

SOLAR STEEL SOLUTIONS



CO-DESIGN AND PRODUCTION OF STEEL SOLUTIONS FOR SOLAR

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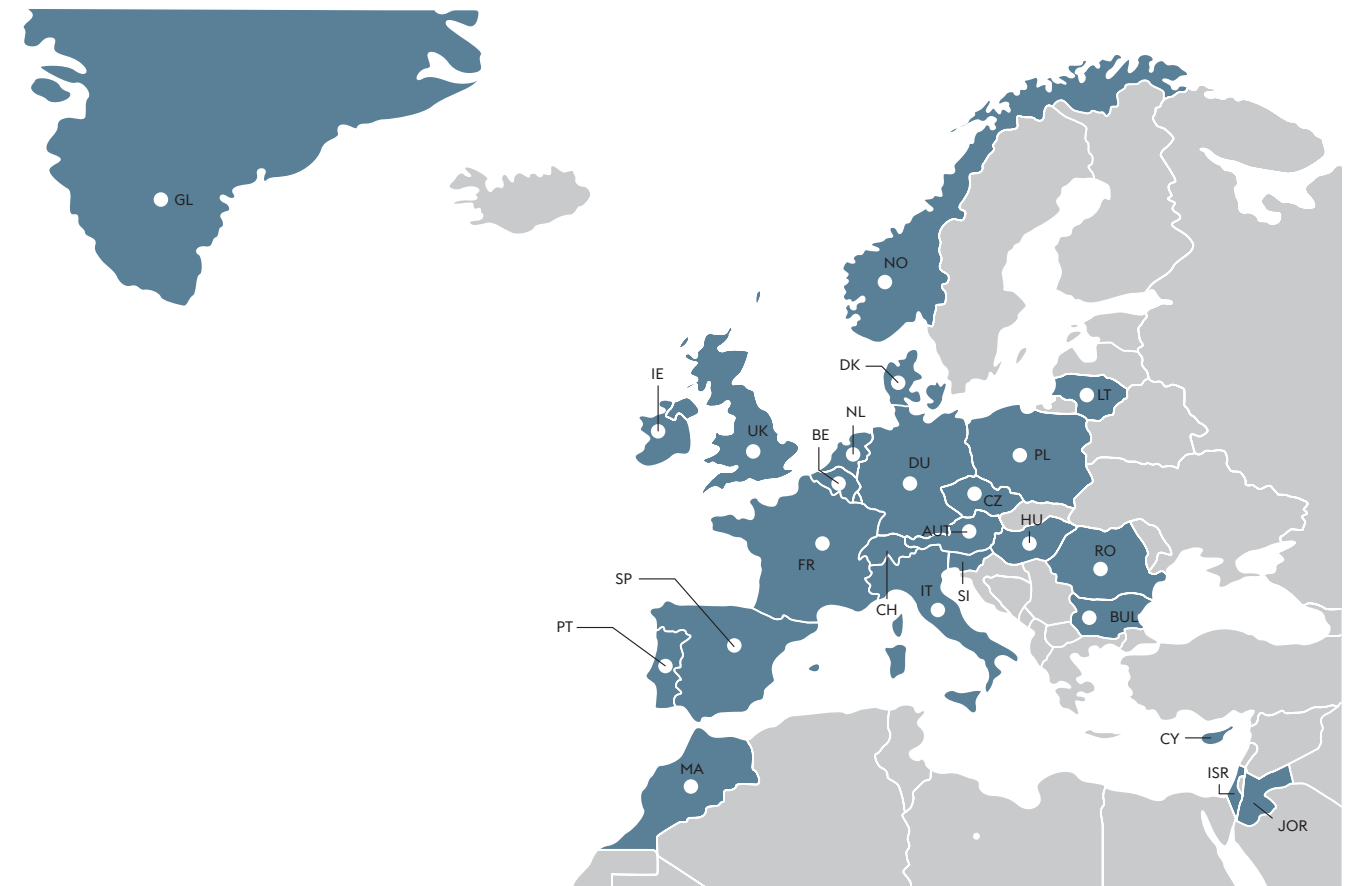
INTRODUCTION



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 >30 MW per week
- » Large range of custom made steel components and solutions
- » Own design offices with over 20 structural engineers

> 4 GW OF SOLAR PROJECTS SUPPLIED



CO-DESIGN

PROCESS FLOW p.10

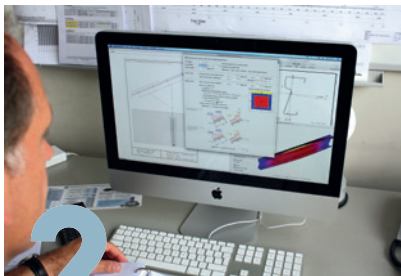
TAILOR-MADE COMPONENTS p.11

FASTSLIDE® SYSTEMS p.12

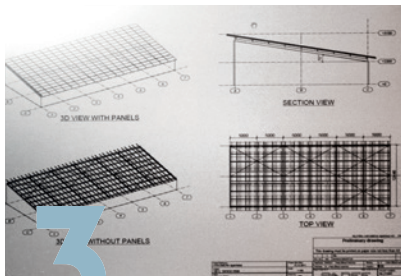
FROM DESIGN



1 Project data



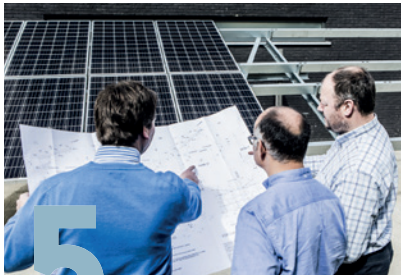
2 Stability engineering



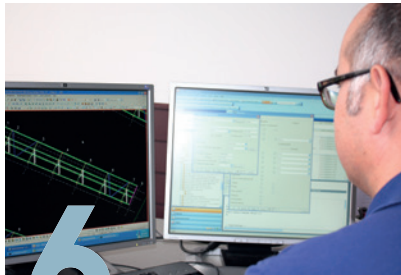
3 Optimisation of profile sections



4 Static calculation note



5 Prototype and customer approval



6 Final production data and assembly guidelines

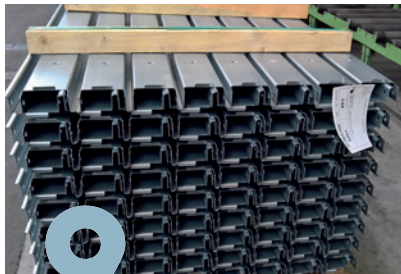
TO PRODUCTION



7 In-line assembly features

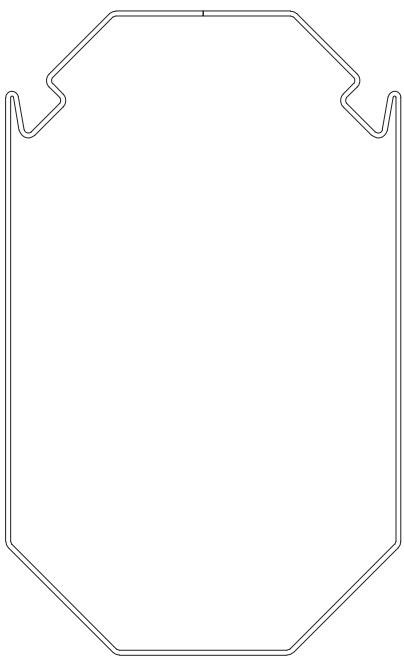
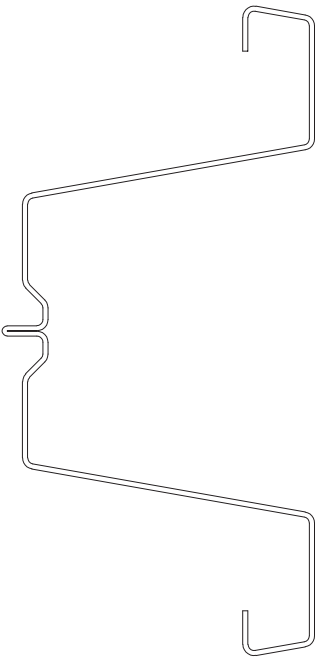
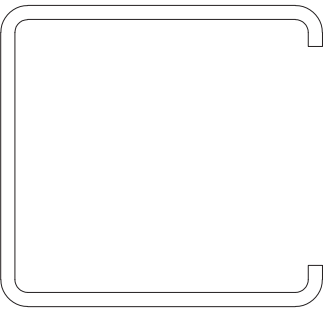


8 Rollforming



9 Ready for shipping

DESIGN OF TAILOR-MADE COMPONENTS



FASTSLIDE® SOLUTIONS

FASTSLIDE® FOR GROUND MOUNT



FASTSLIDE® FOR CARPORTS



FASTSLIDE® FOR ROOFTOPS



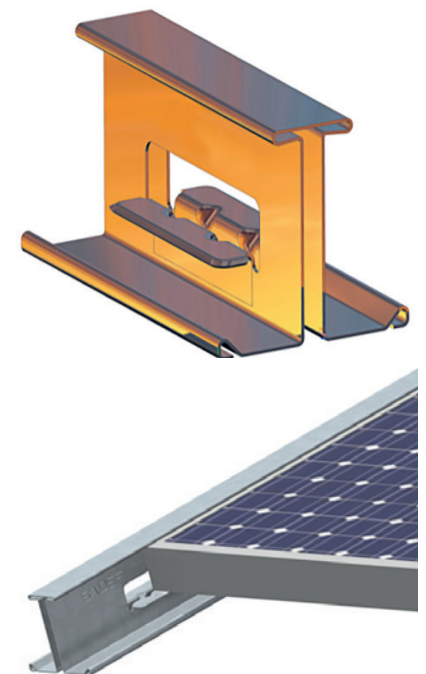
PATENTED SYSTEM

BENEFITS

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

FEATURES

- » Mainly for landscape configuration
- » Compatible with panel frame heights from 32 to 50 mm (depending on wind and snow loads)



GROUND STRUCTURES

RAMMED PILES	p.18
CONCRETE FOUNDATIONS	p.20
SCREWED PILES	p.22



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







CANOPY STRUCTURES

CARPORT TOTAL SOLUTIONS.....	p.28
CARPORT ROOF SOLUTIONS.....	p.30
FLEXPARK®.....	p.32



CARPORT TOTAL SOLUTIONS

The tailor-made solution for commercial and industrial parking areas.



CARPORT ROOF SOLUTIONS

The tailor-made roof system compatible with all types of primary frames.



FLEXPARK®

The standardised solution for small and medium sized carport projects.







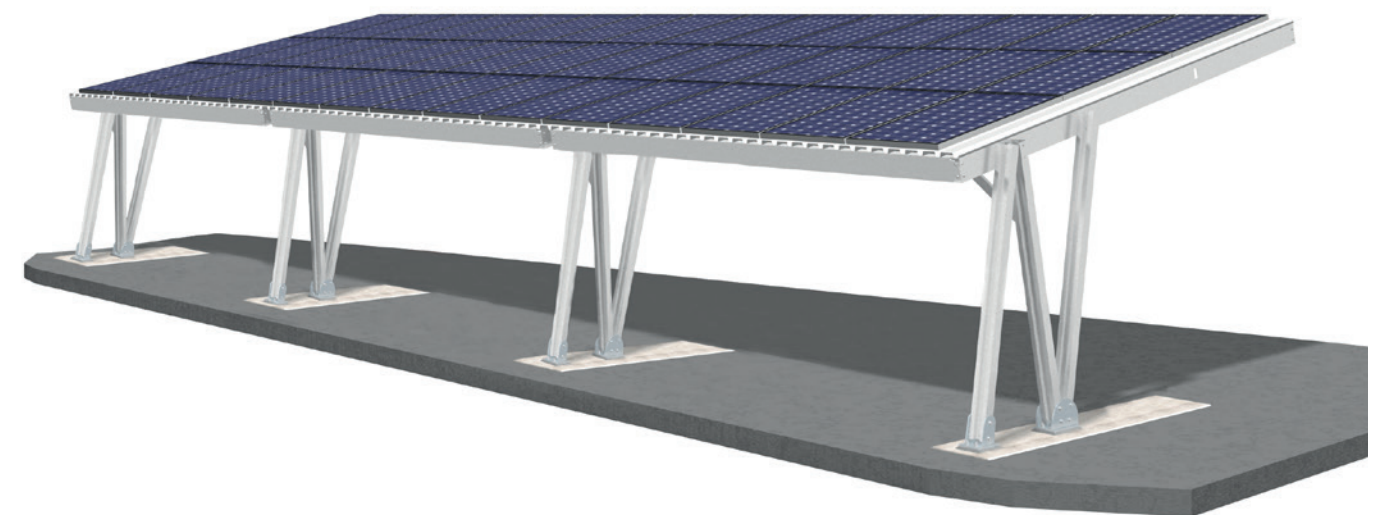
FLEXPARK® THE STANDARDISED SOLUTION

Advantages:

- » Modular extendable per 1 or 2 parking spaces
- » Pre-engineered – Ready for assembly
- » Short lead time
- » Fast assembly

Features:

- » All panel dimensions are possible
- » Panel fixing on steeldeck
- » Tilt 12°
- » Clearance: 2,1m
- » Mono / Double / Multiple
- » Powder coating optional
- » Distribution through system installer



ROOFTOP STRUCTURES

BALLASTED	p.38
VULCANISED	p.40
ANCHORED	p.42
FLEXROOF®	p.44



BALLASTED

The acceptable load on the existing roof building determines the type of 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.



VULCANISED

The vulcanised system solution makes it possible to fix a solar system onto the roof without extra ballast or perforations of the roof membrane.



ANCHORED

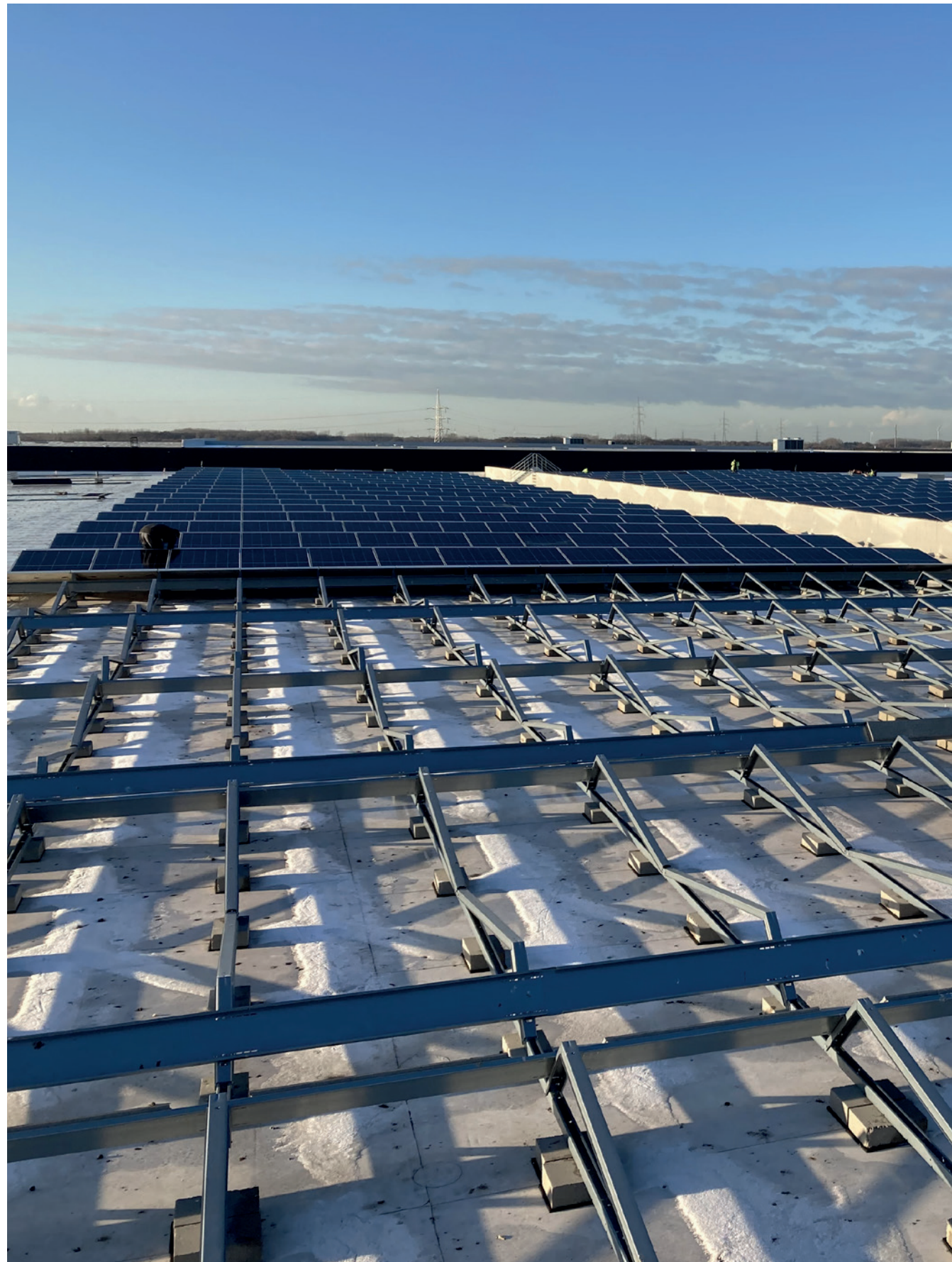
Industrial buildings often have a big span distance with a soft roof cladding and limited acceptable load. Here we need to anchor the structure to the portal frames with a limited number of perforations.



FLEXROOF 3.0

The innovative rooftop structure in steel

- » For flat and slightly sloped roofs
- » Limited thermal expansion
- » All panel dimensions
- » Based on wind tunnel tests









FLEXROOF 3.0 THE INNOVATIVE ROOFTOP STRUCTURE IN STEEL

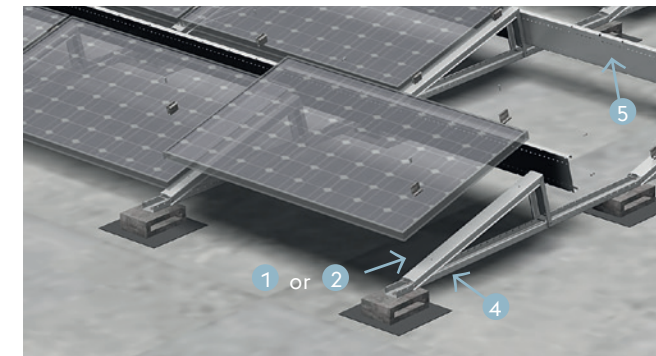
Advantages:

- » Adjustable tilt: stepwise from 5° to 30°
- » Perfect water and snow drain
- » Limited thermal expansion (compared to alu)
- » High corrosion resistance (metallic coated)
- » Cost effective

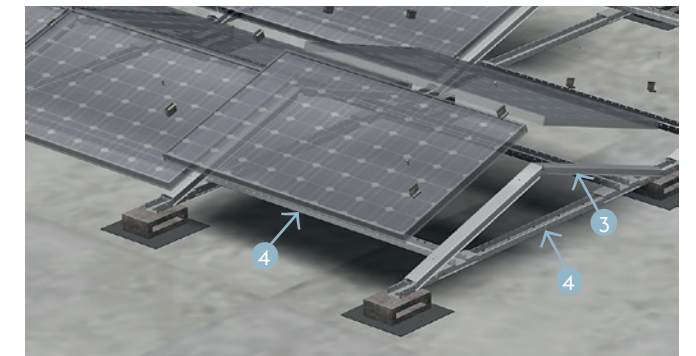
Features:

- » For flat and slightly pitched roofs
- » East/West installation possible
- » Very fast and easy assembly
- » All panel types and dimensions possible
- » Also approved for thin film panels
- » Design software available for system partners

SOUTH



EAST - WEST



STANDARD COMPONENTS

1 $\alpha < 15^\circ$



Triangle profile

2 $\alpha > 15^\circ$



Triangle profile

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



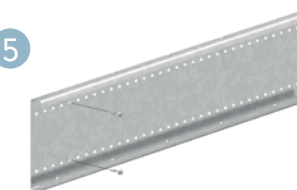
Triangle profile

4



Rail profile

5



Back profile



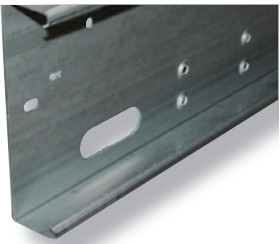
SUSTAINABLE SURFACE TREATMENT

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)



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



NEW DEVELOPMENTS

» FlexAgri Fruit



» FlexAgri Vertical



ADVANTAGES OF SADEF STEEL SOLUTIONS

- + Own design and engineering offices
- + Pre-engineered – Ready for assembly
- + Large manufacturing capacity
- + Project specific design (>500kW)
- + Limited number of components
- + Lifetime durability
- + Low maintenance cost

QUALITY CONTROL



ISO 14001
ISO 9001
ISO 1461
ISO 12944



EN 1090

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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ONE STEP AHEAD.