

• Designing a Cladding Lamella facade 1/2

Basics

Before ordering lamellas project-specific plans should be made, considering the background structures, lamella frame structures, lamella installation direction, ventilation, thermal expansion and gaps as well as flashings and fastenings. The plans should be made by a structural design company familiar with facade planning or the structure planner of the building project.

Lamella installation drawings are made based on the facade drawings. The lamellas are identified with unique ID numbers. Lamella dimensions must match the architect's plan, which is complemented by detailed dimensions of the joints as well as details of any corner, window and door connections. Based on these plans the installer can report the lamella dimensions as the work progresses.

At the same time the location, number and fastening method of the lamella substructure should be specified. These are determined based on wind loads and lamella dimensions.

Joints

The vertical joints are usually left open and covered with vertical joint flashings. Depending on the lamella type, flashings can be installed either on top of the lamellas or under the lamellas. Vertical joints can also be done using lamella shaped joint pieces, which are installed under the lamella endings (not in Lamellas groove 10, 20 and 30). Lamella vertical 70 is an exception as it already has a standard vertical joint (5 mm).

The horizontal joints are distinct for each lamella type, excluding Lamella vertical 70, where sill flashing is used in horizontal joints.

Dimensioning

The width is always expressed as the manufacturing width excluding joints, the height as the effective height and the depth as the distance from the support stud surface to the exterior surface of the lamella. The exception to the rule is Lamella vertical 70, where the width is expressed using the manufacturing height and the height using the effective width (the lamella is only for vertical installation).

Fastening holes

The fastening holes are punched during lamella manufacturing for Lamellas sharp 40 and 45, smooth 50, lap 60, vertical 70, peak 90 and straight 100. The holes are oval, 5 x 10 mm in size. Standard fastening holes are made at the corners of the lamella, 15 mm from the lamella end. Additional holes are made automatically or according to customer specifications. If the customer does not specify the positions of the holes, additional holes are always made automatically as described below. The positions of the required additional holes depend on the width of the lamella. The positions of the holes are expressed in the following format:

Lamella width / 2; lamella width / 3, etc. where the divisor is a number indicating the number of equal-size parts the width should be divided into.

Standard fastening holes:

- Fastening only at the lamella corners; lamella width \leq 750 mm.
- Lamella width / 2; Fastening in the corners and in the middle, 751 - 1 500 mm.
- Lamella width / 3; Fastening in the corners and with 2 equally spaced fastener, 1 501 - 2 250 mm.
- Lamella width / 4; Fastening in the corners and with 3 equally spaced fastener, 2 251 - 3 000 mm.

• **Designing a Cladding Lamella facade 2/2**

Support studs

The lamellas are mostly fastened in steel sheet metal support studs by self-drilling screws. If the lamellas are very wide, additional center support studs (≤ 750 mm) are required. Levelness of the substructure for the entire width of a lamella is extremely important, so that fastening causes no deformation of the lamella surface.

All support studs used in lamella systems can be galvanized as they do not remain visible.

Dimensioning table for Support studs CA1SS1.
 The allowed spans at different loads,
 L = fixing distance, B = support stud distance, q = wind load.
 The loads are not multiplied by a safety factor.

L mm B m	q = 0.6 kN/m ²			q = 0.8 kN/m ²			q = 1.0 kN/m ²		
									
0.5	1240	1540	1565	1130	1400	1420	1050	1300	1320
0.7	1100	1380	1400	1010	1270	1270	935	1165	1165
0.9	1025	1270	1285	925	1150	1170	860	1070	1090

Bending limit $< l/150$, t min. = 1.2 mm

Starting fillets

In Lamellas groove 10 and 20, sharp 45, smooth 50, lap 60, peak 90 and straight 100 a separate starting fillet is needed. Length (width) of the starting fillet is same than the width of the lamella.

The starting fillet is visible in Lamellas groove 10 and 20. In Lamellas sharp 45, smooth 50, lap 60, peak 90 and straight 100 the starting fillet is only visible from directly below.

Ventilation

There must be an adequate ventilation space (min. 20 mm) between the lamella and the windshield, enabling an unobstructed air change. It must be ensured that there are slits to ensure free air change.

The lower edge of the lamellas has ventilation holes (not in Lamellas groove 10, 20 and 30, vertical 70 and peak 90), through which the water that has entered the structure through the joints or is caused by condensation can be removed. The ventilation holes are oval, 5 x 15 mm in size (in Lamella smooth 50 5 x 10 mm). The holes are prepared as described in the fastening hole instruction above, independent of the customer-specified fastening hole positions. The outermost holes are placed 60 mm from the lamella ends.

Corner lamellas

Two separate lamellas slanted at a 45 degree angle can be combined to make a corner lamella, which can be used for the external and internal corners of the building. These external and internal turns can be done with Lamellas groove 10, 20 and 30, sharp 40 and 45, lap 60, peak 90 and straight 100.

The maximum width for the corner lamellas is 3 000 mm. The corners are measured from the outermost point on the lamella. Corner lamellas are usually used with flashings designed for that purpose.

The possibility to produce other special lamellas must be determined case-specifically.

Facade flashings

The number of the flashings in a lamella facade can be decreased significantly through good planning. Typical applications include the corners of the building, window frames, etc. Flashings are typically designed to be covered by the lamellas to improve the esthetic quality of the facade. When planning the flashings the mounting method and shape of the basic lamella must be considered.

Fasteners

The fastenings related to the lamellas can be generally divided into three categories: fastening the support studs to the frame, fastening the lamellas to the support studs, and fastening the flashings.

The lamellas are usually fastened using self-drilling screws. Gasket screws are recommended for facade cladding (sizing according to the instructions by SFS intec, for example). The final type and number of fasteners for each purpose is always defined by the structural designer in charge.