【LAP-WALL】
Design and Installation Documents
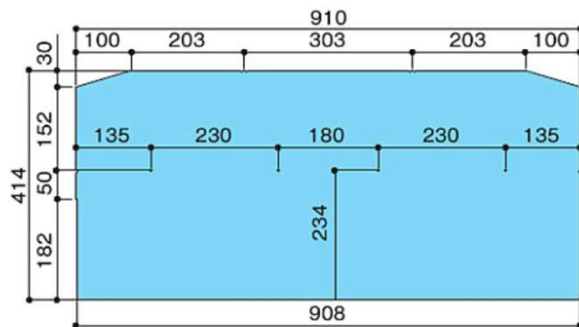# －Local Substrate－

November, 2023

This document describes the installation method in which steel furring strips and substrates are attached to the structure and LAP-WALL are installed on substrate.
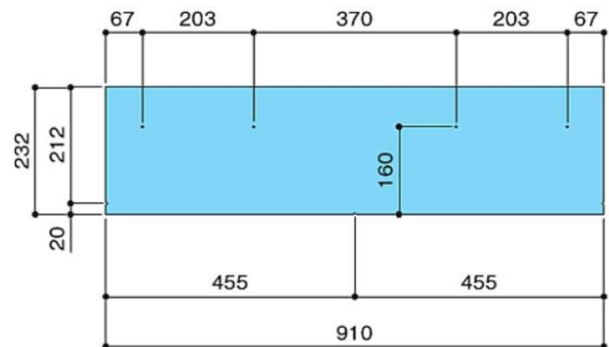
1. Outline of Product

<1> Cladding material

● Wood （Product No: TWC**W）
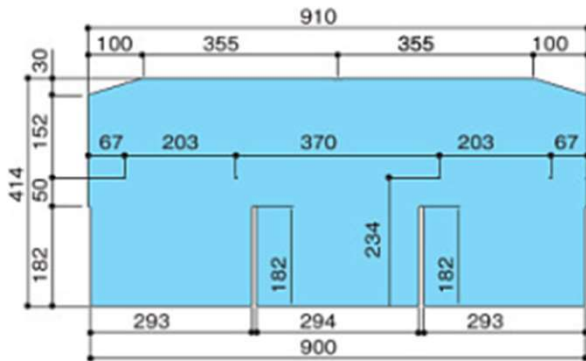
- ・Length of exposed area: 182mm
- ・Thickness: 5.5mm

■ G-Starter (Product No：STG**G)

- ・Thickness: 5.2mm
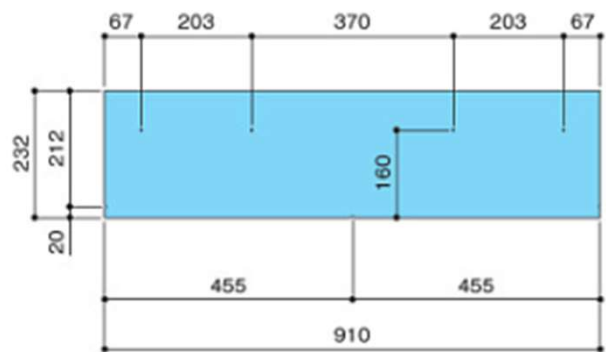

● Brick （Product No: TBD**W）

- ・Length of exposed area: 182mm
- ・Thickness: 5.5mm

■ B-Starter (Product No：STB**G)

- ・Thickness: 5.2mm

● Flat （Product No: TFE**W）

- ・Length of exposed area: 182mm
- ・Thickness: 5.5mm

■ G-Starter (Product No：STG**G)

- ・Thickness: 5.2mm

1. Outline of Product

<1> Cladding material

● SOLIDO typeM_LAP （Product No: SMG**G）

・Length of exposed area: 182mm
・Thickness: 5.5mm

■ G-Starter (Product No：STG**G)
・Thickness: 5.2mm

● Colonial Gulassa / Thrermal Barrier Glass （Product No: CC5*** / CC8***)

・Length of exposed area: 182mm
・Thickness: 5.5mm

■ G-Starter (Product No：STG**G)
・Thickness: 5.2m*
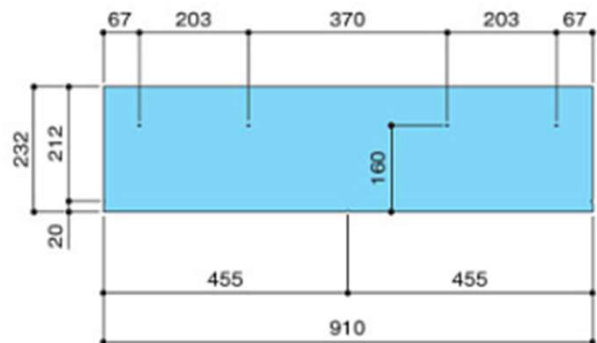
● Simple （Product No: SRA**W）
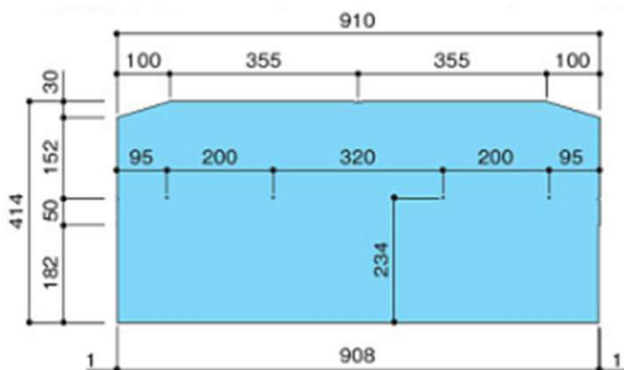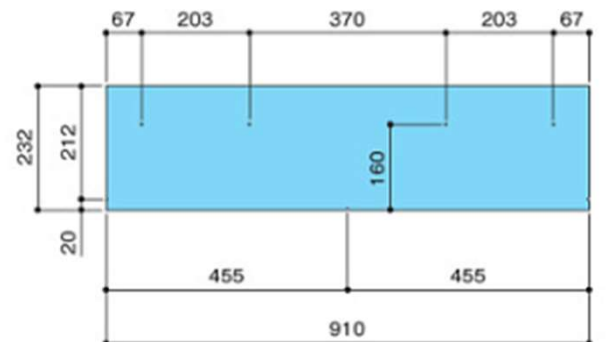
・Length of exposed area: 182mm
・Thickness: 5.5mm
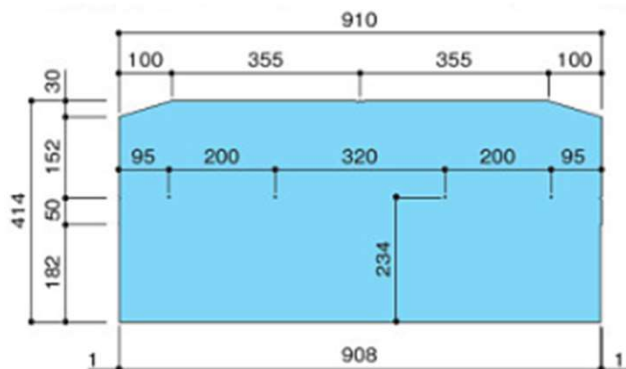
■ G-Starter (Product No：STG**G)
・Thickness: 5.2mm

1. Outline of Product

<1> Cladding material

- **Uroko** （Product No: GUB**G)
  - ・Length of exposed area: 152mm
  - ・Thickness: 6.0mm
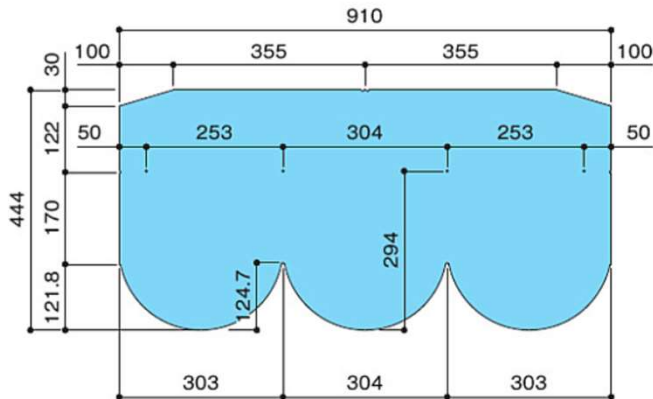
- ■ U-Starter Large (Product No ： STU**LG)
  - ・Thickness: 5.2mm
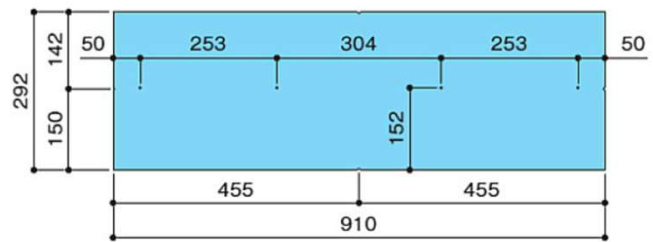
- ■ U-Starter Small (Product No ： STU**SG)
  - ・Thickness: 5.2mm
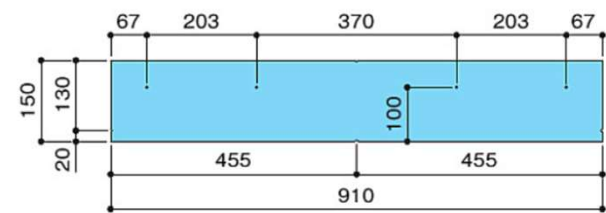
- **Hishi** （Product No: GHA**G)
  - ・Length of exposed area: 152mm
  - ・Thickness: 6.0mm
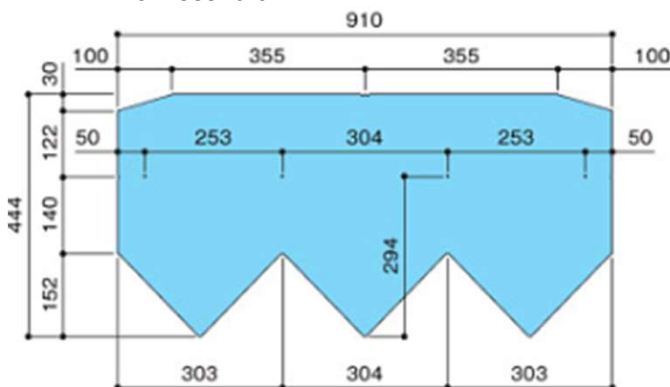
- ■ H-Starter Large (Product No ： STH**LG)
  - ・Thickness: 5.2mm
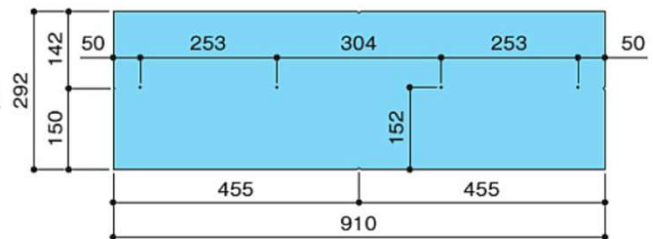
- ■ H-Starter Small (Product No ： STH**SG)
  - ・Thickness: 5.2mm
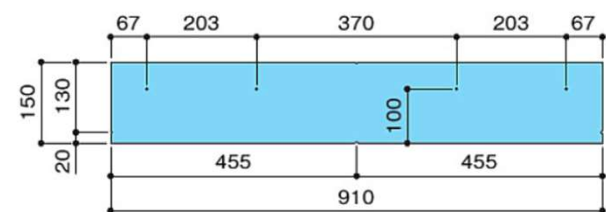
- **Sand** （Product No: SFA**G）
  - ・Length of exposed area: 182mm
  - ・Thickness: 7.0mm

- ■ G-starter (Product No ： STG**G)
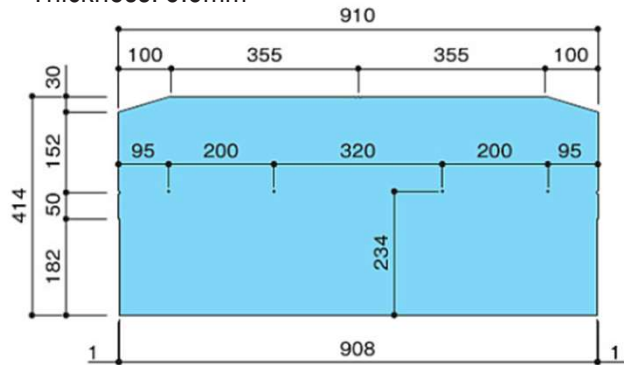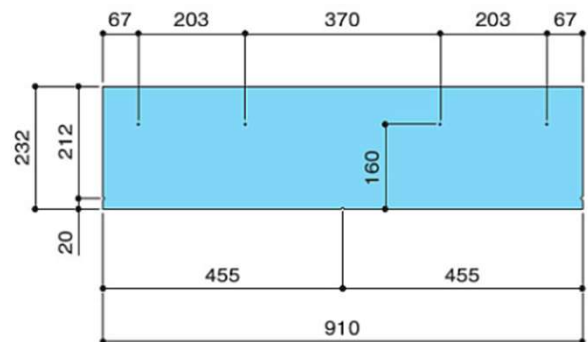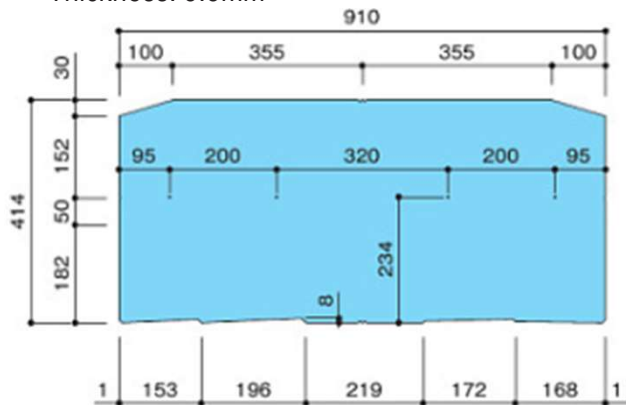 - ・Thickness: 5.2mm
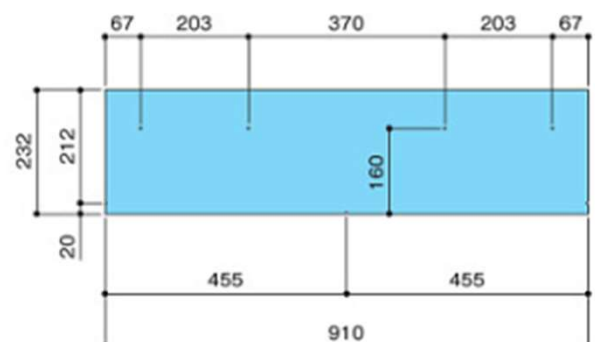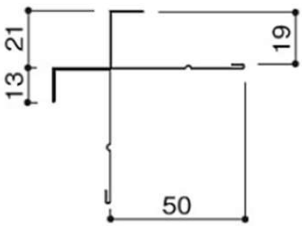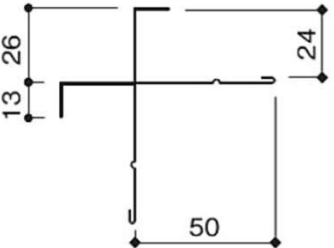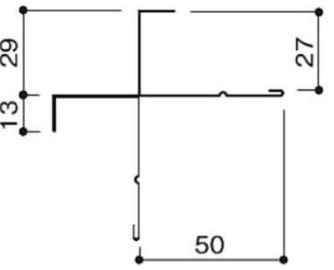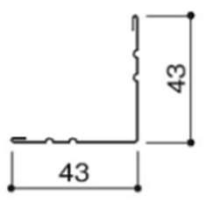
3

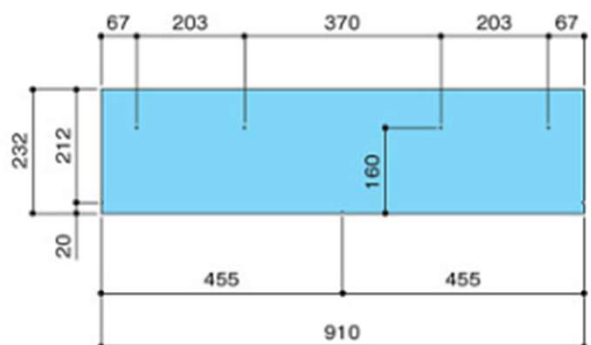# 1. Outline of Product

<2> Installation Components
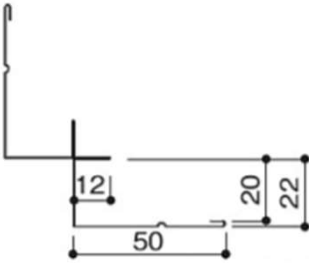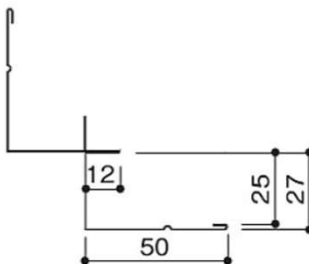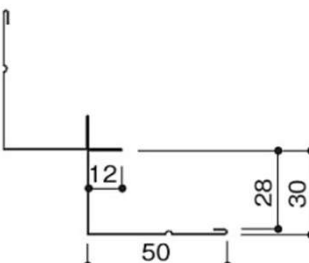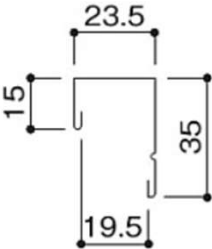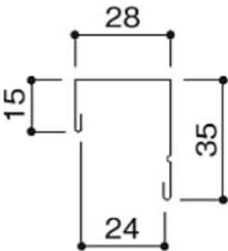
● Metal trim

Area of use	Product Name	Product No	Shape	Color
Sill	Sill flashing	B238W*		Black （*=1） White （*=2） Brown （*=3） Gray （*=4）
Outside	Metal outside corner	KLGY56*		L-Black （*=2） L-Silver gray （*=5） L-Silver （*=4） L-Brown （*=1） L-Orange （*=8） L-Green （*=7） L-Blue （*=0） L-Red （*=9）
	Metal outside corner for Sand	KLGY66*		L-Black （*=2） L-Silver gray （*=5）
	Metal outside corner for Hishi, Uroko	KLGY76*		L-Black （*=2） L-Silver （*=4） L-Brown （*=1） L-Orange （*=8） L-Green （*=7） L-Red （*=9）
Inside	Inside flashing	RCILK		White

1. Outline of Product

<2> Installation Components
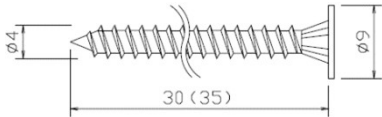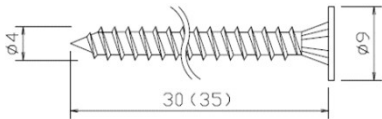
- Metal trim

Area of use	Product Name	Product No	Shape	Color
Inside	Metal inside corner	KLGV56*	(diagram: 12, 50, 20, 22)	L-Black （*=2） L-Silver gray （*=5） L-Silver （*=4） L-Brown （*=1） L-Orange （*=8） L-Green （*=7） L-Blue （*=0） L-Red （*=9）
	Metal inside corner for Sand	KLGV66*	(diagram: 12, 50, 25, 27)	L-Black （*=2） L-Silver gray （*=5）
	Metal inside corner for Hishi, Uroko	KLGV76*	(diagram: 12, 50, 28, 30)	L-Black （*=2） L-Silver （*=4） L-Brown （*=1） L-Orange （*=8） L-Green （*=7） L-Red （*=9）
Under eave	Soffit flashing	B254W*	(diagram: 23.5, 15, 35, 19.5)	Black （*=1） White （*=2） Brown （*=3） Gray （*=4）
	Soffit flashing for Hishi, Uroko, Sand	KLGM63*	(diagram: 28, 15, 35, 24)	Black （*=1） White （*=2） Brown （*=3） Gray （*=4）

1. Outline of Product

<2> Installation Components

● Fastening screw

Product Name	Product No	Shape	material properties
Designated screw 35	KLWB35A	⌀4 ⌀9 30(35)	Steel
Designated screw 35 SUS	KLWB135	⌀4 ⌀9 30(35)	Stainless

● Non-breathable waterproof paper

Product Name	Product No	Shape	Size
Waterproof paper for LAP-WALL (Non moisture permeable)	KLGPHL		Width 1m Length 50m Thickness 0.2mm

● Installation support tool
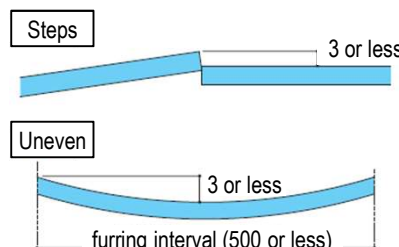
Product Name	Product No	Shape	Purpose
Installation support pin for LAP-WALL	KLKGTS		Assist in installation of LAP-WALL

2. Scope

Item	Scope
Applicable building	Buildings that meet the following conditions ● LAP-WALL shall be able to be installed in accordance with the design and installation standards. ● There shall be no structural problems with the increased weight of the substrate and cladding
Building height	13m or less
Wall shape	Exterior wall surfaces shall be vertical and flat
Target product	LAP-WALL / SOLIDO typeM_LAP

3. Installation Specification

１）Substrate for cladding

The surface of the substrate for cladding should be smooth

     Steps：3mm or less
     Uneven：3mm or less per furring interval

Steps
3 or less

Uneven
3 or less
furring interval (500 or less)

Item		Installation standard	
Type		・Plastwood "Bangkok" (products of THAI GLOBAL MATERIAL) ・Structural plywood (JAS compliant) thickness 9mm or more ・OSB (JAS structural panel 3rd class compliant) thickness 11mm or more ・OSB thickness 15mm or more	
Fastening specifications	Fastener	Countersunk drill screws φ4.0×L30 or more	
	Fastening interval	Vertical direction	303mm or less
		Horizontal direction	606mm or less

※Substrate should be fastened to furring strips or frame to ensure retention
※Install waterproof paper (non moisture permeable) on the substrate(plywood or OSB).

２）Cladding material

Item			Installation standard
Type			LAP-WALL / SOLIDO typeM_LAP
Length of exposed area			182mm or less　※Hishi and Uroko 152mm or less

Fastening specifications	For general section panels	Fastener	Designated screw
			   Product No.KLWB35A (Iron, L=35mm) or
			   Product No.KLWB135 (Stainless steel, L=35mm)

		Number of fasteners	4 per panel
		Fastening position	4 hole positions in panel
	For small width panels at the edge	Fastener	Designated screw Product No.KLWB135 (Stainless steel, L=35mm) ※If existing holes of panel cannot be used, drill holes (φ4mm) and fasten. ※If fastening with one screw, use an adhesive together to fasten.

4. Installation overview

Structure(Precast Concrete or Brick and Mortar)

Substrate for cladding

Non-breathable waterproof paper

Fastener for cladding
(Designated screw)

Steel stud
(Purchase locally)

Anchor
(Purchase locally)

Cladding
(LAP-WALL)

Sill flashing
(Purchase locally)

5. Cross Section View

General section horizontal direction

Cladding
(LAP-WALL)

Designated screw

Substrate for cladding

Steel stud

Non-breathable waterproof paper

Approx. 18

12

50

Approx. 5

Countersunk screw

Anchor

Structure

General section horizontal direction (vertical joints of the substrate)

Cladding
(LAP-WALL)

Designated screw

Substrate for cladding

Steel stud

Non-breathable waterproof paper

Approx. 18

12

50

Approx. 5

Countersunk screw

Anchor

Structure

5. Cross Section View

General section vertical direction

Approx. 18   12   50   Approx. 5

Structure

Steel stud

Substrate for cladding

Non-breathable waterproof paper

Designated screw

Cladding
(LAP-WALL)

Anchor

Countersunk screw

Sill

Approx. 18   12   50   Approx. 5

Substrate for cladding

Non-breathable waterproof paper

Designated screw

Cladding
(LAP-WALL)

Steel stud

Structure

Screw for sill flashing

Anchor

Countersunk screw

10 20

Sill flashing

5. Cross Section View

Outside
Metal finish

Approx. 5   50   12   Approx. 18

Structure

Anchor

Non-breathable waterproof paper

Steel stud

Substrate for cladding

Steel stud

Countersunk screw

Cladding
(LAP-WALL)

Metal outside corner

Inside	
Metal finish	Sealant finish

Metal finish:

Structure

Steel stud

Anchor

Substrate for cladding

Countersunk screw

Metal inside corner

Cladding
(LAP-WALL)

Designated screw

Non-breathable waterproof paper

50   12   Approx. 18

Approx. 5

Sealant finish:

Structure

Steel stud

Anchor

Substrate for cladding

Inside flashing

Countersunk screw

10

Back up materials

Sealant

Cladding
(LAP-WALL)

Designated screw

Non-breathable waterproof paper

50   12   Approx. 18

Approx. 5

5. Cross Section View

Under eave	
Metal finish	Sealant finish

Metal finish:

Structure

Soffit flashing

Countersunk screw

Designated screw (SUS)

Adhesive

Anchor

Cladding
(LAP-WALL)

Steel stud

Substrate for cladding

Non-breathable waterproof paper

Approx. 18   12 50

Approx. 5

Sealant finish:

Structure

Sealant

Countersunk screw

Designated screw (SUS)

Adhesive

Anchor

Cladding
(LAP-WALL)

Steel stud

Substrate for cladding

Non-breathable waterproof paper

Approx. 18   12 50

Approx. 5

Above opening

Approx. 5

Approx. 18   12 50

Cladding
(LAP-WALL)

Steel stud

Designated screw

Structure

Countersunk screw

Non-breathable waterproof paper

Anchor

Substrate for cladding

Steel stud

25 10

Sealant

Sealant

Back up materials

(10)

Metal flashing

12

5. Cross Section View

Under opening

Sealant

Steel stud

Sealant

Metal flashing

Designated screw(SUS)

Countersunk screw

Adhesive

Steel stud

Anchor

Substrate for cladding

Non-breathable waterproof paper

Approx. 18 | 12 50

Approx. 5

Side opening

Structure

Approx. 5

50

12

Approx. 18

Anchor

(10)

Sealant

Countersunk screw

Steel stud

10 25

Metal flashing

Substrate for cladding

Non-breathable waterproof paper

Back up materials

Sealant

Cladding
(LAP-WALL)

6. Standard Installation Method

Installation of LAP-WALL

<1> Installation of non-breathable waterproof paper

- Install non-breathable waterproof paper over the substrate(plywood or OSB).
- Non-breathable waterproof paper should be stretched without sagging or wrinkling.
- Fastening with stables, about 300mm apart at joints and at other key locations.
- In principle, the general section should be installed horizontally, from the bottom (sill) to the top.
- At the top edge, such as under eaves, should be completely installed to the edge.
- To waterproof from the eaves, use double-sided waterproof tape and adhere it to the substrate.
- The overlapping dimensions of each part are shown in the table below.
- In the event of a tear, insert a piece of non-breathable waterproof paper into the upper overlap as shown in the figure below and cover the tear, or securely attach waterproof tape to the tear.

Item		Overlap dimensions
Above and below		90mm or more
Both sides	General section	150mm or more
	Outside	
	Inside	

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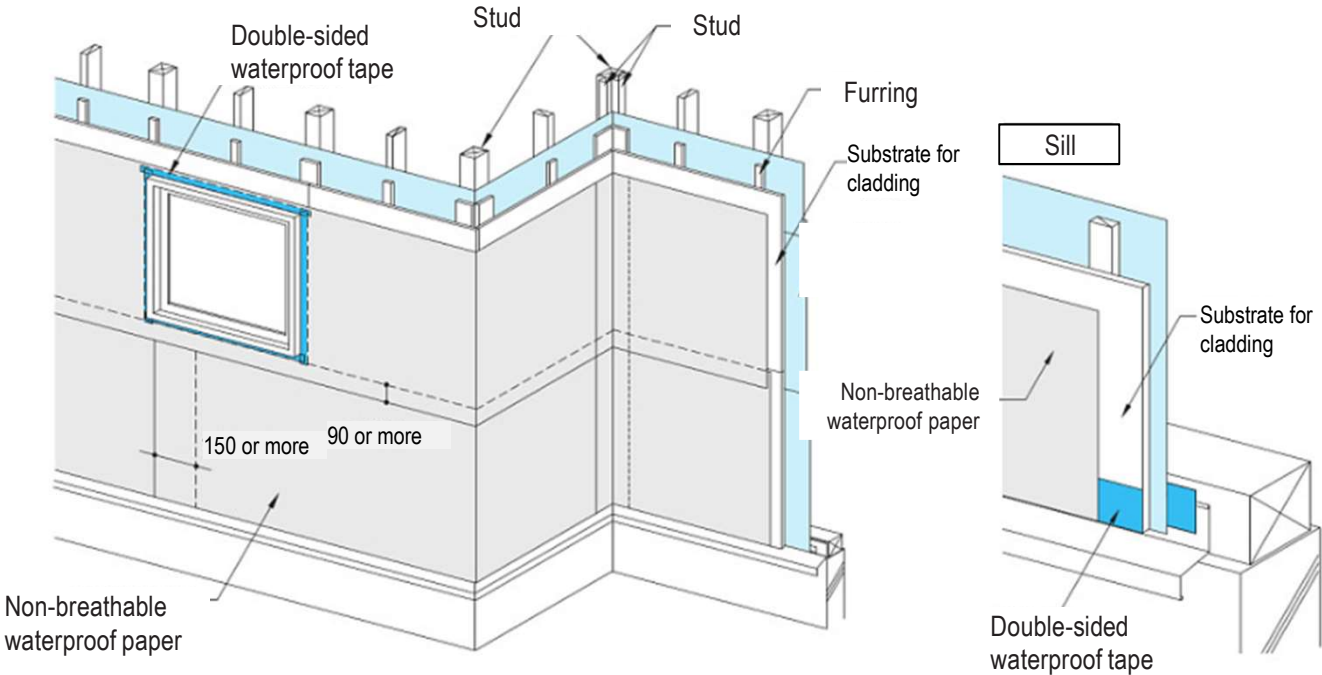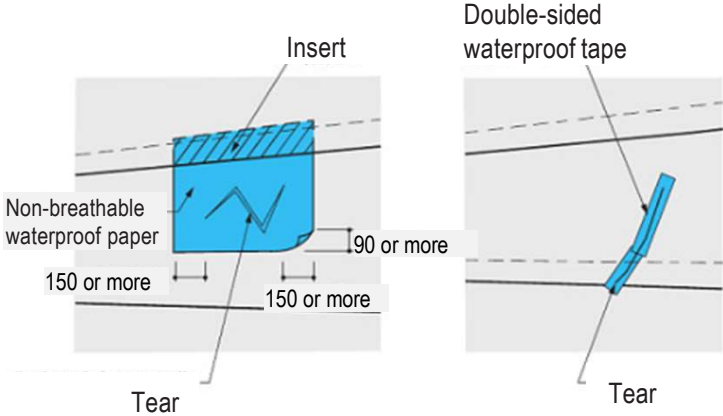
6. Standard Installation Method

Installation of LAP-WALL

<2> Draw guide lines

- In order to install the panel horizontally, horizontal guide lines are drawn around the entire perimeter of the building.
- The position of the horizontal guide lines are shown in the table below.

Product	Item	Position of horizontal guide line	Calculation of horizontal guide line dimensions
Wood Brick Flat Simple Sand Colonial SOLIDO	For the starter	242mm from bottom of the rising edge of the sill flashing	Overall height of starter (232mm) + Gap between sill flashing and bottom of first panel (10mm)
	For the panel of first level	424mm from bottom of the rising edge of the sill flashing	Overall height of panel (414mm) + Gap between sill flashing and bottom of first panel (10mm)
	For the panel	Every 910mm from the guide line for the panel of first level	Length of exposed area for 5 panels (182mm×5)
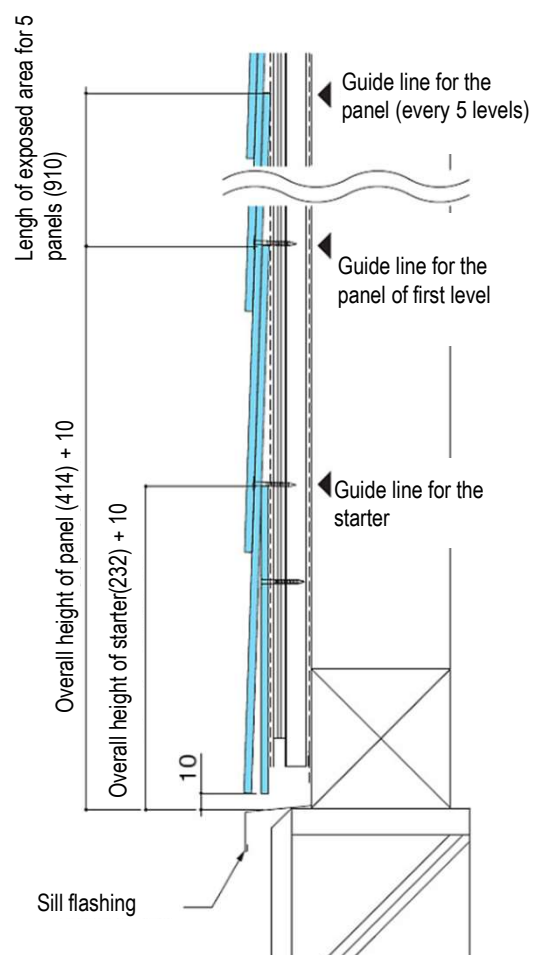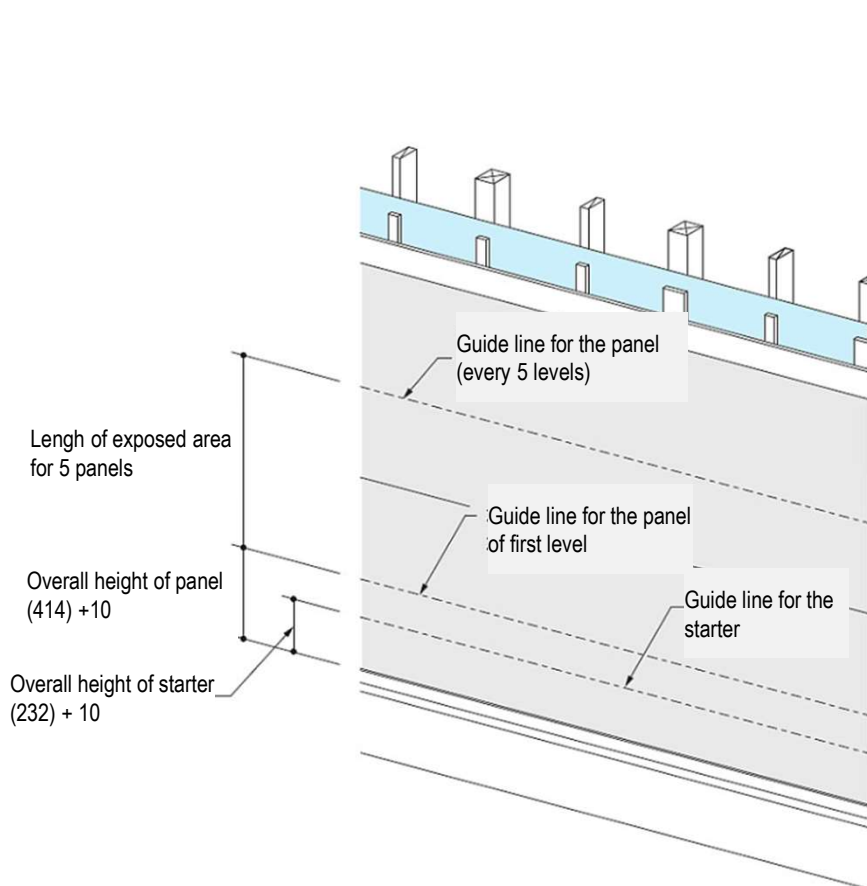
6. Standard Installation Method

Installation of LAP-WALL

<2> Draw guide lines (for Hishi, Uroko)

● In order to install the panel horizontally, horizontal guide lines are drawn around the entire perimeter of the building.
● The position of the horizontal guide lines are shown in the table below.

| Product	Item	Position of horizontal guide line	Calculation of horizontal guide line dimensions
Hishi Uroko	For the starter	160mm from bottom of the rising edge of the sill flashing	Overall height of starter (150mm) + Gap between sill flashing and bottom of first panel (10mm)
	For the panel of first level	454mm from bottom of the rising edge of the sill flashing	Overall height of panel (444mm) + Gap between sill flashing and bottom of first panel (10mm)
	For the panel	Every 760mm from the guide line for the panel of first level	Length of exposed area for 5 panels (152mm×5)
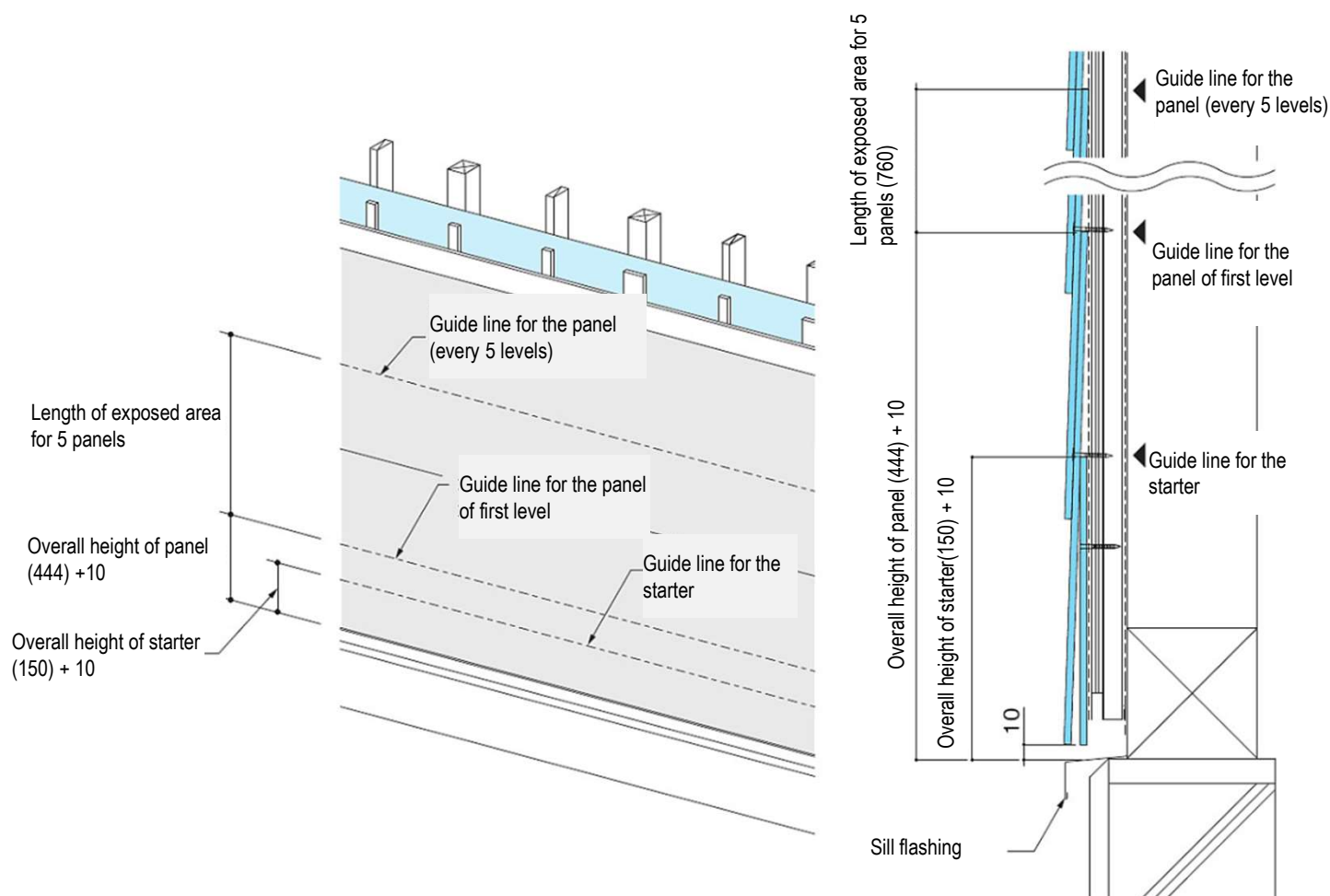
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6. Standard Installation Method

Installation of LAP-WALL

<3> Installation of starter and panel

- Panels should be installed about 20mm out from the bottom edge of the substrate for cladding with a gap of about 10mm from the sill flashing.
- Align the top edge of the starter with the guide line for the starter and fasten with the screws.
- For Hishi and Uroko, align the top edge of the starter (small) with the guide line for the starter and fasten with the screws. Then, align the bottom edge of the starter (large) with the bottom edge of the starter (small) and fasten with the screws.
- After the starters are installed, the first level panels are aligned with the horizontal guide line for the first level and fasten with screws.
- The upper and lower panels are installed according to matching marks.
- For horizontal installation of panels, butt them together lightly.
- If the horizontal direction of wall is 15m or more, install with a gap 1.5mm at the horizontal butt joints of the panels.
- When drilling holes (approx. φ4mm) other than the existing holes in the panel to fasten the panel, secure a distance of at least 30mm from the edge of the panel.
- Installation specifications for panel are shown in the table below.

Product	Displacement width of upper and lower panels	Length of exposed area	Fastening specification	
			Number of fasteners	Fastening position
Hishi Uroko	455mm (Half the full width of the panel)	152mm or less	4 per panel	4 hole positions in panel
Brick Flat Simple Sand Colonial SOLIDO typeM_LAP		182mm or less		
Wood	303mm (1/3 of width of the panel)			
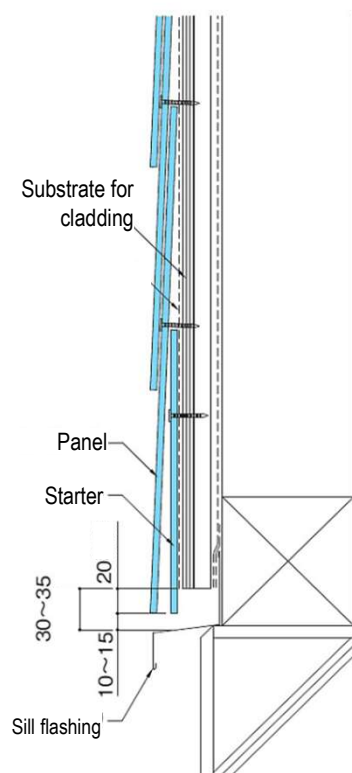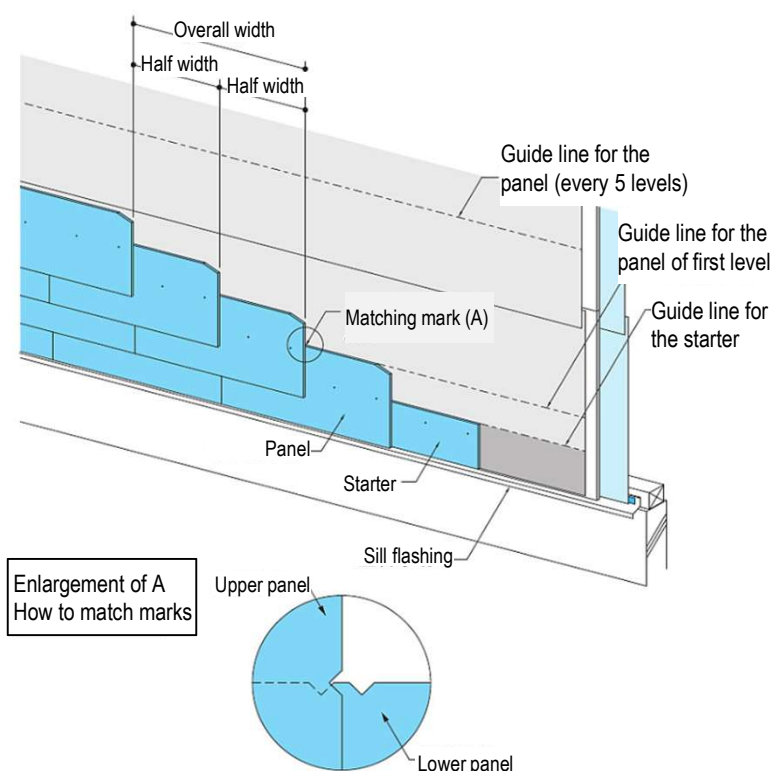
For Brick, Flat, Simple, Sand, Colonial, SOLIDO

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6. Standard Installation Method

Installation of LAP-WALL

<3> Installation of starter and panel

For Wood

Overall width

1/3 width 1/3 width 1/3 width

Guide line for the panel (every 5 levels)

Guide line for the panel of first level

Guide line for the starter

Matching mark (A)

Panel

Starter

Half width

Sill flashing

Substrate for cladding

Non-breathable waterproof paper

Panel

Starter

30〜35 程度

20程度

10〜15

Sill flashing

Enlargement of A
How to match marks

Upper panel

Lower panel

For Hishi, Uroko

Overall width

Half width

Half width

Guide line for the panel (every 5 levels)

Guide line for the panel of first level

Guide line for the starter

Matching mark (A)

Panel

Starter (large)

Starter (small)

Sill flashing

Substrate for cladding

Non-breathable waterproof paper

Panel

Starter (large)

Starter (small)

30〜35 程度

20程度

10〜15

Sill flashing

Enlargement of A
How to match marks

Upper panel

Lower panel

18

6. Standard Installation Method

Installation of LAP-WALL

<4> Installation of horizontal edge

- Panels at the end of horizontal direction, such as outside/inside corners and opening sides, should be cut and installed with the dimension to the horizontal edge.
- Before installation, please consider and lay out the panels to avoid small width panels as much as possible.
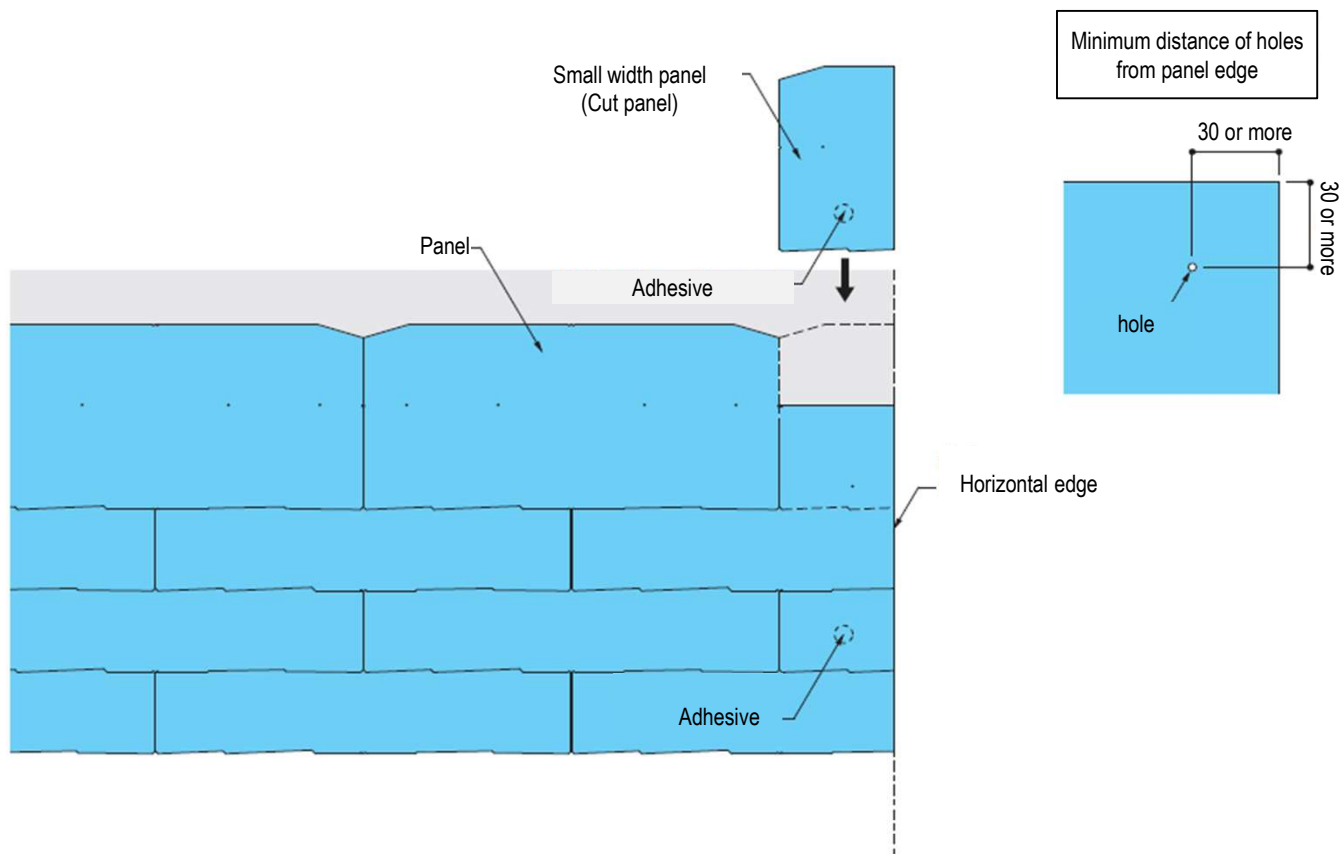- In case the existing holes cannot be used by cutting panel, drill holes (approx. φ4mm) at a position where it does not hit the drainage part of the metal trim and fasten the panel.
- The drilling positions should be at least 30mm away from the edge of the panel.

※ In the following cases, fasten with screws and adhesive.
  ①Top panels
  ②Panels with only one screw.
  ③Panels that may fall or scatter.

Small width panel
(Cut panel)

Panel

Adhesive

Minimum distance of holes
from panel edge

30 or more

30 or more

hole

Horizontal edge

Adhesive
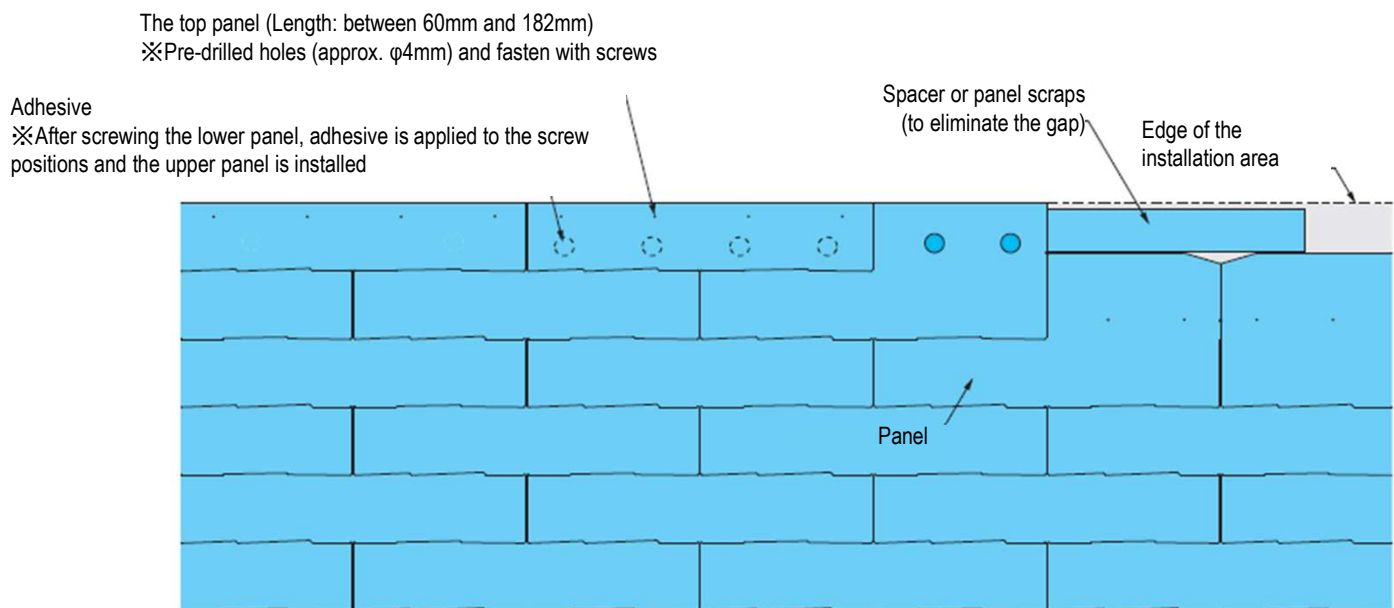
19

6. Standard Installation Method

Installation of LAP-WALL
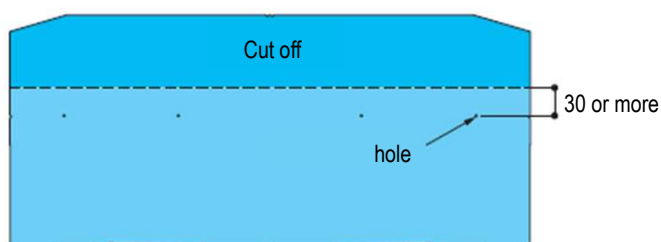
<5> Installation of top edge

- Panels at the top edge, such as under eaves, should be completely installed to the edge.
- For panels that beyond the edge of the installation area, cut off the top of the panel to match the edge of the installation area.
- If there is a gap between the panel cut at the top edge and the lower panel, install the panel scraps as a spacer to eliminate the gap.
- The top panels should be installed so that length is between 60mm and 182mm.
- The top panels should be fastened by drilling at least 3 pre-drilled holes (approx. φ4mm) per panel and using adhesive together. If necessary, apply repair paint to screw heads.

※ In the following cases, fasten with screws and adhesive.
    ①Top panels
    ②Panels with only one screw.
    ③Panels that may fall or scatter.

The top panel (Length: between 60mm and 182mm)
※Pre-drilled holes (approx. φ4mm) and fasten with screws

Adhesive
※After screwing the lower panel, adhesive is applied to the screw positions and the upper panel is installed

Spacer or panel scraps
(to eliminate the gap)

Edge of the installation area

Panel

Exsample of cut at the top of panel

Cut off

hole

30 or more

Minimum distance of holes from panel edge

30 or more

30 or more

hole
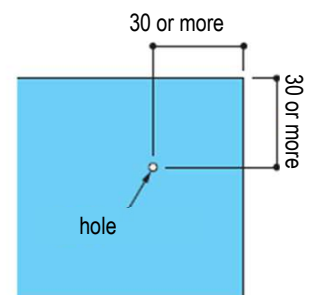
6. Standard Installation Method

Installation of LAP-WALL

<5> Installation of top edge (for Hishi, Uroko)

- Panels at the top edge, such as under eaves, should be completely installed to the edge.
- For panels that beyond the edge of the installation area, cut off the top of the panel to match the edge of the installation area.
- If there is a gap between the panel cut at the top edge and the lower panel, install the panel scraps as a spacer to eliminate the gap.
- The top panels should be installed so that length is between 60mm and 152mm.
- The top panels should a cut panel or starter.
- When using a starter, drill at least 3 pre-drilled holes (approx. φ4mm) per panel and using adhesive together.
- When using a cut panel, drill at least 3 pre-drilled holes (approx. φ4mm) for each small piece and using adhesive together.
- If necessary, apply repair paint to screw heads.
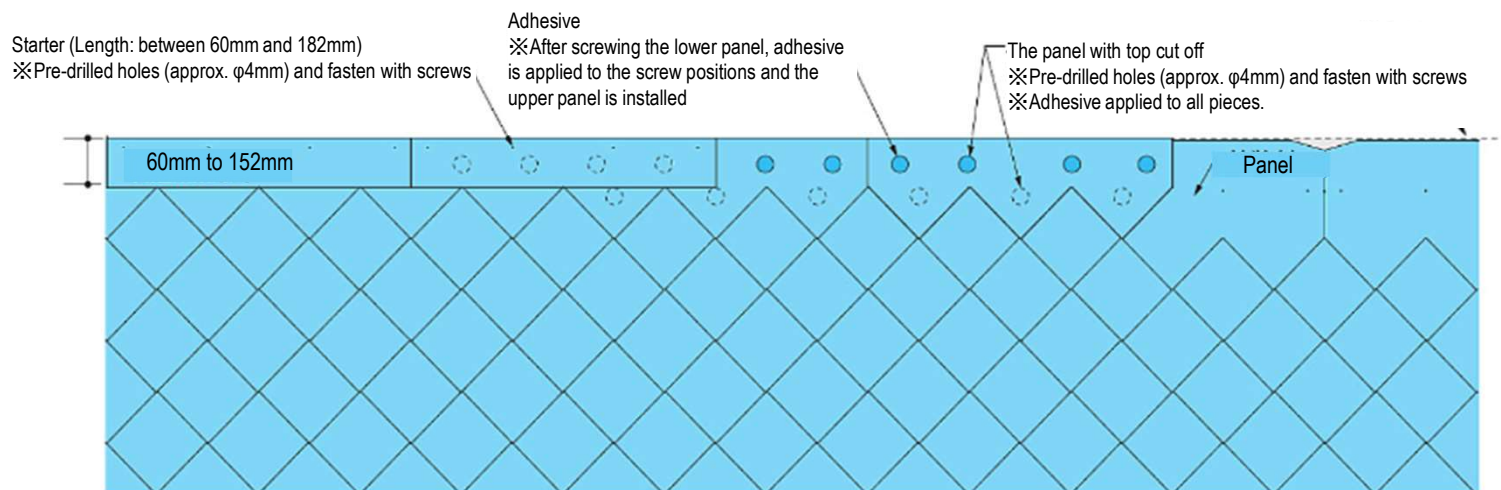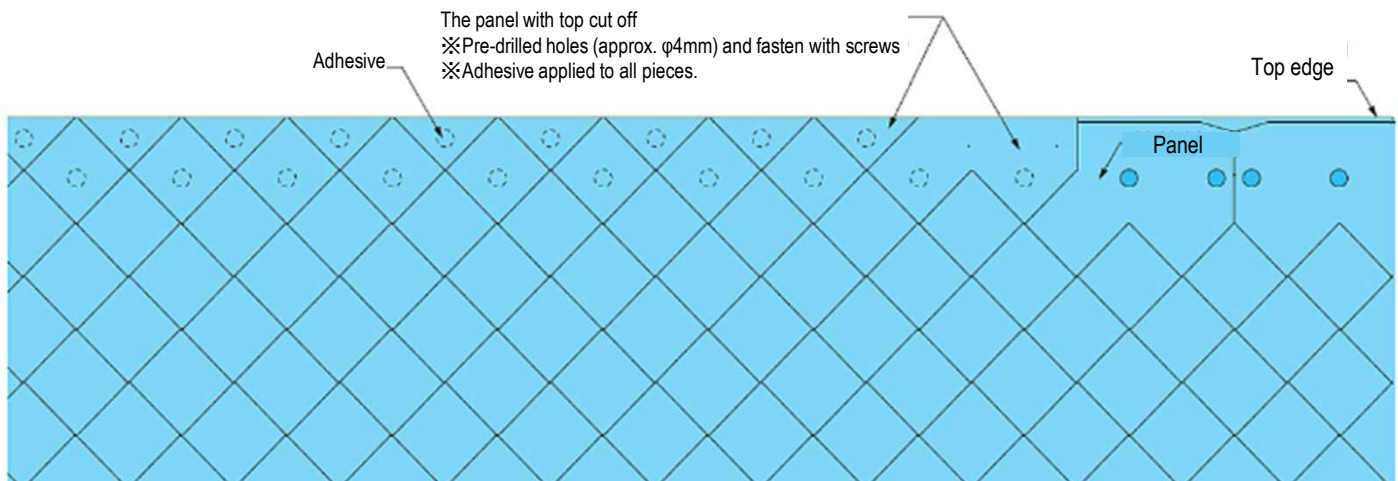
※ In the following cases, fasten with screws and adhesive.
　①Top panels
　②Panels with top cut off.
　③Panels with cut vertically.
　④Panels that may fall or scatter.

If the top panel is the starter

Starter (Length: between 60mm and 182mm)
※Pre-drilled holes (approx. φ4mm) and fasten with screws

Adhesive
※After screwing the lower panel, adhesive is applied to the screw positions and the upper panel is installed

The panel with top cut off
※Pre-drilled holes (approx. φ4mm) and fasten with screws
※Adhesive applied to all pieces.

60mm to 152mm

Panel

If the top panel is the cut panel

Adhesive

The panel with top cut off
※Pre-drilled holes (approx. φ4mm) and fasten with screws
※Adhesive applied to all pieces.

Top edge

Panel

6. Standard Installation Method
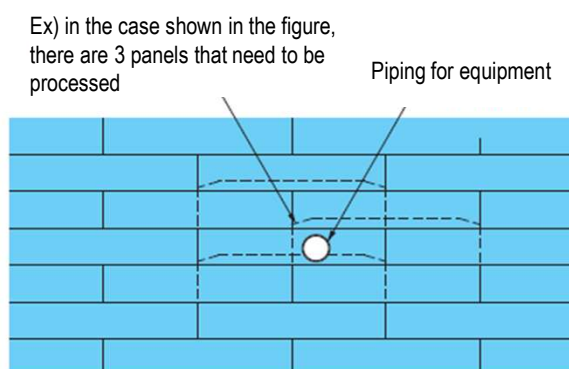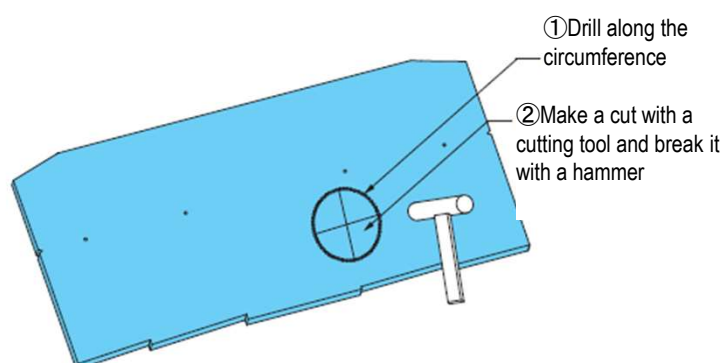
Processing of panels

<1> Cutting of panels

● For cutting the panels, It is recommended that using a cutting tool with a diamond blade for concrete with a vacuum attachment.

　※If necessary, apply repair paint to the cut surfaces of the panel.

● If the width of the panel is less than 100mm, such as in L-shaped cut, cut and separate the panels, apply sealant along the cut surface of the panel, and install them butted together.

Panel

Sealant

100 or less

If the width is less than 100mm, separate the panels, apply sealant along the cut surface of the panel, and install them butted together.

Sealant

If the width is less than 100mm, separate the panels, apply sealant along the cut surface of the panel

Sealant

butt the panels together
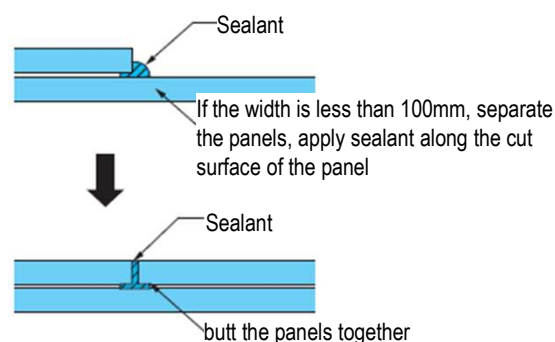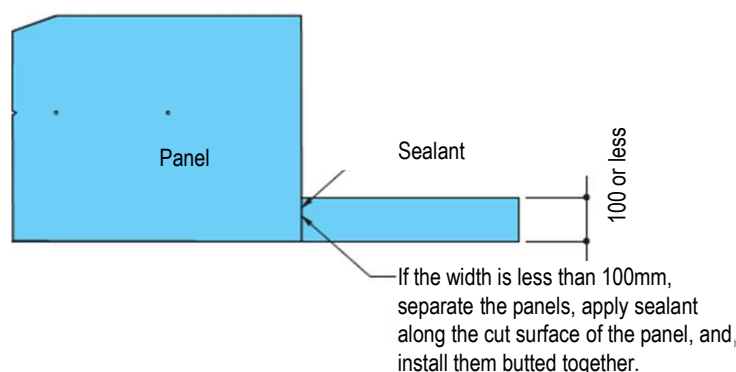
<2> Precautions for drilling process

● To drill a circular hole in the panel, drill along the circumference, then make a cut in the center of the circle with a cutting tool and break it with a hammer or similar tool.

　※　Since the panels are installed in layers, two to three panels need to be processed for each opening.

①Drill along the circumference

②Make a cut with a cutting tool and break it with a hammer

Ex) in the case shown in the figure, there are 3 panels that need to be processed

Piping for equipment
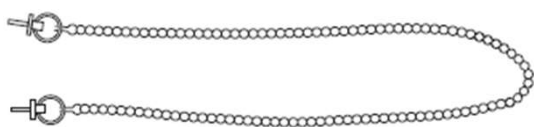
6. Standard Installation Method

How to use the installation support tool

<1> Installation support pin for LAP-WALL

①Applicable products

- All products of LAP-WALL

Installation support pin for LAP-WALL

②How to use

- Installation support pin for LAP-WALL is a tool used to assist in panel installation.
- By inserting pins into the screw holes in the panel, it can be temporarily placed on the top edge of the lower panel.

(1) Insert of pins

- Insert pins into the screw holes in the panel and temporarily place them on the top edge of the lower panels.
  [Pin insertion holes: 2 holes at both ends of panel]
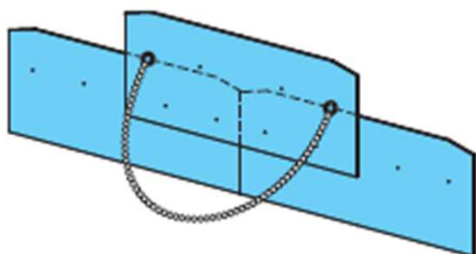
(2) Fastening of panels

- Determine the position of the panel to be fixed, and fasten with screws through the holes where the pins are not inserted.
- Once the panel is secured and positioned, remove the pin and fasten with screws in the remaining holes.