

DESIGN MANUAL

LAMELLA COR-TEN 30

FACADE CLADDINGS



Energy-efficient steel solutions for better **LIVING. WORKING. MOVING.**

● 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 lamella 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.

Cor-Ten products can be delivered to the site pre-patinated. In this case, the patinated Cor-Ten steel surface is even-shaded and the majority of rust streaks have disappeared. Often, however, this alternative is ruled out by work schedule restrictions (the pre-patination takes at least six months). Installation is therefore usually performed using non-patinated products. In such cases the effect of initial surface blotchiness and rust on the building must be taken into consideration.

The risks involved in using Cor-Ten steel lie with possible prevention of the necessary alternate wetting and drying required for patination. Continuously wet surfaces will rust through. Building elements most open to risk include horizontal surfaces and surfaces which are positioned in too close proximity to each other. Horizontal surfaces easily accumulate rust through contact with run-off water. The moisture level beneath the resulting rust layer remains high, allowing rusting to continue unabated. Surfaces positioned in too close proximity to each other accumulate residual moisture in the narrow gap between the materials, thus leading to crevice corrosion.

Structures must be freely ventilated from all sides. Ventilation air channels must be at least 30 mm in depth. All Cor-Ten elements must be separated from each other and from other metal surfaces, for example with EPDM sealings to ensure sufficient ventilation.

Electrochemical incompatibility and the harmful effects of run-off water tend to perish unprotected materials used in conjunction with Cor-Ten steel. As a general rule, different types of metals may be used in conjunction with Cor-Ten steel. However, galvanised materials must not be used in direct contact with exposed Cor-Ten steel. Materials that are easily stained by run-off water and difficult to clean include e.g. concrete, plaster, unpainted galvanised steel, stone, wood and matt enamels. Materials which are more resistant to run-off water staining and are relatively easily cleaned include, e.g. semigloss or gloss enamel coatings, anodized or standard aluminium, stainless steel, neoprene, glass and ceramic tiles.

Structural elements which are not under direct exposure to weathering form a less even patina layer than elements exposed to regular wetting and drying. An uneven surface layer may also be formed in structures that are exposed to extreme local temperature differences or in structures where the flow of outdoor air onto different building elements is variable. The same also applies to continuously sheltered structural components such as steel surfaces located under eaves.

Key design principles for effective functioning of Cor-Ten surfaces:

- All horizontal surfaces should be tilted to facilitate water run-off.
- All Cor-Ten elements should be separated from each other and from other metal surfaces e.g. with EPDM sealings.
- All fastenings should be made of stainless steel and spacing pads positioned between all fastenings and Cor-Ten elements.
- Use of Cor-Ten steel should be avoided in the immediate vicinity of public walkways in order to eliminate rust streaking.
- The risk of rust streaking should be counterbalanced by using dark coloured and dirt repellent surrounding materials.
- Rust water must be channelled away in a controlled manner.
- Implementation of design solutions in practice must be ensured through work site supervision.

● Dimensioning

The lamella 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.

● Lamella joints

The vertical lamella joints are usually left open and covered with vertical joint flashings under the lamellas.

The base of the horizontal joint between the lamellas consists of the turned lamella flanges.

- **Fastening holes**

The fastening holes are punched during lamella manufacturing. The holes are round, with diameter 10 / 8 mm. A larger fastening hole is located on the upper edge of the lamella, just above a smaller fastening hole. The larger of the hole is used to fastening a lead-in rubber (Separating piece EPDM CA3SP814). 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 additional holes, the 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:

- Lamella width ≤ 750 mm;
fastening at the lamella corners.
- Lamella width 751 – 1 500 mm / 2;
fastening at the lamella corners and in the middle.
- Lamella width 1 501 – 2 250 mm / 3;
fastening at the lamella corners and in the middle with two equally spaced fastener.
- Lamella width 2 251 – 3 000 mm / 4;
fastening at the lamella corners and in the middle with three equally spaced fastener.

- **Support studs**

The lamellas are fastened in Cor-Ten steel sheet metal support studs by self-drilling screws. When the lamellas are over 750 mm wide, additional center support studs 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.

- **Special lamellas**

The possibility to produce 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.

The same basic rules must be taken into consideration in the design of flashings as in the design of the lamellas (intersections of the Cor-Ten parts).

- **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 must be fastened using self-drilling screws, which are manufactured of stainless steel. Also gasket screws are obligatory to use.

Sizing of the screws 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.

Fasteners can be painted to the same colour as patinated Cor-Ten. The final Cor-Ten colour can change, however, so choosing an exact colour match can be problematic.

- **Sealings**

Usually used sealing materials in connection with Cor-Ten steel are manufactured of EPDM rubber.

**Energy-efficient steel
solutions for better living,
working and moving.**



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