VODAPRUF

ALC (Aerated Lightweight Concrete) Panel

Picture Taken At : PROJECT @ NATIONAL UNIVERSITY SINGAPORE

CIDB IBS CERTIFICATE
No Cert :IBS098/19724

CONSTRUCTION APPROVAL
PRODUCT :
No Series :20241001-39

No. Fail: JBPM/IP/RNP:700-7/2/25-50 (9)
No. Series: BB/WS/2274/2017 (P3)

ECO- FRIENDLY BUILDING MATERIAL
(In accordance to SEC Green Label
Category 22: Cement and Concrete Version 2)

PSB Singapore Certified
Test Report No : 7191151364 - MEC17/03

Setsco Services Pte Ltd

Certificate NCN/ 101118

Test Report : 7191190389-MEC18/ADD-IHN, 7191153877-MEC17-LJH, 7191151364-MEC17/03 - YX, 7191151364-MEC17/02-EMK, EN8500026712/LWW

Test To : ASTM E90 - 04, BS EN 772 - 11:2011, BS 476: PART 22: 1987: , BS 476: PART 4: 1970, BS 5234: PART 2: 1992

INTRODUCTION

LOCAL CAPACITY & INTERNATIONAL MARKET

History

VODAPRUF Pte Ltd was founded in Year 2013, focus in the manufacturing of Lightherm (Lightweight Concrete), and recent year branched into the manufacturing of vPanel (ALC Panel - Aerated Lightweight Concrete Panel).

Our Factory

Is located in Kulai, Johor Bahru (Malaysia) which is only 35km from Singapore, producing Lightherm & vPanel (ALC Panel). Our sales office is located in Singapore.

Time Line

Year 2013
Incorporated in Singapore by Managing Director Wang Wee Hwa, started operation as a trading company.

Year 2014
Rented first office in Singapore, set up packing machinery for Lightherm manufacturing.

Year 2015
Shifted production plant to Malaysia, started EPS (expanded polystyrene) manufacturing in Senai, Johor Bahru.

Year 2016
Set up second factory to produce vPanel (ALC Panel) in Kulai, Johor Bahru.

Year 2017
Expanded factory over a 2 acres land.

Year 2018
- Acquired more than 230 projects for Lightherm concrete project.
- Franchise - Manufacturing - Partner in Korea, China and Phillipines.

Year 2019
- Set up branch in Sarawak (Malaysia) producing vPanel - Block (ALC Block - Aerated Lightweight Concrete Block).
- Set up branch in Northern Island (UK) producing Lightherm (Lightweight Aggregate).

Year 2020
-vPanel production reaches an annual production capacity of 280,000m2.
-vPanel has been installed for more than 30 projects in both the private and government sectors. These include projects by HDB, MOH, JTC and other commercial and industrial projects, such as, data centres, food factory, manufacturing facilities, chemical plants and private residential projects.

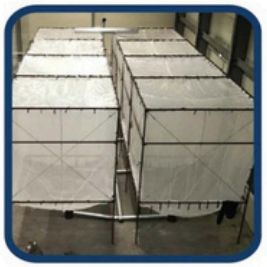
Cost Effective Semi Automated Production with a Productivity of 28,000M2 Per Month.

In – House Logistic for Just – In – Time Delivery.

vPanel - Block (ALC Block - Aerated Lightweight Concrete Block).

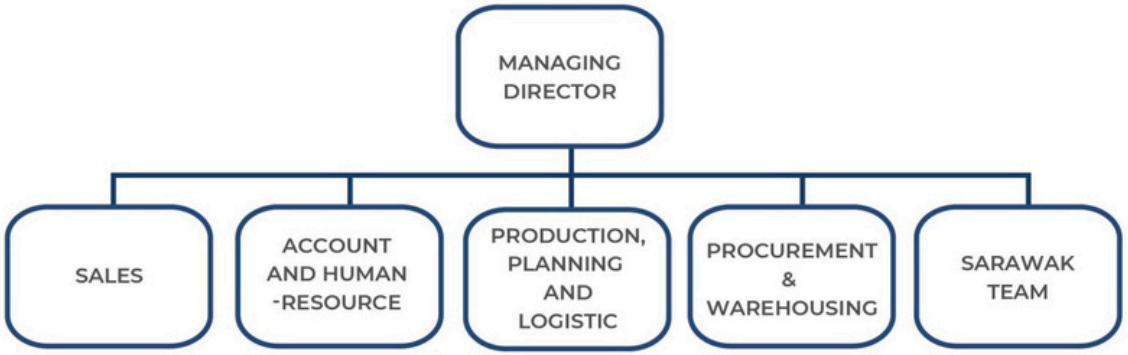
Branch in Northern Island (United Kingdom) , Producing Lightherm Lightweight Aggregates.

Franchisee in Phillipines (Local Production).



Franchisee in Korea (Local Production).

ORGANIZATION STRUCTURE



CORPORATE VISION

To be a global leader in precast wall / block manufacturing through product customizer & chemical technology advancement.

CORE VALUE

INNOVATIVE

To come out with new creative ideas that have the potential to accelerate the building industry advancement.

HONESTY

To act with honesty and integrity towards our

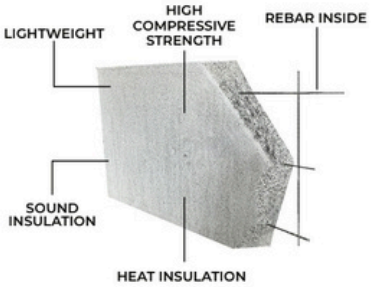
- *Investor*
- *Supplier*
- *Customer*
- *Employee*

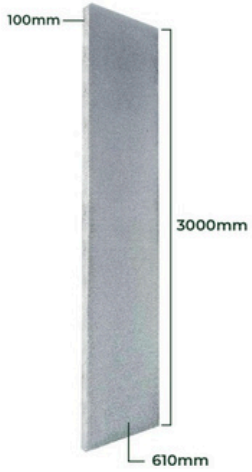
PASSION

To serve the society and industry, and is driven by passion.

PRODUCT INTRODUCTION

vPanel is an Aerated Lightweight Concrete Panel (ALC Panel) made by VODAPRUF PTE LTD , using a blend of cement and sieved sand. vPanel has acquired test certification in Singapore and Malaysia.





Full Test Reports :

1. Non Combustible Test Report , BS 476 : Part 4
2. Compressive Strength Report , BS EN 12390-3 : 2009
3. Certificate of Conformity , COC Class 2
4. Certificate of Conformity , COC Class 1A
5. Fire Rating Report , BS 476 : Part 22
6. Fire Rating Report with Lintel Stiffener , BS 476 : Part 22
7. Water Absorption Test Report , BS EN 772-11 : 2011
8. Acoustic Test Report , ASTM E90
9. Robustness Test Report , BS 5234
10. PE Endorsement
11. Malaysia CIDB Certificate
12. Malaysia BOMBA Certificate
14. Vodapruf ISO 9001:2015 Certificate
15. Singapore Green Building Council Certificate
16. Singapore Environment Council , Green Label Certificate
17. Leeching Test , US EPA Method 1311 : 1992
18. TVOC and Formaldehyde Test , ASTM D5116 - 10

TECHNICAL DATA

No.		
1.	Dry Density kg/m³	500
2.	Wet Density kg/m³	600
3.	Weight , KG / m²	48
4.	Thickness , mm	100mm
5.	Panel Width , mm	610mm
6.	Maximum Panel Length , mm	3000mm
7.	Sound Transmission STC , ISO 140-3 : 1995	Up to 45 STC (10mm thick plaster both sides)
8.	Thermal Conductivity , w / mk	0.1375 W/(m K)
9.	Strength & Robustness (BS 5234 Part 2)	Pass
10.	Fire Rating (BS 476 , Part 22 : 1987)	4 Hours
11.	Suitable for Wet Areas	Yes
12.	Productivity	25 - 30 m² per day
13.	On-Site Installation of Concealed Wiring Ducting & Pipework	After installation of wall, wall surface can be chased. Void within wall to be filled with packing material.
14.	Surface Appearance	Thick plaster only
15.	Compressive Strength	3.5 MPa
16.	External Wall Application	Yes

1. Compressive strength and panel length can be fabricate to project requirement thus reduce wastage.
2. Panel thickness can be customized at an interval of 25mm.
3. Panel density is customizable upon request.

Can VODAPRUF customise the length of vPanel ?

Yes, the maximum length of each thickness range is stated above. Customise length panel will takes a longer lead time but in some cases it can contribute in cost saving. Extra residuallength of the panel can be cut and install using a staggered joint method, thus eliminating risk of wastage.

vPANEL PROJECT REFERENCE

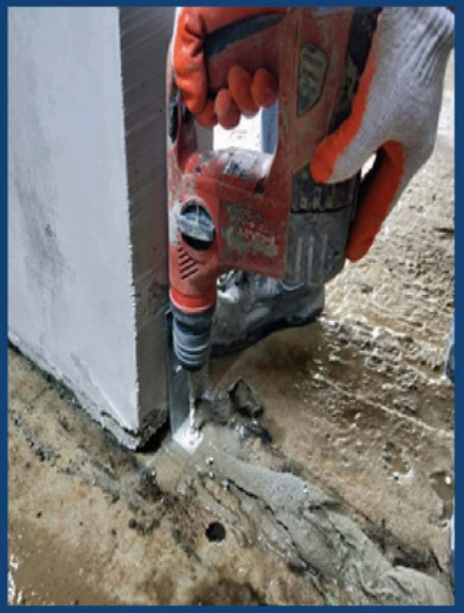
Project Name / Location	Application	Profile	Developer / Owner	Architect	Structrual Consultant	Main Contractor	Coverage	Date of Completion
SG - Bungalow @ 42 Saraca Road	External & Internal Wall	100mm	-	-	-	San Energy Pte Ltd	450m2	Jun 2017
SG - Childcare @ 93 Jurong West Street	Internal Wall	50mm	-	-	-	-	800m2	Mar 2017
SG - HDB @ 288B Bukit Batok	Internal Wall	50mm	HDB	-	-	-	6m2	Jan 2017
SG - Pet Farm @ 56 Sungei Tengah Road	External & Internal Wall	100mm	JTC Corporation	WSP Consultancy	WSP Consultancy	Lian Ho Lee Construction Pte Ltd	25,000m2	Feb 2018
SG – Warehouse Project at Woodland	Internal Wall	100mm	Renovation job	-	-	-	300m2	April 2018
SG-Furnishing Contractor @ 14 Sungei Kadut Street 6	Internal Wall	100mm	-	-	-	-	240m2	May 2018
SG- Factory @ 25 Changi North Rise	External wall , 8 metre height	100mm	-	-	-	Architect Project Group LLP	600m2	Oct 2018
SG- Transformer room at 47 Jalan Buroh	External wall	250mm	Radha Export Pte Ltd	Thymin Pte LTd	Lattitude Architects	Weima Builders Pte Ltd	250	Oct 2018
Factory @ 11 Tuas Avenue 10	External wall	100mm	JTC Corporation Pte Ltd	Pal Consultancy Pte Ltd	D.ArcClub Architects	QFC Construction Pte LTd	800m2	Dec 2018
Factory @ 101 Pioneer Road	External wall	100mm	R.Glazen Singapore Pte Ltd	BK Consulting Pte Ltd	TWA Architect	Meida Construction Pte Ltd	2200m2	Dec 2018
Cheese Making Factory @	Internal Wall	100mm	Zebra Investments Ltd	-	GL Consultancy and Services	Zebra Investments Ltd	450m2	Nov 2018
Industrial Building @ 60 Lorong 23 Geylang	External Wall	100mm	Kai Lim Builder Merchants Pte Ltd	CGM Engineering Consultat	D.Arc Club Architects	Trust Build Pte Ltd	3500m2	Dec 2018
Keng Cheng Primary School @ 15 Lorong 3 Toa Payoh	External Wall	100mm 150mm	-	-	-	Trust Build Pte Ltd	1800m2	Dec 2018
Factory @ Shipyard Crescent	External Wall	100mm	-	-	-	Quadunion Builders Pte Ltd	2800m2	Dec 2018

Project Name / Location	Application	Profile	Developer / Owner	Architect	Structrual Consultant	Main Contractor	Coverage	Date of Completion
SG- Factory @ 10 Tuas Avenue 12	External Wall	100mm	Jackway Convertor Industrial Pte Ltd	The Engineers Collaborative LLP	The Engineers Collaborative LLP	Emma Group Construction Pte Ltd	2200m2	Oct 2018
8-Storey Laboratory Facilities @ NUS , Engineering Drive 3	External & Internal Wall	100mm	NUS	Architects 61	KTP Consultants	Lian Soon Construction Pte Ltd	8000m2	Jun 2019 – Q2'2020
Industrial Building @ 25 Tanjong Penjuru	External & Internal Wall	100mm	GCP Applied Technologies	Metaphor Design+ Architect	GLT Engineers	Kienta Engineering Construction Pte Ltd	2200m2	July 2019 - Feb 2020
Tramp @ Sentosa	External wall	100mm	Sentosa	SH NG Consultants	SH NG Consultants	DN Hybrid Pte Ltd	700m2	Sept - Oct 2019
Kranji Camp 3 - Extension	External & Internal Wall	100mm 150mm	Defence Science & Technology Agency (DSTA)	AJ+J Architect	PDC Consulting Engineers	SLF Construction Pte Ltd	8000m2	Q4'2019 – Q3'2020
Industrial Building 4-Sty @ 23 Gul Ave	External & Internal wall	100mm	Moby Dick Supplies	Czarl Architects	PTS Consultants	JMJ Consultants Pte Ltd	3000m2	July 2019 - Jan 2020
Industrial Building 2-Sty @ (LINDE GAS) @ Jurong Island	Internal wall	100mm	LGS ESG & OSBL (SLUP)	Engineers 9000	Engineers 9000	Kelington Engineering (S) Pte Ltd	500m2	Mar 2020
Industrial building at 60 Marsiling Road , 7-Sty	External & Internal	100mm		Bk Consulting Engineers	Bk Consulting Engineers	Meida Construction Pte Ltd	2500m2	Jan 2020 - May 2020
Sengkang N3 C29 Neighbourhood Centre	External & Internal	100mm 150mm	HDB	Kyoob Architects		Ken-Pal (S) Pte Ltd	4500m2	Q1 2020 - Q3 2020
Data Centre at Sunview Drive	Internal	150mm	Equinix SG5-1	AWP		Nakano Singapore	3000m2	Q1 2020 - Q2 2020
Industrial Building At Ubi Road 4	External & Internal	100mm	Jurong Town Corporation	Point Architects	T.Y.Lin International	Hua Siah Construction Pte Ltd	9300m2	Q1 2020 - Q4 2020

LIGHTWEIGHT ENERGY SAVING WALL PANEL

SG- Factory @ 25 Changi North Rise

Keng Cheng Primary School @ 15 Lorong 3 Toa Payoh

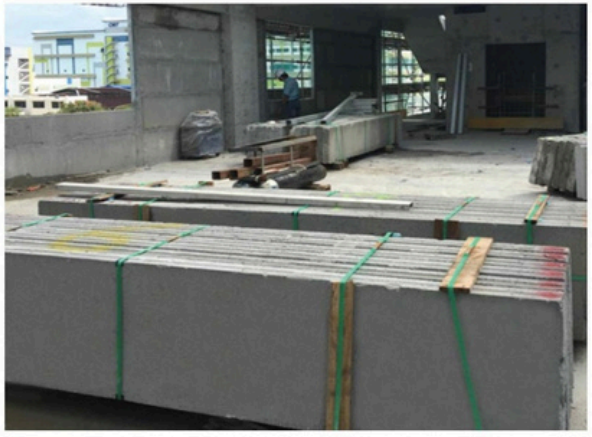


Singapore, Factory @ 10 Tuas Avenue 12

LIGHTWEIGHT ENERGY SAVING WALL PANEL

Singapore

As external & internal wall - Profile thickness of 100mm – 4 - Storey Industrial Building @ 25 Tanjong Penjuru



WHY US ?

Why VODAPRUF ALC Panel instead of other ALC panel supplier

01 Why VODAPRUF

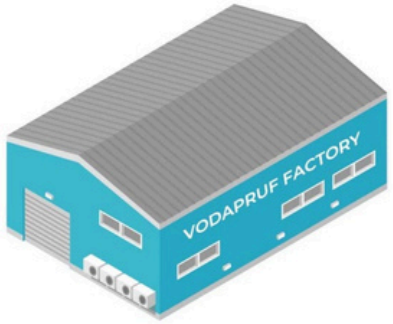
02 Comparison with Hollow Core Panel

03 Comparison with Drywall System

04 Comparison Table

05 Labour Saving Index Comparison

VODAPRUF FACTORY



VODAPRUF WAREHOUSE

LOW PRICE.
VODAPRUF is the only ALC Panel supplier in Singapore that in - house manufacture the panel. Without an intermediate 3rd party, this enable us to provide a better price offer to our customer.

ADVANCE MANUFACTURING.
Enable us to provide JIT (Just in Time) manufacturing for special urgent request.

CLOSE PROMIXTY.
Factory located in Kulai, which is only 35 kilometers from Singapore. Lead time of within 48 hours upon receive customer site instruction time deliver goods.

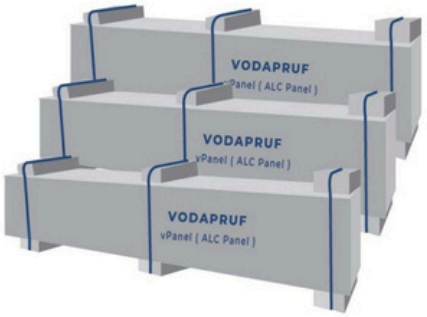
2 ACRE SPACE.
Enable us to stock up to 80,000m2 of panels for our client.

High Level Of Available Stock.

Low Storage Fee.

VODAPRUF LORRY

SITE



VODAPRUF SALES TEAM AND TECHNICAL TEAM

IN HOUSE LORRY.
Ease on aliasing work, thus short lead time of within 48 hours upon receive site instructions.

QUALITY CONTROL.
Ensuring proper loading, proper transportation and proper unloading to eliminate defects due to transportation.

24 HOURS DELIVERY.
During crisis or urgent period, we are able to delivery anytime and any day in a week.

VODAPRUF vPanel (ALC Panel)

Full certificate available.

Lowest price guaranteed.

ON SITE TRAINING.
Provide on site installation guidance to installer.

TECHNICAL SUPPORT.
For the preparation of shopdrawing and drafting works.

AUTHORITY SUBMISSION.
Strong assistant in the submission of DOC (Declaratin of Conformity) for fire rated wall.

COMPARISON WITH HOLLOW CORE PANEL

Item	Specification	Technical Data	vPanel 900(Density900kg / m3, custom mode for specific area)	vPanel 550 Standard Product
1	Sound insulation (ASTM E9O)	STC 46	vSTC 46 without plaster or skim	with skim both side, STC 42 with Plaster both side, STC 50
2	Thermal Conductivity (K-value) (ASTM C518)	0.74 W / m K	0.385 W / m K	0.125m2K / W
3	Thermal Resistance (R-value) (ASTM C518)	0.15 m2 K / W	0.256m2 K / W	0.8m2K / W
4	Fire rating (BS 476 : Part 22)	Integrity : 2 hours Insulation : 2 hours	Integrity : 4 hours Insulation : 3 hours	Integrity : 4 hours Insulation : 3 hours
5	Compressive strength - Cube Test (BS EN 772)	46 N / mm2	5 N / mm2	5 N / mm2
6	Compressive strength - Section (BS EN 772)	34 N / mm2	N / A	N / A
7	Bending strength (AAC 2.5 / BS EN 772 Part 6)	4.4 N / mm2	N / A	N / A
8	Water absorption (SS271) 24 hours water immersion - Should not exceed 23.5%	6.41%	N / A	BS EN 772-11 - Value : 3g / (m2s0.5)
9	Moisture Absorption-Drying Shrinkage (SS 271) Should not exceed 0.09%	0.03%	N / A	N / A
10	Density (BS EN 772)	1450kg / m3	950kg / m3	550kg / m3

STRENGTH AND ROBUSTNESS TEST SS492 OR BS5234 PART 2

1	Stiffness	SD (Severe Duty)	SD (Severe Duty)	SD (Severe Duty)
2	Small Hard Body Impact : Surface Damage	SD (Severe Duty)	SD (Severe Duty)	SD (Severe Duty)
3	Small Hard Body Impact : Perforation	SD (Severe Duty)	SD (Severe Duty)	SD (Severe Duty)
4	Large Soft Body Impact : Damage	SD (Severe Duty)	SD (Severe Duty)	SD (Severe Duty)
5	Large Soft Body Impact : Structural Damage	SD (Severe Duty)	SD (Severe Duty)	SD (Severe Duty)
6	Door Slamming	SD (Severe Duty)	SD (Severe Duty)	SD (Severe Duty)
7	Crowd Pressure	3.0 kN / m	SD (Severe Duty)	SD (Severe Duty)
8	Lightweight Anchorages : Minimum Pull Out Force of 100N	Pass	Pass	Pass
9	Lightweight Anchorages : Minimum Pull Down Force of 250 N	Pass	Pass	Pass
10	Heavyweight Anchorages : Wash Basin	1500 N	1500 N	1500 N
11	Heavyweight Anchorages : Wall Cupboard	4000 N	4000 N	4000 N

COMPARISON WITH DRYWALL SYSTEM PANEL

	vPanel – Lightweight Insulation Panel, 100mm Drywall (120mm thick)	
Layers	1, Single product vPanel.	Layer 1 – gypsum board Layer 2 - C Channel Layer 3 – Rockwool Insulation Layer 4 – C Chanlle Layer 5 – gypsum board
LSI (labour saving index)	0.9	0.7
Hollowness (Non Solid Feeling)	No	Yes
Suitable for wet areas	Yes	No, gypsum board is moisture sensitive.
Productivity	35m2 / man / day	15-20m2 / man / day
Fire Rating (BS 476 Pt 20)	240 minutes	60 minutes
On-Site Installation of Concealed Wiring Ducting & Pipework	After installation of wall, wall surface can be chased. Void within wall to be filled with packing material.	By fitting services before closing up.
Surface Appearance	Smooth without skim coat	Smooth without skim coat
Joint Treatment	Acrylic based waterproofing and flexible tape is applied between abutting panel.	Cementitious compound & fibre tape is applied between abutting panel.
Waterproofing system between panels	Yes	No
Crack prevention system between panel joints	Yes	Yes
Crack prevention system between panel joints and ceiling and floor soffit	Yes	No
Fastener Types	Cavity Anchors	Impact Anchor Tapping Screw
Weight (2.4 metre height)	180kg / m run	166 kg / m run
Sound Insulation	43-52 (depends on wall thickness)	42-47
External wall application	Yes	No

4 KEY PRIMARY benefit of vPanel Lightweight Thermal Insulation Panel compared to drywall :

1. INSULATION
vPanel has good thermal insulation in a single product, while drywall will require the use of Rockwool for insulation feature.

2. WATER RESISTANT
Drywall's gypsum board is moisture sensitive, thus not suitable to be used for wet areas unless with the usage of special water resistance type which is costly.

3. SOLID AND NOT HOLLOW
vPanel is non hollow, thus provided a "solid" feeling , while drywall is hollow.

4. EXTERNAL WALL USE
vPanel is suitable to be use for external wall as it passed the robustness test require and it is also water resistant.

COMPARISON TABLE

Thermal - Conductivity, Weight and Productivity

Thermal Conductivity, (W / mK)					
Traditional	Lightweight	AAC	Brick	Hollow Care	vPanel
Concrete	Concrete	Brick	Wall	Panel	Wall
1.4-1.8	0.1-0.3	0.16	1.31	0.1739	0.1375

Weight, (kg / m2)					
Traditional	Lightweight	AAC	Brick	Hollow Care	vPanel
Concrete	Concrete	Brick	Wall	Panel	Wall
(75mm)	(100mm)	(75mm)	(100mm)	(100mm)	(100mm)
190	150	100	4 - 8	130	48

Productivity, (m2 / man per day)					
Traditional	Lightweight	AAC	Brick	Hollow Care	vPanel
Concrete	Concrete	Brick	Wall	Panel	Wall
(75mm)	(100mm)	(75mm)	(100mm)	(100mm)	(100mm)
10	16 - 20	8 - 16	4 - 8	16 - 20	25 - 30

LABOUR SAVING INDEX COMPARISON

WALL SYSTEM	DESCRIPTION	LABOUR SAVING INDEX Sw
Drywall (Mandatory Component)	Dry partition wall for all internal dry areas (exclude party wall / toilet wall / kitchen wall) (applicable to residential non-landed projects only)	1.00
Curtain wall / full height glass partition / dry partition wall / prefabricated railing	Curtain wall / Full height glass partition	1.00
	Prefabricated railing	1.00
	Dry partition wall	1.00
	Dry Partition wall with tile / stone finishes	0.90
Precast Concrete Wall (2)	Off-form precast concrete external walls and columns (4)	1.00
	Precast concrete wall with skim coat	0.90 (1)
	Precast concrete wall with plastering, tile / stone finishes	0.60
Lightweight Concrete Panel (3)	**(Lightweight concrete panel with skim coat)**	**0.85 (1)**
	Lightweight concrete panel with plastering, tile / stone finishes	0.55
Cast In-situ RC Wall	Off-form cast in-situ RC external walls and columns (4)	0.95
	Cast in-situ RC wall with skim coat	0.80 (1)
	Cast in-situ RC wall with plastering, tile / stone finishes	0.50
Precision Blockwall	Precision blockwall with skim coat	0.30 (1)
	Precision blockwall with plastering, tile / stone finishes	0.10
Brickwall / Blockwall	Brickwall / blockwall with or without plastering (to include the length if used)	Refer to Table 3 (5)

1. These indices also apply to the respective walls with no finishes or finishes done off-site.
2. Precast concrete walls refer to precast walls that are generally non-proprietary and manufactured to customise to a specific project.
3. Lightweight concrete panels include autoclaved lightweight concrete (ALC) panels, autoclaved aerated concrete (AAC) panels.
4. Off-form cast in-situ concrete and off-form precast concrete external walls and columns do not require additional labour - intensive surface treatment.
5. The use of brickwall / blockwall, once used, must be indicated and its wall length computed under the wall system.

   Demerit points for the use of brickwall/blockwall will be computed under Table 3.

* Indices for other systems not shown in this table shall be determined by BCA on a case - by - case basis.

What is the minimum length of precast panel to achieve Labour Saving Index of 0.85 ?

As per latest BCA circular, it would be 2.4 metre.

TECHNICAL DETAILS

1. 4 Type of Common Fixing Installation
2. Method of Statement
3. Test Report & Certificate
4. Detail Drawing

PART 1 : 4 TYPES OF COMMON FIXING INSTALLATION

1. Light Duty
2. Medium Duty
3. Heavy Duty
4. Severe Duty

INSTALLATION TOOLS YOU NEED

Power Drill

Hammer

Screwdriver

Drill Bit Set

Angular Drill Bit

Measuring Tape

Caution :
De-activate the impact drilling mode when forming holes at the vPanel.

LIGHT DUTY

PHOTO FRAME / MIRROR / WALL CLOCK / CLOTHING HOOK

Application :
light-weight items.

Maximum Weight :
up to 2kg per point

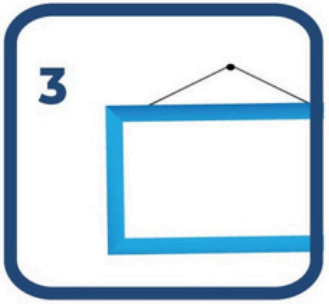
FIXING ACCESSORIES

Concrete Nail
Ø 3mm x 40mm

STEP - BY - STEP

Place the Nail

Hammering



Place Attachment

MEDIUM DUTY

CURTAIN RAIL SYSTEM / WALL FAN / FRAMED PAINTING / LARGE MIRROR / CLOTHING HOOK / LIGHT FITTINGS / SMALL BATHROOM FITTINGS / AIR - CONDITIONING INDOOR UNIT CCTV CAMERA

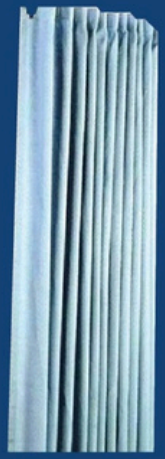
ACCESSORIES

Nylon / Plastic Wall Plug

Wood Screw

Application :
Medium - weight items.

Maximum Weight :
up to 10kg per point



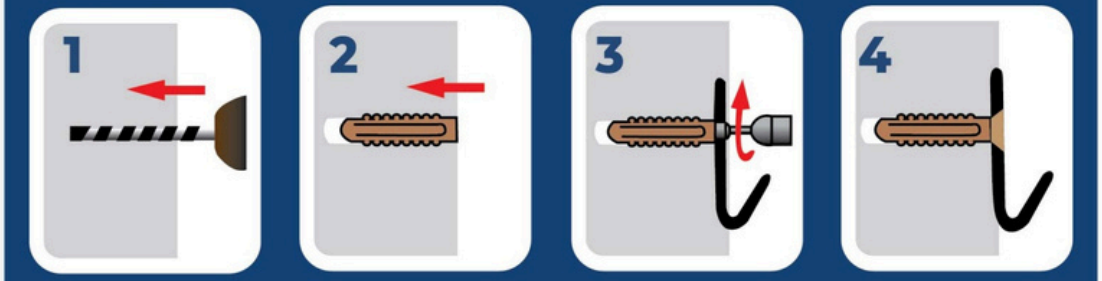
Up to 5KG

Wall Plug Size:
Ø 5mm x 25mm
Hole Diameter x Min depth:
Ø 5mm x 30mm
Screw Size:
Ø 3 ~ 4mm x 30mm

Up to 10KG

Wall Plug Size:
Ø 6mm x 30mm
Hole Diameter x Min depth:
Ø 6mm x 40mm
Screw Size:
Ø 4 ~ 5mm x 30mm

STEP - BY - STEP



Drill Hole | Insert Anchor | Place Attachment | Tighten Screw

HEAVY DUTY

WALL - HUNG CABINET / SHELF / WASH BASIN / URINAL FITTINGS / TOWEL RACKS / RESIDENTIAL DB BOX / AIR - CONDITIONING OUTDOOR UNITS / LARGE TV SCREEN

ACCESSORIES

Nylon / Plastic Wall Plug

Application :
Heavy - weight items.

Maximum Weight:
up to 50kg per point

Up to 30KG

Wall Plug Size:
Ø 8mm x 40mm
Hole Diameter x Min depth:
Ø 8mm x 50mm
Screw Size:
Ø 5 ~ 6mm x 50mm

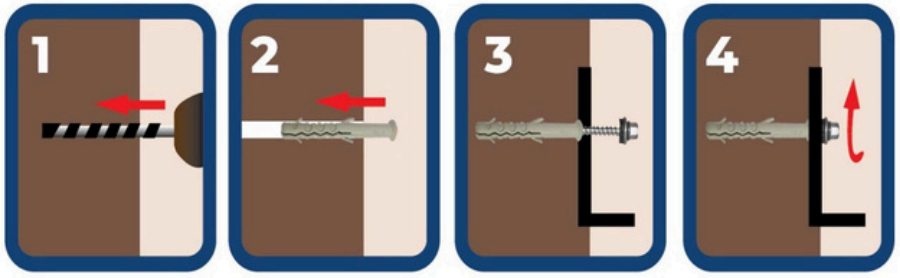
Up to 50KG

Wall Plug Size:
Ø 10mm x 50mm
Hole Diameter x Min depth:
Ø 10mm x 60mm
Screw Size:
Ø 7 ~ 8mm x 50mm

Up to 50KG

Wall Plug Size:
Ø 10mm x 100mm
Hole Diameter x Min depth:
Ø 10mm x 80mm
Screw Size:
Ø 7 ~ 8mm x 100mm

STEP - BY - STEP



Drill Hole | Insert Wall Plug | Place Attachment | Tighten Screw

SEVERE DUTY

ACCESSORIES

Metal Sleeve Anchor

Coarse Threaded Screw

Up to 10KG

Wall Plug Size:
6mm x 40mm
Hole Diameter x Min depth:
6mm x 50mm
Screw Size:
6mm x 50mm

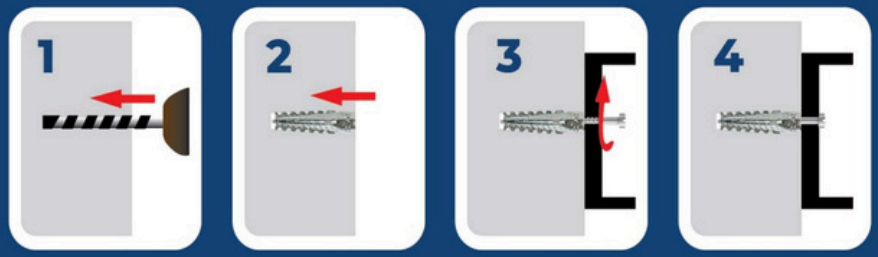
Up to 30KG

Wall Plug Size:
8mm x 50mm
Hole Diameter x Min depth:
8mm x 75mm
Screw Size:
8mm x 50mm

Up to 50KG

Wall Plug Size:
10mm x 60mm
Hole Diameter x Min depth:
10mm x 75mm
Screw Size:
10mm x 75mm

STEP - BY - STEP



Drill Hole | Insert Anchor | Place Attachment | Tighten Screw

INDUSTRIAL HEAVY ELECTRICAL DB / FIRE HOSE REEL / LARGE SIGNBOARD / NON - CANTILEVER AWNING

Application :
Heavy - weight items.

Maximum Weight :
up to 150kg per point

ACCESSORIES

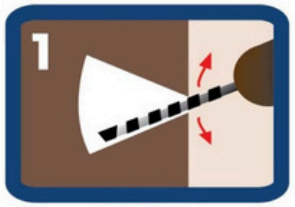
Chemical Anchor System

Threaded Rod

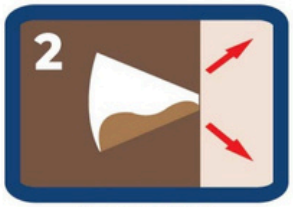
Up to 150KG

Threaded Rod Size:
8mm and 10mm diameter with a 50mm minimum embedment

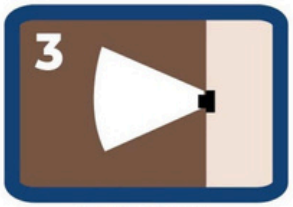
STEP - BY - STEP



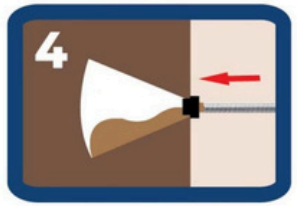
Drill Hole



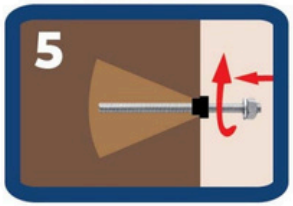
Remove Dust



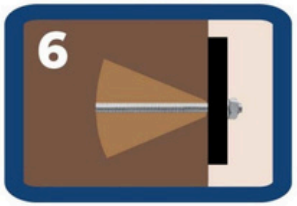
Insert Sleeve



Inject Chemical Mortar



Insert Bolt



Fix Bracket / Nut

PART 2 : CONDUIT INSTALLATION

INSTALLATION TOOLS YOU NEED


Wall Chaser


Angle Grinder


Hammer


Chisel

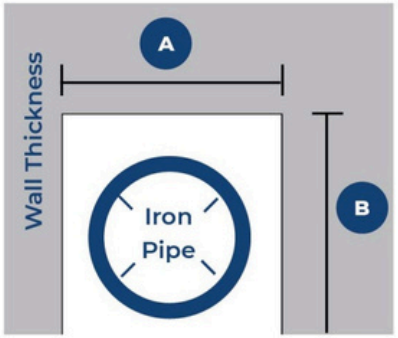

Measuring Tape


Level Tool

CONDUIT

This include adding electrical wiring or plumbing works that necessitate formation of chases on vPanel.

ELECTRICAL PIPING / WATER PIPING / AIR - CONDITIONING PIPING



A Chase Width = Pipe Outer Dimension + 20mm

B Chase Depth = Pipe Outer Dimension + 8mm min.

STEP - BY - STEP

Mark chase location

Insert Conduit

Cut Chase Lines

Mortar Patch

Remove Waste Pieces

Embed Fireglass Tape
Apply thin layer of Skim Coat Base / Render

Clean Dust

Skim Coat / Render
Embed Fibreglass Tape & Top Up with Skim Coat Base / Render

METHOD OF STATEMENT

Before the vPanel installation, please refer to project design shopdrawing to identify the location and dimension of wall. Installation of stiffener and lintel are to be completed before the installing of vPanel.

For first storey, a minimum 100mm of RC kerb to be construct before vPanel installation.

Cutting of vPanel to necessary length and dimension. vPanel comes with standard dimension of 600mm (W) x 3000mm (L)

What are the other accessories that is needed to purchase to install vPanel ?

1. *vNail (one L-bracket with two 100mm v shaped nail) - fastening of panel to slab and hollow section.*
2. *AAC joint mortar - as a filler mortar to panels joints and gap.*

Both material is commonly available in Singapore construction material supplier shop. Customer can also choose to buy through VODAPRUF.

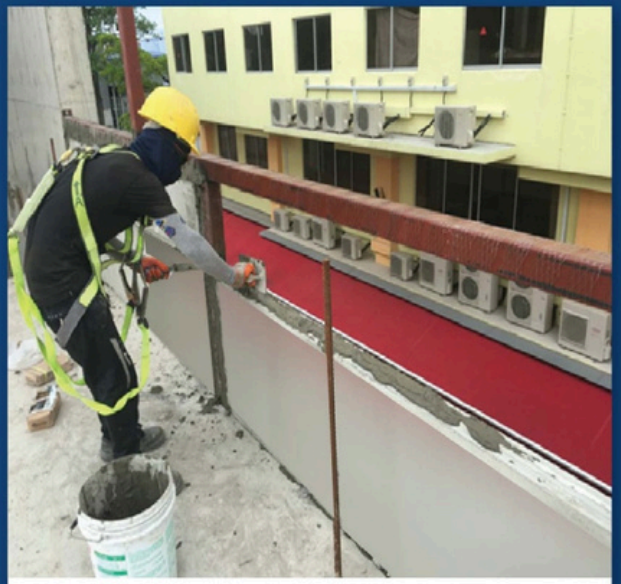
Will the product warranty be voided when we are not using VODAPRUF accessories ?

No. Product comes with warranty of performance and there is no need to buy the commonly available accessories from VODAPRUF. VODAPRUF objective is to provide the most economical-yet-quality solution system to the industry.

METHOD OF STATEMENT

Lifting the vPanel to installation area. As vPanel is untra lightweight, it can be lift up easily by 2-3 workers. For Height level of installation, a scissor lift / boom lift is required to lift up the vPanel.

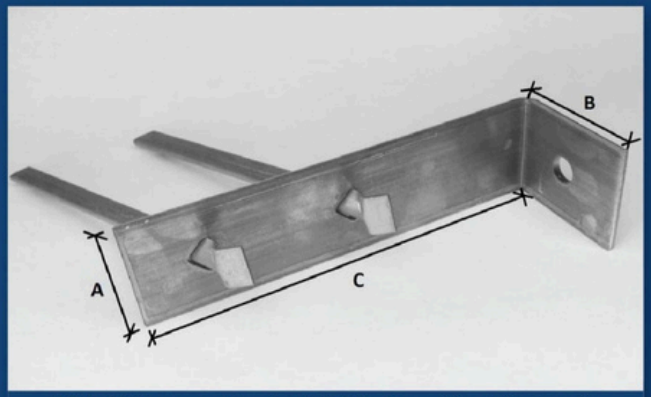
For Height level of installation, a scissor lift / boom lift is required to lift up the vPanel.



Apply cement on the panel installation area.

METHOD OF STATEMENT

Transfer the vPanel to the installation position. Secure the panel with stiffener / column by using vNail on both sides of the vPanel.



FB-40 frame Braket With Double Pin Lock

Code	(A)	(B)	(C)	Thickness	Packing
FB - 40	40	50	150	3	20 pcs / box

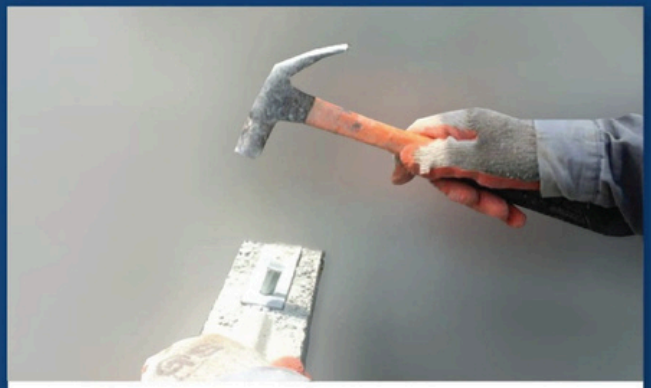
Pin Lock Length : 150mm

*All Measurement in (MM)

How is vPanel fastened to the slab soffit and r.c slab ?

It can be done using traditional rebar method or using vNail as per picture.

Installation of L - Brackets on both side of vPanel to Stiffener / Column.



Installation of L - Brackets on both side of vPanel to Stiffener / Column.

METHOD OF STATEMENT

Repeat the same method to continue the remaining vPanel installation.

Every joint of the panel-panel connection to be covered by fiberglass mesh and cement. Connection of panel to stiffener, to be covered by steel mesh and cement.

After that, proceed to skim coat application, before applying paint on the wall.

For external wall, waterproofing is required after the vPanel installation, with fiberglass mesh.

For external wall, Plastering layer to be applied after waterproofing.

Only then skimcoat and paint application.

CIDB IBS & CREAM CERTIFICATES

CIDB ibs

INDUSTRIALISED BUILDING SYSTEM (IBS) ASSESSMENT & CERTIFICATION CIS 24

Adalah dengan ini disahkan bahawa :
It is hereby verified that :

VODAPRUF SDN. BHD. (1161914-H)
K16, K51 & K52,
CHANG CHUN ROAD, SALENG,
81400 SENAI, JOHOR.

Nama dan Alamat Kilang :
Name and Factory Location :

VODAPRUF SDN. BHD.
K16, K51 & K52,
CHANG CHUN ROAD, SALENG,
81400 SENAI, JOHOR.

Kategori :
Category :

PENGELUAR/ MANUFACTURER

No. Sijil :
Certificate No. :

IBS098/19724

Tarikh Mula Pensijilan :
Certified Since :

25 OCTOBER 2024

Tarikh Dikeluarkan :
Issue Date

25 OCTOBER 2024

Sah Sehingga :
Valid Until :

25 OCTOBER 2025

Sebagai syarikat berstatus IBS yang mengeluarkan produk IBS berikut:
As an IBS Status company that manufactures the following IBS components:

SISTEM BERINOVATIF / INNOVATIVE SYSTEM:
- vPANEL – ALC (AERATED LIGHTWEIGHT CONCRETE) PANEL
Please refer to detail in the SCHEDULE.

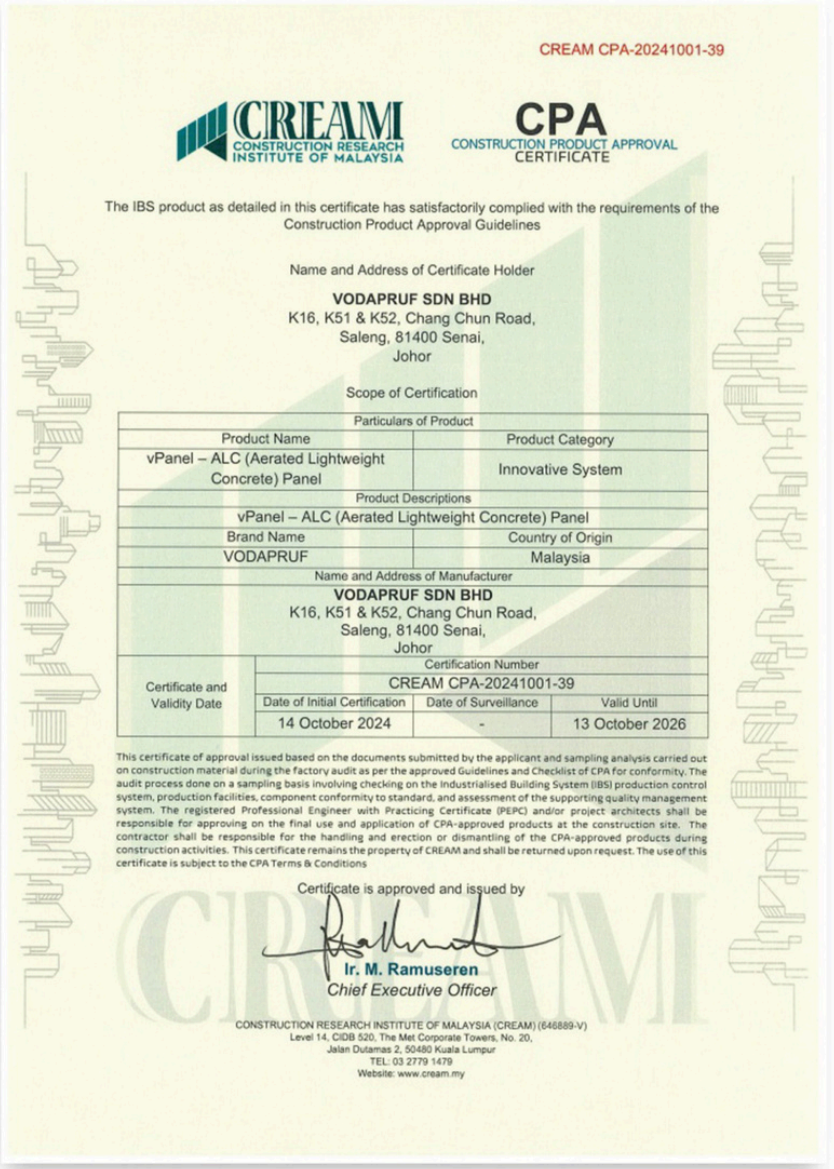
Sebagai mematuhi keperluan:
As complying with :

CIS 24 : 2023
- CONSTRUCTION PRODUCT APPROVAL

CIDB IBS SDN BHD
Lot 8, Jalan Chan Sow Lin
55200 Kuala Lumpur
Malaysia
+603 - 9224 2280 / 2920
+603 - 9226 1868
info@cidbibs.com.my
www.cidbibs.com.my

Ir. Ts. ZURAIHI ABDUL GHANI
Ketua Pegawai Eksekutif

Pendaftaran ini hendaklah diperbaharui selewat-lewatnya 60 hari sebelum tarikh tamat tempoh.
This registration shall be renewed within 60 days before expiration date.



CREAM CPA-20241001-39

CREAM CONSTRUCTION RESEARCH INSTITUTE OF MALAYSIA

CPA
CONSTRUCTION PRODUCT APPROVAL CERTIFICATE

The IBS product as detailed in this certificate has satisfactorily complied with the requirements of the Construction Product Approval Guidelines

Name and Address of Certificate Holder

VODAPRUF SDN BHD
K16, K51 & K52, Chang Chun Road,
Saleng, 81400 Senai,
Johor

Scope of Certification

Particulars of Product		
Product Name	Product Category	
vPanel – ALC (Aerated Lightweight Concrete) Panel	Innovative System	
Product Descriptions		
vPanel – ALC (Aerated Lightweight Concrete) Panel		
Brand Name	Country of Origin	
VODAPRUF	Malaysia	
Name and Address of Manufacturer		
VODAPRUF SDN BHD K16, K51 & K52, Chang Chun Road, Saleng, 81400 Senai, Johor		
Certificate and Validity Date	Certification Number	
	CREAM CPA-20241001-39	
	Date of Initial Certification	Date of Surveillance	Valid Until
	14 October 2024	-	13 October 2026

This certificate of approval issued based on the documents submitted by the applicant and sampling analysis carried out on construction material during the factory audit as per the approved Guidelines and Checklist of CPA for conformity. The audit process done on a sampling basis involving checking on the Industrialised Building System (IBS) production control system, production facilities, component conformity to standard, and assessment of the supporting quality management system. The registered Professional Engineer with Practicing Certificate (PEPC) and/or project architects shall be responsible for approving on the final use and application of CPA-approved products at the construction site. The contractor shall be responsible for the handling and erection or dismantling of the CPA-approved products during construction activities. This certificate remains the property of CREAM and shall be returned upon request. The use of this certificate is subject to the CPA Terms & Conditions

Certificate is approved and issued by

Ir. M. Ramuseren
Chief Executive Officer

CONSTRUCTION RESEARCH INSTITUTE OF MALAYSIA (CREAM) (646889-V)
Level 14, CIDB 520, The Met Corporate Towers, No. 20,
Jalan Dutamas 2, 50480 Kuala Lumpur
TEL: 03 2779 1479
Website: www.cream.my

BOMBA CERTIFICATE

No Perakuan : JBPM/IP/RNP:700-7/2/25-50 (9)
(SEDIA ADA)

Jabatan Bomba dan Penyelamat Malaysia

SIJIL PEPASANGAN KESELAMATAN KEBAKARAN

Sistem Dinding / Wall System
BS 476: Part 22 Method for Determination of the Fire Resistance of Non-loadbearing Elements of Construction

Dengan ini diperakui
VODAPRUF SDN BHD
(VPANEL)

Beroperasi di
K16, K51, K52, BATU 17, CHANG CHUN ROAD,
81400 SENAI, JOHOR

TELAH BERDAFTAR
TEMPOH SAH PERAKUAN : **08/08/2024 HINGGA 07/08/2026**

t.t

.....
Ketua Pengarah
Jabatan Bomba dan Penyelamat Malaysia

**Peringatan:
Sila patuhi sepenuhnya syarat-syarat dan had kegunaan seperti dalam Lampiran A1

(Sijil ini adalah cetakan berkomputer dan tidak memerlukan tandatangan)

LAMPIRAN A1

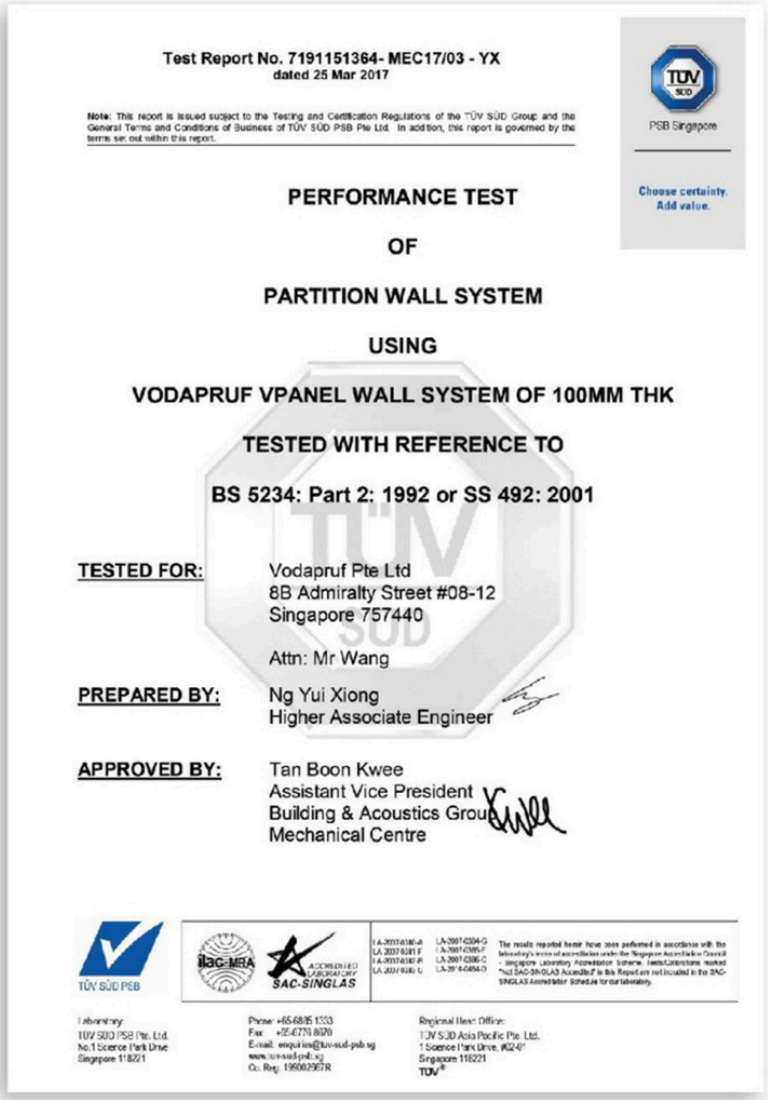
No. Fail: **JBPM/IP/RNP:700-7/2/25-50 (9)**
No. Siri: **BB/WS/2274/2017 (P3)**

Jenis Alat Kelengkapan	: **SISTEM DINDING / WALL SYSTEM**
Jenama & Spesifikasi	: **Brand: VODAPRUF** **Model: VPANEL** **Type: AUTOCLAVED AERATED CONCRETE (AAC)**
Fire Resistance Test	: **Integriti: 240** **Insulation: 240** **Typical of Material: Cement, GGBS, BRC, Calcium Carbonate** **Density: 650 kg/m3** **Thickness: 100mm** **Others:**
Nama & Alamat Pengeluar	: **VODAPRUF SDN BHD**
No. Laporan Ujian/Tarikh	: **2020fe0343-S1 03/06/2022,**
Jenis Skim Pensijilan Barangan	: **SIRIM Product Certification (SIRIM QAS)**
No. Skim Pensijilan Barangan	: **2020FE0343-S1**
Tempoh Sah Laku	: **03/06/2022**
Ulasan Pegawai Proses	: **WALL SYSTEM TKA 4 JAM. TIDAK DIBENARKAN SEBAGAI PARTY WALL.**
Ulasan Mesyuarat	:
Had Kegunaan	: **PEMASANGAN HENDAKLAH MEMATUHI SPESIFIKASI SEPERTIMANA DALAM LAPORAN UJIAN DAN UBBL 1984 SERTA PERLU MEMATUHI SYARAT-SYARAT TAMBAHAN SEPERTI DI LAMPIRAN A2 & A3.**

Tempoh sah perakuan: **08/08/2024 hingga 07/08/2026**

Muka Surat 1 / 4

ROBUSTNESS TEST REPORT, BS 5234



Test Report No. 7191151364- MEC17/03 - YX
dated 25 Mar 2017

PSB Singapore

Choose certainty. Add value.

Note: This report is issued subject to the Testing and Certification Regulations of the TÜV SÜD Group and the General Terms and Conditions of Business of TÜV SÜD PSB Pte Ltd. In addition, this report is governed by the terms set out within this report.

PERFORMANCE TEST

OF

PARTITION WALL SYSTEM

USING

VODAPRUF VPANEL WALL SYSTEM OF 100MM THK

TESTED WITH REFERENCE TO

BS 5234: Part 2: 1992 or SS 492: 2001

TESTED FOR: Vodapruf Pte Ltd
8B Admiralty Street #08-12
Singapore 757440

Attn: Mr Wang

PREPARED BY: Ng Yui Xiong
Higher Associate Engineer

APPROVED BY: Tan Boon Kwee
Assistant Vice President
Building & Acoustics Grou
Mechanical Centre

TÜV SÜD PSB

ilac-MRA SAC-SINGLAS ACCREDITED LABORATORY

LA-2007-0304-G LA-2007-0305-F LA-2007-0306-G LA-2007-0454-G

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme. tests/calibrations marked "not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our laboratory.

Laboratory:
TÜV SÜD PSB Pte. Ltd.
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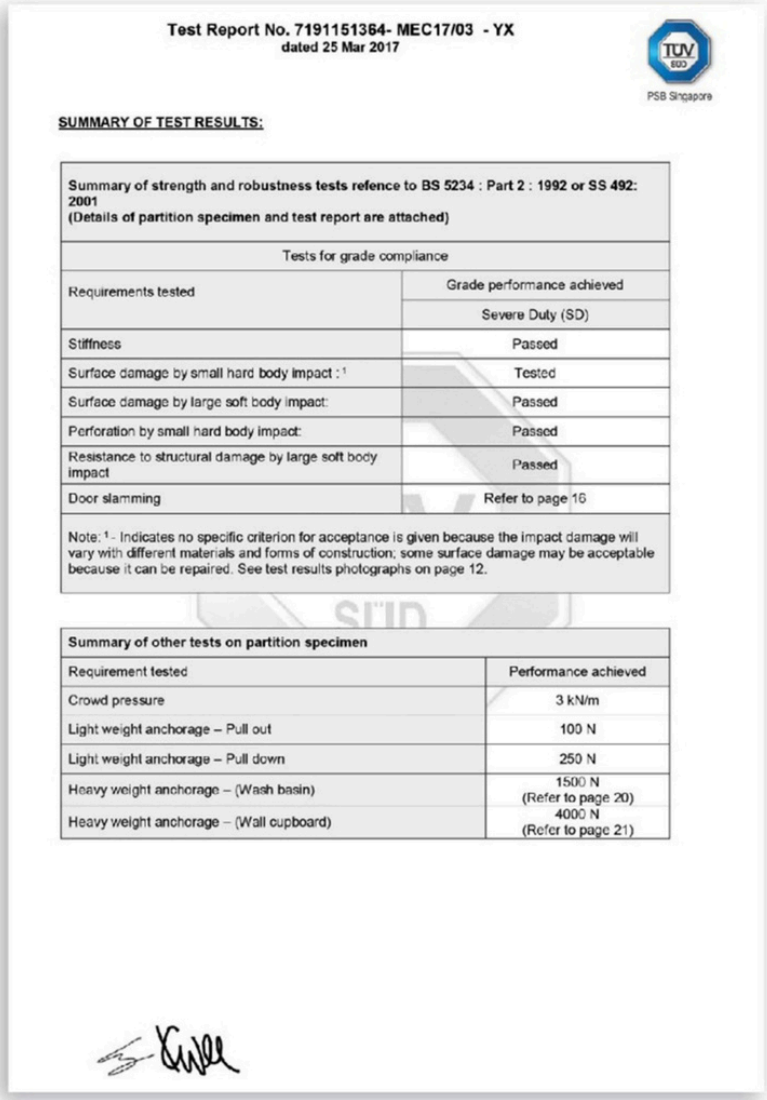
Fax: +65-6778 8670
E-mail: enquiries@tuvsud-psb.sg
www.tuvsud-psb.sg
Co. Reg. 199002967R

Regional Head Office:
TÜV SÜD Asia Pacific Pte. Ltd.
1 Science Park Drive, #02-01
Singapore 118221



Test Report No. 7191151364- MEC17/03 - YX
dated 25 Mar 2017

PSB Singapore

SUMMARY OF TEST RESULTS:

Summary of strength and robustness tests refence to BS 5234 : Part 2 : 1992 or SS 492: 2001 (Details of partition specimen and test report are attached)	
Tests for grade compliance	
Requirements tested	Grade performance achieved
	Severe Duty (SD)
Stiffness	Passed
Surface damage by small hard body impact : [1]	Tested
Surface damage by large soft body impact:	Passed
Perforation by small hard body impact:	Passed
Resistance to structural damage by large soft body impact	Passed
Door slamming	Refer to page 16

Note: [1] - Indicates no specific criterion for acceptance is given because the impact damage will vary with different materials and forms of construction; some surface damage may be acceptable because it can be repaired. See test results photographs on page 12.

Summary of other tests on partition specimen	
Requirement tested	Performance achieved
Crowd pressure	3 kN/m
Light weight anchorage – Pull out	100 N
Light weight anchorage – Pull down	250 N
Heavy weight anchorage – (Wash basin)	1500 N (Refer to page 20)
Heavy weight anchorage – (Wall cupboard)	4000 N (Refer to page 21)

ROBUSTNESS TEST REPORT, BS 5234

Test Report No. 7191151364- MEC17/03 - YX
dated 25 Mar 2017

PSB Singapore

1 INTRODUCTION

This document describes the test procedures and reports of the performance of Vodapruf Vpanel partition system of 100mm THK.

2 DESCRIPTION OF SAMPLE

Components used are as follow :

1) Panel Dimension – Length: 3000, Width: 600mm, Thickness: 100mm
2) Panel to panel joint using joint adhesive
3) Screws used for light weight anchorage – pull out and pull down test

Figure 1: M6 40 Nylon wall plug and screw

4) Bolts use for heavyweight anchorage – wash basin and wall cupboard test

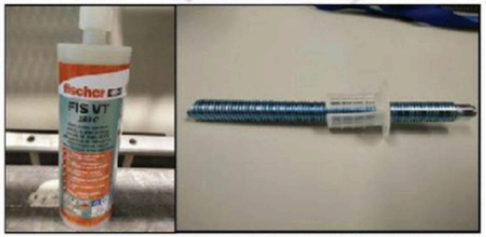


Figure 2: FIS VT 380C Injection mortar and FTR M10 X 130 bolt

Test Report No. 7191151364- MEC17/03 - YX
dated 25 Mar 2017

PSB Singapore

CONCLUSION

All test results other then the observation for door slam test meets the **SEVERE DUTY** grade requirements of BS 5234 Part 2: 1992 or SS 492:2001.
The reader should take note of the rectification and observations of this test for the door slam test and heavyweight anchourage wash basin/wall cupboard test and determine if it can be applied during actual application.

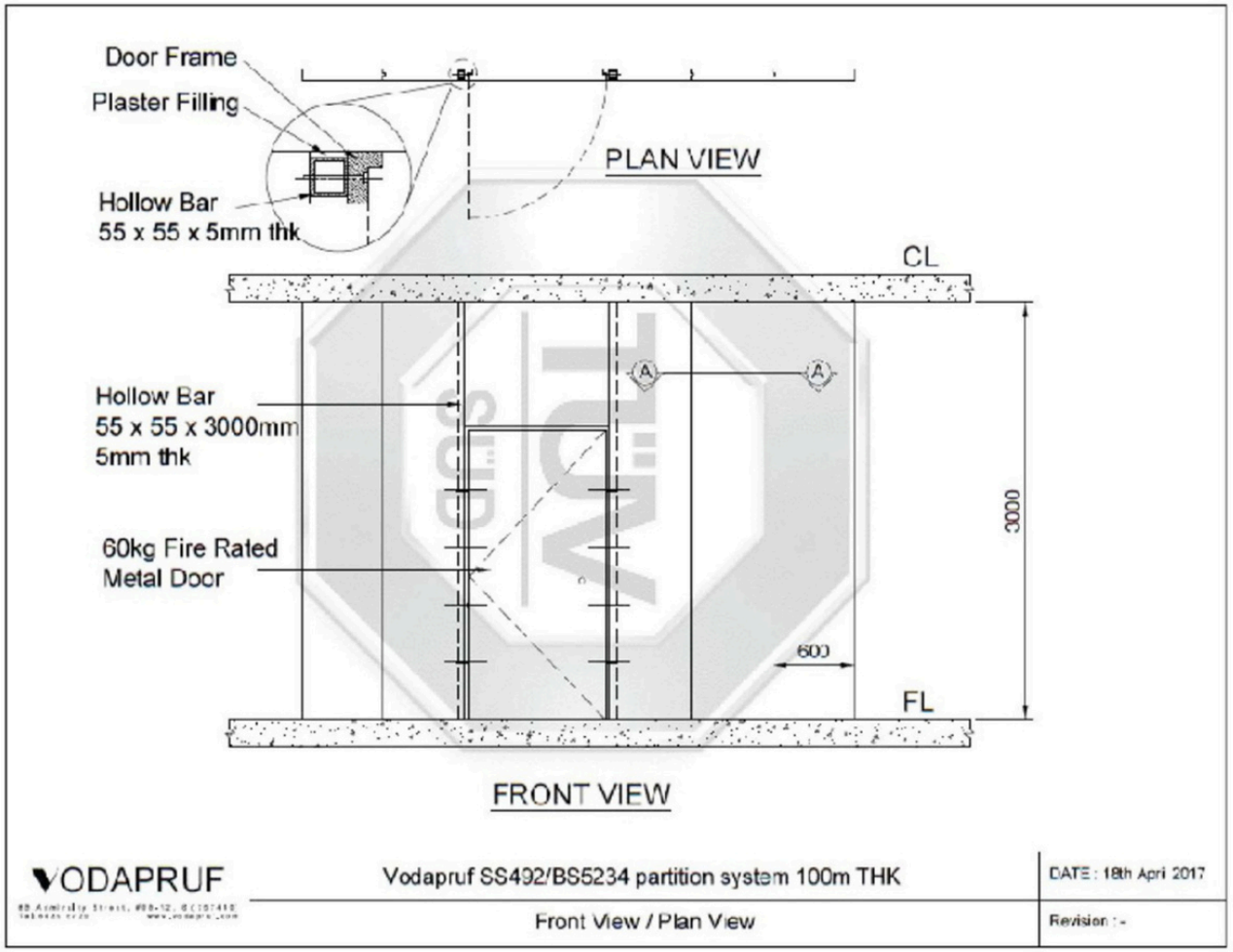
Vodapruf Vpanel partition system of 100mm THK has also achieved the following performance;

Crowd pressure	:	3.0 kN/m
Light weight anchorage – pull out	:	100 N
Light weight anchorage – pull down	:	250 N
Heavy weight anchorage – wash basin	:	1500 N
Heavy weight anchorage – wall cupboard	:	4000 N

Ng Yui Xiong
Higher Associate Engineer

Tan Boon Kwee
Assistant Vice President
Building & Acoustics Group
Mechanical Centre

ROBUSTNESS TEST REPORT, BS 5234



Test Report No. 7191151364- MEC17/03 - YX
dated 25 Mar 2017

PSB Singapore

ACOUSTIC TEST REPORT, ASTM E90

Test Report No. 7191151364-MEC17/02-EMK
dated 16 Jan 2017

PSB Singapore

Choose certainty. Add value.

Note: This report is issued subject to the Testing and Certification Regulations of the TÜV SÜD Group and the General Terms and Conditions of Business of TÜV SÜD PSB Pte Ltd. In addition, this report is governed by the terms set out within this report.

SUBJECT:

Laboratory measurement of airborne sound transmission loss of wall panel system submitted by Vodapruf Pte Ltd on 06 Jan 2017.

TESTED FOR:

Vodapruf Pte Ltd
8B, Admiralty Street #08-12
Singapore 757440

Attn : Mr. Wang Wee Hwa

DATE OF TEST:

09 Jan 2017

DESCRIPTION OF SAMPLES:

The following wall panel system was installed onto the sample carrier for airborne sound transmission loss test.

Brand of wall panel	:	vPanel
Quantity of wall panel	:	5 pieces
Nominal size of wall panel	:	0.60m (width) x 3.02m (length) x 0.10m (thick)
Overall size of wall panel system	:	3.18m (width) x 3.03m (height) x 0.10m (thick)
Measured density of vPanel	:	approximate 532kg/m³

All adjacent panels were jointed by joint mortar. The boundary perimeters of the entire wall panel system were filled up with sealant.

The technical drawing of wall panel system submitted by the company was shown in Appendix.

TÜV SÜD PSB

ACCREDITED LABORATORY SAC-SINGLAS

LA-2087-0188-A LA-2087-0364-E
LA-2087-0188-F LA-2087-0365-E
LA-2087-0192-E LA-2087-0366-C
LA-2087-0193-C LA-2087-0446-D

The results reported herein have been performed in accordance with the terms of accreditation under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme (SAC-SINGLAS). Accredited to ISO/IEC 17025. Unless otherwise stated in this Report, tests are not included in the SAC-SINGLAS Accreditation Scheme for our respective body/laboratory.

Laboratory:
TÜV SÜD PSB Pte. Ltd.
No.1 Science Park Drive
Singapore 118221

Phone : +65 6885 1333
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E-mail: enquiries@tuv-sud-psb.sg
www.tuv-sud-psb.sg
Co. Reg : 199003867R

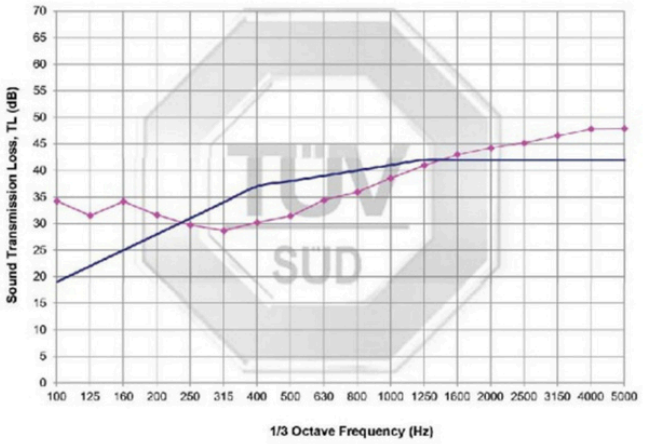
Regional Head Office:
TÜV SÜD Asia Pacific Pte. Ltd.
1 Science Park Drive, #02-01
Singapore 118221

Test Report No. 7191151364-MEC17/02-EMK
dated 17 Jan 2017

PSB Singapore

RESULTS: (cont'd)

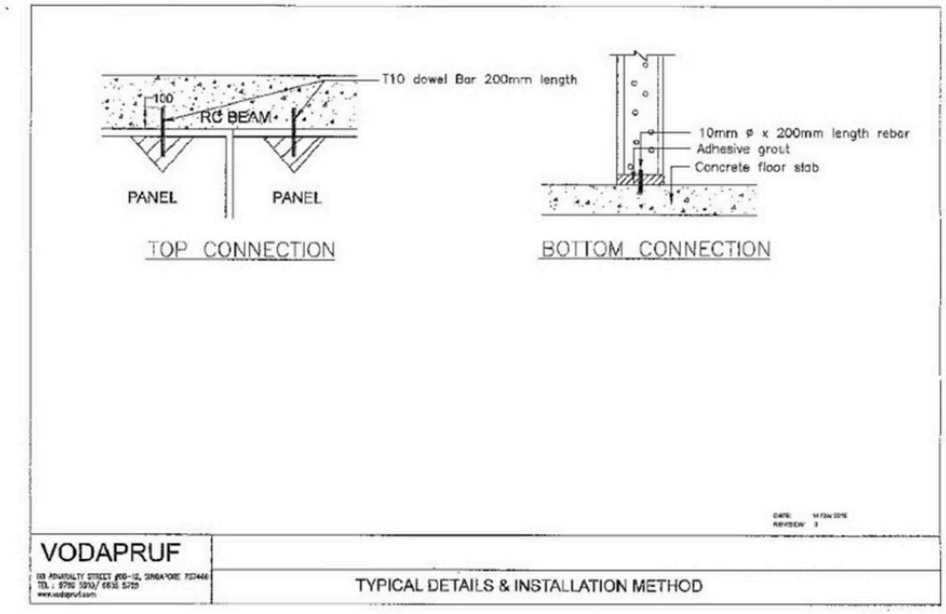
Figure 1 : Sound transmission performance of 100mm thick vPanel wall system



ACOUSTIC TEST REPORT, ASTM E90

Test Report No. 1234567
dated DD MMM YYYY

PSB Singapore

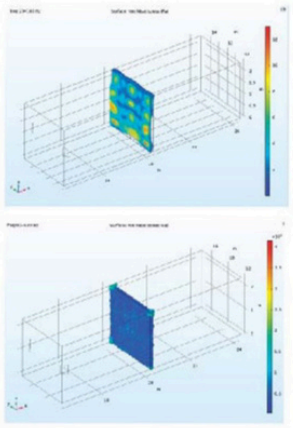


Appendix 2 : Technical detailed drawing of 100mm thick vPanel wall system

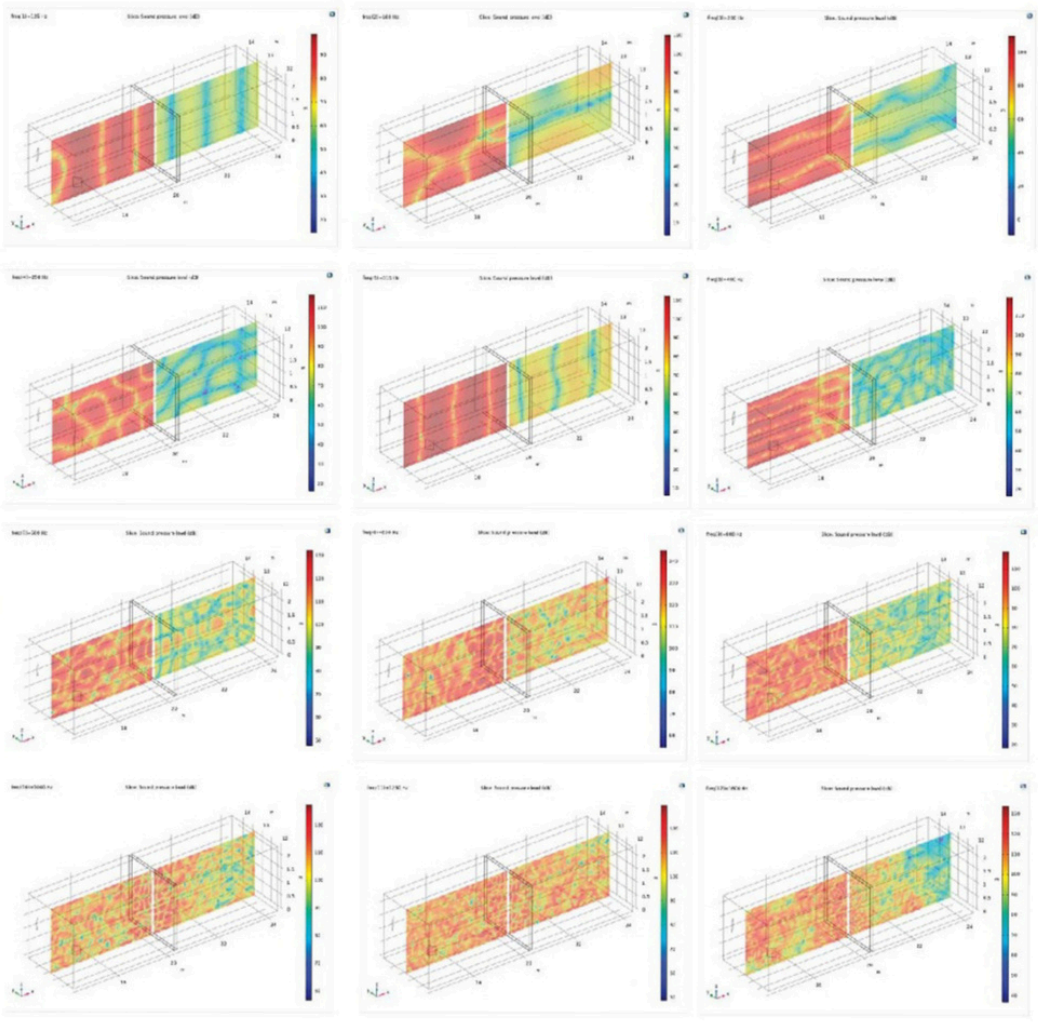
ACOUSTIC TEST REPORT, ASTM E90

Test V-Panel (10 mm plaster + 100mm V-panel 550 kg/m3 + 10 mm plaster)

Von Mises stress (Pa)



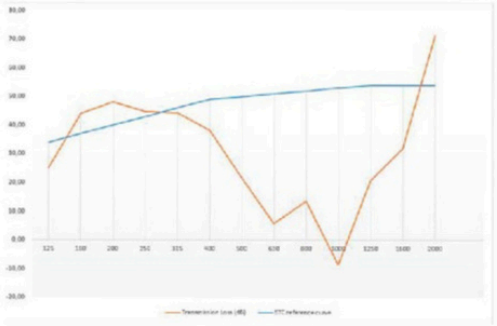
Sound pressure level (dB)



Transmission loss and STC Curve

STC = 50

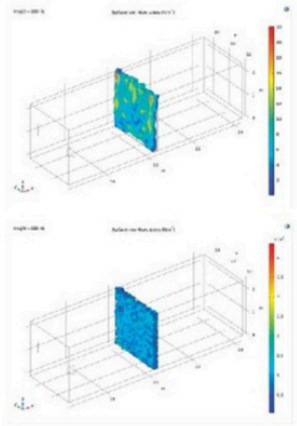
Frequency	Source (dB)	Receiver (dB)	Transmission Loss (dB	STC reference curve
125	82,76	58,8	25,11	34
160	96,3	53,5	43,95	37
200	106,9	50,9	48,15	40
250	109,9	66,3	44,75	43
315	106,7	63,5	44,35	46
400	105,7	68,7	38,15	49
500	113,7	93,34	21,51	50
630	125,1	120,6	5,65	51
800	93,8	81,4	13,55	52
1000	83,41	93,3	-8,74	53
1250	88,2	68,7	20,65	54
1600	117,7	86,9	31,95	54
2000	103,8	33,6	71,35	54



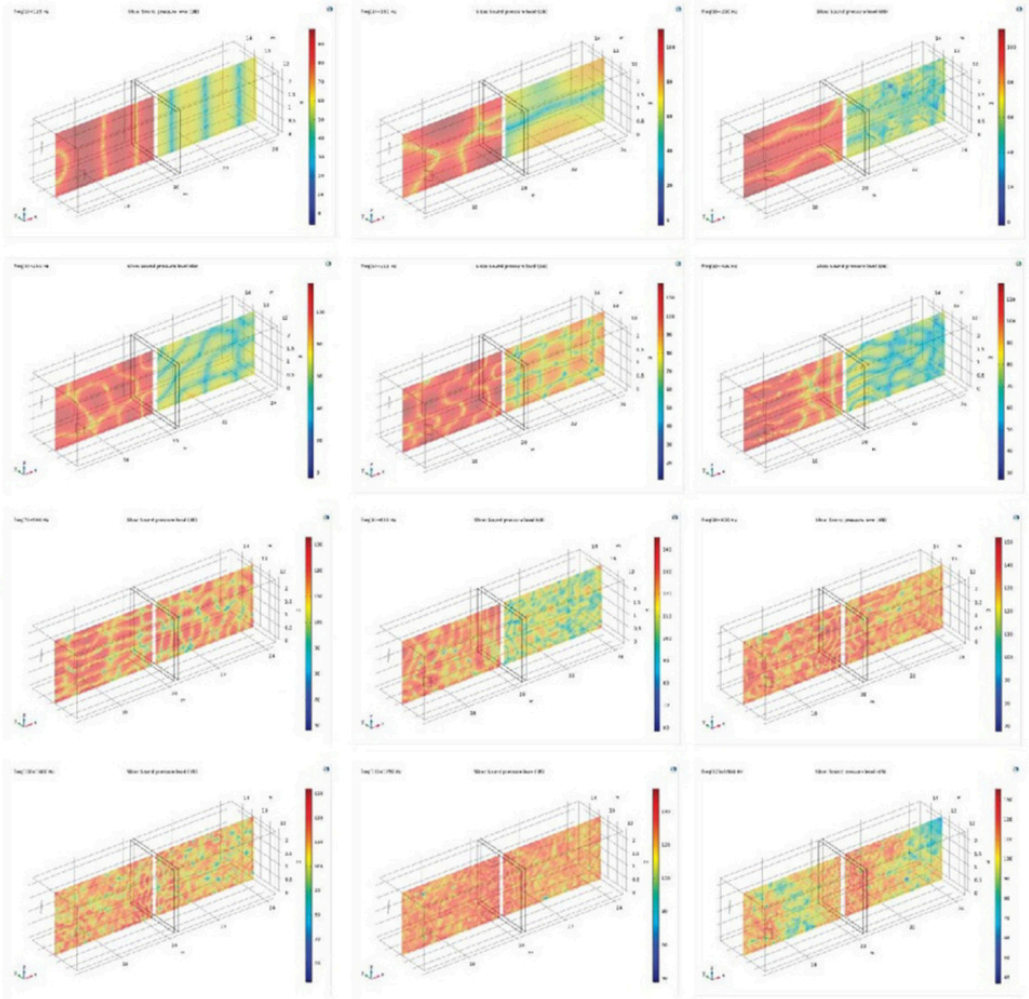
ACOUSTIC TEST REPORT, ASTM E90

Test V-Panel (10 mm plaster + 150mm V-panel 550 kg/m3 + 10 mm plaster)

Von Mises stress (N/m2)

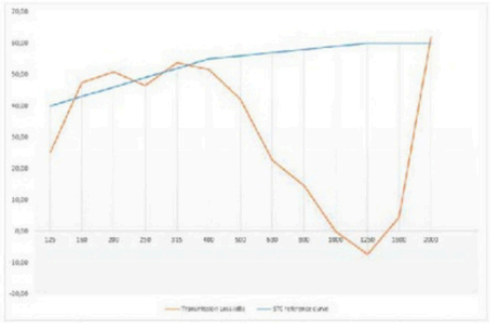


Sound pressure level (dB)



Transmission loss and STC Curve **STC = 56**

Frequency	Source (dB)	Receiver (dB)	Transmission Loss (dB	STC reference curve
125	76,8	53,49	25,22	40
160	96,8	51,4	47,31	43
200	107,2	58,3	50,81	46
250	112,41	67,8	46,52	49
315	106,2	54,32	53,79	52
400	102,2	52,55	51,56	55
500	124,1	83,84	42,17	56
630	126,8	106,1	22,61	57
800	129,9	117,3	14,51	58
1000	107	109	-0,09	59
1250	113,2	122,5	-7,39	60
1600	106,3	103,7	4,51	60
2000	97,2	37,25	61,86	60



WATER ABSORPTION TEST

ADMATERIALS TECHNOLOGIES PTE LTD
58 Sungei Kadut Loop Singapore 729501
Tel: +65 6362 9066 Fax: +65 6362 2080
Co. Reg. No.: 200805959C Email: admaterials.lab@exova.com
Website: www.exova.com, www.admaterials.com.sg

ADMATERIALS TECHNOLOGIES PTE LTD
An Exova Group company

JOB REF. : ADM / 18 / 04101

TEST RESULT :

DETERMINATION OF WATER ABSORPTION DUE TO CAPILLARY ACTION - (BS EN 772 - 11: 2011)

Table 1 Test result for test duration of 10 minutes.

Specimen Ref.	Gross Area (A_s) mm^2	Coefficient of Water absorption due to Capillary Action (Cw,s) $g/(m^2s^{0.5})$	Average Coefficient of Water absorption due to Capillary Action (Cw,s) $g/(m^2s^{0.5})$
1	9840	4	5
2	9058	6	
3	9347	5	
4	9351	5	
5	9702	5	
6	9721	6	

Table 2 Test result for test duration of 30 minutes.

Specimen Ref.	Gross Area (A_s) mm^2	Coefficient of Water absorption due to Capillary Action (Cw,s) $g/(m^2s^{0.5})$	Average Coefficient of Water absorption due to Capillary Action (Cw,s) $g/(m^2s^{0.5})$
1	9840	3	4
2	9058	4	
3	9347	4	
4	9351	4	
5	9702	3	
6	9721	4	

ADMATERIALS TECHNOLOGIES PTE LTD
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Website: www.exova.com, www.admaterials.com.sg

ADMATERIALS TECHNOLOGIES PTE LTD
An Exova Group company

JOB REF. : ADM / 18 / 04101

TEST RESULT (Cont.) :

DETERMINATION OF WATER ABSORPTION DUE TO CAPILLARY ACTION - (BS EN 772 - 11: 2011)

Table 3 Test result for test duration of 90 minutes.

Specimen Ref.	Gross Area (A_s) mm^2	Coefficient of Water absorption due to Capillary Action (Cw,s) $g/(m^2s^{0.5})$	Average Coefficient of Water absorption due to Capillary Action (Cw,s) $g/(m^2s^{0.5})$
1	9840	3	3
2	9058	3	
3	9347	3	
4	9351	3	
5	9702	3	
6	9721	3	

Remarks : Witnessed by : Nil

PREPARED BY:

WEE CHIP KAI
Senior Engineer
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APPROVED BY:

SHERLY WIJAYA
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COMPRESSIVE STRENGTH REPORT,BS EN 12390-3 : 2009

Test Report No. 7362015555-CEG17/01
Dated 17 Jan 2017
Job No C17/0006

TÜV SÜD AL Technologies

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Note: This report is issued subject to the Testing and Certification Regulations of the TÜV SÜD Group and the General Terms and Conditions of Business of TÜV SÜD AL Technologies Pte Ltd. In addition, this report is governed by the terms set out within this report.

SUBJECT:

Determination of Compressive Strength & Density of Three (3) nos of Cube Samples For vPanel.

TESTED FOR:

VODAPRUF PTE LTD
88 Admiralty Street #08-12
Singapore 757440

Attn: Mr. Wang Wee Hwa

DATE OF TEST:

17-Jan-17

TEST METHOD:

The tests were conducted in accordance with BS EN 12390-3: 2009 "Compressive Strength of Test Specimens and BS EN 12390-3: 2009 "Density of Hardened Concrete".

TESTING LOCATION

TÜV SÜD PSB Pte Ltd (Tuas Lab) No. 10 Tuas Avenue 10 Singapore 639134

CHOY WAI HONG
TESTING OFFICER

ONG SOON TUCK
SENIOR ASSOCIATE ENGINEER
CIVIL ENGINEERING CENTRE

ilac-MRA SAC-SINGLAS ACCREDITED LABORATORY

LA-2014-0555-G
LA-2014-0555-G-1
LA-2014-0556-E
LA-2014-0556-E-1

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme. Tests/Calibrations marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our laboratory.

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Regional Head Office:
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3 Science Park Drive, #04-01/05
The Rutherford, Singapore 118223
TÜV®

Test Report No. 7362015555-CEG17/01
Dated 17 Jan 2017
Job No C17/0006

TÜV SÜD AL Technologies

COMPRESSIVE STRENGTH RESULT of vPanel

TEST RESULTS		
Lab Ref	1	2
Sample Ref	S1	S2
Condition As Received	Satisfactory	Satisfactory
Date of Casting	10-01-17	10-01-17
Age at Test (days)	7	7
Average Length (mm)	100.2	100.3
Average Breath (mm)	100.1	100.4
Average Height (mm)	100.3	100.1
Mass (g)	638.4	647.8
Density (kg/m^3)	634.6	642.6
Maximum Load (kN)	53.80	52.58
Compressive Strength at Failure (N/mm^2)	5.36	5.22

SINGAPORE GREEN BUILDING PRODUCT CERTIFICATE

SINGAPORE GREEN BUILDING COUNCIL

SINGAPORE GREEN BUILDING PRODUCT CERTIFICATE

AWARDED TO

Vodapruf Pte Ltd

8B Admiralty Street #08-12
Singapore 757440

FOR THE PRODUCT

Block and Wall Panel

PRODUCT BRAND

VODAPRUF

PRODUCT MODEL

VPANEL

THE PRODUCT HAS BEEN ASSESSED ACCORDING TO THE ASSESSMENT CRITERIA OF SINGAPORE GREEN BUILDING PRODUCT CERTIFICATION SCHEME. IT HAS BEEN AWARDED THE RATING:

SINGAPORE GREEN BUILDING PRODUCT SGBC ✓✓✓ EXCELLENT

Director
SGBC Pte Ltd

Certificate Number	Original Issue Date	Revised Date	Valid Till
SGBP 3271	24 February 2020	-	23 February 2022

✓Good ✓✓Very Good ✓✓✓Excellent ✓✓✓✓Leader

The use and reliance on this certificate is subject to the terms and conditions of the Singapore Green Building Product Certification Scheme. Revised certificates may also be issued at the discretion of the Council. The certification status may be verified at the Singapore Green Building Council website (www.sgbc.sg).

CERTIFICATE OF CONFORMITY, COC CLASS 1A

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

PSB Singapore

CERTIFICATE OF CONFORMITY

No. CLS1A 18 06 92266 005

Certificate Holder:	**Vodapruf Pte Ltd** 8B Admiralty Street #08-12 Singapore 757440 SINGAPORE
Certification Mark:	TÜV SÜD PSB
Product:	Fire Rated Partition Systems
Brand Name:	Vodapruf
Model(s):	vPanel
Product Details:	Integrity: 240mins, Insulation: 180mins Panel: vPanel 100, 100mm, 650kg/m³ (Single layer) Single panel size: 600mm (w) x 3000mm (ht) Each panel screed cladded with 5mm thick concrete panels on both faces
Standard(s):	BS 476-22:1987
Country of Origin:	Malaysia
Test Report(s):	PSB Test 7191153877-MEC17-LJH
Issued on:	2018-06-07
Valid until:	2023-06-06

Products listed under Class 1A must have TÜV SÜD PSB PLS mark as shown above affixed/printed on them. Failure to comply with this requirement may result in revocation of this certificate.

Vice-President (Certification Department)
TÜV SÜD PSB

Page 1 of 1

This Certificate is part of a full report and should be read in conjunction with it. This Certificate remains the property of TÜV SÜD PSB Pte Ltd and shall be returned upon request. The use of this Certificate is subjected to TÜV SÜD Group Testing and Certification Regulations; TÜV SÜD PSB Pte Ltd (PSB) General Terms and Conditions of Business and PSB Product Listing Scheme (PLS) Application Fact Sheet. The manufacturer is solely responsible for compliance of any product that has the same designation as the product type-tested. Persons relying on this Certificate should verify its validity by checking TÜV SÜD PSB's website at www.tuv-sud-psb.sg

ACCREDITED CERTIFICATION BODY SAC

TÜV SÜD PSB Pte Ltd · 1 Science Park Drive · Singapore 118221

PSB 13003.21

Test Report No. 7191153877-MEC17-LJH
dated 26 Apr 2017

PSB Singapore

Choose certainty.
Add value.

Note: This report is issued subject to the Testing and Certification Regulations of the TÜV SÜD Group and the General Terms and Conditions of Business of TÜV SÜD PSB Pte Ltd. In addition, this report is governed by the terms set out within this report.

SUBJECT:

Fire resistance test on a non-loadbearing vPANEL 100mm thick wall panel system submitted by Vodapruf Pte Ltd.

TESTED FOR:

Vodapruf Pte Ltd
8B Admiralty Street
Singapore 757440

DATE SUBMITTED:

30 Dec 2016

DATE OF TEST:

04 Jan 2017

PURPOSE OF TEST:

1. To determine the fire resistance of a partition wall system when tested in accordance with BS 476: Part 22: 1987: "Methods for Determination of the Fire Resistance of Non-loadbearing Elements of Construction - Determination of the Fire Resistance of Partition".

TÜV SÜD PSB

ilac-MRA ACCREDITED LABORATORY SAC-SINGLAS

LA-2017-3192-A LA-2017-3193-F LA-2017-3192-B LA-2017-3193-G LA-2017-2584-B LA-2017-2585-E LA-2017-2586-C LA-2016-0484-D

The results reported herein have been performed in accordance with the terms of accreditation under the Singapore Accreditation Council. Inspection/Calibration/Tests marked "not SAC-SINGLAS Accredited" in this Report are not covered in the SAC-SINGLAS Accreditation Schedule for our respective body/accessory.

Laboratory:
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Regional Head Office:
TÜV SÜD Asia Pacific Pte. Ltd.
1 Science Park Drive, #02-01
Singapore 118221

CERTIFICATE OF CONFORMITY, COC CLASS 1A

PSB Singapore

11. An inspection on the specimen was conducted during the construction stages by a TÜV SÜD PSB's officer to verify on its material used, dimensions and designs. The wall panel construction is as shown in Drawing Plate No. 01 on page 20 provided by the test sponsor.

12. Installation of the test specimen onto the test furnace was arranged and carried out by Vodapruf Pte Ltd.

TEST RESULTS:

13. Table 1 shows the temperature rise for the furnace and the standard curve. In addition, the table shows the percentage difference between the area under the standard curve and the area under the furnace curve compared with the percentage tolerance allowable within the standards.

14. Table 2 and 3 show the mean and maximum unexposed face temperature above the initial temperature.

15. Table 4 shows the deflection measurement of the wall partition towards the furnace along its mid-height.

16. Figure 1 shows the actual time-temperature curve of furnace in relation to the specified time-temperature curve.

17. Photographs of the test are shown in Plates 1 to 10, Photographs of wall panel and other material are shown in Plates 11 to 13.

18. Observations were made during the test on the unexposed face of the test specimen and these are given in Appendix 1 of this report.

19. The results only relate to the behaviour of the specimen of the element of construction under the particular conditions of the test. They are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires.

CONCLUSION:

20. The specimen satisfied the requirements of the BS 476: Part 22:1987 for the periods stated below:

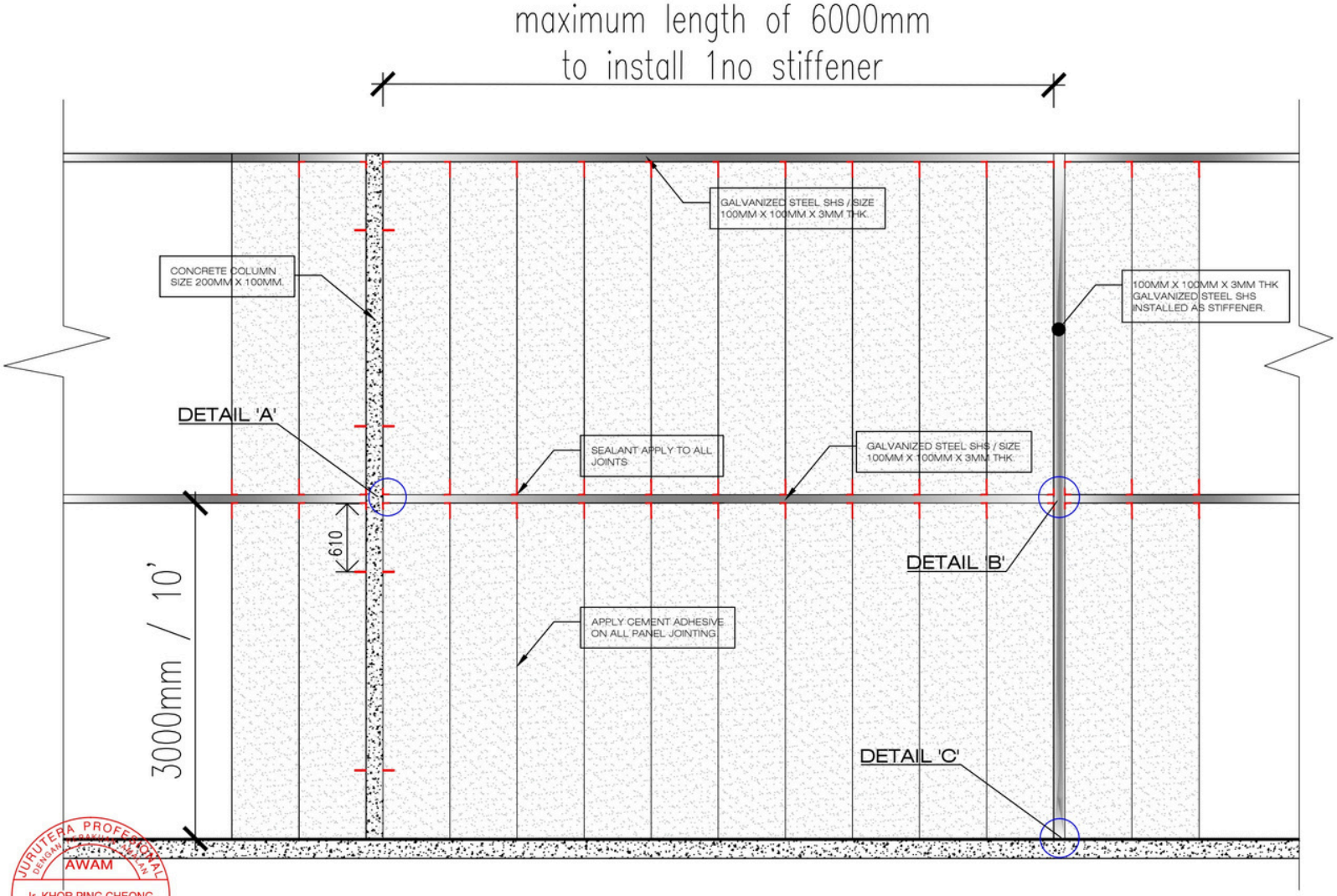
Integrity	:	260 minutes
Insulation	:	222 minutes

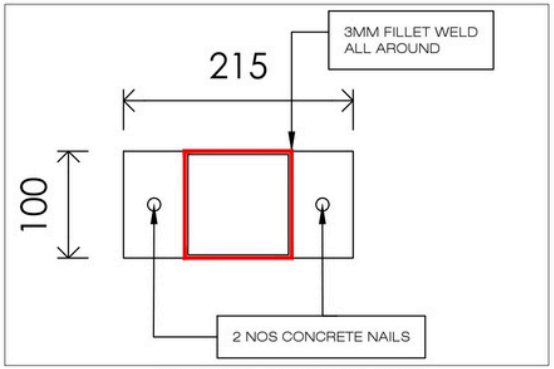
Test Report No. 7191153877-MEC17-LJH
dated 26 Apr 2017

PSB Singapore

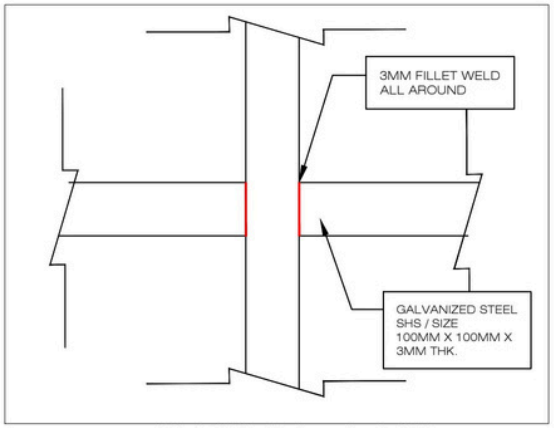
APPENDIX 1

Time (min.sec)	Observation on the unexposed face
00.00	Test commenced.
09:00	Smoke started to emit along the left free vertical edge. Surface along the free vertical edge observed to be damp.
30:00	Smoke emission along the left free vertical edge reduced.
60:00	Integrity intact. A horizontal line 1/5 height from bottom appeared across all wall panels.
90:00	Integrity intact. No significant changes.
120:00	Integrity intact. No significant changes.
150:00	Integrity intact. Water started to seep out along the bottom horizontal line and all vertical panel joints.
180:00	Integrity intact. Wall panels vertical joint lines more visible with little volume of smoke seen emitting.
190:00	Vertical joint line between wall panel B & C a little blackened.
210:00	Integrity intact.
220:00	Red spots along several vertical joint lines.
224:00	Temperature recorded at thermocouple number 7 was 210.8°C.
235:00	All vertical joint lines developed into tiny gaps but not exceeding 6mm in width nor flaming was observed.
240:00	Integrity intact. No further gaps incremental developed nor flaming observed.
260:00	Integrity intact. Test was terminated upon sponsor's consent.

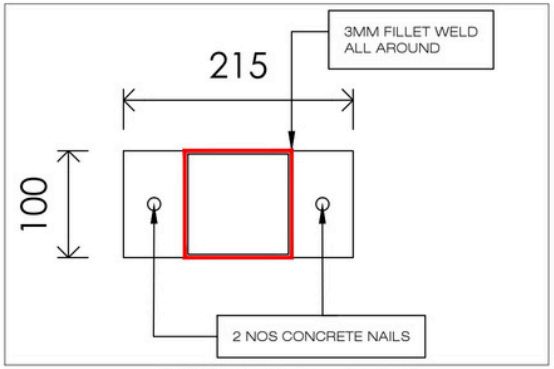




DETAIL A (scale 1:5)



DETAIL B (scale 1:10)



DETAIL C (scale 1:5)

JURUTERA PROFESIONAL
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C112028
MALAYSIA

VODAPRUF

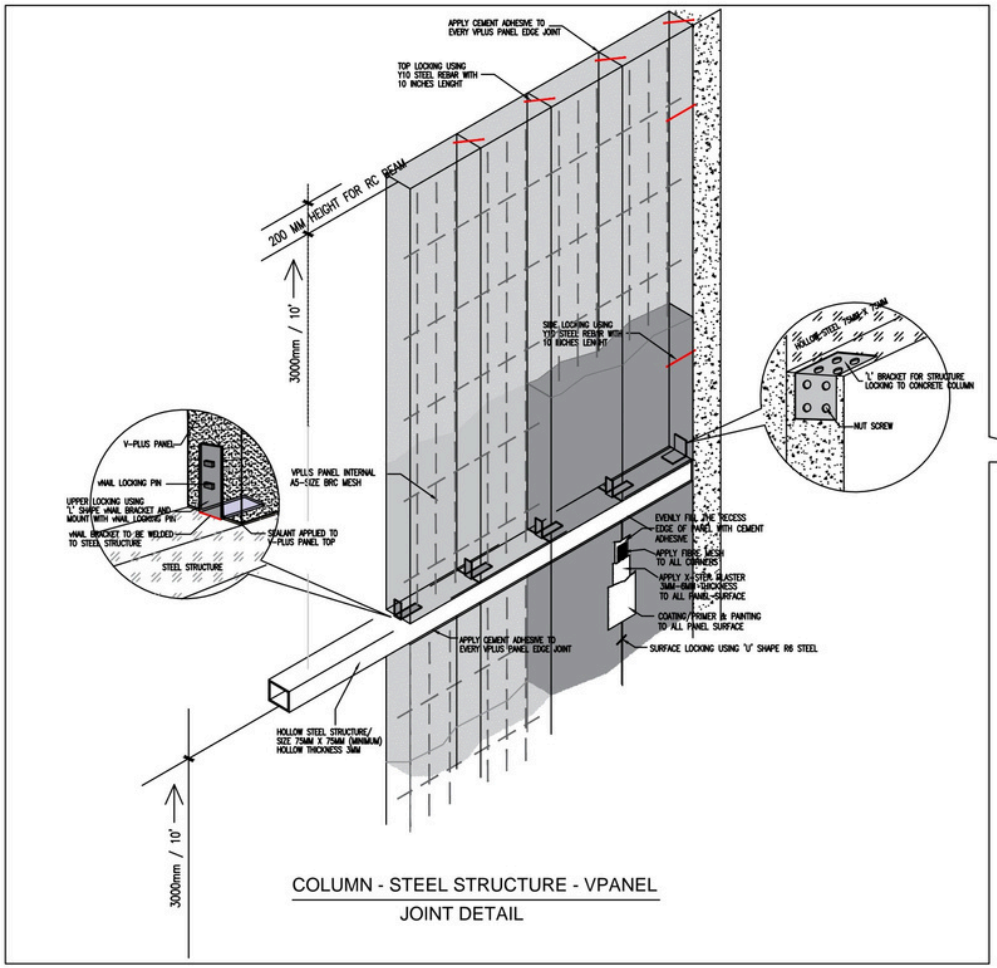
TYPICAL VPANEL CONNECTION - VERTICAL APPLICATION
CONCRETE COLUMN LOCKING WITH 20' HEIGHT WALL

SCALE - 1 : 40
PAPER SIZE - A3

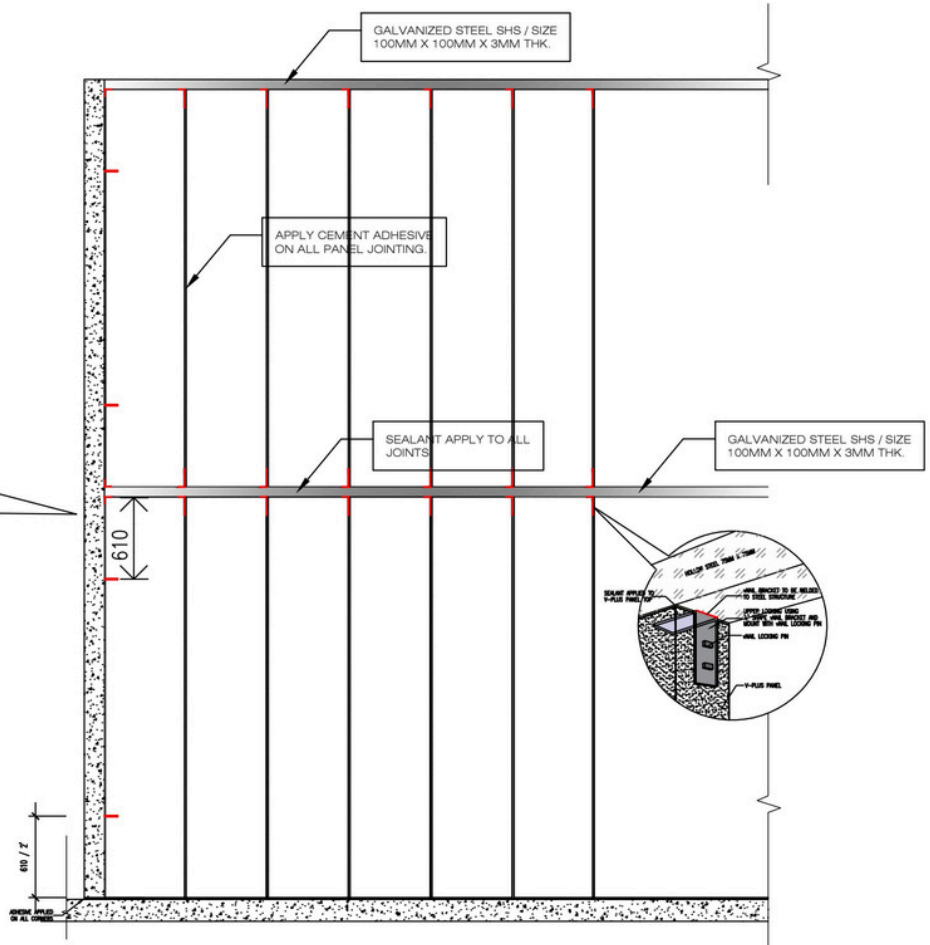
CHECKED BY: BADRUL ZAMRI

DATE : DECEMBER 2024

REV : nil



COLUMN - STEEL STRUCTURE - VPANEL
JOINT DETAIL



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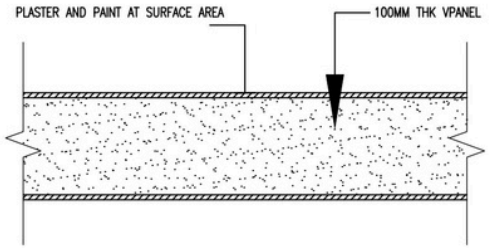
TYPICAL VPANEL CONNECTION - VERTICAL APPLICATION
CONCRETE COLUMN LOCKING WITH 20' HEIGHT WALL

SCALE - 1 : 40
PAPER SIZE - A3

CHECKED BY: BADRUL ZAMRI

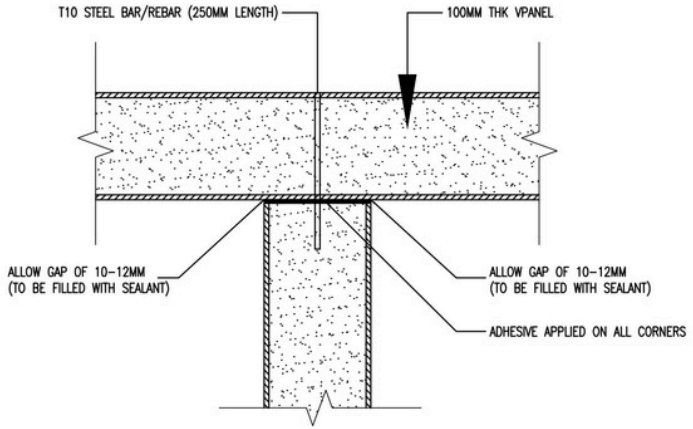
DATE : DECEMBER 2024

REV : nil



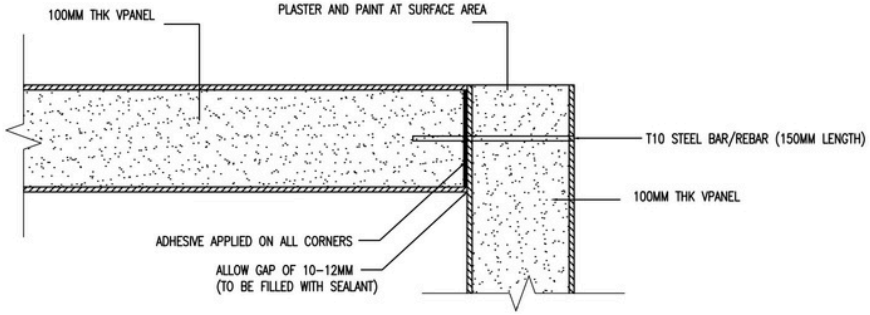
CONNECTION DETAILS

SCALE: 1:5



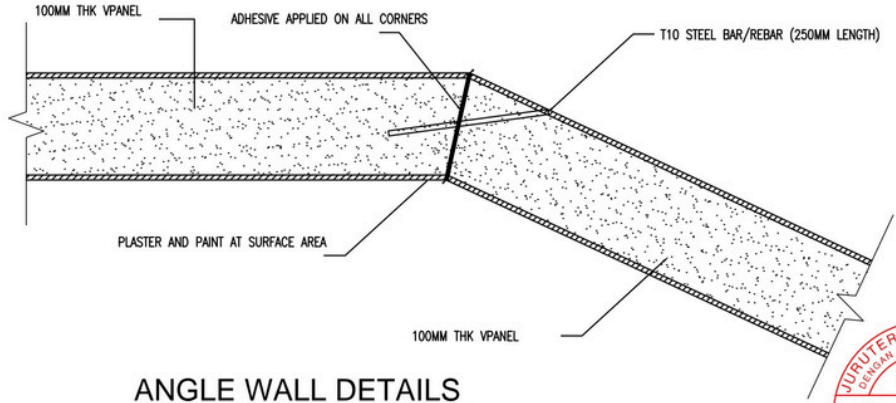
INTERSECTION DETAILS

SCALE: 1:5



CORNERS DETAIL

SCALE: 1:5



ANGLE WALL DETAILS

SCALE: 1:5

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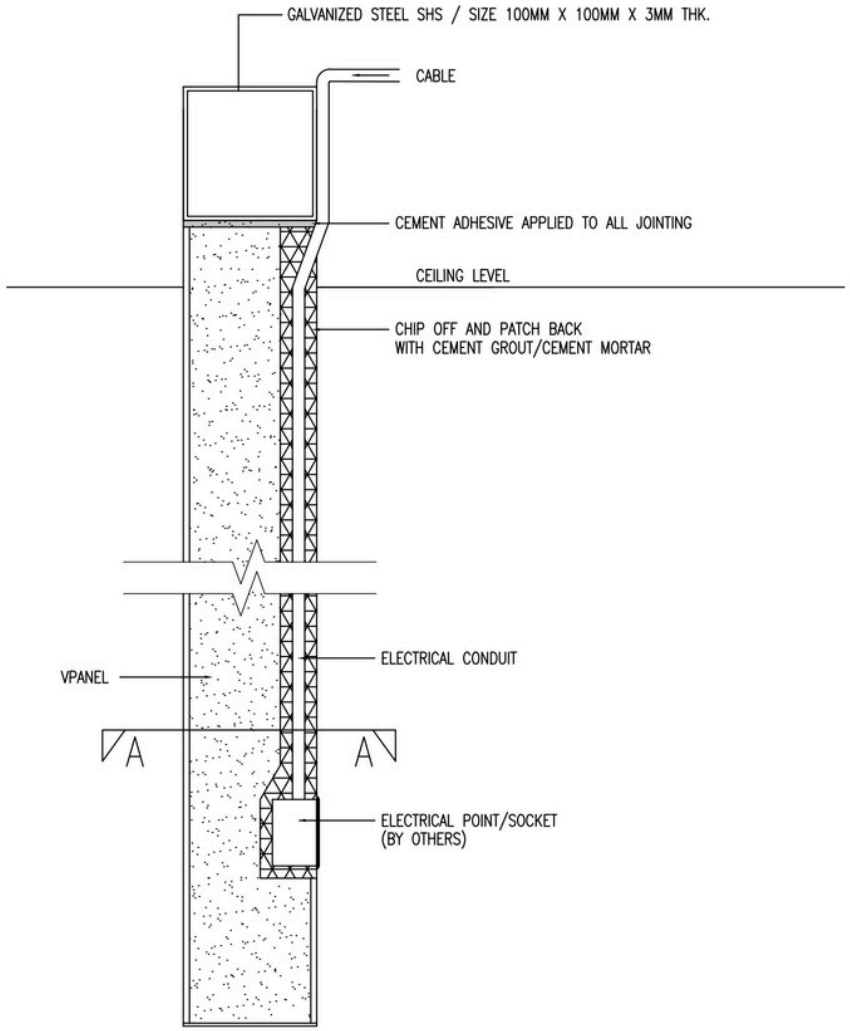
TYPICAL VPANEL CONNECTION - VERTICAL APPLICATION
CONCRETE COLUMN LOCKING WITH 20' HEIGHT WALL

SCALE - 1 : 5
PAPER SIZE - A3

CHECKED BY: BADRUL ZAMRI

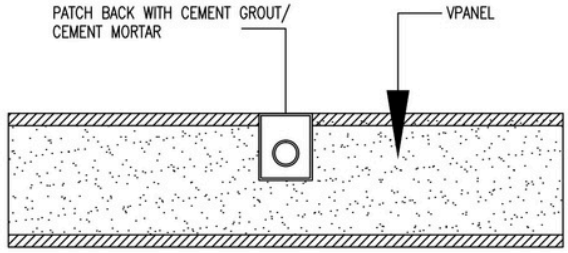
DATE : DECEMBER 2024

REV : nil



VPANEL - ELECTRICAL COMPONENTS

SCALE: 1:4



SECTION A - A

SCALE: 1:4

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VODAPRUF

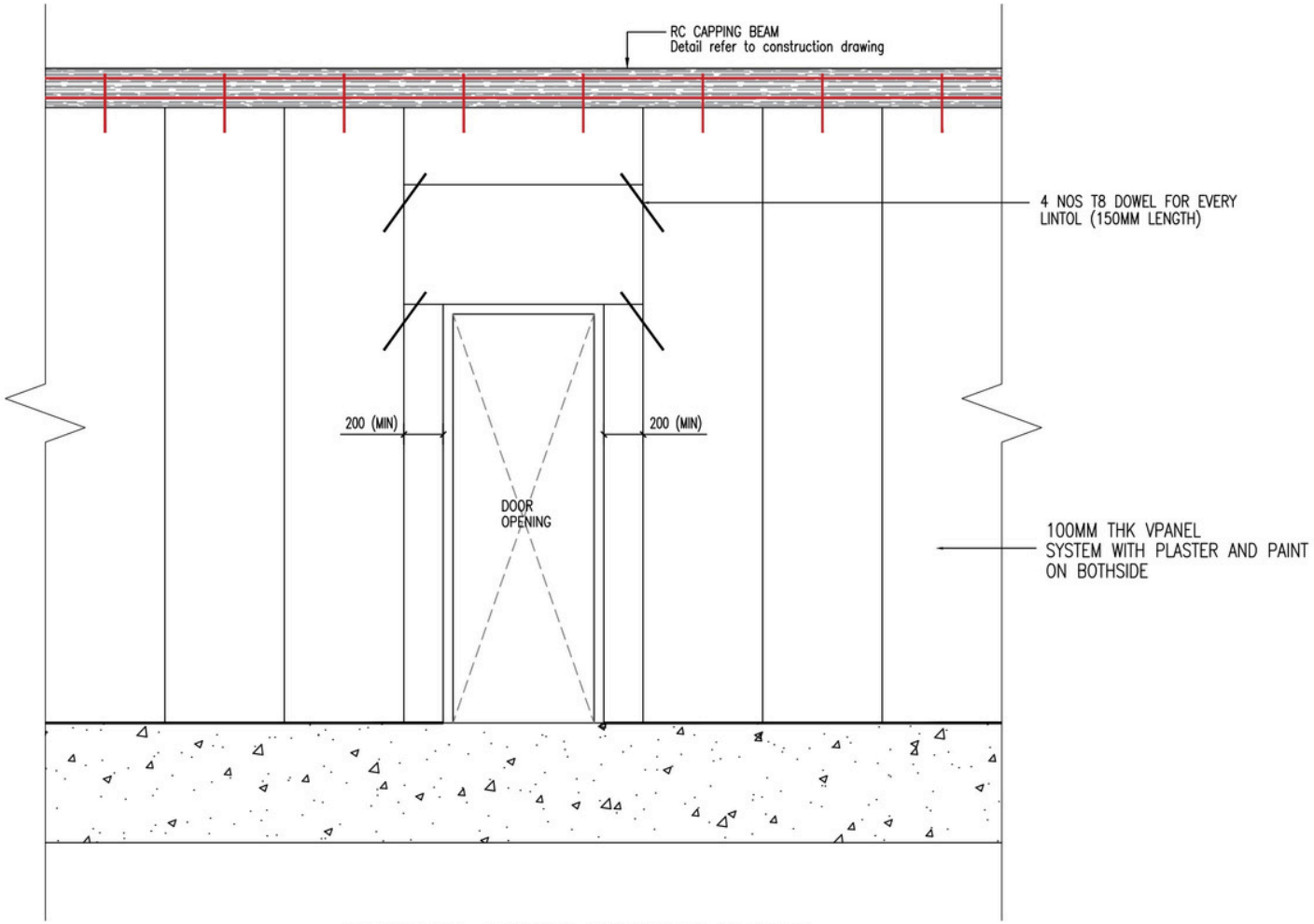
TYPICAL VPANEL CONNECTION - VERTICAL APPLICATION
CONCRETE COLUMN LOCKING WITH 20' HEIGHT WALL

SCALE - 1 : 4
PAPER SIZE - A3

CHECKED BY: BADRUL ZAMRI

DATE : DECEMBER 2024

REV : nil



TYPICAL DOOR INSTALLATION

SCALE 1:25

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MALAYSIA

VODAPRUF

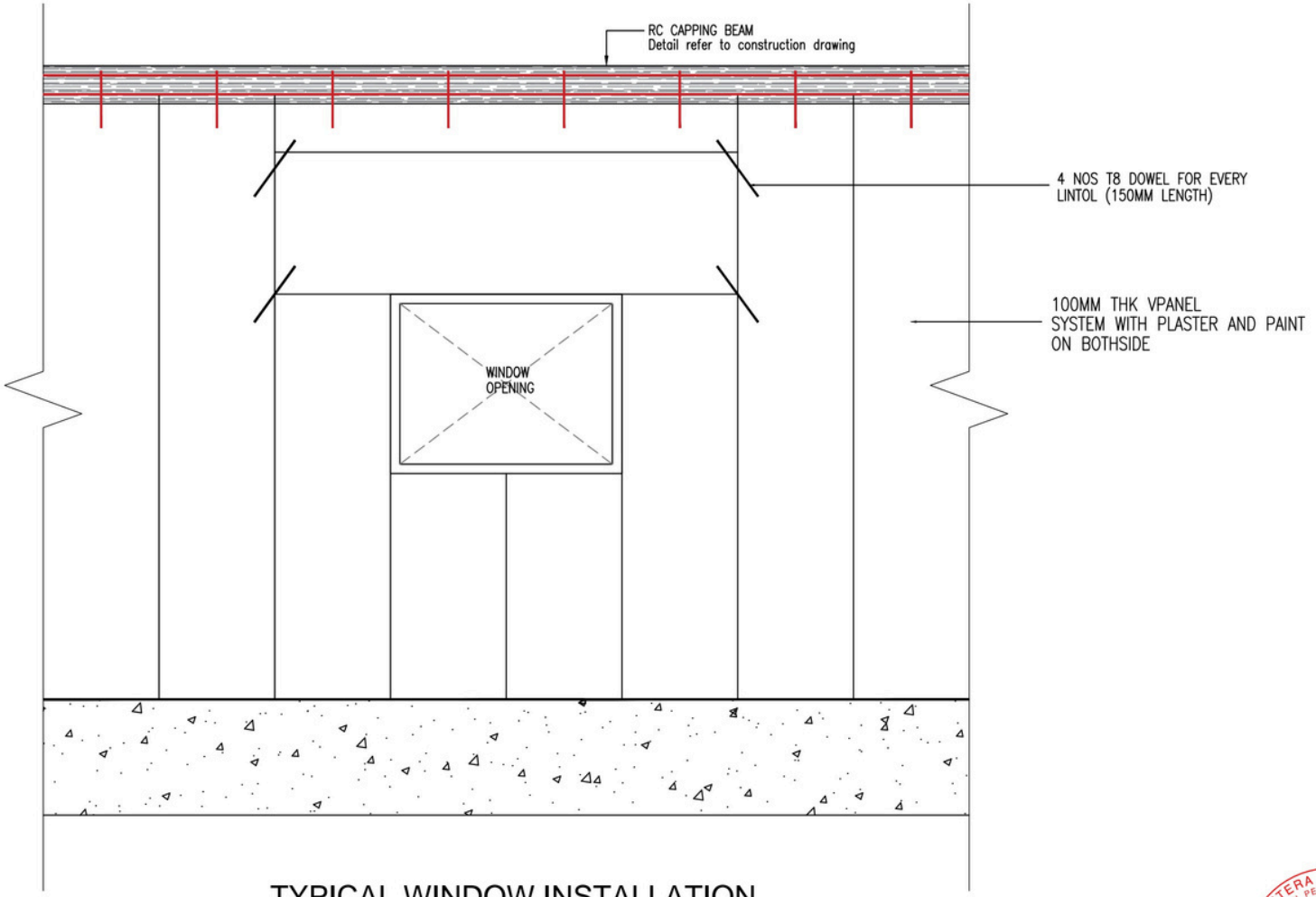
TYPICAL VPANEL CONNECTION - VERTICAL APPLICATION
CONCRETE COLUMN LOCKING WITH 20' HEIGHT WALL

SCALE - 1 : 25
PAPER SIZE - A3

CHECKED BY: BADRUL ZAMRI

DATE : DECEMBER 2024

REV : nil



TYPICAL WINDOW INSTALLATION

SCALE: 1:25

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VODAPRUF

TYPICAL VPANEL CONNECTION - VERTICAL APPLICATION
CONCRETE COLUMN LOCKING WITH 20' HEIGHT WALL

SCALE - 1 : 40
PAPER SIZE - A3

CHECKED BY: BADRUL ZAMRI

DATE : DECEMBER 2024

REV : nil