

PHOTOVOLTAIC OUTER SKIN

/ Cascade-fastened

The solution allows PV modules to be installed in cascades across the building façade. The PV modules are not arranged in a vertical plane, but tilted at a small angle from the building wall (the angle depends on the PV module height). The cascade arrangement is not only possible on vertical planes; this layout works well on slopes and horizontal surfaces.

THE SOLUTION CAN BE DEPLOYED AS FOLLOWS:

- Fastened to solid façades (walls)
- As window sunshades
- A double skin shell, installed on additional substructures (on façades or as cladding for technical equipment on rooftops)

The basic component of this solution is the system of no-frame glass-to-glass PV modules. The applied modules can be transparent, with the transparency ratio adjusted in terms of the PV cell size and layout (or spacing, more specifically), or they can be opaque (where the colour is produced with colour laminating films or tinted back panes). A major component, aside from the PV modules alone, are the cascade aluminium fastening holders. The holder finish can be customised according to the architect's design (by RAL powder coating or anodizing). The holders facilitate proper orientation of the PV modules against one another, and fasten the entire modular plane to the selected substructure.

The spacing and sizing of the holders is adapted to suit the selected PV module type and the required minimum load capacity, a parameter defined by the module sizes and

location (as affected by the wind load). The substructure grating can be built to any design that assures the required structural and strength parameters, based on concrete, aluminium, steel, or wood. Air gaps are maintained between the PV modules to facilitate ventilation for improved building operation costs and comfort.

Various glass unit sizes and thickness ratings can be installed on a single façade. The glass alone can be applied as an additional decorative element. The cascade layout is a great composition for entire façade surfaces or portions thereof to provide a striking accent here and there. The cascade fastening solutions are excellent for building a shading layer that reduces the heating needed for indoor spaces. The selectable transparency ratios enable installation on nurseries, playschools (kindergartens) or schools, where additional regulatory sun exposure requirements apply.

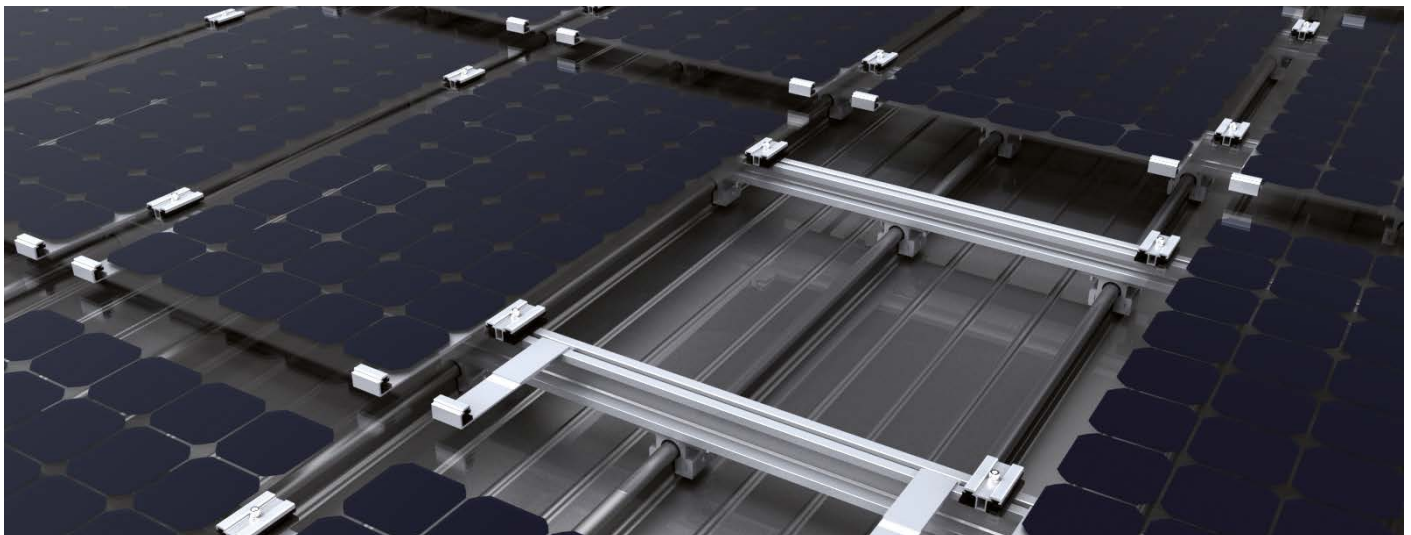
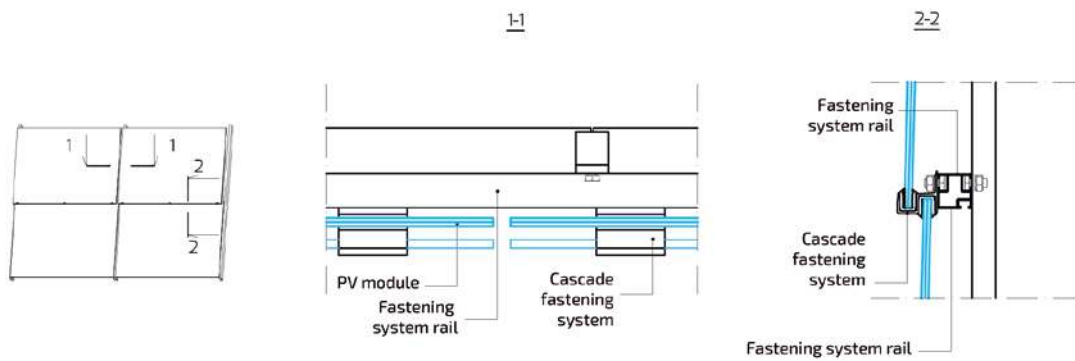
If there is a risk of the build up of icicles on the structural parts in winter, or when the solution is installed on horizontal substructures, you can combine the PV outer skin with the NoFrost snow-clearing system (to prevent snow settling and to ensure continuous power generation in winter).

In terms of electrical power generation ratings, this PV installation is very similar to ventilated façades or louvres, for example. The installed power per 1 m² of the façade system depends on the specific PV cells (i.e. efficiency, size and colour) and their alignment (cell spacing). The typical ratings range from 50 Wp/m² to 200 Wp/m².

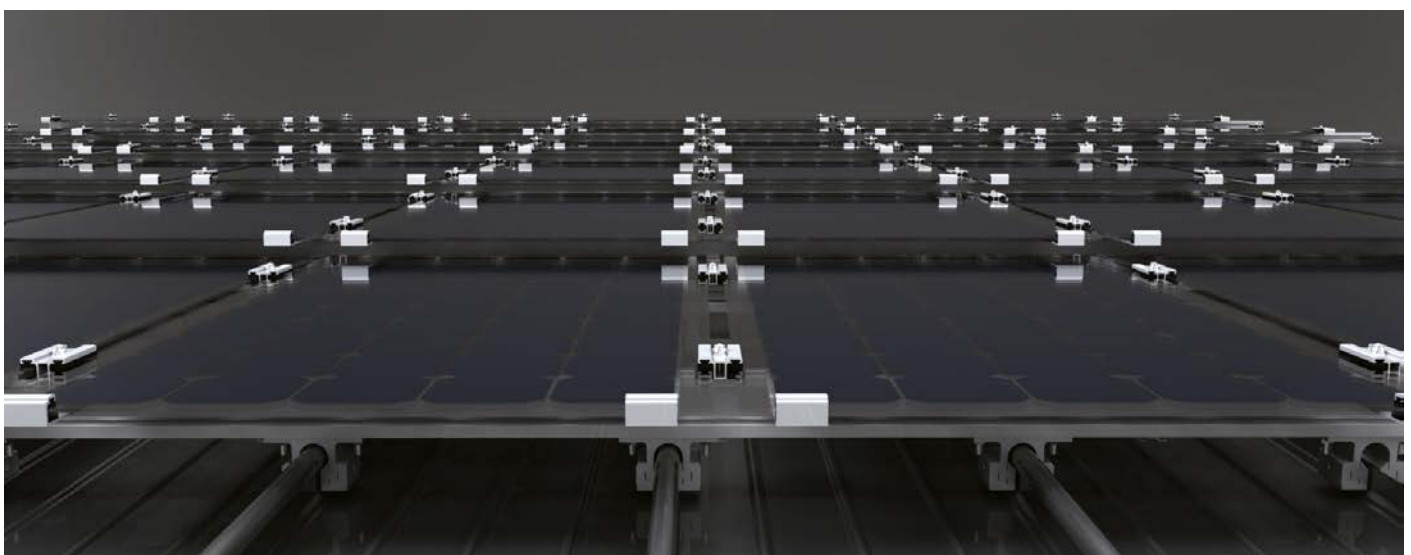
System technical specifications

Unit power	max. 200 Wp/m ²
PV cell efficiency	max. 22.5%
Max. operating voltage	1000 V DC
Module types	Monocrystalline, incl. back-contact Polycrystalline Thin layer
Optional	Transparent Printed

Substructure material	Aluminium / AW 6063 / AW 6060 alloy
Maximum module size	2500 x 1600 mm
Structure colour	See RAL palette
Module thickness	3 to 20 mm



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