



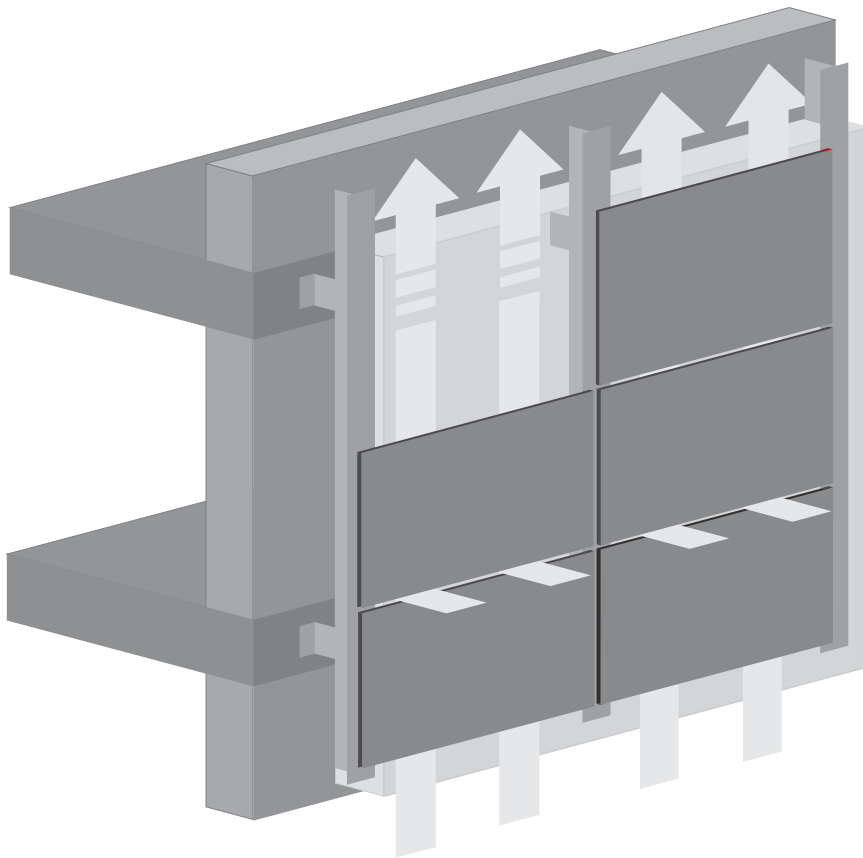
DESIGN +
INSTALLATION
MANUAL

SWISSPEARL®

PREMIUM
SWISS QUALITY
FAÇADE SYSTEMS
FOR HIGH-END
ARCHITECTURE

DESIGN +
INSTALLATION
MANUAL

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All SWISSPEARL panels and systems are specially designed for the rain screen principle associated with the permanent ventilation. The panels deflect most of the rain and the ventilated cavity carries away any moisture. The effectiveness of the system depends on a clear minimum cavity of 25 mm (depending on height of building) and on ventilation openings provided at the base and top of the cladding area, windows, etc. The long-time proven superior quality of the SWISSPEARL ventilated façade systems rests on its most advanced façade "know-how" and system competence for fibre reinforced cement panels.

Advantages

- The most reliable system from the viewpoint of building physics with guaranteed performance.
- Specially designed system for rain screen cladding application. Fully tested for timber and metal sub-frames.
- Rear ventilation system reduces humidity.
- Air circulation optimizes the efficiency of insulation.
- Suitable for new buildings and refurbishment of every type and size.
- Increased life expectancy of building substance.
- Improved sound proofing.
- Nearly no maintenance.
- Never any plaster, paint and sealant problem.
- Building tolerances can be readily accommodated.

SWISSPEARL main advantages

- Long time proven superior SWISSPEARL quality
- Most advanced know how and system competence
- 10 year guarantee, very long life expectancy
- Unique textures and surface aspects
- Almost maintenance free
- No efflorescence



No thermal bridges



Heat of rooms is kept in wall structure



Condensation is carried away



In summer, part of the heat is evacuated by circulating air



Moisture evacuated by thermal action



Air layer + insulation reduce difference in temperatures

www

For further information such as product data sheets, etc. please refer to website www.swisspearl.com.

External wall design

Architect / consultant / contractor are to assume responsibility for the correct design and execution of the external wall and its cladding - including all thermal, water, vapour and wind insulation layers – all in accordance with good building practice.

Façade engineering

Numbers and spacing of fastening points as set out in this Manual correspond to (international) European codes.

Whenever higher standards are applicable - architect/consultant/contractor have to ensure that all required adaptations shall be made in order to achieve compliance with local standards and regulations.

Structural engineer/contractor shall assume overall responsibility for the façade engineering, including:

- Choice of material and type of sub-framing.
- Determine sizes of all structural members to sub-frame.
- Determine all fastening details to sub-framing and panels.

SWISSPEARL rivets

Use aluminium rivets for aluminium sub-framing. Use stainless steel rivets for steel sub-framing. Maritime environment (i. e. distance to ocean less than 1 km) or other aggressive environment calls for the use of stainless steel rivets. Stainless steel rivets may be used on steel or aluminium sub-framing.

Interior applications

SWISSPEARL panels are suitable for interior applications for walls and ceilings, but with the following exclusions:

- High traffic areas subjecting the panel surface to wear and tear.
- Areas where frequent cleaning has to occur such as in toilets, etc.
- Not suitable for flooring, nor as fireplace surroundings.
- Not suitable as kitchen top, nor as sills for window or doors.

General information, programme

Useable panel sizes

SWISSPEARL fibre cement panels must have all 4 sides trimmed off. The use of panels with untrimmed edges is not allowed.

Panel sizes

Available panel width (920 mm) depends on colour platform and shade. Please contact your local authorized distributor.

Metric system

All dimensions in these guidelines are specified according to metric system with indicative Imperial values. Orders are to place and will be confirmed and processed in metric sizes only.

Available sizes for SWISSPEARL panels

Thickness	Net panel size
8, 12 mm 5/16", 15/32"	* 3040 × 1220 mm 119 11/16" × 48 1/32"
	2500 × 1220 mm 98 7/16" × 48 1/32"

Following panels may also be supplied in width 920 mm depending on colour platform and shade. Please contact local SWISSPEARL distributor to check availability in required colour

8 mm only 5/16" only	* 3040 × ** 920 mm 119 11/16" × 36 7/32"
	2500 × ** 920 mm 98 7/16" × 36 7/32"

* 3048 mm / 120.00" if fabricated at factory

** Avoid to mix the two widths. Base sheets in width 1220 and 920 mm are manufactured as different production batches so that the shade may deviate.

SWISSPEARL Technical data	Test results according to EN standards	ATI test results
Density	1.9 g / cm ³	1.9 g / cm ³
Compressive strength	120 MPa	Indicative value
Modulus of elasticity (MOE)	16'000 MPa	18'000 MPa
Modulus of rupture (MOR)	Panel crosswise	30 MPa
	Panel lengthwise	21 MPa
	Panel average	25 MPa
Shrinkage (10 years final)	1.8 mm / m panel	1.8 mm / m panel
Thermal expansion coefficient	0.01 mm/m/°K	0.01 mm/m/°K
Frost resistance cycles	passed 1'000 cycles	
Frost resistance MOR average	25 MPa	20 MPa
Fire performance	A2-s1, d0, non-inflammable	NFPA Class A, does not ignite
	EN 13501-1 non-combustible	ULC-S134 non-combustible
Weight of 8 mm panel	16 kg/m ²	35.2 lbs/m ² / 3 lbs/sqft
CE rating	A5 according to EN 12467	
UV resistance (ΔE value)	0.5 – 2 depending on colour finishing technology	0.5 – 2 depending on colour finishing technology

Design and installation

Impregnation of cut edges

On the production line after trimming/cutting - all panel edges receive impregnation, i. e. panels leave the factory sealed on all 6 faces.

If panels are cut on site, each cut has to be treated by impregnation liquid LUKO whereas the liquid is painted on by hand applicator.

Cutting panels - optimising yield

Based upon list of panels an optimising computer programme is run in order to minimise cut off waste. The programme defines the number of full panels required and counts the length of cutting needed for the job.

Project specific ordering

The characteristics of the raw materials determine properties and appearance of SWISSPEARL panels. Subtle visual differences may occur between production batches. Orders should make allowance for this by itemising quantities accordingly, so that panels for adjacent surfaces on the same job can be supplied from identical production batches.

SWISSPEARL Product guarantee

SWISSPEARL products are covered by a 10 year functional guarantee, provided project was coached by the local authorized SWISSPEARL distributor or the manufacturer and installed by a SWISSPEARL trained contractor.

For details of conditions please refer to "warranty letter" (page 28).

Cladding contractor

SWISSPEARL façades shall be installed by SWISSPEARL trained contractors.

Execution details

Detail drawings showing sub-frame scheme, panel dimensions, distances to panel edges, ventilation openings at top, bottom and windows, building corners, etc. shall be submitted for checking prior to ordering material.

Scope of application – sub-frame

SWISSPEARL panels have been designed for installation on timber, timber/metal or metal sub-frame systems. Architect, consultant, contractor to choose appropriate system in accordance with local building standards / regulations.

Sub-framing - general remarks

Engineering metal sub-frames: material expansion and retraction due to temperature change must be duly allowed for with regard to sub-frame fastening details. Leave a free gap at support interruptions, which must coincide with the panel joints, i. e. such interruption may not be located mid panel. Building tolerances are to be taken up by shimming, so that all panel support profiles are in one plane. Allowable deflection ratio is 1/300 between panel supports and applies for the whole façade area. Sub-framing members in timber must be protected from rain water by EPDM strips covering the whole batten surface.

Seismic loads

Local standards / regulations to be considered.

Penetrations through panel

Where water pipes or other installations lead through the panel – leave 5 mm of free space all around between panel and installation - so as not to constraint panel movement. No need to seal such gaps.

Suspended ceilings, soffits

For the installation of panels as ceilings and soffits the same installation details apply as for cladding panels to metal sub-frame or timber battens.

Distances between fasteners are max. 500 mm in both directions.

However, if wind load tables call for smaller distances - these apply.

Signage, light fittings, etc.

Provide attachment points behind the panel as required. At the fastening points leave 5 mm free space between panel and fasteners. Do not attach temporary signs, etc. to the façade, as they could leave marks on the panel surface.

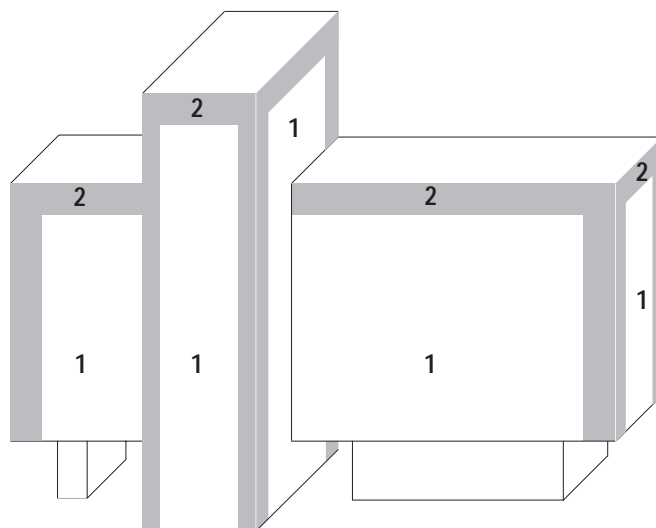
Bending SWISSPEARL panels

Panels can be bent on building site, whereas the panel size and the fastening distances are determining factors regarding minimal bending radii.

Approximately

min. $r = 16$ m panel bent lengthwise
min. $r = 20$ m panel bent crosswise

- 1 Normal wind load area
- 2 Fringe wind load area



Wind load fringe area = according to local standards

Wind load zones

As per scheme there are two wind load zones: The normal wind load area for the most part of cladding and the fringe wind load area at the top and the corners of the building. The applicable wind load values for each project must be determined by the engineer and recorded in writing for future reference.

Design and installation

Ventilation cavity

Building tolerances must be allowed for. The cavity may not be reduced by horizontal profiles or any stray objects such as loose wind proofing layers, etc.

Cladding height	min. cavity
up to 6 m	20 mm
6 - 25 m	30 mm
25 - 50 m	40 mm
50 - 75 m	50 mm
75 - 100 m	75 mm
more than 100 m	100 mm

Air intake and exit openings

They must have a clear cross section of at least half the cross section of the ventilation cavity. Reductions, e. g. by insect screens, must be compensated.

Thermal insulation

The insulation layers must be stable and well fastened so that they can not detach themselves and obstruct the ventilation in the cavity.

Building expansion joints

Structural expansion joints must be applied to sub-framing and cladding in the identical position and to the same extent.

Panel joints

To be min. 5 mm wide for vertical joints and min. 6 mm wide for horizontal joints.

The wider any joint, the less noticeable are inaccuracies in width.

Therefore typical joint width 8 mm.

Horizontal joint flashings

Flashings are to be used for timber sub-frames.

Open panel joints

If joints are left open to the weather, increase thickness of cavity (min. 40 mm). The additional exposure to rain water, UV radiation, etc. is to be taken into account.

Surface of material behind panels should be coloured dark, as it is visible through the open joints.

Rain deflection profile

They are recommended especially for higher buildings and windy conditions, and for timber sub-frames. Rain deflection profiles reduce the air flow; i. e. the ventilation gap must be increased accordingly.

Perforated ventilation profiles

The ventilation opening at the bottom of cavity is to be closed off by a perforated screen, to prevent any intrusion by rodents and vermin.

Shrinkage

SWISSPEARL panels, like any other product containing Portland cement, shrink evenly to reach after 10 years a final shrinkage of 1.8 mm per linear meter of panel. Therefore panels should not be butted tightly, thus allowing panel joints to become unnoticeably wider over the years.

Inclined cladding – special coating

If SWISSPEARL panels / the façade are inclined more than 5° from the vertical, a special coating will have to be applied to cater for increased exposure to climate.

This special so called "R"-coating is less translucent than standard coating and results in a different surface aspect.

Panel fastening method

SWISSPEARL warranty only applies if panels are fastened mechanically with the supplied screws and rivets. SWISSPEARL panels may not be fixed by adhesive method.

If panels are fastened by adhesive method (interior application), order special wax free panel rear side (so called ARSB).

System guarantee to be obtained from glue manufacturer.

Concealed fastening method

Concealed fastening with back anchoring systems (SIGMA 8 and 12). For further information, contact authorized distributor.

Scratches on panel surface

During installation handle panels with care to avoid scratches, as they can not be repaired.

Anti graffiti coating

Anti graffiti coating alters the panel appearance by adding gloss to the surface. Such coatings are applied at own risk.

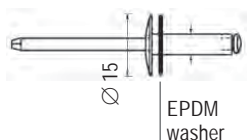
It is therefore recommended to obtain a full system warranty from anti graffiti coating manufacturer.

Silicone, polysulphide and Thiokol sealant may not be used, as they could cause permanent staining to SWISSPEARL panel.

Where the use of sealant is unavoidable, compatibility (incl. primer) with SWISSPEARL panel to be verified; best suitable would be hybrid polymer, polyurethane or acrylic sealant.

System components and accessories

Metal sub-framing



Rivet, mandrel **A3 steel**, body **AlMg3**
head blank or in standard colours

Total grip range Deduct 1 mm
for washer

4,0×18-K15 mm	8 - 13 mm	7 - 12 mm	
4,0×24-K15 mm	13 - 18 mm	12 - 17 mm	
4,0×30-K15 mm	18 - 23 mm	17 - 22 mm	
Rivet, mandrel and body in stainless steel head blank or in standard colours	4,0×18-K15 mm	9 - 13 mm	8 - 12 mm
	4,0×23-K15 mm	14 - 18 mm	13 - 17 mm



Rivet setting device for above SS rivets to
be screwed onto muzzle of GESIPA
ACCUBIRD (not required for Al rivets)



6 mm

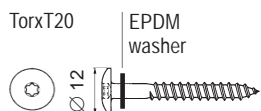
Aluminium, fixed point sleeve
Stainless steel fixed point sleeve

Ø 9.4/4.1×6 mm
Ø 9.4/4.1×6 mm



Bore concenter gauge, ref. 9541-2

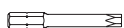
Ø 4.1 mm/drill bit type A for aluminium
Ø 4.1 mm/drill bit type S for steel



Timber sub-framing

T20 saucer-head 12 mm wood screw,
stainless steel, blank or in colours

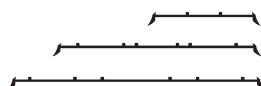
4.8×38 mm (standard)
4.8×44 mm
4.8×60 mm (special item)



Torx bit T20W for T20 screws, see above



Depth stop with T20W bit.
Suitable to any screw driver

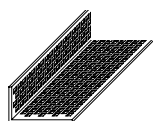


EPDM backing strip, black
for intermediate battens
for panel joints, external and internal
corners, windows

W = 60 mm
W = 120 mm
W = 150 mm

EPDM =
Ethylene
propylene diene
monomer rubber

Accessories for metal and timber sub-framing



Ventilation profile, perforated
aluminium raw, standard colours
2500 mm long, 0.7 mm thick

50×30 mm
70×30 mm
100×40 mm



Horizontal I-flashing, stainless steel,
quality 4.301 for horizontal joints
available blank, standard colours

35×5×0.5 mm
Length 2500, 3040 mm

Horizontal joint flashing with bent rib,
aluminium, powder coated black

40×7×0.5 mm
Length 2500, 3040 mm



Rain deflection profile
hard PVC, grey

Length 2500 mm



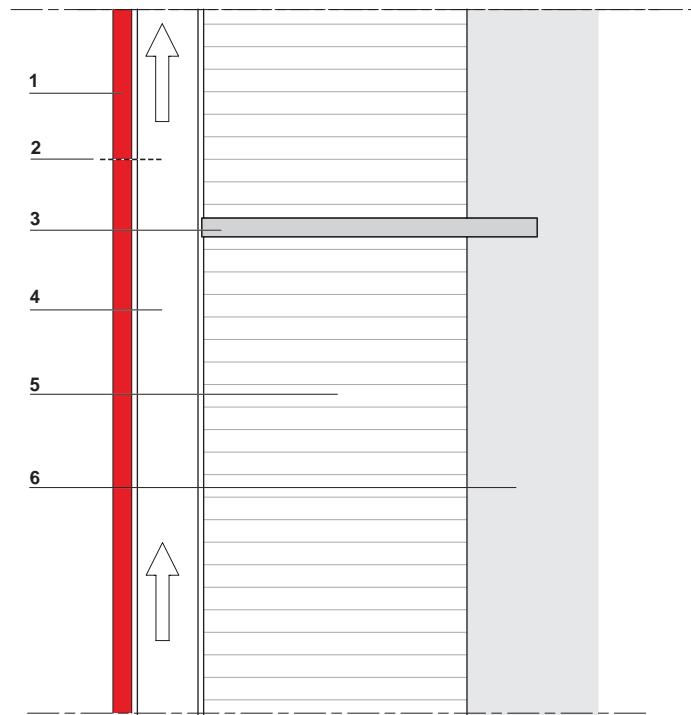
LUKO hand applicator for impregnation
of cut panel edges consisting of reservoir,
replaceable sponge, cap

125 ml

1 fill treats approx.
50 m of 8 mm
panel edge

Definition

- 1 SWISSPEARL panel
- 2 Fastener
- 3 Sub-frame
- 4 Ventilated cavity (void)
- 5 Thermal insulation layer
- 6 External wall



Rain screen cladding Rear ventilated façade

The design principle involves deflection of almost all rain water, but allows minimal penetration through the panel joints into an inner zone (ventilated cavity), where drainage and evaporation can occur.

The inner wall surface towards the ventilated cavity should be of non water absorbing or water repellent characteristics.

The external wall system does not call for any water nor vapour proofing layers minimising thus risk of condensation in both directions (out and inwards).

1 Cladding

Weather shield with open, backed, articulated or lapped joints. Crucial for the appearance and aesthetical impact of the building.

2 Panel fasteners

Rivets to metal sub-frames
Screws to timber battens

3 Sub-framing

Consists of vertical panel support profiles and their attachments to the building structure. The sub-frame consists of metal profiles, timber battens or a combination thereof.

4 Ventilated cavity

Air space behind the cladding with openings at bottom and top. The void is ventilated naturally with ambient air, evacuating accumulated heat and humidity.

5 Thermal insulation layer

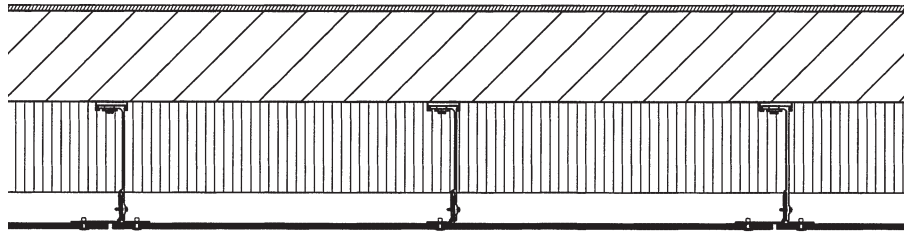
Mineral, glass wool, PU or extruded polystyrene covered by wind proofing layer, depending on building code, standards and good practice.

6 External wall

Made out of bricks, blocks, concrete, timber frame or planked metal studs.

External wall construction

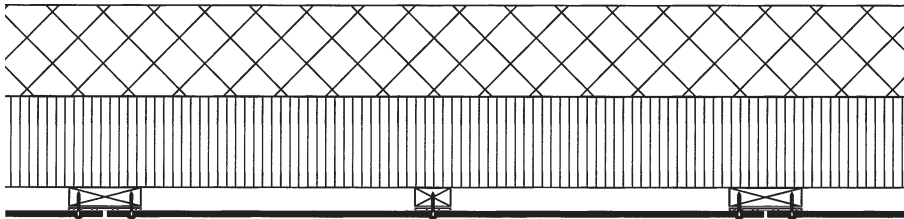
Brick wall / Cement Masonry Unit



Sub-frame system – Vertical T profiles and angles attached to wall brackets

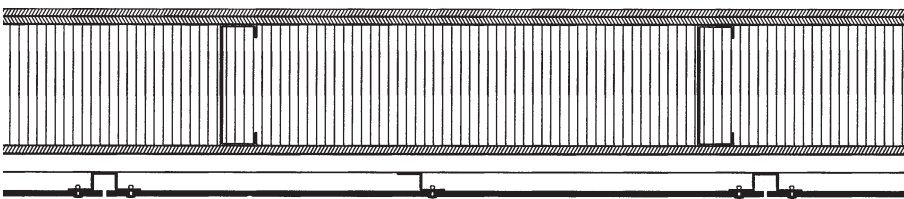
In the case of load bearing external walls (made of concrete / bricks / blocks) the sub-frame can be attached wherever required by the panel pattern layout.

Concrete wall



Vertical timber battens fastened to horizontal metal angles or with spacer screws

Studs/Drywall construction [common in USA]



Self made sub-frame – Vertical Z and hat profiles on horizontal Z or flat stock bars

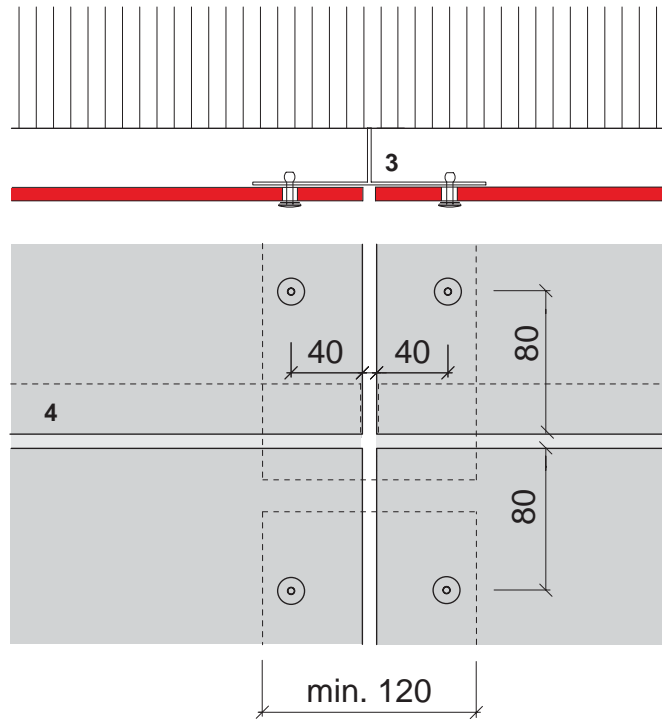
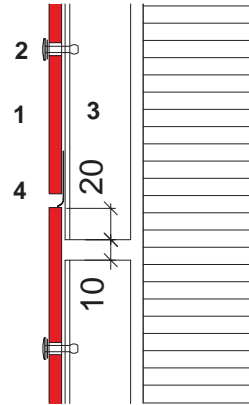
In the case of an external wall supported by studs, a horizontal structural member must be attached to the studs in order to allow the attachment of the vertical panel support system wherever needed by the panel pattern layout.

This horizontal member, designed by the engineer, can be a profiled section such as a zed (same thickness as thermal insulation layer) or hat profile or a flat stock bar where space is short.

Metal sub-framing

- 1 SWISSPEARL panel
- 2 Rivet
- 3 Panel support profile
- 4 L-flashing

L-flashing is kept in position without fasteners



Sub-frame engineering

Engineer/contractor are responsible for the design and installation of all sub-framing parts including all pertaining fasteners.

Vertical panel support profiles

Aluminium profiles should be interrupted every 3 m (approximately) for installation from floor to floor. Steel profiles to be interrupted every 6 m.

The interruptions of the profiles must coincide with the panel joints as per diagram above.

Sub-frame profiles gauge

Refer to SWISSPEAL rivet data sheets regarding technical values of aluminium and stainless steel rivets on different sub-frame profile gauges.

Horizontal joint flashings

Optional.



Rivets

Stainless steel or aluminium saucer head rivet, with blank or powder coated head.

Standard type 4.0 × 18 mm, head Ø 15 mm.

Longer rivets (24, 30 mm) for lapped claddings and for the use of decor caps.

Drill holes to panels

All holes for rivets to be Ø 9.5 mm

Min. distance to panel edge

Horizontally: 40 mm

Vertically: 80 mm

Max. distance to panel edge

100 mm

Rivet installation

Use GESIPA ACCUBIRD rivet gun or similar. For stainless steel rivets use SWISSPEARL rivet setting device.

Fixed / slipping panel fastening points

Each panel must be fastened by 2 fixed fastening points. All the others are slipping points.

The 2 fixed points may not be located on the same panel support profile.

Metal sub-framing

Wind load [kNm ²] - Wind velocity [km/h] Building height up to [m]		0.9 kNm ² - 138 km/h 15 25 50			1.1 kNm ² - 152 km/h 15 25 50			1.3 kNm ² - 165 km/h 15 25 50		
Landscape type										
City	normal area	725	725	600	710	650	530	650	600	480
	fringe area	650	600	530	650	570	480	600	570	430
Small town, plain	normal area	725	725	600	650	570	530	570	530	470
	fringe area	650	600	530	570	530	480	530	490	420
Large open plain	normal area	620	590	540	570	530	490	530	490	440
	fringe area	580	540	500	530	490	450	490	450	410
Coast line	normal area	570	530	500	530	480	460	490	460	420
	fringe area	530	500	470	490	460	420	440	420	380

Reference values for max. spacing distance "d" between fasteners

One plane

All faces of panel support profiles to lay in the same plane. Profiles to be shimmed or adjusted as required.

Concenter bore gauge

SWISSPEARL concenter bore gauge Ref. 9541-2 to drill holes into sub-frame profiles. Use drill bit type A for aluminium profiles and type S for steel profiles.

Vertical panel joints

Typical joint width is 8 mm, min. joint width = 5 mm.

The vertical panel support profiles close off the panel joints and make them almost watertight. Do not seal any joints.

Horizontal panel joints

Typical joint width is 8 mm, min. joint width = 6 mm.

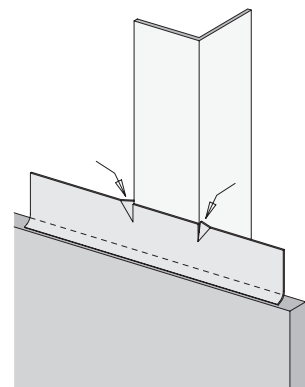
Horizontal joint flashings can be used to prevent water from penetrating into ventilation cavity. Cut flashing 2 mm shorter than panel, so as to avoid the flashing showing in the vertical joints. Where flashing need to be joined together, butt the ends within a vertical profile to have both ends supported.

Additional material layer

Where it is necessary to fasten additional material, namely perforated angles, it is imperative to use fasteners that add no extra bulk, such as countersunk rivets or screws.

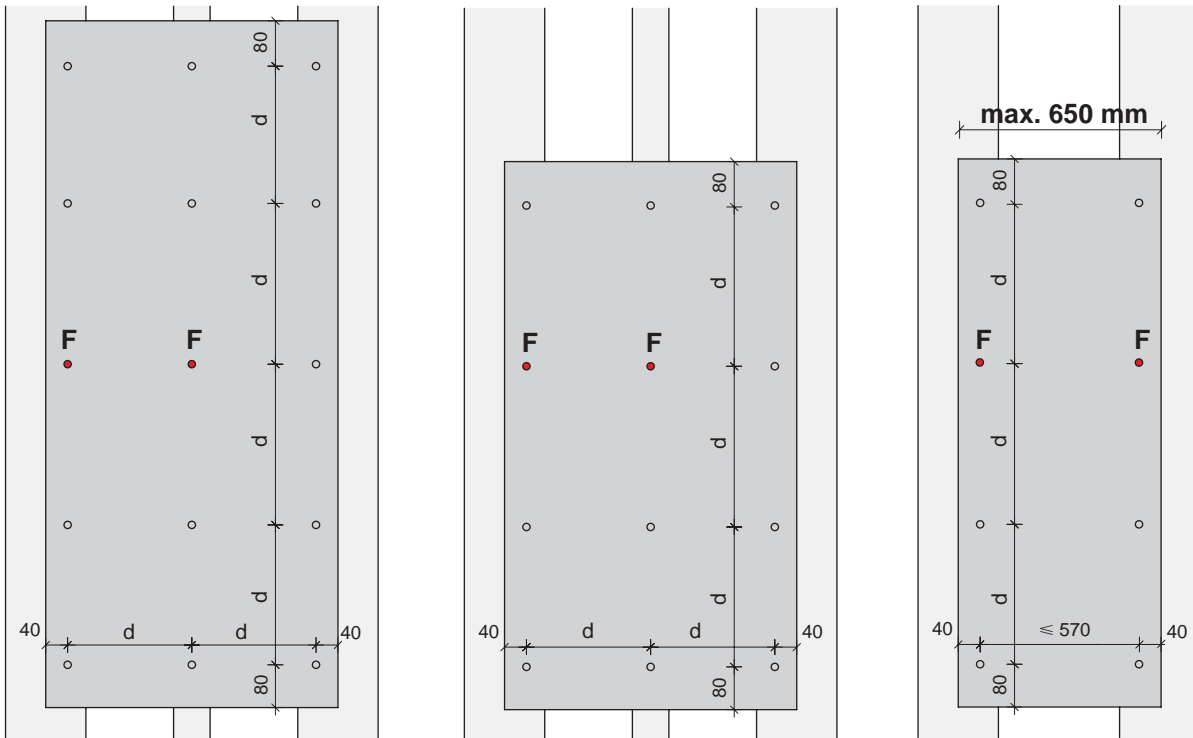
Fixing without strain

To ensure the restraint free fixing of the panels it is imperative to use the concenter gauge to drill the holes for the rivets into the sub-frame.



The lateral dislocation of the joint flashing must be prevented by cutting and bending the upper edge at both sides of one vertical profile per flashing.

Interruptions (joints) to panel support profiles must coincide with the panel joints. They may not be in the middle of a panel.

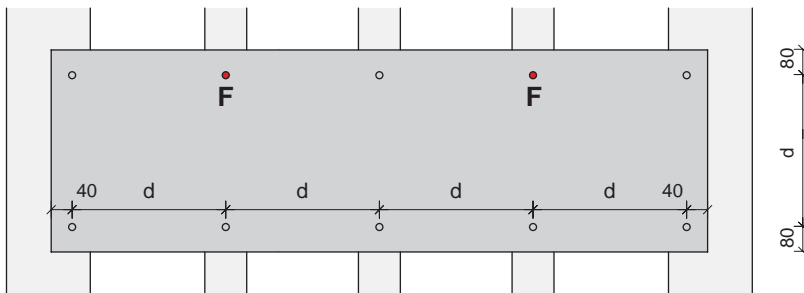
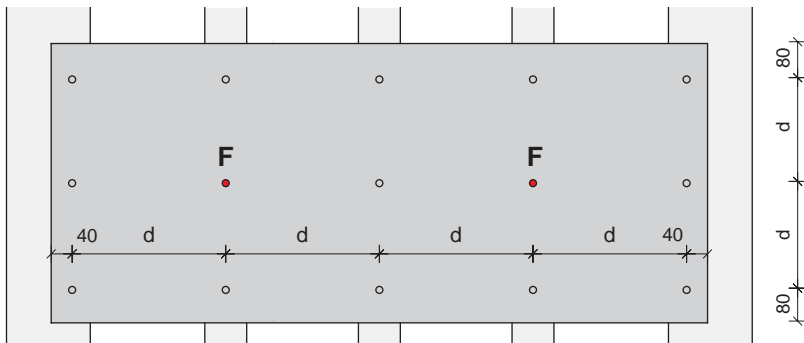


Reference values for max. spacing distance "d" between fasteners

Single span panel

(no intermediate support)

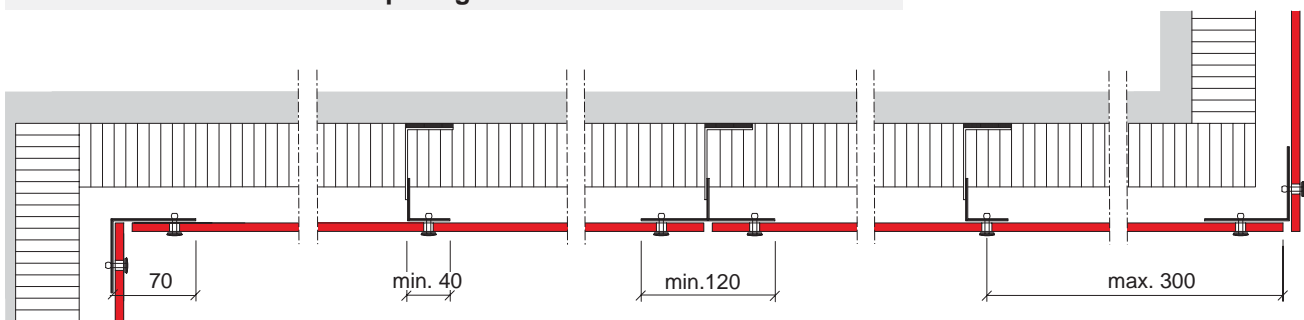
If more than 5 single span panels are adjoining each other - the chain of fixed points must be interrupted by a different configuration of the 2 fixed points. Consult with technical advisor.



Reference values for max. spacing distance "d" between fasteners

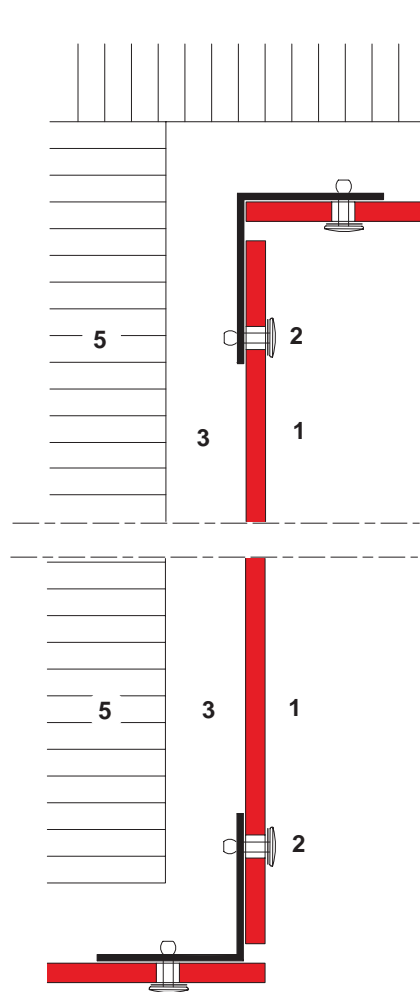
Hat channels

Since hat channels (both legs attached) are very rigid, the fixed points must be close together, i. e. on adjacent 2 profiles.

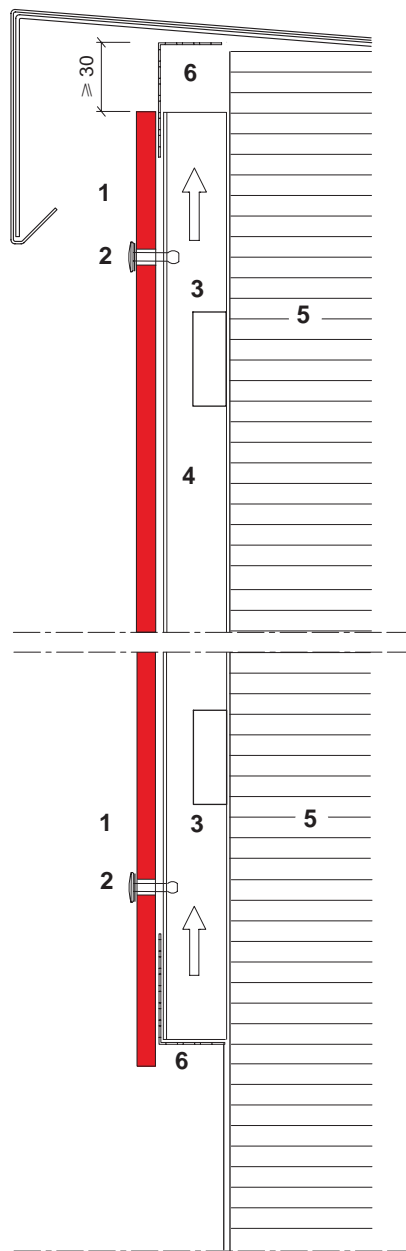


Details metal sub-framing

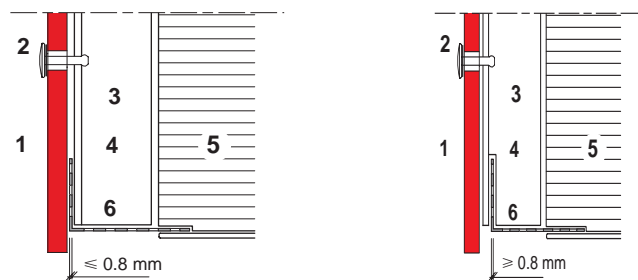
Corners



Termination top and bottom

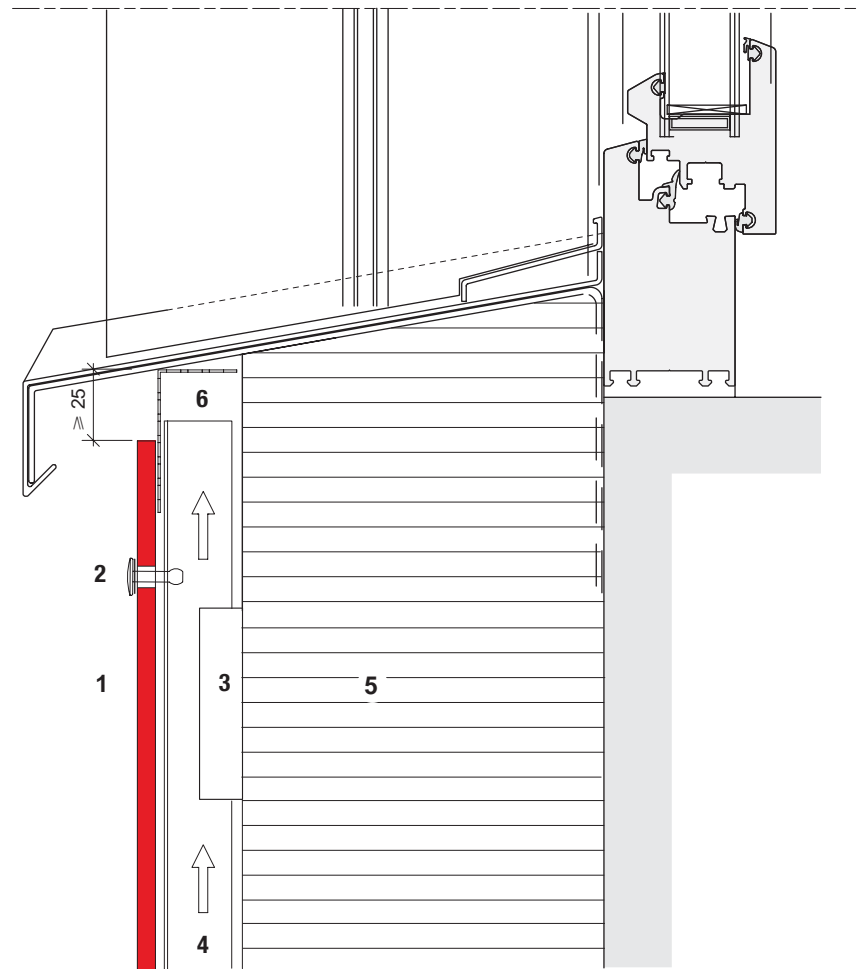
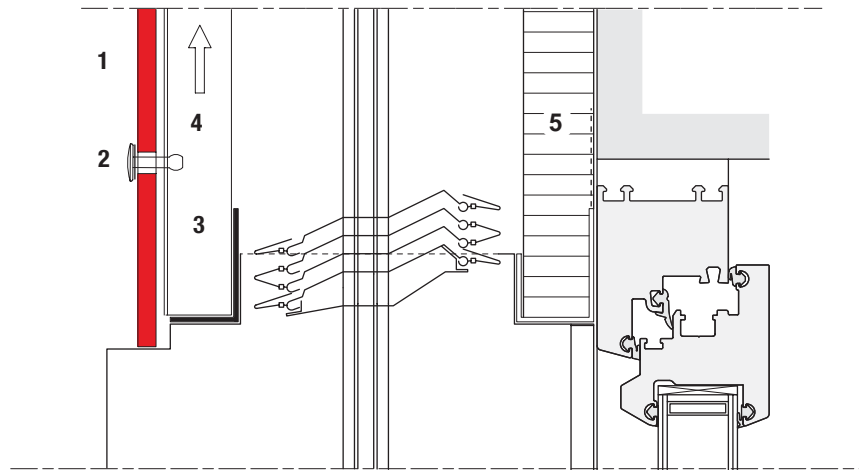
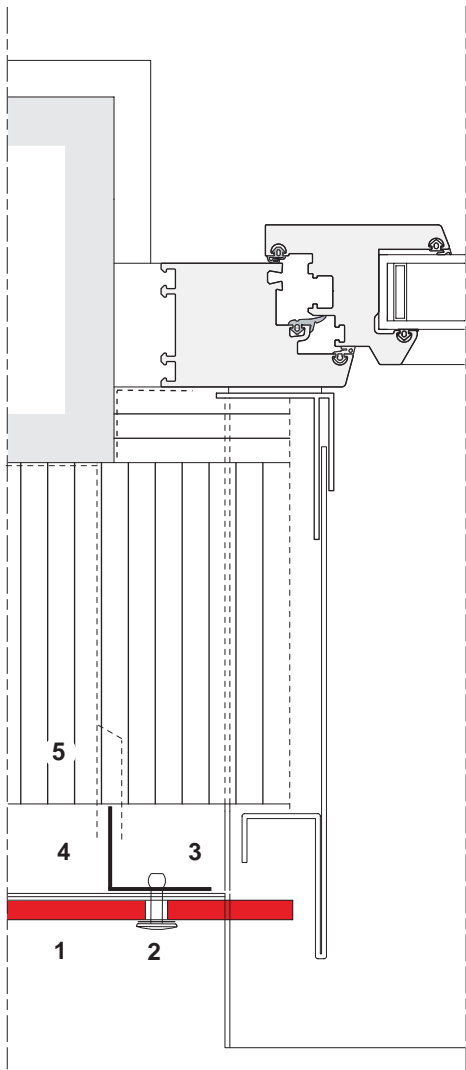


- 1 SWISSPEARL panel
- 2 Rivet
- 3 Sub-framing
- 4 Ventilated cavity (void)
- 5 Thermal insulation
- 6 Ventilation profile



Sub-frame to be notched out if ventilation profile thicker than 0.8 mm

Windows



- 1 SWISSPEARL panel
- 2 Rivet
- 3 Sub-framing
- 4 Ventilated cavity (void)
- 5 Thermal insulation
- 6 Ventilation profile

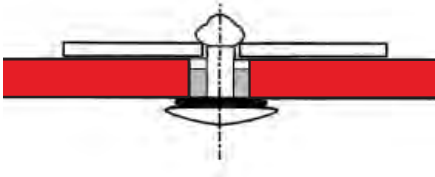


Hole diametres
 All holes to panels for both fixed and slipping points to be of diameter **9.5 mm**
 All holes to sub-framing for fastening the panels to be of diameter **4.1 mm**

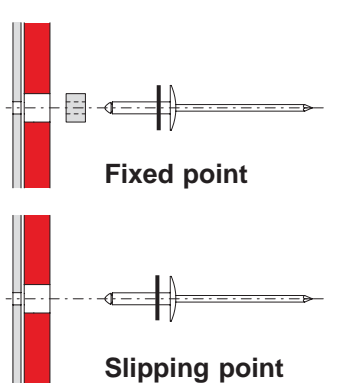
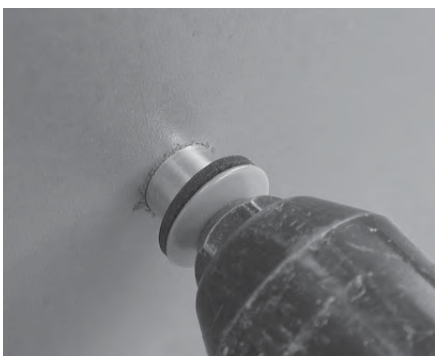
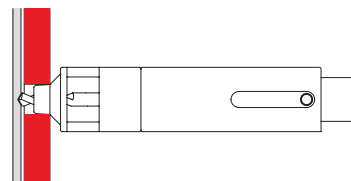
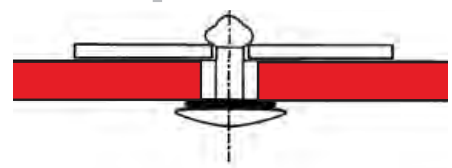
Fixed points
 Always 2 fixed points per panel, both fixed points may not be **on the same support profile!**

Stainless steel rivets
 Use rivet setting device to install stainless steel rivets.

Fixed point



Slipping point



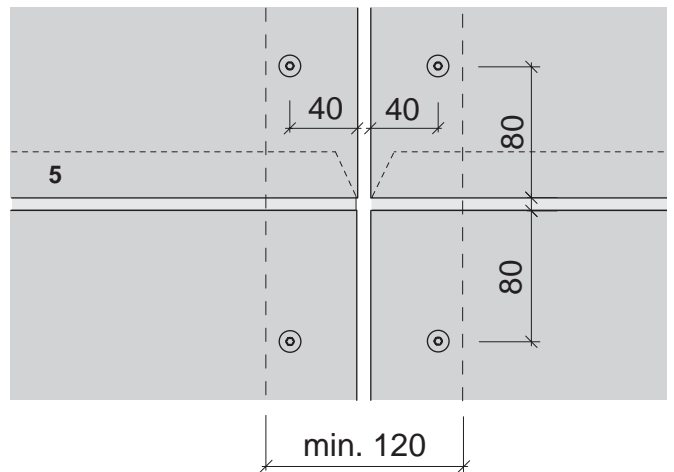
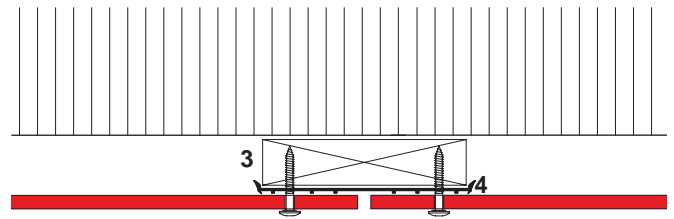
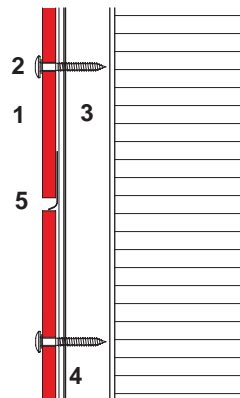
Rivet and fixed point sleeve

Rivet to slipping point

Timber sub-framing

- 1 SWISSPEARL panel
- 2 Screw
- 3 Timber batten
- 4 EPDM backing strip
- 5 L-Flashing

L-flashing is kept in position without fasteners



Sub-frame engineering

Engineer / contractor are responsible for the design and installation of all sub-framing parts including all pertaining fasteners.

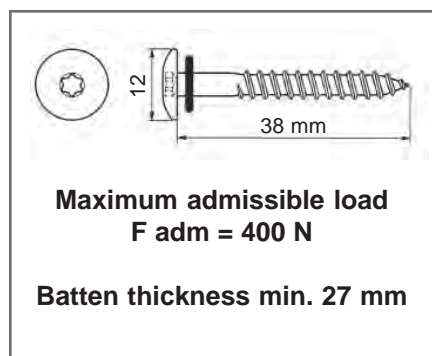
Timber battens

Straight grown pine, dry (max. 16 % moisture content).

Vertical batten sizes

Battens to joints min. 27 × 120 mm (thickness gauged).

Intermediate battens min. 27 × 60 mm (thickness gauged).



Screws

Stainless steel saucer head screw, with blank or powder coated head Standard type 4.8 x 38 mm, head Ø 12 mm, drive T20.

Fixing without strain

Use any power screw driver.
Use SWISSPEARL depth stop with correct setting, so that the panel do not dip at the fasteners.
Use SWISSPEARL driver bit T20W as not to scratch the paint.

Drill holes to panels

All holes for screws to be Ø 5.5 mm

Min. distance to panel edge

Horizontally: 40 mm
Vertically: 80 mm

Max. distance to panel edge

100 mm

All screws must be set perpendicularly to the surface of the SWISSPEARL panels, so that the heads rest flat on the panel face.

Timber sub-framing

Wind load [kN/m ²] - Wind velocity [km/h]		0.9 kN/m ² - 138 km/h			1.1 kN/m ² - 152 km/h			1.3 kN/m ² - 165 km/h		
Building height up to [m]		8	15	25	8	15	25	8	15	25
Landscape type										
City	normal area	725	650	600	650	600	570	600	570	530
	fringe area	650	600	570	600	570	530	570	530	510
Small town, plain	normal area	725	650	600	600	570	530	570	530	500
	fringe area	650	600	570	570	530	510	530	500	480
Large open plain	normal area	650	600	570	600	530	510	530	510	460
	fringe area	600	570	530	530	510	480	510	460	430
Coast line	normal area	600	570	530	550	510	460	460	430	410
	fringe area	570	530	480	510	460	430	430	410	380

Reference values for max. spacing distance "d" between fasteners

One plane

All faces of panel support battens to lay in the same plane. Battens to be shimmed as required.

Vertical panel joints

Typical joint width is 8 mm, min.
joint width = 5 mm.

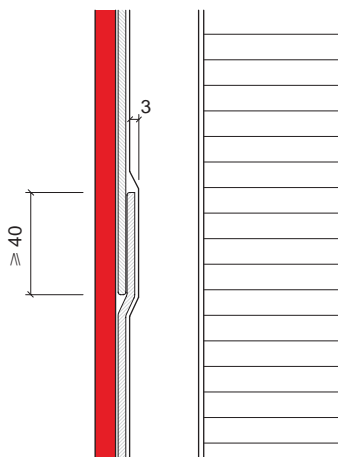
All battens at vertical joints and all intermediate battens must be fully covered by EPDM backing strips provided by SWISSPEARL and stapled to the battens.

EPDM strips to be in one single piece top to bottom or lapped as per diagram.

Horizontal panel joints

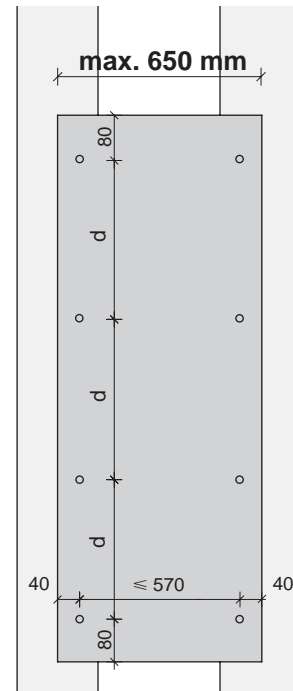
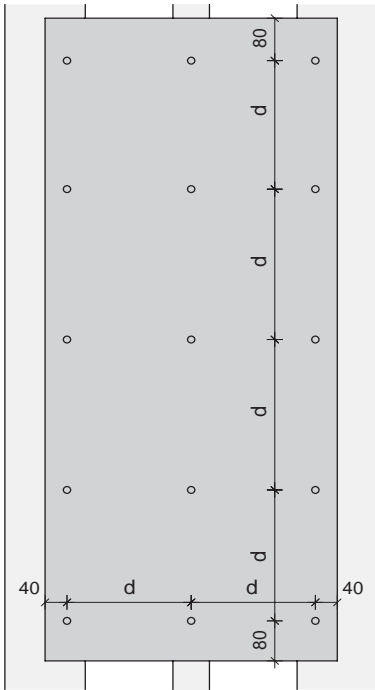
Typical joint width is 8 mm, min.
joint width = 6 mm.

Use horizontal joint flashings to prevent water from penetrating into ventilation cavity. Cut flashing 2 mm shorter than panel, so as to avoid the flashing showing in the vertical joints. Where flashings need to be joined together, butt the ends within a vertical profile to have both ends supported.

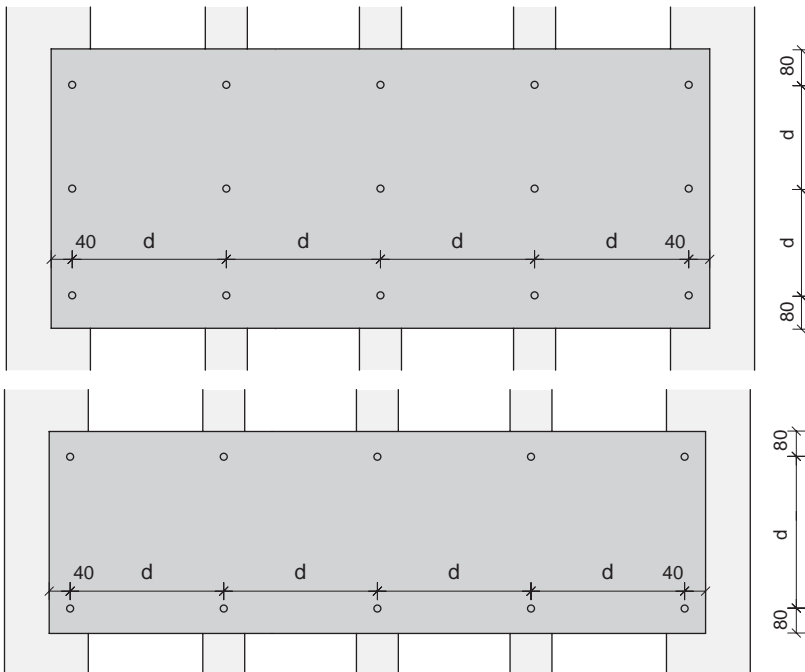


EPDM strip overlap

EPDM = Ethylene propylene diene monomer rubber



Reference values for max. spacing distance "d" between fasteners



Reference values for max. spacing distance "d" between fasteners

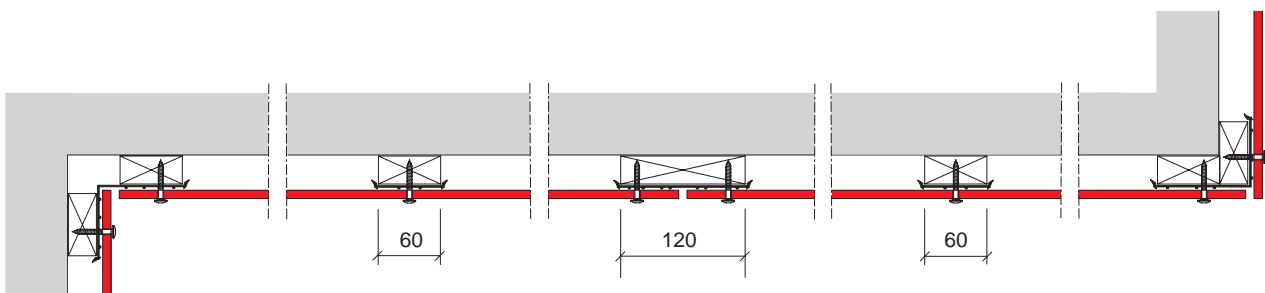
Single span panel

(no intermediate support)

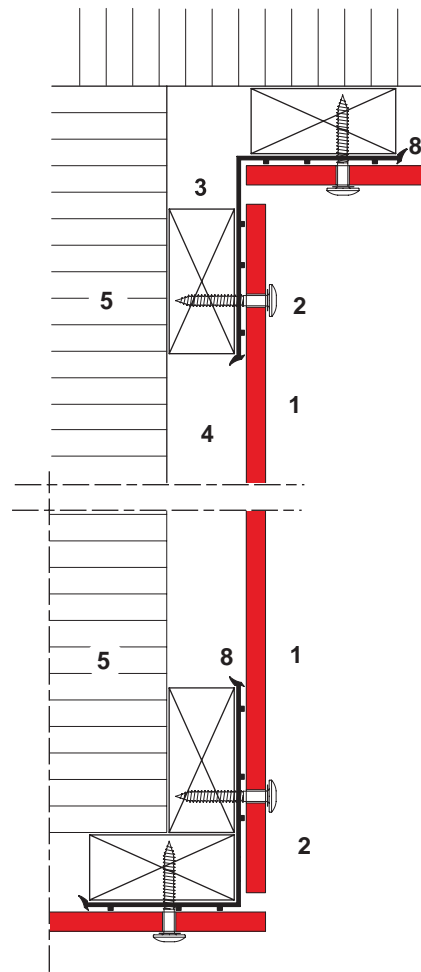
This condition occurs often with one or two panels next to windows, corners, etc.

External building corner - battens

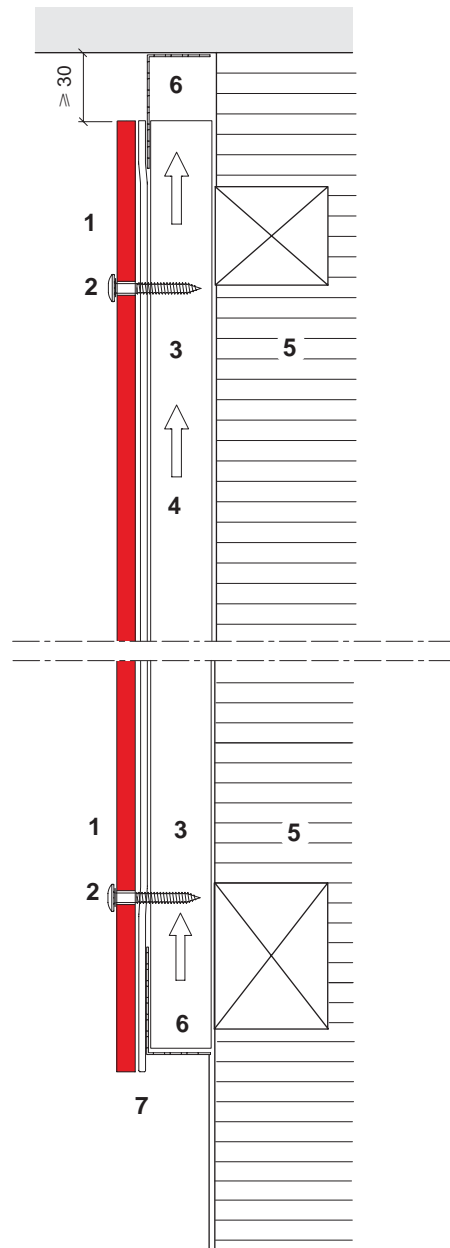
The timber battens are to be joined together as per scheme below (same orientation as panels), in order to avoid that the panel fastener falls between the two joined battens.



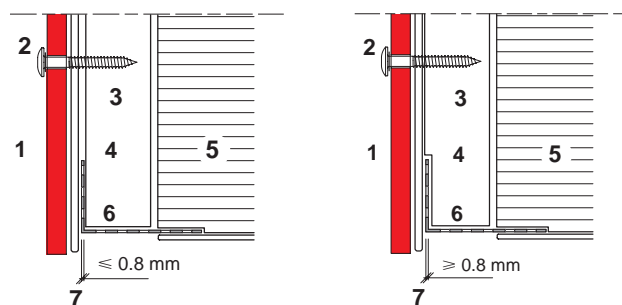
Corners



Termination top and bottom

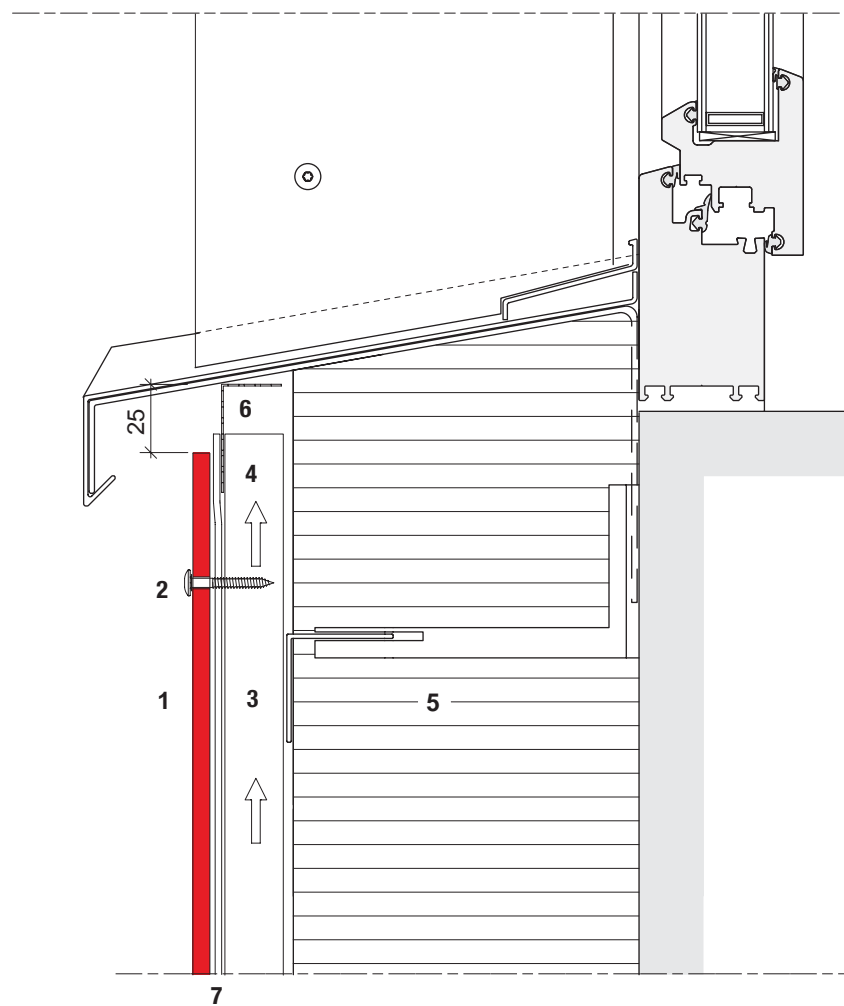
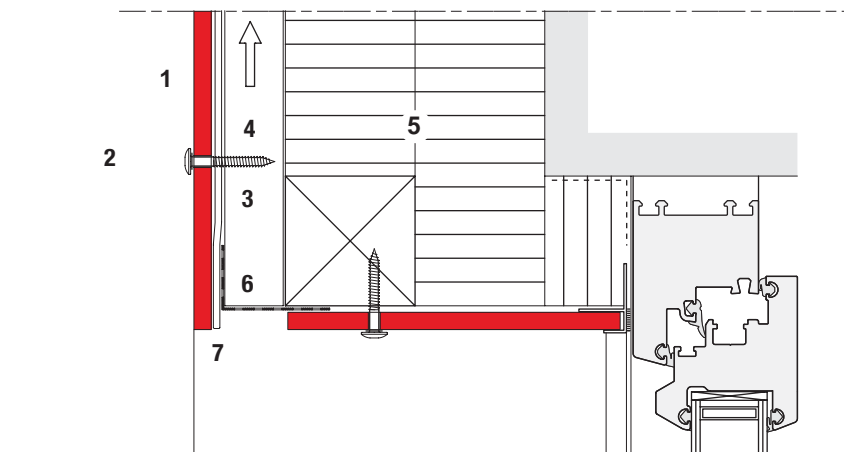
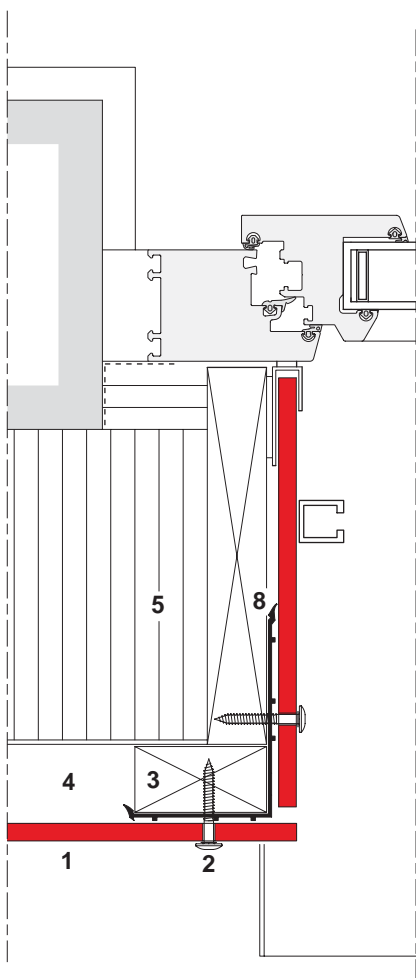


- 1 SWISSPEARL panel
- 2 Screw
- 3 Timber batten
- 4 Ventilation cavity (void)
- 5 Thermal insulation
- 6 Ventilation profile
- 7 EPDM backing strip
- 8 EPDM backing strip 150 mm



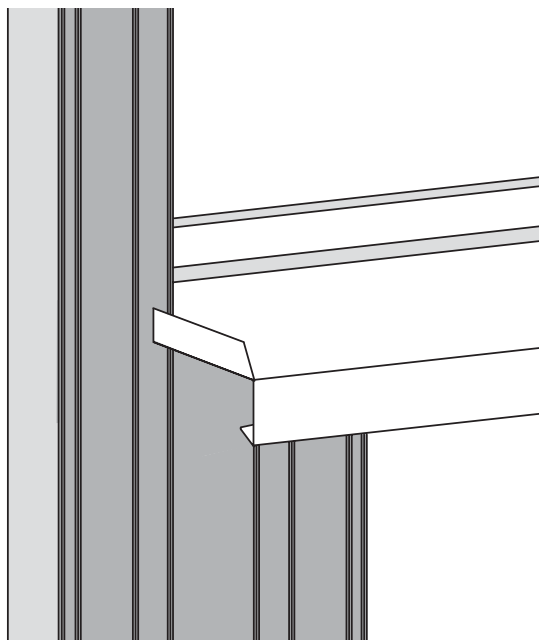
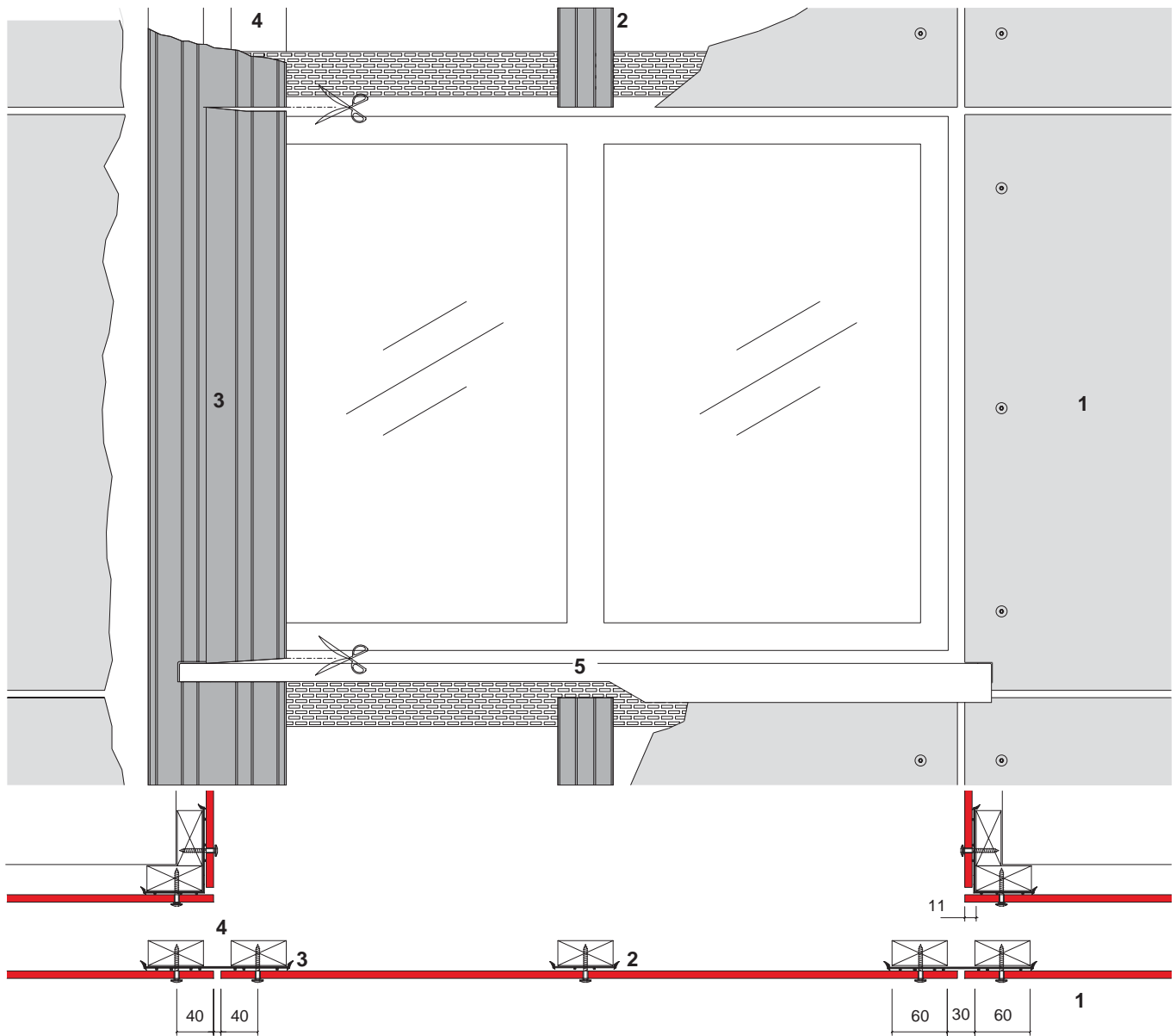
Sub-frame to be notched out if ventilation profile thicker than 0.8 mm

Window

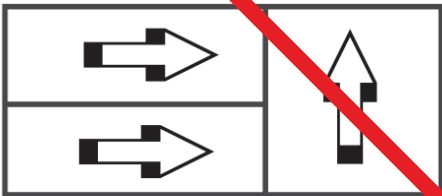
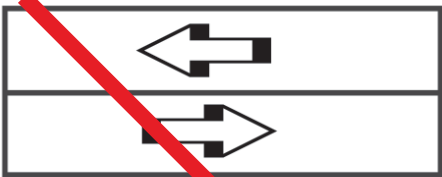
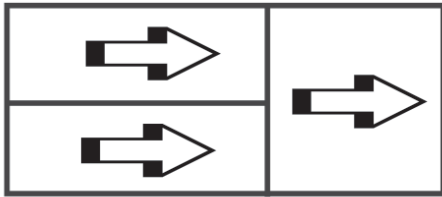
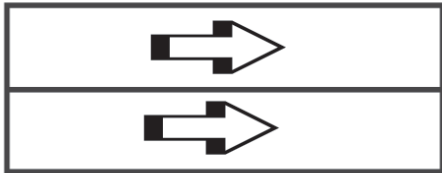


- 1 SWISSPEARL panel
- 2 Screw
- 3 Timber batten
- 4 Ventilation cavity (void)
- 5 Thermal insulation
- 6 Ventilation profile
- 7 EPDM backing strip
- 8 EPDM backing strip 150 mm

Window



- 1 SWISSPEARL panel
- 2 EPDM strip 60 mm
- 3 EPDM strip 150 mm
- 4 Timber batten 27 × 60 mm
- 5 Window sill



This applies for REFLEX only

All other products are not directional

Appearance

With varying angles of viewing and changing incidence of light, the iridescent surface of REFLEX presents a different aspect to the beholder. This effect is influenced by the direction the panels are manufactured. To achieve consistency in the aspect over an entire façade, from whatever angle it is viewed, panels must come from the same batch and must be installed oriented alike.

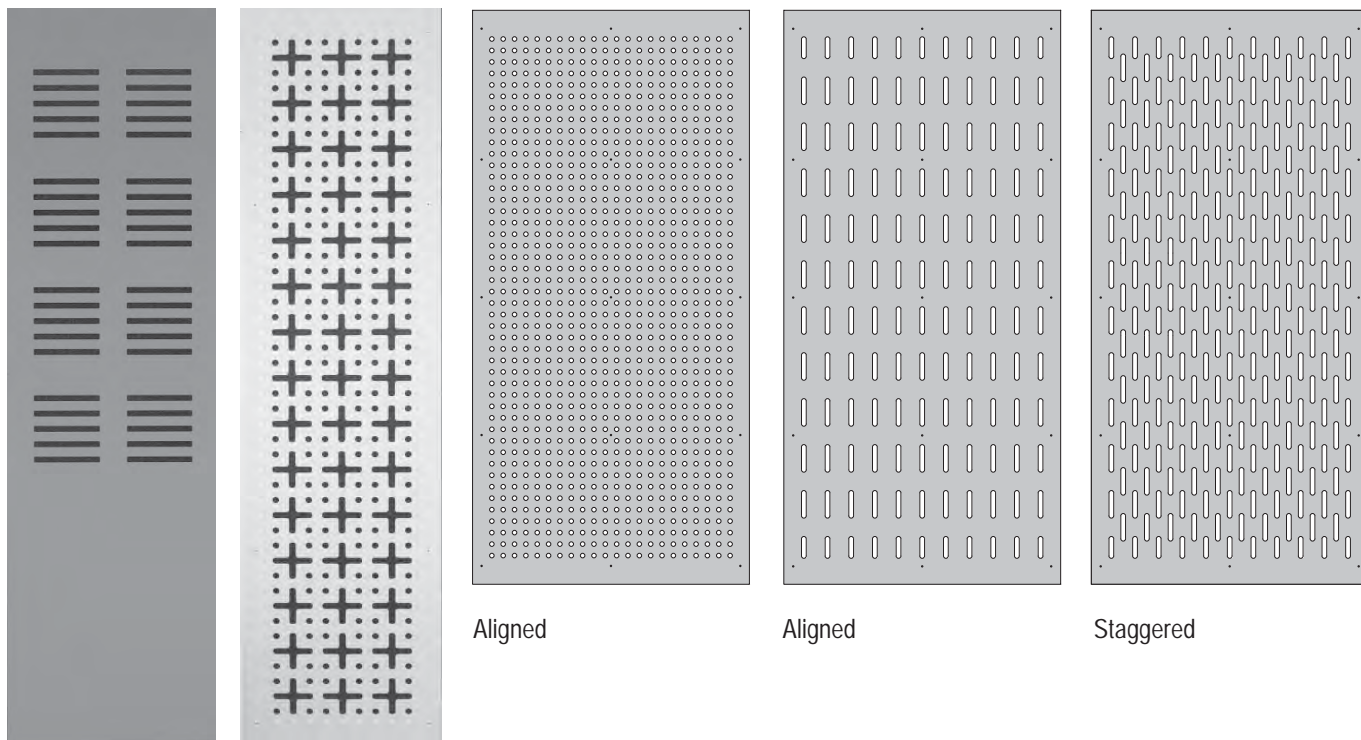
Identification

On the back of every REFLEX panel arrows indicate the direction of production which always runs with the longitudinal edge of the panel.

Installation

All arrows on the back of the panels must point in the same direction. Where this requirement is not observed, the incorrect installed panels will appear in the façade as colour deviation.

Perforated panels



Panel stability

The greater the perforated area, the lesser the panel stability. Generally the perforated area should not exceed 15 – 18 % of the panel size. Decisive factors are in particular the panel size and the perforation pattern (staggered, aligned, etc.). As a thumb rule the solid part between perforations should be at least of the same dimension as the perforation itself.

The panel must have a non perforated, 100 mm wide area all around its edge and non perforated zones around panel fasteners, depending on panel size and configuration of perforations.

Each perforation project to be submitted in order to obtain confirmation as to its feasibility.

Wind load, mechanical impact

Perforated panels require increased support profiles and fasteners to correspond to the parameters of a standard non perforated situation. Do not use perforated panels in exposed areas.

Exterior application

Min. size perforation is 20 mm and edge of perforation must be chamfered, so that perforation edge and sides can be properly coated. Coating will be applied after fabrication. Holes min. Ø 20 mm, max. Ø 100 mm, any size possible.

Slots min. 20 mm wide, max. length 460 mm.

Interior application

For interior application the perforations can be carried out on finished panels, as chamfering and coating after fabrication is not necessary. However, surface coated and chamfered perforations provide a higher finishing quality.

Diametre of larger holes as described above.

Smaller holes to be of Ø 5.5, 6, 8, 9.5 mm on a 16/32/48 mm grid.

Bending of perforated panels

Perforated panels may not be bent at all.

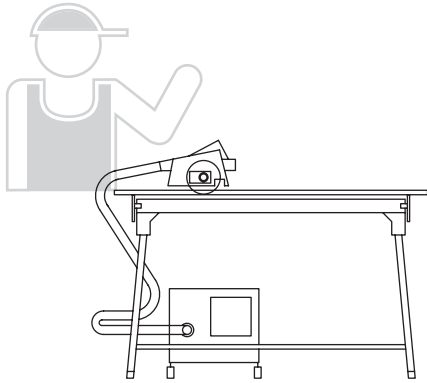
Ventilation void

Ventilated cavities to perforated panels to be same as for standard application.

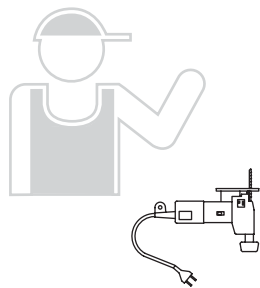
Extract air

Where perforated panels are used in connection with air extraction, condensation may occur on the panel and the formation of ice or dirt. Detail with care to avoid such occurrence.

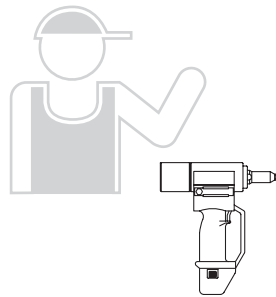
Tools



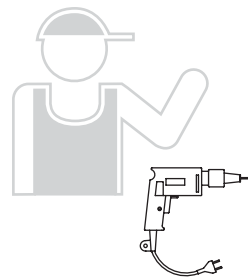
FESTO or HILTI circular saw with straight edge and dust-extractor



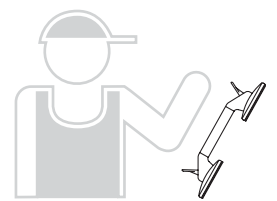
Jig saw



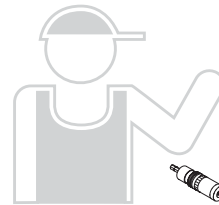
Riveting gun GESIPA ACCUBIRD



Power drill



Vacuum handle



Depth gauge



Rivet setting device



Screw driver with depth gauge

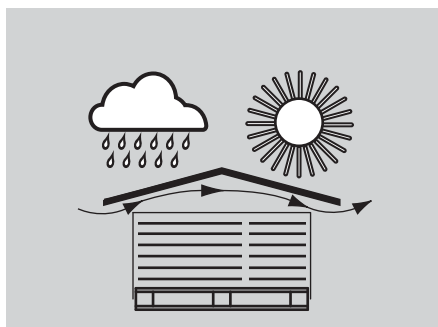
A single setting of the depth stop ensures that all screws are tightened to exactly the desired depth, regardless of the differences in the substrate. Thus every panel is fastened without strain.



Rivet setting device

Required for stainless steel rivets only. The thread gets screwed onto muzzle of rivet gun, concave shaped die prevents deformation of rivet head at its installation.

Handling on site



Stacks **must** be stored **out of dampness** and direct **sunlight**. The shrink wrapping, the panels are supplied in, is not sufficient.

On site storage

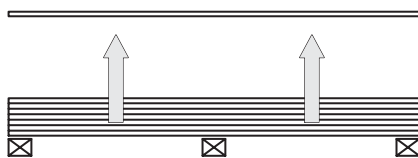
SWISSPEARL panels must be protected from dampness and weather under a roof. Where this is not possible, store under tarpaulin to avoid permanent staining. If panels stored for more than 2 months, panels to be stacked between battens.

Processing of SWISSPEARL panels at the factory

- Cutting panels to size and drilling holes for fasteners according to list of panels, which has to be provided by the contractor.
- It is recommended to order the panels and to have them packed onto pallets in the sequence of installation.

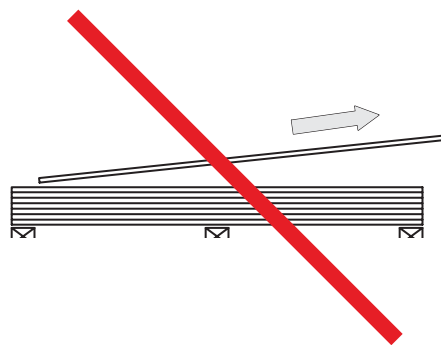
Re stacking panels on site

- Always stack the panels flat.
- Each stack should not be more than 500 mm high (1' 8"), max. 2 stacks on top of each other.
- Use foam protection layer between panels (as supplied by factory).
- Lift panels off the stack, do never pull them from the stack.



Correct

Always lift panels off the stack



Wrong

Panels shall not be pulled from the stack

Fabricating panels at local fabricators or on building site

- Avoid tools which produce fine dust.
- Always work out of the weather.
- Rig up work bench (e. g. using saw horses and planks or pallets).
- Always drill / cut perpendicularly to the panel surface.
- Cut panel to size: Use circular saw with straight edge and dust extraction. Blade diamond tipped or carbide metal blade with staggered teeth (trapezoidal / flat).
- Cut outs in panel: Use jig saw with suitable blade.
- Dust from fabricating on site must be removed immediately.

Cleaning procedures

- Remove dust immediately after fabricating panels.
- Dry dust
To be removed with a vacuum cleaner, or with a clean, dry and soft cloth or brush.
 - Wet dust
Results in staining of the panel surface. It must be removed immediately, using plenty of water and a sponge or a soft brush.

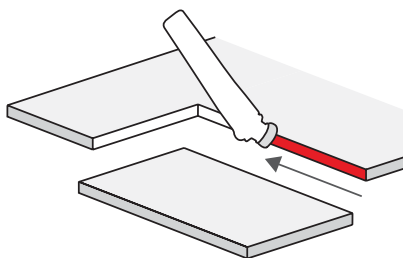
Cleaning of new claddings

- Non calcium based stains.
Use water blaster to thoroughly wash cladding with cold water at max. 80 bars (minimum distance from panels 25 cm/10"). Use flat fan spray nozzle, dirtblasters are not allowed. Prior do test on inconspicuous part of cladding.
- Calcium based stains
 - 1 Apply a mist spray of a solution of 10% acetic acid in water
 - 2 Allow to react a few minutes but do not let dry out
 - 3 Use water blaster to rinse cladding (see cleaning of new claddings)
 - 4 Repeat steps 1 to 3 on obstinate stains
- Do not use glass cleaning detergents!
- Never wash warm façades in direct sun light with alkaline or acid cleaners, as the detergent may cause irreversible stains.

Cleaning during life-time of the walls

Normally no cleaning will be needed since the rain will periodically wash away dust, environmental dirt, etc. However, if particular environmental conditions result in a visible dust layer, wash away for instance with garden hose or water blaster with flat fan spray nozzle (max. 80 bars, minimum distance from panels 25 cm/10"). For any other type of dirt, proceed as for new claddings.

If graffiti occurs, best is quick replacement of soiled panels. For any other method of cleaning or application of an anti-graffiti protection, contact Swiss technical advisors.



LUKO Impregnation liquid to panel edges supplied in hand applicator

- 1 Panel edge must be slightly broken, clean and dry
- 2 Remove protective cap
- 3 Position hand applicator – tank upwards
- 4 Apply sponge at right angle to panel edge and run with moderate pressure twice along edge (forth and back)
- 5 Caution – do not allow LUKO to flow onto front face of panel - remove immediately
- 6 Check that LUKO has been applied over entire panel length
- 7 Put on the cap when interrupting the job
- 8 Replace sponge when worn
- 9 Store + use at a minimum temperature of - 8°C (18°F).

LUKO liquid has a shelf life of 12 months. Use LUKO liquid undiluted.

Check existence of application

Simply check with water, if it gets absorbed – edge has not been properly treated with LUKO.

Masking tape

For the use of masking tape on SWISSPEARL panels it should be noted that most common masking tapes are not resistant to UV rays. Such tapes leave behind residues, that can not be removed without causing damage to panel surface.

However the use of the following masking tapes is recommended

- **Masking tape 3M Blue 2090** for temporary application (1 - 2 weeks).
- **Masking tape 3M Gold 244** for longer term application.

For indoor fabrication use LUKO impregnation liquid supplied in 1 litre bottles. Use/store this product at a minimum temperature of + 5°C.

- **Product is not frost proof !**
- **For fabricators only !**
- **Not suitable for job site !**

Warranty Letter (Example)

With reference to your order n°..... of 200..... and our consignment(s) for above mentioned building we confirm that we give a warranty for a period of 10 years, beginning on date of delivery, provided that:

- the panels were cut/drilled at the fabricator's shop, transported, stored and cut/drilled on the building site according to the Design + Installation Manual valid at the date of ordering/delivery; and
- the panels were installed:
 - according to the Design + Installation Manual
 - with the prescribed system components, i. e. screws, rivets, fixed point sleeves, EPDM strips
 - with the prescribed tools, i. e. bore center gauge, rivet setting device, T20W bit, depth stop

This warranty covers

- The water tightness and frost resistance as well as the mechanical and physical characteristics of the SWISSPEARL panels, the average figures of which are defined in the EN standards and SWISSPEARL performance values.
- The functional quality of the system components and accessories supplied by SWISSPEARL, i. e. screws, rivets, fixed point sleeves, EPDM strips, etc.

The warranty does not cover

Defects caused or substantially contributed to by:

- Inappropriate fabricating and storage (at the fabricator's shop and/or on the building site), handling and installation of the panels.
- Inappropriate application of the panels for the local conditions.
- The use of inappropriate fasteners for the building location and/or sub-framing.
- Slight modifications in colours such as homogeneous lightening according to test values or alterations due to air pollution or other environmental influences (dust, soiling from window sills, metal profiles, etc.).
- Damages due to the use of accessories which do not belong to the SWISSPEARL range.
- Damages due to aggressive cleaning procedures.
- Damages due to algae.
- Defects caused by a use of the panels and accessories other than the use described in the Design and Installation Manual.

Any SWISSPEARL product which does not comply with these quality standards will be replaced free of charge, **ex works Niederurnen**, on condition that Eternit (Schweiz) AG are notified within a period of 4 weeks after the appearance of any defect.

Purchaser's remedies hereunder for replacement of the defective product are exclusive and in lieu of any other remedies, such as rescission of the purchase contract or reduction of the purchase price, which purchaser might have.

In particular, the warranty covers neither the transport costs nor labour expenses for dismantling and dumping defective panels and installing new panels.

Except for the warranties set out in this document, Eternit (Schweiz) AG makes no warranty, express or implied, with respect to the panels and accessories and expressly disclaims any warranty of merchandability, description or fitness for any particular purpose or function. In no event shall be liable to purchaser or any other party for special, consequential, incidental or punitive damages including, without limitation, loss of use, profits, revenue or goodwill.

Eternit (Schweiz) AG shall not be liable for failure of performance hereunder due to force majeure.

Attachment: Technical Data sheet

Panel strips

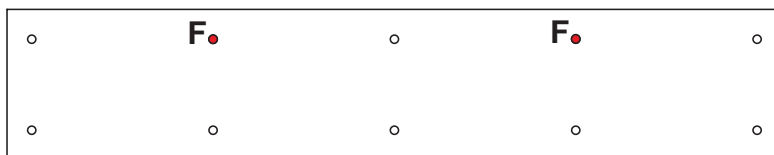
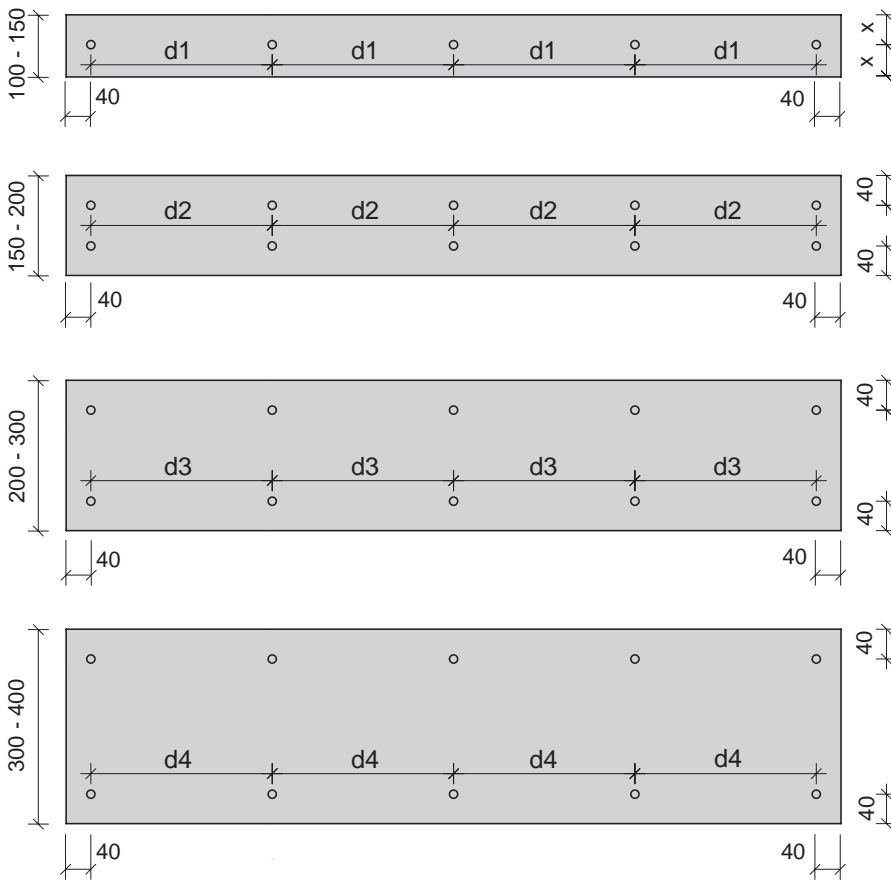
Height of strip	Max. distance between fasteners [mm]		
100 - 150 mm	d1	400	Unless closer spacing
150 - 200 mm	d2	450	is required due to
200 - 300 mm	d3	500	high wind load as
300 - 400 mm	d4	550	per table next page

Panel strips

The narrower the strip, the closer the distance between fasteners should be, to ensure that the panel strip stays perfectly flat.

Panel strips should be generally min. 100 mm wide; narrower strips are possible but require utmost care for handling and installation.

Reference values for max. spacing distance "d"

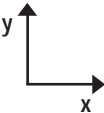


Metal sub-framing

Typical positions of fixed points

Distances between fasteners

This table shows actual wind loads on the cladding and relates neither to landscape type nor to building height. Applicable wind load values are to be determined for each project in accordance with the local standards and for high rise buildings with specific wind load studies.

Windload [kPa = kN/m ²]	Windload [psf]	Wind velocity [km/h]		Vertical panels Spacings [mm]		Horizontal panels Spacings [mm]	
				horizontally x	vertically y	horizontally x	vertically y
1.4	29	172		380	580	490	530
1.5	31	178		380	580	490	530
1.6	33	184		380	580	490	530
1.7	36	190		380	480	490	530
1.8	38	196		380	480	490	350
1.9	40	201		380	480	490	350
2.0	42	206		380	480	490	350
2.5	52	230		380	480	420	350
3.0	63	252		380	410	420	350
3.5	73	280		280	410	420	260
4.0	84	300		280	360	370	260
4.5	94	> 300		280	320	370	240

This table applies to 8 mm panels fastened with rivets onto metal sub-framing

■ Windload

The value means the actual wind load occurring on the cladding.

■ Spacings

Maximum distance between panel fasteners.

■ Dimensions between fasteners

Originate from full size panel (1220 × 3040 mm) and quantity of fasteners (3, 4, 5, etc.) and fastener to panel edge distance of 40 mm horizontally and 80 mm vertically.

■ Interpolation

Intermediate values for wind load/spacing may be interpolated.

■ Safety factor

A safety factor of 3.0 is taken into account for the admissible system load (rivet and panel).

■ Engineering responsibility

Structural Engineer / Contractor shall assume overall responsibility for the façade engineering.

Conversion

US standard gauges for sheet and plate iron & steel

Gauge	Metric	Fractions of an inch	Inches
0	7.9375 mm	1/32 0.8 mm	1" 25.4 mm
1	7.1374 mm	1/16 1.6 mm	2" 50.8 mm
2	6.731 mm	3/32 2.4 mm	3" 76.2 mm
3	6.35 mm	1/8 3.2 mm	4" 101.6 mm
4	5.9436 mm	5/32 4.0 mm	5" 127.0 mm
5	5.55498 mm	3/16 4.8 mm	6" 152.4 mm
6	5.1562 mm	7/32 5.6 mm	7" 177.8 mm
7	4.7625 mm	1/4 6.4 mm	8" 203.2 mm
8	4.3688 mm	9/32 7.1 mm	9" 228.6 mm
9	3.9624 mm	5/16 7.9 mm	10" 254.0 mm
10	3.556 mm	11/32 8.7 mm	11" 279.4 mm
11	3.175 mm	3/8 9.5 mm	12" 304.8 mm
12	2.7686 mm	13/32 10.3 mm	
13	2.37998 mm	7/16 11.1 mm	
14	1.9812 mm	15/32 11.9 mm	Feet
15	1.778 mm	1/2 12.7 mm	1' 304.8 mm
16	1.5875 mm	17/32 13.5 mm	2' 609.6 mm
17	1.4224 mm	9/16 14.3 mm	3' 914.4 mm
18	1.27 mm	19/32 15.1 mm	4' 1'219.2 mm
19	1.10998 mm	5/8 15.9 mm	5' 1'524.0 mm
20	0.9525 mm	21/32 16.7 mm	6' 1'828.8 mm
21	0.87122 mm	11/16 17.5 mm	7' 2'133.6 mm
22	0.79248 mm	23/32 18.3 mm	8' 2'438.4 mm
23	0.7112 mm	3/4 19.1 mm	9' 2'743.2 mm
24	0.635 mm	25/32 19.8 mm	10' 3'048.0 mm
25	0.55372 mm	13/16 20.6 mm	
26	0.47498 mm	27/32 21.4 mm	Temperatures
27	0.4318 mm	7/8 22.2 mm	212°F 100°C
28	0.39624 mm	29/32 23.0 mm	100°F 37.78°C
29	0.3556 mm	15/16 23.8 mm	32°F 0°C
30	0.3175 mm	31/32 24.6 mm	0°F -17.78°C
31	0.27686 mm	1 inch 25.4 mm	- 40°F - 40°C
32	0.254 mm		
33	0.23622 mm		
34	0.2159 mm	Distance	Weight
35	0.19812 mm	1 mile 1'609.3 m	1 lb. 453.6 g
36	0.1778 mm	1 km 0.621 mile	

Very important: "dos and don'ts"

Generalities

- All national, local, state, federal and other applicable safety regulations must always be complied with.
- Purchase SWISSPEARL façade panels/systems only from appointed authorised distributors.
- Use SWISSPEARL façade panels/systems only for applications recommended by manufacturer.
- All manufacturer's recommendations regarding design, storage, fabrication, installation and cleaning of SWISSPEARL façade panels/systems must be fully complied with.

Design and Installation

- Before start of installation, verify that:
 - SWISSPEARL distributor has checked that detail drawings comply with present Design + Installation Manual
 - correct fasteners and accessories have been delivered to site.
- Sub-frames are to be designed by structural engineer/contractor. Thermal expansion/retraction is to be accounted for.
- Interruptions of support profiles must coincide with panel joints.
- Uninterrupted air circulation, from bottom to top, must be maintained behind SWISSPEARL façade panels.
- Do not install SWISSPEARL façade panels/systems directly onto wall surfaces of any kind.
- Do not use any sealant in connection with SWISSPEARL façade panels.
- Adhesive fixing is prohibited.
- Do not use any EPDM backing strips onto metal sub-framing.
- Use screws to timber sub frame, use rivets to metal sub frame, do not use screws to metal sub frame.

Storage and handling

- Lift pallet crosswise and set forks apart to minimise bending of pallet. Fork length must support pallet entirely; if required, use fork extensions.
- When lifting pallet up by crane, attach pallet at sufficient support points to prevent it from bending.
- Stacked SWISSPEARL panels to be stored under roof. If not possible (e. g. on building site), use tarpaulin to cover the pallets (the plastic sheeting the pallets are wrapped in, is not sufficient).
- Pallets / stacks always to be placed horizontally, and to be kept off the grade.
- Never slide panels across one another. Lift panels individually to avoid scratching.
- Panel stacks to be max. 500 mm (2') high, do not stack more than 2 pallets. When re-stacking panels, insert foam foil between each panel to protect the surface. Protect stack adequately.
- All manufacturer's labels, instructions, Design + Installation Manual must be made available to the entire staff on building site. When re-stacking/re-palletising, the instructions must be attached onto the new stacks/pallets such as to be noticed easily.

Fabrication and handling

- Fabricate SWISSPEARL panels with vacuum equipped power tools recommended by manufacturer.
- Immediately remove fabricating dust from panel.
- Never use sawing system with water cooled blade.
- After saw cutting, each panel edge must be sealed by using LUKO impregnation liquid.
- Do not allow LUKO impregnation liquid to flow onto the panel face.
- Install SWISSPEARL façade panels/systems by contractors trained and instructed by manufacturer or SWISSPEARL distributor.
- Make sure that dust is removed from face and back side of panel prior to it's installation.
- If a panel is to be rested on it's edge, use protection pads to avoid damage.

Cleaning

- Do not clean SWISSPEARL façade panels by dry methods.
- Immediately remove cement stains by applying a solution of 10 % acetic acid in water, allow to react 5 - 20 minutes, but do not allow to dry out. Follow up with a cold, clean water rinse. If required, use high pressure water blaster at 40-80 bars (580-1160 psi), always test this method on inconspicuous panel area.
- Never clean a façade in the bright sun light.

Authorized Distributor

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