



SOLAR STEEL SOLUTIONS

voestalpine SadeF nv
www.voestalpine.com/sadef

voestalpine
ONE STEP AHEAD.



CO-DESIGN AND PRODUCTION OF STEEL SOLUTIONS FOR SOLAR

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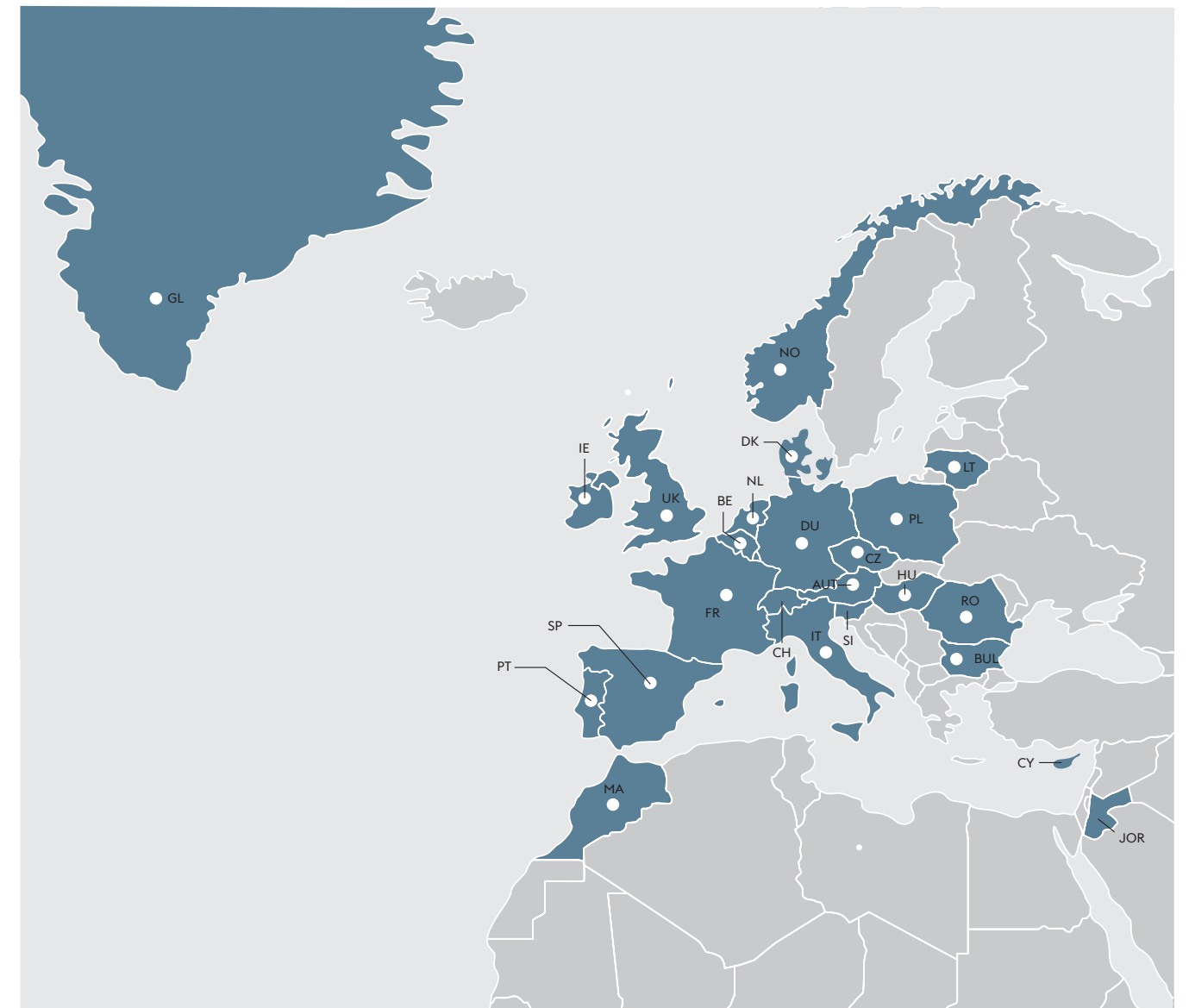
**IF YOU CAN DREAM IT,
WE CAN MAKE IT**



FACTS AND FIGURES

- » Subsidiary of the steel group voestalpine
- » Global and industrial supplier
- » Vertically integrated
- » 35 production lines at voestalpine Sadef
- » Over 75 years of experience in cold roll forming
- » Supply capacity over 10MW per week
- » Large range of custom made steel components and solutions
- » Own design office with over 20 structural engineers

> 5 GW OF SOLAR PROJECTS SUPPLIED



CO-DESIGN

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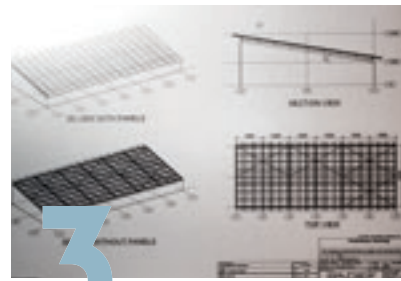
FROM DESIGN



1 Project data



2 Stability engineering



3 Optimisation of profile sections



4 Static calculation note



5 Prototype and customer approval



6 Final production data and assembly guidelines

TO PRODUCTION



7 In-line assembly features



8 Rollforming



9 Ready for shipping

DESIGN OF TAILOR-MADE COMPONENTS



PV MODULE SUPPORT



PV MODULE SUPPORT



RAMMING PILE



PURLIN



PV MODULE SUPPORT

FASTSLIDE SOLUTIONS

FASTSLIDE FOR GROUNDMOUNT



FASTSLIDE FOR CARPORTS



FASTSLIDE FOR ROOFTOPS



PATENTED SYSTEM

BENEFITS

- » Panel mounting up to 2 panels/minute
- » No clamps
- » Prevents micro-cracks
- » Smaller spacing between panels

FEATURES

- » Compatible with panel frame heights from 30 to 50 mm (depending on wind and snow loads)



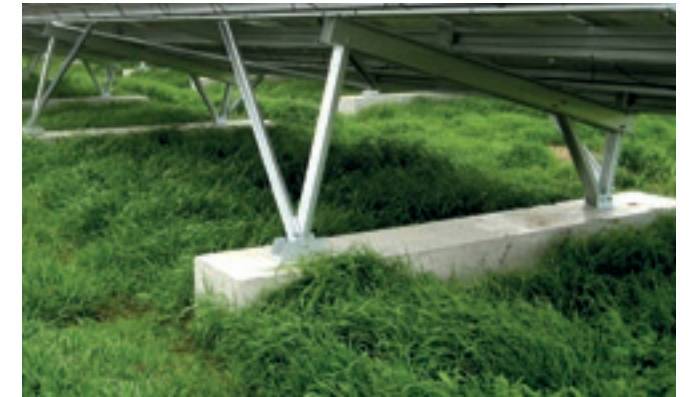
GROUND STRUCTURES

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RAMMED PILES

- » Recommended for stable soil
- » Installation of >250 piles/day per machine
- » Optimal accessibility for maintenance (central pile)
- » Limited number of components – no accessories
- » Most economical solution



CONCRETE FOUNDATIONS

- » Recommended for unstable soil (e.g. landfill, ...)
- » Whenever ramming is not possible
- » Adjustability after ground settlement
- » Poured concrete on site or pre-fabricated blocks



SCREWED PILES

- » Recommended for rocky soil
- » Suitable for landfill with limited penetration depth
- » Installation of >200 screws/day per machine



ANCHORED PILES

- » Recommended for unstable soil (e.g landfill)
- » Low penetration depth







CANOPY STRUCTURES

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FLEXPARK FIX
The standardised solution for small and medium sized carport projects.



FLEXPARK VARIABLE
The standardised solution for small and medium sized carport projects.



CARPORT TOTAL CONCEPT
The tailor-made concept for commercial and industrial parking areas.



CARPORT ROOF CONCEPT
A tailor-made roof concept compatible with all types of primary frames.

FLEXPARK FIX THE STANDARDISED SOLUTION

Advantages:

- » Easy access
- » No obstructive posts when opening doors
- » Quick, easy and efficient installation

Features:

- » Modular system
- » Parking space width: standard 2.5m.
On demand 2.4 and 2.6m (larger volumes)
- » Frame distance: every 2 car parking spaces
- » Clearance: 2.8m
- » Roof width: 5.4m
- » Compatible with all PV modules
- » Portrait and landscape



FLEXPARK VARIABLE THE STANDARDISED SOLUTION

Advantages:

- » Easy access
- » No obstructive posts when opening doors
- » Quick, easy and efficient installation

Features:

- » Modular system
- » Parking space width range: from 2.4 to 2.8m
- » Variable frame distance: every 2 or 3 parking spaces
- » Clearance: 2.8m
- » Roof width: 5.0m + optional overhang max 0.6m
- » Compatible with all PV modules
- » Portrait and landscape







ROOFTOP STRUCTURES

BALLASTED p.38

» FLEXROOF p.40

» PORTAL FRAME..... p.46

ANCHORED p.48



BALLASTED

The maximum acceptable load on the roof is determined by the building and its roof structure. Either we can ballast the portal frames or spread the load on the roof. This type of structure is the perfect system for installing modules on flat roofs without any need to penetrate the roof.

Flexroof

Flexroof is an innovative PV-structure, with a distributed ballast across the roof used for flat and slightly sloped roofs. The structure is based on wind tunnel tests and can be used for all panel dimensions, both in landscape and portrait.

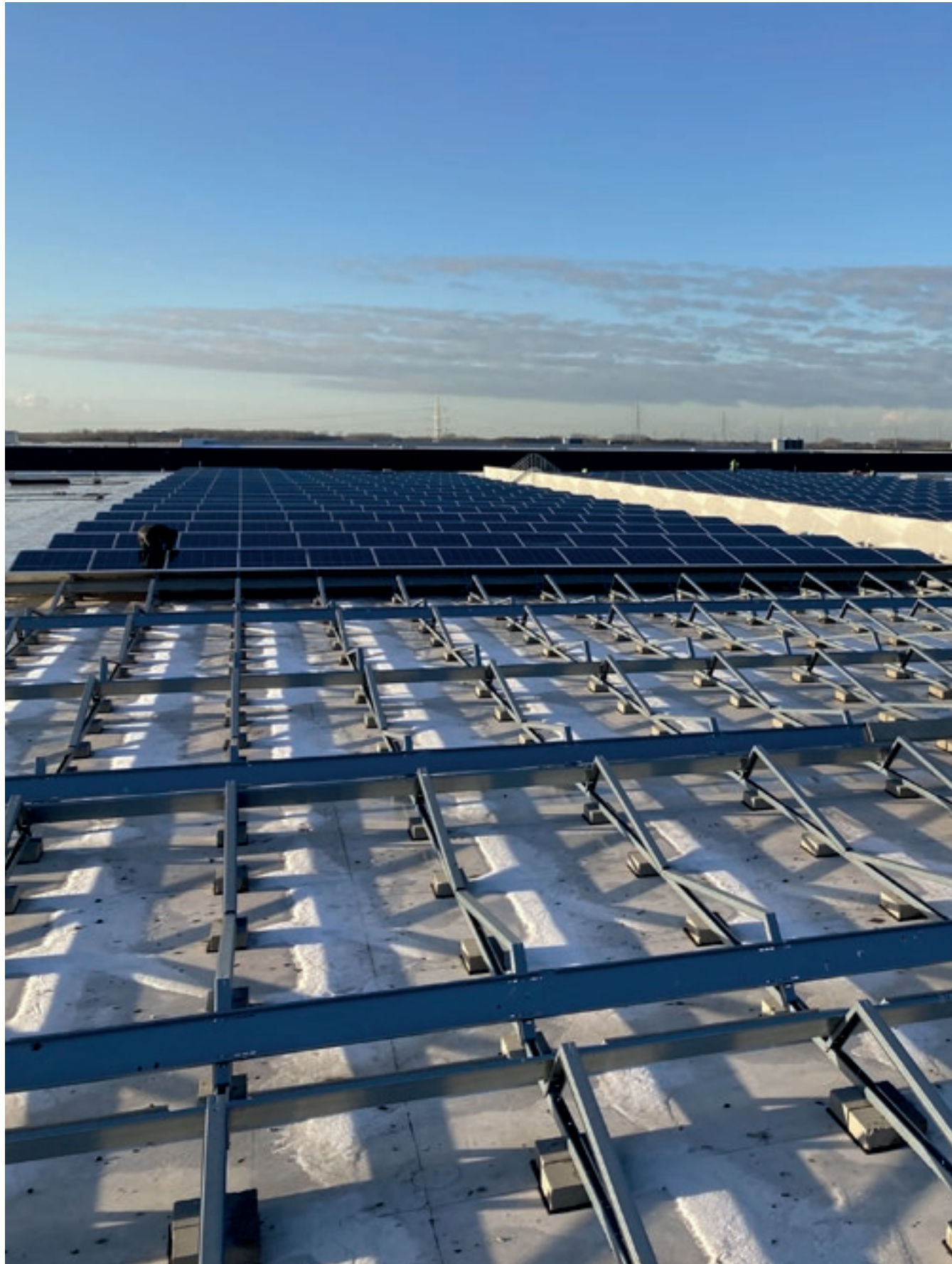
Portal frame

Industrial roofs with larger span distances combined with soft roof cladding have low load-bearing capacities. Using portal frames, the ballast for the PV-structure is positioned directly on the roof beams, being the strongest parts of the roof.



ANCHORED

When a conventional ballasted system is not possible, we can provide the solution by anchoring the structure directly to the portal frames with a limited number of penetrations.





FLEXROOF LANDSCAPE THE INNOVATIVE ROOFTOP STRUCTURE IN STEEL

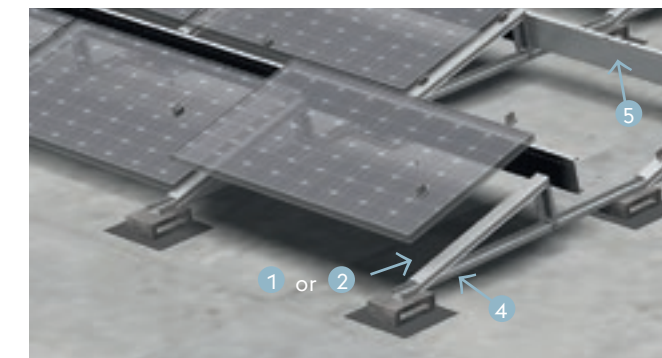
Advantages:

- » Modular and adjustable for large range of panels
- » One component fits for multiple row distances and tilts
- » Unobstructed roof drainage
- » Tailor-made solutions for large scale projects

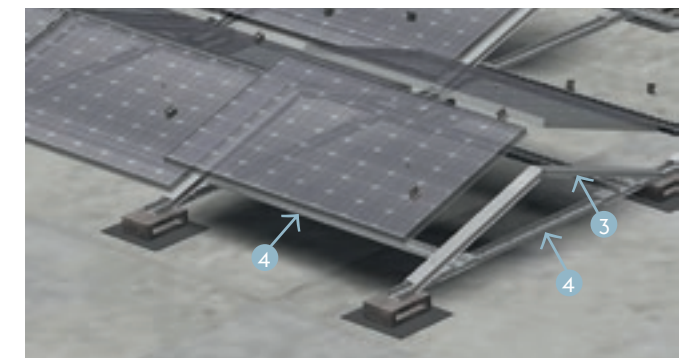
Features:

- » Quick and easy to install (Click-system)
- » Integrated thermal dillatation
- » Easy ground wiring
- » Pre-drilled concrete tiles: FastFoot
- » Calculation tool available for partners: iSolar
- » Integrated cable trays optional

SOUTH



EAST - WEST



STANDARD COMPONENTS

1 $\alpha < 15^\circ$



Triangle profile

2 $\alpha > 15^\circ$



Triangle profile

3 $\alpha: 11^\circ \text{ or } 16^\circ$



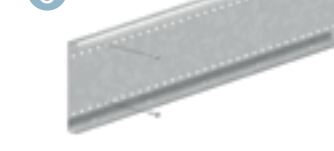
Triangle profile

4



Rail profile

5



Back profile



FLEXROOF PORTRAIT THE INNOVATIVE ROOFTOP STRUCTURE IN STEEL

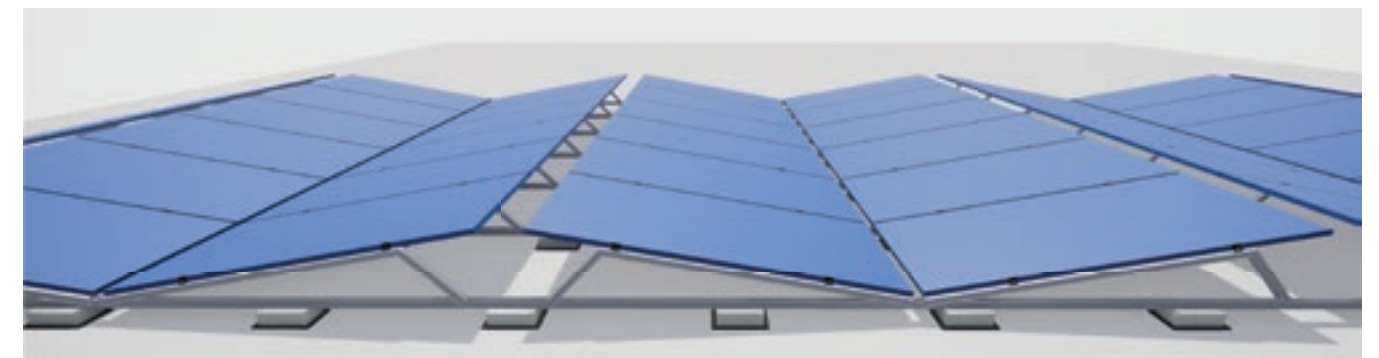
Advantages:

- » Modular and adjustable for large range of panels
- » Unobstructed roof drainage
- » Tailor-made solutions for large scale projects

Features:

- » Quick and easy to install (Click-system)
- » Integrated thermal dillatation
- » Easy ground wiring
- » Pre-drilled concrete tiles: FastFoot
- » Calculation tool available for partners: iSolar
- » Integrated cable trays optional

EAST - WEST



STANDARD COMPONENTS



Triangle profile portrait



Insert rail profile with
click connection



Back profile



FastFoot



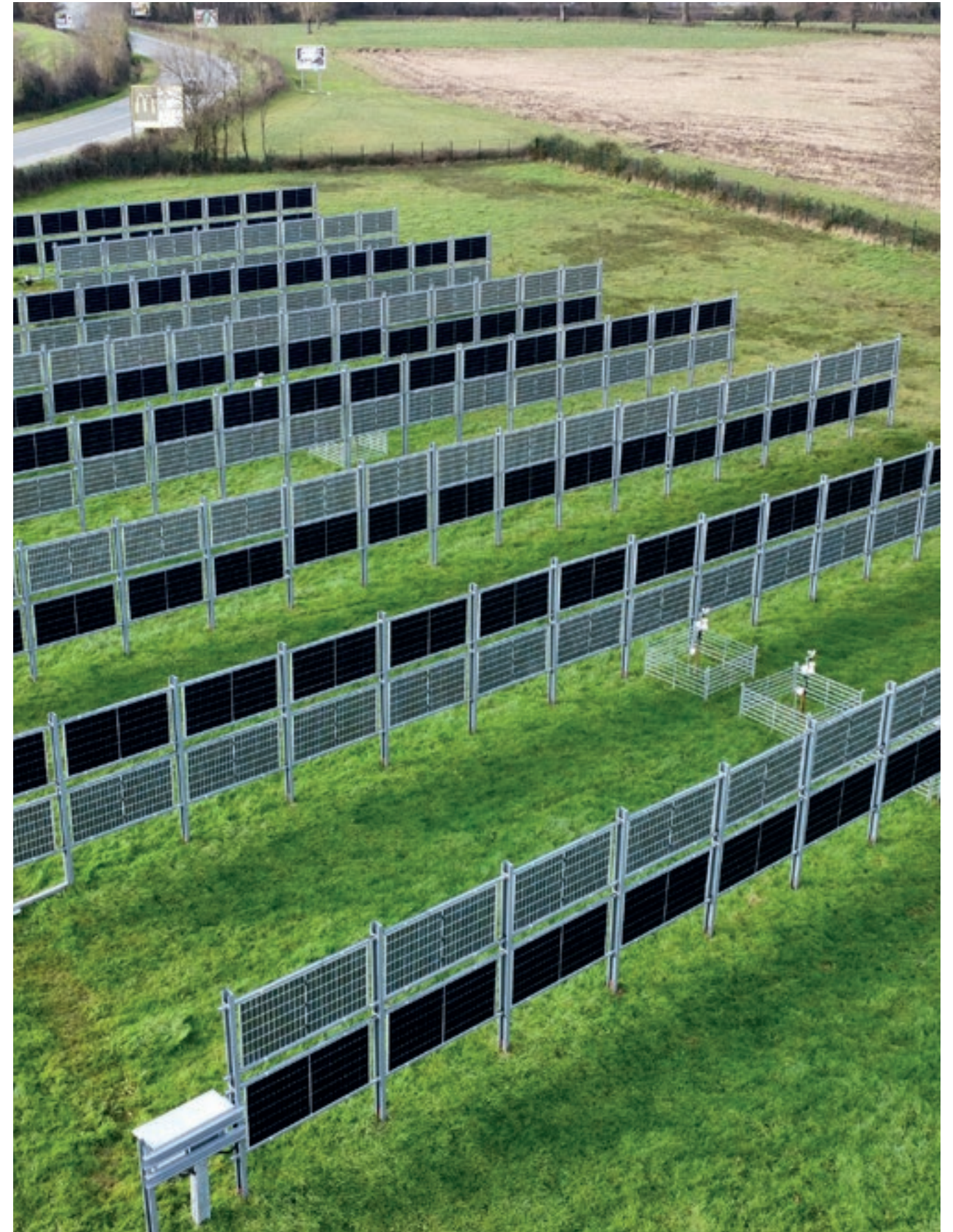
End profile



Click connector







SURFACE TREATMENTS

To protect steel against environmental influences, different surface treatments are available.

PRE-GALVANIZING (EN10.346)
(Continuous hot dip galvanized coil)

- » Galvanized before rollforming
- » Standard: Z275 (275 gr. zinc/m2 - average 19 µ zinc layer)
- » On request:
Zn-coatings up to Z1200 (average 80 µ)
ZnMg: ZM310 (average 25 µ) or ZM430 (average 35 µ)
or ZM800 (65 µ), ZM1000 (80 µ)



HOT DIP GALVANIZING (EN-ISO 1461)

- » After rollforming of the pickled material, profiles can be galvanized by dipping in a zinc bath
- » Minimum coating to EN-ISO 1461: see table below

AVERAGE MINIMUM COATING (EN-ISO 1461)	
Steel thickness	Mean coating thickness (minimum) µm
steel > 6 mm	85 µm
3 mm < steel ≤ 6 mm	70 µm
1,5 mm ≤ steel ≤ 3 mm	55 µm

DUPLEX POWDERCOATING

- » Applied after rollforming
- » Coating process: pre-galvanized or hot dip galvanized » powder coating
- » Polyester, epoxy or PU-coating
- » Electrostatic powdercoating in any RAL-colour
- » Colour and coating thickness to be specified

DUPLEX EPOXY-COAL TAR COATING

- » Applied after rollforming
- » Coating process: pre-galvanized or hot dip galvanized
- » Epoxy-coal tar coating



DURABILITY				
ENVIRONMENT CATEGORY	THICKNESS LOSS (AFTER FIRST YEAR OF EXPOSURE)		EXAMPLES OF TYPICAL ENVIRONMENTS IN A TEMPERATE CLIMATE (INFORMATIVE ONLY)	
	ZINC THICKNESS LOSS * µm	ZINC MAGNESIUM THICKNESS LOSS µm	EXTERIOR	INTERIOR
C2 low	0,1 to 0,7	< <0.4	Atmospheres with low level of pollution. Mostly rural areas.	Unheated buildings where condensation may occur, e.g. depots, sport halls.
C3 medium	0,7 to 2,1	<0.4	Urban and industrial atmospheres, moderate sulfur dioxide pollution. Coastal areas with low salinity.	Production rooms with high humidity and some air pollution, e.g. food-processing plants, laundries, breweries, dairies.
C4 high	2,1 to 4,2	<0.4	Industrial areas and coastal areas with moderate salinity.	Chemical plants, swimming pools, coastal ship- and boatyards.
C5-I very high (Industrial)	4,2 to 8,4	0.4	Industrial areas with high humidity and aggressive atmosphere.	Building or areas with almost permanent condensation and with high pollution.
C5-M very high (Marine)	4,2 to 8,4	tbd	Coastal and offshore areas with high salinity.	Buildings or areas with almost permanent condensation and with high pollution.

* Extract from EN-ISO 12944-2





SUSTAINABILITY

CHALLENGE

Climate change is one of the biggest challenges of our time. Together with our partners across the value chain, we are contributing to the transition and have set a goal of achieving net-zero carbon emissions in the metal forming division by 2035.

SAVE ENERGY & OPTIMIZE PROCESSES

Energy consumption and carbon emissions are directly related to one another. First, we focus on saving energy by rigorously improving production processes and making continuous investments in our infrastructure. Furthermore, we use, re-use, produce, and source green energy

CLOSED LOOP PRODUCTION

voestalpine SadeF steel profiles are of excellent quality and high durability and thus have a high lifetime, but when steel profiles are no longer in use, the scrap material can be endlessly recycled into green steel using renewable energy. voestalpine SadeF has been using green steel as raw material for several years and we intend to do so evermore the coming years. We strive for a fully closed production loop as we continue to improve and perfect every step of the steel making process.

ADVANTAGES OF SADEF SOLAR STRUCTURES

- » Own design and engineering offices
- » Pre-engineered – Ready for assembly
- » Own large manufacturing capacity
- » Project specific design
- » Limited number of components
- » High durability
- » Low maintenance cost
- » Over 15 years of experience in solar

QUALITY CONTROL



For further information on corrosion resistance, we refer to:
EN-ISO14713: Protection against corrosion of iron and steel structures. Zinc and aluminium coatings.
EN-ISO12944: Corrosion protection of steel structures by protective paint systems.
Specific requirements to be discussed case by case.

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