G11/AS1 and AS/NZS 5601.1.

3.2 BURIED PIPES

Pipes to be bedded in a trench, backfilled, marker taped and separated from other services, to AS/NZS 5601.1, 5.4 Installation of consumer piping underground.

Application

3.3 INSTALL PIPING

Run the system, completely concealed, in the most suitable type of pipe for each part of the installation, bent, supported, jointed and complete with all fittings to AS/NZS 5601.1. Confirm the type of pipe and its location. Label pipework to distinguish it from other services to AS/NZS 5601.1, 5.1.12 **Identification of pipework.**

3.4 PRESSURE TEST

Pressure test the system for leakage to AS/NZS 5601.1 before pipework is concealed by linings.

3.5 LOCATION OF CYLINDERS

Cylinders and associated equipment to be installed external to buildings, except where AS/NZS 1596 permits. Location and clearances to AS/NZS 5601.1, Appendix J, **LP Gas cylinder locations.**

Installation of cylinders

3.6 GENERAL

Cylinders shall be installed upright with the valve uppermost to ensure the inlet to the safety valve remains in the vapour space clear of the liquid content of the cylinder.

- Clearances around cylinders shall comply with CLEARANCES AROUND CYLINDER clause.
- Where two or more exchange cylinders are installed, a manual or automatic changeover valve shall be fitted immediately upstream of the regulator. This valve may be an integral part of an automatic changeover regulator.

3.7 SUPPORT

Cylinders shall not be supported by other cylinders.

Cylinders shall be installed on supporting bases that are firm, level, of non-combustible material, and with a finished surface that prevents ponding of water and at least 50mm above the surrounding surface. Soil is not considered an acceptable supporting base.

All cylinders to be securely held in place by galvanized chains and anchor brackets. The brackets shall be fastened to a wall or similar robust anchorage. Fixings shall be galvanised or stainless steel.

3.8 CYLINDER CONNECTION

Cylinders should be connected directly to the changeover valve assembly by flexible pigtails.

An excess flow valve, to prevent cylinder venting if hose fails, shall be fitted immediately upstream of the piping or hose assembly. This excess flow valve may be an integral part of the POL fitting.

Pigtails connecting cylinders to changeover valves or manifolds should not exceed 1 metre in length.

A non-return valve must be fitted in the supply between each cylinder and the changeover valve, or in a manifold system, between each cylinder and its manifold connection, to prevent flow across the changeover system to AS/NZS 5601.1.

3.9 CYLINDERS IN AN ENCLOSURE OR RECESS

To AS/NZS 5601.1, Appendix J, **LP Gas cylinder locations.**

3.10 CYLINDERS UNDER BUILDINGS SUPPORTED ON PIERS

To AS/NZS 5601.1, Appendix J, **LP Gas cylinder locations.**

3.11 CLEARANCES AROUND CYLINDER

Cylinders should be installed with clearances complying with the AS/NZS 5601.1, Appendix J, **LP Gas cylinder locations**, figure J3 **Minimum clearance to ignition sources**, and figure J4 **Minimum clearance to a drain or opening into a building**, and at least 1 metre from any readily ignitable material. Readily ignitable materials include paper, dry grass or oily substances.

3.12 CYLINDER SAFETY VALVE DISCHARGE

The discharge point of the cylinder safety valve shall be directed away from any other cylinder, piping, building, drain, approach path to cylinders and any opening into or under a building.

3.13 TEST POINTS

A pressure test point should be installed immediately downstream of each second stage regulator. Such test point may be an integral part of the regulator.

Completion

3.14 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused materials and elements from the site.

3.15 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

Commissioning

3.16 FINAL INSPECTION AND TESTING

Check cylinders are working and ensure all connected appliances are operating correctly. Carry out final inspections and testing, pressure test the system for leakage to AS/NZS 5601.1. Leave system shut off at the cylinders until practical completion.

3.17 HANDOVER

Provide a copy of the system operating and maintenance instructions.

Completion

3.18 REPLACE

Replace damaged, cracked or marked elements.

3.19 LEAVE

Leave appliances clean and in full working order to the standard required by following procedures.

3.20 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

Materials

4.1 LPG CYLINDER SYSTEM

Location:	As shown on drawings
LPG supplier:	TBC
Cylinder Number/size:	2 x 45kg
Changeover valve supply:	Supplied by gas fitter
Cylinder restraint:	Anchors and chain by gas fitter
Proprietary enclosure:	Yes

7420 SANITARY SYSTEMS

1 GENERAL

This section relates to above ground gravity flow sanitary systems;

- for foul water
- from sanitary fixtures to first underground drain connection
- including system wastes, floor wastes, floor waste gullies, traps, vents and valves
- with associated components and accessories to make the system work

1.1 RELATED SECTIONS

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures tapware and accessories.
Refer to 7430 DRAINAGE for underground drains.

1.2 DOCUMENTS

Documents referred to in this section are:

NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - Sanitary plumbing
NZBC G13/AS3	Plumbing and drainage
AS 2887	Plastic waste fittings
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 3500.2:2003	Plumbing and drainage - Sanitary plumbing and drainage

Plumbers, Gasfitters and Drainlayers Act 2006

1.3 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:
Tranquillity channel drain installation instructions in appendix

1.4 QUALIFICATIONS

Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

2 PRODUCTS

2.1 PVC-U WASTE, DISCHARGE AND VENT PIPES

PVC-U pipe to AS/NZS 1260 complete with fittings brand-matched to the pipe manufacturer's requirements.

2.2 EXPOSED PIPES AND TRAPS

Chrome plate on copper pipes and associated copper and brass fittings.
White polybutylene or PVC, including all associated fittings.

3 EXECUTION

3.1 EXECUTION GENERALLY - NZBC G13/AS1

Carry out this work and complete all tests to NZBC G1/AS1: 2.0, 3.0 and NZBC G13/AS1.

3.2 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

3.3 INSTALL TRAPS, WASTE AND VENT PIPES - NZBC G13/AS1

Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to NZBC G13/AS1 and AS/NZS 2032. Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

3.4 PENETRATIONS

At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

3.5 TEST

Test soil and waste disposal systems to ensure no leakage exists and leave in proper working order.

3.6 CLEAN UP

Remove labels and clean fittings. Remove unused materials from the site.

4 SELECTIONS

4.1 PVC-U WASTE, DISCHARGE AND VENT PIPES

Brand/type: Marley

4.2 EXPOSED PIPES AND TRAPS

Brand/type: Marley

4.3 FLOOR WASTES

Location:	Wet Area Tiled Shower
Manufacturer:	Tranquillity
Brand/type:	Channel drain / stainless steel
Grate/finish:	Tiled insert

7430 DRAINAGE

1 GENERAL

This section relates to the supply and laying of gravity foul water (sewage), stormwater and groundwater drainage.

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC B1/AS1	Structure
NZBC E1/AS1	Surface water
NZBC G13/AS2	Foul Water
NZBC G13/AS3	Plumbing and Drainage
AS/NZS 1254	PVC-U pipes and fittings for Stormwater and Surface Water applications
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of Polyethylene pipe systems
AS 2439.1	Perforated Plastics Drainage and Effluent Pipes and Fittings - Perforated drainage pipe and associated fittings
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
NZS 3104	Specification for concrete production
AS/NZS 3500.2:2003	Plumbing and drainage - Sanitary plumbing and drainage
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications

Plumbers, Gasfitters and Drainlayers Act 2006

1.2 AS BUILT DOCUMENTS

Supply a 1:100 scale as-built drawing of drains and fittings to the territorial authority and to the owner on completion.

1.3 QUALIFICATIONS

Drainlayers to be experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006.

2 PRODUCTS

2.1 CONCRETE

17.5 MPa prescribed mix to NZS 3104.

2.2 REINFORCEMENT

Plain round and/or deformed steel bars, Grade 300 to AS/NZS 4671.

2.3 PVC-U PIPES

PVC-U pipes bends, junctions, fittings and joints to AS/NZS 1254 and AS/NZS 1260.
Underground PVC-U pipe to be Classified as follows:

Classification	**Use**
SN4 - SN6	Domestic & light load areas
SN8 - SN10	Commercial & Industrial medium load areas
SN16	Public roads & high load areas

2.4 TRENCH BACKFILLING MATERIAL - NZBC G13/AS2 & NZBC E1/AS1

Bedding:	Clean granular non-cohesive material with a maximum particle size of 20 mm.
Bedding & surround:	Clean granular non-cohesive material with a maximum particle size of 20 mm.
Compacted selected fill:	Any Fine grain soil or granular material which is free from topsoil and rubbish and has a maximum particle size of 20 mm.
Ordinary fill:	Excavated material.
Concrete:	75 mm thick concrete pad.

3 EXECUTION

3.1 EXCAVATE

Excavate for drains to a firm even base with correct gradients set in straight runs.
Trenches running parallel, below and close to foundations of buildings to NZS 3604 or NZS 4229 to be separated to:

- NZBC E1/AS1, 3.9.7, **Proximity of Trench to Building**, for stormwater and subsoil drains.
- NZBC G13/AS2, 5.6, **Proximity of Trench to Building**, for foul water drains.

3.2 MANUFACTURER'S REQUIREMENTS

All drainage installations to the pipe and fitting manufacturer's requirements.

3.3 DRAINAGE GENERALLY - NZBC G13/AS2 & NZBC E1/AS1

Carry out drainage work and tests to NZBC G13/AS2 (foul water), NZBC E1/AS1 (stormwater). Lay uPVC pipe systems to relevant sections of AS/NZS 2032, NZS 2566.1 and AS/NZS 2566.2. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033 and NZS 2566.1.

3.4 LAY FOUL WATER DRAINS

Lay drains in straight runs to correct gradients, to discharge into the network utility operator's sewer. Set inspection fittings on a concrete base.

3.5 CONCRETE ENCASEMENT

Concrete encase shallow drains and drains under driveways, on a 100mm deep 17.5 MPa concrete bed reinforced with three 10mm mild steel bars. Surround pipes with a polythene membrane to allow movement and encase in 100mm 17.5 MPa concrete.

3.6 FIELD TEST

Field test drains for watertightness (PVC-U to AS/NZS 2032 or AS/NZS 2566. 2 Appendix N) to the satisfaction of the territorial authority inspector.

3.7 PLACING & COMPACTING TRENCH BACKFILLING MATERIAL

Granular bedding and selected fill shall be placed in layers no greater than 100 mm loose thickness and compacted. Base bedding (beneath the pipe) shall be placed and compacted before pipes are laid.

Up to 300mm above the pipe, compaction shall be by tamping by hand using a rod with a pad foot (having an area of 75 ± 25 mm by 75 ± 25 mm) over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing the drains.

More than 300 mm above the pipe, compaction shall be by at least four passes of a mechanical tamping foot compactor (whacker type) with a minimum weight of 75 kg.

4 SELECTIONS

4.1 PVC-U PIPES

Brand/type: Marley

7552W WARMUP FLOOR HEATING SYSTEMS

1 GENERAL

This section relates to the supply and installation of **Warmup New Zealand Ltd** electrical floor heating systems for domestic and commercial applications.
It includes:

- undertile heating
- thermostats and associated control systems and accessories

1.1 RELATED WORK

Refer to 6812W WARMUP WETROOM SYSTEMS for the supply and installation of interior tiled shower and wet areas tiling systems.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC G9/VM1	Electricity, 1.0 Electrical installations
AS/NZS 3350.1	Safety of household and similar electrical appliances - General requirements
AS/NZS 60335.1	Household and similar electrical appliances - Safety - General requirements
AS/NZS 60335.2.96	Household and similar electrical appliances - Safety - Particular requirements for flexible sheet heating elements for room heating.
NZS 6110	Electrical installations - floor and ceiling heating systems

Electricity (safety) Regulations 2010
New Zealand Electrical Codes of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Warmup™ Product Brochures
Warmup™ Undertile Installation Manual
Warmup™ Thermostat Installation and Operating Instructions
BRANZ Appraisal 644 - Warmup Undertile Heating

Manufacturer/supplier contact details

Company:	**Warmup New Zealand Ltd**
Web:	www.warmup.co.nz
Email:	info@warmup.co.nz
Telephone:	09 820 4001

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a Warmup™ manufacturer/supplier warranty:

Conditional lifetime: For Warmup™ Undertile

5 years:	For Warmup™ Undercarpet heaters
10 years:	For Warmup™ In-slab heating elements
5 years:	For Warmup™ floor heating controllers

- Provide this warranty on the Warmup™ New Zealand Ltd standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide a Warmup™ installer/applicator warranty:

Conditional lifetime: For Warmup™ Undertile

5 years:	For Warmup™ Undercarpet heaters
10 years:	For Warmup™ In-slab heating elements
5 years:	For Warmup™ floor heating controllers

- Provide this warranty on the Warmup™ New Zealand Ltd standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 QUALIFICATIONS - GENERAL

Installation to be performed by a registered electrician or a Warmup approved installer to Warmup recommendations.

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified Warmup™ systems, components and associated products listed in this section.

1.8 MANUFACTURERS DOCUMENTATION

Refer to Warmup New Zealand Ltd for all product information and installation instructions.

Performance

1.9 QUALITY ASSURANCE

Maintain quality necessary to assure that work is performed in accordance with this specification and qualifying requirements of Warmup New Zealand Ltd.

1.10 ELECTRICITY

Comply with Electricity (Safety) Regulations 2010, NZBC G9/VM1, New Zealand Electrical Codes of Practice, NZS 6110 and AS/NZS 60335.2.96.

2 PRODUCTS

Materials- floor heating products

2.1 UNDERTILE HEATING ELEMENTS

Warmup™ undertile heating elements, 2.4mm in diameter comprised of multi-stranded heating conductors, Teflon - fluro-polymer primary insulation, full knitted earth screen and PVC secondary insulation. Tested to AS/NZS 60335.1 and AS/NZS 60335.2.96. Available in a number of lengths, wattages and coverage. Refer to SELECTIONS for options.

Thermostats

2.2 THERMOSTAT - PROGRAMMABLE

Warmup™ TH115 with advanced temperature control, on/off switch, remote input, on-screen heating command indicator, temporary bypass and floor model with easy access floor sensor connector, backlit LCD and battery-free backup (air, floor or air with floor limitation).

3 EXECUTION

Conditions - general

3.1 GENERALLY

All work and materials to comply with Warmup New Zealand Ltd installation instructions.

3.2 CONFIRM LAYOUT

Before commencing work confirm the proposed location of heating cables/elements and controls.

3.3 CO-ORDINATE SERVICES

Co-ordinate and co-operate with other sub-trades to avoid any conflict with the installation of the system with other subcontractors work.

Application - general

3.4 PRELIMINARY WORK

Ensure all walls (where required) and floor penetrations are clearly marked.

3.5 CHECK SUBSTRATE

Ensure that substrate is level, not subject to movement, deflection and is structurally sound. Ensure all surfaces are clean dry and free from dust and dirt, oil and grease with no projection of sharp materials. Complete all remedial work before commencing installation.

Installation - under tile floor heating

3.6 FLOOR PREPARATION

Check floor has been cleaned and primed prior to the installation of the heating elements. All fixings such as door stops and floor mounted cabinetry to be clearly marked out on the floor.

3.7 INSTALL UNDERTILE HEATING

Install Warmup™ undertile heating in accordance with Warmup™ Undertile Installation Manual, and as follows:

- Chisel out channels for cold tail connections
- Clean and sweep floor
- Mark out element positions
- Spray adhesive to floor areas where the element will be looped
- Tape element down with Warmup fixing tape
- Band tape to hold the element at the correct centres
- Fix floor probe in place
- Test element and fit alarm monitor.

Ensure that as much of the floor area is covered in each of the zones shown on the plan / Warmup™ schedule.

Note: Warmup™ "Watchdog" audible alarm must be installed and remain turned on until tiling, grouting and all perimeters and movement joints are sealed. Electrical connection of heating controller must be carried out by registered electrician once tiling is completed.

3.8 COLD TAIL CONNECTIONS

Terminate all cold tails in a flush box mounted approximately 300 mm above F.F.L.

3.9 CONNECTION TO POWER SUPPLY

Connect from wall mounted flush box to power supply protected by an RCD. Refer to the appropriate electrical section for electrical connections of the undertile heating elements. All electrical connections to be carried out by a registered electrician.

3.10 TILING

After installation of Warmup™ heating elements the floor tiler is to install tiles using an approved flexible tile adhesive. Refer to the appropriate tiling section for installation of tiles, adhesives, grouting, movement joints, sealants and accessories.

3.11 TIMBER FLOORS

For timber overlay floors ensure:

- If a moisture test has not been carried out, turn off the underfloor heating 1 week prior to the test.
- Turn off underfloor heating during and for 48 hours either side of the flooring work period.
- Post flooring installation, turn on heating with thermostat set at 5°C and increase by 5°C increments daily, until desired maximum temperature is reached.
- Ensure the thermostat is fitted with a maximum temperature of 27°C.

Installation - thermostat controls

3.12 INSTALL THERMOSTAT SENSORS

Install thermostat sensors for each zone in accordance with the Warmup™ schedule. Install sensors within a conduit so they are easily replaced after completion. For a timber floor install the sensor higher than the heating cables / directly under the flooring.

3.13 TEST ALL ELEMENTS

Test all elements for continuity, resistance and insulation resistance prior installation of flooring, and after installation and prior to livening. Fill out the pre and post floor placement test result sheets and forward these results to the owner. It is recommended that all elements are tested at prewired stage of the installation.

3.14 TEST AND ACTIVATE ALL CONTROLS

Activate all thermostats and check for correct operation. Where programmable or intelligent thermostats are installed the correct day and time to be programmed in. Once these thermostats have been checked, leave in manual and off unless instructed otherwise.

3.15 CONNECTION TO POWER SUPPLY

Connect from wall mounted flush box to power supply protected by an RCD. Refer to the appropriate electrical section for electrical connections of thermostats. All electrical connections to be carried out by a registered electrician.

3.16 COMMISSION

Allow to commission the system fully to Warmup™ instructions.

Completion

3.17 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused materials and elements from the site.

3.18 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked components. Replace damaged or marked items where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

3.19 PROTECTION

Provide temporary protection of the finished work prior to tiling:

4 SELECTIONS

For further details on selections go to www.warmup.co.nz.
Substitutions are not permitted to the following, unless stated otherwise.

Under tile heating

4.1 WARMUP™ UNDER TILE HEATING ELEMENTS

Location:	BATHROOM
Brand/type:	Warmup™ Undertile Heating
Area:	UT800
Watts:	800
Coverage:	5.5m²
Substrate:	6mm Marmox insulation board over new 20mm JH fibre cement flooring

Thermostat controls

4.2 WARMUP™ THERMOSTAT - PROGRAMMABLE

Location:	BATHROOM
Brand:	Warmup™ TH115
Type:	

** APPENDIX

1 5312.3 Ferro - Leven St DesignIT cert
2 5312.3 Ferro -Leven St risk matrix
3 GIB Bracing installation manual
4 JAMES HARDIE -Secura-Interior-Installation-Manual-Feb-2013
5 Ardex superflex manual
6 ardexsuperflexinternalbranz472
7 Marmox Insulation board - Installation instructions - Timber floor_1
8 Marmox Shower_Tray_Sizes
9 Marmox Channel 1.5m x 1m traverse data sheet
10 Rinnai VT24 installation-guide
11 Rinnai VT24 operation-guide
12 Tranquiliity Channel Drain - Tile Insert_data sheet
13 Tranquillity Channel drain installation guide_14
14 Marshall Trade Seal install instructions Oct
15 Manrose thru roof extractor fan with cowl
16 Dektite data sheet
17 CS for doors - Spacemaker cavity slider +Installation+Instructions+A4

Design Certificate – Technical basis for structural design methodology contained in designIT for houses - New Zealand.

designIT for houses, New Zealand has been developed by experienced timber engineers to assist designers in selecting appropriate sizes of structural laminated veneer lumber products manufactured by Carter Holt Harvey (including hySPAN, hy90, hyONE and hyJOIST) and other generic stress grades of timber, to be used as structural elements for the construction of buildings that fall within the scope of NZS 3604.

The design methodology used for the software complies with the loading and general design requirements contained within AS/NZS 1170 and with timber structural design in accordance with NZS 3603:1993 including Amendment 4 (Verification method B1/VM1, 6.1).

designIT relies on the accurate input of span and loading information by the user. Where accurate inputs are submitted the product and/or stress grade and the size given will comply with the structural requirements of the New Zealand Building Code (NZBC), provided the installation is in accordance with the installation requirements provided by designIT and/or in product literature and/or NZS 3604, or specific engineering design, as appropriate.

Futurebuild LVL and Laserframe components, when used and treated to the required treatment levels prescribed in NZS 3602 and NZS 3604, as modified by Acceptable Solution B2/AS1, will comply with the requirements of the NZBC (Acceptable Solution B2/AS1, 3.2).

References:

AS 1720.1 – 2010 Timber structures. Part 1: Design methods.
NZS 3603:1993 Timber Structures Standard.
NZS 3604:2011 Timber-framed buildings.
NZS 3602:2003 Timber and Wood-based products for Use in Building
AS 1684.1 – 1999 Residential timber framed construction. Part 1: Design criteria.
AS/NZS 1170:2002 Structural design actions, Parts 0 and 1.
AS/NZS 1170:2011 Structural design actions, Part 2: Wind actions.
AS/NZS 1170:2003 Structural design actions, Part 3: Snow and ice actions.

This Design Certificate, and any associated warranty/certification, is void where there has been substitution of alternate products not detailed within the Member Specification.

Version date: 20 June 2016

For further information or advice please contact: Carter Holt Harvey Woodproducts New Zealand
173 Captain Springs Road, Onehunga. Auckland
Telephone 0800 808 131
Facsimile 0800 808 132
Email: designit@chhwoodproducts.co.nz

Specifier details:

Specifier:	Katipo 2	
Business name:	Katipo design	
Address:	1 Dowling Street	
Email:	stu@katipodesign.co.nz	
Phone: 03 477 0462	**Mobile:** 021 294 7430	**Facsimile:**

Project & Site details:

Project:	Leven Street Alterations	**Ref. no.:** 5312.3
At (address):	44 Leven Street Dunedin	
For (owner/s):	Paul & Nicky Ferro	
Wind zone:	Medium	
Snow loading	Snow Region: N5, Altitude: 175 m (sub-alpine), Ground snow load, Sg [1,2] = 0.9 kPa	

1. designIT does not include any allowance for the effects of drifting and sliding of snow.
2. Snow loads are applied to roofed over structures only, the design of exposed floors/decks are not covered by designIT.

MEMBER DESIGN DETAILS

Member 1

1) Member code and description CB1 - Counter beams supporting hanging beams

2) Date prepared 31/05/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span	4.0 m
Ceiling load width 'CLW'	4.1 m
Mass of ceiling	20 kg/m²

5) Member specification

Size, stress grade/product	Use 240 x 63 hySPAN
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G+\psi_L Q$ *	13.3 mm	5.2 mm (long term)	$\frac{13.3}{5.2} = 2.56$
*Critical serviceability load case			

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit states design reaction[2,3] End[4] kN
1.35G	0.60	-2.3
1.2G + 1.5Q	0.80	-3.9
1.2G + W_U + $\Psi_C Q$	1.00	-5.1
0.9G + W_U	1.00	-1.6

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports
Chamfer allowed - see Detail H7

Member 2

1) Member code and description CB2 - Counter beams supporting hanging beams

2) Date prepared 31/05/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span	4.0 m
Ceiling load width 'CLW'	2.8 m
Mass of ceiling	20 kg/m²

5) Member specification

Size, stress grade/product	Use 200 x 63 hySPAN
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G+\psi_L Q$ *	13.3 mm	6.3 mm (long term)	$\frac{13.3}{6.3} = 2.11$
*Critical serviceability load case			

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1 [1]	Limit states design reaction [2,3] End [4] kN
1.35G	0.60	-1.6
1.2G + 1.5Q	0.80	-3.4
1.2G + W_U + Ψ_CQ	1.00	-3.6
0.9G + W_U	1.00	-1.1

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports
Chamfer allowed - see Detail H7

Member 3

1) Member code and description R1 - Common rafters

2) Date prepared 7/06/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span	4.1 m - single
Maximum rafter spacing	450 mm
Roof mass	30 kg/m²
Lateral restraint condition	Bottom edge restrained by ceiling / ceiling battens at 600 crs max.
Roof snow load	0.6 kPa (μ_i=0.7, C_e=1.0)

5) Member specification

Size, stress grade/product	Use 190 x 45 SG8 Laserframe
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m³

6) Serviceability

Load case	Limit [3] on average deflection [2]	Estimated average deflection [2]	Rigidity ratio [4]
Long term load - G+ψ_LQ *	13.7 mm	6.3 mm (long term)	$\frac{13.7}{6.3}$ = 2.17
*Critical serviceability load case			

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1 [1]	Limit states design reaction [2,3] End [4] kN
1.35G	0.60	-0.5
1.2G + 1.5Q	0.80	-2.2
1.2G + S_U + Ψ_CQ	0.80	-1.1
1.2G + W_U + Ψ_CQ	1.00	-0.9
0.9G + W_U	1.00	0.5

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements Minimum bearing - end supports, 30 mm.

Member 4

1) Member code and description L1 - Lintels - In single or upper storey load bearing walls

2) Date prepared 8/06/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span	1.6 m
Roof load width 'RLW'	2.1 m
Roof type and mass	Light roof & ceiling - 40 kg/m²
Roof snow load	0.6 kPa, snow overhang 0.1 kN/m (μ_i=0.7, C_e=1.0, k = 0.5)

5) Member specification

Size, stress grade/product	Use 2/140 x 45 SG8 Laserframe
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m³

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G+\psi_L Q$ *	5.3 mm	1.6 mm (long term)	$\frac{5.3}{1.6}$ = 3.38
*Critical serviceability load case			

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit states design reaction[2,3] End[4] kN
1.35G	0.60	-1.4
1.2G + 1.5Q	0.80	-3.0
1.2G + S_U + Ψ_CQ	0.80	-2.9
1.2G + W_U + Ψ_CQ	1.00	-2.4
0.9G + W_U	1.00	1.3

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements Provide at least 30 mm bearing at end supports
Nail lamination required - refer AS 1684

Member 5

1) Member code and description L2 - Lintels - In single or upper storey load bearing walls

2) Date prepared 8/06/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span	1.8 m
Roof load width 'RLW'	2.1 m
Roof type and mass	Light roof & ceiling - 40 kg/m²
Roof snow load	0.6 kPa, snow overhang 0.1 kN/m (μ_i=0.7, C_e=1.0, k = 0.5)

5) Member specification

Size, stress grade/product	Use 2/140 x 45 SG8 Laserframe
Material type	Dry softwood, machine stress graded and verified (NZS 3622)

Assumed design density < 480 kg/m³

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G+\psi_L Q$ *	6.0 mm	2.3 mm (long term)	$\frac{6.0}{2.3} = 2.65$
*Critical serviceability load case			

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit states design reaction[2,3] End[4] kN
1.35G	0.60	-1.6
1.2G + 1.5Q	0.80	-3.4
1.2G + S_U + $\Psi_C Q$	0.80	-3.2
1.2G + W_U + $\Psi_C Q$	1.00	-2.7
0.9G + W_U	1.00	1.5

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports
Nail lamination required - refer AS 1684

Member 6

1) Member code and description L3 - Lintels - In single or upper storey load bearing walls

2) Date prepared 8/06/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 0.9 m
Roof load width 'RLW' 3.2 m
Roof type and mass Light roof & ceiling - 40 kg/m²
Roof snow load 0.6 kPa, snow overhang 0.1 kN/m (μ_i=0.7, C_e=1.0, k = 0.5)

5) Member specification

Size, stress grade/product Use 2/90 x 45 SG8 Laserframe
Material type Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density < 480 kg/m³

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G+\psi_L Q$ *	3.0 mm	1.4 mm (long term)	$\frac{3.0}{1.4} = 2.15$
*Critical serviceability load case			

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit states design reaction[2,3] End[4] kN

1.35G	0.60	-1.8
1.2G + 1.5Q	0.80	-4.5
1.2G + S_U + Ψ_CQ	0.80	-3.7
1.2G + W_U + Ψ_CQ	1.00	-3.1
0.9G + W_U	1.00	1.8

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports
Nail lamination required - refer AS 1684

Member 7

1) Member code and description

L4 - Lintels - In single or upper storey load bearing walls

2) Date prepared

8/06/2016

3) Serviceability criteria

AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span	1.7 m
Roof load width 'RLW'	3.2 m
Roof type and mass	Light roof & ceiling - 40 kg/m²
Roof snow load	0.6 kPa, snow overhang 0.1 kN/m (μ_i=0.7, C_e=1.0, k = 0.5)

5) Member specification

Size, stress grade/product	Use 2/140 x 45 SG8 Laserframe
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m³

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - G+ψ_LQ *	5.7 mm	2.8 mm (long term)	$\frac{5.7}{2.8}$ = 2.00
*Critical serviceability load case			

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

		Limit states design reaction [2,3]
Load case	**k_1[1]**	**End[4] kN**
1.35G	0.60	-2.2
1.2G + 1.5Q	0.80	-4.1
1.2G + S_U + Ψ_CQ	0.80	-4.6
1.2G + W_U + Ψ_CQ	1.00	-3.8
0.9G + W_U	1.00	2.1

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports
Nail lamination required - refer AS 1684

Member 8

1) Member code and description

L5 - Lintels - In single or upper storey load bearing walls

2) Date prepared 8/06/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span	1.8 m
Roof load width 'RLW'	3.2 m
Roof type and mass	Light roof & ceiling - 40 kg/m²
Roof snow load	0.6 kPa, snow overhang 0.1 kN/m (μ_i=0.7, C_e=1.0, k = 0.5)

5) Member specification

Size, stress grade/product	Use 2/140 x 45 SG8 Laserframe
Material type	Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density	< 480 kg/m³

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Long term load - $G+\psi_L Q$ *	6.0 mm	3.4 mm (long term)	$\frac{6.0}{3.4} = 1.78$
*Critical serviceability load case			

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1[1]	Limit states design reaction[2,3] End[4] kN
1.35G	0.60	-2.4
1.2G + 1.5Q	0.80	-4.3
1.2G + S_U + Ψ_CQ	0.80	-4.8
1.2G + W_U + Ψ_CQ	1.00	-4.0
0.9G + W_U	1.00	2.2

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements Provide at least 30 mm bearing at end supports
Nail lamination required - refer AS 1684

Notes for interpretation of serviceability data

1. "average deflection" is an engineering concept based upon a notional estimated load, notional member rigidity and, in some cases, an approximate model of material response to environmental conditions. These parameters are, 'standardised' in AS/NZS 1170, AS 1684.1 and AS 1720. Deflections calculated using this methodology cannot therefore be usefully compared with deflections calculated using other methods, eg GLTAA design methodology.
2. Deflection is the flexural response to load – 'out-of-level' measurements of installations are not necessarily deflections and can incorporate 'initial out-of-straightness', whether intended or not. Furthermore, loads can be higher/lower than the notional estimate and in any comparison with measured levels, material variability needs to also be considered. AS 1720 gives the following basis for estimation of upper bound deflections for various materials.

No 1 Framing – visually graded to NZS 3631	Average + 100%
SG grades - mechanically graded to AS/NZS 1748	Average + 43%
GL grades for glulam to AS/NZS 1328	Average + 33%
LVL to AS/NZS 4357 (includes hySPAN and hyJOIST)	Average +18%

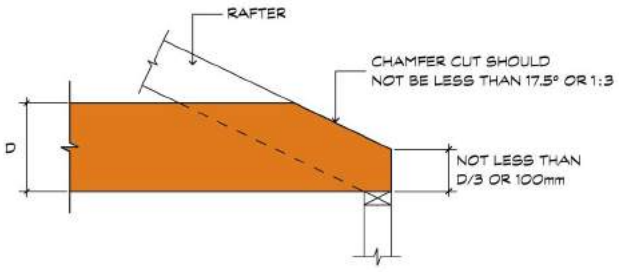
As can be seen, comparison of the 'average deflection' for different materials, even if calculated on the same basis, does not give the whole picture!

3. The limits referred are those specified in AS 1684.1 for the stated load case.
4. 'Rigidity ratio' expresses the rigidity of the specified beam relative to the rigidity of a notional beam just meeting the serviceability requirements of AS 1684.1

Notes for interpretation of reaction data

1. Duration of load factor 'k_1' for strength as per NZ 3603:1993
2. Negative (-) reactions relate to the 'gravity' or 'downwards' force on the support
3. Positive reactions relate to the 'upwards' forces or 'tie-down' requirement on the support
4. End reaction includes allowance for overhang/cantilever where one has been designed

Chamfer of hySPAN at supports



DETAIL H7

The above chamfer detail may be used for counter beams, hanging beams and strutting beams sized using designIT.

Risk Matrix Calculation

to E2 / AS1 Building Envelope Risk Matrix

Project:	**Ferro Alterations**
Location:	**44 Leven St, Roslyn, Dunedin**
Wind Zone:	**MEDIUM**

Part of Building	Northern Wall	
Risk Factor	**Risk severity**	**Score**
Wind Zone	**MEDIUM**	**0**
Number of storeys	**LOW**	**0**
Roof/wall intersection design	**MEDIUM**	**1**
Eaves width	**V.HIGH**	**5**
Envelope complexity	**LOW**	**0**
Deck design	**LOW**	**0**
Total risk score	**Northern Wall**	**6**

Part of Building	Eastern Wall	
Risk Factor	**Risk severity**	**Score**
Wind Zone	**MEDIUM**	**0**
Number of storeys	**LOW**	**0**
Roof/wall intersection design	**MEDIUM**	**1**
Eaves width	**V.HIGH**	**2**
Envelope complexity	**LOW**	**0**
Deck design	**LOW**	**0**
Total risk score	**Eastern Wall**	**3**

Part of Building	Southern Wall	
Risk Factor	**Risk severity**	**Score**
Wind Zone	**MEDIUM**	**0**
Number of storeys	**LOW**	**0**
Roof/wall intersection design	**MEDIUM**	**1**
Eaves width	**V.HIGH**	**5**
Envelope complexity	**LOW**	**0**
Deck design	**LOW**	**0**
Total risk score	**Southern Wall**	**6**

Part of Building	Western Wall	
Risk Factor	**Risk severity**	**Score**
Wind Zone	**MEDIUM**	**0**
Number of storeys	**LOW**	**0**
Roof/wall intersection design	**MEDIUM**	**1**
Eaves width	**V.HIGH**	**5**
Envelope complexity	**LOW**	**0**
Deck design	**LOW**	**0**
Total risk score	**Western Wall**	**6**

Suitable Claddings

Direct fixed rusticated weatherboards

CBI 5113.
June 2011.

GIB EzyBrace® Systems

Kemp House

www.gib.co.nz

GIB®

Ceiling Diaphragms

Battens

Ceiling diaphragms may be constructed using steel or timber ceiling battens.

Battens shall be spaced at a maximum of:
- 500mm for 10mm GIB® Plasterboard
- 600mm for 13mm GIB® Plasterboard

Timber battens shall be fixed in accordance with the requirements of NZS 3604:2011.

Steel battens shall be GIB® Rondo® battens or similar with a minimum base metal thickness (BMT) of 0.55mm with two external flanges of 8mm to allow direct screw fixing to roof framing.

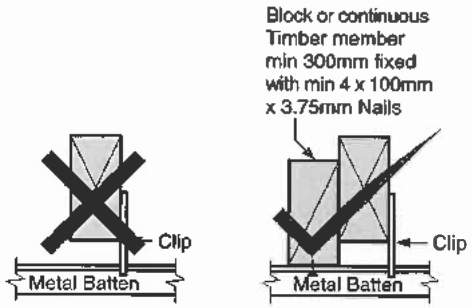
Steel battens shall be fixed with 2/32mm x 8g GIB® Grabber® wafer head self tapping screws to supporting framing.

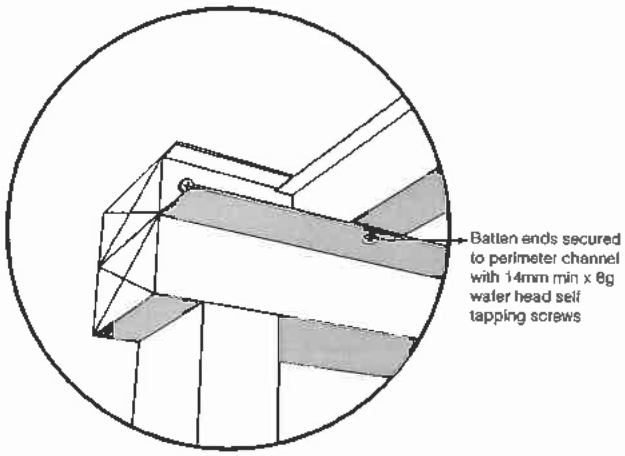
Steel battens must be fixed directly to the roof framing. If a clip system has been used, a timber block (min 300mm) or a continuous timber member can be fixed alongside the bottom chord to permit a direct connection to the batten.

For steel battens a steel channel or metal angle is required at the perimeter of the diaphragm. The perimeter channel shall be fastened to the top plate with 32mm x 8g GIB® Grabber® wafer head self tapping screws at 300mm centres maximum.

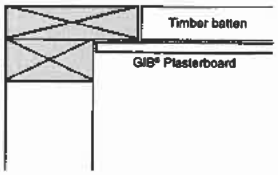
The linings are fastened to the perimeter channel in case (a) with 25mm x 6g self tapping screws at 150mm centres and in case (b) to the 140mm x 35mm top plate with 32mm x 6g GIB® Grabber® high thread screws at 150mm centres. Within the diaphragm area sheets may be fastened as described in 'General Fixing Requirements for GIB® Ceiling Diaphragms'.

Perimeter fastenings shall be spaced at:
- 150mm for ceiling diaphragms up to 7.5m and not steeper than 15 degrees
- 100mm for ceiling diaphragms 7.5m–12m or steeper than 15 degrees

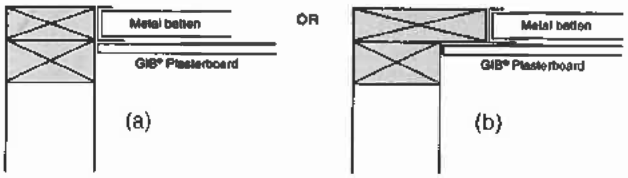




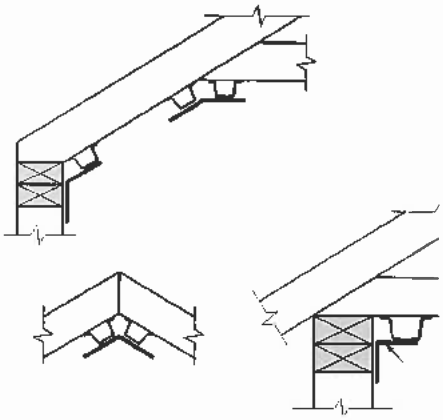
Timber battens example



Steel battens with perimeter channel example



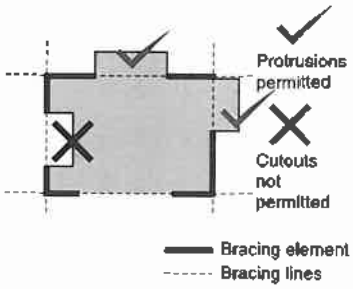
Coved ceiling diaphragms can be achieved by attaching a folded metal angle to the junction. The metal angle shall be;
- min 0.55mm BMT
- fastened at 300mm centres on each edge using 30mm GIB® Nails or 32mm x 8g GIB® Grabber® wafer head self tapping screws or similar to the roof framing.
- linings are fastened to the folded angle as specified for the perimeter at 150mm centres with 25mm x 6g self tapping screws.

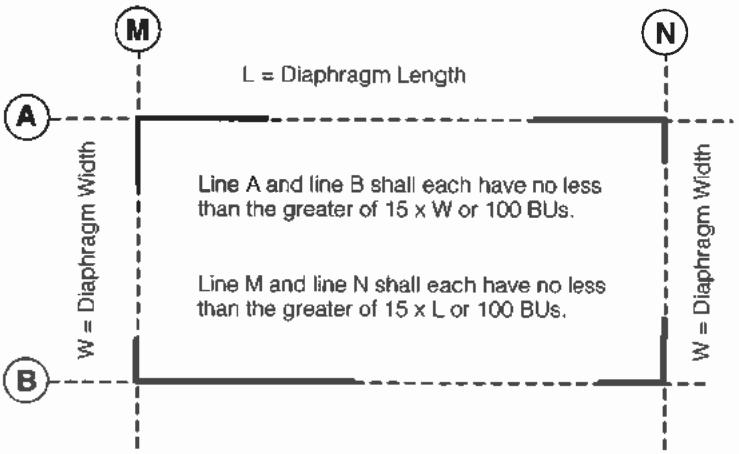


Ceiling Diaphragms

JUNE 2011

GIB® Ceiling Diaphragms are stiff and strong horizontal bracing elements which effectively transfer loads to bracing walls. They themselves do not have a bracing unit rating but are used when bracing lines exceed 6m separation. The basic shape of a ceiling diaphragm is square or rectangular. Protrusions are permitted but cut-outs are not. The length of a ceiling diaphragm shall not exceed twice its width. Dimensions are measured between supporting bracing lines. Supporting bracing lines shall have a bracing capacity no less than the greater of 100 bracing units or 15 bracing units per metre of diaphragm dimension, measured at right angles to the line being considered, as illustrated.





Limitations for GIB® plasterboard ceiling diaphragms

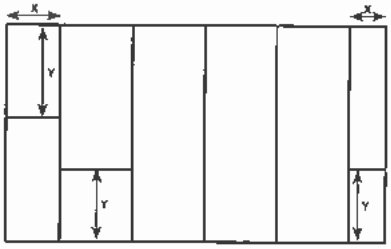
GIB® plasterboard ceiling diaphragms may be constructed as follows:

- For diaphragms not steeper than 15° and not exceeding 7.5m in length, any GIB® plasterboard may be used provided perimeter fixing is at 150mm centres
- For diaphragms not steeper than 45° and not exceeding 7.5m in length and for diaphragms not steeper than 25° and not exceeding 12m in length, any GIB® plasterboard may be used provided perimeter fixing is at 100mm centres

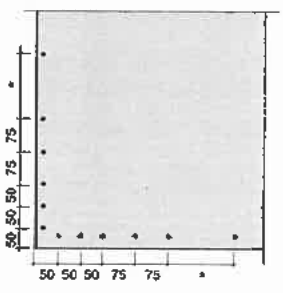
Otherwise construction is in accordance with the general fixing requirements for GIB® ceiling diaphragms outlined below.

General Fixing Requirements for GIB® Ceiling Diaphragms

- Linings shall be installed over the entire area of the diaphragm.
- Fastening shall be no less than 12mm from sheet edges and not less than 18mm from sheet end.
- Sheets shall be supported by framing members (e.g., ceiling battens) spaced at no more than 500mm centres for 10mm GIB® Plasterboard and at no more than 600mm centres for 13mm GIB® Plasterboard.
- Sheets within the diaphragm area may be fastened and finished conventionally in accordance with the publication entitled, "GIB® Site Guide". All joints shall be paper tape reinforced and stopped. It is recommended that sheet butt joints are formed off framing and back-blocked (see "GIB® Site Guide").
- Use full width sheets where possible. At least 900mm wide sheets with a length not less than 1800mm shall be used. Sheets less than 900mm wide but no less than 600mm may be used provided all joints with adjacent sheets are back-blocked (see "GIB® Site Guide").
- Openings are allowed within the middle third of the diaphragm's length and width. Fixing of sheet material to opening trimmers shall be at 150mm centres. Neither opening dimension shall exceed a third of the diaphragm width. Larger openings, or openings in other locations, require specific engineering design. Refer "Openings in Bracing Elements" page 17.
- Fasteners are placed at 150mm or 100mm centres around the ceiling diaphragm with the corners fastened using the GIB EzyBrace® 2011 fastener pattern.



Sheet Widths and Lengths in Ceiling Diaphragms



Fastening pattern for ceiling diaphragms

*** Perimeter centres at 150mm or 100mm depending on diaphragm limitations above**

GIB® Plasterboard Linings

When fixing part sheets of GIB® Plasterboard, a minimum width of 300mm applies for bracing elements. Horizontal fixing is recommended. If fixing vertically, full height sheets shall be used where possible. Where sheet end butt joints are unavoidable they must be formed over nogs or over the studs and fastened at 200mm centres. Alternatively, and preferably, the sheet end butt joints may be back-blocked.

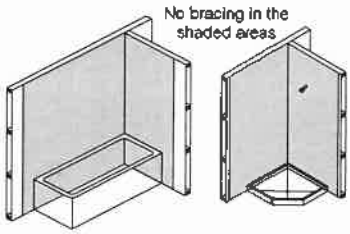
Plasterboard bracing element sheets must be fixed directly to the wall framing, eg bracing must be provided by the inner layer of a multilayer system. When a GIB® bracing element has been designated for a section of wall, BU ratings can not be increased by incorporating additional proprietary bracing elements within that same section of wall.

Limitations

GIB® Plasterboard must be stacked flat and protected from the weather. GIB® Plasterboard must be handled as a finishing material. GIB® Plasterboard in use must not be exposed to liquid water or be installed in situations where extended exposure to humidities above 90% RH can reasonably be expected. GIB EzyBrace® Systems must not be used in showers or behind baths. It is highly recommended not to install GIB® Plasterboard in any situation where external claddings are not in place or the property is not adequately protected from the elements. If GIB® Plasterboard is installed under these conditions, the risk of surface defects such as joint peaking or cracking is greatly increased.

GIB EzyBrace® Systems in Water-Splash Areas

When GIB® Plasterboard is installed in locations likely to be frequently exposed to liquid water it must have an impervious finish. Examples are adhesive fixed acrylic shower linings or ceramic tiles over an approved waterproof membrane over GIB Aqualine®. The NZBC requires 15 years durability in these situations. Bracing elements are required to have a durability of 50 years. Bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members. Otherwise GIB EzyBrace® Systems can be used in water-splash areas as defined by NZBC Clause E3, provided these are maintained impervious for the life of the building.

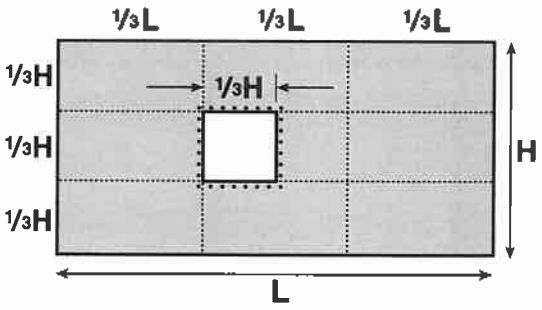


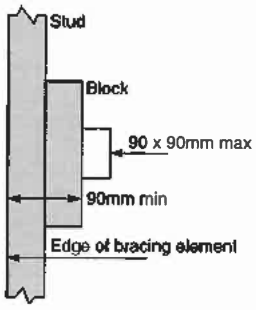
Renovation

When relining walls during the process of renovation, ensure that bracing elements are reinstated (check the building plans).

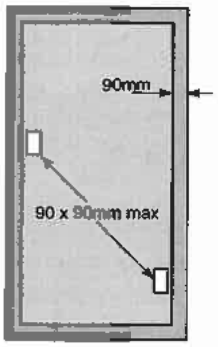
Openings in Bracing Elements

Openings are allowed within the middle third of a wall bracing element's length and height. Neither opening dimension shall be more than one third of the element height. Wall linings are fixed to opening trimmers at 150mm centres. Small openings (e.g., power outlets) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the braced element. A block may need to be provided alongside the perimeter stud as shown below.





Small opening e.g. switch box



Framing

General framing requirements such as grade, spacings and installation shall comply with the New Zealand Building Code and the provisions of NZS 3604:2011. To achieve the published bracing performance the minimum actual framing dimensions are 90 x 35mm for external walls and 70 x 45mm for internal walls. Wall bracing tests on GIB EzyBrace® Systems were undertaken without nogs. Nogs are not considered to add to the bracing performance of the wall.

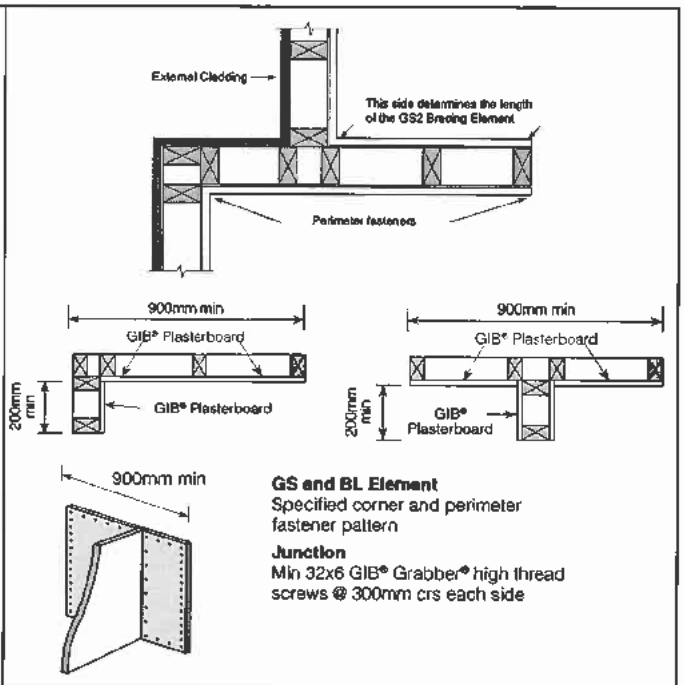
Guidelines for intersection walls

Where the lining on a double lined internal GS2 Bracing Element is shorter on one side, the length of the element is taken as the shorter wall length but bracing fasteners can still follow the wall perimeter on both sides.

GIB® Bracing Elements may have intersecting walls with a minimum length of 200mm. Fasteners are required around the perimeter of the bracing element. Vertical joints at T-junctions shall be fixed and jointed as specified for intermediate sheet joints. **The bracing element length must be no less than 900mm.**

Where a Wall Bracing Element is interrupted by a T or L junction the element is deemed to be continuous for the whole length (900mm in the example illustrated).

When fixing part sheets of GIB® Plasterboard, a minimum width of 300mm applies for bracing elements.



GS and BL Element
Specified corner and perimeter fastener pattern

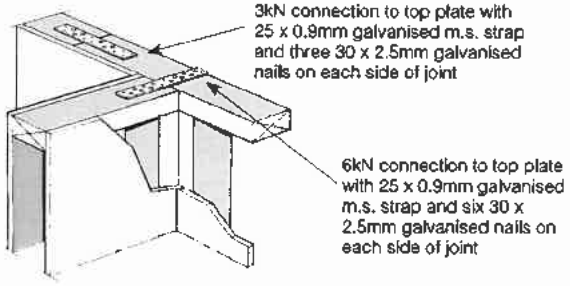
Junction
Min 32x6 GIB® Grabber® high thread screws @ 300mm crs each side

Top Plate Connections

The top plate of a wall that contains one or more wall bracing elements shall be jointed according to the rating of the highest-rated individual wall bracing element as follows:

(a) Rating not exceeding 100 bracing units: A 3kN connection as shown or by an alternative fixing of 3kN capacity in tension or compression along the plate;

(b) Rating exceeding 100 bracing units: A 6kN connection as shown or by an alternative fixing of 6kN capacity tension or compression along the plate.



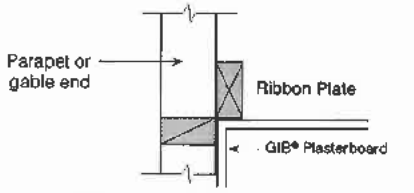
Parapets and Gable End Walls

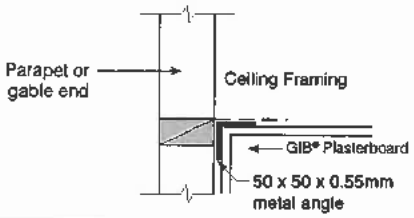
Bracing elements must be fixed from top plate to bottom plate. Fixing to a row of nogs is not acceptable unless either:

A continuous member such as an ex 90x45mm ribbon plate is fixed across the studs just above a row of nogs at the ceiling line.

OR

A minimum 50x50x0.55mm metal angle is installed as shown. The angle is fixed to a row of nogs with 30x2.5mm galv FH nails at 300mm centres.





Bottom Plate Fixing

JUNE 2011

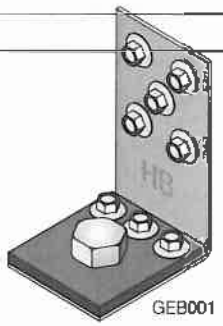
Bottom plate fixings for GIB® Bracing Elements			
Brace type	**Concrete slabs**		**Timber floors**
	External wall	**Internal wall**	**External and internal walls**
GS1-N	As per NZS 3604:2011. No specific additional fastening required	As per NZS 3604:2011. Alternatively use 75 x 3.8mm shot-fired fasteners with 16mm washers, 150mm and 300mm from each end of the bracing element and at 600mm thereafter.	Pairs of 100 x 3.75mm flat head hand driven nails or 3 / 90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011
GS2-N	Not applicable		
GSP-H BL1-H BLP-H	Intermediate fastenings to comply with NZS 3604:2011. In addition: GIB Handibrac® fixings or metal wrap-around strap fixings and bolt as illustrated on pages 19 and 20.		Pairs of 100 x 3.75mm flat head hand driven nails or 3 / 90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011. In addition: GIB Handibrac® fixings or metal wrap-around strap fixings and bolt as illustrated below.
BLG-H	Not applicable	As for GSP-N, BL1-H, BLP-H on concrete slab above	

Panel Hold-down Details

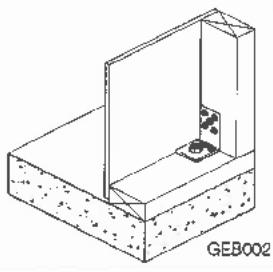
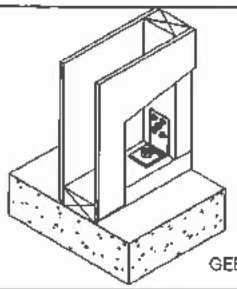
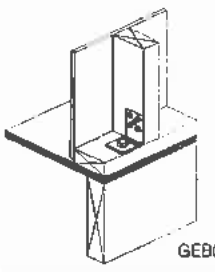
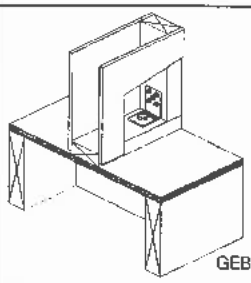
GIB HandiBrac® – RECOMMENDED METHOD

Developed in conjunction with MiTek™ NZ, the GIB HandiBrac® has been designed and tested for use as a hold-down in GIB® BL and GSP bracing elements.

- The GIB HandiBrac® registered design provides for quick and easy installation
- The GIB HandiBrac® provides a flush surface for the wall linings because it is fitted inside the framing. There is no need to check in the framing as recommended with conventional straps
- The GIB HandiBrac® is suitable for both new and retrofit construction
- The design also allows for installation and inspection at any stage prior to fitting internal linings



GEB001

Concrete Floor		Timber Floor	
External walls	**Internal walls**	**External walls**	**Internal walls**
 GEB002	 GEB003	 GEB004	 GEB005
Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate	Position GIB HandiBrac® at the stud / plate junction	Position GIB HandiBrac® in the centre of the perimeter joist or bearer	Position GIB HandiBrac® in the centre of floor joist or full depth solid block
Hold-down fastener requirements			
A mechanical fastening with a minimum characteristic uplift capacity of 15kN.		12x150mm galvanised coach screw	

Refer to gib.co.nz/cad for CAD details.

Panel Hold-down Details

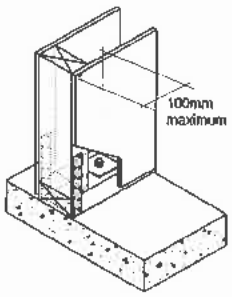
JUNE 2011

Bracing strap installation

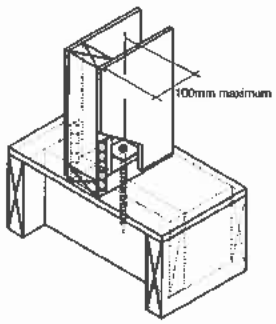
Care needs to be taken with the installation of the bracing strap. It should be checked in to be flush with the face of the stud providing a flat substrate for the plasterboard. It should be positioned in such a way that the important corner fastenings of the bracing element are not affected by it. Keeping the strap to the edge of the end stud as shown will allow the important corner fastenings to be installed without having to penetrate the bracing strap.

Concrete Floor	Timber Floor
400 x 25 x 0.9mm galvanised strap to pass under the plate and up the other side of the stud. Six 30x2.5mm flat head galvanised nails to each side of the stud. Three 30x2.5mm flat head galvanised nails to each side of the plate. Hold down bolt to be fitted within 100mm of the end of the element.	

Internal wall

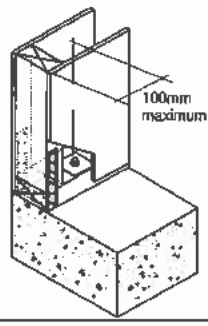


GEB006

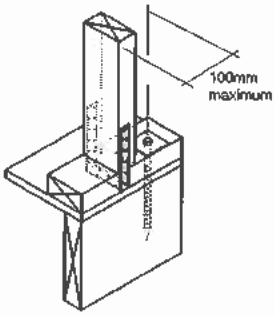


GEB007

External wall



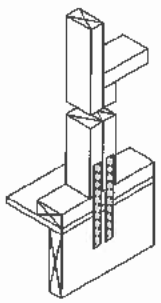
GEB008



GEB009

NB: where applicable drawings have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box that can be found at the web address gib.co.nz/cad

2/300 x 25 x 0.9mm galvanised straps with six 30 x 2.5mm flat head galvanised nails to each stud and into the floor joist and three nails to the plate. Block to nog fixed with 3/100 x 3.75mm nails to stud.



GEB010

Hold-down fastener requirements

Concrete floor	Timber floor
A mechanical fastening with a minimum characteristic uplift capacity of 15kN fitted with a 50x50x3mm square washer within 100mm of the ends of the bracing element.	12x150mm galvanised coach screw fitted with a 50x50x3mm square washer within 100mm of the ends of the bracing element

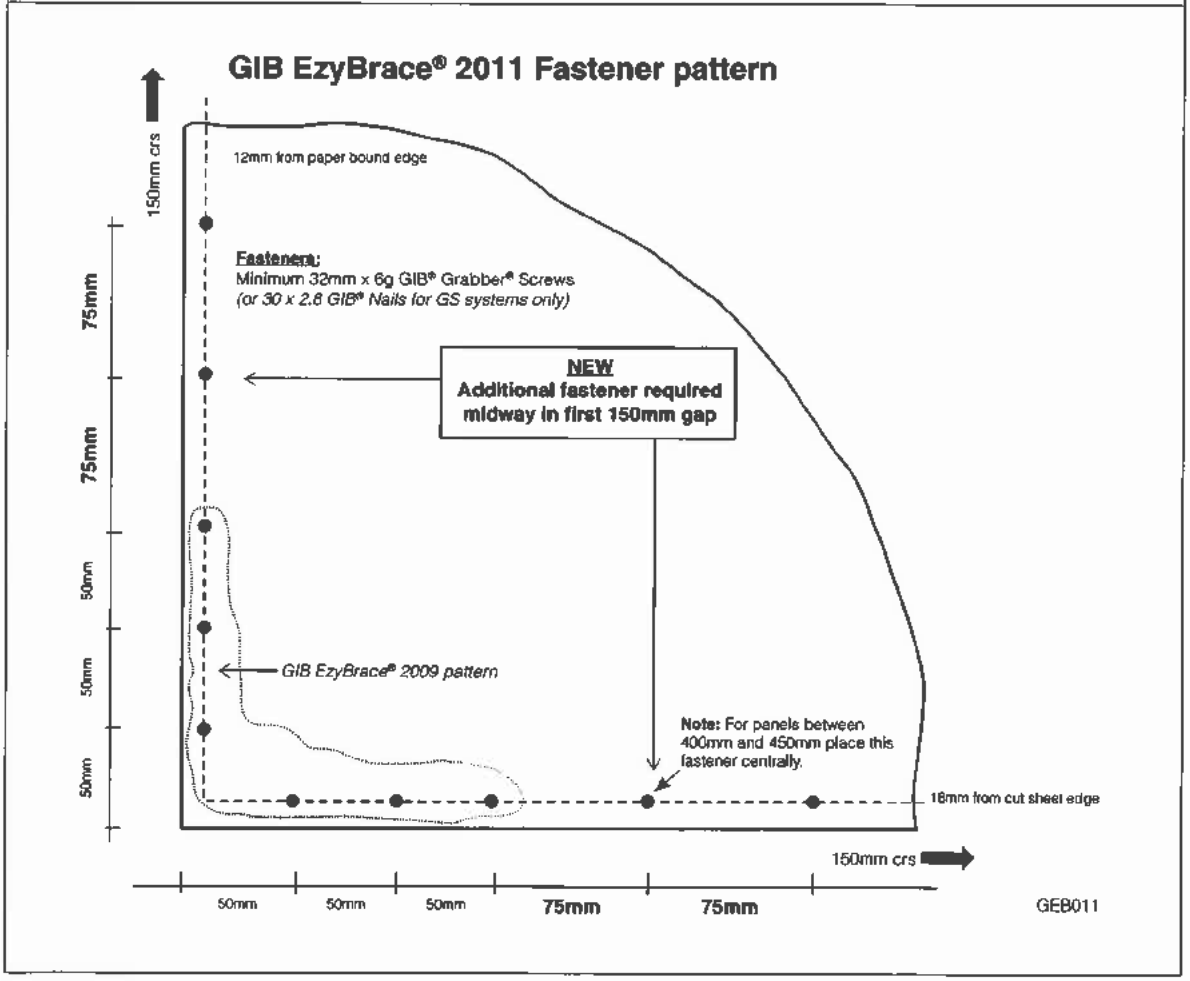
Refer to gib.co.nz/cad for CAD details.

Construction Details

JUNE 2011

Revised Fastener Pattern for *all four corners* of GIB EzyBrace® Elements

As GIB Braceline® screws are no longer required for BL bracing elements, two additional fasteners must be installed in ***all four corners*** of GIB EzyBrace® GS and BL elements, as shown.
Fasteners must be placed no closer than 12mm from the paper bound sheet edge and no closer than 18mm from sheet ends or cut edges.



Refer to gib.co.nz/cad for CAD details.

PERMITTED GIB® PLASTERBOARD SUBSTITUTIONS IN GIB EZYBRACE® SYSTEMS

GIB Ezybrace® Systems have been designed and tested using only the products specified. Occasionally additional properties may be required to be provided by a different GIB® Plasterboard product. The following table provides acceptable substitution options.

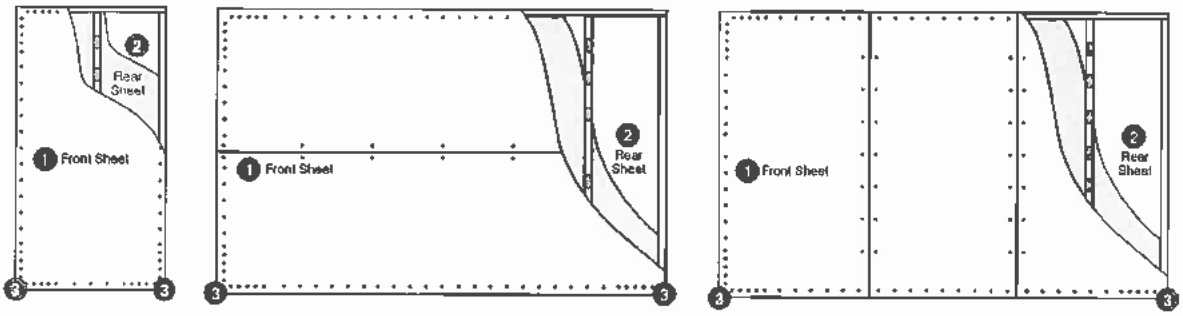
Specified	Permitted alternative GIB® Plasterboard products								
	GIB® Standard	GIB Ultraline®	GIB Braceline/ Noiseline®	GIB Aqualine®	GIB Toughline®	GIB Fyreline®			
						10mm	13mm	16mm	19mm
GIB® Standard		OK	OK	OK	OK	OK	NOTE 2		
GIB Braceline®	X	X		NOTE 1	OK	X	NOTES 1 and 2		

NOTE 1 The element must be 900mm or longer. Use 32mm x 6g GIB® Grabber® drywall screws at ***100mm*** centres to the perimeter of the bracing element. The bracing corner fastening pattern, as illustrated above, applies to all four corners of the element. Panel hold-down fixings are required.

NOTE 2 The fastener type and length must be as required for the relevant FRR system but the fixing pattern must be as shown above.

Construction Details

JUNE 2011



System	Lining one side ❶		Lining opposite side ❷		Panel Hold-Down Fixings ❸	Fastener spacing
	Lining	Fasteners	Lining	Fasteners		
GS1-N	Any 10mm or 13mm GIB® Plasterboard	30mm GIB® nails, or minimum 32mm x 6g GIB® Grabber® high thread screws	Not required	Not required	Not required	*GIB® Plasterboard* Corner fastening pattern as illustrated above Fasteners at 150mm to bracing element perimeter, and: • at 300mm centres to intermediate sheet joints for vertical fixing, or • at stud / sheet junction for horizontally fixed elements, and • GIBFix adhesive daubs at 300mm crs to intermediate framing *Plywood* Fasteners at 150mm around the perimeter of every sheet and at 300mm centres to intermediate studs. Place fasteners no closer than 7mm from sheet edges. Plasterboard corner fastener pattern does not apply to plywood.
GS2-N			Any 10mm or 13mm GIB® Plasterboard	30mm GIB® nails, or minimum 32mm x 6g GIB® Grabber® high thread screws		
GSP-H			Minimum 7mm Ecoply manufactured to AS/NZS 2269	50mm x 2.8mm Flat head galvanised or stainless steel nails	Yes, see Pages 19 and 20	
BL1-H	10mm or 13mm GIB Braceline®	minimum 32mm x 6g GIB® Grabber® high thread screws GIB Braceline® Nails may be used for 10mm GIB Braceline® ONLY	Not required	Not required		
BLG-H			Any 10mm or 13mm GIB® Plasterboard	30mm GIB® nails, or minimum 32mm x 6g GIB® Grabber® high thread screws		
BLP-H			Minimum 7mm Ecoply manufactured to AS/NZS 2269	50mm x 2.8mm flat head galvanised or stainless steel nails		

GIB EzyBrace® System Specification – GS1-N

JUNE 2011

Specification Code	Minimum Length (m)	Lining requirement
GS1-N	0.4	Any 10mm or 13mm GIB® Standard Plasterboard to one side only

WALL FRAMING

Wall framing to comply with;

- NZBC B1 - Structure; AS1 Clause 3 Timber (NZS 3604:2011)
- NZBC B2 - Durability AS1 Clause 3.2 Timber (NZS 3602)

Framing dimensions and height as determined by NZS 3604 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber Floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or

Three power driven 90 x 3.15 nails at 600mm centres.

Concrete floor

INTERNAL WALL BRACING LINES

In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and 600mm centres thereafter.

EXTERNAL WALL BRACING LINES

In accordance with the requirements of NZS 3604 for external plate fixing.

WALL LINING

Any 10mm or 13mm GIB® Plasterboard lining.
Sheets can be fixed vertically or horizontally.
Sheet joints shall be touch fitted.
Use full length sheets where possible.

PERMITTED SUBSTITUTION

For permitted GIB® Plasterboard substitutions refer to Page 21 in GIB Ezybrace® Systems 2011.

FASTENING THE LINING

Fasteners

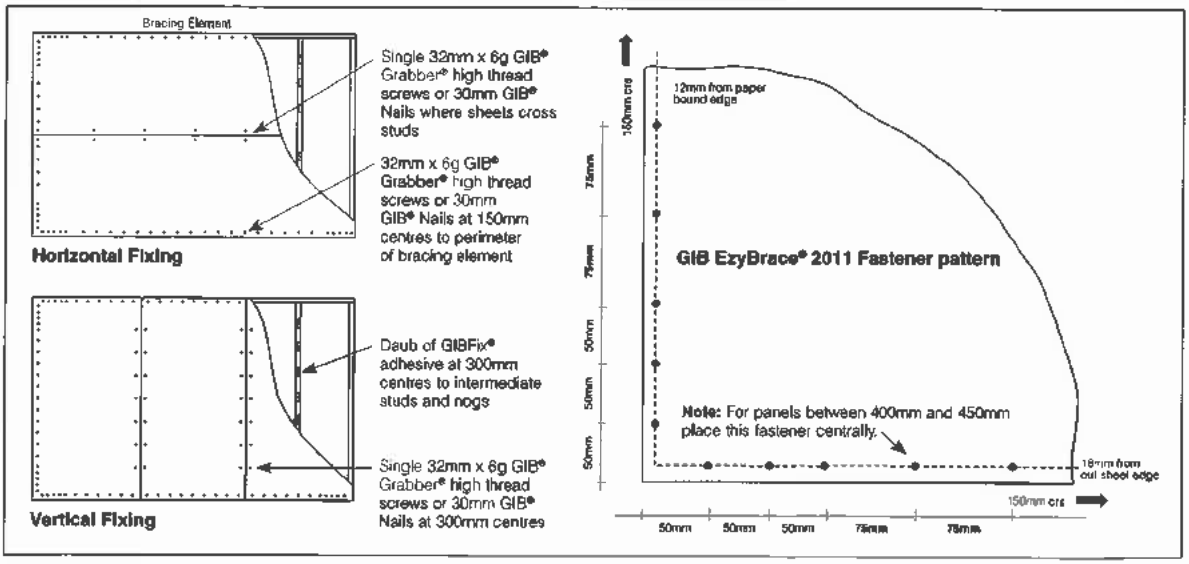
32mm x 6g GIB® Grabber® high thread screws; or
30mm GIB® Nails.

Fastener centres

50,100,150, 225, 300mm from each corner and 150mm thereafter around the perimeter of the bracing element.
For vertically fixed sheets place fasteners at 300mm centres to intermediate sheet joints.
For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud.
Use daubs of GIB Fix® adhesive at 300mm centres to intermediate studs.
Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

All fastener heads stopped and all sheet joints paper tape reinforced and stopped in accordance with the GIB® Site Guide.



In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This Specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems 2011 and has been appraised in accordance with the BRANZ Appraisal No. 294 (2011).

BRANZ Appraised
Appraisal No.294 (2011)

scyon®
SECURA™
INTERIOR FLOORING

Installation Manual

FEBRUARY 2013 | NEW ZEALAND

James Hardie®
a smarter way™

Content

WE VALUE YOUR FEEDBACK

To continue with the development of our products and systems, we value your input. Please send any suggestions, including your name, contact details, and relevant sketches to:

Ask James Hardie™
Fax 0800 808 988
literaturefeedback@jameshardie.co.nz

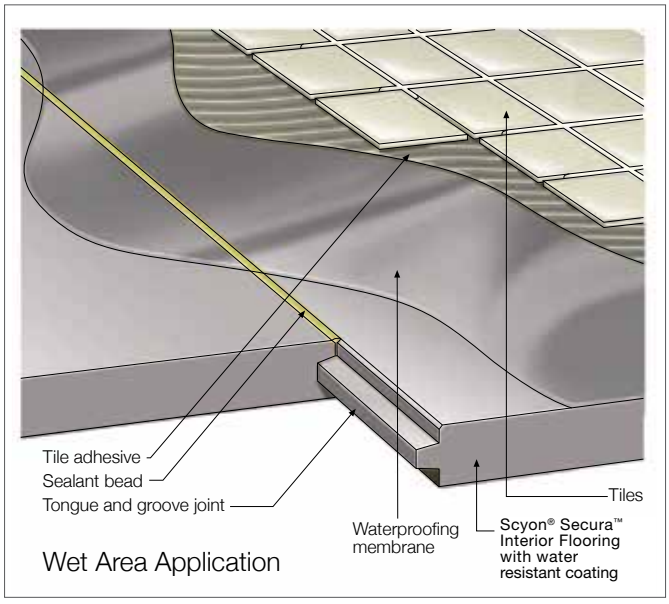
1 Introduction

Scyon® Secura™ Interior Flooring is a substrate which has been specifically engineered for use in internal wet and dry areas such as bathrooms, toilets and laundries to overlay with tiles, heavy grade vinyl or carpeting. Scyon Secura Interior Flooring provides a durable, stable and moisture resistant substrate.

Scyon Secura Interior Flooring is manufactured using James Hardie's unique Scyon advanced lightweight fibre cement composite technology, making it easier to cut and gun nail.

Scyon Secura Interior Flooring is a 19mm thick structural tongue and groove flooring which is an alternative to timber, particle board or plywood flooring. It's lighter than traditional James Hardie 18mm HardiePanel™ Compressed Sheet thus making it easier to handle and install.

The 19mm thickness and tongue and groove joining means Scyon Secura Interior Flooring is compatible with other 19mm flooring products on the market and eliminates the need for timber blocking along the tongue and groove joint. The moisture-resistant sealer on all six sides combined with the high strength Scyon® technology makes it suitable for use in wet and dry areas. Tiles and heavy grade vinyl linings can be directly fixed to this substrate without the need for an underlay sheet.



Wet Area Application

The specifier or other responsible party for the project must ensure the information and details in this manual are appropriate for the intended application and specific design and detailing is undertaken for areas which fall outside the scope of this documentation. This manual must be read in conjunction with the New Zealand Building Code (NZBC) and other relevant standards/regulations relating to wet/dry area construction.

Note: Scyon Secura Interior Flooring is not suitable for exterior flooring applications.

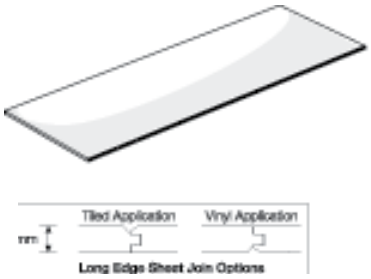
Scope

This installation manual covers the use of Scyon Secura Interior Flooring in wet and dry areas of buildings within the scope of NZS 3604 or specific engineering design (SED) projects where the loading concentrations do not exceed those specified in NZS 3604 or mentioned in section 3.2.

Make sure your information is up to date

When specifying or installing James Hardie products, ensure you have the current manual. If you're not sure you do, or you need more information, visit www.jameshardie.co.nz or Ask James Hardie™ on 0800 808 868.

Table 1

James Hardie product information			
Product	**Description**	**Size (MM)**	**Code**
	A structural flooring product sealed on all six sides for both tiled or heavy grade vinyl covered internal wet area flooring applications Long edges have a tongue and groove for easy jointing across the joists. **Tiled applications:** Install sheet with label 'This side down for Tiles' facing down **Vinyl or Carpet applications:** Install sheet with label 'This side UP for Vinyl' facing up	2700 x 600	**404260**

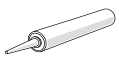
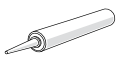
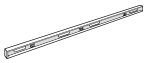
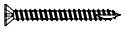
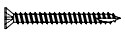
All dimensions provided are approximate only and subject to manufacturing tolerances

Table 2

Accessories supplied by James Hardie		
Accessories	**Description**	**Code**
	**HardieBlade™ Saw Blade** HardieBlade Saw Blade 185mm diameter Used to cut Scyon Secura Interior Flooring	300660

Accessories not supplied by James Hardie

James Hardie recommends the following products for use in conjunction with its flooring products. James Hardie does not supply these products and does not provide a warranty for their use. Please contact the component manufacturer for information on their warranties and further information on their products.

Accessories	Description	Accessories	Description
	**Backing rod** PEF backing rod to be used with sealant in control joints.		**Waterproofing membrane** Used over the Scyon Secura Interior Flooring in wet areas. Use the recommended products and applications. Refer table 4.
	**Sealant** Sealant used in v joint in tiled applications, Ensure the sealant is compatible with the waterproofing membrane system selected.		**Adhesive** Adhesive used over joists prior to installation of Scyon Secura Interior Flooring. Bostik Seal 'n' Flex 1 Sika Sikaflex 11FC Holdfast 220LM
	**Level/straight edge** For checking straightness of underlying flooring.		**Screws for timber** 10g x 40mm wood thread self embedding screws.
	**Paslode Impulse FrameMaster** or **Paslode Pneumatic Nailer**		**Screws for steel** 8-10g x 40-45mm wing tek min. class 3 coating.
			50 x 2.87mm stainless steel ring RounDrive nail 50 x 2.87mm Dekfast HD galvanised RounDrive nail

2 Safe working practices

WARNING – DO NOT BREATHE DUST AND CUT IN A WELL VENTILATED AREA

James Hardie products contain sand, a source of respirable crystalline silica which is considered by some international authorities to be a cause of cancer from some occupational sources. Breathing excessive amounts of respirable silica dust can also cause a disabling and potentially fatal lung disease called silicosis, and has been linked with other diseases. Some studies suggest smoking may increase these risks. During installation or handling: (1) work in outdoor areas with ample ventilation; (2) minimise dust when cutting by using a HardieBlade™ Saw Blade and dust-reducing circular saw attached to a HEPA vacuum; (3) warn others in the immediate area to avoid breathing dust; (4) wear a properly-fitted, approved dust mask or respirator (e.g P1 or P2) in accordance with applicable government regulations and manufacturer instructions to further limit respirable silica exposures. During clean-up, use HEPA vacuums or wet cleanup methods - never dry sweep. For further information, refer to our installation instructions and Safety Data Sheets available at www.jameshardie.co.nz.

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS, AND INSTALLATION INSTRUCTIONS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

James Hardie recommended safe working practices

CUTTING OUTDOORS

1. Position cutting station so that wind will blow dust away from user or others in working area.
2. Use the following method to cut Scyon Secura Interior Flooring:

BEST

- Dust reducing circular saw equipped with HardieBlade™ Saw Blade and HEPA vacuum extraction.

GOOD

- Dust reducing circular saw with HardieBlade™ Saw Blade.

SANDING/DRILLING/OTHER MACHINING

When sanding, drilling or machining you should always wear a P1 or P2 dust mask and warn others in the immediate area.

IMPORTANT NOTES:

1. For maximum protection (lowest respirable dust production), James Hardie recommends always using “Best” - level cutting methods where feasible.
2. NEVER use a power saw indoors
3. NEVER use a circular saw blade that does not carry the HardieBlade logo
4. NEVER dry sweep - Use wet suppression or HEPA Vacuum
5. NEVER use grinders
6. ALWAYS follow tool manufacturer’s safety recommendations

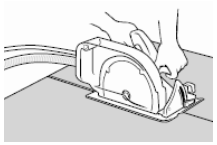
P1 or P2 respirators can be used in conjunction with above cutting practices to further reduce dust exposures. Additional exposure information is available at www.jameshardie.co.nz to help you determine the most appropriate cutting method for your job requirements. If concern still exists about exposure levels or you do not comply with the above practices, you should always consult a qualified industrial hygienist or contact James Hardie for further information.

3 Design

Working instructions

Refer to recommended Safe Working Practices before starting any cutting or machining of product.

HardieBlade Saw Blade



The HardieBlade Saw Blade used with a dust-reducing saw and HEPA vacuum extraction allows for fast, clean cutting of Scyon Secura Interior Flooring. A dust-reducing saw uses a dust deflector or a dust collector connected to a vacuum system. When sawing, clamp a straight-edge to the sheet as a guide and run the saw base plate along the straight edge when making the cut.

Hole-Forming

For smooth clean cut circular holes:
Mark the centre of the hole on the sheet. Pre-drill a 'pilot' hole.

Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill.

For irregular holes:
Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face.

Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported.

Storage and handling

To avoid damage, all James Hardie building products should be stored with edges and corners of the sheets protected from chipping.

James Hardie building products must be installed in a dry state and protected from rain during transport and storage. The product must be laid flat under cover on a smooth level surface clear of the ground to avoid exposure to water, moisture, etc.

Quality

James Hardie conducts stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets aesthetic requirements before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation.

3.1 GENERAL

All construction must be carried out in accordance with the relevant building regulations and standards.

Prior to installation of Scyon Secura Interior Flooring, ensure the supporting framing is suitable and is in accordance with this manual.

A solvent free waterproofing membrane must be applied over the Scyon Secura Interior Flooring in internal wet areas prior to the installation of tiles.

3.2 LOADING CONSIDERATION

Scyon Secura Interior Flooring in this manual has been designed to satisfy the requirements for wet and dry areas for buildings within the scope of NZS 3604, 'Timber Framed Buildings', NASH 3405 'An Alternative Solution for Steel Framed Buildings' and load specified under domestic and residential activities of Table 3.1, (Category A) of AS/NZS 1170.1 'Structural Design Actions – Permanent, Imposed and Other Actions'.

Note: The Standard AS/NZS 1170 also specifies higher loads for areas in public buildings which are subject to crowd loading, storage of materials and heavy wheel loadings. For these applications James Hardie HardiePanel Compressed Sheet shall be used. Refer to Flooring Installation Manual.

If in doubt, contact your builder, designer or engineer or Ask James Hardie 0800 808 868.

Notes:

- Scyon Secura Interior Flooring must NOT to be used on concrete slabs. To build up height of concrete, purpose-made concrete levelling compounds are more suitable
- For tiling of walls use James Hardie Villaboard® Lining

3.3 FRAMING

3.3.1 Timber frame

Timber floor joists must either be in accordance with NZS 3604: 'Timber Framed Buildings' or be specifically designed as per NZS 3603 'Timber Structure Standard' considering the maximum loading specified in AS/NZS 1170 'Structural Design Actions' as explained above.

Floor joists must be 45mm minimum wide. The joist spacing must not exceed those given in Table 3.

Table 3

Scyon Secura Interior Flooring Fixing	
JOIST SPACING CENTRES (MAXIMUM)	**FASTENER MAXIMUM SPACING CENTRES**
450mm	200mm

In addition to any lateral support required, the floor joists must also be supported by continuous blocking or strutting as per section 7 of NZS 3604.

Moisture content in timber floor joists must not exceed 20% at the time of installation of Scyon Secura Interior Flooring.

For further timber treatment and allowable moisture content information refer to NZS 3602 'Timber and Wood-Based Products for use in Buildings' and NZS 3640 'Chemical Preservation of

Round Sawn Timber' for minimum timber treatment selection and treatment requirements. Also refer to framing manufacturer's literature for further guidance on timber selection. Framing must be protected from moisture on site in accordance with the recommendations of the framing manufacturers.

Note: Tiles, tile grouts and adhesives can be detrimentally affected by even small deflections. Therefore it is recommended that for tiled applications reduce joist spans by 20% as specified in NZS 3604.

3.3.2 Steel Frame

The use of steel framing must be in accordance with NASH 3405 Steel Frame Guide and the framing manufacturers' specifications. Framing members must be 0.75mm to 1.9mm BMT.

Steel frame must have appropriate level of coating to meet the durability requirement of Clause B2 of NZBC.

3.4 SUB FLOOR VENTILATION

Check that adequate ventilation exists under all framed floors (especially new floors) and that the sub floor area is free from dampness. Refer to NZS 3604 for ventilation requirements.

3.5 FASTENER DURABILITY

Fasteners must meet the minimum durability requirements of the NZBC.

Contact fastener manufacturers/suppliers for more information.

4 Scyon Secura Interior Flooring Installation

For floor joist spacing and sizes refer to Section 3.

4.1 PANEL LAYOUT

Scyon Secura Interior Flooring must always be installed across the floor joists with short sheet edges fully supported on joists. Scyon Secura Interior Flooring must be laid in staggered pattern. See Figure 1. No blocking is required under the tongue and groove joints.

When using the site cut sheet pieces, the minimum length of the cut sheet to be used must be 900mm or more.

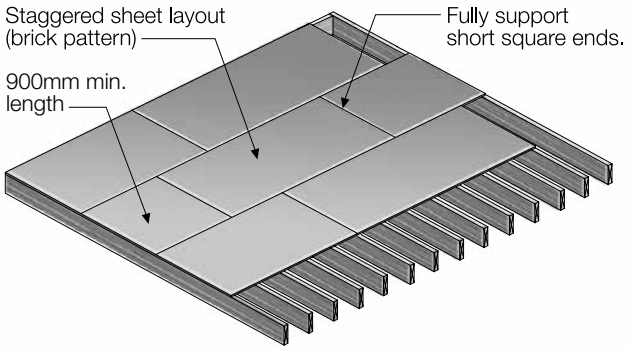
Tile and Vinyl Applications.

The sheets are laid in a staggered pattern. Ensure the sheets are facing the correct way down depending on the final finish ie. tiles or vinyl.

Note:

1. Install sheet with label 'This side down for tiles' facing down.
2. Install sheet with label 'This side up for vinyl' facing up.

Figure 1: Sheet layout - tile and vinyl



Being 19mm thick, Scyon Secura Interior Flooring can easily be combined with traditional particle board or plywood flooring substrates.

Fixings to be 50 x 2.87mm RounDrive nails at 200mm maximum centres. Refer Table 3.

4.2 Installation Steps

You must ensure the product is of acceptable quality prior to installation.

The sheet is multi-purpose and depending on the finish, ensure sheet is laid with correct face upwards for the final desired finish.

The Scyon Secura Interior Flooring must not be exposed to exterior elements for more than 90 days.

Figure 2: Fastener layout

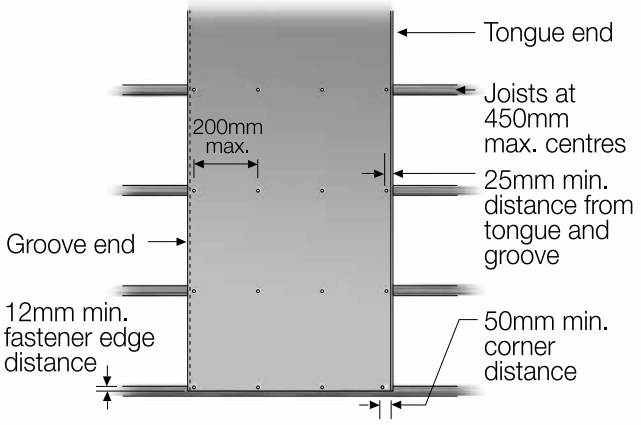


Figure 3: Construction adhesive

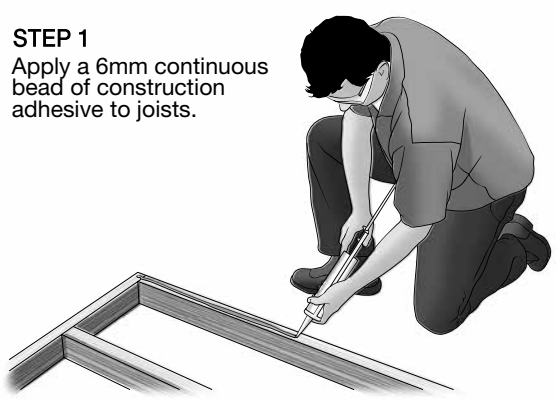
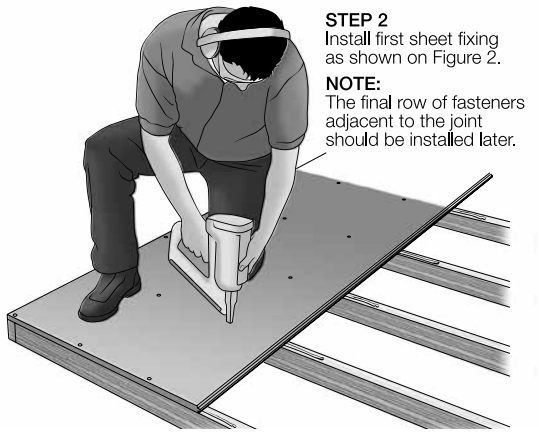


Figure 4: Fixing first panel.



Fixings to be 50 x 2.87mm RounDrive nails at 200mm maximum centres

Figure 5: Nailing second panel

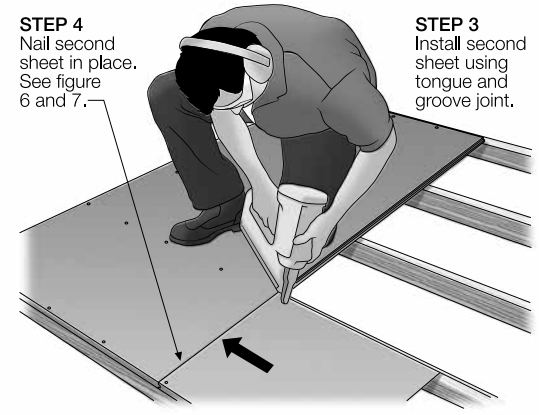


Figure 6: Sealing over fasteners - wet areas only

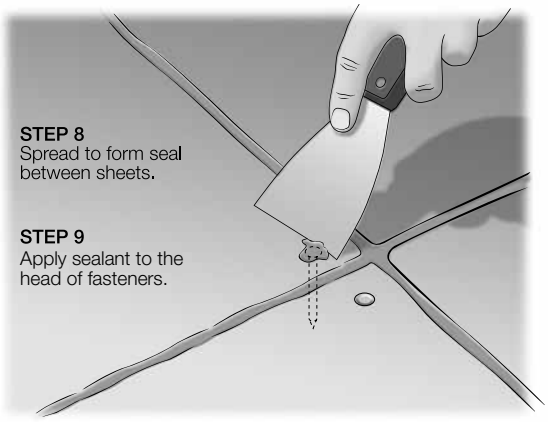


Figure 7: Butt joint internal wet areas - tile floor

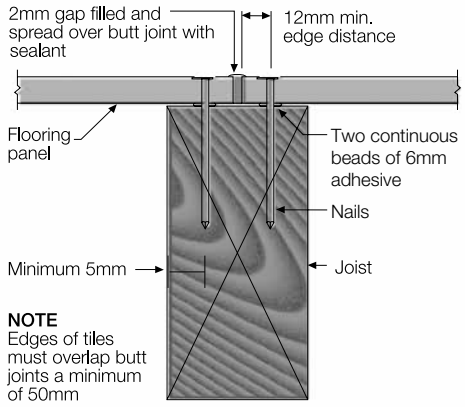
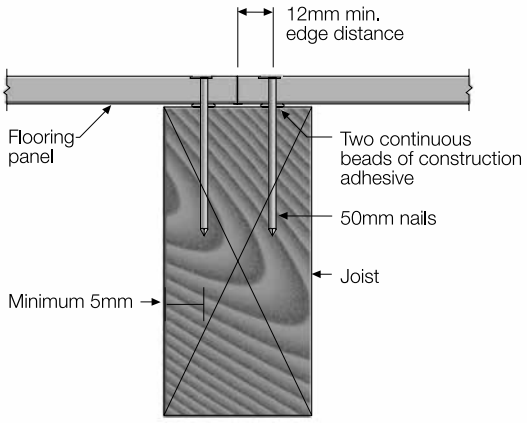


Figure 8: Butt joint internal dry/wet areas - vinyl floor

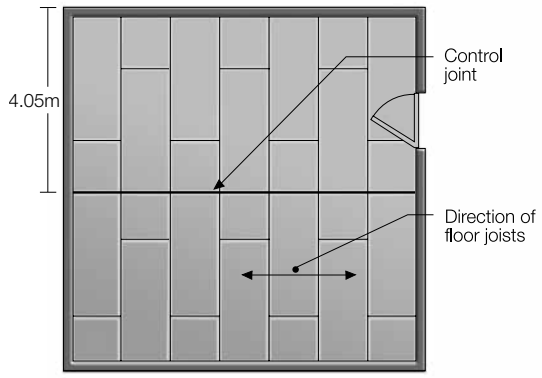


4.3 CONTROL JOINTS

4.3.1 Tiled Floors

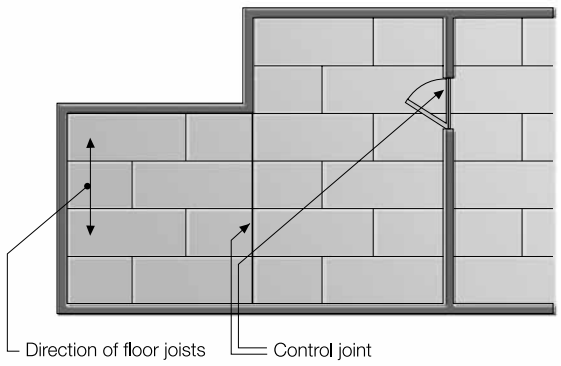
Control joints in Scyon Secura Interior Flooring sheets and the tiles are required in wet and dry areas where floor dimensions exceed 4.05m in the long sheet direction and where existing structural joints are located. Position joints symmetrically about the centre of the floor as shown in Figure 9. Additional control joints in the tiles may be required, refer to the current Good Tiling Practice Guide by BRANZ for more information available at www.branz.co.nz.

Figure 9: Control joint layout



Also provide control joints where there are changes of direction, such as an L-shaped room, and at doorways where the tiled surface is carried through to the next room as shown in Figure 10.

Figure 10: L shaped room



Place a 6-8mm diameter polyethylene backing rod in the bottom of the joint between the sheets and fill the joint with a suitable flexible sealant. All square edges must be fully supported as per Figure 11.

It is important that the control joints be carried through to the top of the floor surface i.e. they should not be covered OVER by tiles.

Note: No control joints are required in the flooring sheets when finishing with vinyl unless there is an existing structural joint or otherwise specified by relevant code and regulation.

Figure 11: Control joint

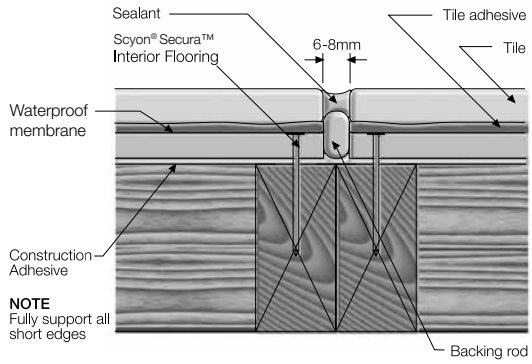
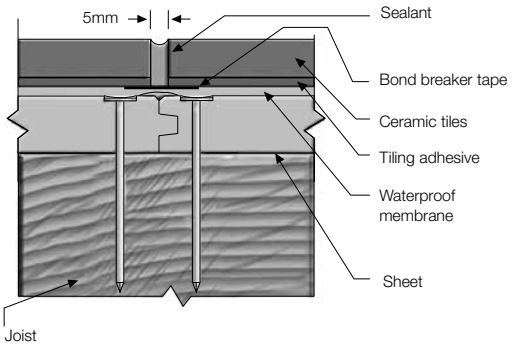


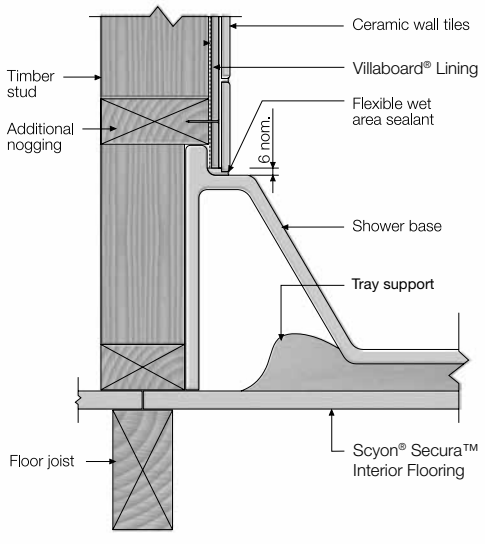
Figure 12 Tile control joint over tongue and groove joint



4.4 Preformed Trays and Bases

Preformed trays and bases must be installed to manufacturer's instructions.

Figure 13: Performed tray detail for Villaboard Lining to be tiled



5 Waterproofing Membrane

All Scyon Secura Interior Flooring under showers (wet areas) must be waterproofed prior to tiling. Refer to clause E3 Internal Moisture of NZBC and AS 3740 for further guidance regarding the definition of wet areas.

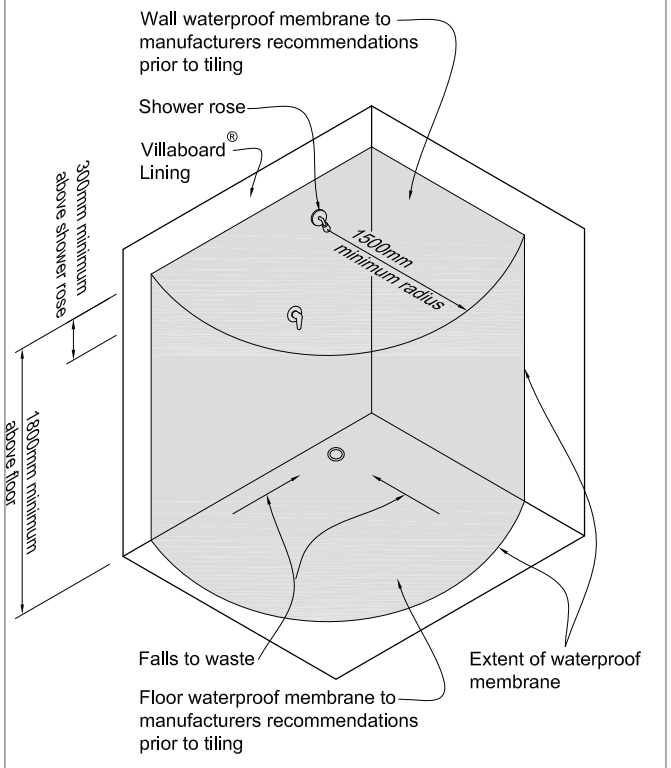
All sheet fixing must be completed as per this installation manual before the primer and the solvent free waterproofing membrane is applied.

Ensure the sheet is dry and free from surface dust and dirt before applying the primer.

The primer and waterproof membrane can be applied directly over the flush nail heads. Ensure compatibility of sealants with waterproofing membranes.

Only water based waterproofing membranes/chemicals must be used with Scyon Secura Interior Flooring. Follow the manufacturer's instructions for coverage areas, and specific instructions. For suitable Waterproofing Manufacturers refer to Table 4.

Figure 14: Sealing around splash zones (showers)



Prime sheet and apply coat of selected waterproof membrane with associated mesh as per waterproof manufacturers' recommendations.

Figure 15: Waterproofing floor to wall

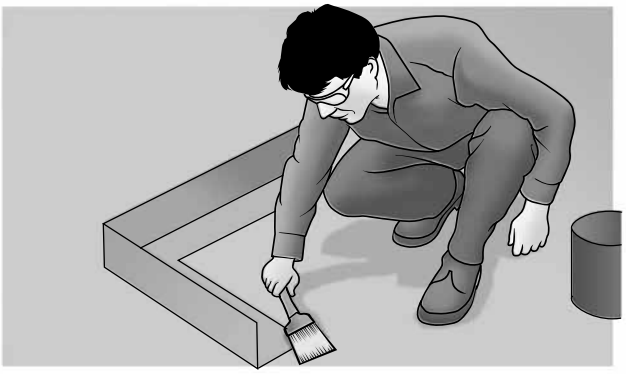


Figure 16: In-situ applied internal membrane

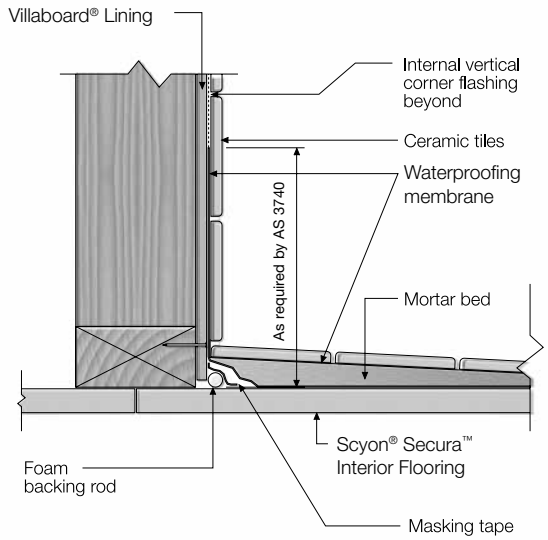


Table 4

Recommended waterproofing membranes/tile adhesives
ASA Waterproofing Membrane Dampfix 2 from Bostik
Mapegum WPS and Mapelastic from Mapei NZ Ltd.
Superflex® Ardex Liquid Membranes' from Ardex NZ Ltd
Flexi-Seal® from Flexco (NZ) Ltd
DuroSet™ and DuroQik™ from Waterproofing Systems Ltd

All waterproofing membranes specified above are water based membranes. Use only water based membranes over Scyon Secura Interior Flooring.

For coverage information of the selected waterproof membrane refer to manufacturer's recommendations.

Waterproofing membranes must be applied in accordance with their manufacturer's requirements.

Note: Refer to AS 3740 for further guidance on waterproofing requirements.

6 Finishes

6.1 GENERAL

James Hardie flooring must be finished with a suitable floor covering to suit the intended application. For the suitability and installation requirements of floor coverings, check with the manufacturer.

6.2 PREPARATION

Where minor height variations (3mm or less) occur at butt joints, these may be levelled out by filling with self levelling compounds eg. Ardex Feather Finish or equivalent. Ensure final finish is compatible with all components eg. vinyl adhesive with leveling compound.

Sanding of the Scyon Secura Interior Flooring is not recommended.

6.3 VINYL

As the sheets are supplied fully sealed, only water based vinyl adhesives must be used for this application.

Allow the adhesive to air dry before the vinyl is applied. Refer to a reputable vinyl manufacturer for suitable products and installation instructions.

6.4 SCREEDS

Where the application requires the flooring to have falls created, a mortar bed screed may be used. The surface of the flooring must be thoroughly clean and dry prior to applying the screed as per manufacturer's instructions. To prevent cracking of floor tiles, the mortar bed must be reinforced over all joints in flooring sheets.

6.5 SELECTION OF TILES

The following brief notes do not cover all aspects of tiling. Further advice should be sought from specialists in these areas.

The importance of choosing the proper tile for a given environment cannot be stressed enough. Manufacturer's catalogues indicate the recommended uses and limitations of their products and should be consulted when unsure.

6.6 TILE ADHESIVES

Because of possible differential movement between tiles and the Scyon Secura Interior Flooring only approved flexible adhesive and grouts must be used.

Refer to the adhesive manufacturers' specifications for sheet preparation before applying the flexible tile adhesive.

The recommended brands of waterproof membranes and tile adhesives are shown in Table 4. It is essential that all tile systems such as primers, waterproofing membranes, flexible adhesives and grouts are all supplied by the same manufacturer to ensure compatibility of products and warranty protection.

6.7 TILING

Tiles should be applied with proprietary adhesive that conform to AS 2358 and installed in accordance to AS 3958.1 and to tile and adhesive manufacturer recommendations. Use a flexible tile adhesive recommended for internal wet area applications and compatible with all other materials.

It is recommended that tiles are laid from the control joint out and the edges of tiles must overlap butt joints a minimum of 50mm.

Ensure the tile adhesive used is suitable and compatible with adjoining surfaces for the intended application.

Refer to the waterproofing and tile manufacture and relevant tiling standards for maximum tile control joint spacing, product suitability and compatibility including grout, tile adhesive, tile and waterproofing warranty and maintenance requirement.

The waterproofing requirements of AS 3740 and clause E3 NZBC must be met. Once Scyon Secura Interior Flooring has been fixed in place, install flooring material in accordance with manufacturer's specifications within three months of Scyon Secura Interior Flooring installation.

6.8 TILING PRACTICE

Refer to the selected tile manufacturer for complete details regarding the laying and fixing of the ceramic tiles, marble, slate and granite stone. Reference can also be made to the BRANZ publication "Good Tiling Practice" available at www.branz.co.nz.

7 Maintenance

Regular cleaning, checks and maintenance of the finished surface, joints, junctions, penetrations, sealant, grout etc must be carried out at regular intervals and as per manufacturers' recommendations.

Maintain waterproofing membranes to meet the objectives of Clause B2 of NZBC and as per the requirements of the relevant component manufacturer.

8 Product information

8.1 GENERAL

Scyon Secura Interior Flooring is an advanced lightweight cement composite building product. The basic composition is Portland cement, ground sand, cellulose fibre and water.

Scyon Secura Interior Flooring is manufactured to AS/NZS 2908.2 'Cellulose- Cement Products Part 2: Flat Sheets' (ISO 8336 'Fibre Cement Flat Sheets').

Scyon Secura Interior Flooring is a classified Type B, Category 2 in accordance with AS/NZS 2908.2 'Cellulose-Cement Products'.

8.2 PRODUCT MASS

Based on equilibrium moisture content the approximate mass of:

- Scyon Secura Interior Flooring is 24.5kg/m^2.

8.3 DURABILITY

Resistance to moisture/rotting

Scyon Secura Interior Flooring has demonstrated resistance to permanent moisture induced deterioration (rotting) by having passed the following tests in accordance with AS/NZS 2908.2:

- Water permeability (Clause 8.2.2)
- Warm water (Clause 8.2.4)
- Heat rain (Clause 6.5)
- Soak dry (Clause 8.2.5)

8.4 FIRE PROPERTIES

Scyon Secura Interior Flooring is deemed to be non-combustible.

Scyon Secura Interior Flooring has been tested by CSIRO and are classified as a Group 1 material.

Scyon Secura Interior Flooring has the following early fire hazard indices (tested to AS 1530 Part 3).

Early fire hazard indicies	
Flammability (FI)	0
Spread of Flame Index (SFD)	0
Heat evolved index	0
Smoke developed index (SDI)	0 - 1

Notes

Notes

Product Warranty

February 2013

Warranty: James Hardie New Zealand ("James Hardie") warrants for a period of 15 years from the date of purchase that the Scyon Secura Interior Flooring (the "Product"), will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, fire and damage from termite attacks to the extent set out in James Hardie's relevant published literature current at the time of installation. James Hardie warrants for a period of 12 months from the date of purchase that the accessories supplied by James Hardie will be free from defects due to defective factory workmanship or materials.

Nothing in this document shall exclude or modify any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law.

CONDITIONS OF WARRANTY:

The warranty is strictly subject to the following conditions:

a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation;

b) this warranty is not transferable;

c) the Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice;

d) the project must be designed and constructed in strict compliance with all relevant provisions of the current NZBC, regulations and standards;

e) the claimant's sole remedy for breach of warranty is (at James Hardie's option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product;

f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces);

g) all warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law;

h) if meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

Disclaimer: The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) above. James Hardie has tested the performance of the Scyon Secura Interior Flooring when installed in accordance with the Scyon Secura Interior Flooring Installation Manual, in accordance with the standards and verification methods required by the NZBC and those test results demonstrate the product complies with the performance criteria established by the NZBC. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design) James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards, as it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.

Ask James Hardie™
Call 0800 808 868
www.jameshardie.co.nz

James Hardie
a smarter way™


scyon®
The culmination of years of innovative research and development, Scyon's® resilient makeup challenges conventional building methods in a range of steadfast products. James Hardie® are committed to the sustainable production of building products for a tougher and greener tomorrow.
For more information about performance, installation, warranties and warnings visit scyon.co.nz
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James Hardie
a smarter way™

ARDEX WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part

Tjohmf Dpnqpofou Voefsujmf Xbufsqsppfloh Nfncsbof

CSBO Bqqsbjtfe

Mpx WPD dpoufou nffut Hsffo Cvjmejoh Dpvodjm pg Bvtusbmjb Hsffo Tubs JFR.2 sfrvjsfnfout

Gbtu es joh pof qbsu bds mjd nfncsbof

ARDEX WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part Undertile Waterproofing Membrane

BRANZ Appraised
Appraisal No.472 [2005]

BRANZ Appraised
Appraisal No.473 [2005]

Copies available on request.

PRODUCT DESCRIPTION

Ardex WPM 001 (Superflex Bathroom & Balcony Premixed 1 Part) is a tough, ready to use waterproofing membrane specifically designed for use under tiles. Ardex WPM 001 has been uniquely formulated with synthetic microfibres to increase its strength and eliminate the need for a separate reinforcement mat. Ardex WPM 001 is based on the most advanced acrylic polymer technology, and is totally resistant to re-emulsification once cured.

Ardex WPM 001 is flexible, safe to use, low in odour, and is fully compatible with polymer modified tile adhesives. Ardex WPM 001 is one of the fastest drying one part acrylic membranes on the market – normally ready to tile in 48 hours @ 23°C.

WPM 001 meets the Green Building Council of Australia Green Star IEQ-13 requirements for Architectural Sealant when tested in accordance with SCAQMD Method 304-91 Determination of Volatile Organic Compounds (VOC) in Various Materials as referenced by South Coast Air Quality Management Division (SCAQMD) Rule 1168.

FEATURES/BENEFITS

- Fast drying Ardex WPM 001 can be tiled over in 48 hours in non critical areas*
- Liquid reinforced: Excellent strength, eliminates need for reinforcing mat
- Flexible: Accommodates normal building movement class 3 membrane as per AS/NZ 4858: 2004 Wet Area Membranes
- Advanced acrylic: Will not re-emulsify once cured
- Designed for tiling - Fully compatible with Ardex tile adhesive systems
- Water based, safe to use, low odour & easy cleaning
- CSIRO Appraisal #91 for undertile waterproofing in shower recesses
- Conforms to the requirements of AS/NZ 4858: 2004 Wet Area Membranes. (Ref: CSIRO Report 3779)

*Critical areas include areas where the membrane is applied at greater than 0.5mm or over impermeable substances such as over bond breakers or incorporating other reinforcement. Longer drying times are necessary in these areas.

APPLICATION RANGE

Performance Levels
Commercial and residential

Location
Internal wet areas, balconies, decks, and other areas that will be tiled or otherwise protected from regular foot traffic.

Surfaces
Walls & floors

Substrates

Concrete	Cured for min. 28 days or sealed when set with one coat of Ardex WPM 300 (HydrEpoxy 300) at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. External wet concrete should be allowed to dry thoroughly or sealed with one coat of Ardex WPM 300 as above.
Renders and screeds	Cured for min. 7 days or sealed when set with one coat of Ardex WPM 300 at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. Wet render should be allowed to dry thoroughly or sealed with one coat of Ardex WPM 300 as above.
Fibre cement	Suitable for wet area grade fibre cement.
Plasterboard	Wet area grade only.
Plywood	Structural plywood (PAA branded), marine grade or other wet area grade only.
Particleboard	Wet area grade, internal use only (special preparation is required – contact Ardex).
Permanent Immersion	In conditions of permanent immersion, it is recommended that Ardex WPM 002 (Superflex Two Part) is used. Must be covered with tiles for full immersion.

Contact Ardex for use over existing membranes, covering materials, and any other substrates not listed.

SPECIFICATION CLAUSE

ARDEX WPM 001 (Superflex Premixed)
The waterproofing membrane shall be Ardex WPM 001: a one part acrylic modified fibre reinforced membrane formulated to provide a tough, long lasting water barrier under tiling systems.

PACKAGING

Single component: 20kg (approx 15 litres) or 6.5kg (approx 5 litres).

TABLE 1

	Thickness per Coat		Total Dry Film Thickness (2 coats)	Theoretical Coverage		Per Unit
	Dry Film	Wet Film		Per coat	For 2 coats	
FLOORS	0.5mm	1.0mm	1.0mm	15m²	7.5m²	20kg(15L) unit
WALLS	0.25mm	0.5mm	0.5mm	30m²	15m²	20kg(15L) unit

SHELF LIFE

12 months when stored in the original unopened packaging, in a dry place at 23°C. Do not store in direct sunlight. Replace lid tightly after use. Use remaining contents from part used containers within 3 months.

COVERAGE

Two coats are recommended for an effective waterproof membrane.

Coverage will vary depending on the porosity of the surface.

One 20kg (15 litre) unit will cover approximately 7.5-15m² (based on two coats) depending on area requirements between wall and floor surfaces to be treated. Refer Table I.

DRYING TIMES

Recoat time

1-2 hours at (23°C/50% RH) between first and second coats. Alternatively, if a polyester mat is used between coats then the second coat can be applied whilst the first coat is still wet.

Dry through

The slowest drying areas are those where the membrane has been applied over a silicone bond breaker, eg. wall and floor junctions. The membrane cannot be tiled over until these critical areas are completely dry. Ardex WPM 001 is totally dry in 48 hours at 23°C/50% RH, but can take up to 72 hours at 10°C/50% RH in corners or for thick films.

Fully cured

The shower should not be used until the membrane has reached its full strength. Ardex WPM 001 membrane is fully cured after 3 days at 23°C, or after 5 days at 10°C.

Drying times will vary depending on humidity, surface temperature and surface porosity.

Do not apply on substrates where the surface temperature is below 10°C or above 35°C.

CLEANING

Wash hands, brushes, rollers, etc, with water while the membrane is still fresh. Remove cured material with mineral turpentine.

SAFETY PRECAUTIONS

Do not use the product in the following situations:

- Areas subject to negative hydrostatic pressure or rising damp, unless treated with Ardex WPM 300.
- Where the substrate is wet – wet surfaces can be sealed with one coat of Ardex WPM 300 at a coverage rate of 3.0 square metres per litre and allowed to cure overnight.
- Where rain is imminent.
- Where the membrane will be left exposed and subjected to regular foot traffic.
- On glazed, glass or other totally impervious surfaces (eg. areas pre-treated with water repellants).
- Where the surface temperature is below 10°C or greater than 35°C.
- All floor areas must have adequate falls either built into the substrate or achieved with a sand/cement screed prior to application of the Ardex WPM 001.

For substrates or situations other than those listed contact Ardex.

SAFETY DATA

Ardex WPM 001 is non-hazardous and non dangerous. It may produce discomfort of the eyes, respiratory tract and skin. Do not breathe gas/fumes/vapour/spray. Avoid contact with skin. Wear eye/face protection. In case of contact with eyes, rinse with plenty of water and seek medical advice.

ADDITIONAL INFORMATION IS LISTED IN THE MATERIAL SAFETY DATA SHEET.

QUALITY PRODUCT

Ardex WPM 001 is manufactured and tested to Ardex procedures which are maintained in accordance with Quality System Standard ISO 9001.

ARDEX WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part Undertile Waterproofing Membrane

USER NOTES

The technical details and recommendations contained in this data sheet are given in good faith and represent the best of our knowledge and experience at the time of printing. It is the responsibility of the user to ensure that the product is used in accordance with Ardex instructions and in applications for which they are intended.

APPLICATION

Apply Ardex WPM 001 by brush or roller. A medium nap (12-15mm pile) paint roller is recommended. New rollers should be dampened with water before being used for the first time.

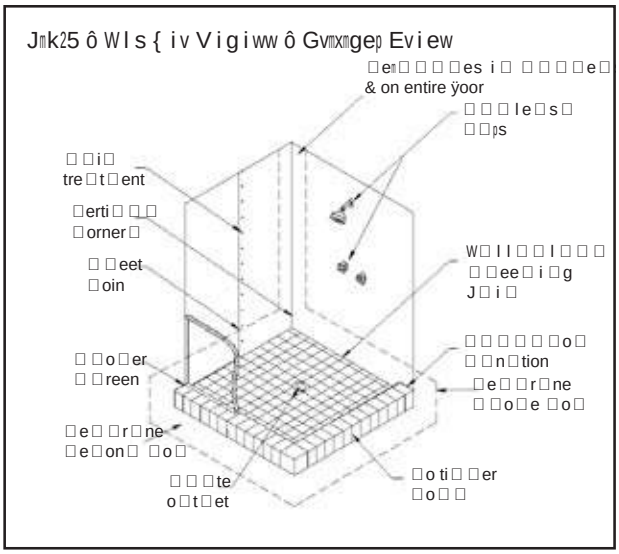
For best results with a paint brush use a good quality, 50mm long bristle variety.

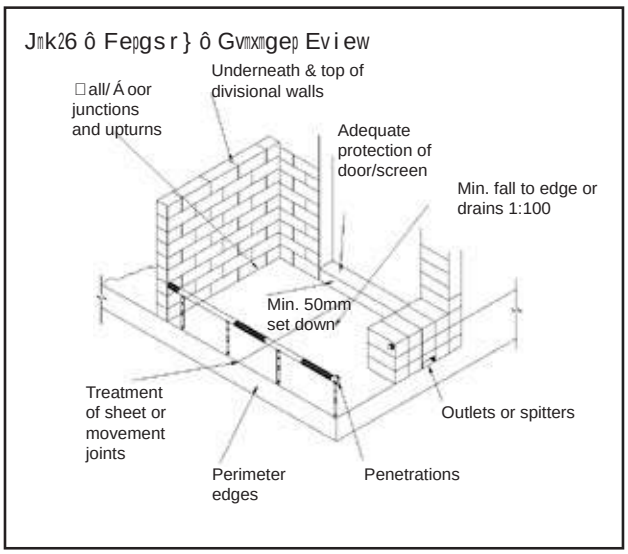
To achieve the required dry film thickness per coat, application must consist of laying the product onto the surface and light finish the surface. Do not try to apply in the same manner as a building paint. A conventional building paint is normally applied at 25-40 micrometers wet film thickness while Ardex WPM 001 needs to be applied at between 0.5 and 1.0 mm per coat depending on product and application (Refer Table 1).

Critical Areas:

INTERNAL WET AREAS

1. Construction should be in accordance with Australian 3740 - 2004 Waterproofing of wet areas within residential buildings.
2. All render and tile bed requirements should be completed before application of the membrane and tiles or other floor coverings should be direct bonded to the membrane.
3. Ensure wall & floor sheets are installed as per sheet manufacturer's recommendations.
4. Ensure suitable brick/concrete hobs are used (do not use timber).
5. Ensure that falls to the waste are min 1:60 (ie. approx. 30mm in 2mtr)) before waterproofing. Ensure outlet pipes are fixed securely and that the waste or drainage flanges are recessed into the floor.
6. Avoid sheet joints in shower recess floor. Ensure that sheets are securely fixed to the wall at the bottom edge, and sheet joints are sealed with a neutral cure silicone sealant spread approximately 6mm on either side of the joint.
7. Treat nail and screw holes with neutral cure silicone sealant.
8. Seal the perimeters of taps, shower outlets and waste outlets with neutral cure silicone sealant.
9. Apply a bead of neutral cure silicone sealant to all horizontal and vertical corners.
10. Apply a bead of neutral cure silicone sealant to the junction of the hob or angle and walls. Spreading the sealant to 6mm on either side of the joint.
11. Waste outlets shall incorporate a puddle flange or similar in accordance with AS3740 & the top surface shall be set flush with the surface to which the membrane is to be applied. A bead of neutral cure silicone shall be applied across the intersection of the puddle flange and the screed/ floor.
12. Apply the membrane to the entire shower recess floor and down into waste or drainage flange. Apply the membrane over the hob and at least 150mm beyond the outside edge of the hob (ideally to entire wet area floor).
13. Apply the membrane 1800mm up the walls or to the height of the shower rose within the shower recess.
14. Install the shower screen to inside edge of the hob.





BALCONIES AND DECKS

1. Ensure that the deck is constructed with falls to edge/drains of min 1:100 (ie. 20mm in 2m) or else achieve the fall with a sand/cement screed.
2. Ensure a min set down (step down) of 50mm to the finished floor level (ie. top of tiles).
3. Ensure suitable flashing is installed, ideally prior to the installation of the balcony screen/ sliding door.
4. Treat any sheet joints with a neutral cure silicone prior to waterproofing.
5. Prepare and seal all wall/floor junctions with a bead of neutral cure silicone.
6. Apply the membrane up the step down and as far up underneath the screen door flashing as possible (ideally waterproof prior to installing door).
7. Where possible, apply the membrane prior to building divisional walls, or other items such as planter boxes.
8. Apply the membrane to the entire balcony floor and at least 50mm up the wall above the top surface of the finished tiles and finished below the wall drainage vents.
9. Apply the membrane to the top of the parapets and divisional walls, or else install suitable metal capping.
10. Apply the membrane down over the front edge of the balcony onto the drip rail.
11. Carefully seal any gaps around balcony penetrations prior to applying the membrane.
12. Apply the membrane down into outlets and drains, ensuring excess material is removed.
13. Ensure all weep holes are above the membrane application area.

APPLICATION NOTES

Surface preparation

- Ensure all surfaces are structurally sound and totally dry. The pores of concrete surfaces should be open (absorbent surface). All sheet substrates must be securely fixed in accordance with the manufacturers instructions.
- Falls to outlets of at least 1:60 or approx. 30mm in 2mtr (wet areas) or 1:100 externally, must be achieved prior to tiling.
- The surface to be coated should be free from dust, oil, paint, curing compounds and any other contaminating materials.
- Damaged concrete should be repaired (leveled) and surface defects including all cracks and sharp protrusions should be treated prior to the application of the membrane.
- Remove laitance on concrete or screeds by mechanical means.
- Highly dense (>40MPa) or steel trowelled concrete should be roughened by suitable mechanical means (shot blasting, grinding, etc).

Priming

The primer is a critical part of the waterproofing system. Apply one coat of Ardex WPM 265 (Sheltercoat/ Superflex Water Based Primer) by brush or roller to all areas to be waterproofed including the floor waste. Allow the primer to completely dry prior to the application of the Ardex WPM 001 membrane. This will take around 20-30 minutes depending upon weather conditions and porosity of the substrate. Coverage is approximately 6m² per litre. Plastic (eg. PVC) pipes should be primed with a solvent based plumbers pink primer. Prime metal surfaces with a suitable metal primer such as epoxy polyamide primer.

GENERAL APPLICATION

Crack preparation

Cracks <2mm:

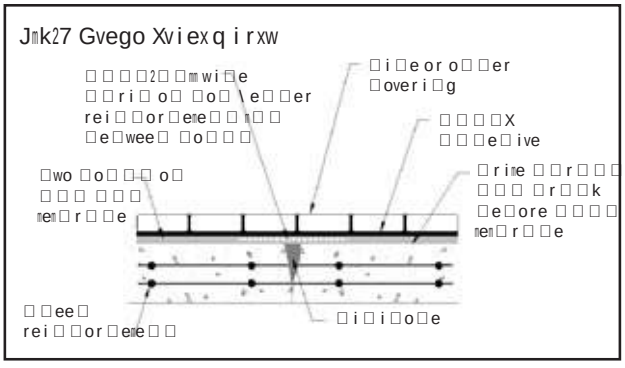
Clean and remove any loose particles in the crack. Prime the crack and adjacent area carefully with Ardex WPM 265 and allow to dry before applying two coats of Ardex WPM 001 membrane in a band at least 200mm wide equidistantly across the crack, along the length of the crack.

Cracks 2-6mm:

(Refer Fig. 3) Prepare and prime the crack as above. Apply a bead of neutral cure silicone into the crack and extend it 6mm either side. Apply a 300mm wide band of Ardex WPM 001 equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of Ardex “Deckweb” polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth preferably using a fluted roller, and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

Cracks >6mm:

Contact your local Ardex representative.



ARDEX WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part Undertile Waterproofing Membrane

Movement/construction joints

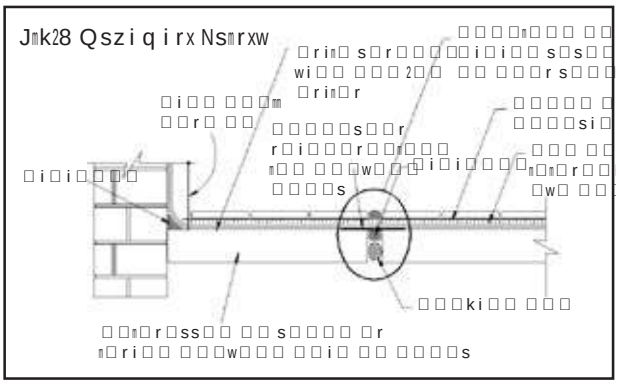
Movement joints (<6mm)

Use same procedure as in crack preparation.

Clean and prime the joint before filling it with a bead of neutral cure silicone and extending it 6mm each side of joint. Apply a 300mm wide band of Ardex WPM 001 equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of Ardex "Deckweb" polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the mat and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

Construction joints (>6mm)

Use the same procedure as above, but replace the reinforcing mat with 120mm of Ardex Coving Bandage. Note: if tiling, movement joints should be taken to the surface of the tiles. Fill the joints between the tiles immediately above the movement joints with an appropriate joint sealant. (Refer Fig.4)



Corners & coving areas

After priming with Ardex WPM 265 and allowing to dry, apply a generous bead (12mm) of neutral cure silicone sealant to seal all junctions between two substrates in coving areas and corners.Smooth over the silicone so that it extends 6mm up the wall and 6mm over the floor and allow to touch dry.

Apply a first coat of Ardex WPM 001 to the area and allow the membrane to dry.

Apply a second coat ensuring that excess product is removed from the junction (the final dry film thickness should be minimum of 1.0mm). Alternatively, if a polyester reinforcement mat is used between coats then the second coat can be applied as soon as the mat is fully bedded into the first coat.

WALL/FLOOR JUNCTION

After priming with Ardex WPM 265 and allowing to dry, apply a generous bead (12mm) of neutral cure silicone sealant to seal all junctions between two substrates. Smooth over the silicone so that it extends 6mm up the wall and 6mm over the floor and allow to touch dry. Place a 190mm wide band of Ardex "Deckweb" polyester woven mat reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. The Ardex WPM 001 should be applied to at least 100 mm up the wall surfaces as per the recommendations for the application of Ardex WPM 001 to floors.

Walls

Two coats of Ardex WPM 001 are required to achieve a minimum total dry film thickness of 0.5mm.

After priming with Ardex WPM 265 and allowing to dry, apply two coats of Ardex WPM 001 (to achieve a minimum dry film thickness of 0.5mm) in two opposite directions. Wall sheet joints should be treated with a neutral cure silicone, PVC duct tape or base jointing compound. In balcony situations take the membrane up underneath any existing cover flashing or install appropriate flashing. Allow the first coat to dry before applying the second coat.

Floors

Two coats of Ardex WPM 001 are required to achieve a minimum total dry film thickness of 1.0mm. The flooring recommendations should be extended at least 150 mm up all perimeter walls.

Prime the surface with Ardex WPM 265 and allow to dry.

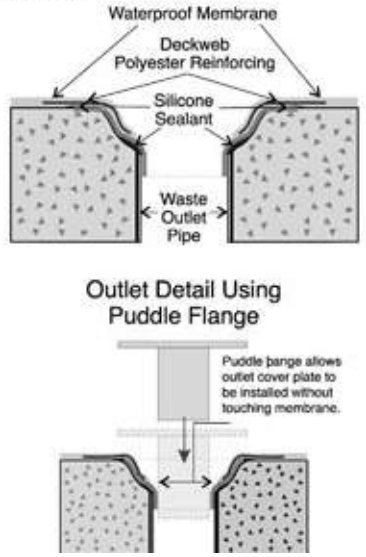
Apply the first coat over the primed surface and allow it to dry (1-2 hours at 23°C, 50%RH) before applying a second coat in an opposite direction. In shower recesses a drainage flange must be installed on all timber/sheeted floors, and are strongly recommended on all other substrates. Where possible rebate the flange into the floor. Seal the perimeter of the flange with neutral cure silicone treatment. If a flange is not installed the membrane must be applied down into the pipe. (Refer Fig.5) Allow the membrane to dry completely before tiling. Refer drying times above.

Waste Outlet

Prime the surface with Ardex WPM 265 and allow to dry. Surfaces of the outlet flange must be primed with an appropriate primer.

Apply Ardex WPM 001 over the adjacent floor surface extending down into the waste outlet flange overlapping the edge of flange by at least 30mm. Place Ardex "Deckweb" polyester woven mat reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. (Refer Fig. 5)

Fig.5 – Waste outlet

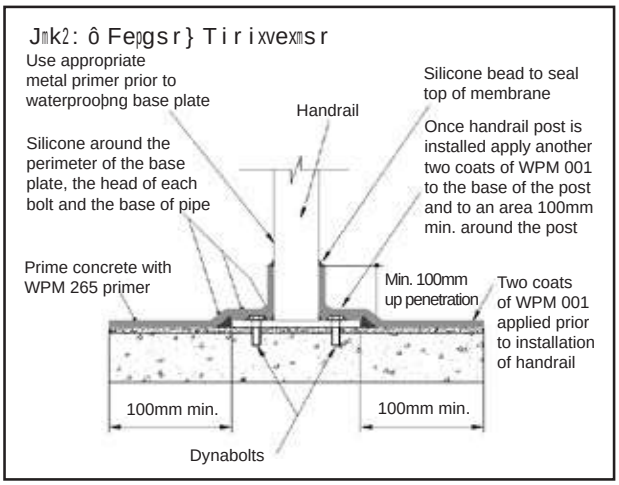


Balcony penetrations (Refer Fig.6)

All upstands are to be mechanically fixed through the membrane, which must be fabricated with a base plate flange.

Prime the metal with an appropriate metal primer such as an epoxy polyamide primer and allow to dry. Apply a 10mm bead of neutral cure silicone around the perimeter of the penetration. Apply the first coat of Ardex WPM 001 on the substrate and the flanged metal.

Allow first coat to dry before applying a second coat ensuring a finished dry film thickness of no less than 1.0mm is achieved. Place a suitable flashing collar around the penetration sealing it with a suitable sealant.



Tiling systems

It is advisable to conduct a flood test of the shower once the membrane has cured (normally after 72 hours), and before the tiling commences. A broad range of Ardex tile adhesives can be used over Ardex membranes. Contact Ardex or your nearest Ardex stockist for advice on the most suitable system.

TECHNICAL DATA

Ardex WPM 001 (Superflex Premixed)
Characteristics of liquid

Form & Colour	Blue viscous paste
Type	Single part
Specific Gravity	Approx. 1.34kg/litre
pH of Liquid	8.5
Viscosity of Liquid (RVT Brookfield, spindle 7 speed 10)	52,000cps
Non Volatile Matter (volume) AS1321.10	50.3%±1
Tensile Strength 7 days dry AS1145	1.04 MPa
Full Cure	1.92 MPa
Elongation at Break 7 days dry AS1145	780%

Conforms to requirements of class 3 membrane of AS/NZ 4858: 2004 Wet Area Membranes.

NOTE: Most of the tests have been carried out in the Ardex laboratory under standard conditions (23±2°C, 50±5% R.H)

ARDEX WPM 002

Superflex Bathroom & Balcony - 2 Part

Qbsu Voefsujmf Xbufsqsppfloh Nfncsbof

CSBO Bqqsbjtfe

Sbqje Es joh Ujnf

Uxp Dpnqpofou Voefsujmf Xbufsqsppfloh Nfncsbof

Bewbodfe bds mjd xjmm opu sf.fnvmtjg

Mjrvje sfjogpsdfe fmjnjobuft uif offe gps sfjogpsdjoh nbu

Xbufs cbtfe tbgf up vtf- mpx pepvs boe fbt dmfboj

Nffut dmbtt JJJ dbufhps gps BTOO 6 Xfu Bsfb

Mpx WPD dpoufou nffut Hsffo Cvjmejoh Dpvodjm pg B
Hsffo Tubs JFR.2 sfrvjsfnfout

ARDEX WPM 002

Superflex Bathroom & Balcony - 2 Part
2 Part Undertile Waterproofing Membrane

BRANZ Appraised
Appraisal No.472 [2005]

BRANZ Appraised
Appraisal No.473 [2005]

Copies available on request.

PRODUCT DESCRIPTION

Ardex WPM 002 (Superflex Bathroom & Balcony 2 Part) is a tough, fast drying two component waterproofing membrane specifically designed for use under tiles. The product has been uniquely formulated with synthetic microfibres to increase its strength and eliminate the need for a separate reinforcement mat. Ardex WPM 002 is based on the most advanced acrylic polymer technology, and is totally resistant to re-emulsification.

Ardex WPM 002 is flexible, safe to use, low in odour, and is fully compatible with polymer modified tile adhesives. Ardex WPM 002 is one of the fastest drying acrylic membranes on the market – normally ready to tile in 16-24 hours @ 23°C.

WPM 002 meets the Green Building Council of Australia Green Star IEQ-13 requirements for Architectural Sealant when tested in accordance with SCAQMD Method 304-91 Determination of Volatile Organic Compounds (VOC) in Various Materials as referenced by South Coast Air Quality Management Division (SCAQMD) Rule 1168.

FEATURES/BENEFITS

Fast drying Ardex WPM 002 can be tiled over in 16-24 hours, or 4 hours @ 23°C/50% RH in non critical areas*.

Features benefits

- Liquid reinforced: Excellent strength, eliminates need for reinforcing mat.
- Flexible: Accommodates normal building movement.
- Advanced acrylic: Will not re-emulsify.
- Designed for tiling: Fully compatible with ABA/Ardex tile systems adhesives.
- Water based, safe to use, low odour and easy cleaning for undertile waterproofing in shower recesses by independent testing authority.
- Excellent exterior.
- Conforms to the requirements of AS/NZ 4858: 2004 Wet Area Membranes (Ref: CSIRO Report 3879)

*Critical areas include areas where the membrane is applied at greater than 0.5mm or over impermeable substances such as over bond breakers or incorporating other reinforcement. Longer drying times are necessary in these areas.

APPLICATION RANGE

Performance levels
Commercial and residential.

Location
Internal and external wet areas, balconies, decks, and other areas that will be tiled or otherwise protected from regular foot traffic.

Surfaces
Walls and floors.

Substrates

Concrete	Cured for min. 28 days or sealed when set with one coat Ardex WPM 300 (HydrEpoxy 300) at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. Wet concrete should be allowed to dry thoroughly or sealed with one coat of Ardex WPM 300 as above.
Renders and screeds	Cured for min. 7 days or sealed when set with one coat Ardex WPM 300 at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. Wet render should be allowed to dry thoroughly or sealed with one coat of Ardex WPM 300 as above.
Fibre cement	Wet area grade only.
Plasterboard	Wet area grade only.
Plywood	Structural plywood (PAA branded) or marine grade or other wet area grade only. Not recommended for external use (refer Ardex).
Particleboard	Wet area grade, internal use only (special preparation is required – contact Ardex). Not recommended for external use (refer Ardex).
Permanent Immersion	In conditions of permanent immersion, it is recommended that WPM 002 must be covered with tiles for full immersion applications.

Contact Ardex for use over existing membranes, covering materials, and any other substrates not listed.

SPECIFICATION CLAUSE

Ardex WPM 002 (Superflex Two Part)
The waterproofing membrane shall be Ardex WPM 002, a two component cementitious acrylic modified fibre reinforced membrane formulated to provide a tough, long lasting water barrier under tiling systems.

PACKAGING

Two component: 20kg (approx 20 litres) liquid pail/ 2 x 10kg bags powder.

TABLE 1

	Thickness per coat		Total dry film thickness (2 coats)	Theoretical coverage		Per unit
	Dry film	Wet film		Per coat	For 2 coats	
FLOORS	0.6mm	0.9mm	1.2mm	32m²	16m²	40kg kit
WALLS	0.4mm	0.6mm	0.8mm	48m²	24m²	40kg kit

SHELF LIFE

12 months when stored in the original unopened packaging, in a dry place at 23°C. Do not store in direct sunlight. Replace lid tightly after use. Use remaining contents from part used containers within 3 months.

COVERAGE

Two coats are recommended for an effective waterproof membrane. Coverage will vary depending on the porosity of the surface.

One 40kg kit will cover approximately 16-24m (based on two coats) depending on area requirements between wall and floor surfaces to be treated.

DRYING TIMES

Curing time will vary depending on temperature and humidity.

Recoat time

1-2 hours (23°C/50% RH) between first and second coats. Alternatively, if a polyester mat is used between coats then the second coat can be applied whilst the first coat is still wet.

Dry through

The slowest drying areas are those where the membrane has been applied over a silicone bond breaker, eg. wall and floor junctions. The membrane cannot be tiled over until these critical areas are completely dry.

Ardex WPM 002 membrane is totally dry in 16 hours at 23°C/50% RH but can take up to 24 hours at 10°C / 50% RH in corners or for thick films.

In areas where bond breakers or additional reinforcement are not used, Ardex WPM 002 can be tiled over after 4 hours at 23°C / 50% RH.

Fully cured

The shower should not be used until the membrane has reached its full strength. Normally Ardex WPM 002 membranes are fully cured after 3 days at 23°C, or after 5 days at 10°C.

Drying times will vary depending on humidity, surface temperature and surface porosity.

Do not apply on substrates where the surface temperature is below 10°C or above 35°C.

CLEANING

Wash hands, brushes, rollers, etc, with water while the membrane is still fresh. Remove cured material with mineral turpentine.

SAFETY PRECAUTIONS

Do not use the product in the following situations:

- Areas subject to negative hydrostatic pressure or rising damp, unless treated with Ardex WPM 300.
- Where the substrate is wet – wet surfaces can be sealed with one coat of Ardex WPM 300 at a coverage rate of 3.0 square metres per litre and allowed to cure overnight.
- Where rain is imminent.
- Where the membrane will be left exposed and subjected to regular foot traffic.
- On glazed, glass or other totally impervious surfaces (eg. areas pre-treated with water repellants).
- Where the surface temperature is below 10°C or greater than 35°C.
- All floor areas must have adequate falls either built into the substrate or achieved with a sand/cement screed prior to application of the Ardex WPM 002.

For substrates or situations other than those listed contact Ardex.

SAFETY DATA

Ardex WPM 002 Part A is non-hazardous. It may produce discomfort of the eyes, respiratory tract and skin. It should not be swallowed or inhaled. Avoid contact with skin and wear eye/face protection. In case of contact with eyes, rinse with plenty of water and contact a doctor or Poisons Information Centre.

Ardex WPM 002 Part B contains cement and is therefore hazardous. It may cause burns and serious damage to eyes. Do not breathe dust and avoid contact with eyes. Wear dust masks, goggles and gloves when handling. Keep container locked up and in a well ventilated place.

ADDITIONAL INFORMATION IS LISTED IN THE MATERIAL SAFETY DATA SHEET.

ARDEX WPM 002

Superflex Bathroom & Balcony - 2 Part
2 Part Undertile Waterproofing Membrane

APPLICATION

Apply Ardex WPM 002 by brush or roller. A medium nap (12–15mm pile) paint roller is recommended. New rollers should be dampened with water before being used for the first time.

For best results with a paint brush use a good quality, 50mm long bristle variety.

To achieve the required dry film thickness per coat application must consist of laying the product onto the surface and light finish the surface. Do not try to apply in the same manner as a building paint. A conventional building paint is normally applied at 25–40 micrometers wet film thickness while Ardex WPM 002 needs to be applied at between 0.6 and 0.9 mm per coat depending on product and application (Refer Table 1).

Critical areas:

INTERNAL WET AREAS

1. Construction should be in accordance with Australian 3740 - 2004 Waterproofing of wet areas within residential buildings.
2. All render and tile bed requirements should be completed before application of the membrane and tiles or other floor coverings should be direct bonded to the membrane.
3. Ensure wall and floor sheets are installed as per sheet manufacturer's recommendations.
4. Ensure suitable brick/concrete hobs are used (do not use timber), and that the top of the hob does not slope outwards.
5. Ensure that falls to the waste are min 1:60 (ie. approx. 30mm in 2m) before waterproofing. Ensure outlet pipes are fixed securely and that the waste or drainage flanges are recessed into the floor.
6. Avoid sheet joints in shower recess floor. Ensure that sheets are securely fixed to the wall at the bottom edge, and sheet joints are sealed with a neutral cured silicone sealant spread approximately 6mm on either side of the joint.
7. Treat nail and screw holes with neutral cure silicone sealant.
8. Seal the perimeters of taps, shower outlets and waste outlets with neutral cure silicone sealant.
9. Apply a bead of neutral cure silicone sealant to all horizontal and vertical corners, and spread to 6mm on either side of joint.
10. Apply a bead of neutral cure silicone sealant to the junction of the hob or angle and walls, and spread to 6mm on either side of joint.
11. Waste outlets shall incorporate a puddle flange or similar in accordance with AS3740 and the top surface shall be set flush with the surface to which the membrane is to be applied. A bead of neutral cure silicone shall be applied across the intersection of the puddle flange and the screed/ floor.
12. Apply the membrane to the entire shower recess floor and down into waste or drainage flange. Apply the membrane over the hob and at least 150mm beyond the outside edge of the hob (ideally to entire wet area floor).
13. Apply the membrane 1800mm up the walls or to the height of the shower rose within the shower recess.
14. Install the shower screen to inside edge of the hob.

BALCONIES AND DECKS

1. Ensure that the deck is constructed with falls to edge/drains of min 1:100 (ie. 20mm in 2m) or else achieve the fall with a sand/cement screed.
2. Ensure a min set down (step down) of 50mm to the finished floor level (ie. top of tiles).
3. Ensure suitable flashing is installed, ideally prior to the installation of the balcony screen/sliding door.
4. Treat any sheet joints with a neutral cure silicone

Fig.1 ð Shower recess ð critical areas

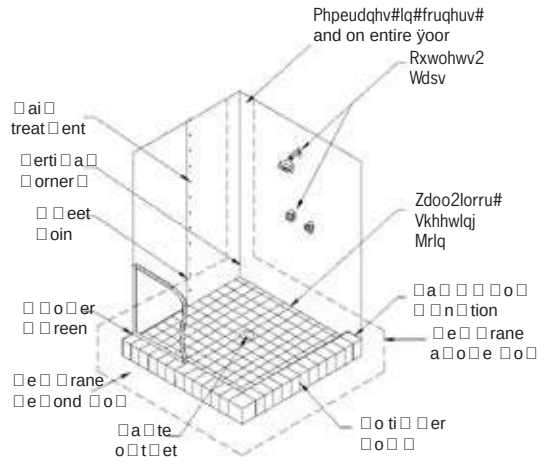
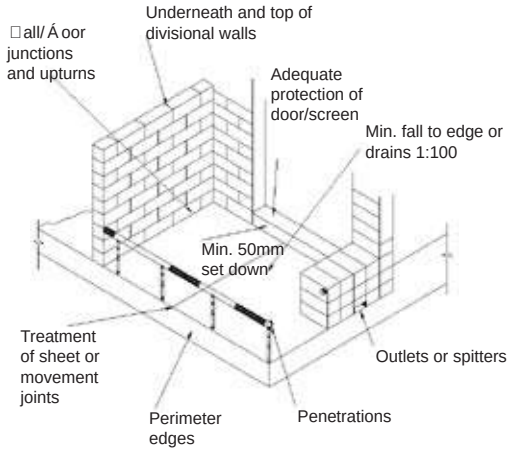


Fig.2 ð Balcony ð critical areas



prior to waterproofing.

5. Prepare and seal all wall/floor junctions with a bead of neutral cure silicone.
6. Apply the membrane up the step down and as far up underneath the screen door flashing as possible (ideally waterproof prior to installing door).
7. Where possible, apply the membrane prior to building divisional walls.
8. Apply the membrane to the entire balcony floor and at least 50mm up the wall above the top surface of the finished tiles and finished below the wall drainage vents.
9. Apply the membrane to the top of the parapets and divisional walls, or else install suitable metal capping.
10. Apply the membrane down over the front edge of the balcony onto the drip rail.
11. Carefully seal any gaps around balcony penetrations prior to applying the membrane.
12. Apply the membrane down into outlets and drains, ensuring excess material is removed.
13. Ensure all weep holes are above the membrane application area.

APPLICATION NOTES

Surface preparation

- Ensure all surfaces are structurally sound and totally dry. The pores of concrete surfaces should be open (absorbent surface). All sheet substrates must be securely fixed in accordance with the manufacturers instructions.
- Falls to outlets of at least 1:60 or approx. 30mm in 2m (wet areas) or 1:100 externally, must be achieved prior to tiling.
- The surface to be coated should be free from dust, oil, paint, curing compounds and any other contaminating materials.
- Damaged concrete should be repaired (leveled) and surface defects including all cracks and sharp protrusions should be treated prior to the application of the membrane.
- Remove laitance on concrete or screeds by mechanical means.
- Highly dense (>40MPa) or steel trowelled concrete should be roughened by suitable mechanical means (shot blasting, grinding, etc).

Priming

The primer is a critical part of the waterproofing system. Apply one coat of Ardex WPM 265 (Sheltercoat/Superflex Water Based Primer) by brush or roller to all areas to be waterproofed including the floor waste. Allow the primer to be completely dry prior to the application of the Ardex WPM 002 membrane. This will take around 20-30 minutes depending upon weather conditions and porosity of the substrate. Coverage is approximately 6m² per litre. Plastic (eg. PVC) pipes should be primed with a solvent based plumbers pink primer. Prime metal surfaces with a suitable metal primer such as epoxy polyamide primer.

GENERAL APPLICATION

Crack preparation

Cracks <2mm:

Clean and remove any loose particles in the crack. Prime the crack and adjacent area carefully with Ardex WPM 265 and allow to dry before applying two coats of Ardex WPM 002 membrane, in a band at least 200mm wide equidistantly across the crack, along the length of the crack.

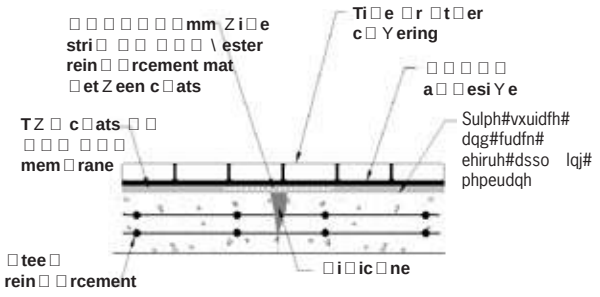
Cracks 2-6mm:

(Refer Fig. 3) prepare and prime the crack as above. Apply a bead of neutral cure silicone into the crack and extend it 6mm either side. Apply a 300mm wide band of Ardex WPM 002 equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of Ardex “Deckweb” polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

Cracks >6mm:

Contact your local Ardex representative.

Fig.3 Crack Treatments



ARDEX WPM 002

Superflex Bathroom & Balcony - 2 Part
2 Part Undertile Waterproofing Membrane

Movement/construction joints

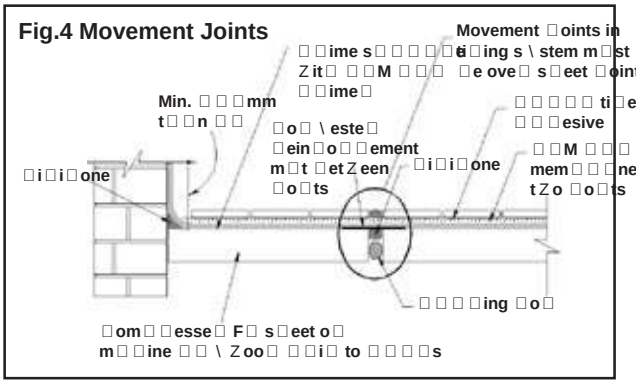
Movement joints (<6mm)

Clean and prime the joint before filling it with a bead of neutral cure silicone and extending it 6mm each side of joint. Apply a 300mm wide band of Ardex WPM 002 equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of Ardex "Deckweb" polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

Construction joints (>6mm)

Use the same procedure as above, but replace the reinforcing mat with 120mm of Ardex Coving Bandage. Note: if tiling, movement joints should be taken to the surface of the tiles. Fill the joints between the tiles immediately above the movement joints with an appropriate joint sealant. (Refer Fig.4)

Fig.4 Movement Joints



Corners and coving areas

After priming with Ardex WPM 265 and allowing to dry, apply a generous bead (16mm) of neutral cure silicone sealant in coving areas and corners. (Refer Fig.5) Smooth over the silicone so that it extends 8mm up the wall and 8mm over the floor and allow to touch dry.

Apply a first coat of Ardex WPM 002 to the area and allow the membrane to dry.

Apply a second coat ensuring that excess product is removed from the junction (the final dry film thickness should be around 1.2mm) Alternatively, if a polyester reinforcement mat is used between coats then the second coat can be applied as soon as the mat is fully bedded into the first coat.

WALL/FLOOR JUNCTION

After priming with Ardex Superflex WPM 265 and allowing to dry, apply a generous bead (16mm) of neutral cure silicone sealant to seal all junctions between two substrates. Smooth over the silicone so that it extends 8mm up the wall and 8mm over the floor and allow to touch dry. Place a 190mm wide band of Ardex "Deckweb" polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. The Ardex WPM 002 should be applied to at least 150mm up the wall surfaces as per the recommendations for the application of Ardex WPM 002 to floors.

Walls

Two coats of Ardex WPM 002 are required to achieve a minimum total dry film thickness of 0.8mm.

After priming with Ardex Superflex WPM 265 and allowing to dry, apply two coats of Ardex WPM 002 (to achieve a minimum dry film thickness of 0.8mm) in two opposite directions. Wall sheets joints should be treated with a neutral cure silicone, PVC duct tape or base jointing compound. In balcony situations take the membrane up underneath any existing cover flashing or install appropriate flashing. Allow the first coat to dry before applying the second coat.

Floors

Two coats of Ardex WPM 002 are required to achieve a minimum total dry film thickness of 1.2mm. The flooring recommendations should be extended at least 150mm up all perimeter walls.

Prime the surface with Ardex WPM 265 water based primer and allow to dry.

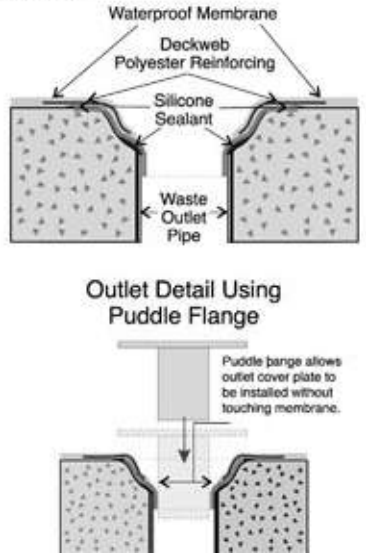
Apply the first coat over the primed surface and allow it to dry (1-2 hours at 23°C, 50% RH) before applying a second coat in an opposite direction. In shower recesses a drainage flange must be installed on all timber/sheeted floors, and are strongly recommended on all other substrates. Where possible rebate the flange into the floor. Seal the perimeter of the flange with neutral cure silicone treatment. If a flange is not installed the membrane must be applied down into the pipe. (Refer Fig.5) Allow the membrane to dry completely before tiling. Refer drying times above.

Waste outlet

Prime the surface with Ardex WPM 265 and allow to dry. Surfaces of outlet flange must be primed with an appropriate primer.

Apply Ardex WPM 002 over the adjacent floor surface extending down into the waste outlet pipe overlapping the pipe surfaces by at least 30mm. Place Ardex "Deckweb" polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. (Refer Fig. 5).

Fig.5 – Waste outlet



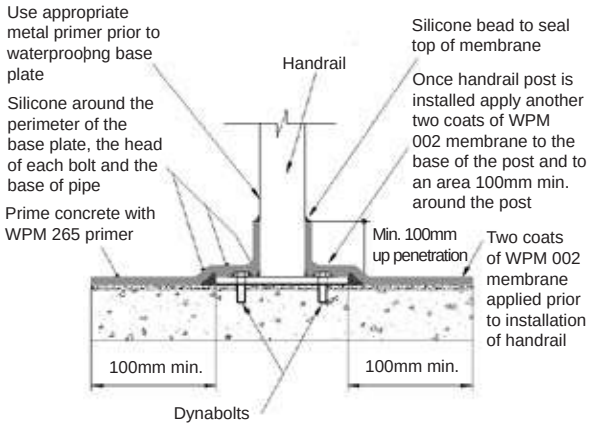
Balcony penetrations (Refer Fig.6)

All upstands are to be mechanically fixed through the membrane, which must be fabricated with a base plate flange.

Prime the metal with an appropriate metal primer such as an epoxy polyamide primer and allow to dry. Apply a 10mm bead of neutral cure silicone around the perimeter of the penetration. Apply the first coat of Ardex WPM 002 on the substrate and the flanged metal.

Allow first coat to dry before applying a second coat ensuring a finished dry film thickness of no less than 1.2mm is achieved. Place a suitable flashing collar around the penetration sealing it with a suitable sealant.

Fig.6 ð Balcony penetration



Tiling systems

It is advisable to conduct a flood test of the shower once the membrane has cured (normally after 48 hours), and before the tiling commences. A broad range of Ardex tile adhesives can be used over Ardex Superflex membranes. Contact Ardex or your nearest Ardex stockist for advice on the most suitable system.

QUALITY PRODUCT

Ardex WPM 002 is manufactured and tested to Ardex procedures which are maintained in accordance with Quality System Standard ISO 9001.

USER NOTES

The technical details and recommendations contained in this data sheet are given in good faith and represent the best of our knowledge and experience at the time of printing. It is the responsibility of the user to ensure that the product is used in accordance with Ardex instructions and in applications for which they are intended.

TECHNICAL DATA

Ardex WPM 002
Characteristics of components

Form & Colour	Liquid: white, medium viscosity Powder: off white
Characteristics of mixed product	
Mixing Ratio	1:1 by weight
SG of mixed product	1.44kg/litre
Non Volatile Matter	77±1%
Colour	light grey/green
Characteristics of cured membrane	
Shore A hardness ASTM D2240	
– dry film	85 – 90
– wet film	75 – 80
Tensile Strength	
7 days dry AS1145	1.7 MPa
Full Cure 28 days:	2.9 MPa
Elongation at Break	
7 days dry AS1145	332%

NOTE: Most of the tests have been carried out in the Ardex laboratory under standard conditions (23±2°C, 50±5% RH)

BRANZ Appraised
Appraisal No.472 [2011]

BRANZ Appraisals

Technical Assessments of products for building and construction

BRANZ APPRAISAL No. 472 (2011)

SUPERFLEX™ WET AREA MEMBRANES

Ardex New Zealand Ltd
P O Box 19549
Woolston
Christchurch
Tel: 03 384 3029
Fax: 03 384 9779

BRANZ
BRANZ Limited
Private Bag 50 908
Porirua City
New Zealand
Tel: +64 4 237 1170
Fax: +64 4 237 1171
www.branz.co.nz

Product

1.1 Superflex™ Wet Area Membranes are premixed and two-part, liquid applied waterproofing membranes for use under ceramic or stone finishes in internal wet areas.

Scope

2.1 Superflex™ Wet Area Membranes have been appraised for use as waterproofing membranes for internal wet areas of buildings, within the following scope:

- on floor substrates of concrete, flooring grade particleboard, plywood, and fibre cement sheet tile underlay, and on wall substrates of wet area fibre cement sheet lining systems and wet area plasterboard lining systems; and,
- when protected from physical damage by ceramic or stone tile finishes; and,
- where floors are designed and constructed such that deflections do not exceed 1/360th of the span.

2.2 The use of Superflex™ Wet Area Membranes on concrete slabs where hydrostatic or vapour pressure is present is outside the scope of this Appraisal.

2.3 Building structural movement and control joints in the substrate must be carried through to the tile finish. The design and construction of the substrate and movement and control joints are specific to each building, and therefore the responsibility of the building designer and building contractor and are outside the scope of this Appraisal.

2.4 Ceramic or stone tile finishes are outside the scope of this Appraisal.

2.5 The membranes must be installed by Ardex New Zealand Ltd trained and approved applicators.

Building Regulations

New Zealand Building Code (NZBC)

3.1 in the opinion of BRANZ, Superflex ™ Wet Area Membranes if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years. Superflex™ Wet Area Membranes meet this requirement. See Paragraph 9.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.6. Interior wet area floors and walls incorporating Superflex™ Wet Area Membranes will meet this requirement. See Paragraphs 11.1- 11.6.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Superflex™ Wet Area Membranes meet this requirement and will not present a health hazard to people.

This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 Materials supplied by Ardex New Zealand Ltd are as follows:

Superflex™ WPM001 Premixed Bathroom and Balcony

- A one part, polymer-based, ready-to-use, liquid-applied membrane containing micro-fibres, supplied as a light blue thixotropic paste in 6.5 kg (approximately 5 litres) and 20 kg (approximately 15 litres) pails.

Superflex™ WPM002 Two Part Bathroom and Balcony

- A fast drying, two part, flexible, cementitious-based, liquid applied membrane containing micro-fibres. It is supplied as Superflex™ WPM002 Part A Liquid in 10 and 20 kg pails and Superflex™ WPM002 Part B Powder in 10 kg multi-wall bags. When dry, the membrane is light grey in colour.

Superflex™ Primer

- A water-based primer used to seal substrates and enhance the adhesion of the membranes. It is supplied as a red coloured liquid in 20 kg plastic containers.

Handling and Storage

5.1 All materials must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and out of freezing conditions. The membrane products have a shelf life of 12 months from date of manufacture in the original unopened packaging. Once opened, the products must be used within 3 months.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Superflex™ Wet Area Membranes. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 Superflex™ Wet Area Membranes are for use in buildings where an impervious waterproof membrane is required to floors and walls to prevent damage to building elements and adjoining areas.

7.2 Superflex™ WPM002 Two Part is designed to be used where a quicker curing time is required, such as in cool or humid conditions.

7.3 The membranes must be protected from physical damage by the application of ceramic or stone tile finishes.

7.4 Movement and control joints may be required depending on the shape and size of the building or room, and the tile finish specified. Design guidelines can be found in the BRANZ "Good Practice Guide Tiling".

7.5 Timber framing systems must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and all sheet edges are fully supported. Timber framing systems supporting the substrates must be constructed such that deflections do not exceed 1/360th of the span. Where NZS 3604 is used, the allowable joist spans given in Table 7.1 shall be reduced by 20%.

Substrates

Plywood

8.1 Plywood must be a minimum of 17mm thick complying with AS/NZS 2269, CD Grade Structural with sanded C face upwards and treated to H3 (CCA treated). LOSP treated plywood must not be used. The plywood must be supported with dwangs or framing with a maximum span of 400mm in each direction, fixed with 10g x 50mm stainless steel countersunk head screws at 150mm centres on the edges and 200mm through the body of the sheets.

Fibre Cement Compressed Sheet/Fibre Cement Sheet Tile Underlay

8.2 Fibre cement compressed sheet must be manufactured to comply with the requirements of AS 2908.2 and must be specified by the manufacturer as being suitable for use as a wet area substrate. Fibre cement sheet tile underlay must be covered by a valid BRANZ Appraisal for use in internal wet areas. Installation must be in accordance with manufacturer's. instructions.

Particleboard

8.3 Particleboard must be specified for the end use in accordance with NZS 3602.

Concrete and Concrete Masonry

8.4 Concrete and concrete masonry substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101 and NZS 3604 Concrete Slab-On-Ground Floors and Concrete masonry to NZS 4229 and NZS 4230.

Wet Area Wall Linings

8.5 Plasterboard wall linings must be manufactured to comply with AS/NZS 2588, and be covered by a valid BRANZ Appraisal for use in internal wet areas.

8.6 Fibre Cement Sheet must be covered by a valid BRANZ Appraisal for use in wet areas.

Durability

Serviceable Life

9.1 Superflex™ Wet Area Membranes, when subjected to normal conditions of environment and use, are expected to have a serviceable life of at least 15 years and be compatible with ceramic or stone tile finishes with a design service life of 15-25 years.

Maintenance

10.1 No maintenance of the membranes will be required provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiled areas to ensure they are sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiles, grouts and sealants.

10.2 In the event of damage to the membranes, the tiling must be removed and the membrane repaired by removing the damaged portion and applying as for new work.

10.3 Drainage outlets must be maintained to operate effectively, and ceramic or stone tile finishes must be kept clean.

Internal Moisture

11.1 Superflex™ Wet Area Membranes are impervious to water and when appropriately designed and installed will avoid the likelihood of water penetrating behind linings or entering concealed spaces.

11.2 Superflex™ Wet Area Membranes are suitable for use to contain accidental overflow to meet NZBC Clause E3.3.2. A means of Code Compliance for overflow is given in NZBC Acceptable Solution E3/AS1 Paragraph 2.

11.3 Surfaces must be finished with ceramic or stone tile finishes. A means of Code Compliance to NZBC Clause E3.3.3 and E3.3.4 is given in NZBC Acceptable Solution E3/AS1 Paragraph 3.1.1 (b), 3.1.2 (b) and 3.3.1 (b).

11.4 Falls in showers and shower areas must be a minimum of 1 in 50. In unenclosed showers, falls must extend a minimum of 1500 mm out from the shower rose. Floor wastes must be provided and the floor must fall to the outlet.

11.5 The waterproofing membrane must completely cover shower bases, and for unenclosed showers it must extend a minimum of 1500 mm out from the shower rose. Further design guidance on waterproofing wet areas, including waterproofing walls and junctions can be obtained from AS 3740, BRANZ "Good Practice Guide Tiling", and flooring and wallboard manufacturers.

11.6 Where water resistant wall finishes such as prefinished sheet materials are used, they must flash over the membrane a minimum of 30mm.

Installation Information

Installation Skill Level Requirement

12.1 Installation of the membranes must be completed by Ardex New Zealand Ltd trained and approved applicators.

12.2 Installation of substrates must be completed by tradespersons with an understanding of internal wet area construction, in accordance with instructions given within the Ardex New Zealand Ltd Technical Literature and this Appraisal.

Preparation of Substrates

13.1 Substrates must be dry, clean and stable before installation commences. With surfaces that are even and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents.

13.2 The relative humidity of the concrete must be 75% or less before membrane application. Concrete substrates can be checked for dryness by using a hygrometer as set out in BRANZ Bulletin No. 424.

13.3 All voids, cracks, holes, joints and excessively rough areas must be filled to achieve an even and uniform surface. Junctions of substrate abutments, such as at wall/floor and wall/wall junctions must have fiberglass mesh installed as set out in the Technical Literature.

Membrane Installation

14.1 Installation must not be undertaken where the substrate surface temperature is below 10ºC or above 35ºC.

14.2 Superflex™ WPM002 Two Part Bathroom and Balcony liquid and dry components must be mixed and left to stand for 5 minutes before re-mixing, then applying. Superflex™ WPM001 Premixed Bathroom and Balcony must be thoroughly stirred before application.

14.3 The membranes must be applied in a minimum of two coats at the rates set out in the Technical Literature to give a total finished thickness of 1.2 – 1.5 mm. Subsequent coats must be applied at an opposite direction to the previous coat.

14.4 Application can be made by roller (medium/long nap), brush (long bristle), or a flat steel trowel.

14.5 Reinforcement fabric is bedded into the wet layer between coats to provide movement protection at wall/wall and wall/floor junctions, and at any other areas such as joints in the flooring substrate, floor cracks or around penetrations in the membrane.

14.6 Clean up may be undertaken with water.

Tiling

15.1 The membranes must be fully cured before tiling. The cured membranes must be protected at all times to prevent mechanical damage, so may require temporary covers until the finishing is completed.

15.2 Tiling must be undertaken in accordance with AS 3958.1 and the BRANZ "Good Practice Guide, Tiling". The compatibility of tile adhesive must be confirmed with the adhesive manufacturer or Ardex New Zealand Ltd.

Inspections

16.1 Critical areas of inspection are:

- Construction of substrates, including crack control and installation of bond breakers and movement control joints.
- Moisture content of the substrate prior to the application of the membrane.
- Acceptance of the substrate by the membrane installer prior to application of the membrane.
- Installation of the membrane to the manufacturer's instructions, particularly installation to the correct thickness and use of reinforcement.
- Membrane curing and integrity prior to the installation of tiles including protection from mechanical damage during curing and prior to tile installation.

Health and Safety

17.1 Safe use and handling procedures for the membranes are provided in the Technical Literature. The materials must be used in conjunction with the relevant Material Safety Data Sheet.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

18.1 The following testing of Superflex™ WPM001 Premixed Bathroom and Balcony and Superflex™ Two Part Bathroom and Balcony has been undertaken by Ardex Australia Pty Ltd research and development laboratory: water vapour transmission; water absorption; tensile strength and elongation before and after UV exposure, immersion in bleach, immersion in industrial detergent and immersion in water. Test methods and results were reviewed by BRANZ and found to be satisfactory.

18.2 The following testing of Superflex™ WPM001 Premixed Bathroom and Balcony was undertaken by the Commonwealth Scientific Industrial Research Organisation (CSIRO) Australia:

- In accordance with ANSI A118.10 for ICBO Evaluation Service - dimensional stability; waterproofness; shear strength to ceramic tile and cement mortar; and fungal and micro-organism resistance.
- In accordance with AS 1145 – behaviour under cyclic strain.

18.3 Testing of Superflex™ WPM001 Premixed Bathroom and Balcony and Superflex™ WPM002 Two Part Bathroom and Balcony has been undertaken by BRANZ for low temperature flexibility and peel adhesion after heat/humidity aging.
18.4 Testing for suitability over particleboard in accordance with AS/NZS 4858-2004, Appendix C has not been undertaken because compliance with the standard has been met by satisfactory water vapour transmission test results.

The above test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

19.1 An assessment was made of the durability of the Superflex™ Wet Area Membranes by BRANZ technical experts.
19.2 Site visits have been carried out by BRANZ to assess the practicability of installation and to examine completed installations.
19.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

20.1 The manufacture of the membrane has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
20.2 The quality management system of membrane's manufacturer has been assessed and found to be satisfactory.
20.3 The quality of supply of the membrane system materials to the market is the responsibility of Ardex New Zealand Ltd.
20.4 Quality on site is the responsibility of the Ardex New Zealand Ltd approved and trained applicators.
20.5 Designers are responsible for the substrate design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of the substrate manufacturer, Ardex New Zealand Ltd and this Appraisal.
20.6 Building owners are responsible for the maintenance of the tiling or stone finishing systems in accordance with the instructions of Ardex New Zealand Ltd.

Sources of Information

- AS 2908.2: 2000 Cellulose-cement products - flat sheet.
- AS 3740 – 2010 Waterproofing of wet areas within residential buildings.
- AS 3958.1: 1991 Guide to the installation of ceramic tiles.
- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 2269: 2008 Plywood - Structural.
- AS/NZS 4858 - 2004 Wet area membranes.
- NZS 3101: 1995 The design of concrete structures.
- NZS 3602: 2003 Timber and wood-based products for use in buildings.
- NZS 3604: 1999 Timber framed buildings.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 4229: 1999 Concrete masonry buildings not requiring specific engineering design.
- NZS 4230: 1990 Code of practice for the design of masonry structures.
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition May 2007.
- The Building Regulations 1992, up to, and including August 2008 Amendment.
- Good Practice Guide Tiling, BRANZ, March 2004.
- Good Practice Guide Membrane Roofing, BRANZ, October 2003.

BRANZ

In the opinion of BRANZ, Superflex™ Wet Area Membranes are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.
The Appraisal is issued only to Ardex New Zealand Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
a) relates only to the product as described herein;
b) must be read, considered and used in full together with the technical literature;
c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
d) is copyright of BRANZ.
2. Ardex New Zealand:
a) continues to have the product reviewed by BRANZ;
b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
c) abides by the BRANZ Appraisals Services Terms and Conditions.
d) Warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
c) any guarantee or warranty offered by Ardex New Zealand.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Ardex New Zealand or any third party.

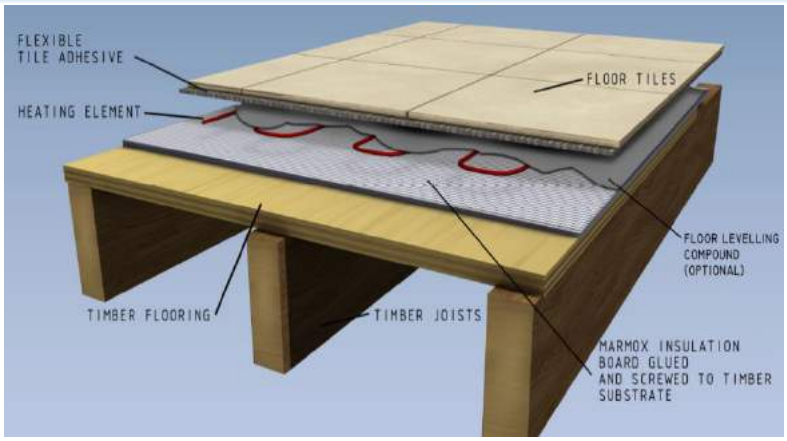
For BRANZ

P Burghout
Chief Executive

Date of issue: 15 April 2011

MARMOX INSULATION BOARD
Installation instructions

TIMBER FLOOR

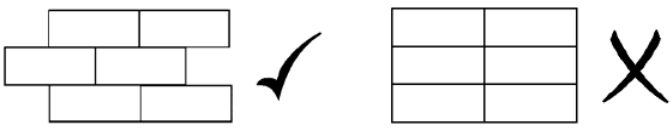


UNDERTILE HEATING WITH MARMOX INSULATION BOARD INSTALLED ON A TIMBER FLOOR.

Preparation

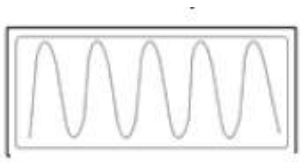
1. The existing timber floor must be flat, swept clean of debris, plaster and dust etc. This is to ensure good adhesion.

2. Cut the boards to fit the shape of the room, with staggered joints, before adhering them to the floor (see example below). The board can be cut using a basic "box cutting" blade, Stanley knife or jigsaw.



Fixing of Marmox Board with Tile Adhesive

3. Once the Marmox is laid out you are ready to fix it down. One product that can be used is Bostik, Tuff as Nails, adhesive–polystyrene friendly/solvent free. Individually lift up each board and apply the glue around the edge of the floor where the board will go and zig-zag in the centre (see example to the right) to ensure it will be securely adhered to the floor.



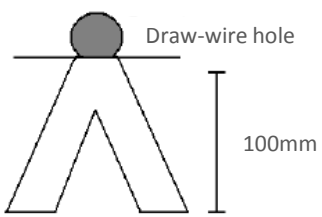
Floor diagram

4. Place the board back in its original position. At this stage you need to gently press down on the board so no voids (air) are left beneath.

5. The board then needs to be fixed using 25mm clout/jolt head nails or wallboard screws at 150mm centres, approximately 40 fixings per board.

6. Long joins need to be bandaged with a fiberglass adhesive tape(eg Fostoc Fibatape)

If Marmox is being used in conjunction with Warmup undertile heating, and a waterproofing layer is to be installed before the heating, a "fishtail" cut will need to be removed where the draw-wire exits the bottom of the wall. This is to avoid piercing the waterproofing when the heating is installed.



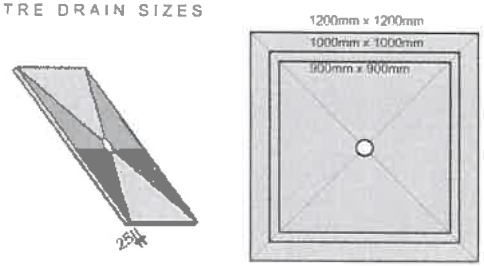
When all of the individual Marmox boards have been laid, scrape away any excess adhesive that may have squirted up through the gaps to ensure a nice flat floor for the tiler.

There should be no foot traffic on the Marmox boards until dry or for approximately 8 hours.

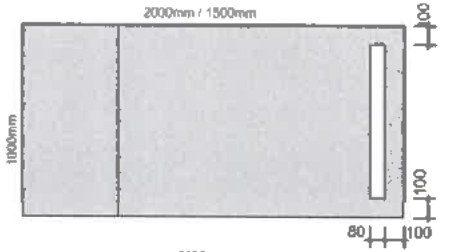
Marmox New Zealand Ltd
T 09 820 4001 **F** 09 820 7090 **E** info@marmox.co.nz **W** www.marmox.co.nz

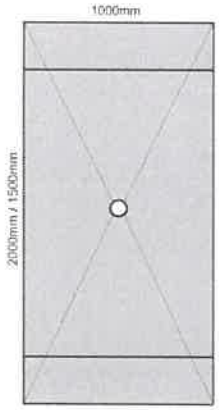
MARMOX SHOWER TRAY SYSTEM

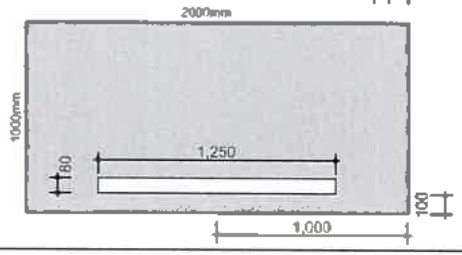
CENTRE DRAIN SIZES



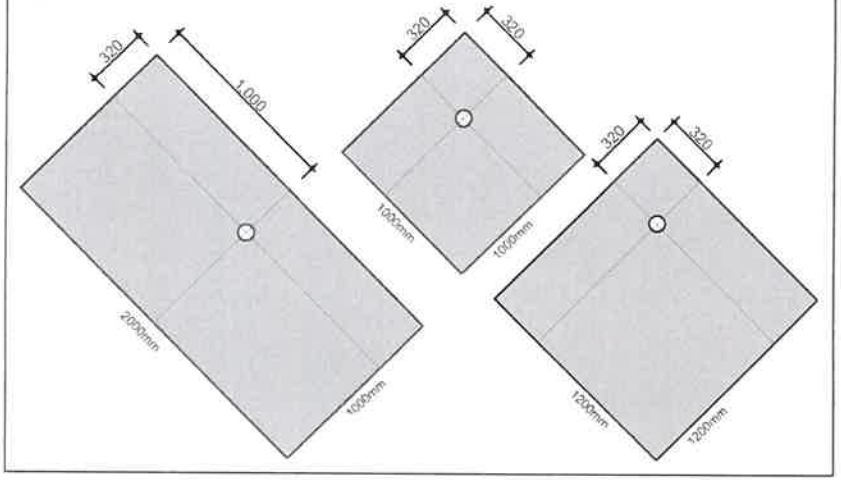
TROUGH DRAIN SIZES



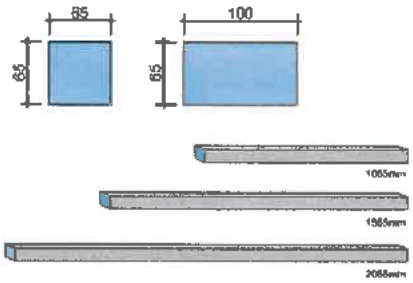




OFFSET DRAIN SIZES



SHOWER HOB SIZES

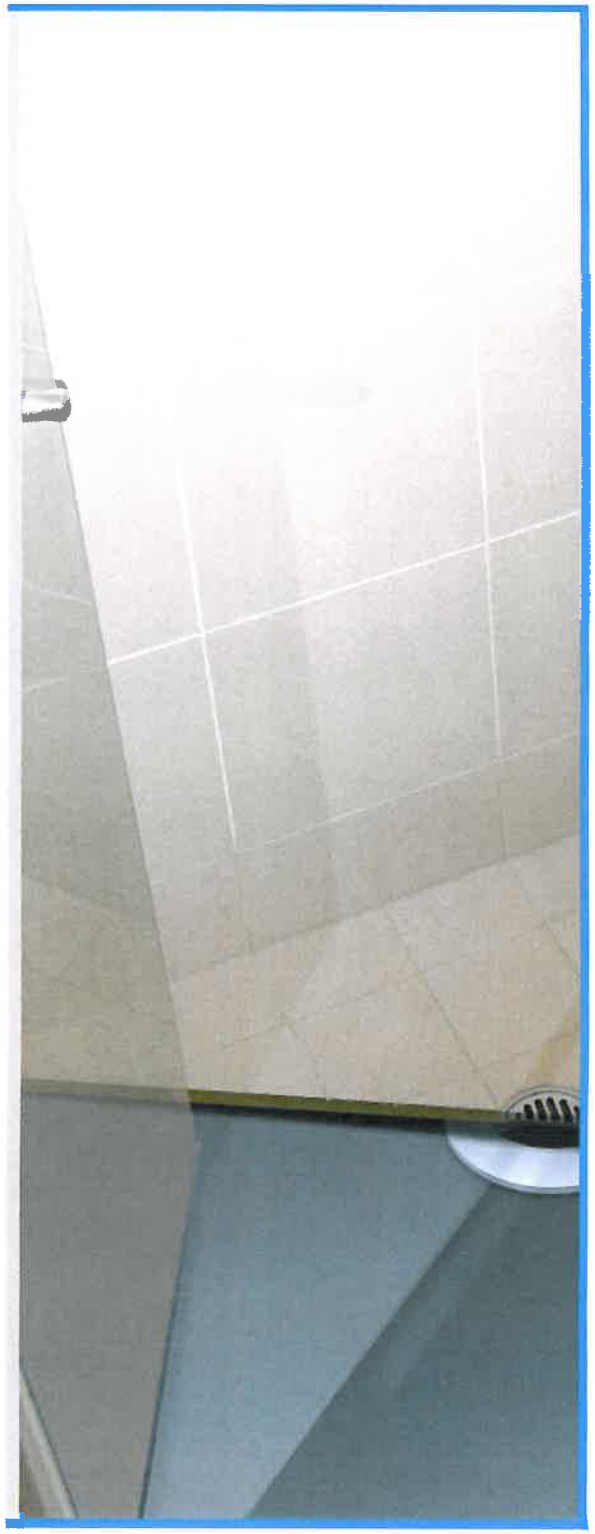


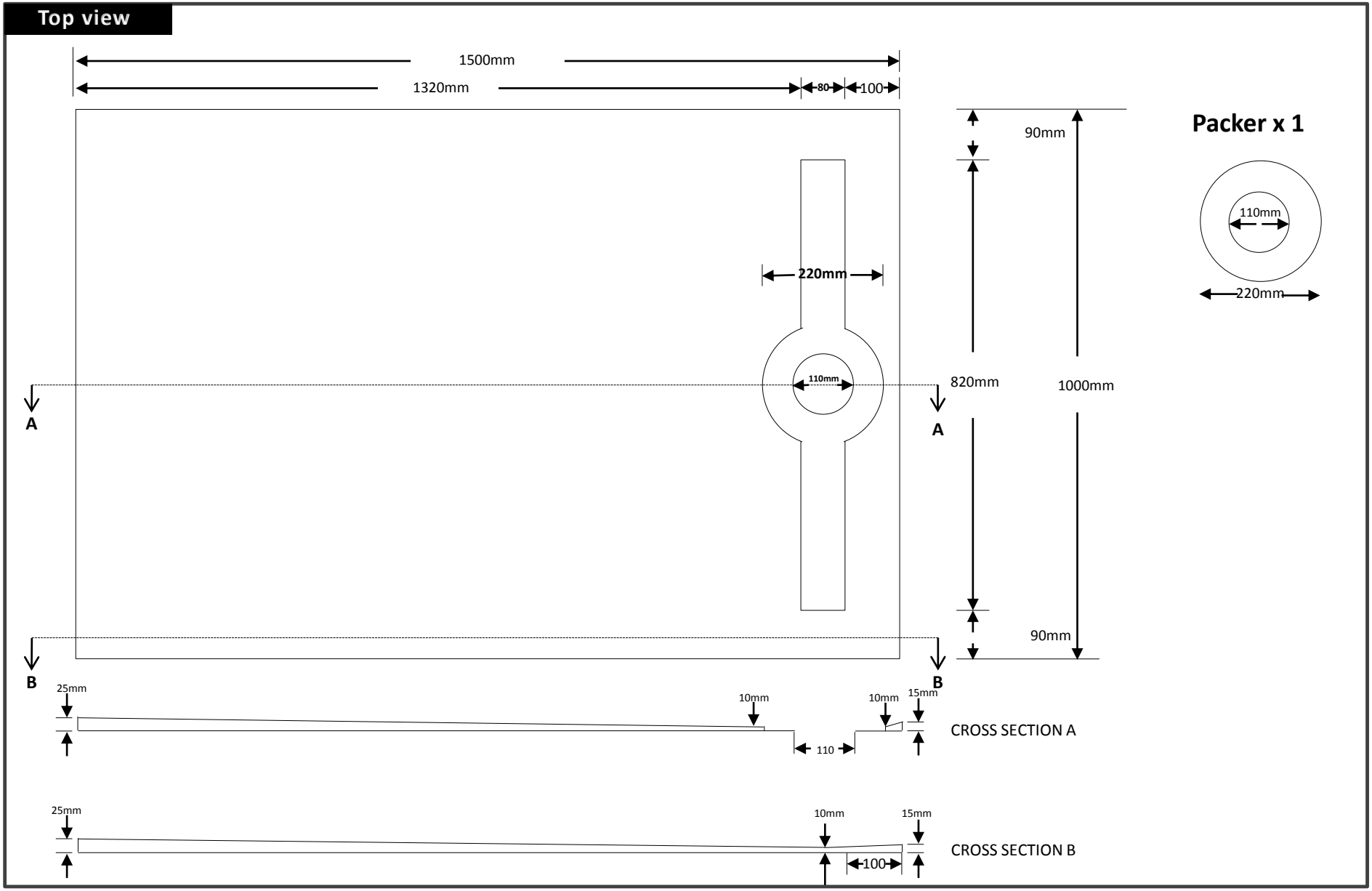
ADVANTAGES

- MORE ECONOMICAL WATERPROOF SYSTEM
- 100% WATERPROOF MARMOX SHOWER TRAY SYSTEM
- ACOUSTICALLY BETTER THAN SCREED
- HYGENIC AS NO MOISTURE BUILDS UP IN TILES
- PRE-LAID TO FALLS (MIN 4% DRAIN ANGLE)
- AVAILABLE WITH CORNER OR CENTRAL DRAIN
- LIGHTWEIGHT (AS LITTLE AS 3.5KG)
- CAN BE FINISHED WITH TILES OR SHEET SYSTEMS
- EASY ACCESS FLOOR LEVEL
- CAN BE EASILY CUT TO FIT ANY SIZE
- PREFORMED (NO SKILLED LAYING OF FALLS)
- CAN BE FIXED TO TIMBER OR CONCRETE FLOORS

TECHNICAL PROPERTIES

COMPRESSIVE STRENGTH	0.3N/mm
DENSITY	XPS core 36kg/m³ Polymer Cement Layers Approx weight 2.7kg/m² per face
FIRE RATING	Class 0 (BS 476 parts 6 and 7)



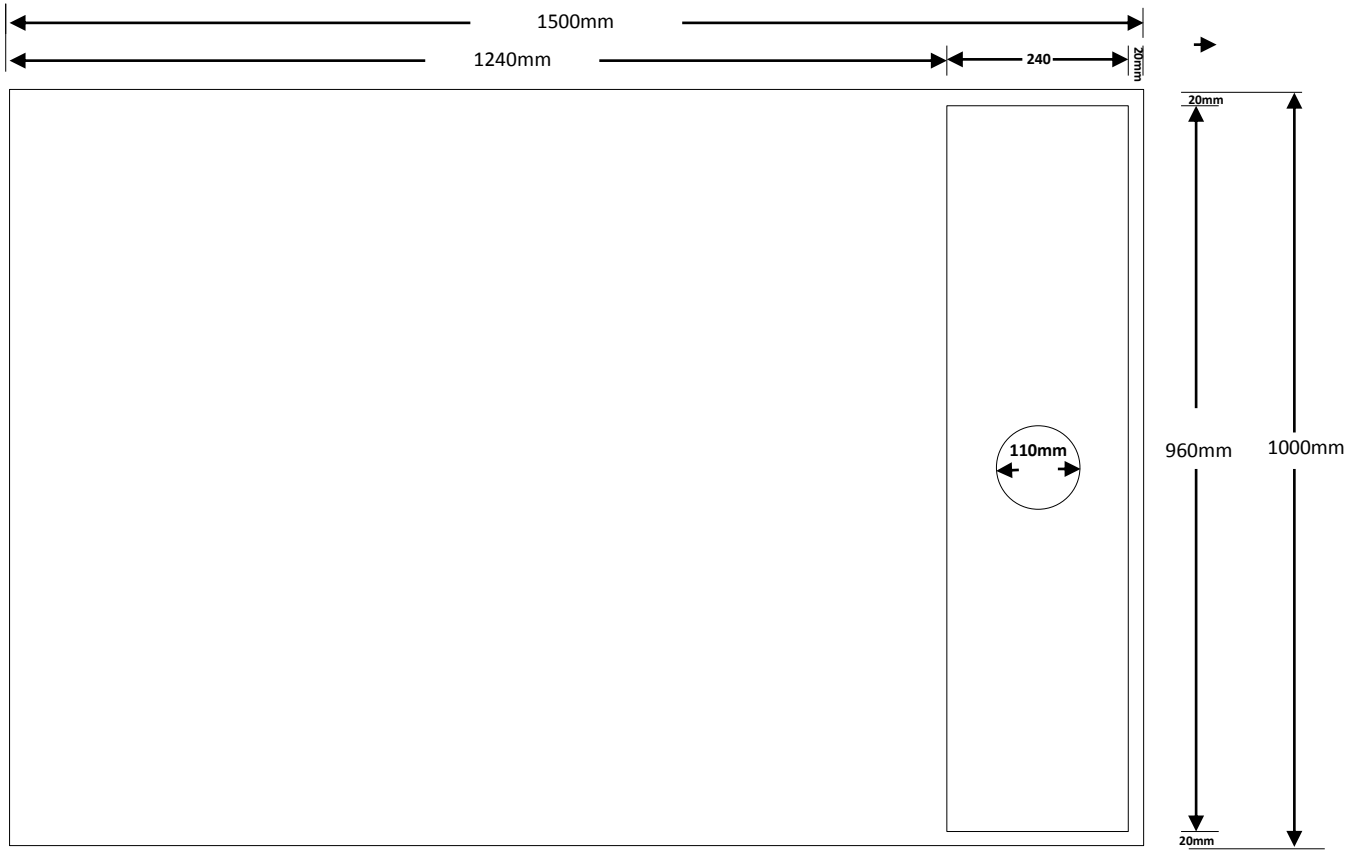


DRAWING NOT TO SCALE

Marmox New Zealand Ltd

Title: Trough Drain Traverse Channel 1000mm x 1500mm

Bottom view



DRAWING NOT TO SCALE

Marmox New Zealand Ltd

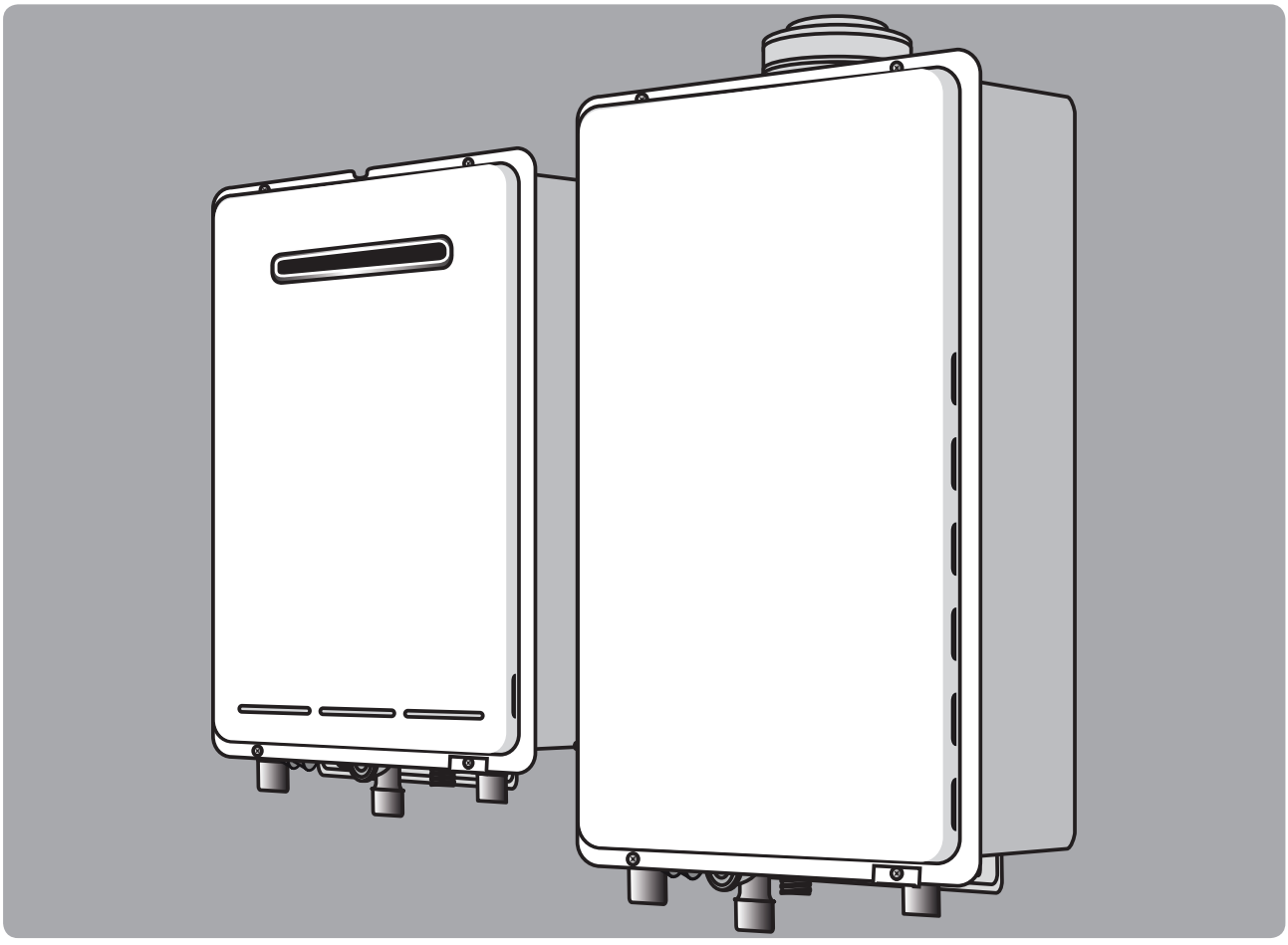
Title: Trough Drain Traverse Channel 1000mm x 1500mm

Rinnai

Installation guide

Continuous flow water heaters

Models: VT16-26, HD200, HDi200, HD250, EF24, EF250, EFi250



Important:

This appliance must be installed in accordance with:

- Manufacturer's installation instructions
- Current AS/NZS3000, AS/NZS3500, AS/NZS 5601.1 and G12/AS1
- Local regulations and municipal building codes

For use with Natural Gas or Universal LPG as indicated on the appliance.

Not suitable as a spa or swimming pool heater.

Rinnai continuous flow internal water heaters
('i' models) must be installed with an approved Rinnai flue system.

Appliance must be installed, commissioned and serviced by an authorised person, being in New Zealand a licensed gasfitter, in accordance with these instructions and all applicable local rules and regulations.

Warning
Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.

For more information about buying, using, and servicing of Rinnai appliances call: 0800 RINNAI (0800 746 624)

Rinnai New Zealand Limited
105 Pavilion Drive, Mangere, Auckland
PO Box 53177, Auckland Airport, Auckland 2150

Phone: (09) 257 3800, Fax: (09) 257 3899
Email: info@rinnai.co.nz
Web: www.rinnai.co.nz, www.youtube.com/rinnainz

contents:

Before installation

Check for damage

8QSDFNDQGLQVSHFWWKHXQLW RQYLVLDOLc able) and cheFNIRUGDPDge. DO NO7LQVWDOODQ\GDPDged itHPV

Check components and gas type

CheFNDOOFRPSRQHQWVDUH eVXSSOLe GDQGWKDWWKHFRUU ecWJDVt\p e.

Read these instructions before starting

Read theVHLQVWUXFWLRQVDQGWKHRSHUDWLQJLQVWUXFWLRQVLQWKHRSHUDWLQJ eWDQGUHDG Le ZLWKt SVU eTXUed bIRU HVWDUWLQJWKHLQVWDOODWLRQ. Follow thVHLQVWUXFWLRQVFDUHIXOO\ WRDYRLGSHUVRQDOLQMXU\RU SURSHUW\ GDPDge.

Solar installations

FRUILQQDLFRQWLQXRXVIORZKRWwatHUKHDWeUV XVed in VRODULQVWDOODWLRQVUeIHU WR WKe G6RODU6XSSOHPHQWDU\ DFFHVVRU\...

EF models are heavy

The RLQQDLQ (PR GHVDUH32 kg. PleaVH e caUHIXOLIWLQJDQGV eHNDVVLVWDQFHLIUeTXLUed.

Applicable models

TheVHLQVWDOODWLRQLQVWUXFWLRQVDSSO\ WRWKHIROORwing RLQQDLFRQWLQXRXVIORZKRWwatHUKHDWeUV

RLQQDLQ V T16	[HUQDO	5B VR1620WG		**Model number**
RLQQDLQ V T20	[HUQDO	5B VR2024WG		Rt FKHFNR del QXPEHULVZLWKLQ the data plate on the OHIWVLGHRIWKH appliance.
RLQQDLQ V T24	[HUQDO	5B VR2426WG		
RLQQDLQ V T26	[HUQDO	5B VR2626WG		
RLQQDLQ 0	[HUQDO	5B VRM2632WC		
RLQQDLQ I0	IntHUQDO	5B VR2632FFUG		
RLQQDLQ 2 50	[HUQDO	5B VR3237WG		
RLQQDLQ (2 4	[HUQDO	5B 430WG		
RLQQDLQ (2 50	[HUQDO	5B M3237WD		
RLQQDLQ (L2 50	IntHUQDO	5B M3237FFUD		

i = intHUQDOaWK VPHXWb HLQVWDOOed with an appURYed RLQQDLIOXe \VWHP

FRUPLQLPXPt eGDVFRQVXPSWLRQVSUHVVXUeVVDQGJDVt\peVVe aVe UHIHU WRWKHGDWDSODWHRQWKHOHIWVLGH RIWKHDSSOLDQFe .

Appliance location

Installation in environments free from corrosive compounds

Air surrounding the water heater, venting and vent termination(s) is used for combustion and must be free from compounds that cause corrosion of internal components. These include corrosive compounds that are found in aerosol sprays, detergents, bleaches, cleaning solvents, oil based paints/varnishes, and refrigerants. Therefore Rinnai recommends outdoor models be used for these locations where possible. The water heater, venting and vent termination(s) should not be installed in any areas where the air may contain these corrosive compounds. Chemicals that are corrosive in nature should not be stored or used near the water heater or vent termination.

Damage and repair due to corrosive compounds in the air is not covered by warranty.

If it is necessary for a water heater to be located in areas which may contain corrosive compounds, Rinnai strongly recommends the following:

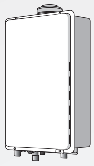
<u>Indoor (internal) water heaters</u>

- DO NOT install in areas where contaminated air is present.
- Consider, before installation, where air has the ability to travel within the building.
- Where possible, install the heater in a sealed closet so that it is free of contaminated indoor air.

<u>Outdoor (external) water heaters and vent terminations of indoor (internal) water heaters</u>

- Install as far away as possible from exhaust vent hoods
- Install as far away as possible from air inlet vents—corrosive fumes may be released through these vents when air is not being run through them

Internal models



Internal models are designed for indoor installations only. They may be installed in an enclosure if the requirements of AS/NZS 5601.1 are sDWLV d. An enclosurHEZQ d as a compartment, enclosed area or partitioneRŠDFHSUŁDUO\ used for the installation of the appliance.

They must be mounted on a vertical structure with the water and gas connections on the underside pointing downwards. For appliances installed in roof spaces or elevated structures, speFLr equirements apply. Refer to AS/NZS 5601.1 for details.

<u>Catch pan</u>

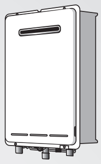
CAUTION It is important that a suitably drained catFKSDQt ed where damage could be caused by discharge from the water heater. Provision must be made for safe disposal of any leaking water to an external location.

This appliance MUST be used with the appropriate RQDes ystem.

The locDWLRQWKHXt erminal must comply with AS/NZS 5601.1 Fig. 6.2.

Manufacturer's instructions for model REU-KM3237FFUD (EFi250); for reference j, gas appliances over 200 MJ/h input, usH—PP

External models



External models are designed for outdoor installations only. They must be located in an above ground open-air situation with natural ventilation, without stagnant areas, and where gas leakage and products of combustion are rapidly dispersed by wind and natural convection.

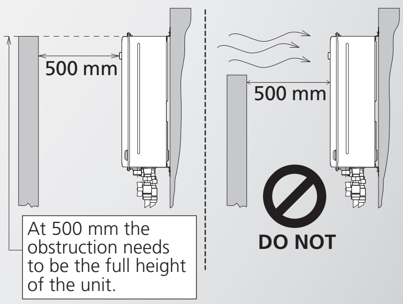
They must be mounted on a vertical structure with the water and gas connections on the underside pointing downwards.

The locDWLRQWKHXt erminal must comply with AS/NZS 5601.1 Fig. 6.2.

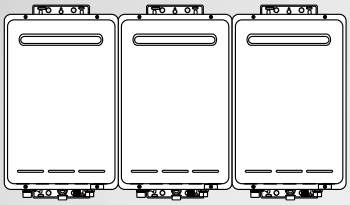
Manufacturer's instructions for model REU-KM3237WD (EF250); for reference j, gas appliances over 200 MJ/h input, usH—PP

<u>Horizontal obstructions</u>

AS/NZS 5601 stipulates a minimum horizontal clearance of 500 mm between a building structure and obstruction facing the terminal. At 500 mm the obstruction needs to be the full height of the unit (as shown), and not a partial obstruction. A partial obstruction of less than 1 m could result in wind SXQDeJDs es back into the Xt erminal.



When multiple units of the same model are installed on the same vertical face, with the flue terminals at the same height, they can be installed next to each other (as shown).



All models

This appliance must be placed as close as possible to the most frequently used hot water outlet or outlets to minimise the delay for hot water delivery.

For installations where the distance between the water heater and the outlets is considerable, a flow and return system can be used to minimise the waiting time for hot water delivery. Alternatively, multiple appliances can be strategically placed to serve different outlets. Contact Rinnai for further information.

An AC 230 V, 10 Amp, earthed power point must be provided adjacent to the appliance. For outdoor installations, this power point must be weatherproof. It must be clear of the gas and water connections to the appliance and also the flue exhaust and water pressure relief valve. The power cord of the appliance is 1.5 m long.

All appliances must be installed to ensure access can be gained without hazard or undue difficulty for inspection, repair, renewal or operational purposes. Sufficient clearances shall allow access to and removal of all serviceable components.

Appliances should not be mounted higher than 3.5 m above the ground or floor level unless the customer can arrange permanent and safe access or can provide another means of access such as scissor or boom lifts.

Clearances from combustible materials

The appliance can be mounted directly against the wall or structure. There is no need to use non-combustible sheeting or leave an air gap between the appliance back panel and the wall or structure for the purposes of meeting the temperature hazard requirements of AS/NZS 5601.

General installation information

Catch pan

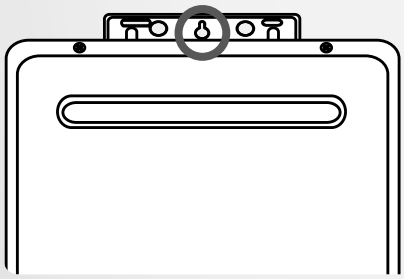
It is important a suitably drained catch pan is fitted (especially for internal units) where damage could be caused by discharge from the water heater. Provision must be made for safe disposal of any leaking water to an external location.

Mounting the appliance

Refer 'Connections and Fittings' for individual appliance weights. The wall or structure on which these units are to be mounted must be capable of supporting these weights and the associated pipe work.

Ensure suitable fixing screws or bolts are used to secure the units to the walls, in accordance with AS/NZS 5601.1. Wooden plugs shall not be used.

The top bracket has a keyhole slot (circled below) so the appliance can be positioned by hanging it on one screw while the other screws are secured.



Circuit diagrams

Refer to commissioning sheet supplied with the appliance (inside front cover of appliance).

Pipe sizing

Refer 'Connections and Fittings' for appliance gas consumption. If the gas pipe sizing is insufficient the customer will not get the full performance benefit. Gas pipe sizing must consider the gas input to this appliance as well as all the other gas appliances in the premises. The gas meter and regulator must be specified for this gas rate.

An approved sizing chart such as the one in AS/NZS 5601.1, or proprietary system manufacturer guide should be used.

Water pipe sizing and layout should be performed in accordance with AS/NZS 3500. All hot water pipe work should be insulated to optimise performance and energy efficiency.

Water supply

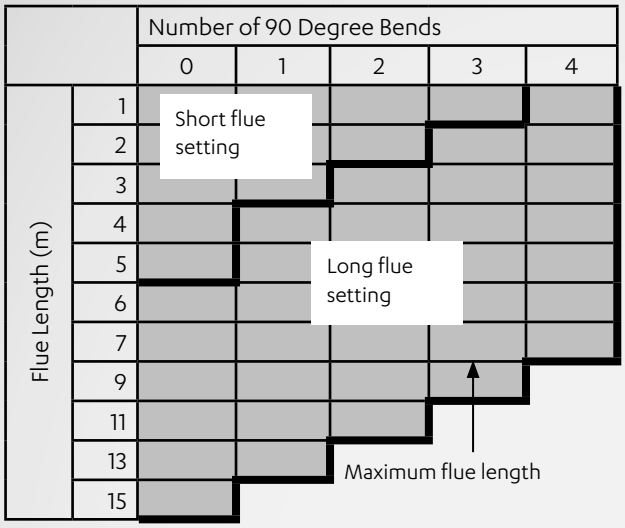
Refer 'Connections and Fittings' for applicable water pressures. Approved pressure limiting valves may be required if the stated maximum rated water supply pressures are exceeded. To achieve the rated flow, the stated minimum water supply pressures must be supplied. The water heaters will operate at lower pressures but will not achieve the rated flow.

Water chemistry and impurity limits are stated in our detailed warranty statement. Most metropolitan water supplies fall within these requirements. If you are unsure about the quality of the water, please contact Rinnai and we will provide you with the details of an authorised agency who are able to test your water for compliance to Rinnai standards. If sludge or foreign matter is present in the water supply, a suitable filter or strainer should be incorporated in the water supply to the water heater.

Flued (internal) water heaters

This water heater must be fitted with the appropriate Rinnai flue system.

The chart below highlights the maximum flue length and number of bends. It also shows the difference between a short and long flue—this is important if changing settings (DIP switches).



Refer to separate Rinnai flue guide for further details.

Water delivery temperature

Local regulations and/or requirements of AS/NZS3500.4 must be considered regarding the temperature limitations of hot water supplied to areas used primarily for personal hygiene. The temperature of these areas may be limited to 55 °C or less.

If the appliance is to deliver water primarily for the purposes of personal hygiene in an early childhood centre, school, nursing home or similar facilit DV d in AS/NZ3500.4 a Temperature Limiting Device (TLD), such as a Tempering Valve may be required (even if the appliance is set to 55 °C or less). For these types of applications contact Rinnai.

Requirements for RL LFR Xoe w units installed without controllers

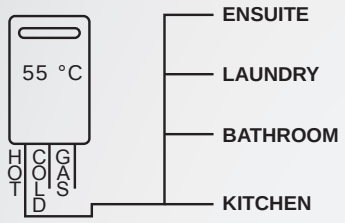


Diagram 1 - 55 °C Appliance

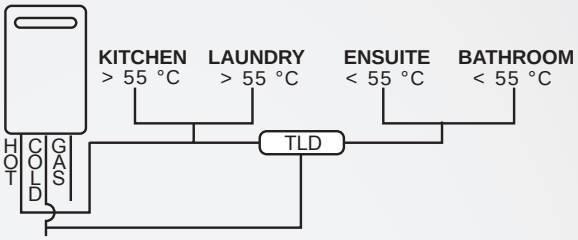


Diagram 2 - Not a 55 °C Appliance
(TLD = Temperature Limiting Device)

Xoe w unit is set to deliver water at a temperature higher than 55 °C, it will be necessary t DV Temperature Limiting Device for delivery to areas used for the purposes of personal hygiene.

Connections and fittings

Models	Gas consumption MJ/h	Water Supply kPa		Weight kg	Fittings			Condensate
		Min.	Max.		Hot	Cold	Gas	
VT16 external REU-VR1620WG	125	120	1000	15	R½ (15 mm)	R½ (15 mm)	R¾ (20 mm)	N/A
VT20 external REU-VR2024WG	160	160	1000	16	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	N/A
VT24 external REU-VR2426WG	188	180	1000	17	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	N/A
VT26 external REU-VR2626WG	199	180	1000	17	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	N/A
HD200 external REU-VRM2632WC	199	140	1000	21	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	N/A
HDi200 internal REU-VR2632FFUG	195	140	1000	21	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	N/A
HD250 external REU-VR3237WG	249	200	1000	29	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	N/A
EF24 external REU-K2430WG	162	240	1000	27	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	R½ (15 mm)
EF250 external REU-KM3237WD	211	240	1000	32	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	R½ (15 mm)
EFi250 internal REU-KM3237FFUD	211	240	1000	32	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	R½ (15 mm)

Service connection points

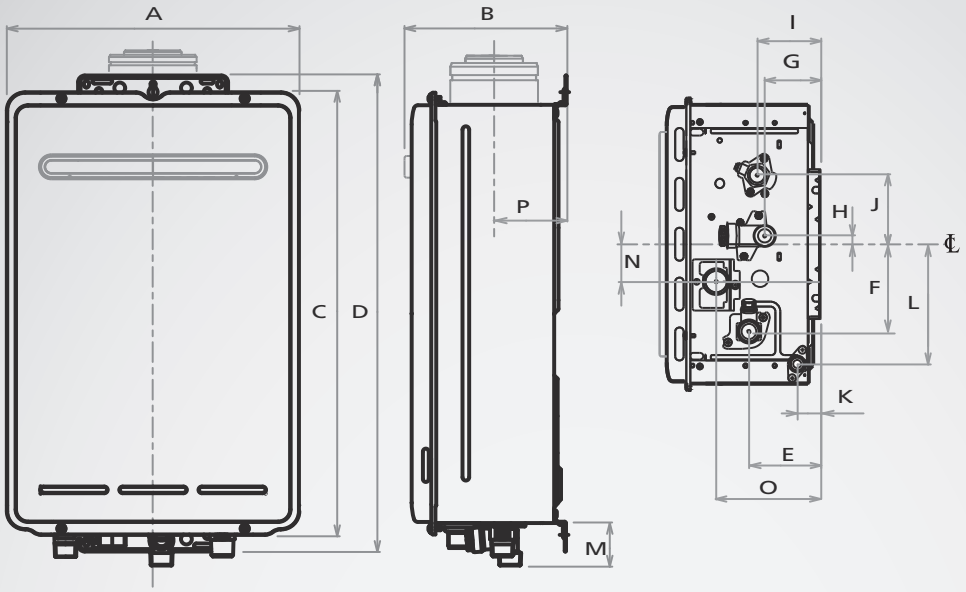
These dimensions are NOT an indication of the pipe sizes required.

An approveGI⊠Ooew isolation valve and disconnection union MUST bHWted to the cold water inlet. A non-return valve is not required unless required by local regulations.

Isolation valves must bHWted so the appliance can be removed.

Purge gas and cold water supply lines to remove air and swarf beforHDQOFRQction of the appliance. Swarf in the gas or water supplies may cause damage.

Dimensions: VT and HD models

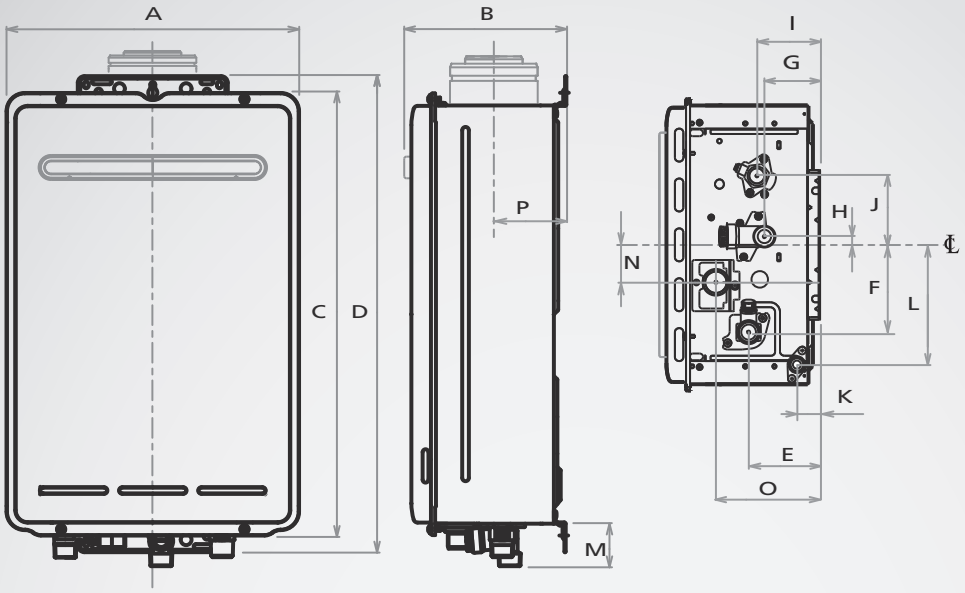


Dimensions table (mm)		VT16 external (REU-VR1620WG)	VT20 external (REU-VR2024WG)	VT24 external (REU-VR2426WG)	VT26 external (REU-VR2626WG)	HD200 external (REU-VRM2632WC)	HDi200 internal (REU-VR2632FFUG)	HD250 external (REU-VR3237WG)
A	Width	350	350	350	350	350	350	470
B	Depth	194	194	194	194	250	235~275	244
C	Height - unit	530	530	530	530	600	600	600
D	Height - including brackets	571	571	571	571	636	641	644
E	Hot water outlet (from wall)	87	87	87	87	95	91~131	115
F	Hot water outlet (from centre)	105	105	105	105	110	110	61
G	Cold water inlet (from wall)	68	68	68	68	74	70~110	99
H	Cold water inlet (from centre)	10	10	10	10	27*	27*	52
I	Gas connection (from wall)	77	77	77	77	103	99~139	61
J	Gas connection (from centre)	83	83	83	83	89	89	110
K	Condensate outlet (from wall)	-	-	-	-	-	-	-
L	Condensate outlet (from centre)	-	-	-	-	-	-	-
M	Gas: Length gas connection (from base)	40	40	40	40	41	41	41
	Cold: Length of cold water inlet (from base)	50	50	50	50	51	51	51
	Hot: Length of hot water outlet (from base)	39	39	39	39	42	42	42
N	Electrical connection (from centre)	45	45	45	45	21**	21**	2**
O	Electrical connection (from wall)	128	128	128	128	160	160~200	100
P	Flue spigot centre line (from wall)	-	-	-	-	-	95~135	-

* This measurement is to the left of the centre line
** This measurement is to the right of the centre line

HDi200 ot from base of unit approx. 85 mm

Dimensions: EF models



Dimensions table (mm)		EF24 external (REU-K2430WG)	EF250 external (REU-KM3237WD)	EFi250 internal (REU-KM3237FFUD)
A	Width	350	470	470
B	Depth	277	283.1	257~307
C	Height - unit	600	654	654
D	Height - including brackets	644	721.6	721.6
E	Hot water outlet (from wall)	164.5	115	110~150
F	Hot water outlet (from centre)	100	100	100
G	Cold water inlet (from wall)	83	79.6	74.6~114.6
H	Cold water inlet (from centre)	53*	27.2	27.7
I	Gas connection (from wall)	70.5	104	99~139
J	Gas connection (from centre)	25	103.2	103.2
K	Condensate outlet (from wall)	33	137.6	132.6~172.6
L	Condensate outlet (from centre)	132	195	195
M	Gas: Length gas connection (from base)	51	40.2	40.2
	Cold: Length of cold water inlet (from base)	62	50.2	50.2
	Hot: Length of hot water outlet (from base)	41	41.2	41.2
	Condensate connection length (from base)	24	22.4	22.4
N	Electrical connection (from centre)	10**	49	49
O	Electrical connection (from wall)	175	200	195~235
P	Flue spigot centre line (from wall)	-	-	139~179

* This measurement is to the left of the centre line
** This measurement is to the right of the centre line

EF250 models: Earthing the unit

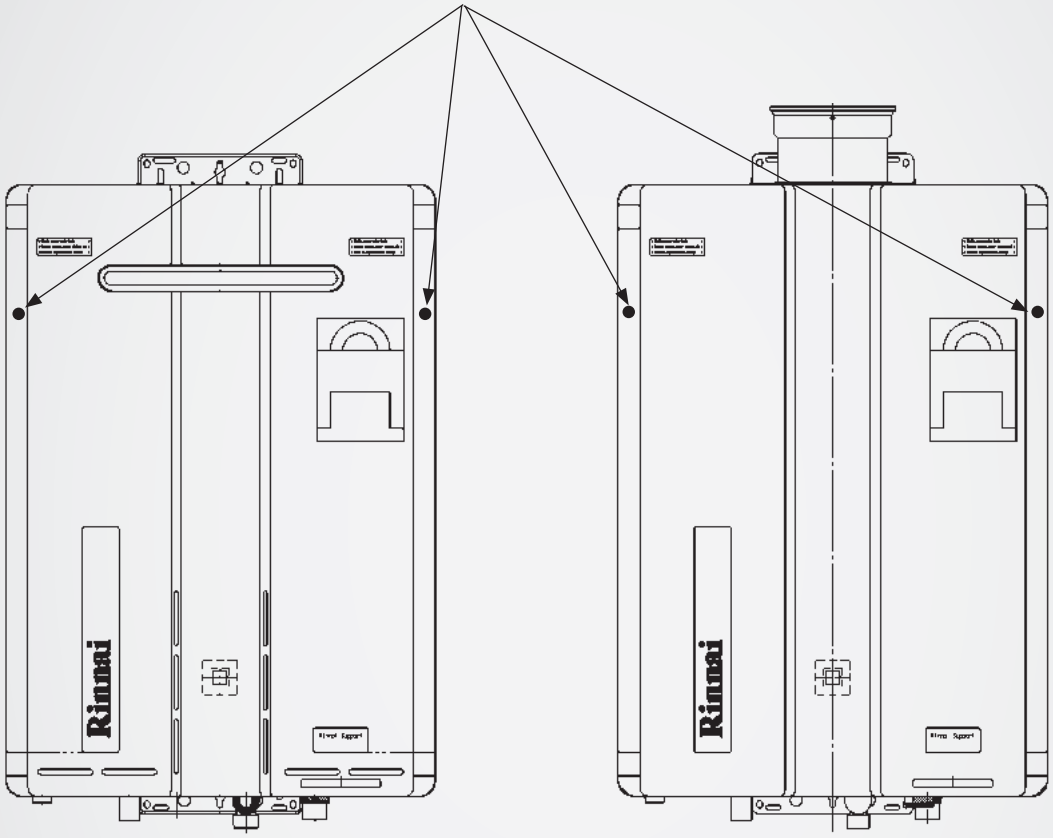
Removing the cover and earthing the unit

For the R[illegible]e w water heaters (EF250 & EFi250), the earthing screws are located under the side trim, refer image below. First remove the trim and then the earthing screws before[illegible].

WARNING

For safe operation of the appliance the earthing screws MUST be replaced.

Earthing screws located under side trim



EF models: Condensate drain

The Rinnai Infinity EF water heaters generate condensate continuously at a rate of up to five litres per hour as a by-product of a highly efficient gas burner. Condensate must be drained via a pipe to a suitable discharge point.

As condensate is a by-product of gas combustion it is mildly acidic. For this reason copper tube and fittings MUST NOT be used as it will corrode. Instead Rinnai recommend plastic pipes and fittings.

Important considerations for the condensate drain pipe

Content of AS3500.4.2003 section 5.12 'Temperature/Pressure Relief and Expansion Control Valve Drain Lines' has been used as a guide in preparing these considerations.

A. Water heater drain outlet connection, ½ " (15 mm) BSP male.

B. PE ½ "BSP (15 mm) female to barbed ignition system connector (13-19 mm) or equivalent plastic fitting.

C. Drain pipe and fittings to match (B).

D. Continuous fall of at least 2° from water heater to discharge point, length and bends in accordance with 'Maximum length and changes of direction greater than 45°'.

E. Suitable points of discharge are deemed to be sewers or pits. DO NOT discharge onto electrical connections, earth stakes, copper pipes, concrete paths, or into a pond.

Maximum length and changes of direction greater than 45°

Length and changes of direction				
Max. length (m)	9	8	7	6
Max. changes of direction (> 45°)	3	4	5	6

Installation of a condensate drain

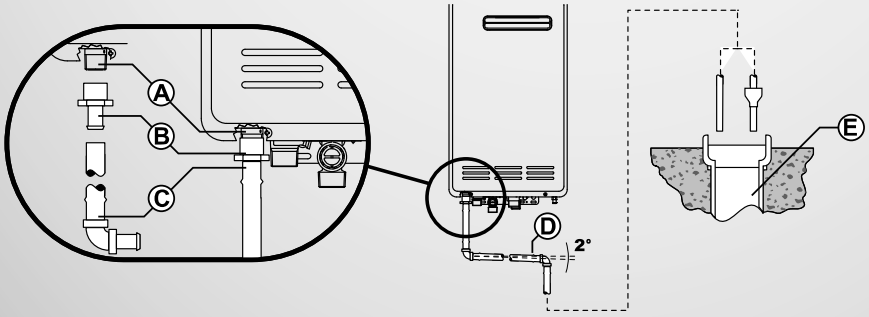
Point of discharge from each drain line shall be located so the release of condensate does not cause a nuisance, is readily discernible and incurs no risk of building damage. There shall be no tap, valve or other restrictions in any line. Each line shall fall continuously from the valve to the approved point of discharge.

Drain lines shall not discharge into a storage water heater safe tray. The end of the condensate drain line shall be:

- Not lower than 200 mm, or higher than 300 mm above an unpaved surface; or

- Not lower than 75 mm, or higher than 300 mm above a gravel pit, and not less than 100 mm in diameter in a paved surface.

Where discharging over a tundish or gully trap, drain lines shall have an air gap of a size at least twice the diameter of a drain line.



Joining of condensate drain lines

Condensate drain lines from multiple water heaters may be joined together provided they conform with the installation requirements stated on this page.

Common stack discharge

Where individual heaters are installed in a multistory building, the condensate drain lines may discharge into a common stack subject to the following:

- Drained to a tundish having a discharge line that is not less than the common stack, directly connected to a fixture trap, and installed in a connection with any adjacent soil or waste stack.

- Discharge point of the common stack is readily visible and does not cause any nuisance.

- Common stack is vented by extending the pipe upwards, above the roof level.

Tundish drain lines

The drain line from any tundish shall be not less than DN 20 or less than one size larger than that of the largest drain line discharging into the tundish. Tundish drain lines shall comply with the installation requirements above.

Areas subject to freezing

In areas where water pipes are prone to freezing, the drain pipe from any valve shall be insulated and not exceed 300 mm in length. It shall discharge into a tundish through an air gap of not less than 75 mm and not exceed more than 150 mm measured from the outlet of the drain pipe to the rim of the tundish.

Controllers - general information

Water controllers are available as an optional extra. Universal (Compact), Deluxe, and Wireless controllers can be used together.

Maximum number of controllers

A maximum of four water controllers can bHWted with the following limitations:

- Max. of one Kitchen Deluxe controller (MV-100V)
- Max. of two Bathroom Deluxe controllers (BC-100V)

Only one controller can be set to deliver 55 °C, this cannot be a Bathroom Deluxe controller.

This next section refers to wired controllers. For details on wireless controllers refer to separate instructions.

Important

Others manufacturers' controllers are not compatible with Rinnai ,Q IRQQRXoe w water heaters.

Installation of controllers

Do not install controllers:

- near a heat source such as, a cook top, stove or oven—heat, steam, smoke, or hot oil may cause damage
- in direct sunlight
- outdoors unless protection from dust ingress and sunlight are provided
- against a metal wall unless in accordance with AS3000

Positioning

Controllers must be installed in shaded and clean locations. They should bHWted out of reach of children (suggested height 1.5 m). The Compact and Bathroom Deluxe Controllers are water resistant, however, durability is improved when positioned outside the shower recess or at least 400 mm above the highest part of a sink, basin or bath.

Water controller cables

Water controllers operate at extra low voltage (12 Volts DC) which is supplied from the water heater. Controllers come with 15 m of electrical cable. The appliance end of the controller cables arHWted with spade terminals.

Extension cabling is available as an accessory from Rinnai. Alternatively, a two core sheathed (double insulated WKD minimum cross sectional area of 0.5 mm^2 may be used.

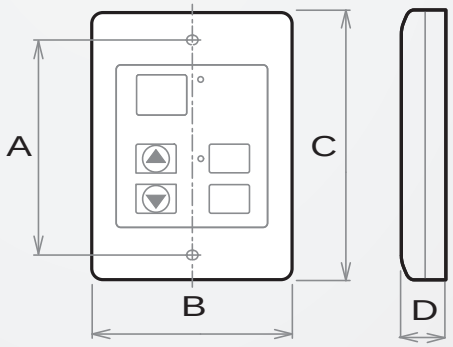
Maximum individual cable runs:

One controller	= 100 m
Two controllers	= 50 m*
Three plus controllers	= 20 m*

* per controller

Water controller cables are not polarity sensitive.

Dimensions



Dim.	Description	Compact (MC-91)	Kitchen Deluxe (MC-100V)	Bathroom Deluxe (BC-100V)
A	Distance between mounting holes	83	83	181
B	Width	90	128	195
C	Height	120	120	97
D	Depth	20	20	22

Controllers - Universal (Compact)

Fitting the Universal (Compact) controller

1. Determine the most suitable position for the controller.

2. Drill three holes as shown (Fig. 1 and Fig. 2) for securing screws and one to provide cable access.

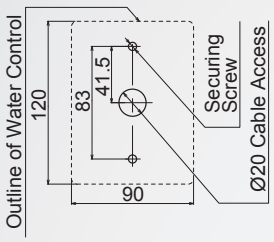


Fig.1

3. When running cable through the access hole ensure the connector and the end of the cable is located nearest to the controller (Fig. 2).

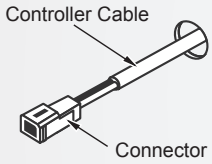


Fig.2

4. Carefully remove the face plate from the controller using the screwdriver (Fig. 3).

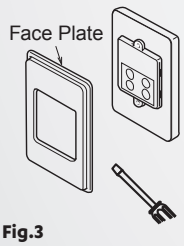


Fig.3

5. Fix the controller to the wall using appropriat[illegible] as shown (Fig. 4).

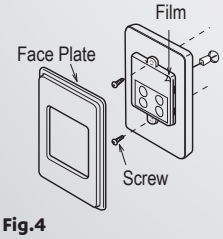


Fig.4

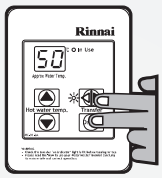
6. Remove protective plastic from the controller face as shown (Fig. 4) and replace the face plate.

Optional programming of the Universal controller

Step one

Are four controllers connected? If NO—refer to step two. If YES, activate the fourth controller as follows.

1. For the controller in the kitchen only, press and hold the 'Transfer' and 'On/Oš' buttons simultaneously until a beep is heard (approximately [illegible] econds).



2. Check display on all four controllers is displaying a temperature when switched on. If any controller displays two dashes, repeat above step.

Step two

1. For the controller in the kitchen only, press and hold the 'Transfer' and 'On/Oš' buttons simultaneously until a beep is heard (approximately [illegible] econds).

2. When the contr[illegible]ted in the kitchen is switched on it will be possible to select temperatures higher than 50 °C (at this controller). If not repeat above step.

If the kitchen controller is swapped repeat the programming procedure.

Controllers - Kitchen Deluxe

Installation

1. Determine the most suitable position for the controller.

2. Use the wall mounting bracket as a template to mark and drill three holes, locating the cable access hole as shown.

3. Fix the mounting bracket to the wall using the appropriate fixings.

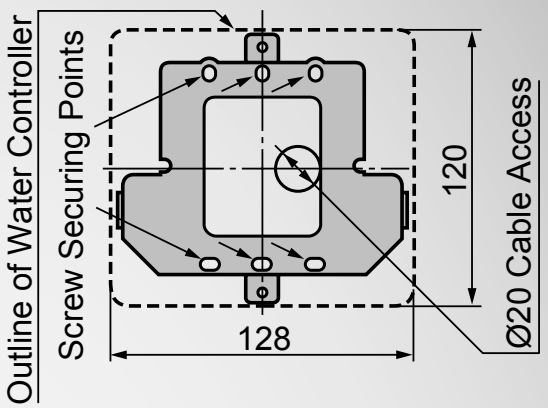
4. Run the water controller cable through the hole in the wall.

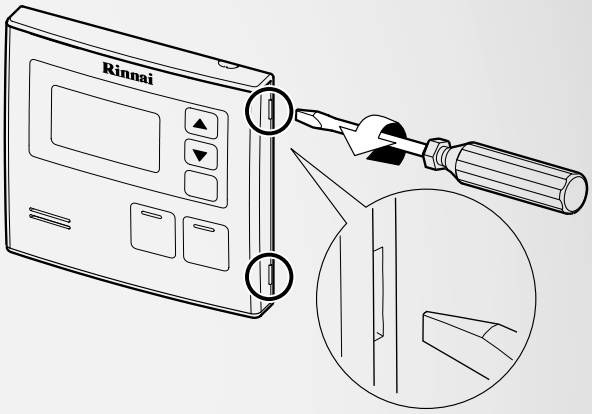
5. Carefully remove the face plate from the controller using a screwdriver as shown.

6. Connect the controller cable to the kitchen water controller. At this point cables from other controllers (if fitted) may also be connected to the kitchen water terminals, eliminating the need for multiple cable runs directly to the water heater. Feed excess cable lengths into the wall cavity to avoid pinching of cables between the wall and the water controllers.

7. Fasten water controllers to wall mounting bracket. Avoid the use of impact drills and over-tightening of fixings as this may damage the controllers.

8. Remove the protective plastic from the controller face and replace the face plate.





Controllers - Bathroom Deluxe

Installation

1. Determine the most suitable position for the controller.

2. Mark and drill three holes, locating the cable access hole as shown (Fig.1).

3. When running a cable through the access hole ensure the connector end of the cable is located nearest to the controller (Fig.2).

4. [illegible] d self-adhesive seal to the back of the controller (Fig.3).

5. Carefully remove the face plate from the controller. Do this by placing your thumbs on the front digital display while ho[illegible] ers behind the top plate and gently push down as shown (Fig.4). Do not use a screwdriver as this may damage the controller.

6. Connect the cable to the bathroom controller. Feed e[cess cable lengths into the wall cavity to avoid pinching of cables between the wall and the controller.

7.)[illegible] oom controller to the wall using appropriat[illegible] Avoid the use of impact drills and over-tightening of [illegible] g e the controller.

8. Remove the protective plastic from the controller face and replace the face plate.

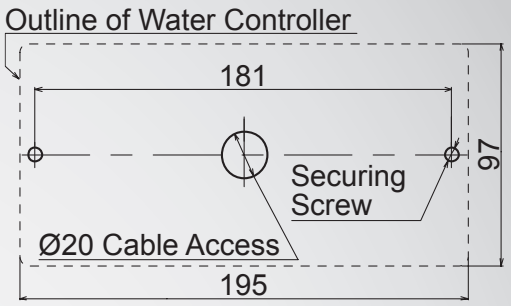


Fig.1

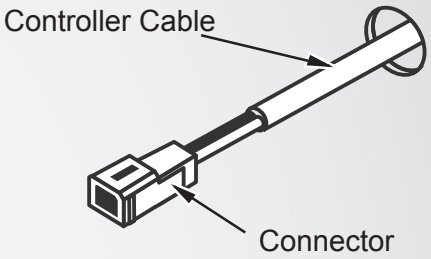


Fig.2

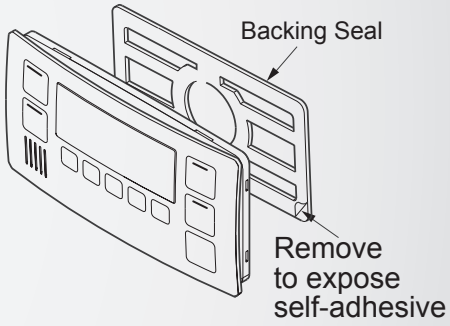


Fig.3

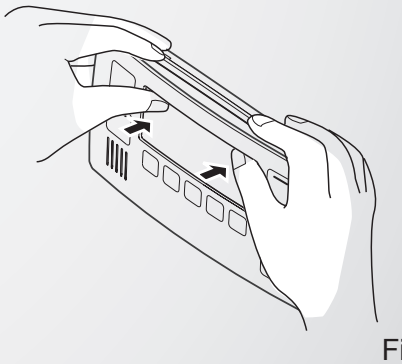


Fig.4

Controllers - communication cables

Communication cables connect the water heater to the water controllers and operate at an extra low voltage (12 Volts DC) which is supplied from the water heater. Communication cables are supplied with the water controllers (15 m) and are wired with spade terminals for connection to the water heater.

Up to two cables can be connected to the cable connector at the water heater. Extension cables are available from Rinnai. Alternatively two core sheathed (double insulated) PVC flex with a cross sectional area of 0.5 mm^2 may be used (refer maximum individual cable lengths on p. 15).

CAUTION

Do not attempt to connect cables to the cable connector at the water heater unless the electric power supply to the water heater is switched off. Otherwise damage to electrical components may occur.

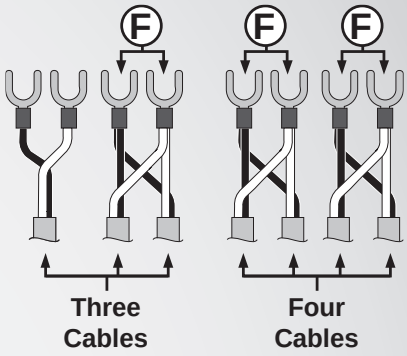
To connect up to two cables to the cable connector

1. Turn off power supply and unplug water heater from the power point.
2. Remove retaining screw of the cable connector at the base of the appliance.
3. Swing the cable connector door open. Thread the cable through the weather seal of the cable access hole (B) in the direction shown allowing sufficient cable length so the cable sheath can be secured with the cable clamp (C) supplied with the transceiver.
4. Loosen screw terminals (D) and (E) and connect cable spade connectors to these terminals and re-tighten. Polarity is not important, either wire colour can be connected to either terminal.
5. Return the cable connector to the original position taking care not to damage cable wires in the process and replace the retaining screw.

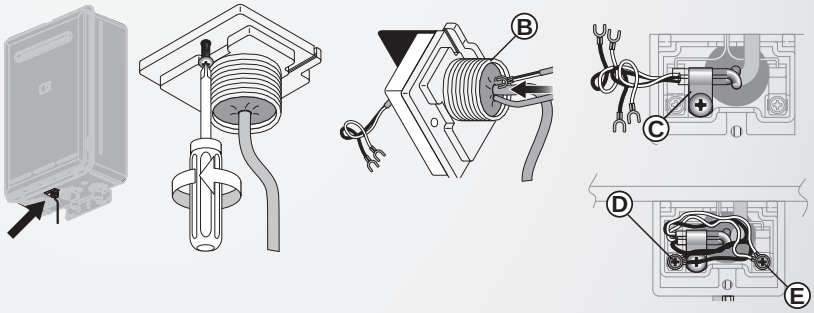
Connecting three to four controllers

1. Repeat steps 1-3 for connecting up to two controllers.
2. To connect three to four controllers, separate all the cables to be wired into pairs. Cut off the spade connectors from each pair and re-terminate each pair into a new spade connector (F) so there are only two sets of spade connectors. Four spade connectors in total to be terminated.
3. Repeat steps 4 and 5 for connecting up to two controllers.

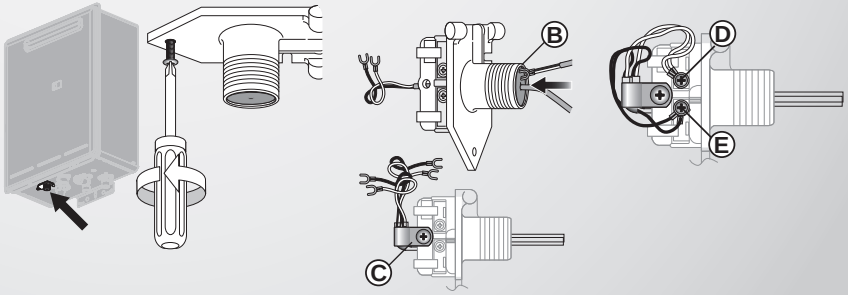
Spade connectors are available from your local electrical supplier.



Cable connector for VT26, VT24, VT20, and VT16



Cable connector for HD250, HD200, HDi200, and EF models



Commissioning

WARNING The appliance operation must be tested after installation. Ensure building occupants do not have access to the hot water outlets during this procedure.

Testing

1. Before [illegible] ction of the water heater, purge the gas and hot and cold water supply lines. Swarf in the gas or water supplies may cause damage.

2. Turn on the gas and water supplies and test for leaks (gas and water) near the unit.

3. Isolate gas supply. Remove test point screw located on the gas inlet and attach pressure gauge.

4. Turn the power on at the power point socket and turn on the gas.

5. If water controllers are [illegible]t ed ensure they are on. Select the maximum delivery temperature and open all available hot water taps including the shower. If water controllers are [illegible]t ed, open all available hot water taps.

6. Operate all other gas appliances at their maximum gas rate.

7. With all gas appliances operating on maximum, the pressure should read between 1.0-3.5 kPa (NG) or 2.75-3.5 kPa (ULPG). If the pressure is lower, the gas supply is inadequate and the appliance will not operate to spe[illegible]c ation. It is the responsibility of the installer to check the gas meter, service regulator and pipe work for correct operation and sizing. The gas regulator on the appliance is electronically controlled and factory preset. Under normal circumstances it does not need adjustment during installation.

8. Close all hot water outlets.

9. Inspect and clean the strainer located on the cold water inlet connection. This may need to be repeated to ensure the strainer remains clear, especially on new installations.

10. If water controllers are [illegible]ted, it is necessary to test their operation through the complete range of functions (refer operation guide).

11. CR[illegible]er delivery temperatures using a thermometer. If controllers are [illegible]ted, ensure temperatures exceeding 55 °C cannot be selected on bathroom controllers.

12. After testing is completed, explain to the customer how to operate the water heater and water controllers (if [illegible]ted). Ensure your details are entered in the customer operation guide (Installer details).

Gas pressure setting

The gas regulator on the appliance is electronically controlled and factory preset. Under normal circumstances it does not need adjustment during installation. Make adjustments only if the unit is not operating correctly and all other causes for incorrect operation have been eliminated. Instructions for gas pressure setting are in the instruction pocket located inside the appliance front cover.

Commissioning checklist

Commission the unit in accordance with the Commissioning Checklist supplied with the appliance (inside front cover of appliance). Ensure you leave the completed checklist with the customer.

If the appliance can not be adjusted to perform correctly call 0800 RINNAI (0800 746 624) for assistance.

Recommended solar system layout

Rinnai continuous flow water heaters configured for solar systems produce hot water at 75 °C and are not suitable for use with water controllers. The household water supply MUST be protected by a suitable tempering valve.

Installation

Rinnai continuous flow water heaters in solar installations are only suitable as gas boosters in solar hot water systems. These models produce water at higher than normal temperatures and must be connected to the hot water supply by use of a suitable tempering valve.

Install a Rinnai continuous flow water heater using a flow diversion valve as shown. Remember 'B to Boiler' when setting up the flow diversion valve.

The water heater must be set to 75 °C (refer dip switch settings on following pages).

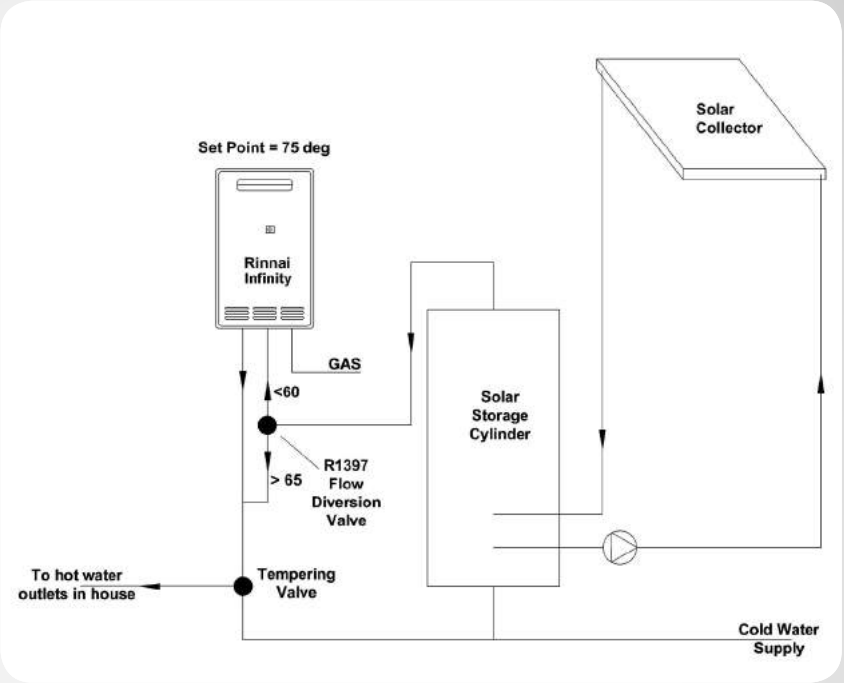
Rinnai water controllers cannot be used with Rinnai Infinity solar units as the hot water does not always pass through the Rinnai Infinity, and the Rinnai Infinity dip switch setting of 75 °C is unable to be adjusted.

System configuration to protect for Legionella

If the system is configured according to the details above it will meet the requirements of the Acceptable Solution G12/AS2 for protection against Legionella. Section 3.5.2 states:

b) the instantaneous water heater must heat all water passing through it to not less than 70 °C.

Recommended system layout using a Rinnai Continuous Flow water Heater and Flow Diversion Valve



DIP switch settings

DIP switch settings - important

DIP switch settings must only be changed by a licensed gasfitter. They have been provided as there may be a requirement to change the temperature of the water delivered from the water heater.

WARNING Care must be taken when changing the temperature settings as the DIP switches are small and can be easily switched or bumped into the wrong position. Please use this information carefully and fully check the operation of the water heater before leaving site including the temperature of the water delivered.

The cover of the water heater will need to be removed to carry out this operation. As this will expose live mains voltage wiring **please disconnect the power supply before removing the front cover**.

We wish to draw your attention to the requirements of the New Zealand Building Code and compliance document G12. This requires that water delivered to sanitary fixtures be no more than 55 °C. Increasing the water heater set temperature will therefore require that you protect all sanitary fixtures to which the appliance is plumbed with suitable tempering valves or similar.

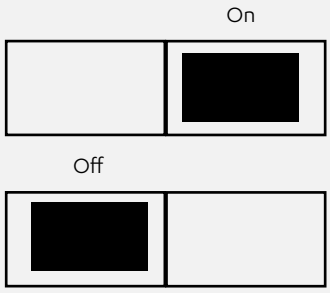
Rinnai will accept no liability for issues arising out of the use of this DIP switch information.

If you have any doubts about the performance of the water heater please contact Rinnai by phoning 0800 TO RINNAI (0800 86 746 624).

The setting of water temperatures in domestic model Infinity units (white cases) to greater than 55 °C (with the exception of units set to 75 °C in domestic solar installations) will reduce the warranty period. Refer to warranty information in the Operation Guide for further information.

The following pages detail DIP switch settings for the specific Rinnai continuous flow water heaters listed. They ARE NOT applicable for older models.

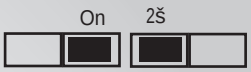
Legend for DIP switch settings
(black indicates position of switch)



Short and long flues

Reference to what is a short and long flue can be found on page 8.

DIP switch settings



Applicable models and REU numbers

RL[illegible]	y VT16	External	REU-VR1620WG
RL[illegible]	y VT20	External	REU-VR2024WG
RL[illegible]	y VT24	External	REU-VR2426WG
RL[illegible]	y VT26	External	REU-VR2626WG
RL[illegible]	y EF24	External	REU-K2430WG

DIP switch 1: Upper SW (8P)

SW No.	Note						
1		2š					
2	Fixed temperature (with controllers)	Oš	Fixed temperature			On	With controllers
3 4 5	Temperature settings	See Chart A					
6		2š					
7	Gas pressure	2š	Normal	On	Forced min.	On	Forced max.
8		2š		2š		On	

Chart A: Temperature settings

DIP. SW.1-SW No. (8P)			SW No. 2 = Off (fixed temperature)	SW No. 2 = On (with controllers)	
3	4	5	No controllers x ed temp.)	No controllerVx ed temp.)	With controllers (max. set temp.)
Oš	Oš	2š	55	55	55
On	Oš	2š	75	55	75
Oš	On	2š	65	55	65
On	On	Oš	60	55	60
Oš	Oš	On	50	50	50
On	Oš	On	42	42	42
Oš	On	On	not to be used	40	40
On	On	On	not to be used	55	75

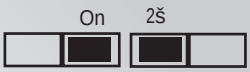
DIP switch 2: Lower SW (4P)

SW No.	Note				
1	Gas type	Oš	ULPG	On	NG
2,3,4	Model settings	See Chart B			

Chart B: Model settings

DIP. SW.2-SW No. (4P)			Model (REU-number)
2	3	4	
Oš	Oš	2š	VT26 (VR2626WG) and EF24 (K2430WG)
Oš	On	2š	VT24 (VR2426WG)
Oš	Oš	On	VT20 (VR2024WG)
Oš	On	On	VT16 (VR1620WG)

DIP switch settings



Applicable models and REU numbers

RL[illegible]	y HD200	External	REU-VRM2632WC
RL[illegible]	y HDi200	Internal	REU-VR2632FFUG
RL[illegible]	y HD250	External	REU-VR3237WG

DIP switch 1: Upper SW (8P)

SW No.	Note							
1	HDi200	Flue setting	Oš	LR[illegible]		On	ShorW[illegible]	
	HD200, HD250	Model setting	2š					
2	Fixed temperatur[illegible] controllers)		Oš	Fixed temperature		On	With controllers	
3 4 5	Temperature settings		See Chart A					
6			2š					
7	Gas pressure		2š	Normal	On	Forced min.	On	Forced max.
8			2š		2š		On	

Chart A: Temperature settings

DIP. SW.1-SW No. (8P)			SW No. 2 = Off (fixed temperature)	SW No. 2 = On (with controllers)	
3	4	5	No controllers x ed temp.)	No controller Vx ed temp.)	With controllers D š et temp.)
Oš	Oš	2š	55	55	55
On	Oš	2š	75	55	75
Oš	On	2š	65	55	65
On	On	Oš	60	55	60
Oš	Oš	On	50	50	50
On	Oš	On	42	42	42
Oš	On	On	85, 95[1]	40	40
On	On	On	85	55	75

[1] 95 °C setting only available for HD250 model

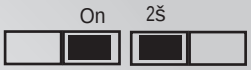
DIP switch 2: Lower SW (4P)

SW No.	Note				
1	Gas type	2[illegible]			
2,3,4	Model settings	See Chart B			
5,6	Not in use	2š			

Chart B: Model settings

DIP. SW.2-SW No. (4P)			Model (REU-number)
2	3	4	
Oš	Oš	2š	HD2953237W G)
Oš	Oš	On	9R M2632WC)
Oš	On	On	l956 32FFUG)

DIP switch settings



Applicable models and REU numbers

RL[illegible]	y EF250	External	REU-KM3237WD
RL[illegible]	y EFi250	Internal	REU-KM3237FFUD

DIP switch 1: Upper SW (8P)

SW No.	Note						
1	Flue settings	2š	EF250 Ext & EFi2[illegible]ORe (p. 8)		On	EFi250 Internal shorWe (p. 8)	
2	Fixed temperature (with controllers)	Oš	Fixed temperature		On	With controllers	
3 4 5	Temperature settings	See Chart A					
6	Not in use	Factory setting is 'Oš'					
7	Gas pressure	2š	Normal	On	Forced min.	On	Forced max.
8		2š		2š		On	

Chart A: Temperature settings

DIP. SW.1-SW No. (8P)			SW No. 2 = Off (fixed temperature)	SW No. 2 = On (with controllers)	
3	4	5	No controller[illegible] ed temp.)	No controller[illegible] ed temp.)	With controllers (max. set temp.)
Oš	Oš	2š	55	55	55
On	Oš	2š	75	55	75
Oš	On	2š	65	55	65
On	On	Oš	60	55	60
Oš	Oš	On	50	50	50
On	Oš	On	42	42	42
Oš	On	On	95	40	40
On	On	On	85	55	75

DIP switch 2: Lower SW (4P)

SW No.	Note				
1	Gas type settings	2š	ULPG	On	NG
2		2š		2š	
3	Type settings	2š	External	2š	Internal
4		2š		On	
5	Automatic return	Oš	Inactive	On	Active
6	External device	Oš	S-BMS	On	AH

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Installation guide

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U298-1272X02(00)

Rinnai

Operation guide

Continuous flow water heaters

For Rinnai continuous flow water heaters manufactured from 2010 onwards
(serial number 09.12-xxxxxx)

Important:

This appliance shall be installed in accordance with:

- Manufacturer's installation instructions
- AS/NZS 5601 Gas Installations
- Local regulations and municipal building codes

Installation, servicing and repair shall be carried out only by authorised personnel.

Internal Rinnai continuous flow water heaters must be installed with a Rinnai approved flue system.

Not suitable as a spa or swimming pool heater.

All gas appliances require regular servicing. Servicing must be carried out by an authorised person, being in New Zealand a licensed gasfitter.

Owner, please retain this manual for future reference.
Installer, please leave this manual with the owner.

Warning
Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.

For more information about buying, using, and servicing of Rinnai appliances call: 0800 RINNAI (0800 746 624)

Rinnai New Zealand Limited
105 Pavilion Drive, Mangere, Auckland
PO Box 53177, Auckland Airport, Auckland 2150

Phone: (09) 257 3800, Fax: (09) 257 3899
Email: info@rinnai.co.nz
Web: www.rinnai.co.nz, www.youtube.com/rinnainz

contents:

About your water heater

Before using or operating your water heater ensure your installer talks to you about the use and care of this appliance, and that you understand these instructions.

Installer

The installer also needs to complete:

- their installer details (p. 21)
- the commissioning checklist supplied with the appliance as the water heater has been installed and commissioned correctly

The installer needs to leave the checklist, and operation guide with you.

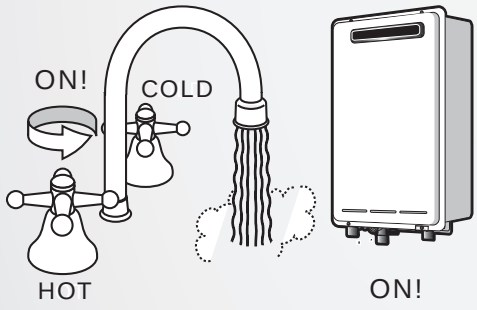
Important

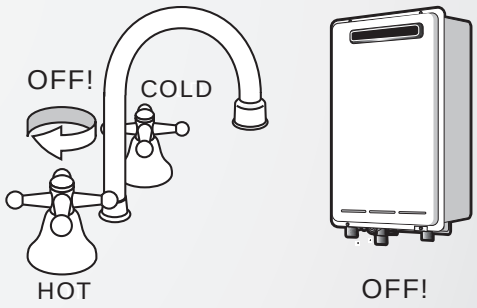
The RUNNING water heater requires power to prevent damage in freezing conditions. DO NOT disconnect the power if there is a likelihood of freezing without draining the water heater. Instructions for draining the water heater can be found at the back of this guide.

Principle of operation

If no controllers are fitted the opening of any hot water tap will automatically start the appliance. Once water is flowing through the appliance the burner will be ignited by electronic ignition. If a controller is fitted it must be switched on for the appliance to heat the water

When the hot water tap is closed and water flowing through the appliance has stopped the burner will extinguish.





In the event of a power failure

The water heater will not operate without electricity. If power fails water heating will cease. When power is restored the water flow may need to be stopped and restarted (and a controller fitted, switched on) in order for water heating to continue.

Warning about hot water

Excessively hot water is dangerous. Rinnai continuous flow water heaters, through the use of water controllers, allow you to control the temperature of hot water to safe levels.

Water temperatures above 55 °C can cause instant severe burns, such as scalding and may even result in death. Those most at risk; children, disabled, elderly, and the sick. Hot water at 65 °C, a common water temperature in New Zealand, can severely burn a child in less than half a second. At 55 °C, preset temperature for domestic Rinnai continuous flow water heaters, it takes half a minute.

Always

- Test the water temperature with your elbow before placing your child in the bath, and feel the water yourself before bathing or showering
- Supervise children whenever they are in the bathroom
- Make sure the hot water tap is turned off

Consider

Installing child proof tap covers or child resistant taps, both will prevent a child being able to turn on the tap.

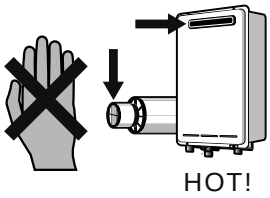
Never

Leave a toddler in the care of another child. They may not understand the need to have the water temperatures set at a safe level.

General safety

Do not:

- Touch the unit cover or the flue outlet
- Insert objects into the flue outlet

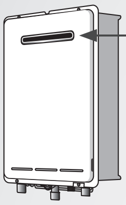


Keep flammable materials, spray cans, fuel containers, pool chemicals, trees, shrubs etc. well clear of the flue outlet.

General information

Discolouration of ue outlets - EF external models

FRXWRXWOet may change over time due to condensate in the exhaust gases. This is normal. The discolouration will not damage the unit, and will RQVct performance of the water heater.

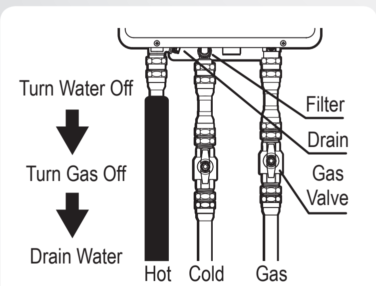


Frost kits

Frost protecWLRQd as standard on all models. Frost protection operates automatically, as required, whenever the appliance is connected to the electric power supply.

If power has failed and there is risk of damage from frostQVW gas supply to the unit and open a tap slightly to alloZw through the unit. This may prevent damage from freezing.

If the appliance is not going to be used for an extended period and the electric power supply is disconnecteRQVZter and gas supplies and arrange for your plumber to drain all water from the appliance to prevent frost damage. If for practical reasons a plumber is unable to drain your system, we have an instruction sheet on how to drain the unit at the back of this guide.



Installation by a licensed tradesperson

Improper installation, adjustment, service, or maintenance can cause serious injury, property damage, or death. Please ensure your installation is completed by a licenseGVw and plumber.

Safety devices

Your RQERQXw water heater has the following safety devices:

- Flame failure
- Boil-dry protection
- Overheat protection (OHS)
- Fusible link
- Pressure relief valve
- Combustion fan rpm check

Servicing

Rinnai has a service and spare parts network with personnel who are fully trained and equipped to give the best advice on your Rinnai appliance. If your appliance needs servicing, please call Rinnai (0800 746 624).

For reliable operation Rinnai FRQXw water heaters in domestic applications should be serviced every two years, including inspecWLRQKHsystem (if installed). A service record has been provided at the back of this guide. For commercial use annual servicing is recommended. Rinnai has a recommended 'Commercial Maintenance and Servicing Schedule'. This is available on request, or via our website.

Regular servicing is not covered by the Rinnai warranty. Do not attempt to carry out any service work other than that mentioned in the troubleshooting section. If you have any other faults or problems, please contact your installer or Rinnai.

Solar installations

There is a recommended system layout for Rinnai continuous ow water heaters used in solar installations. It is important your VWOOHUFRQs your solar system correctly as water heaters in solar installations produce higher than normal temperatures.

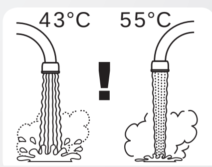
Rinnai water controllers cannot be used with RQERQXw water heaters in solar installations as the hot water does not always pass thrRXJFRQXe ow unit.

Preset temperatures

The RQERQXw water heaters are factory preset to a temperature limit of 55 °C , excluding one commercial model, ZKLQ HD200 external.

Temperature controllers are available to allow precise digital temperature control—a great safety feature if you have young children. Controllers can be VWd at any time (except in solar installations) after installation of the hot water unit.

Water ow



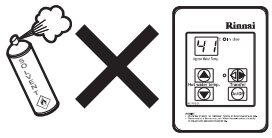
Ew will vary slightly depending on the incoming water temperature and temperature selected. For example, the watHUw will be higher at 43 °C than at 55 °C.

There is alsRDPQXw rate requireGIRUFRQXw unit to start, so if a hot water tap is only opened a fraction, there may not bHHQXw to start the unit.

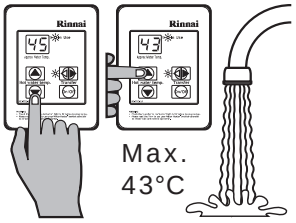
General controller information

To clean your water controller, use a soft damp cloth and mild detergent.

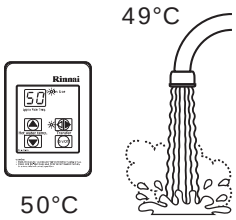
DO NOT use solvents.



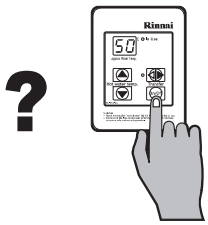
While hot water outlets are open the set temperature may be lowered BUT not raised above 43 °C. Transfer of priority between controllers is not possible. These are safety features.



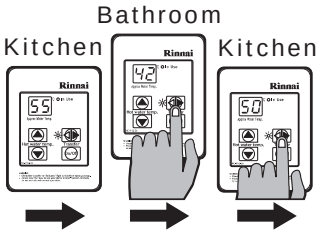
Depending on weather conditions and the length of pipe between the hot water unit and the outlet in use, there may be a variation between the temperatures displayed at the water controller and water outlet.



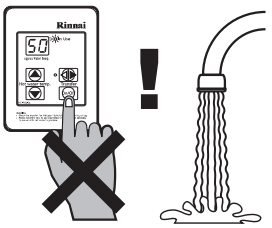
There is no need to turn water controllers [illegible] er use.



As a safety precaution, if a kitchen controller temperature is set above 50 °C, transferring and then returning priority will result in a default set temperature of 50 °C. This is a safety feature.

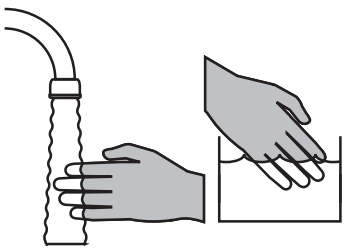


Do not push the On/[illegible]t on on any controller when the red water heater 'In Use' indicator is on. This will turn [illegible]t er heater causing the water to go cold.



Temperatures higher than 55 °C should not be able to be selected on controllers installed in bathrooms, ensuites or toilets. This is to reduce the risk of burns from hot water. If this is not the case, the controllers have been incorrectly installed and you should contact your installer.

Check the water temperature before use. A parent or carer should ALWAYS check the temperature before a child is placed in contact with hot water.



Water controllers are an optional extra. They allow precise temperature control—no need to mix hot and cold water.

When used correctly, the hot water unit will deliver the selected temperature, even when the water flow is varied, or when more than one tap is in use.

Each water controller can be individually programmed, however the water heater can only deliver one set temperature at any time. The available temperatures are shown in the table below.

Rinnai controllers

- Universal (Compact), temperature selection only
- Kitchen Deluxe, temperature selection and voice prompting
- Bathroom Deluxe, temperature selection, shower saver, bath fill, and voice prompting
- Wireless, temperature selection only

Controller configurations

A maximum of four water controllers can be fitted with a combination of wired and wireless controllers, with the following limitations:

- maximum of one Kitchen Deluxe controller (MC-100V)
- maximum of two Bathroom Deluxe controllers (BC-100V)

Only one controller can be set to deliver 55 °C, this cannot be a Bathroom Deluxe controller.

Controllers need to be turned on for delivery of hot water

The water heater will not heat water unless the controller(s) are turned on. If water is flowing before a controller is turned on, the water heater will not heat the water. Turn off the tap for a few seconds then turn on again.

Ignition problems

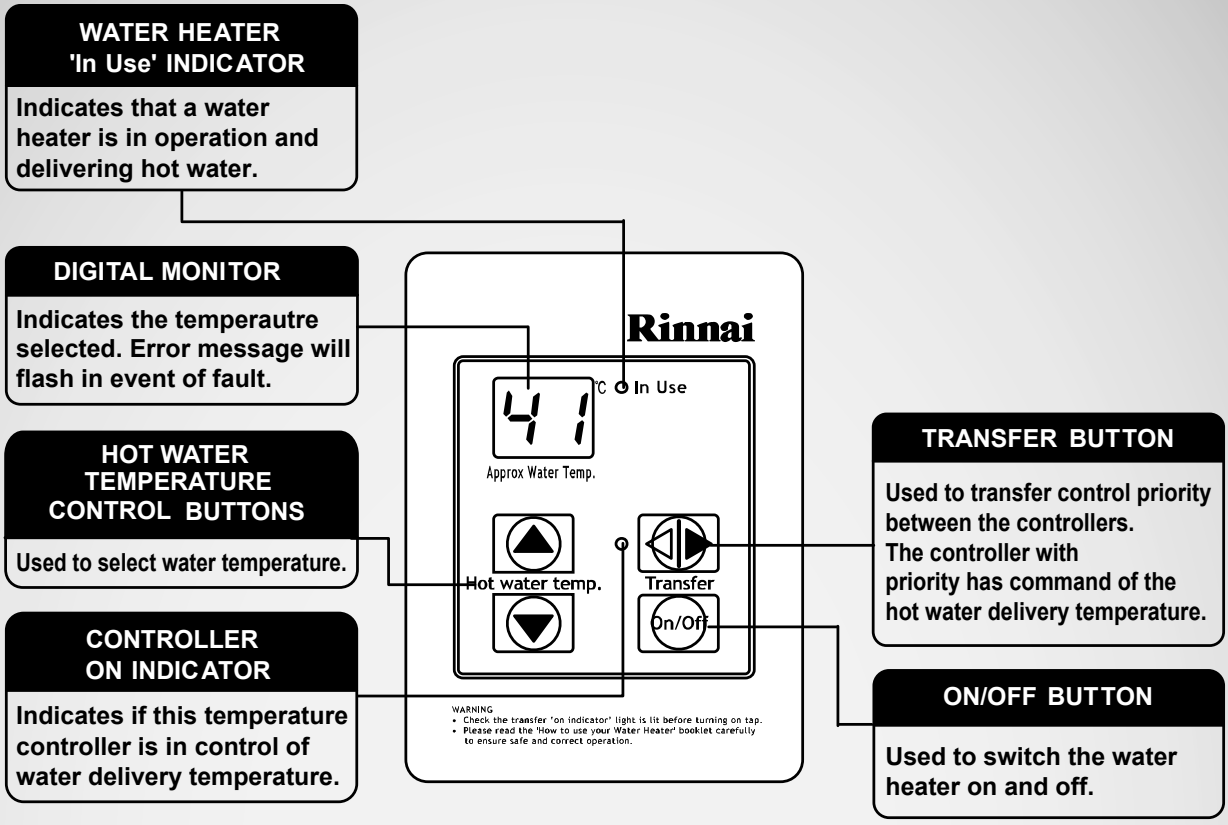
If the water heater fails to ignite, the 'In Use' indicator will not illuminate. The water heater will not attempt re-ignition until water flow is stopped for a few seconds and then restarted.

When gas bottles have been changed or the gas supply is disrupted (controller may display error code 11 or 12) ignition may fail and the 'In Use' indicator wont be on. The water flow may need to be stopped and restarted several times before the appliance will remain alight.

Controllers - available temperatures		
Kitchen	Domestic	37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 50, 55 °C
	Commercial	60, 65, 75 °C
Bathroom (hot water)		37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 50 °C
Bathroom (bath fill)		37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48 °C
Suggested temperatures	Kitchen	50-55 °C
	Shower	37-43 °C
	Bath fill	39-45 °C

To obtain water temperatures lower than 37 °C add cold water.

Universal controller (Compact)



Turning on

If the water controller is switched off (no digits displayed in the digital window) press the On/Off button once. The On indicator will illuminate, indicating the continuous flow water heater will be ready to supply hot water once a hot water tap is opened.

Adjusting the temperature

Select the desired temperature using the 'Hot water temp.' up and down buttons until the required temperature is displayed.

To operate the continuous flow water heater, open any hot water tap. This will automatically light the burner providing hot water. The water heater 'In Use' indicator will illuminate on the water controller.

Once the hot water is running, if the set temperature is either too hot or cold, press the 'Hot water temp.' up or down buttons until the desired temperature is reached.

Muting the 'beep' sound

The 'beep' sound can be muted by pressing the 'Hot water temp.' up and down buttons simultaneously for more than three seconds.

How to use two or more Compact controllers

Turning on

If the controllers are switched off, press the On/Off button once. The On indicator on the desired controller will illuminate, indicating that the hot water unit will be ready to supply hot water once a hot water tap is opened.

Transferring priority

An illuminated On/Off indicator confirms that the desired controller is in control of the water delivery temperature. If the On/Off indicator is not illuminated press the 'Transfer' button once (while water is not flowing). The On/Off indicator on the controller will illuminate indicating that the hot water temperature control has been transferred to this controller and that the continuous flow water heater will be ready to supply hot water.

Adjusting the temperature

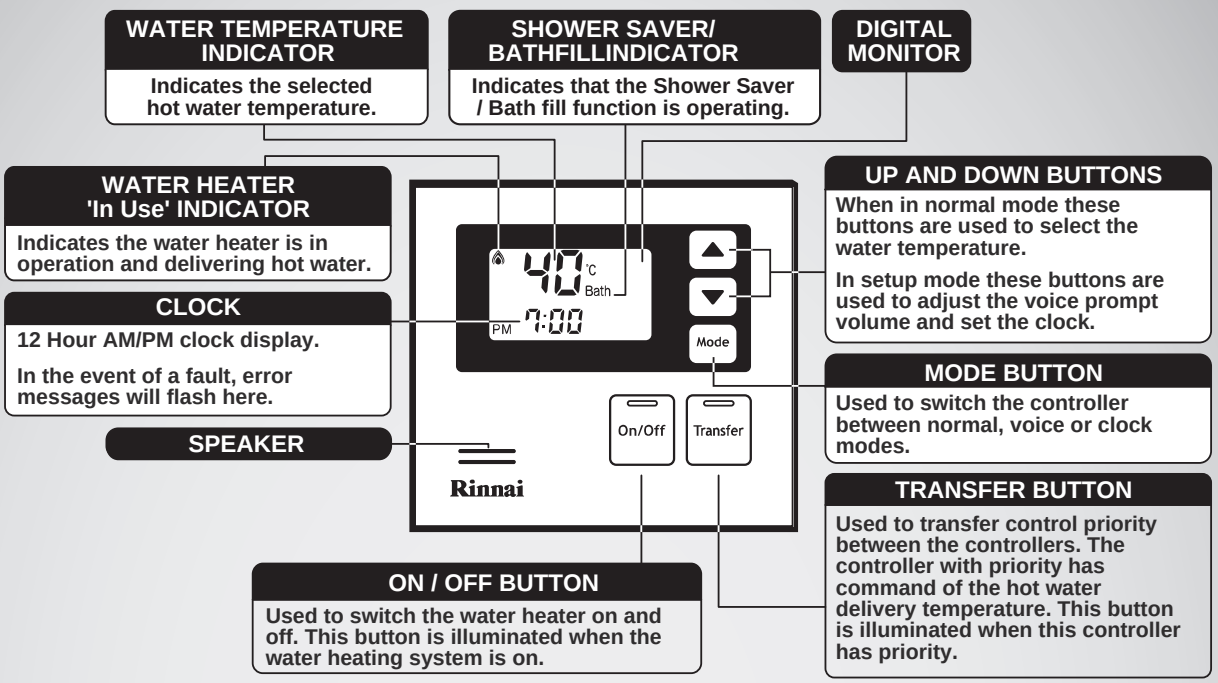
Select the desired temperature using the 'Hot water temp.' up and down buttons until the desired temperature is displayed.

Once the hot water is running, if the set temperature is too hot or cold, press the 'Hot water temp.' up and down until the desired temperature is reached.

With the water running the temperature can be adjusted down as desired, but as a safety feature, can only be adjusted up as far as 43 °C. To increase the temperature above 43 °C, first stop the water flow.

Kitchen Deluxe controller

The Kitchen Deluxe controller is not water resistant, avoid direct exposure to water or steam as these conditions may cause damage.



Turning on

If the water controller is switched off (no digital window) press the On/Off button once.

The On indicator will illuminate, indicating that the water heater will be ready to supply hot water once a hot water tap is opened.

If more than one controller is installed press the 'Transfer' button once to transfer priority to the desired controller.

Setting the clock

The clock is a 12 hour AM/PM display. To set the time press the 'Mode' button twice. In the digital monitor the word 'Clock' will be displayed and the clock digits will flash. The first time the clock has been set the starting time will be AM 12:00.

Use the up and down buttons to select the desired time. Holding these buttons down continuously cycles the digits. When you get close to the time you wish to set, press the button intermittently to avoid going further than the desired time.

To return to normal mode, press the 'Mode' button once. If no buttons are pressed for approximately 60 seconds the controller will return to normal mode.

The time is always displayed regardless of whether the controller is turned on or off. The clock may need resetting if power to the water heater is disrupted due to a power failure or if the power is switched off for a prolonged period.

Setting the sound options

Voice prompts are only available when Bathroom Deluxe controllers are installed. To set the sound options press the 'Mode' button once to place the controller into voice mode. Use the up and down buttons to select the audible setting as follows:

- Voice high, med., low sets the voice prompt volume but does not affect the 'beep' sound when pressing the buttons.
- Mute switches all voice prompts and audible tones.

To return to normal mode, press the 'Mode' button once, if no buttons are pressed for approx. 60 seconds the controller will return to normal mode.

Adjusting the temperature

Select the desired temperature using the 'Hot water temp.' up and down buttons until the required temperature is displayed.

Once the hot water is running, if the set temperature is too hot or cold, press the 'Hot water temp.' up and down buttons until the desired temperature is reached.

With the water running the temperature can be adjusted down as desired, but as a safety feature can only be adjusted up as far as 43 °C. To increase the temperature above 43 °C first stop the water flow.

Bathroom Deluxe controller

Avoid getting water directly into the speaker as this may cause damage.

WATER TEMPERATURE INDICATOR

Indicates the selected hot water temperatures.

WATER VOLUME INDICATOR

Indicates Shower Saver/Bath Fill volume selected.

SHOWER SAVER / BATH FILL BUTTON

Used to selected Shower Saver/Bath Fill function.This button is illuminated when this function is selected.

WATER HEATER 'In Use' INDICATOR

Indicates the water heater is in operation and delivering hot water.

SHOWER SAVER / BATH FILL INDICATOR

Indicates the Shower Saver/Bath Fill function has been selected and that a shower is running or the bath is filling.

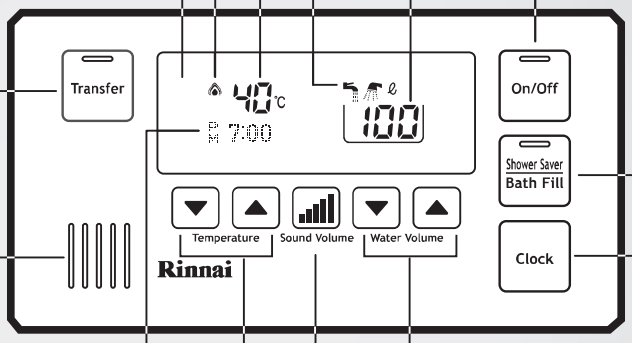
ON/OFF BUTTON

Used to switch the water heater on and off. This button is illuminated when the water heater is on.

DIGITAL MONITOR

TRANSFER BUTTON

Used to transfer priority between controllers. The controller with priority has command of the hot water temperature. This button is illuminated when the controller has priority.



SPEAKER

CLOCK & REMINDER VOLUME INDICATOR

12 hour AM/PM clock display.

Indicates how much water still needs to flow for the selected Shower Saver/Bath Fill volume, decreasing while the shower runs or the bath fills.

In the event of a fault, error message codes will flash here.

WATER VOLUME BUTTONS

Used to select Shower Saver/Bath Fill volumes.

TEMPERATURE BUTTONS

In normal Shower Saver/Bath Fill modes these buttons are used to select the water temperature.

In clock mode these buttons are used to set the clock.-

CLOCK SETTING BUTTON

Used to select clock setting mode.

SOUND VOLUME BUTTON

Used to select voice and audible tone options.

Turning on

If the water controller is switched [illegible] d in the digital window) press the On/2š button once.

The On indicator will illuminate, indic[illegible]e w water heater will be ready to supply hot water once a hot water tap is opened.

If more than one contr[illegible]ted press the 'Transfer' button once to transfer priority to the desired controller.

Setting the clock

The clock is a 12 hour AM/PM display. To set the time press the 'Clock' button once. In the digital monitor the clo[illegible]e [illegible] st time the clock has been set the starting time will be AM 12:00.

Use the up and down buttons to select the desired time. Holding these buttons down continuously cycles the digits. When you get close to the time you wish to set, press the button intermittently to avoid going further than the desired time.

To return to normal mode, press the 'Clock' button once. If no buttons are pressed for approximately 60 seconds the controller will return to normal mode.

The time is always displayed regardless of whether the controller is turne[illegible]2š The clock may need resetting if power to the water heater is disrupted due to a power failure or if the power is switche[illegible]UD prolonged period.

Setting the sound options

Voice prompts are only available when Bathroom Deluxe controllers are installed.
To set the sound options press the 'Sound Volume' button and select the desired audible settind as follows:

- Voice high, med., lo[illegible] sets the voice prompt volume but doe[illegible] ct the 'beep' sound when pressing the buttons.
- [illegible] es all voice prompts and audible tones.

To return to normal mode, Press the up and down buttons. If no buttons are pressed for approximately 10 seconds the controller will return to normal mode.

Adjusting the temperature

Select the desired temperature using the 'Temperature' up and down buttons until the required temperature is displayed.

Once the hot water is running, if the set temperature is too hot or cold, press the 'Temperature' up and down buttons until the desired temperature is reached.

With the water running the temperature can be adjusted down as desired, but as a safety feature can only be adjusted up as far as 43 °C. To increase the temperature above 43 °C[illegible] st stop the water [illegible]ow.

Operating the shower saver and bath fill

Initial settings:

- Temperature: 40 °C
- Volume: 100 L (range 30-400 L)

Setting shower/bath temperature and volume

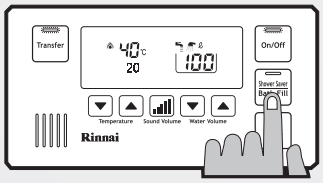
With the system on, select a Deluxe Bathroom Controller. If it does not have priority, press the 'Transfer' button once and the 'Transfer' button will illuminate.

Press 'Shower Saver/Bath Fill' button once. The button will illuminate and voice prompt and tone will sound. Ensure you have the voice and sound turned on.

To select the desired delivery temperature use the 'Temperature' up and down buttons. The selected temperature will be displayed on the digital monitor and will remain as the default 'Shower Saver/Bath Fill' temperature until it is changed or if the mains power is turne[illegible] for an extended period.

:KH[illegible]OLQ[illegible]EDWKIRUWKH[illegible] st time, it is recommended that a low EDWK[illegible]OOR[illegible]RZ[illegible]HV[illegible]KDVOLW[illegible] es or lower be used. During subsequent EDWK[illegible]OOVWKH[illegible]RZ[illegible]an then be adjusted to suit your known bath volume or desire[illegible]OOevel.

A volume counter (to highlight remaining volume of water to be delivered) displays on the controller below the temperature display (replaces the clock during 'Shower Saver/Bath Fill' operation).



When filling the bath or if the water has been turned off

Be careful not to over[illegible]OOWKHEDWK an average bath volume is OLW[illegible] es. It is recommended that [illegible]HQ[illegible]OLQ[illegible]EDWKIRUWKH[illegible] st time you should:

- remain by the bath during the [illegible]OOLQ[illegible] ocess
- use a lo[illegible]EDWK[illegible]OOR[illegible]RZ[illegible]HV[illegible]K DVOLW[illegible]es or less

If the 'Shower Saver/BDWK[illegible]O[illegible]s interrupted (water is turned o[illegible]) for any reason and there is more than half the volume of the set amount of water delivered, the 'Shower Saver/Bath Fill' will reset itself back to normal operation when turned on again.

For example:

Set volume	Delivered volume interrupted*	Delivered volume restarted**
L	50 L	110 L
L	110 L	Resets***

* BDWK[illegible]OOL[illegible]Qterrupted—tap closed

** BDWK[illegible]OO[illegible]estarted—tap turned on again

*** Resets back to normal operation

Using shower saver/bath fill

Press the 'Shower Saver/Bath Fill' button once. The button will illuminate and a voice prompt and tone will sound. During 'Shower Saver/Bath Fill' operations the 'Bath' indicator will also be displayed on the Kitchen Deluxe Controller digital monitor (when [illegible]Wted).

The voice prompt will say "The hot water system is ready. Open the hot water tap". Open the hot water tap for the shower or bath.

The 'In Use' indicator will illuminate on all deluxe water controllers and the shower will run or the bath will start t[illegible]OO

To stop shower saver/bath fill operations

If you wish to stop the wat[illegible]U[illegible]ow while the shower saver[illegible]EDWK[illegible]OO function is in operation, press the 'Shower Saver/Bath Fill' button. The butt[illegible]RQ[illegible]OO[illegible]e[illegible]VKDW[illegible]QKH voice prompt will say "Hot water is not available. T[illegible]R[illegible]OOKRW water taps and push the 'Bath Fill' button". Follow the voice prompt instructions.

When the shower saver/bath fill operation finishes

Once the shower saver/bath fill operation finishes, the following occurs:

1. Flow from the shower/bath hot water tap stops.

2. 'Shower Saver/Bath Fill' button will flash.

3. Kitchen Deluxe Controller (if fitted) 'Bath' indicator will flash.

4. A tone will sound.

5. The voice prompt will say "Bath fill is complete. Turn off the bath hot water tap and push the 'Bath Fill' button.

Follow the voice prompt instructions. Note, the water heater will not allow hot water to flow from any fixture until the 'Shower Saver/Bath Fill' button has been pressed.

Using multiple controllers

The water heater can be turned on and off at any water controller. If more than one controller is fitted, press the 'Transfer' button to transfer priority to the desired water controller.

Troubleshooting with controllers

With controllers or status monitor

Your Rinnai continuous flow water heater has a self diagnostic capability. If a fault occurs, an error code will flash on the digital monitor (if you have water controllers) or status monitor (selected models only). This assists with diagnosing the fault and may enable you to overcome a problem without a service call. Please quote the code displayed when contacting Rinnai.

Common error codes	Fault	Possible solution
-	Noticeable reduction in water flow	Inlet water filter needs to be cleaned—service call.
03	Power interruption during bath fill, water will not flow when power is back on	Turn off all hot water taps and press On/Off twice.
10	Air intake or flue blocked	Service call.
11	No ignition, no gas supply	Check gas is turned on at water heater and gas meter, or cylinder.
12	Flame failure, low gas flow	Check gas is turned on at the water heater and gas meter or cylinder. Check there are no obstructions to the flue outlet.
14	Overheat thermal fuse	Service call.
16	Over temperature warning	Service call.
25	Condensate trap error	Check condensate drain for blockage.
32	Outgoing water temperature sensor faulty	Service call.
33	Heat exchanger outlet sensor faulty	Service call.
34	Air temperature sensor faulty (internal models only)	Service call. Will require; checking sensor wiring for damage, measuring resistance of sensor, checking combustion fan, checking internal flue leakage, checking flue system integrity, and possibly replacing sensor.
52	Gas modulating valve faulty	Service call.
61	Combustion fan failure	Service call.
65	Water flow control faulty—does not stop flow properly	Service call.
71	Microprocessor failure	Service call.
72	Microprocessor failure	Service call.
LC	Scale build-up in heat exchanger—when checking maintenance code history, 00 is substituted for LC	Service call.

In all cases you may be able to clear the error code by turning the hot water tap off, then on again. If this does not clear the error code, try pushing the On/Off button Off, then On again. If the error code remains, contact Rinnai for advice.

Troubleshooting without controllers

Fault	Possible solution
Unit does not start	Check power is on at the unit. Check gas isolation valve at the unit and gas meter are fully open.
Unit starts and then shuts down immediately	Check power is still on. Check gas isolation valve at the unit and gas meter are fully open. Open your hot water tap fully.
Unit starts then water goes cold	Check power is still on. Open hot water tap fully.
Excessive temperature fluctuation while water is flowing	Service call
Excessive noise or vibration from the water heater	Service call

Faults caused by insufficient gas supply, insufficient water supply, gas quality, water quality, installation errors or operation errors are not covered by the Rinnai warranty.

Service record

Model:_____

Serial Number:_____

For domestic use Rinnai recommends servicing every two years. For commercial use annual servicing is recommended.

Service 1 Date _____

Company _____

Address _____

_____

Phone _____

Contact _____

Comments _____

_____

Service 2 Date _____

Company _____

Address _____

_____

Phone _____

Contact _____

Comments _____

_____

Service 3 Date _____

Company _____

Address _____

_____

Phone _____

Contact _____

Comments _____

_____

Service 4 Date _____

Company _____

Address _____

_____

Phone _____

Contact _____

Comments _____

_____

Service 5 Date _____

Company _____

Address _____

_____

Phone _____

Contact _____

Comments _____

_____

Service 6 Date _____

Company _____

Address _____

_____

Phone _____

Contact _____

Comments _____

_____

Service 7 Date _____

Company _____

Address _____

_____

Phone _____

Contact _____

Comments _____

_____

Service 8 Date _____

Company _____

Address _____

_____

Phone _____

Contact _____

Comments _____

_____

Service record - parts replaced

Unit	Run Hours / Ignition Cycles	Part Replaced	Reason	Date	Company

All parts must be replaced with genuine replacement parts available from Rinnai.

Draining your water heater

Frost protecWRQ t ed as standard on all models manufactured from 2010 onwards. Frost protection operates automatically (as required) whenever the appliance is connected to the electric power supply.

If you live in an area prone to frost and will be away for an extended period with the power supply disconnected, Rinnai recommend draining your appliance to prevent frost damage (not covered by warranty).

We strongly recommend having your water heater drained by a plumbeUDW t er but understand that remote locations and cost may prohibit this.

About this instruction

These instructions are intended as a guide only. Rinnai will not accept liability for issues arising from the use of this information. In particular Rinnai will not be responsible for damage caused by water freezing where this procedure was followed and WKH t er failed to drain from the unit.

Instructions

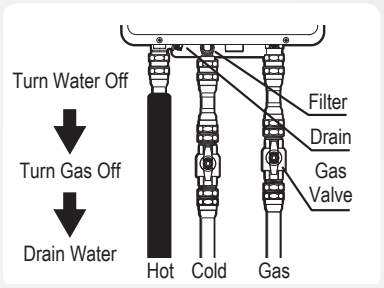
You will need:

- A bucket if water cannot be drained into a garden or drain
- Approx. 15 minutes (to complete)

WARNING

To avoid burns wait until the water heater cools before draining the water as hot water may drain from the unit if there has been recent hot water use.

1. TXU Q t er controllers in the building and then turn RII t er, gas, and power at the unit.



2. TRU t er heater open all hot water taps in the building. Refer to picture on next page.

3. If required, place the bucket under the unit and unscrew the wate t er and hot water drain plug. If you have an EF FRQGHQVLQJ e w water heater you will also need to unscrew the condensate trap and water drain plugs.

4. Drain the water heater—can hold up to one litre of water and surrounding pipes.

Refilling your water heater

1. Check that the gas and power is turneG RII RU p en hot water taps.

2. Insert the condensate trap plug, screw in the water heater drain plugs and the wate t er in the cold water inlet.

3. Turn on the cold water at the FRQGHQVLQJ e w water heater.

4. Turn on the hot tap to purge air from the pipe work and unit.

5. TXU RII WKH p .

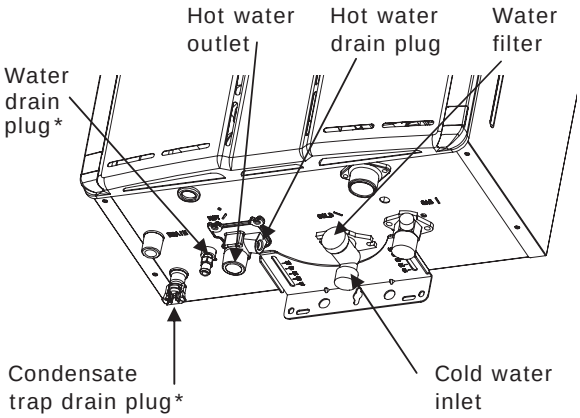
6. Turn on the gas and power DWWKH FRQGHQVLQJ e w water heater and turn on any temperature controllers in the building.

When the water heater or external pipes have frozen

DO NOT operate the water heater if it or the external pipes have frozen. Close the gas and water valveV DQG RII SRZHU ower. Wait until the water thaws, check this by opening the water supply valve.

Check the water heater and pipes for leaks.

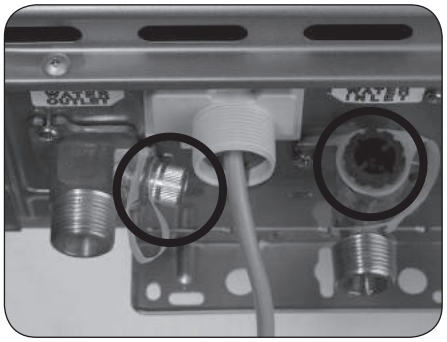
Line drawing showing the different connections underneath a continuous flow unit

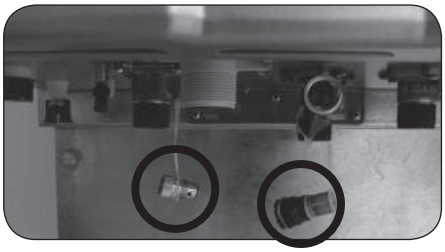


* Condensate trap and water drain plugs—EF models only.

Wash hands after dealing with condensate as it is mildly acidic.

Photos highlighting connections that need to be drained





Installer details

Company name:

Installer name:

Address:

Phone: Mobile:

Certificate of compliance number for installation:

Signed: Date:

Installer, please remember to complete and leave the commissioning checklist with the owner.

Limited Warranty

Rinnai brings you peace of mind with a:

Rinnai warranty

RQQDLEUr s you rHal SHDFHRf mind with comprHKHQV HZDUr anty plans covHUQ parts and labour. For full dHtails on Rinnai product warrantiHs go to www.rinnai.co.nz/warranty.html.

This warranty is applicabOHto all Rinnai continuous ow watHUKatHrs installHd from 2010. All tHUmVWKHZDUr anty arHHšHctivHfrom tKHd atHRf installation.

Warranty summary

		HEAT EXCHANGER		ALL OTHER PARTS	
Rinnai continuous ow water heater	Application	Parts	Labour	Parts	Labour
WhitHGRPH stic moGHOV	DomHstic WITHOUT a Rinnai contrROOHU	10 yHars pro rata	3 yHars	3 yHars	3 yHars
	DomHstic WITH a Rinnai contrROOHU	12 yHars pro rata	3 yHars	5 yHars	3 yHars
	CRPPHr cial	1500 hours or 1 yHar*	1500 hours or 1 yHar*	1500 hours or 1 yHar*	1500 hours or 1 yHar*
GHUFRPPHr cial moGHOV	DomHstic WITHOUT a Rinnai contrROOHU	12 yHars pro rata	3 yHars	5 yHars	3 yHars
	CRPPHr cial	5000 hours or 3 yHars* (pro rata)	1500 hours or 1 yHar*	1500 hours or 1 yHar*	1500 hours or 1 yHar*

* WhichHvHUFRmHs › rst

Domestic vs commercial applications

A domHstic application is dH› nHd as an installatLRQr HDFRQ inuous ow unit is sHt to 55 °C[1] or lowHr, dHOLYHUQ hot watHUto a singOHrHsidHQial dwHOOQ(not usHd for commHrcial purposHs[2]).

All otKHUQ tallat ions arHdH› nHd as commHrcial applications.

For constant usHDpplications such as, undHr oor hHating, circulating ring mains, spa pools (but not limitHd to), thH watHUKatHUmust bHsizHd and installHd according to writtHQ uidHOLQs from Rinnai.

[1] A solar installation using a Rinnai continuous ow unit in a singOHrHVLGHQWLDO GZHOOLQJLVFRQVLGHr Hd a domHstic application

[2] ExamplHs of a commHrcial application in a domHstic dwHOOQhair salon, catHUQ kitFKHQ, ORc arHIDFDl y Htc. An accommodation businHss such as a motHOZKHr HDFRQWLQXRXV ow unit sHrvHs tKH TXDOLWLHVRf DQXPEHURf dwHOOLQJV LVVHHQ d to bHDGRPH stic application.

Proof of purchase

RECORD YOUR DETAILS
OF PURCHASE BELOW:

Retailer:

Retailer address:

Date of purchase:

Product details:

ATTACH YOUR PROOF OF
PURCHASE HERE:

Please keep these details in a safe place for future reference.

Experience our innovation

Rinnai.co.nz | **0800 746 624**

http://www.youtube.com/rinnainz

Operation guide

060 00012 31314 7

U287-2778X02(00)

PRODUCT SPECIFICATION SHEET

tranquillity bathroom collection

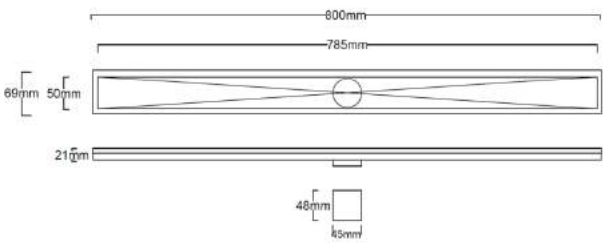
Channel drain TILE INSERT

Product Code: FDT 800 / FDT 1000 / FDT 1200

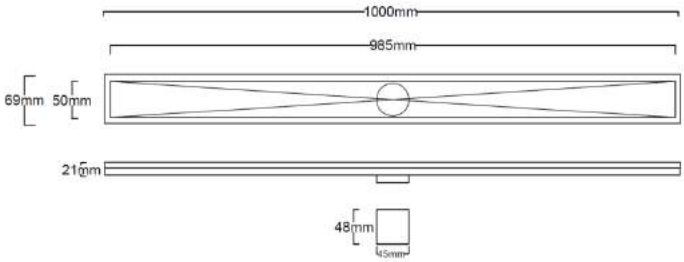
800/1000/1200 (l) x 69(w) x 21(d) mm ø 45mm

Features: Superior fall/centre outlet ● 316 grade stainless steel ● Manufactured from high-quality maintenance-free materials

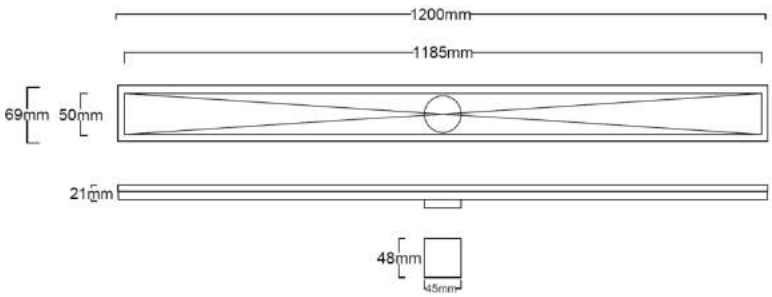
FDT 800



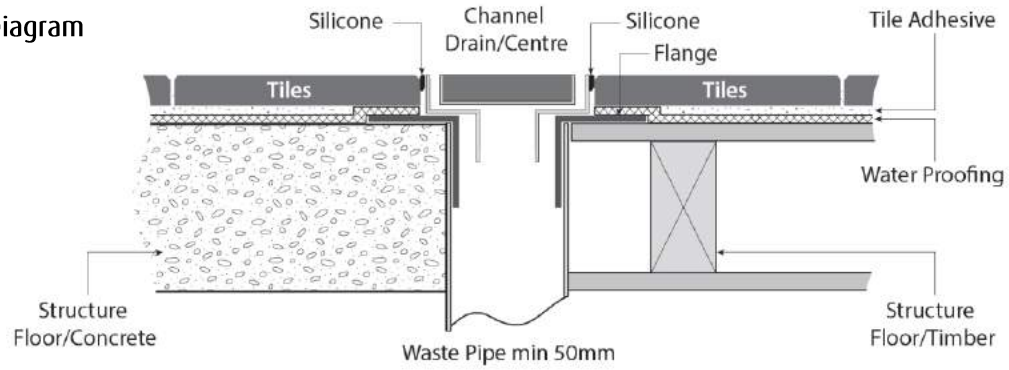
FDT 1000



FDT 1200



Installation Diagram

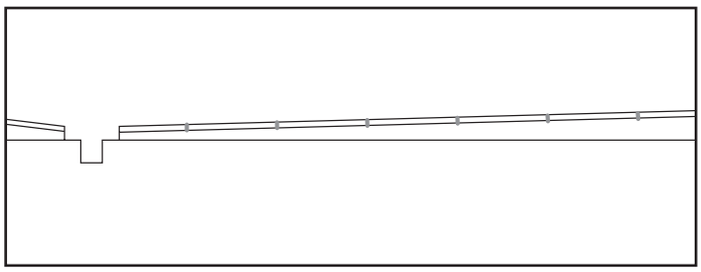


Additional Information

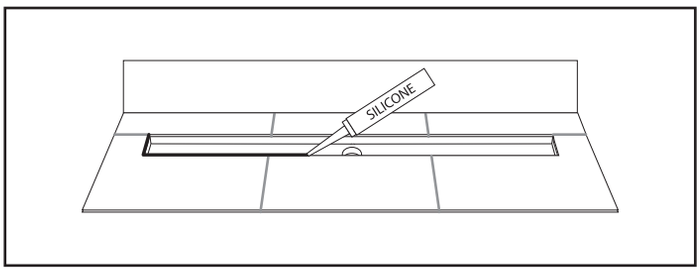
- 5 year warranty

NEW ZEALAND PHONE 0800 805 558 **EMAIL** info@tbw.co.nz **www.tbw.co.nz**
AUSTRALIA PHONE 1300 62 11 51 **EMAIL** info@formebathroomcollection.com.au **www.formebathroomcollection.com.au**

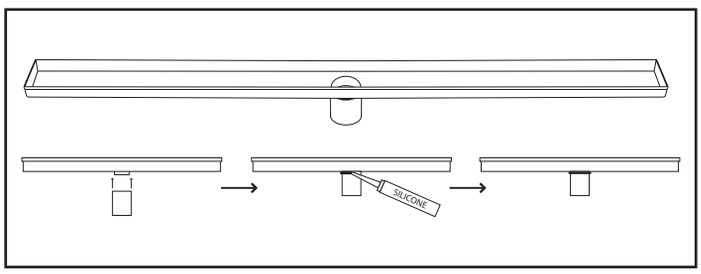
Channel Drain Installation Guide



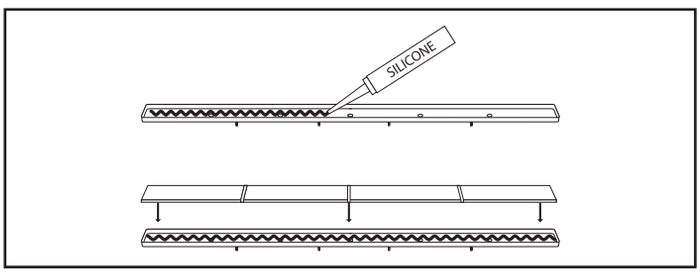
STEP 1 – Check fall is per specification ie 1% – 10mm:1000mm, note channel position



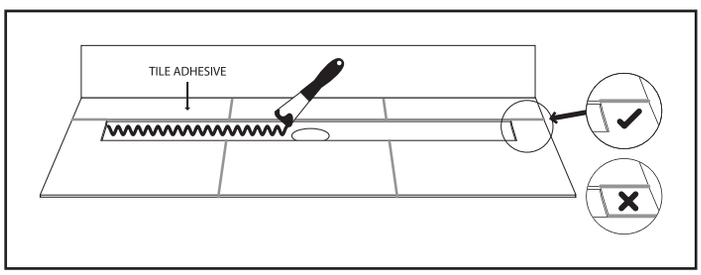
STEP 5 – Seal around the perimeter of the channel insert (Where the channel insert and tiles meet) with silicone sealant and allow to cure



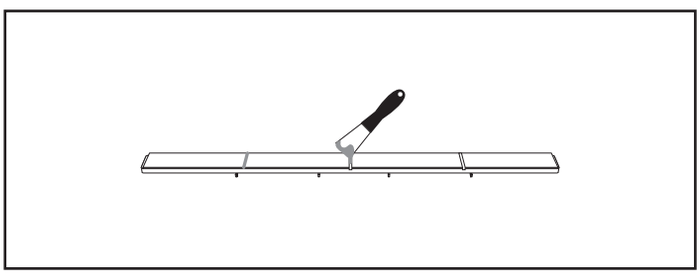
STEP 2 – Attach stainless sleeve to channel and create a water-tight seal with silicone sealant and allow to cure



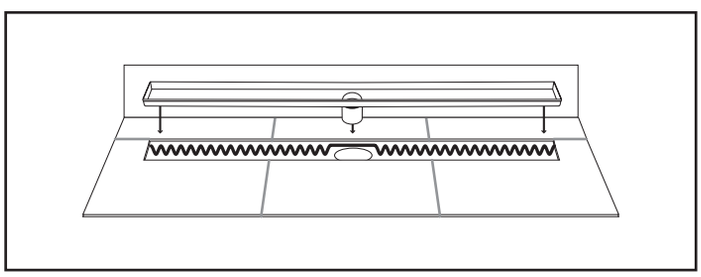
STEP 6 – Glue tiles into the tile insert using silicone and allow to cure
Note steps 6, 7 and 8 are for the tile insert model only



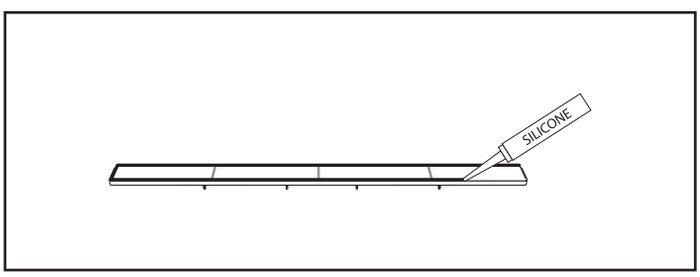
STEP 3 – Apply an appropriate amount of tile adhesive or silicon to the channel cut-out



STEP 7 – Once the tiles have been glued in place, grout the tile joins and allow to cure



STEP 4 – Lower the channel insert into the channel cut-out and allow to cure



STEP 8 – Seal around the perimeter of the tile insert (Where the tile insert and tiles meet) with silicone sealant and allow to cure

STAINLESS STEEL

WaterMark
Cert 23027

FPS.CO.NZ
FUTURE-PROOF BUILDING

tranquillity
bathroom collection

TRADE-SEAL

TRADE-SEAL is a one piece self adhesive collar for sealing around pipe and conduit.

Sizes available:
8-12 mm
15-22 mm
25-32 mm
42-55 mm
50-70 mm
75-90 mm
100-110 mm
125-135 mm
150-165 mm
200-220 mm

BRANZ Appraised
Appraisal No.719 [2011]

Installation Instructions:

Step 1. Select the appropriate sized TRADE-SEAL from within the range to suit pipe or conduit diameter. TRADE-SEAL's should never be forced over pipes or conduit.

Step 2. Ensure the surface to receive the TRADE-SEAL is clean and dry.

Step 3. Slide the TRADE-SEAL over the pipe or conduit until the EPDM boot achieves a snug fit. Some TRADE-SEAL's may require trimming to ensure there isn't excessive tension on the boot. If trimming is required slide the TRADE-SEAL over the pipe or conduit until it becomes tight, mark this point of the boot. Remove the boot and trim the excess rubber then re-check for a snug fit.

Step 4. Slide the TRADE-SEAL into place over the pipe/conduit & push firmly against the building underlay or RAB. Remove the backing release film & press firmly onto the underlay/RAB.

Note: Make sure the TRADE-SEAL is placed in a diamond shape to ensure effective water run-off.

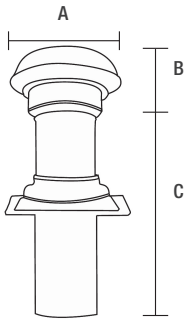
Step 5. Smooth the TRADE-SEAL onto the substrate to ensure adequate adhesion.

Step 6. Push TRADE-SEAL collar back on to penetration to fit cavity width.

Note: Never force TRADE-SEAL's over pipes or conduit.

DIMENSION INFORMATION (MM)

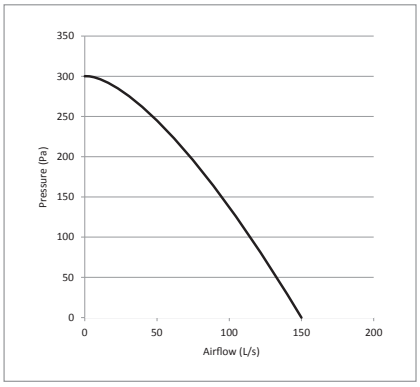
Models	A	B	C
FAN0529 - FAN1002	275	170	-
FAN1009	275	170	-
FAN0531- FAN0533	275	170	-
FAN0530 - FAN0967	275	170	500
FAN1060	275	170	500
FAN0532 - FAN0534	275	170	500
FAN0739 - FAN0740	275	170	500



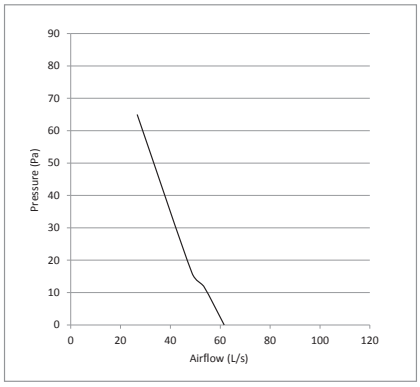
Dimensions - Thru Roof Fans

TECHNICAL SPECIFICATION & PERFORMANCE DATA

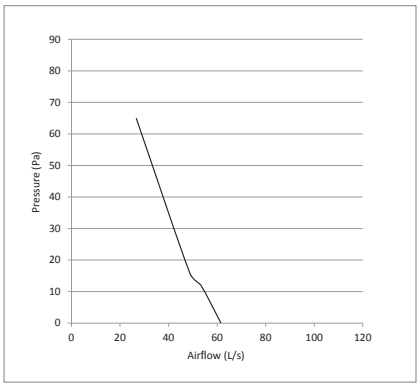
Models	FAN0529 FAN0530 FAN0740	FAN1002 FAN0967	FAN0531 FAN0532 FAN0739	FAN0533 FAN0534	FAN1009 FAN1060
Supply Voltage	220-240VAC	220-240VAC	220-240VAC	220-240VAC	220-240VAC
Fan	Centrifugal	Centrifugal	Axial	Axial	Axial - Whisper
Fan Performance	153 l/s, 550m^3/hr	153 l/s, 550m^3/hr	75 l/s, 270m^3/hr	75 l/s, 270m^3/hr	89 l/s, 320m^3/hr
Fan Wattage	58W	58W	44W	44W	46W
Maximum Pressure	320 Pa	320 Pa	80 Pa	130 Pa	130 Pa
Fan Speed	2500 RPM	2500 RPM	2850 RPM	2850 RPM	2750 RPM
Sound Level @ 1m	62 dB(A)	62 dB(A)	55 dB(A)	55 dB(A)	38 dB(A)
Operating Temp	-25 - +50°C	-25 - +50°C	-20 - +80°C	-20 - +80°C	-20 - +80°C
IP Rating	IPX4	IPX4	IPX2	IPX2	IPX2



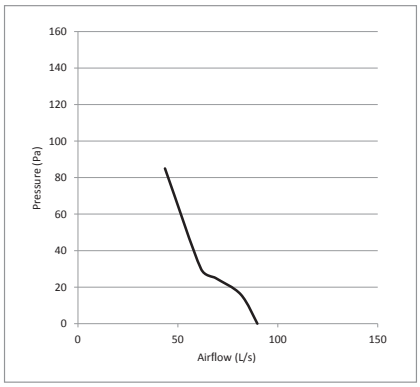
FAN0529/FAN0530/FAN0740



FAN0531/FAN0532/FAN0739



FAN0533/FAN0534



FAN1009/FAN1060

Dektite

Design features

Flexible Cone Sleeve

Dektite cone shape eliminates seal breakdown due to vibration or expansion and contraction, while isolation of pipe from sheeting dampens noise levels.

Stress Isolation Points

Unique to Dektite, two flexible shoulders absorb distortion and stop transfer of stresses from base to cone, as unit is formed over roofing profile.

Bonded Aluminium Flange

Corrosion-resistant, malleable flange, evenly distributes fastening pressure and allows ease of hand-shaping on most sheet profiles.

Integrity of Flashing Shape

Minimal distortion after installation, maintains natural flashing shape and seal around pipe, while water run-off is improved.

UV Protection

Dektite products are resistant to ultraviolet light damage and will remain fully flexible under all conditions.

Easily Identified Sizing

Pipe diameter rings are clearly marked on the cone sleeve (metric and imperial) for cutting to match the appropriate pipe diameter.

Low Profile Design

Sleek, unobtrusive shape is designed to minimise silhouette on roofline, while managing to provide generous internal clearance for steep, angular installations.

Improved Waterproofing

Designed to strengthen sealant bond and improve waterproofing, the ribbed base also has a tapered edge to improve runoff and contribute to a superior waterproof seal.

Perfect for approved flues!

Dektite EPDM polymer flashings have been officially tested and conform to all Australian and New Zealand Standards on approved flue systems. EPDM withstands temperatures from -50^{o}C - 115^{o}C and up to 150^{o}C intermittently. withstands temperatures from -60^{o}C - 200^{o}C and up to 250^{o}C intermittently.

Dektite Premium

The versatile solution

Most extensive range of Dektites 0 - 510mm penetrations, available in black and grey EPDM and silicone red for high temperatures.

Designed to enable practically any pipe flashing operation to be carried out within minutes, simple to install and very effective.

The low profile cone not only looks good but provides a generous internal clearance, so even the steepest roofs are handled with ease.

Around the base of the cone a flexible bead reduces stress on the flashing membrane.

Suitable for flashing pipes that penetrate wall claddings.

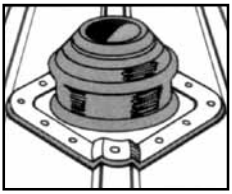
For a maintenance free seal on pipes from 0 – 510mm diameter, it's much more than a flexible solution to pipe flashing, it's a means of saving time and money.

Can also be used to flash square penetrations. Just add 30% to the pipe diameter and trim the cone to suit.

EPDM withstands temperatures from -50°C - 115°C and up to 150°C intermittently.

Silicone withstands temperatures from -60°C - 200°C and up to 250°C intermittently.

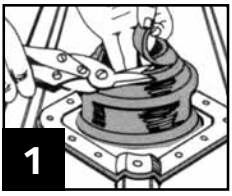
Installation Instructions:



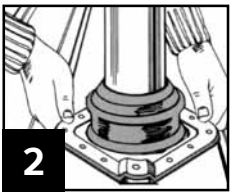
NOTE:

For more effective drainage, always fit the Dektite on the diamond or bias.

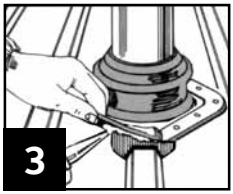
Dektites are suitable for flashing pipes that penetrate wall claddings.



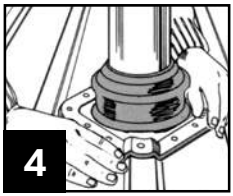
Cut a neat hole in roofing sheet with minimum clearance for pipe and insert pipe through hole. Trim the cone to suit pipe size using sharp tin snips. Where required, support cut sections of sheet with additional framing.



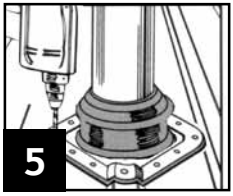
Slide Dektite flashing down over pipe. Lubricating the pipe with water allows the pipe to slide snuggly into position.



Apply a neutral-cure silicone sealant by turning back the flexible flange (refer to page 13 for silicone types).

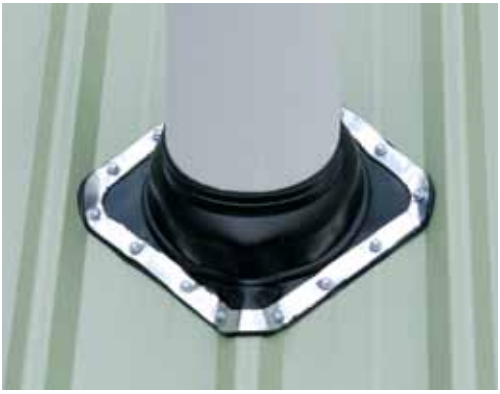


Press base to the roof profile by hand, smooth out any awkward creases. Don't fully extend to allow for vibration.



Fasten using self drilling washered screws. Fit fasteners progressively outward in opposing pairs to avoid gaps.

Code: Black EPDM	Code: Grey EPDM	Code: Red Silicone	Base (mm)	Pipe (mm)	Pitch
DFE10MB			71 x 71	0-20	0-60
DFE100B	DFE100MG		100 x 100	0-35	0-60
DFE100BS		DFE200RES	100 x 100	0-35	0-60
DFE101B	DFE101G		139 x 139	5-55	0-45
DFE101BS		DFE201RES	139 x 139	5-55	0-45
DFE102BA	DFE102GA	DFE202REA	181 x 181	50-70	0-45
DFE103B	DFE103G	DFE203RE	218 x 218	5-127	0-45
DFE104B	DFE104G	DFE204RE	279 x 279	75-175	0-45
DFE105B	DFE105G	DFE205RE	309 x 309	100-200	0-45
DFE106B	DFE106G	DFE206RE	363 x 363	125-230	0-45
DFE107B	DFE107G	DFE207RE	456 x 456	150-300	0-45
DFE108B	DFE108G	DFE208RE	495 x 495	170-355	0-45
DFE109B	DFE109G	DFE209RE	680 x 680	230-508	0-45



NEW PRODUCT DEKTITE SOLAR

DFE201RES

DFE100BS

CS CavitySliderS®

For doors that < slide > **inside** walls

HowTO
install this

CS SpaceMakeR® Single
sliding door unit.

Before you start:

READ this "HowTO" (Installation Instructions) CAREFULLY!

(It could save you lots of work!)

Other CS Cavity Sliders fitted with timber jambs are covered by this HowTO.
They are:

CS SofStoP® (SF)* * Extra data sheets may be required for these units.

Check out the full range of products and use our on-line calculator at: **www.csfordoors.co.nz**

Keep this "How TO" handy. You may need it later on.

Another quality product from:

CS FOR DOORS®

WHAT YOU NEED TO KNOW FIRST.

Construction of the wall.
We name the construction of the wall, referred to in these instructions as a 100mm x 50mm framework in wood. In reality this may mean a 94mm x 47mm or 90mm x 45mm wooden framework.
Although not shown, the unit covered in this "HowTO" may also be fitted into other types of wall materials (steelstud, concrete, brick, etc.).
For concrete or masonry type walls, fix a 100mm x 50mm timber jack stud into the opening on each side.
Fix these in place with ø10mm x 98mm long countersunk masonry anchors at 400mm centres.

Lintel or trimmer sizes.
CS Cavity Sliders are non-loadbearing units. They require the lintel (or trimmer, ceiling joist or other structural component) directly above the track to span the full trim size opening width. Timber lintels must be sized from NZS3604.
Specific design is required for all other kinds of structural components.

The hole in the wall.
Calculation of how big the hole in the wall framing should be to fit in this unit:

CS SpaceMaker Single unit

Height = door leaf height + 95mm
Height = door leaf height + 105mm (for SF only)
Width = (door leaf width x 2) + 30mm (also for SF)

Standard clearances under the door.
With this CS SpaceMaker unit sitting hard on top of the concrete or timber floor, the clearance under the door leaf ranges between 22 - 30mm (adjustable). The majority of these standard clearances is taken up by the floor covering (e.g. carpet, tiles etc.).

Modified clearances under the door.
If you require **more** than 30mm clearance under the door: pack the CS SpaceMaker unit off the floor by the amount you need.
If you need **less** than 22mm clearance under the door leaf (e.g. for polished timber floors) there are three options to do this:

A CS FOR DOORS can supply special seals which fit to the bottom of the door leaf.

B* A door leaf up to 15mm taller can be fitted.

C* The whole unit can be made up to 15mm shorter.

***B** & **C** are only available when **pre-ordered**.

Contamination of the top track.
Never drill, nail or screw through the centre section of the track.
Make sure no dirt, grit or aluminium swarf gets into the track. This could impair the smooth running of the carriages.

Fixing cavity slider to the floor
Installing the cavity slider 100% plumb and level will **NOT** guarantee a correctly sliding door.
Wall, lintel, floor and door can all be out of plumb and straightness a small fraction, and this can cause the door to slide incorrectly into the cavity pocket. It is for this reason that the skirting block fixing (found at the base of the cavity slider behind the split jambs) is only secured once you have ensured door is running parallel to the cavity pocket.

Go to page **3** (overleaf) →

NOW FOR THE INSTALLATION ITSELF.

1 Remove packaging and check components.
Lay the CS SpaceMaker unit flat on the floor in front of the door opening.

Remove the transportation cleat (if still fitted) from the bottom plate assembly. (Take out the two screws and the three staples.)

Check for any obvious product defects.

Lay the unit on its back and sight the gap to check for normal clearances (drawing **Z**).

If anything looks out of specification or you are unsure, contact CS before beginning your install.

2 Fit the door leaf (if not already fitted).
Refer to 'Fitting your own door'.
(Page 4, instruction 15, drawing **Z**).

3 Fit the closing jamb to the CS SpaceMaker unit (if not already fitted).
Use 2 screws 8 gauge x 25mm long (as supplied) (drawing **Y**).

4 Now place the whole unit into the framed opening in the wall.
Check that the jack studs on both sides of the door opening are plumb in both directions.

5 Fix the aluminium back stud.
Plumb up the two timber split jambs (drawing **W**). Use a level!

While keeping the timber split jambs plumb, pack behind the aluminium back stud as shown. Now screw the aluminium back stud including the packing to the 100mm x 50mm jack stud through the five pre-punched holes.

Timber studs: use 8 gauge x 29mm wood screws.
Steel studs: 8 gauge x 29mm self-tapping screws.

6 Level the track (drawing **W**).
The track must be fitted level and straight.

Do not pack above the track.

This CS SpaceMaker unit does not need to be fixed to the lintel via the track (drawing **Y**).

7 Fix the closing jamb (drawing **W**).
Plumb closing jamb. Use a level!

Pack and nail at 500mm centres to the jack stud through the recessed centre section of the closing jamb and packing.

Use ø2.8mm x 60mm nails in the following order:

First: Fix the top of the closing jamb (drawing **W**).

Second: Fix the bottom of the closing jamb.

Ensure that the distance between the closing jamb and the split jamb are the same, both at the bottom and at the top.

The distance at the bottom must never be more than the distance at the top.
Measure this carefully!

Now fix between the top and bottom.

Use a straight edge to make sure that the closing jamb is straight.

8 Fix the bottom plate assembly (drawing **U**).
The door must slide parallel with the bottom plate assembly (see the 2 sets of black **A-A** arrows).

If not, gently tap the front of the assembly to the left or right until it does.

8 The door should now slide smoothly and fit into the recess in the closing jamb, leaving parallel gaps on either side between the door leaf and the closing jamb.

Fix the skirting block fixing to the floor only when the cavity pocket has been adjusted so that the **door closes neatly into the closing jamb and slides parallel to the bottom plate of the cavity slider.**

Fix the bottom plate assembly to the floor as follows:

- To **concrete** floors: Fix with ø8mm x 90mm masonry anchors through the pre-drilled holes in the skirting fixing blocks of the bottom plate. (See the red stamped arrow on the timber).
- To **timber** floors: Fix the bottom plate assembly with ø3.15mm x 75mm nails on either side in the centre of the skirting fixing block thickness. (See the red stamped ⊕ on the timber). Pre-drill ø3mm holes for these nails.

9 Fit the head jambs
(if not already fitted) (drawing **Y**).

Before fitting head jambs, adjust the door for plumb and for the desired clearance under the door (instructions on page 4).

Slide the head jamb into place between the vertical jambs.

This goes for both grooved and architraved jambs: 'Flush up' the joints. Then screw into place with the 8 gauge x 32mm long countersunk head screws (as supplied). Gently tap wooden plugs to cover the screw heads.

FINISHING THE INSTALLATION.

10 Fixing the wall linings.
The cavity slider comes with split jambs intentionally 'rounded out' as shown (drawing **Z**). This round out is to accommodate any slight bowing of the door leaf and to allow door hardware to clear the jambs.

The standard clearance is approximately 5-7mm between door and split jamb.

The supplied 'jamb spreader' should be inserted into the cavity slider opening prior to fixing wall linings and architraves.

Wherever possible, linings should only be glued on. Use short drywall screws to hold linings in place until glue is dry. For 10mm linings use maximum 25mm long drywall screws.

We recommend sealing the inside of all plasterboard linings and mdf architraves.

11 If fitting architraves (drawing **Y**).
Nail the architraves to the four vertical jambs and the two horizontal head jambs.

Use panel pins with a maximum length of 25mm plus the thickness of the architrave.

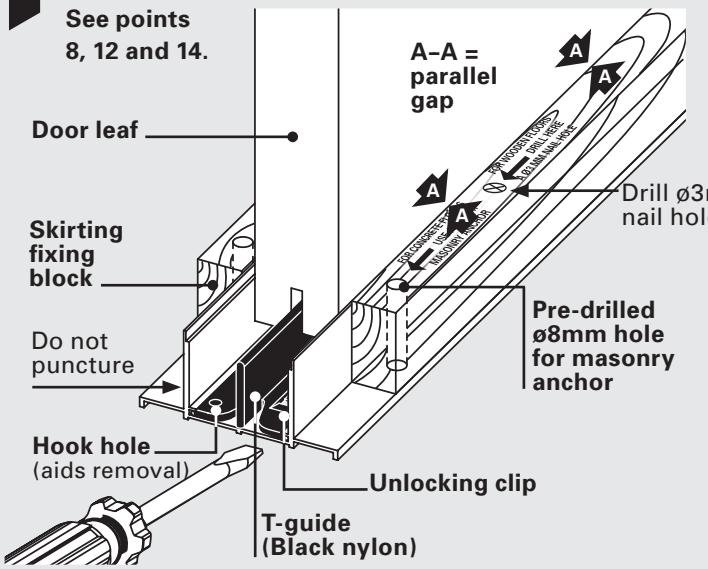
If the architrave is wider than 50mm you can also nail the architrave to the nogs.

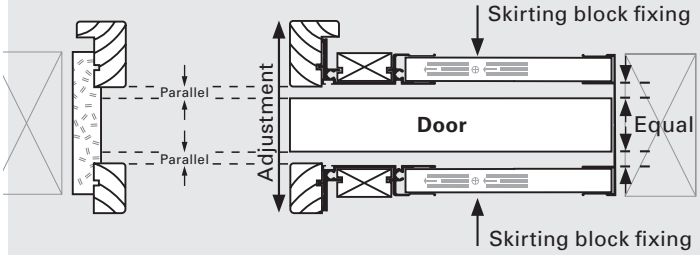
Use panel pins with a maximum length of the combined thicknesses of the architrave and wall linings **plus** 15mm.

Go to page **4** (overleaf) ➡

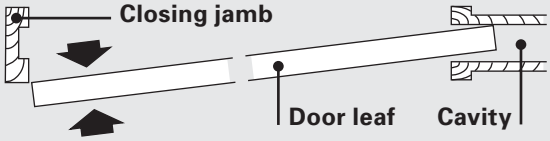
U BOTTOM PLATE ASSEMBLY

See points 8, 12 and 14.

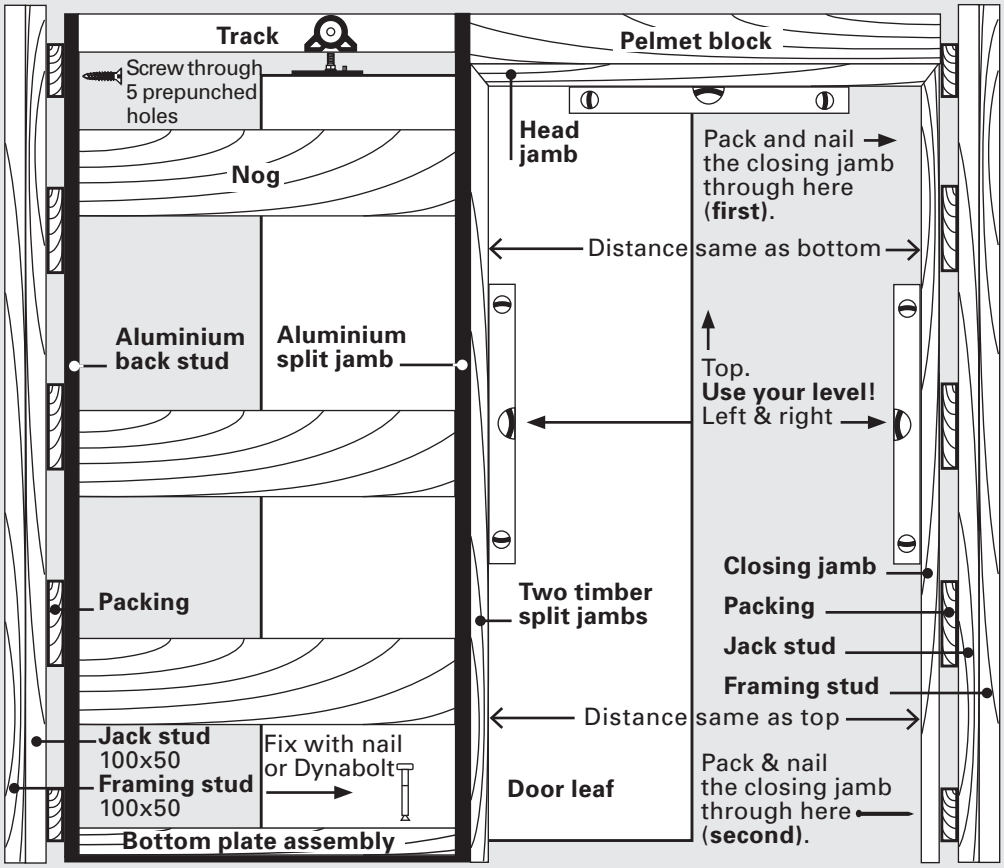




V DOOR REMOVAL **See point 14.**



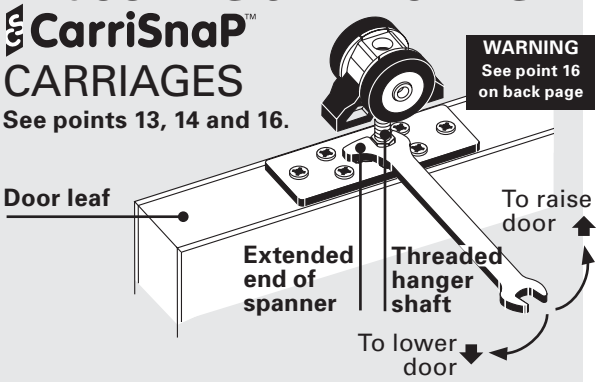
W ELEVATION **See points 5, 6 and 7.**



X ADJUSTING & REMOVING CarriSnaP™ CARRIAGES

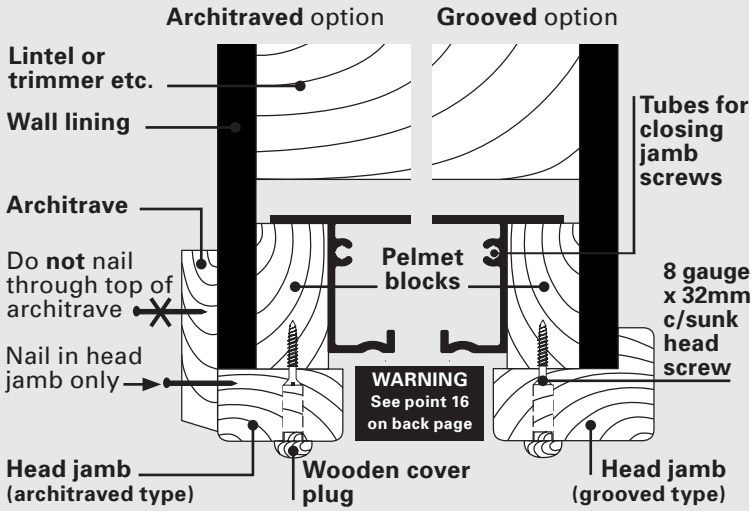
See points 13, 14 and 16.

WARNING See point 16 on back page



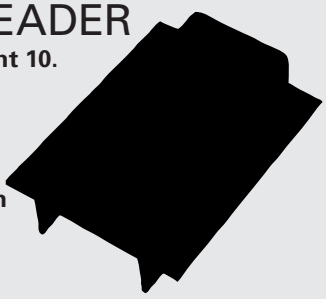
Y TRACK CROSS SECTIONS

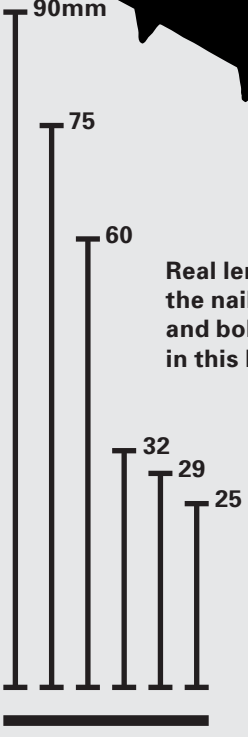
See points 3, 6, 9, 11 and 16.



JAMB SPREADER

See point 10.





Real length of the nails, screws and bolts as used in this HowTO.

11 Note: Nail the horizontal architraves to the head jambs; however: do **not** nail them to the timber pelmet blocks above the head jamb.

12 If fitting skirtings (drawing **U**).
When you fix the skirtings, make sure that you do not puncture the aluminium extrusion of the bottom plate assembly.

The maximum length of the panel pins are the combined thicknesses of the skirting and the wall lining **plus** 17mm.

Do not hammer too hard against the bottom plate. This may damage the channel through which the door leaf slides.

13 Adjusting the door heights (drawing **X**).
Use the small end of the spanner supplied to rotate the hexagonal nut at the bottom of the carriage hanger.

To **raise** door: Rotate spanner from **left to right**.
To **lower** door: Rotate spanner from **right to left**.

Note: The hanger shaft fits into a self-locking nut. If you turn the hexagonal nut too far downwards, the shaft will become loose from the self-locking nut. So: if the turning resistance suddenly feels much easier, you have gone too far.

14 Removing the door leaf (drawing **X**).
Using the spanner supplied, slide the extended end down the threaded part of the hanger shaft of the CarriSnap carriage. Fit it over the hexagonal nut at the bottom.

Now, (with the extended part of the spanner) press down the curved release pin that points up from the mounting plate.

Once this pin is fully depressed you can slide the spanner sideways in the direction of that pin.

You will see that the whole carriage, plus the shaft, comes loose from the mounting plate.

It is not always easy to slide the spanner sideways. You could relieve the weight of the door a little by putting a thin wedge between door and floor.

Now do the same with the second carriage.

You can remove the door now (drawing **V**)(for painting, repairs etc).

If you have trouble removing the door out of the cavity: lift the unlocking clip (drawing **U**) and slide the black nylon T-guide backwards for a second.

If you also want the CarriSnaps out:

Slide them towards the closing jamb end of the track and then take them out.

To replace the door or the carriages again: Follow the same steps, but in reversed order.

15 Fitting your own door (drawing **Z**).
Drill two ø25mm (1") x 13mm deep holes 85mm from either edge in the top of your door leaf in the position as marked on drawing **Z**.

Screw both mounting plates to the door with the mounting plates placed **exactly** in the centre of the door thickness and 85mm in from either edge.

Cut a groove at the bottom of the door leaf to the dimensions **and** tolerances shown.

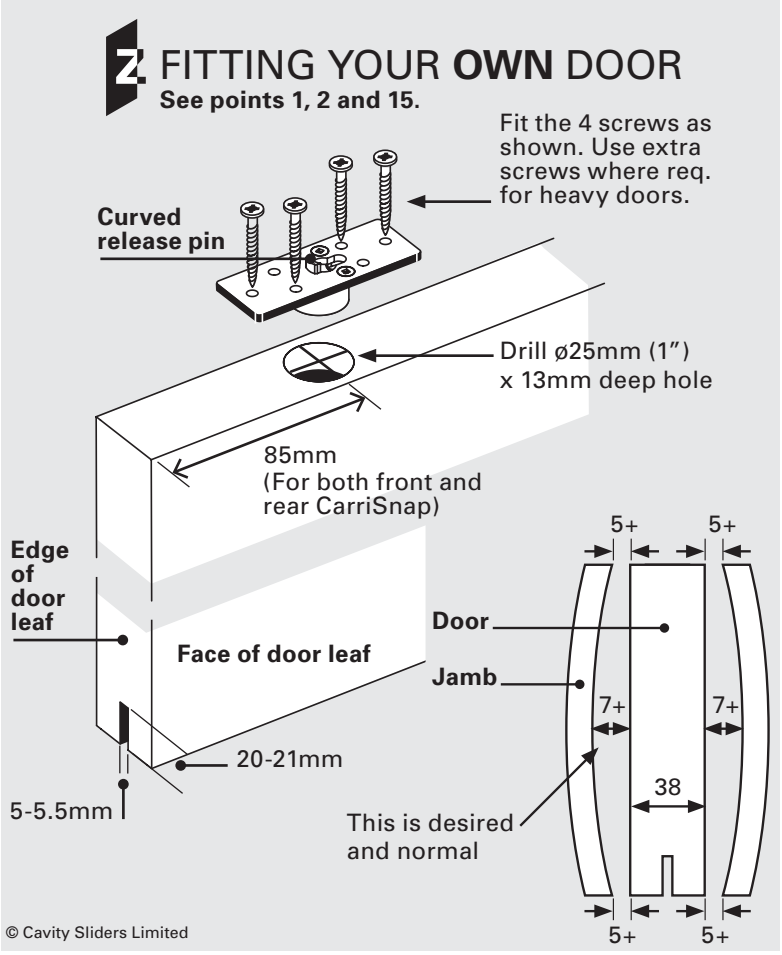
Make it central of the door thickness and absolutely straight.

Go to page **5**

16 WARNING (drawing **X** and **Y**).

CS Cavity Sliders require the track running surface to be clean and free of any contamination or damage. For smooth reliable service, the tyres on the carriage should not be chipped, dented or have swarf embedded in the tyre.

Please ensure you take extra care with the carriages to avoid any damage during the installation process.



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For doors that < slide > inside walls

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www.csfordoors.co.nz

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For doors that < slide > **inside** walls

HowTO
install this

SpaceMakeR®
Bi-Parting
sliding door unit.

Before you start:

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(It could save you lots of work!)

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They are:

SofStoP® (SF)*

* Extra data sheets may be required for these units.

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Keep this "How TO" handy. You may need it later on.

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CS FOR DOORS®

WHAT YOU NEED TO KNOW FIRST.

Construction of the wall.
The construction of the wall is referred to in these instructions as a 100mm x 50mm framework in wood.
In reality this may mean a 94mm x 47mm or 90mm x 45mm wooden framework.
Although not shown, the unit covered in this HowTO may also be fitted into other types of wall materials (steelstud, concrete, brick, etc.).
For concrete or masonry type walls, fix a 100mm x 50mm timber jack stud into the opening on each side.
Fix these in place with ø10mm x 98mm long countersunk masonry anchors at 400mm centres.

Lintel or trimmer sizes.
CS Cavity Sliders are non-loadbearing units. They require the lintel (or trimmer, ceiling joist or other structural component) directly above the track to span the full trim size opening width.
Timber lintels must be sized from NZS3604.
Specific design is required for all other kinds of structural components.

The hole in the wall.
Calculation of how big the hole in the wall framing should be to fit in this unit:

SpaceMaker Bi-Parting unit
Height = door leaf height + 95mm
Height = door leaf height + 105mm (for SF only)
Width = (door leaf width x 4) + 10mm (also for SF)

Standard clearances under the door.
With this SpaceMaker unit sitting hard on top of the concrete or timber floor, the clearance under the door leaf ranges between 22 - 30mm (adjustable).
The majority of these standard clearances is taken up by the floor covering (e.g. carpet, tiles etc.).

Modified clearances under the door.
If you require **more** than 30mm clearance under the door: pack the SpaceMaker unit off the floor by the amount you need.
If you need **less** than 22mm clearance under the door leaf (e.g. for polished timber floors) there are three options to do this:

A CS FOR DOORS can supply special seals which fit to the bottom of the door leaves.

B* A door leaf up to 15mm taller can be fitted.

C* The whole unit can be made up to 15mm shorter.

***B** & **C** are only available when **pre-ordered**.

Contamination of the top track.
Never drill, nail or screw through the centre section of the track.
Make sure no dirt, grit or aluminium swarf gets into the track. This could impair the smooth running of the carriages.

Fixing cavity slider to the floor
Installing the cavity slider 100% plumb and level will **NOT** guarantee a correctly sliding door.
Wall, lintel, floor and door can all be out of plumb and straightness a small fraction, and this can cause the door to slide incorrectly into the cavity pocket. It is for this reason that the skirting block fixing (found at the base of the cavity slider behind the split jambs) is only secured once you have ensured door is running parallel to the cavity pocket.

Go to page **3** (overleaf) →

NOW FOR THE INSTALLATION ITSELF.

1 Remove packaging and check components.
Lay the units flat on the floor in front of the door opening.

Remove the transportation cleat (if still fitted) from the bottom plate assembly. (Take out the two screws and the three staples.)

Check for any obvious product defects.

Lay each unit on its back and sight the gap to check for normal clearances (drawing **Z**).
If anything looks out of specification or you are unsure, contact CS before beginning your install.

2 Fit the door leaves (if not already fitted).
Refer to 'Fitting your own doors'.
(page 4 & 5, instruction 13, drawing **Z**).

3 Place both units as a pair into the framed opening in the wall.
Check that the jack studs on both sides of the door opening are plumb in both directions.
Make sure that the ends of both tracks **butt hard together** with the alignment pins fitting into the corresponding screw tubes (drawing **Y**).

4 Fix the aluminium back studs.
Plumb up the four timber split jambs (drawing **W**). Use a level!
While keeping the timber split jambs plumb, pack behind the aluminium back stud as shown.
Now screw the aluminium back studs to the 100mm x 50mm jack studs through the five pre-punched holes in each back stud.

Timber studs: use 8 gauge x 29mm wood screws.
Steel studs: get 8 gauge x 29mm self-tapping screws.

5 Level the tracks (drawing **W** & **Y**).
The tracks must be fitted level and straight.
Do not pack above the tracks.
Screw the tracks to the lintel as shown in drawing **Y,** using two screws (one in each side) for each track (four screws in total).
Screws should be fitted 50mm back from the centre from each track and 30mm either side of the centre of the track (drawing **Y**).
Wind screws in, only enough to level and straighten both tracks.

6 Fix the bottom plate assembly (drawing **U**).
The doors must slide parallel with the bottom plate assembly (see the 2 sets of black **A-A** arrows).
If not, gently tap the front of the assembly to the left or right until they do.
The doors should now slide smoothly and butt neatly when both doors close together in the centre.
Fix the skirting block fixing to the floor only when the cavity pocket has been adjusted so that the **door closes neatly into the closing jamb and slides parallel to the bottom plate of the cavity slider.**
Fix the bottom plate assembly to the floor as follows:

- To **concrete** floors:
  Fix with ø8mm x 90mm masonry anchors through the pre-drilled holes in the skirting fixing blocks of each bottom plate.
  (See the red stamped arrow on the timber).
- To **timber** floors:
  Fix the bottom plate assembly with a ø3.15mm x 75mm nail on either side in the centre of the skirting fixing block thickness.
  (See the red stamped ⊕ on the timber).
  Pre-drill ø3mm holes for these nails.

7 Fit the head jambs (drawing **Y**).
Before fitting head jambs, adjust the doors for plumb and for the desired clearance under the doors (instruction 11).
Slide the head jambs into place between the vertical jambs.
This goes for both grooved and architraved jambs: 'Flush up' the joints. Then screw into place with the 8 gauge x 32mm long countersunk head screws (as supplied). Gently tap wooden plugs to cover the screw heads.

FINISHING THE INSTALLATION.

8 Fixing the wall linings.
The supplied 'jamb spreader' should be inserted into the cavity slider opening prior to fixing wall linings and architraves.
Wherever possible, linings should only be glued on. Use short drywall screws to hold linings in place until glue is dry.
For 10mm linings use maximum 25mm long drywall screws.
We recommend sealing the inside of all plasterboard linings and mdf architraves.

9 If fitting architraves (drawing **Y**).
Nail the architraves to the four vertical jambs and the two horizontal head jambs.
Use panel pins with a maximum length of 25mm plus the thicknesses of the architrave.
If the architrave is wider than 50mm, you can also nail the architrave to the nogs.
Use panel pins with a maximum length of the combined thicknesses of the architrave and wall linings plus 15mm.
Note: Nail the head architraves to the head jambs, however: do **not** nail the head architraves to the timber pelmet blocks above the head jamb.

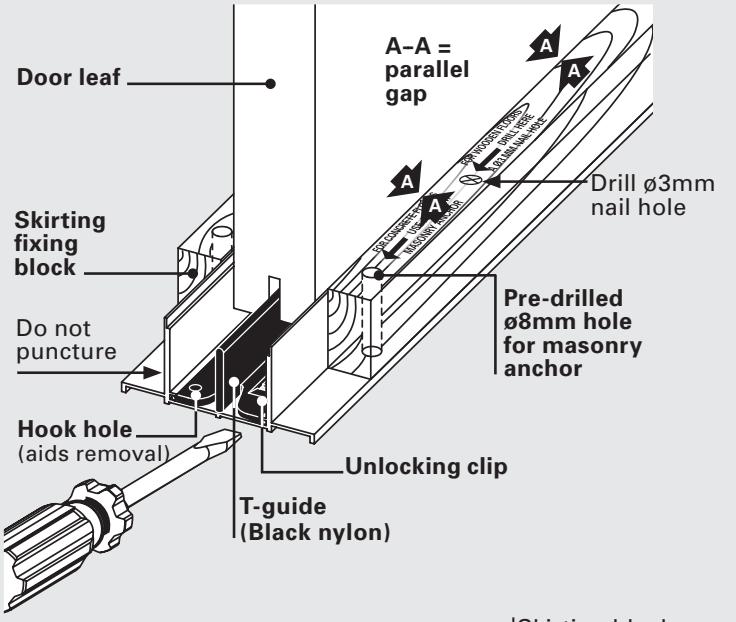
10 If fitting skirtings (drawing **U**).
When you fix the skirtings, make sure that you do not puncture the aluminium extrusion of the bottom plate assembly.
The maximum length of the panel pins are the combined thicknesses of the skirting and the wall lining **plus** 17mm.
Do not hammer too hard against the bottom plates. This may damage the channel through which the door leaf runs.

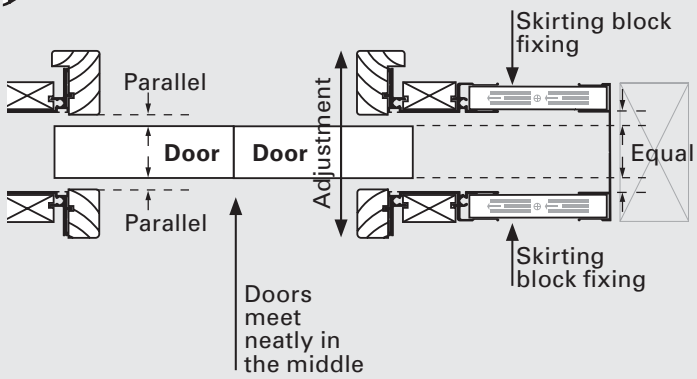
11 Adjusting the door heights (drawing **X**).
Use the small end of the spanner supplied to rotate the hexagonal nut at the bottom of the carriage hanger. Adjust the doors for plumb, making sure they butt neatly together when closed with no gaps.
To **raise** door: Rotate spanner from **left to right**.
To **lower** door: Rotate spanner from **right to left**.
Note: The top of the hanger shaft fits into a self-locking nut. If you turn the hexagonal nut too far downwards, the shaft will become loose from the self-locking nut.

Go to page 4 (overleaf) ➡

U BOTTOM PLATE ASSEMBLY

See points 6 and 10.

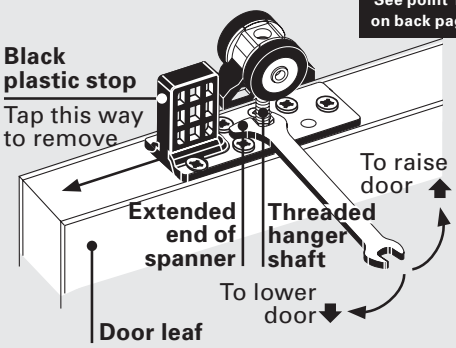




X ADJUSTING & REMOVING CarriSnap™ CARRIAGES

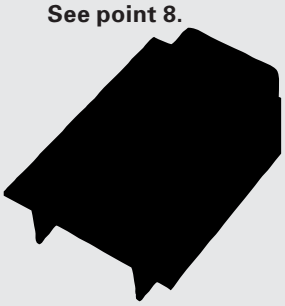
See points 11, 12 and 14.

WARNING See point 14 on back page



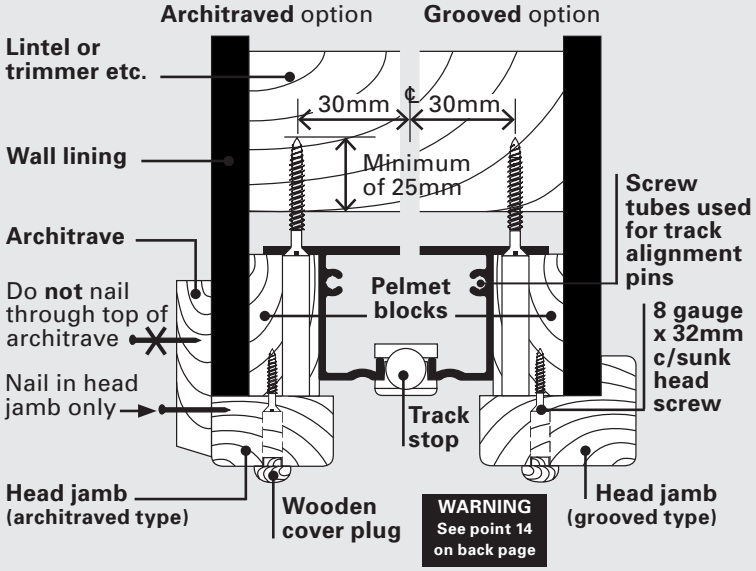
JAMB SPREADER

See point 8.



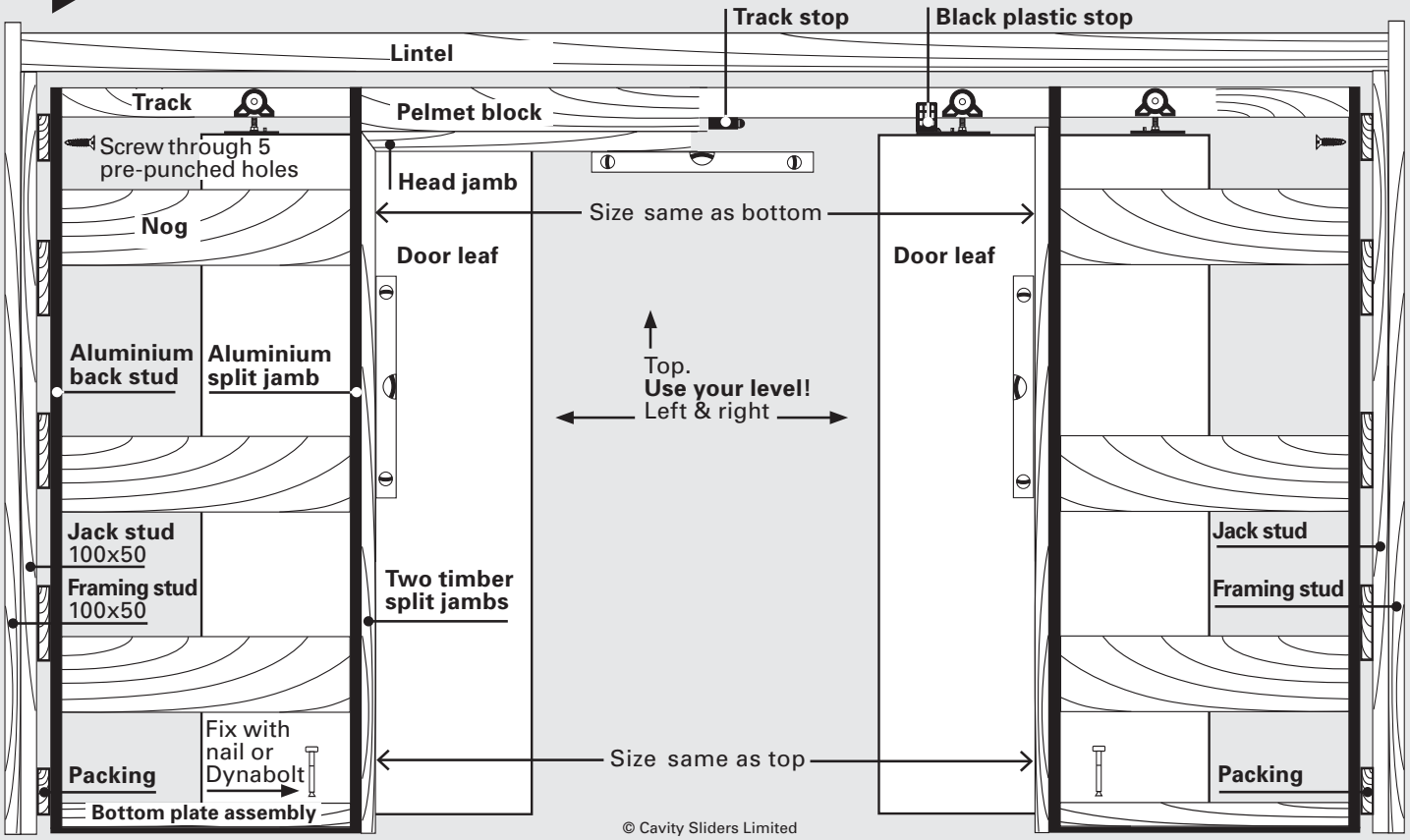
Y TRACK CROSS SECTIONS

See points 3, 5, 7, 9, 13 and 14.



W ELEVATION

See points 4 and 5.



11 So: if the turning resistance suddenly feels much easier, you have gone too far.
Set the position of the track stops in the top track so that when the doors are in the closed position their leading edges do not pass the central joint of the tracks.

12 Removing the door leaves (drawing **X**).
Using the spanner supplied, slide the extended end down the threaded part of the hanger shaft of the CarriSnap carriage.
Fit it over the hexagonal nut at the bottom.
Now, (with the extended part of the spanner) press down the curved release pin that points up from the mounting plate.
Once this pin is fully depressed, you can slide the spanner sideways in the direction of that pin.
You will see that the whole carriage, plus the shaft, comes loose from the mounting plate.
It is not always easy to slide the spanner sideways. You could relieve the weight of the doors a little by putting a thin wedge between door and floor.
Now do the same with the second carriage.
Finally, remove the black plastic stop that is tightly fitted into the mounting plate at the front of each door leaf. Remove this by tapping it out in the direction shown using a hammer and drift. (drawing **X**).
You can remove the doors now (for painting, repairs etc).
If you also want to take the carriages out: do so by sliding them towards the centre of the opening.
To replace the door again: Follow the same steps, but in reversed order.

13 Fitting your own doors (drawing **Y** & **Z**).
The cavity slider comes with split jambs intentionally 'rounded out' as shown (drawing **Z**). This round out is to accommodate any slight bowing of the door leaf and to allow door hardware to clear the jambs.
The standard clearance is approximately 5-7mm between door and split jamb.
Fit doors in the following sequence:

A Fit the carriages and groove the doors as per the dimensions shown (drawing **Z**).
Drill two ø25mm (1") x 13mm deep holes in the top of each door leaf in the positions shown.
Screw the mounting plates to the doors.
Note: these mounting plates must be placed **exactly** in the centre of the door thickness.
The larger of the two mounting plates (the one with the black plastic stop) fits closest to the leading edge of the door. Make sure the black plastic stop is facing the leading edge of the door.
Cut a groove at the bottom of each door leaf to the dimensions **and** tolerances shown.
Make each groove central of the door thickness, parallel and absolutely straight.

B Remove the track stops from the centre of each track (drawing **Y**) by loosening the two stainless steel cap screws.
Slide the stops to the centre of the track where they will drop out through the carriage access slot.

C Slide both doors into cavity pockets, making sure that the carriage fitted to the back of each door enters the track first.

Go to page 5 →

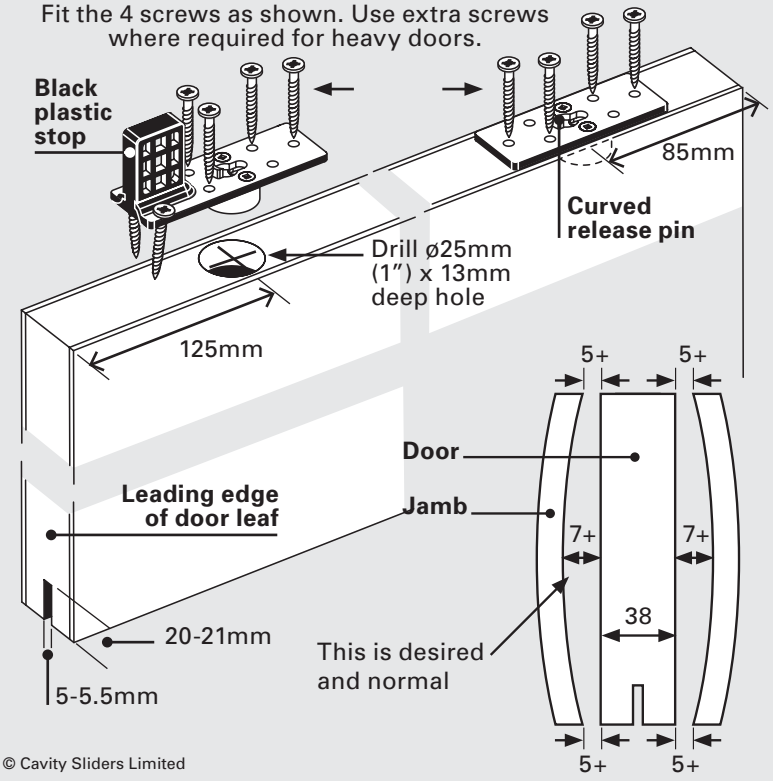
D Re-fit the track stops to the tracks with each rubber buffer part pointing towards the cavity pocket. Temporarily tighten the cap screws.
Continue at instruction 3 on page 3.

14 WARNING (drawing **X** and **Y**).

CS Cavity Sliders require the track running surface to be clean and free of any contamination or damage. For smooth reliable service, the tyres on the carriage should not be chipped, dented or have swarf embedded in the tyre.
Please ensure you take extra care with the carriages to avoid any damage during the installation process.

FITTING YOUR **OWN** DOORS

See points 1, 2 and 13.



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T 09 276 0800
F 09 276 2525

info@csfordoors.co.nz
www.csfordoors.co.nz

22/03/2024

To whom this may concern,

Re: 44 Leven Street, Roslyn, Dunedin

We've established a baseline figure for your property.

Our estimate is based on research I have conducted of other similar-era properties and areas, along with the state of the current rental market. I believe this 3/4 bedroom, 1 bathroom home would achieve a weekly rent within the vicinity of **$730-$760 pw as a four-bedroom, $690-710 if three-bedroom.**

Features:

- Three or four bedrooms
- Two living spaces or one if used as fourth bedroom
- Tastefully renovated throughout
- Neutral decor with character features
- Spacious and well-appointed kitchen
- Luxurious bathroom
- Great outdoor entertaining spaces
- Premier Dunedin location

When appraising the property, we take into consideration the following; comparison of similar properties, features or benefits of the property, condition and presentation, location and proximity to popular amenities and overall condition of the rental market.
This appraisal may vary depending on the supply and demand of tenants and properties at the time of renting and as such, we cannot offer our estimates as anything other than estimates.

Please do not hesitate to contact me if I can assist you further.

Sincerely

Nathan Dickson
Leasing Agent
027 214 7265
nathan@ljhdunedin.co.nz
dunedin.ljhooker.co.nz