

## **Façade claddings**

### **Sandwich panel SPA, SPB W, SP2D W**

The ventilated façade cladding system by Ruukki offers a wide selection of options for wall façade architecture created with Ruukki panels. Ruukki's Design Palette range includes ideal cladding options: premium quality Liberta rainscreen panels, cladding lamellas, design profiles plus a range of materials and colours. For more information on Ruukki façade claddings, see [www.ruukki.com](http://www.ruukki.com).

In addition, bricks, wood and ceramic tiles can be used for cladding. Advertising hoardings and letters can be fixed to the surfaces of panels, in line with the instructions in this brochure.

Ruukki is a metal expert you can rely on all the way, whenever you need metal based materials, components, systems or total solutions. We constantly develop our product range and operating models to match your needs.

- **Fastening the façade cladding**

**Ruukki façade claddings, wood paneling, ceramic tiles and hoardings**



Fasten the façade cladding to the outer surface of the Ruukki panel using metal support studs. At the same time, the studs create an even ventilation gap, which should be at least 20 mm wide. Ensure that the gaps created will enable well-functioning ventilation. If the studs are installed horizontally, you must use support studs with ventilation holes. This prevents harmful amounts of condensed moisture from penetrating the ventilation gap. It allows any condensed moisture out of the structure.

To ensure an even load distribution, the following maximum centers have been defined for support studs:

- c/c 1200 mm if the studs are cross-wise to the panel
- c/c 600 mm if the studs are along the length of the panel
- c/c 600 mm in all corners and areas exposed to high wind, however the studs are installed

Support studs are fixed to the panel surface with self-drilling screws or rivets suitable for thin materials. The precise type of fastener should be selected according to the thickness of the material. Only use fasteners for which reliable strength values can be obtained. Through testing, the following characteristic values have been determined for screws and rivets, and their strength, when used on Ruukki panel surfaces:

- Self-drilling screw Ø4.8 mm, 14 mm washer
  - Shear strength FRvk = 700 N
  - Tensile strength FRtk = 400N
- Self-drilling screw Ø6.3 mm, 15 mm washer
  - Shear strength FRvk = 800 N
  - Tensile strength FRtk = 400 N
- Rivet Ø3.2 mm
  - Shear strength FRvk = 500 N
  - Tensile strength FRtk = 300 N

The following minimum edge distances, and limit values for the distances between fasteners, must be observed when placing them:

- Fastener's distance to edge of the element  $\geq 100$  mm
- Distances between fasteners 100 – 300 mm

Other selection criteria for fastening materials include their life expectancy and the risk of corrosion when fastening one metal to another.

The fastening of the façade cladding to the studs, and of the studs to the panel surface, should always be dimensioned on a case-by-case basis. The total mass of the cladding attached to the panel surface must not exceed 20 kg/m<sup>2</sup>. If vertical studs are fixed through panel up to building frame, e.g. intermediate floors or beams to transfer the loads, the total mass of the cladding attached to the panel surface must not exceed 30 kg/m<sup>2</sup>.

The panel's strength capacity must be checked with respect to any additional loads exerted by the façade cladding. If the cladding consists of short elements (e.g. RSPs, ceramic tiles), fastened to the panel surface with perpendicular support studs, a maximum of 75% of the panel's bearing capacity may be used. Bearing capacity can be verified easily using TrayPan, dimensioning software suitable for Ruukki panels (downloadable from Ruukki's website).

In standard cases, the panels' deflection limit is L/100. Stricter limits can be set for certain façade claddings (such as ceramic tiles). These should be evaluated on a case-by-case basis.

Additionally, the fixing screws' capacity should be verified for any additional load exerted by the façade cladding.

The principles outlined above also apply to the attachment of advertising hoardings and letters. During dimensioning, account should be taken of any additional loads due to snow, ice and wind.



### Brick masonry

Vertical loads caused by brick masonry must be transferred directly onto a separate structure, for example a plinth. Only horizontal loads due to brick masonry may be directed onto the panel, provided that the following limits are observed:

Panel span  $\leq$  3 m:

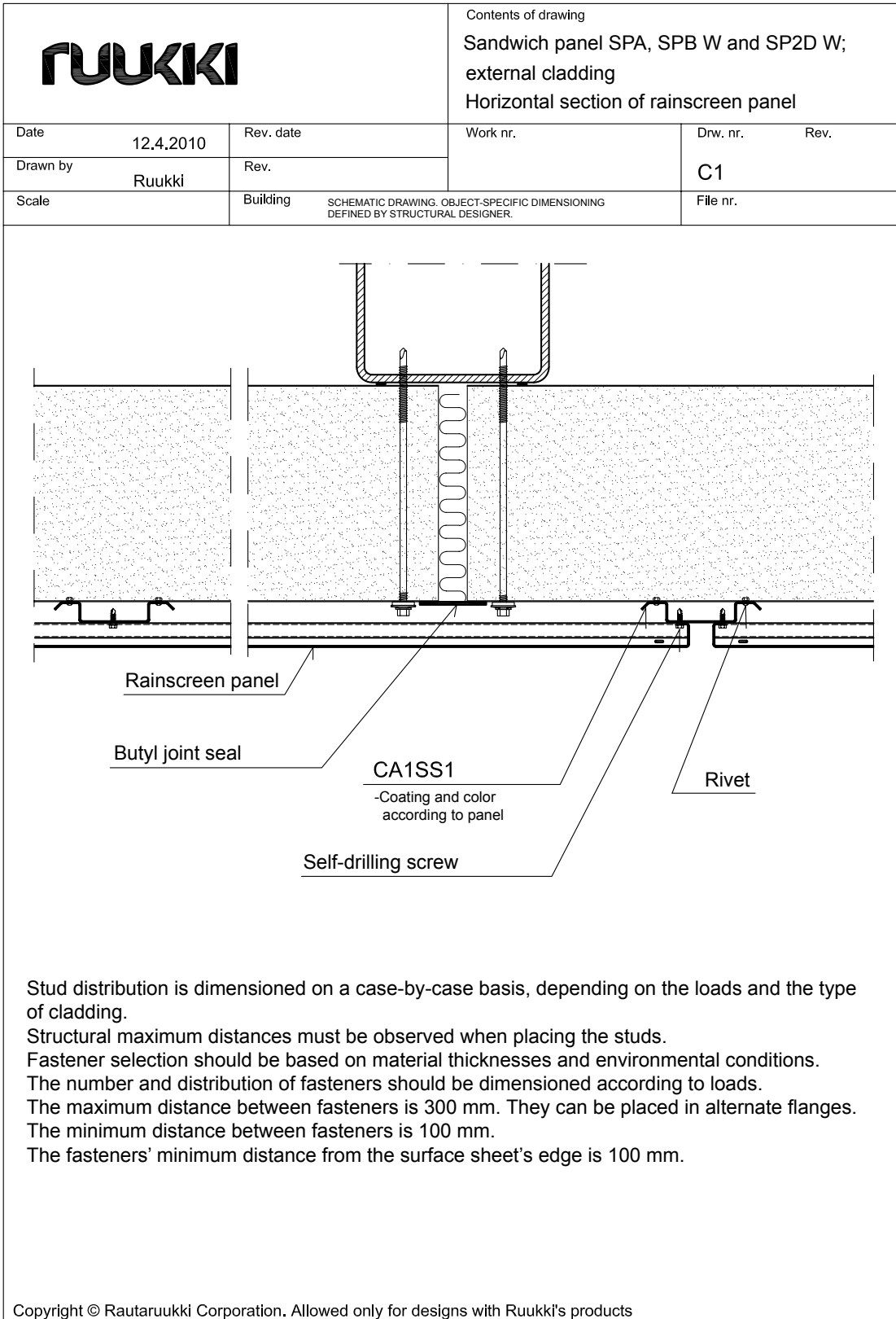
The brick masonry is only supported along the support lines of the panels (e.g. pillars), the brick ties being fastened directly onto the frame construction, through the elements. Based on this solution, the brick masonry transfers wind loads directly onto the supporting structures; the panels are dimensioned only to bear pressure and suction loads from inside the building. In addition, any deflection caused by internal pressure and temperature changes must not be too great for the free ventilation gap.

Panel span  $>$  3 m:

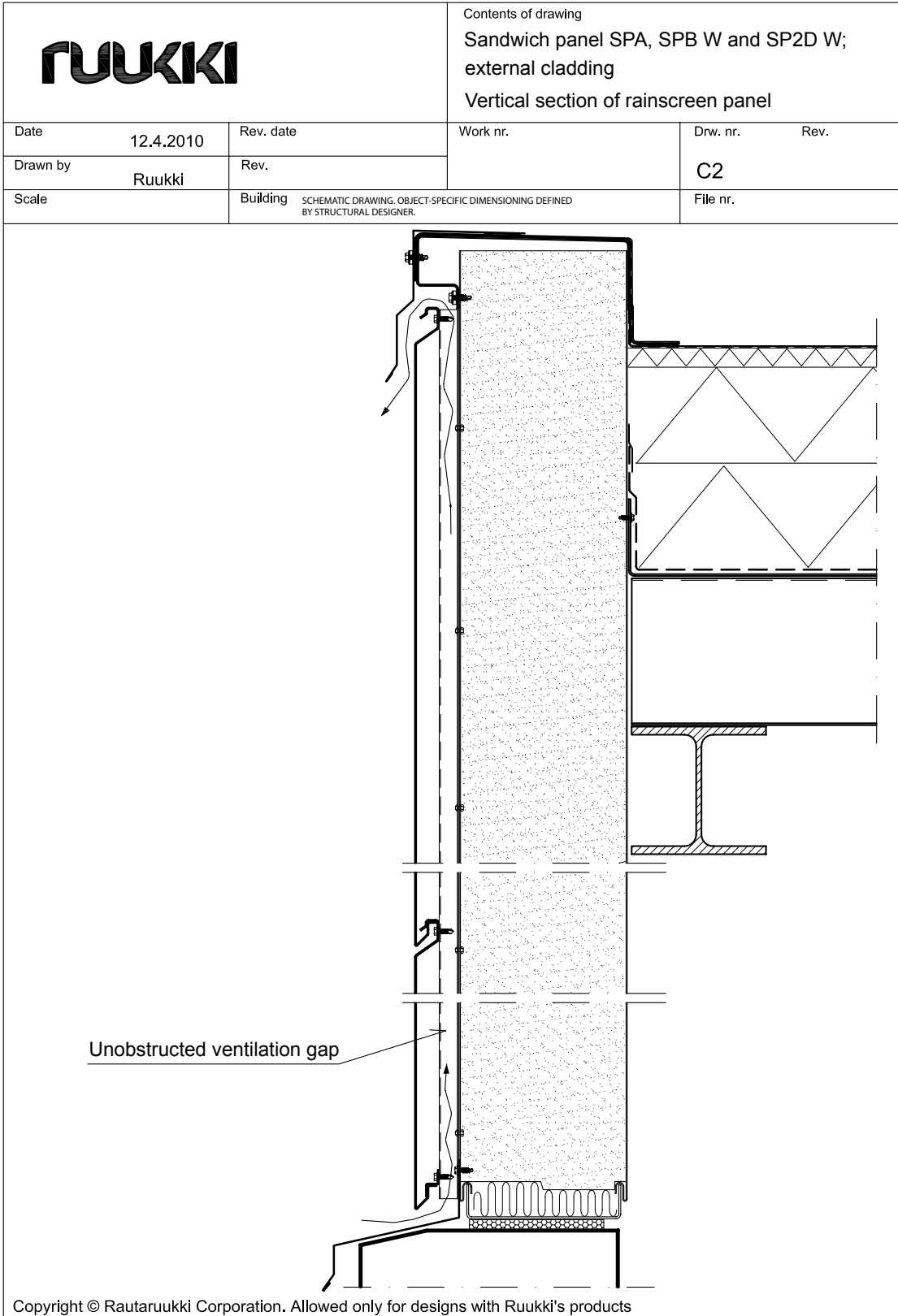
The brick masonry is supported along the panels' support lines, and by brick ties fastened to the outer panel surfaces. The number of ties is determined on a case-by-case basis, the minimum being 4 pcs/m<sup>2</sup>. The wind load should be distributed between the brick masonry and panel in line with their respective rigidity. Deflections should be limited to L/400, at a maximum. In practice, the surface load transferred to the panel is reduced by the brick wall's combination with the panels. Generally speaking, dimensioning the panel in its ultimate limit state is sufficient, without the assistance of the brick wall. When evaluating deflection, account should be taken of combined factors, to ensure that deflection caused by temperature differences and pressure loads does not exceed the deflection value of L/400. Brick ties must be rigid enough to ensure the same deflection in the brick masonry and panel. In addition, the flanges through which the brick ties are fastened to the panel surface must be rigid enough to ensure an even load distribution over all rivets or screws. The fastening flange must be sufficiently large to allow the required minimum distance of 100 mm between fasteners.

● Construction sections

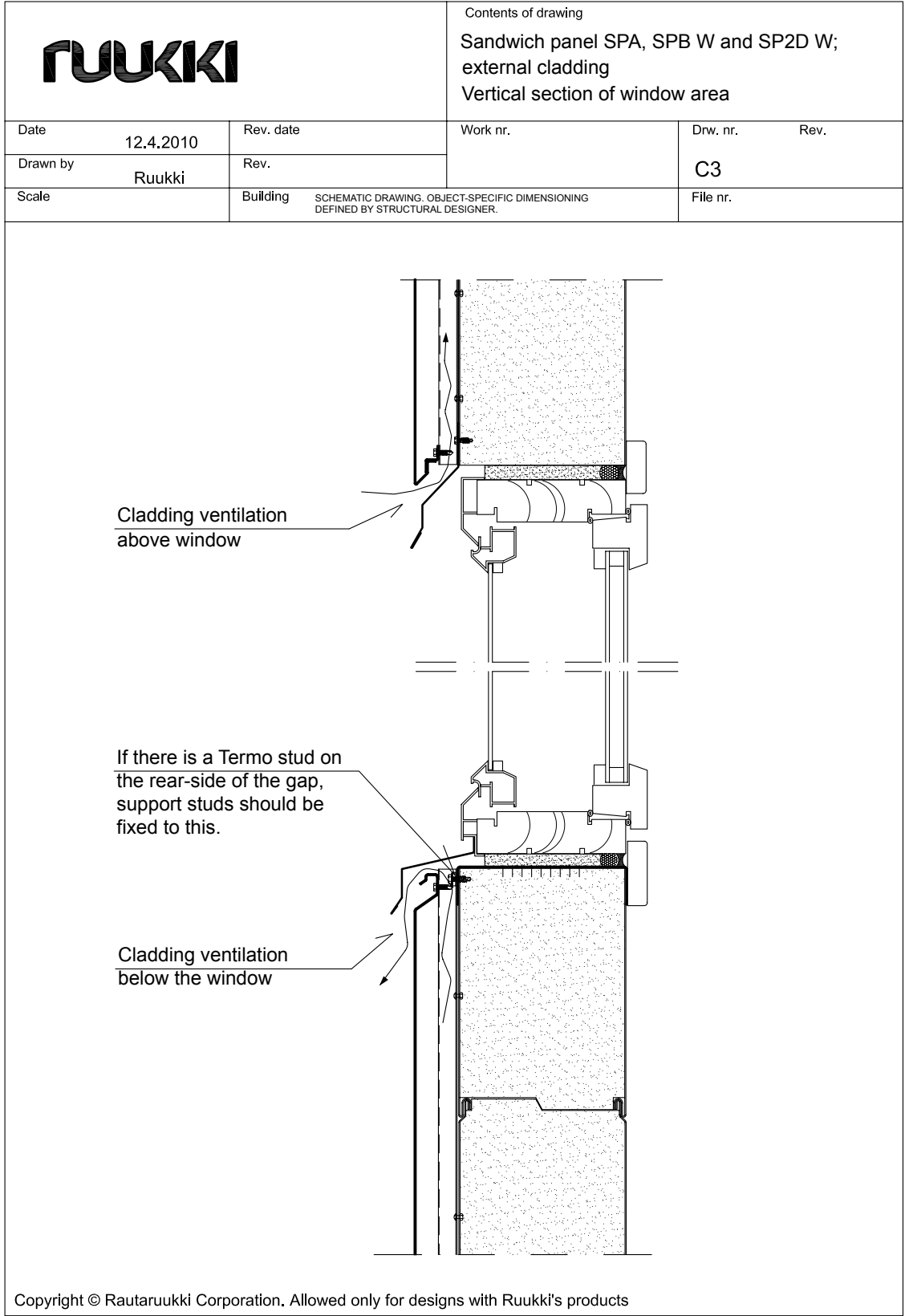
Rainscreen panel, horizontal section




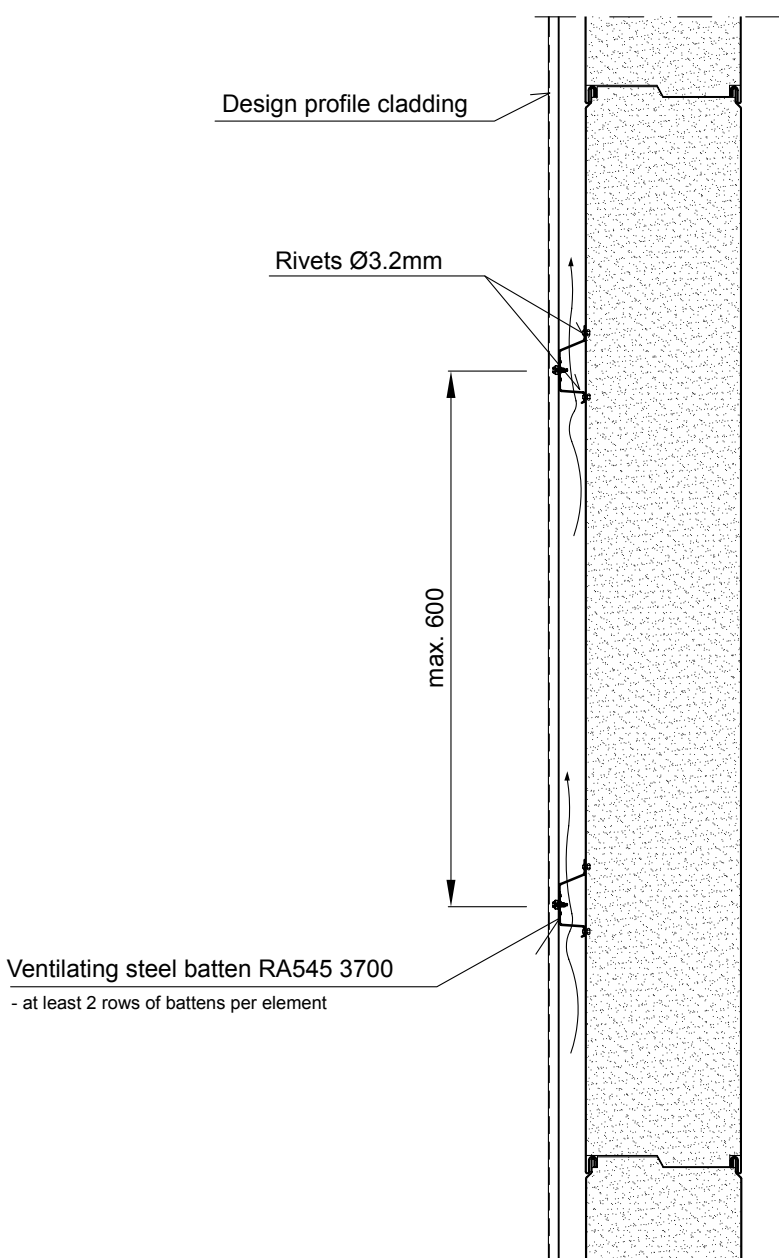
**Rainscreen panel, vertical section**




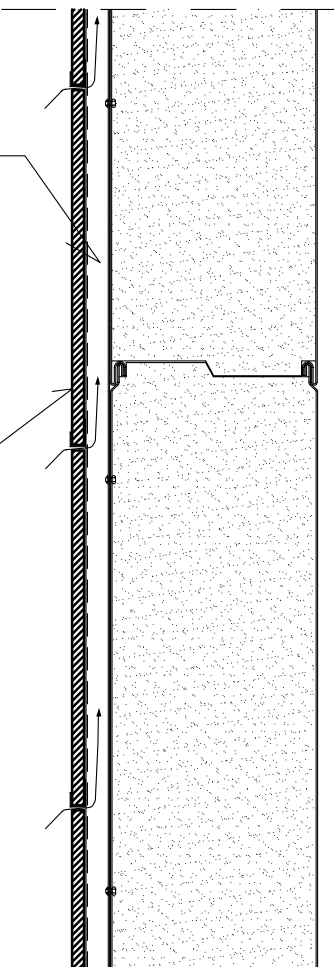
Rainscreen panel, vertical section



## Design profile, vertical section

		Contents of drawing	
		Sandwich panel SPA, SPB W and SP2D W; external cladding Vertical section of vertical design profile	
Date	12.4.2010	Rev. date	
Drawn by	Ruukki	Rev.	
Scale	Building		File nr.
		SCHEMATIC DRAWING. OBJECT-SPECIFIC DIMENSIONING DEFINED BY STRUCTURAL DESIGNER.	
		Work nr.	Drw. nr. Rev.
			C4
			
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**Ceramic tiles, vertical section**

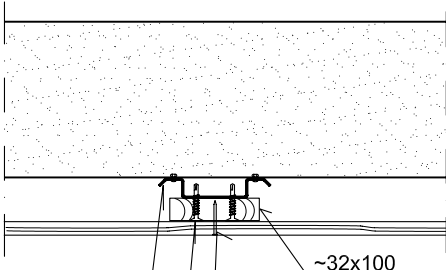
		Contents of drawing Sandwich panel SPA, SPB W and SP2D W; external cladding Vertical section of ceramic tile cladding		
		Date 12.4.2010	Rev. date	Work nr.
Drawn by Ruukki	Rev.	Building    SCHEMATIC DRAWING. OBJECT-SPECIFIC DIMENSIONING DEFINED BY STRUCTURAL DESIGNER.		File nr.
Scale				File nr.
<p> <b>Support stud CA1SS1</b>                      - or special ventilating stud according to tile supplier's specifications                 </p> <p> <b>Ceramic tiles</b>                      - tiles should be fixed to the studs mechanically or with glue, depending on the manufacturer's instructions                 </p> <p>                     Account must be taken of the external cladding's deflection limits, when dimensioning the sandwich panel SPA elements.                 </p>				
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Wood cladding, vertical and horizontal section

<b>RUUKKI</b>		Contents of drawing Sandwich panel SPA, SPB W and SP2D W; external cladding Wood cladding	
Date	12.4.2010	Rev. date	
Drawn by	Ruukki	Rev.	
Scale	Building	Work nr.	Drw. nr. Rev. C7
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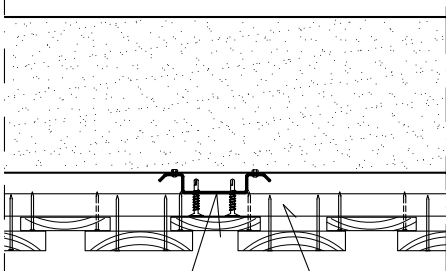


~32x100

**Fixed to horizontal boards with nails**  
- horizontal boards can also be fixed directly onto CA1SS1 with screws, without a 32x100 spacer

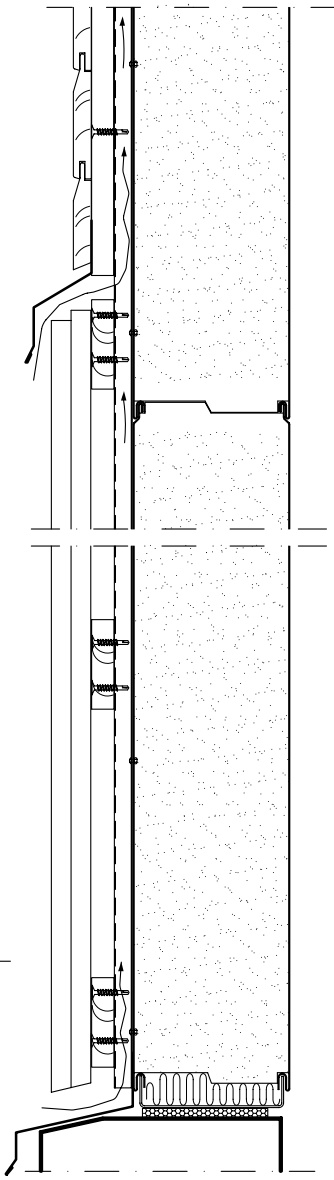
**Self-drilling countersunk screws**

**Distribution of, and fasteners for, CA1SS1** should be dimensioned according to the loads and horizontal boards.


**Horizontal support ≤ 600**  
- fixed to CA1SS1 with self-drilling screws

**Distribution of, and fasteners for, CA1SS1** should be dimensioned according to the loads and horizontal support.

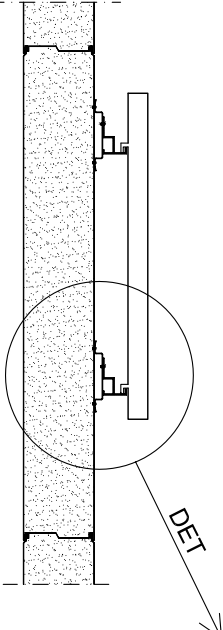


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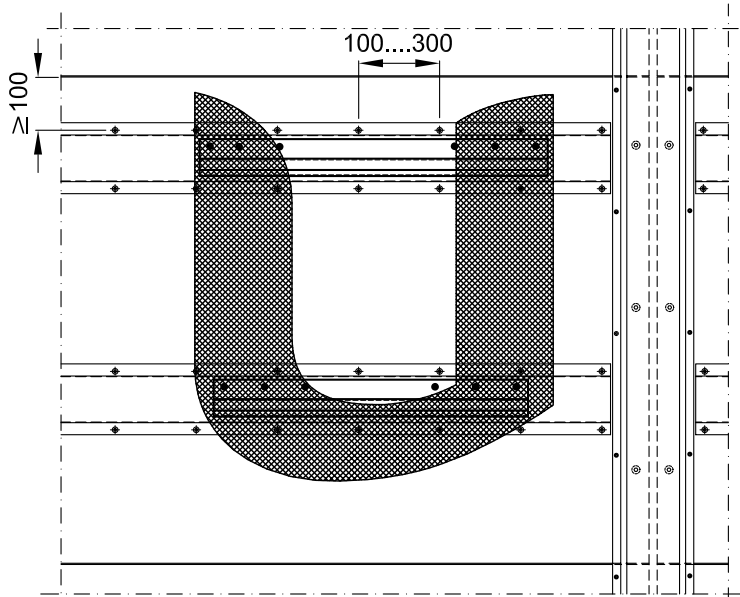
Advertising hoardings and letters

		Contents of drawing Sandwich panel SPA, SPB W and SP2D W; external cladding Fastening of letters and other objects to the surface (example)	
Date	12.4.2010	Rev. date	Rev.
Drawn by	Ruukki	Work nr.	Drw. nr. Rev.
Scale	Building	SCHMATIC DRAWING. OBJECT-SPECIFIC DIMENSIONING DEFINED BY STRUCTURAL DESIGNER.	C11 File nr.

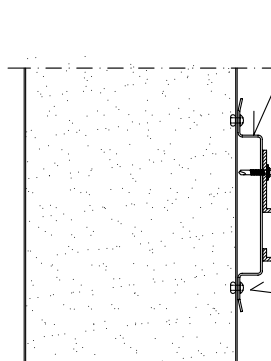


DET



100  
100...300

Fastenings should not be placed at the vertical joints between elements



CA1ss2 t=a.2 (surface sheet coloring, if needed)

Stainless steel screws, e.g. SX3-S16-5.5x22

Special aluminum profile


- profile length limited (thermal agitation difference between steel and aluminum)
- Oval holes, for example, must take account of thermal agitation
- insulation between CA 1SS2 and Al fastener, if needed

Fastening rivets

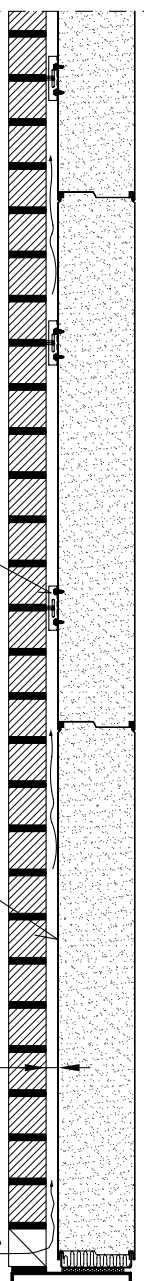
The fastening of the CA1SS2 to the surface sheet, and to the aluminum profile, must be dimensioned on a case-by-case basis. During dimensioning, as well as snow, ice and wind loads, account should be taken of the mass of the letter/object. When dimensioning and fastening the sandwich panel SPA element, account must be taken of any additional loads caused by objects to be attached.

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**Brick masonry, vertical and horizontal section**

		Contents of drawing Sandwich panel SPA, SPB W and SP2D W; external cladding Lateral support for brick wall	
Date	12.4.2010	Rev. date	
Drawn by	Ruukki	Rev.	
Scale	Building	SCHEMATIC DRAWING. OBJECT-SPECIFIC DIMENSIONING DEFINED BY STRUCTURAL DESIGNER.	File nr.
		Work nr.	Drw. nr. Rev.
			C6



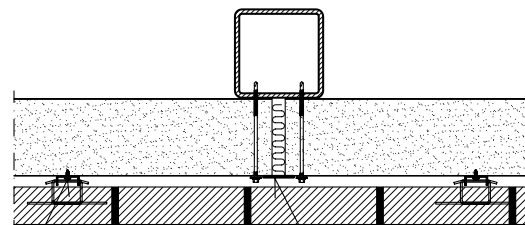
**Brick ties allowing vertical movement**  
 - at least 4 pcs/m<sup>2</sup>  
 - dimensioning on a case-by-case basis

**No brick ties on the bottom element**

**25...40**  
 - ventilation gap and tooling allowance

**Ventilation openings**  
 - ventilation cubes or open vertical joints

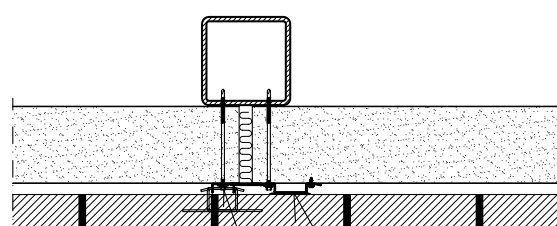
**Horizontal section**  
 - brick wall supported by sandwich panel only



**Butyl joint seal**

**Brick ties should be fixed with a minimum of 2 fasteners**  
 - type and number to be determined on a case-by-case basis

**Horizontal section**  
 - the brick wall has a support line along the pillar  
 - the brick wall is dimensioned continuously  
 - for short spans (< 3 m), underpinning into the sandwich panel is not recommended, except where supports are located



**The brick ties are fixed to the pillars with element screws**  
 - number of brick ties dimensioned according to wind suction load

**Stud CA1SS1 and mortar leveling**  
 - takes wind load  
 - support widths must be sufficient

- If the brick wall rests entirely on the sandwich panels, the maximum deflection value (L/400) must not be exceeded.  
 - Additional loads, due to the brick wall being fixed to the sandwich panels with brick ties, must always be checked against Ruukki's dimensioning instructions.

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• **Contact information**

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